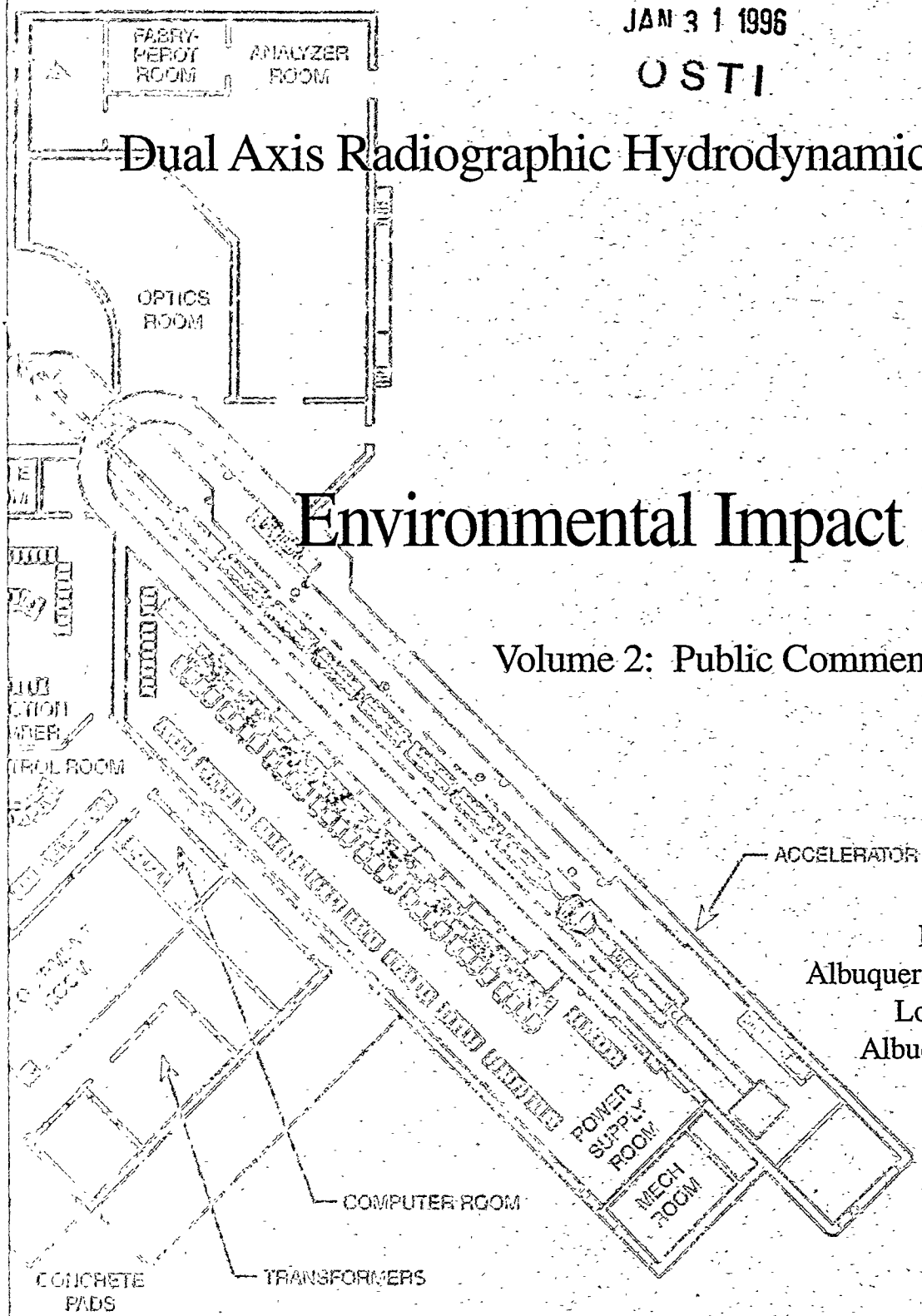
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DOE/EIS-0228-Vol.2

Dual Axis Radiographic Hydrodynamic Test Facility



Final Environmental Impact Statement

Volume 2: Public Comments and Responses

Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Albuquerque, New Mexico

August 1995

Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) is a research and technology development facility of the Department of Energy (DOE), operated under contract by the University of California.

DOE coordinates and administers the energy functions of the Federal government. Among other things, DOE is responsible for the nuclear weapons program, research and development of energy technologies, and basic science research.

The origin of DOE and LANL was the Army's Manhattan Engineer District formed in August 1942. Known as the Manhattan Project, this organization developed the original laboratory and production facilities, including LANL, that created the nuclear weapons used in World War II. In 1946 the Atomic Energy Commission (AEC) assumed these responsibilities. In 1974 part of the AEC functions were transferred to the Energy Research and Development Administration (ERDA); in 1977 the DOE was formed from ERDA and other organizations.

LANL was established in 1943 to provide research, design, and testing of nuclear weapons and nuclear materials. Along with Lawrence Livermore National Laboratory in Livermore, California, and Sandia National Laboratories headquartered in Albuquerque, New Mexico, LANL remains one of the three research laboratories in the DOE nuclear weapons complex.

Over the past 50 years, LANL's mission has expanded to include research in energy, materials science, nuclear safeguards and security, biomedical science, computational science, environmental protection and cleanup, and other basic science research. In addition to work done in support of DOE programs, LANL provides research and science services for other Federal agencies, universities, foreign countries, and private industry.

LANL is one of the largest multiprogram research laboratories in the world with an annual budget of about $1 billion and employs about 10,000 contractor and subcontractor personnel. LANL is located in north-central New Mexico and covers about 43 square miles of Federal land in Los Alamos and Santa Fe counties.

The DOE Assistant Secretary for Defense Programs is responsible for policy, planning, and managing the DOE nuclear weapons complex, including research, experiments, and technology development work for nuclear weapons. The DOE Los Alamos Area Office and its parent Albuquerque Operations Office provide oversight of LANL operations.

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Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Albuquerque, New Mexico

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Summary

SUMMARY

INTRODUCTION TO VOLUME 2

On May 12, 1995, the U.S. Department of Energy (DOE) issued the draft *Dual Axis Radiographic Hydrodynamic Test Facility Environmental Impact Statement* (DARHT EIS) for review by the State of New Mexico, Indian Tribes, local governments, other Federal agencies, and the general public. DOE invited comments on the accuracy and adequacy of the draft EIS and any other matters pertaining to their environmental reviews. The formal comment period ran for 45 days, to June 26, 1995, although DOE indicated that late comments would be considered to the extent possible.

As part of the public comment process, DOE held two public hearings in Los Alamos and Santa Fe, New Mexico, on May 31 and June 1, 1995. In addition, DOE made the draft classified supplement to the DARHT EIS available for review by appropriately cleared individuals with a need to know the classified information. Reviewers of the classified material included the State of New Mexico, the U.S. Environmental Protection Agency, the Department of Defense, and certain Indian Tribes.

Volume 2 of the final DARHT EIS contains three chapters. Chapter 1 includes a collective summary of the comments received and DOE's response. Chapter 2 contains the full text of the public comments on the draft DARHT EIS received by DOE. Chapter 3 contains DOE's responses to the public comments and an indication as to how the comments were considered in the final EIS.

METHODOLOGY

DOE considered all comments to evaluate the accuracy and adequacy of the draft EIS and to determine when EIS text needed to be corrected, clarified, or otherwise revised. DOE gave equal weight to spoken and written comments, to comments received at the public hearings, and to comments received in other ways. The comment period was not intended to solicit "votes" or "endorsements" regarding the proposed action or any alternative analyzed. Rather, comments were reviewed for content and relevance to the environmental analysis contained in the EIS.

Spoken comments presented at the public hearings were recorded by a court reporter and a verbatim transcript produced (see transcripts 1 through 4 in chapter 2 of this volume). The written comments and transcripts were reviewed and separate topics were identified. Most comment letters and transcript statements contained several topics. Each topic raised in a comment letter is addressed in chapter 3 of this volume. If a given topic was mentioned by several individuals, DOE's response to the topic is presented with the first comment that raised the subject and subsequent comments are cross-referenced back to that response. Accordingly, each comment topic is considered once, regardless of the number of times it was mentioned by different commentors. The responses also indicate whether or not the text of the EIS was corrected or revised because of the comment and, if so, which section of the EIS was revised.

Some commenters raised topics that are not pertinent to this environmental review. In those cases, DOE has attempted to answer the questions or address the concerns, but no change to the text of the EIS was

made. Some commenters indicated simply that they either agreed or disagreed with DOE's proposed action or certain aspects of the analysis; DOE acknowledged these comments but, as a rule, these did not lead to changes to the EIS text.

The DARHT EIS includes a classified supplement. The full response to some comments raised by the public may include information that has been classified as Secret Restricted Data or otherwise is not releasable to the public. The DARHT EIS classified supplement includes additional information that is pertinent to some responses and augments the unclassified responses to some comments. The classified supplement is available to appropriately cleared individuals with a need to know the classified information.

Chapter 1

Major Issues on the DARHT Draft EIS

CHAPTER 1
MAJOR ISSUES ON THE DARHT DRAFT EIS

The major issues associated with the comments received on the draft DARHT EIS are presented collectively in this section. This categorization of major issues represents significant topics directly related to the environmental consequences associated with the DARHT EIS. Each major topic raised through the comment process is summarized and followed by a generalized response to the comment. The major issues of the comments received involved the following topics:

- Containment of tests
- Hydrology issues
- Endangered species
- Health impacts
- Relationship of DARHT EIS to other DOE NEPA reviews
- Nuclear weapons policy issues

1.1 CONTAINMENT OF TESTS

A significant number of commenters focused on a concern that all or most tests should be conducted in containment to minimize the impact on the environment. The draft EIS states that open air testing would result in uranium discharges to surface water that would exceed maximum contamination levels. Considering this and potentially other impacts the commenters recommended that the enhanced containment option be adopted.

DOE has prepared a revised preferred alternative, which is the Phased Containment Option of the Enhanced Containment Alternative to address the concerns raised in this comment (section 3.7.2.3). Under the Phased Containment Option, containment for experiments at DARHT would be provided according to an incremental, phased plan. The containment would begin with containment of 5 percent of the material over the first 5-year period; 40 percent containment in the second 5-year period; and 75 percent containment over the subsequent 20-year period. Additionally, if justified by the development effort and operating experience, a vessel may be developed to contain a greater percentage of material. This approach has the advantage of allowing lessons learned in each phase to be incorporated in the next phase and provides for a lower overall cost as well as a lower initial expenditure for design and capital cost.

Although concentrations of depleted uranium released under the DARHT Baseline Alternative would be slightly above the proposed maximum containment level (MCL), the quality of the surface water entering the Rio Grande is forecast to remain well below the drinking water standards (section 5.2.4.1). Additional environmental protection would be provided by the Phased Containment Option.

1.2 HYDROLOGY

Commenters were concerned that the extent to which LANL operations have contributed to the contamination of the main aquifer is unknown. LANL and the State of New Mexico are working to determine any effects on the main aquifer underlying LANL. Commenters recommended that computer modeling be conducted to determine the potential for surface water and ground water contamination. The results for each alternative should be included in the final EIS.

Since 1991, advanced LANL techniques have been used to detect tritium at ultra-low levels and to determine whether recent water (a few decades old) has recharged the main (i.e., deep) aquifer in several locations at LANL. In all instances, main aquifer contamination is associated with a high tritium source concentration in a canyon bottom alluvial aquifer and with older wells into the main aquifer constructed with cable-tool drilling techniques and having questionable seals between well-bore and well-casing. In contrast, mesa top migration is relatively slow, and all indicators are that mesa-top facility locations offer significant, if not complete, isolation from the main aquifer.

LANL and the State of New Mexico are currently engaged in development of a ground water protection plan for LANL. As part of this plan, DOE has suggested that sitewide monitoring of the main aquifer be expanded and improved with the development of 23 new main aquifer wells and with the initiation of process-related research focused on developing a greater understanding of the existing examples of main aquifer contamination. Environmental surveillance data and long-term consequence modeling have shown that no significant soil contamination or water resource problem should arise from the development of any of the proposed options. Water resources and monitoring is discussed in section 4.4.

Computer modeling has been used in the DARHT EIS to determine the potential surface water and ground water contamination. Appendix D of the DARHT EIS describes the methods used to model impacts to water resources.

1.3 THREATENED AND ENDANGERED SPECIES

Commenters raised concerns that, prior to issuing the draft EIS, DOE had not received Section 7 Endangered Species Act concurrence from the U.S. Fish and Wildlife Service (USFWS) regarding DARHT's impact on threatened or endangered species. They were concerned that there was no information specifying the impact of each alternative on any threatened or endangered species. In particular, the presence of the Mexican spotted owl is of concern in the immediate vicinity of DARHT.

The draft EIS provided information related to potential impacts to known habitat for threatened or endangered species. The DARHT final EIS has been updated to reflect the recently discovered presence of the Mexican spotted owl (a federally listed threatened species) in the vicinity of the DARHT site, which was based on LANL field surveys completed after publication of the draft EIS (section 4.5.4). The DOE has conducted Section 7 consultation with the USFWS based on these new findings. Appropriate mitigative measures and operating restrictions will be implemented to mitigate any impacts to the Mexican spotted owl or the habitat. Appendix K of the DARHT final EIS describes the consultation process

between the DOE and the USFWS associated with the DARHT EIS. Appendix K also discusses the threatened, endangered, or sensitive species that could potentially inhabit the proposed area; addresses the mitigation measures to minimize potential impacts to those species; and summarizes the biological assessment prepared by DOE and LANL in July 1995. In a separate letter, the USFWS concurs with the DOE determination that the operation of the DARHT Facility would not be likely to adversely affect the Mexican spotted owl.

1.4 HEALTH IMPACTS

Commenters expressed concern about the potential for accidents involving plutonium and the effects of cleaning out the double-walled containment vessels used for dynamic experiments conducted with plutonium. Additionally, commenters questioned the demonstrated safety and reliability of the containment vessels.

DOE has prepared a classified supplement to the DARHT EIS that discusses potential accident scenarios involving dynamic experiments using plutonium. The unclassified environmental impacts from the classified supplement have been included in the appropriate sections of the unclassified DARHT EIS. Based on the analysis in the classified supplement, conducting dynamic experiments with plutonium would be expected to have minimal potential for environmental impacts under any of the alternatives analyzed. As noted in the EIS, any dynamic experiments that would incorporate plutonium would be conducted inside a double-walled vessel. DOE believes that vessel failure with a subsequent release to the environment is not a reasonable scenario.

Chapter 5 of the EIS addresses environmental impacts of DARHT operations. These evaluations reveal that no cancer deaths or other health impacts would be expected from any action at DARHT involving depleted uranium or other materials. As noted in the impact analysis there would be a very small possibility of up to 12 latent cancer fatalities in the event of an accidental breach of a double-walled vessel involving a dynamic experiment with plutonium. DOE believes that this type of accident would be extremely unlikely.

1.5 RELATIONSHIP TO OTHER NEPA DOCUMENTS

Commenters questioned the relationship of the DARHT EIS to other NEPA documents including the Stockpile Stewardship and Management (SS&M) Programmatic EIS (PEIS) and the LANL Sitewide EIS. Concerns of how DARHT would be used to support the SS&M mission and why the DARHT EIS is being completed before the Los Alamos Sitewide EIS were expressed.

The DARHT EIS notes that the actions needed to improve DOE's capability to conduct hydrodynamic tests are included within the stockpile stewardship mission defined by the President and Congress (section 2.2.2). The DOE proposal to provide enhanced high-resolution radiographic capability responds to Presidential and Congressional direction; DOE does not believe that its decisions regarding its need to acquire enhanced radiographic hydrodynamic test capability would prejudice its future decisions regarding stockpile stewardship and management.

The draft DARHT EIS was approved on May 1, 1995, and the EPA Notice of Availability was published on May 12, 1995 [60 FR 25717]. On June 14, 1995, DOE published its Notice of Intent to prepare a *Stockpile Stewardship and Management Programmatic EIS* [60 FR 31291]. The SS&M program is being developed to meet the future challenges involved in ensuring the safety and reliability of the stockpile. Three particular challenges must be met:

- Full support of the Nation's nuclear deterrent with safe and reliable nuclear weapons while transitioning to a more appropriate nuclear weapons complex
- Preservation of the core intellectual and technical competencies of the weapons laboratories
- Assurance that the activities needed to maintain the Nation's nuclear deterrent are consistent with its arms-control and nonproliferation objectives

The SS&M PEIS will assess the environmental impacts of alternatives for conducting the Stockpile Stewardship and Management Program. The ROD following the SS&M PEIS is expected to identify capabilities and facilities for the SS&M program and to determine the configuration (sites for future facilities) to implement the SS&M program. The transition to the future nuclear weapons complex is expected to include proposals for new experimental and computational facilities to perform the stockpile stewardship and management mission. However, as expressly noted in the Notice of Intent for the SS&M PEIS, DOE will continue with its ongoing hydrodynamic testing program and has proposed to provide an enhanced hydrodynamic test capability in the near term regardless of the decisions to be made following the SS&M PEIS.

Under NEPA regulations, while work on a required program environmental impact statement is in progress, a Federal agency may not undertake in the interim any major action covered by the program unless the action:

- Is justified independently of the program
- Is itself accompanied by an EIS
- Will not prejudice the ultimate decision on the program, including determining subsequent development of the program or limiting programmatic alternatives [40 CFR 1506.1 (c)]

DOE believes that any course of action selected after completion of the DARHT EIS would meet this standard. Chapter 2 of the EIS provides the technical justification for providing enhanced hydrodynamic testing capability. This conclusion has been supported by the President and Congress who have directed DOE to rely on hydrodynamic testing to ensure the safety, performance, and reliability of the stockpile in the absence of underground nuclear testing. This determination is unrelated to, and would not depend on, any other stockpile stewardship actions which may be proposed as part of the SS&M program. Under any course of action to be analyzed in the SS&M PEIS, DOE would still need to continue hydrodynamic testing and would still need to acquire enhanced radiographic capability.

Similarly, because enhanced hydrodynamic capability is needed in the near term regardless of the alternatives to be analyzed in the SS&M PEIS or the decisions that will result from the SS&M ROD, DOE believes that a decision to implement any of the alternatives analyzed in this DARHT EIS would not prejudice any ultimate decisions regarding the SS&M program. Hydrodynamic testing and dynamic experiments at LANL as an ongoing mission will continue in support of stockpile stewardship, and this

fact will be one of the baseline assumptions for the SS&M PEIS. The proposal contained in the DARHT EIS would not render more or less reasonable any of the alternative courses of action to be considered in the SS&M PEIS, nor would it affect any decisions expected from the SS&M ROD. DOE believes that the DARHT EIS adequately identifies and analyzes the proposed action and the reasonable alternative means to achieve it. Therefore, DOE believes that its proposal to acquire enhanced radiographic capability meets the regulatory requirements for interim actions, and that any actions decided upon in the DARHT ROD would not be limited pending completion of the SS&M PEIS.

The DARHT project is likewise a permissible interim action pending completion of the LANL Sitewide EIS. DOE's need for enhanced radiographic capability to conduct science-based stockpile stewardship as directed by the President and Congress provides the independent justification for the project. That capability can be provided by implementing any of the alternatives analyzed in the DARHT EIS without requiring additional new facilities or changes in operation for existing facilities at LANL, since radiographic hydrotesting is an ongoing mission for LANL. Thus, deciding whether and how to provide enhanced radiographic capability will not prejudice any decisions resulting from the LANL Sitewide EIS.

1.6 NUCLEAR WEAPONS POLICY ISSUES

Comments were received concerning the proliferation impacts of the DARHT Facility. The commenters expressed concerns that DARHT may adversely impact nonproliferation agreements and DARHT's use for counterproliferation purposes was not clearly defined.

DOE has revised the discussion in the DARHT EIS of nonproliferation and counterproliferation applications for enhanced radiographic hydrodynamic test capability (section 2.3.4 and 2.5). The Treaty on the Nonproliferation of Nuclear Weapons (1968) went into effect in March 1970 and was indefinitely extended in May 1995. The treaty is aimed at the cessation of the nuclear arms race and limiting the proliferation of nuclear weapons to nonnuclear states. The parties agree not to transfer nuclear weapons, other devices, or control over them, and to not assist, encourage, or induce nonnuclear states to acquire them. However, the treaty does not invoke stockpile reductions by nuclear states, and it does not address actions of nuclear states in maintaining their stockpiles. The concepts and capabilities of hydrodynamic testing have been well known to negotiating parties for the Nonproliferation Treaty, and the capability exists with several of the nuclear states. Thus, by developing an enhanced radiographic hydrodynamic test capability, the DARHT project does not introduce any new elements for the treaty parties. DARHT can be used to assess threats of foreign systems well in advance of an emergency.

Chapter 2
Public Comments

CHAPTER 2
PUBLIC COMMENTS

The Dual Axis Radiographic Hydrodynamic Test Facility Draft Environmental Impact Statement was published in May 1995 and the Notice of Availability was published on May 12, 1995, initiating the 45-day public comment period that ended on June 26, 1995. On May 31 and June 1, 1995, public hearings were held in Los Alamos and Santa Fe, New Mexico, and transcripts of these hearings were produced. Comments were received throughout the public comment period and, to accommodate as many respondents as possible, comments were accepted after the close of the comment period. The last comment was received on August 8, 1995.

COMMENT CATEGORIES

The comments are presented by category in the following order and are printed two original letter sheets per page.

- Federal Agencies
- Tribal Government
- State Government
- Municipal & Local Government
- Companies
- Organizations
- Private Citizens

The complete transcripts of the public hearings and their attachments are presented at the end of the individual comment letters.

COMMENT CODING SYSTEM

Comments are coded with a numeric code to indicate individual respondents and comment number. Written comments received through the comment period are coded **1** through **39** and **55**. Codes **40** through **54** indicate transcripts and transcript attachments (documents or letters of comment handed in as part of the transcript record). Numbers following a hyphen indicate the individual comments contained within each written comment, transcript, or transcript attachment. Examples of codes are:

- **1-2** refers to the 2nd comment from the letter coded **1**
- **40-17** refers to the 17th comment in the transcript coded "comment **40**"

Side bars in correspondence, transcripts, and attachments indicate the specific lines on which the numbered comments appeared. An index to the public comments as they appear in this document is presented on the following pages.

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2	U.S. Department of the Interior	PC-5
3	U.S. Environmental Protection Agency	PC-9
Tribal Government		
4	Pueblo of San Ildefonso	PC-10
5	Pueblo of San Ildefonso	PC-11
State Government		
6	New Mexico Energy, Minerals, and Natural Resources	PC-15
7	New Mexico Environment Department	PC-16
8	New Mexico Environment Dept, DOE Oversight Bureau	PC-18
Municipal & Local Government		
9	Los Alamos County Council	PC-23
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11	Carson Forest Watch	PC-24
12	Citizens for Alternatives to Radioactive Dumping	PC-25
13	Concerned Citizens for Nuclear Safety	PC-25
14	Concerned Citizens for Nuclear Safety	PC-39
15	Laboratory Retirees Group, Inc.	PC-43
16	Los Alamos County Chamber of Commerce	PC-44
17	Los Alamos Study Group	PC-44
18	Natural Resources Defense Council	PC-66
19	Republican Party of Los Alamos County	PC-72
20	Responsible Environmental Action League	PC-72
21	Responsible Environmental Action League	PC-75
22	Retired Public Employee Association of California, Chapter 97	PC-76
23	Western States Legal Foundation	PC-77
Private Citizens		
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25	Beery, Jerry	PC-100
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27	Chandler, Christine	PC-102

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30	Lockhart, Milton	PC-103
31	Mechels, Chris	PC-105
32	Morgan, Marion	PC-105
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34	Porterfield, Donivan	PC-107
35	Riseley, Mary	PC-108
36	Sander, Robert	PC-108
37	Switlik, Clement	PC-109
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39	Wikstrom, Chrysa	PC-110
55*	Davis, John	PC-111

Hearing Transcripts and Attachments

40	Hearing Transcript – Los Alamos Afternoon Session	Part 1 Divider
41	Transcript attachment – Sidney Singer	TA1-1
42	Transcript attachment – M.G. Lockhart	TA1-2
43	Transcript attachment – Louis Rosen	TA1-2
44	Hearing Transcript – Los Alamos Evening Session	Part 2 Divider
45	Hearing Transcript – Santa Fe Afternoon Session	Part 3 Divider
46	Transcript attachment – Pat Wolff	TA3-1
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48	Transcript attachment – Milton Lockhart	TA3-3
49	Transcript attachment – Maurice Weisberg	TA3-4
50	Transcript attachment – Greg Mello	TA3-5
51	Transcript attachment – Greg Mello	TA3-12
52	Transcript attachment – Greg Mello	TA3-21
53	Hearing Transcript – Santa Fe Evening Session	Part 4 Divider
54	Transcript attachment – Greg Cunningham	TA4-1

* This number appears out of sequence because the comment letter was received on August 8, after the comment number sequence was finalized.

The follwing people provided oral comments at the public hearings.

Los Alamos Afternoon Session

Jerry Beery
Ed Grothus
Milton Lockhart
Jas Mercer-Smith
Marion Morgan, Democratic Party of Los Alamos County
Morrie Pongrantz, Los Alamos County Council
Louie Rosen
Steven Shankland, Los Alamos Monitor
Sidney Singer, REAL (written comment submitted by Milton Lockhart)
Barb Stine
Tom Switlik
Doug Venable
Scott Watson
Diana Webb
Ginger Welch
Don Wolkerstorfer

Los Alamos Evening Session

Mike Barr
Richard Browning
Mike Burns
Christine Chandler
George Chandler
Anita McCorkle
Melvin McCorkle
Jas Mercer-Smith
Linda Mulka
Morrie Pongrantz
Barb Stine
Tom Switlik
Dave Thompson
John Ussery
Harry Watanabe
Scott Watson
Diana Webb

Santa Fe Afternoon Session

Helen Corneli
Bob Day
Richard Deyo
Marilyn Huff
Milton Lockhart
Greg Mello, Los Alamos Study Group
Jas Mercer-Smith
Peggy Prince
John Stroud, Los Alamos Study Group (?)
Archie Velarde
Diana Webb
Maurice Weisberg
Pat Wolff, Quiet room transcipts

Santa Fe Evening Session

Ken Bower
Christine Chandler
George Chandler
Jay Coghlan, Concerned Citizens for Nuclear Safety
Kip Corneli
Greg Cunningham
Bob Day
Susan Hirshberg, Concerned Citizens for Nuclear Safety
Daniel Kerlinsky, New Mexico Physicians for Social Responsibility
Milton Lockhart
John Lyles
Melvin McCorkle
Chris Mechels
Jas Mercer-Smith
Mary Riseley, Los Alamos Study Group
T.J. Trapp
Scott Watson
Diana Webb
Elizabeth West

Comment 1, page 1

ASSISTANT TO THE SECRETARY OF DEFENSE
3050 DEFENSE PENTAGON
WASHINGTON, DC 20301-3050

ATOMIC ENERGY

JUL 6 1995

Ms Carol M. Borgstrom
Director
Office of NEPA Policy and Assistance
Department of Energy
Washington D.C 20585

Dear Ms Borgstrom:

Thank you for the opportunity to review the Department of Energy's Draft "Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility Environmental Impact Statement (EIS)" (DOE/EIS-0228D). The Department of Defense considers DARHT to be a critically important facility for DOE's Science-Based Stockpile Stewardship (SBSS) Program and is on record supporting the DARHT facility. I have no comments on the Draft EIS at this time, but I would like to commend your efforts to complete the EIS process and to proceed with DARHT. 1

Harold P. Smith, Jr.

EH-25, received on JUL 17 1995

Comment 2, page 1

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

JUL 28 1995

In Reply To:
ER 95/368

Ms. Carol M. Borgstorm, Director
Office of NEPA Policy and Assistance (EH-42)
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Ms. Borgstorm:

The Department of the Interior has reviewed the draft environmental impact statement for the Dual Axis Radiological Hydrodynamic Test Facility (DARHT), Los Alamos National Laboratory, Los Alamos County, New Mexico. Our comments on the draft statement are enclosed with this letter.

We note in our comments that a significant amount of information concerning project description, impacts and mitigation cannot be found in the draft statement. While it would be best to prepare a revised draft statement containing the missing information, an extension of time beyond thirty days to review the final statement and resolve outstanding issues in meetings appears to be in order.

The opportunity to review the document is appreciated.

Sincerely,

Terrence N. Martin

for Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

Enclosure

EH-25, received on AUG 01 1995

Comment 2, page 2

Enclosure
ER 95/368

General

The draft statement indicates a series of environmental reviews were conducted for the DARHT project between 1982 and 1989, and construction of the DARHT project was completed in 1990. This Department has no record of receipt of any environmental documents prepared for this facility during the period 1982-1989. 1 It is unclear why this Department was not given the opportunity to review and provide comments on these documents. Copies of these documents should be provided to our U.S. Fish and Wildlife Service (Service) at 2105 Osuna Road NE, Albuquerque, New Mexico 87113. Further, construction of the facility should have been delayed until compliance with provisions of the National Environmental Policy Act (NEPA) had been completed.

The draft statement does not adequately discuss or analyze the overall impacts of this project on fish and wildlife resources. We believe it fails to inform decision-makers of potential impacts associated with the construction and operation of the proposed facility. The final statement should provide this information.

Specific Comments

Chapter 2.3.2, Purpose and Need, Need for Enhanced Radiographic Capability, Evaluating Aging Weapons, pages 2-6 through 2-8. The Department of Energy (DOE) estimates that it will take several years to "baseline" each weapons system expected to remain in the nuclear weapons stockpile. 2 The final statement should indicate whether this baseline research will be conducted entirely at DARHT, the number and descriptions of systems tests, and how long this research is expected to continue.

Chapter 3.3, Proposed Action and Alternatives, Considerations Common to All Alternatives, pages 3-2 through 3-13. This section discusses aspects of the program that would not change, regardless of which alternative is implemented. Table 3-1 within this section provides a list of technology, facilities, and structures necessary to support the tests. No information is provided to indicate whether the structures and facilities referenced are existing or proposed; nor, is there information regarding the provision of utilities and communication facilities 3 to the structures. While the draft statement discusses an exclusion fence (page 5-26), there is no mention of the fence in the paragraphs discussing project infrastructure. The final statement should provide information regarding all structures and facilities proposed for construction, and discuss the requirements for power, water, safety and communication facilities.

Comment 2, page 3

Pager 2

Chapter 3.3.5, Radiographic Support Laboratory (RSL), page 3-9. Construction of the RSL was completed in 1990. It is inclear whether records of consultation and/or NEPA compliance is 4 available for this facility. The final statement should include discussions of significant impacts as a result of the construction and operation of this facility and the methods used to mitigate those impacts.

Chapter 3.3.7, Development of Operating Procedures, page 3-11. Operating procedures, including emergency response, may have specific impacts to species of concern to our Service. The final statement should either be modified to fully discuss such 5 procedures and their potential for impacts on federally-protected species, or a commitment should be made in the text to discuss such procedures with our Service.

Chapter 3.5, Preferred Alternative, pages 3-15 through 3-21. Under the preferred alternative, DOE would complete both axes of the DARHT and use the facility to conduct tests on the safety, performance, and reliability of existing weapons. Detonations of high explosive charges, between 150 and 500 pounds (lbs), would be conducted in the vicinity of the dual axis firing point. On page 3-20 the draft statement indicates for higher charges (up to 500 lbs) a ". . .temporary expendable blast shield would be constructed to mitigate blast effects." While Section 3.7 of the draft statement (pages 3-25 through 3-28), regarding the Enhanced Containment Alternative, discusses use of single-walled vessels and a separate recycling facility to recycle containment vessels after each use, the Preferred Alternative section contains no such discussion of blast containment. In addition, page 3-20 indicates a sharply focused x-ray beam having a "much stronger x-ray dose" than used in other facilities would be used in tests. Also discussed on page 3-20, is an "electron beam" that could be used during a second mode of operation for the DARHT facility. While use of shields during high level testing and beam-tuning operations prior to actual tests are discussed (page 3-21), very little discussion is provided regarding protection of adjacent areas during tests. It is assumed that unless blasts are high level (up to 500 lbs.), they will be conducted in an open space scenario with no blast shield, and blast debris will not be collected for disposal.

Resources of critical environmental concern are located in the immediate vicinity of the DARHT facility. The final statement 6 should be modified to include discussions of potential for impacts from escaped beams or flying fragments of bombs or test materials. Methods to avoid, minimize, and mitigate significant impacts should be proposed for review.

Comment 2, page 4

Page 3

Chapter 3.11, Comparison of Alternatives, page 3-41. Table 3.3 in this section provides a summary of potential environmental impacts of the proposed alternatives. While earlier portions of the draft statement include such statements as, "Previous DARHT facility construction activities through 1994 account for the clearing of 14,000 board feet of lumber."; "This plant community within the 8 ac (2.3 ha) associated with DARHT facility has been altered due to construction."; and, "Any reptile, amphibian, bird, and large mammal populations have been displaced by these activities." (page 3-11); Table 3.3 indicates that no habitat reduction would occur as a result of the Preferred Alternative. The final statement should address these inconsistencies.

7

The attempt of the draft statement to separate impacts caused by the construction of a Federal facility built without first having met all its obligations under NEPA from those impacts that would be caused by the project after environmental compliance has been met, is inappropriate. Table 3.3 should be corrected to illustrate the acreage and types of habitat impacted by direct and *indirect* impacts from the construction and operation of the DARHT facility. Indirect impacts would include impacts occurring downwind, down gradient, and down slope of the DARHT facility as a result of noise, erosion, sedimentation, and contamination with hazardous chemicals or materials.

8

9

Chapter 4.1.1, Affected Environment, Land Resources, Land Use, Page 4-3. This section contains the first mention of "exclusion zones," designated as areas having restrictions to "ensure compatibility in the firing site." Figure 4.3 (page 4-5) illustrates the exclusion zone designated for the Pulsed High Energy Radiation Machine Emitting X-Rays Firing Site. The final statement should provide some information on *why* exclusion zones are necessary, and whether an exclusion zone is or will be necessary for the DARHT facility.

10

Chapter 4.5.4, Biotic Resources, Threatened and Endangered Species, pages 4-43 through 4-46. This section contains Table 4-12, which lists plant and animal species that are federally listed and candidates for listing. The draft statement has omitted several species from the list provided by our Service separately on January 23, 1995. Concurrent review of the biological assessment prepared for the DARHT facility uncovers multiple omissions and incorrect status listings for several species. A detailed review of this document is forthcoming from our Service's Ecological Services State Office in New Mexico. However, it is interesting to note that the biological assessment appears to have been conducted after publication of the draft statement, as evidenced by statements

11

Comment 2, page 5

Page 4

that contradict determinations made in the draft statement (page 7-B). Both documents should be modified to include discussions of the potential for occurrence and impacts to all listed and candidate species.

11

Review of data related to the American peregrine falcon indicate that three areas of suitable habitat for this endangered species are located at the DARHT. Discussion should be provided regarding the potential for impacts to this species and formal consultation initiated, if necessary.

12

No discussion is given regarding habitat located in the canyon below the DARHT facility construction site. Impacts to the Mexican spotted owl are of particular concern to the Service. Recent data supplied by Los Alamos National Laboratories confirm the presence of a pair of Mexican spotted owls in the canyon below the construction site during May 1995. In addition to the species provided in the January 23, 1995, species list, potential for occurrence of the southwestern willow flycatcher (*Empidonax traillii extimus*) should be investigated if suitable habitat is available. Surveys for the Jemez Mountains salamander should be conducted and mitigation prescribed if impacts are expected.

13

12

The final statement must adequately assess potential impacts to federally-listed species and other resources of concern. Measures should be developed and discussed in the final statement that will avoid or minimize potential impacts to these species.

In addition, we recommend that informal consultation for the American peregrine falcon and southwestern willow flycatcher be initiated to determine whether formal consultation is necessary for these species.

12

Chapter 5.2.1, Environmental Consequences, Preferred Alternative, Land Resources, pages 5-19 through 5-32. Hazardous and radioactive contaminants could be released during operations of the facility or in the event of an accident. We recommend computer modelling be conducted to determine potential for air, surface water, and groundwater contamination. The results of such modelling should be included for each alternative provided in the final statement.

14

Impacts to fish and wildlife caused by flying fragments, contamination, and blast effects should be discussed. Thorough discussions of the potential impacts from tests of varying blast strengths should be provided. Such discussions should include size, velocity and expected travelling distance of fragments, intensity of blast overpressures at various distances, intensity of noise, and the predicted impact on fish and wildlife.

15

Comment 2, page 6

Chapter 5.2.5, Biotic Resources, pages 5-25 through 5-27. This section states (page 5-26) that ". . .further construction at the DARHT facility site would have little, if any, further impact on vegetation." Plans for revegetation of disturbed areas or
16 landscaped areas, and a discussion regarding how construction noise or dust will affect wildlife resources should be included. In addition, impacts are said to be caused by ". . .repetitive, short-term disturbance from site activities." No discussion is
16 provided with regard to the ". . .1) vibratory ground motion, 2) airwaves, and 3), dispersal of metal fragments and other airborne debris. . . ." referred to under the cultural resources portion of the draft statement (page 5-27). Until such a discussion is included, we believe the draft statement is incomplete.

The discussion of potential for impacts to wetlands contained in
17 this section indicates that, because no wetlands lie within the DARHT facility site, no impacts are expected to occur. As stated above under Section 3.11, evaluation of indirect impacts are necessary for complete documentation of project impacts. Not
17 until modelling requested above under Section 5.2.1 is completed can a determination be made regarding potential for impacts to wetlands.

Chapter 5.2.5.4, Threatened and Endangered Species, page 5-27. The discussion regarding the potential for impacts to federally-listed species consists of one sentence; "It is unlikely that completion of DARHT facility construction would change the attractiveness of the area for potential use by threatened or endangered species."

The attempt to separate impacts caused by the construction of a
8 Federal facility built without compliance with environmental laws and regulations, from those impacts that would be caused as a result of the continued construction after environmental review has taken place, is inappropriate.

Because of the occurrence records of the pair of Mexican spotted owls discussed above (under Section 4.5.4), we are concerned that a Mexican spotted owl core area has or may be impacted by construction or operation of the DARHT facility. The DOE is currently working with our Service to determine if section 7 consultation will be necessary.

Neither surveys, nor impact analyses, are provided for other
12 listed species, including the endangered American peregrine falcon and southwestern willow flycatcher; nor have even the rudimentary and outdated analyses contained in the biological assessment, been included or referenced in the draft statement. Because information regarding potential impacts to federally-listed species is not discussed, much less mitigated, the draft statement is inadequate.

Comment 2, page 7

Discussions in this section regarding impacts to biotic
18 resources ignores potential for accidents during transportation of materials as discussed in Section 5.7 of the draft statement (pages 5-56 through 5-59). In addition to the identification of routes for transport of hazardous and radioactive materials, sensitive resources along these routes should be further identified and protective mitigation proposed.

Chapter 5.9, Cumulative Impacts, pages 5-60 through 5-63. The discussion of potential for cumulative impacts contained in this section states that groundwater contamination could occur over the next millennium as a result of releases of hazardous
19 materials from the site. However, no discussion of potential for cumulative impacts as a result of surface contamination is given. Certain chemicals are subject to biomagnification as they work upward through the various trophic levels of the ecological food chain, thus, creating risks to fish and wildlife that prey upon food items containing elevated body burdens of these potentially toxic elements. Carcinogenic compounds associated with carboniferous compounds that have been exposed to heat could become an issue over multiple years of testing activities. In addition, the cumulative impacts discussion should be expanded to
19 include impacts associated with the expansion of development into previously undeveloped areas and the impacts of expanded human activity.

Comment 3, page 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JUN 14 1995

Ms. M. Diana Webb
DARHT EIS Manager
Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

Dear Ms. Webb:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality Regulations for Implementing NEPA, the U.S. Environmental Protection Agency (EPA) Region 6 office in Dallas, Texas has completed its review of the U.S. Department of Energy's (DOE) Draft Environmental Impact Statement (DEIS) for the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility at the Los Alamos National Laboratory (LANL) in New Mexico.

DOE is responsible for ensuring that the United States nuclear weapons remain safe, secure, and reliable. The DOE program that responds to the President's challenge to ensure confidence in the nuclear weapons stockpile in the absence of nuclear testing is a science-based stockpile stewardship program. For the Nation's nuclear weapons, DOE proposes to provide enhanced high-resolution radiographic capability for hydrodynamic tests and dynamic experiments to meet its mission. Hydrodynamic tests and dynamic experiments are essential elements of the evaluation process of weapon performance under the program. These tests are performed on mock-ups of nuclear weapons and do not result in nuclear detonation or nuclear yield. DOE has determined that no other currently available advanced techniques exist which can provide the level of detail and information comparable to that which can be obtained from enhanced radiographic hydrodynamic testing.

The DARHT facility would include two electron accelerators to produce x-ray beams that intersect at a firing point. The Draft EIS evaluates the potential impact of six alternatives including the no action alternative. The DOE's preferred alternative is to complete the DARHT Facility at its LANL facility. Analysis within the Draft EIS assesses very little

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Comment 3, page 2

difference in the environmental impacts among the alternatives. The DEIS indicates that the preferred alternative will cause no significant impact to the environment or to public health.

The following comments are offered for your consideration in preparation of the Final EIS.

1 1. Unless there are significant and needed test results that cannot be obtained from a contained test, or significant cost or safety reasons for performing uncontained tests, EPA suggests that all dynamic tests be contained. This operating philosophy seems to be consistent with the alternative described in Section 3.7, "Enhanced Containment Alternative (ECA)." ECA is similar to the preferred alternative, but with the addition of containment to prevent the release of most airborne emissions, metal fragments, and other debris resulting from firing site operations. DOE currently uses steel containment vessels at LANL for some dynamic experiments. Discussion on this operating feature should be included in the Final EIS.

2 2. In Section 4.9 of the DEIS, a statement is made that there have been, "... no *reported* accidents associated with the detonation of explosives [at PHERMEX] ..." The modifier "reported" should be deleted in the Final EIS, or the possibility and implications that unreported accidental detonations may have occurred, should be discussed.

3 3. Under Section H.3.2, "Aerosolization", small fragments are described as having cross sections of 0.08 to 1.1 m^2 but it appears that the units should be "in^2". This should be corrected in the Final EIS.

4 EPA classifies your DEIS as "LO", i.e., EPA has "Lack of Objections." Our classification will be published in the Federal Register according to our responsibility under Section 309 of the Clean Air Act, to inform the public of our views on proposed Federal actions.

We appreciate the opportunity to review the DEIS. We request that you send our office two (2) copies of the Final EIS at the same time that it is sent to the Office of Federal Activities, EPA, 401 M Street S.W., Washington, D.C. 20460.

Sincerely yours,

W.B. Hathaway for
Jane N. Saginaw
Regional Administrator

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Office of Governor

PUEBLO DE SAN ILDEFONSO
TEWA
NEW MEXICO

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SI-GC95-161

May 23, 1995

Carol Borgatrom, Director
Office of NEPA Oversight (EH-25)
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

M.Diana Webb, DART EIS
Document Manager
U.S. Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, N.M. 87544

Re: Draft environmental impact statement for the dual axis radiographic hydrotest (DARHT) facility

Dear Ms. Borgstrom and Ms. Webb:

In reviewing of the draft environmental Impact Statement for the DARHT Facility, the Pueblo of San Ildefonso objects to the descriptions and identification of the locations of cultural sites as stated in the following sections.

1 Section 4.6 of chapter four of the draft environmental impact statement (DEIS) contains three items that present serious problems for the Pueblo of San Ildefonso and that are not consistent with applicable law. First, Tables 4-14 and 4-15 list the archeological sites within 2,500 foot radii of the DARHT and Phermex facilities, and Figures 4-19 and 4-20 identify the locations of those sites on maps. (DEIS pages 4-48 through 4-54) That information should not be included in a public document such as the DEIS. Archeological sites in this area are subject to extensive looting and damage by sightseers, and the publication of the descriptions of these sites and their locations puts them at substantial risk.

2 Section 4.6.1 of Chapter four also increases the risk of looting and other harm to four specific sites, LA 12655 (the Nake'muu site), and LA 71408 through 71410 by describing the sites and their locations in more detail. (DEIS, pages 4-55) The description of the Nake'muu site is particularly troubling because the DEIS states that it is one of the best preserved sites in the region and sets forth its locations in fairly specific terms.

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3 Third, the DEIS indicates in section 4.6.3 that if other "cultural resources of ceremonial importance or traditional cultural properties" are identified during consultation with Native Americans, those will be discussed in the final environmental impact statement. The Pueblo of San Ildefonso will not discuss cultural resources of ceremonial importance or traditional cultural properties with the Department of Energy or any other entity if that entity proposes to publish the results of that discussion in a document to be distributed to the public.

4 The publication of the information in the DEIS and the proposed publication of similar information in the final environmental impact statement is also inconsistent with the confidentiality requirements of the Archeological Resources Protection Act. Section 16 U.S.C. 47 of that Act mandates that information such as this not be disclosed unless the federal land management agency has determined that disclosure of the information would not create a risk of harm to the resources involved. The Pueblo is not aware that any such determination has been made with regard to these sites.

5 The Pueblo therefore requests an explanation for the disclosure of this information in the
6 DEIS. The Pueblo also requests that the Department not publish such information in the final environmental impact statement.

This is not our final comment on the Draft EIS for the DARHT facility, this will be forth coming once the entire document is thoroughly reviewed. I would appreciate hearing from you on this matter.

Sincerely,

Governor

1st. Lt. Governor

xc: San I-POEP
I. Tse-Pe, Tribal Administrator
File

Comment 5, page 1

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SI-GC95-194

June 30, 1995

M. Diana Webb
DARHT EIS Project Manager
Los Alamos Area Office
U.S. Department of Energy
528 35th Street
Los Alamos, New Mexico 87544

By mail and facsimile
(505)665-1506

RE: Dual Axis Radiographic Hydrodynamic Test Facility
(DARHT) Draft Environmental Impact Statement

Dear Ms. Webb:

I have enclosed the Pueblo of San Ildefonso's comment on the draft environmental impact statement for the dual axis radiographic hydrodynamic test facility. The Pueblo appreciates your extending the time for submission of this comment, and we hope that the delay has not caused your inconvenience.

The Pueblo would be grateful if the Department of Energy would respond to the Pueblo's concerns expressed in this comment.

Thank you for your cooperation. We look forward to hearing from you.

Sincerely yours,

Edmer C. Torres
Governor

xc: File

Comment 5, page2

The Pueblo of San Ildefonso's
Comments on the proposed Dual Axis
Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
June 30, 1995

1.0 Introduction

The Pueblo of San Ildefonso (Pueblo) has three principal concerns about the draft environmental impact statement (draft EIS) for the proposed dual axis radiographic hydrodynamic test facility (DARHT). First, the draft EIS does not analyze in detail all of the alternatives relevant to this proposed federal action, and in fact, a key alternative that could lead to substantial cost savings to the United States Department of Energy (DOE) and result in the use of improved technology in the long-term has not been evaluated. Second, the draft EIS does not properly describe the state of the environment at Los Alamos National Laboratory (LANL), and the environmental impacts of the proposed alternatives, and therefore cannot properly address the needed mitigation measures for these impacts. Third, the draft EIS does not adequately address impacts of the proposed alternatives on significant cultural resources. These inadequacies in the draft EIS should be corrected before a decision is made about whether to proceed with the proposed DARHT facility.

2.0 Proposed Alternatives

There is a key alternative to the proposed DARHT facility that has not been evaluated. On page 3-37, the draft EIS describes a multi-axis, multi-time Advanced Hydrotest Facility (AHF). This facility is described as conceptual and not having reached the stage of a firm DOE proposal, with needed design and development of the technology, siting studies, and construction design several years away. A multi-axis, multi-time facility would be far superior to a dual axis facility, for all of the reasons described in the draft EIS that justify building a dual axis facility to replace a single axis test facility. The draft EIS states that the DARHT facility would provide information useful for the design of the AHF. Accelerated development of the AHF and an upgrade of existing facilities is an alternative that needs to be evaluated. Moreover, that alternative needs to be evaluated in the context of a National Environmental Policy Act review; it is not adequate to rely on the reviews conducted by various committees in other contexts that are outlined on page 3-37 of the draft EIS. 1

The DARHT facility will cost more than 100 million dollars to construct. If there is a possibility that more advanced technology could become available after several years that would be superior to DARHT, this alternative needs to be examined in greater detail. The possibility exists that after the expenditure of 100 million dollars, the proposed federal action might result in the creation

of a facility that will not represent the technological state-of-the-art. Therefore, a new alternative should be added to the list of alternatives analyzed in detail in the draft EIS. Such an alternative to the proposed action would entail upgrade of existing single axis facilities to match some of DARHT's projected capabilities (since DARHT will operate for some time as a single axis facility), creation of an accelerated program to design a multi-axis facility and use of experience from computer, laboratory, and pilot-scale tests instead of from a full-scale DARHT facility to guide the AHF Studies. It is likely that this alternative will cost significantly less over a long-term period than an alternative in which DARHT and a subsequent AHF are built. Such an alternative could also result in significant improvement in the testing capability of the DOE. Given that this new alternative has the potential for significant cost savings and enhanced technological and testing capabilities, it should be investigated in detail.

1

3.0 Inadequacies in the Description of the Affected Environment

Chapter 4 of the draft EIS relies on annual environmental surveillance reports for a description of the Affected Environment. This description is not adequate because there have been significant inadequacies, data gaps, and omissions in these reports. Despite this, the draft EIS uses these annual environmental surveillance reports to draw conclusions about the affected environment, and relies on them for much of the data quoted in Chapter 4 of the draft EIS.

2

For example, the report for 1992 (LANL, 1994) is referenced for a discussion of estimated doses from radiological exposures in Section 4.8.1.1 in the draft EIS. In Section 4.3, this same report (LANL, 1994) is referenced in regard to data for surface water and groundwater monitoring data. The annual environmental surveillance report for 1992 (LANL 1994) contains little data on surface soil contamination within the LANL's on-site soils, although some data on contaminated on-site sediments are presented. Because of its reliance on this report, the draft EIS does not address existing contamination in on-site soils. This is a very significant omission because the operation of the proposed DARHT facility is expected to result in surface soil contamination. If the affected environment is not adequately described, it is impossible to assess the impacts of the proposed action adequately.

2

3.1 Inadequacies in environmental surveillance reports pertaining to specific LANL locations

The draft EIS's reliance on annual environmental surveillance reports is also flawed because those reports do not present a complete picture of LANL's environment since they do not include data from all of the various groups at LANL involved in collecting environmental data. Data for certain select routine sampling

3

locations are presented in the environmental surveillance reports. Levels of contamination for other locations and various environmental media near the routine surveillance sampling sites may be higher than what is reported in the environmental surveillance documents, however. The next three subsections describe some of these errors in past environmental surveillance documents.

3.1.A Technical Area 33 area K

Technical Area 33 contains Area K, which has shown high levels of tritium within surface soils. Information in unpublished LANL reports indicates that levels of tritium in soils within Area K could be as high as 890 nCi/l. This value is on the order of 100,000 times the regional background levels. The environmental surveillance report for 1992 (LANL, 1994) does not address on-site surface soil radiological contamination in great detail. There is a brief discussion of elevated plutonium levels at eight on-site soil sampling locations. There is no table showing what these levels are or where they were found. There is also no mention of elevated tritium levels in on-site soils.

This report does address contamination at Technical Area 33, Area K indirectly in the section on radiological contamination in soils and sediments, however. The report mentions elevated levels of tritium in canyon sediments downgradient from Technical Area 33, Area K, and states that this area will be studied in greater detail as a part of a corrective action plan mandated by the Resource Conservation and Recovery Act. This fact illustrates the problem with the annual environmental surveillance reports; these reports do not present all the relevant data related to on-site waste sites within LANL. It therefore is impossible to assess radiological exposures from such waste sites without study of all the relevant documents. For that reason, the draft EIS cannot develop a complete picture of the affected environment by relying primarily on the environmental surveillance reports.

3.1.B Airborne radioactivity

The amounts of airborne radioactivity released by LANL have not been fully described in the annual environmental surveillance reports. For instance, in 1988, the amount of Pu 238 measured in ambient air concentrations at Technical Area 54, Area G, was reported in a LANL memorandum (Jacobsen, 1992b) as 3696.6 aCi/cu.m. The Environmental Surveillance report for 1988, however, does not report any values for Pu 238. (LANL, 1989) In this report (LANL, 1989), the Pu 239 and Pu 240 concentrations at on-site stations in Technical Area 54 are described as being a maximum of 53.4 aCi/cu.m. A LANL memorandum (Jacobsen, 1992b), describes the Pu 239 concentration at a location in Technical Area 54, Area G, as 191.1 aCi/cu.m.

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Table 1 highlights some of the major discrepancies that exist between the values reported in past environmental surveillance reports and those reported in a LANL memorandum. A recent finding by the Defense Nuclear Facilities Safety Board concurs with these conclusions and identifies the lack of a proper explanation for the discrepancies.

TABLE 1: Maximum Ambient Air Concentrations of Selected Radionuclides at Technical Area 54 Reported in LANL Memoranda and Published Reports (Jacobsen, 1992b; LANL, 1986; LANL 1989; LANL 1990; LANL, 1992.)

	LANL Memorandum	Published Reports
1985		
	Am 241 -207.38 aCi/cu.m.	Am 241 -28.5 aCi/cu.m.
	U - 207.38 pg/cu.m.	U - 83.0 pg/cu.m.
	Pu 238 - 11.84 aCi/cu.m.	Not reported
	Pu 239 - 59.53 aCi/cu.m.	Pu 239 & 240 - 50.8 aCi/cu.m.
1988		
	U - 264.4 pg/cu.m.	U - 318.6 pg/cu.m.
	Pu 238 - 3696.6 aCi/cu.m.	Not reported
	Pu 239 - 191.2 aCi/cu.m.	Pu 239 & 240 - 53.4 aCi/cu.m.
1989		
	U - 434.36 pg/cu.m.	U - 186.5 pg/cu.m.
	Pu 238 - 1455.4 aCi/cu.m.	Not reported
	Pu 239 - 128.0 aCi/cu.m.	Pu 239 & 240 - 32.3 aCi/cu.m.
1990		
	U - 185.5 pg/cu.m.	U - 75.6 pg/cu.m.
	Pu 238 - 360.4 aCi/cu.m.	Pu 238 - 1.2 aCi/cu.m.
	Pu 239 - 15.0 aCi/cu.m.	Pu 239 & 240 - 9.3 aCi/cu.m.

A major problem with the modeling of air releases of radioactivity by LANL is that LANL's studies do not always include the release caused by the wind erosion of contaminated soils and sediments. Only the releases from stacks are routinely monitored and considered. However, large areas of canyon floors and the soils at material disposal areas are contaminated with plutonium, americium, cesium, tritium, and other radionuclides. When radioactive particles are picked up by the wind, they constitute a release of radioactivity into the air. This is particularly important because in 1992 the net dose from airborne radioactivity released from LANL was 7.9 mrem. (LANL 1994) This value is 79% of the maximum of 10 mrem allowed by the Environmental Protection Agency (EPA). Given the concentration of radionuclides in large areas of contaminated soil and sediments, and given the highly

Comment 5, page 6

erodible soils in Northern New Mexico, the net release by this process could be quite high. A similar diffuse release of tritium is also occurring at waste disposal areas, and from lagoons and effluent discharge areas. This release of tritium is also not adequately monitored at the present time.

A study conducted by LANL (LANL, 1981) of resuspension of plutonium dust in Pueblo canyon estimated the release in pueblo canyon to lead to a concentration of 3 aCi/cu.m. for Pu 239. One reading for Pueblo canyon in 1977 was as high as 166 aCi/cu.m. These numbers establish that there could be a significant airborne release of radioactivity from the resuspension of radioactive particles. The referenced study (LANL, 1981) only considered Pueblo canyon, and not the releases from other areas of surface contamination; and only considered plutonium 239, and not all the other radionuclides that could be released in this manner. Therefore, without considering the extent of radiological exposure from such diffuse sources, an accurate estimate of the dose from air releases cannot be made. Estimates of impacts and releases from the operation of DARHT cannot, therefore, be compared with the existing affected environment, as the understanding of air monitoring data and the air pathway for exposure is not presented in a complete fashion in the draft EIS.

LANL uses CAP-88 to estimate doses to humans from releases of airborne radioactivity. This model is best used for chronic releases of small amounts of radioactivity. At LANL, however, large amounts of radioactivity have been released in unplanned events. CAP-88 is not a good tool for estimating the doses from acute releases. CAP-88 uses averaged wind data. An accidental large release requires knowledge of wind data for the day of release. The effect of regional weather patterns on such days is also very important, and needs to be modelled to develop an adequate picture of the effect of the release. However, LANL has not made available any studies on exposure from such unplanned large releases, nor are such releases adequately modelled in the draft EIS. 4

3.2 Waste management at Technical Area 54 Area G

Technical Area 54, Area G, is situated at the edge of Pueblo lands, and on the rim of a canyon, Canada del Buey. Highly radioactive wastes are disposed of at this area in pits and shafts, and transuranic wastes are stored there temporarily. The wastes buried at Technical Area 54 Area G are highly contaminated with tritium. Sediments in drainages leading off from this area have been found to have high levels of tritium, several times above background values (LANL, 1992). In a LANL memorandum (Jacobsen, 1992a) from tests conducted in 1985, the level of tritium in soils at a depth of 10-30 cm at a location within Technical Area 54 Area G was described as 160,000 nCi/l. The 1985 Environmental Surveillance report for 1985 (LANL 1986) describes the levels of tritium in on-site soils and sediments from effluent release areas

in Technical Area 54 as 0.0 nCi/l, however. The implication of this value for the reader is that there are no high readings within this area. A draft environmental assessment report prepared for a planned expansion of Area G (LANL, 1991), states that at several sampling stations within Area G "elevated tritium concentration levels, approximately double background levels, were recorded in 1985 but were below regional concentrations in subsequent years". The LANL memorandum (Jacobsen, 1992a) states that tritium levels in 1989 were as high as 380,000 nCi/l in soils within Area G. The published Environmental Surveillance report for 1989 does not provide the levels of tritium in on-site soils and sediments for Technical Area 54 (LANL, 1990). An on-site area for which some data are provided is described in this report (LANL, 1990) as "East of Technical Area 54". The levels of plutonium at this location are described as approximately 0.01 pCi/g. The table in which this data appears is labelled "Radiochemical Analyses of On-Site Soils and Sediments"; the implication of this table heading is that the locations described are representative of the areas in which they occur. The LANL memorandum (Jacobsen, 1992a), however, describes the levels of plutonium in Technical Area 54 Area G in 1989 to be of the order of 10 pCi/g. The draft environmental assessment (LANL, 1991) that discusses the expansion of Area G describes the levels of plutonium in Area G in 1980 to have a highest concentration of 1.37 pCi/g, and to occur only in shallow soils 0-1 cm deep. The LANL memorandum (Jacobsen 1992a), however, describes the levels of plutonium in soils to be as high as 2.46 pCi/g and at a depth of 10-30 cm.

3.3 Conclusions

The gaps and inconsistencies in the data that are described in subsections 3.1, 3.2, and 3.3 above cast doubt on the quality and thoroughness of the draft EIS. All such errors and omissions must be corrected before an accurate understanding can be reached of the environment that would be affected by the proposed DARHT facility. Without a proper understanding of this affected environment, it is difficult to assess the significance of the impacts of the proposed facility. The Pueblo therefore reserves the right to comment further on the proposed facility and the significance of the proposed action until after the affected environment is described in sufficient detail. Only then can the significance of the environmental impacts of the proposed facility be properly assessed.

5

4.0 Cultural Resources

There are four principal problems with the draft EIS's treatment of the impacts of the proposed DARHT facility on cultural resources: the disclosure of information about those resources, the lack of evidence concerning the impacts of vibration on those resources, the treatment of the effects on those resources of flying debris, and the failure to recognize the need for Pueblo

members to have access to those resources.

6 First, the draft EIS improperly discloses the nature and locations of cultural resources. This was detailed in a May 23, 1995 letter from Pueblo Governor Elmer C. Torres and First Lieutenant Governor Randy P. Sanchez to M. Diana Webb and Carol Borgstrom, and the Pueblo will not repeat those concerns here.

7 Second, the draft EIS does not analyze the impacts of ground and air vibrations caused by the proposed DARHT facility on cultural resources. Rather, the draft EIS states with regard to the Nake'muu site that air vibrations are a greater concern than soil vibrations, that any cumulative damage caused by vibrations will be reported in a subsequent report, and that damage will be mitigated. (Draft EIS pages 5-27, 5-28) The draft EIS also indicates, however, that the cumulative impacts of air vibration 7 are unknown. (Id.) Moreover, there is no explanation of how damage will be mitigated. This is a particular problem because Nake'muu's pristine state makes it unlikely that damage could be mitigated without altering the site. The draft EIS's treatment of this issue therefore is not adequate.

8 Third, the draft EIS asserts that flying debris from the proposed facility will not have an effect on Nake'muu because they will be less than one inch in diameter and will not be falling with great force when they hit the site. (Draft EIS page 5-28) That analysis ignores two important points, however. The first is that the Phermex facility has generated much larger shrapnel fragments which are found in the area surrounding that facility. The second 8 is that the presence of shrapnel on a site such as Nake'muu has a direct and negative impact on the integrity and feel of the site, even if that shrapnel causes no structural damage.

9 Finally, the draft EIS makes no mention of the need of Pueblo members to use and to have access to the Nake'muu site. The draft EIS's analysis of noise, vibrations, and debris caused by the proposed DARHT facility does not address the impacts of those effects on Pueblo members who visit the site. There is also no consideration given to providing Pueblo members with access to the site. These are issues that should be addressed.

5.0 Conclusion

The Pueblo therefore requests that these issues be addressed before a decision is made on whether to proceed with the proposed DARHT facility.

Comment 5, page 9

6.0 References

Jacobson, K., 1992a, Environmental Surveillance at Area G, LANL Memorandum EM-8:92-1818.

Jacobson, K., 1992a, Environmental Surveillance at Area G, LANL Memorandum EM-8;2134.

Los Alamos National Laboratory, 1981, Formerly Utilized MED/AEC Sites Remedial Action Program, Final Report, LA-8890-ENV.

Los Alamos National Laboratory, 1986, Environmental Surveillance at Los Alamos During 1985, Environmental Protection Group, LA-10721-ENV.

Los Alamos National Laboratory, 1989, Environmental Surveillance at Los Alamos During 1988, Environmental Protection Group, LA-11628-ENV.

Los Alamos National Laboratory, 1990, Environmental Surveillance at Los Alamos During 1989, Environmental Protection Group, LA-11628-ENV.

Los Alamos National Laboratory, 1991, Environmental Assessment Expansion of Area G, EA-90-004L

Los Alamos National Laboratory, 1994, Environmental Surveillance at Los Alamos During 1992, Environmental Protection Group, LA-12764-ENV.

Los Alamos National Laboratory, 1992, Environmental Surveillance at Los Alamos During 1990, Environmental Protection Group, LA-12271-MS.

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New Mexico
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

May 10, 1995

Ms. M. Diana Webb
U.S. Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, New Mexico 87544

Dear Ms. Webb:

1 Thank you for the opportunity to comment on the Draft Environmental Impact Statement, Dual Axis Radiographic Hydrodynamic Test. Upon review of the materials you sent, we see no need for further comment from our office at this time.

If you have any questions, please do not hesitate to call Karen Lightfoot, Endangered Species Botanist for the State of New Mexico.

Sincerely,

Karen S. Lightfoot

KSL/ajc

Comment 7, page 1

State of New Mexico
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DEPUTY SECRETARY

US DOE/LAAO - IN
30004692

June 23, 1995

M. Diana Webb, DARHT EIS Document Manager
Department of Energy
Los Alamos Office
528 35th Street
Los Alamos, New Mexico 87544

Dear Ms. Webb:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS), DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST (DARHT) FACILITY, (DOE/EIS-0228/D), U.S. DEPARTMENT OF ENERGY, MAY 1995

The following transmitts New Mexico Environment Department (NMED) staff comments on the above-referenced Draft Environmental Impact Statement (DEIS).

WATER QUALITY ISSUES

1 Section 4.4.2, p. 4-27, par.1: A spring discharges within Threemile Canyon, approximately a quarter mile from the confluence of Pajarito Canyon and Threemile Canyon. The statement, "The presence of a permanent perched or alluvial water body in this canyon is considered unlikely" should be revised to reflect site conditions.

2 Section 4.4.3, p. 4-38, par.5: It is agreed that the presence of perched-intermediate depth aquifers or ground water may exist near the vicinity of TA-15 and may be influenced by activities conducted at the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility. It should be noted that the hydraulic connection betwen known occurrences of perched-intermediate depth ground water and the main aquifer is not understood.

3 Section 4.4.3, p. 4-38, par.6: It is further agreed that "There are no wells in TA-15; therefore, all inferences on the main aquifer beneath this technical site have been drawn from information derived from supply wells and deep test wells near TA-15". It is inadequate to sample production wells and test wells which have great screen lengths, high dilution factors, and drew conclusions as to the influence from potential release sites. The screen lengths within the test wells near TA-15 are from 300 feet

Comment 7, page 2

3 to 620 feet longer than recommended by the U.S. Environmental Protection Agency (EPA).

4 If DARHT Facility operations have the potential to impact ground water quality, Los Alamos National Laboratory (LANL) may be required to obtain a discharge permit for them. Section 5.2.4.2 of the DEIS indicates that infiltration into Threemile Mesa may contain levels of metals which exceed New Mexico Quality Control Commission (WQCC) standards. LANL should submit a Notice of Intent to Discharge to NMED's Ground Water Section (GWS) for evaluation of whether or not a discharge plan will be required for the DAHRT Facility.

5 We find no conflicts in the DEIS with New Mexico surface water quality statutes or regulations. However, any DARHT Facility-related changes that could have a surface water quality impact, must comply with the State of New Mexico Water Quality Standards, Water Quality Act, Water Quality Control Commission regulations and related statutes.

AIR QUALITY ISSUES

The DEIS provides several alternatives to the proposed action including a "no action alternative". Relative to air quality effects, there is very little difference in the environmental impacts among the alternatives presented. To be noted is that under the No Action Alternative the U.S. Department of Energy (DOE) would continue to operate the PHERMEX facility at LANL with subsequent air emissions.

Also, as discussed in the DEIS, radioactive emissions from the proposed facility would be regulated by the EPA and not by the State of New Mexico. Non-radioactive emissions from LANL are subject to NMED regulations established under the New Mexico Air Quality Control Act.

As described in Chapter 3 of the DEIS, all of the alternatives are similar with respect to the type of weapons testing that will be performed. Weapons tests are described in detail in section 3.3.1, p. 3-3. Under all of the alternatives air emissions of certain toxic compounds will occur. Appendix A of Part Three of the New Mexico Air Quality Control Regulation (AQCR) 702 specifies that a permit is required if the emissions of certain toxic compounds exceed specified levels. According to the information provided in the DEIS, two air contaminants, Lithium Hydride and Depleted Uranium, may exceed the permit action levels in all of the selected alternatives, including the No Action Alternative. The only alternative in which these permit requirements would appear not to be triggered is the Enhanced Containment Alternative. Estimated emissions from the DARHT Facility (all alternatives except Enhanced

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Containment) are summarized in the table below.

The air emissions exceedances calculated in the table are based upon an estimate of the weapons testing emissions averaged to an hourly basis. According to this calculation, the hourly emissions 6 of Uranium and Lithium Hydride would exceed the NMED permit requirements by one order of magnitude. It is important to note that this is a conservative estimate since the emission value(s) has been averaged. According to information presented in the DEIS, the schedule for testing would be 20 shots (individual weapons test) per year. In addition, the maximum test shot size was assumed to be 500 lbs with a potential for aerolization of depleted uranium at 50,000 grams (See Appendix C - C1.3.3 Hydrodynamic Testing). Based on this information it would appear that individual test 6 shots could significantly exceed the NMED permit requirements for Uranium and Lithium Hydride.

In Summary, our review of the DEIS indicates that an AQCR 702 permit would be required for the proposed DARHT Facility, No Action 6 Alternative, and all other Alternatives (with the possible exception of the Enhanced Containment Alternative) with respect to Uranium and Lithium Hydride emissions. Under AQCR 702 Part Three C.2., LANL will have to receive an AQCR 702 Construction Permit from the Department prior to construction. Under AQCR 702 Part 7 Three F.3.d. the Department will deny the permit application "if the source will emit a toxic air pollutant in such quantities and duration as may with reasonable probability injure human health".

CONTAMINANT	ANNUAL EMISSION DARHT (1) AND ALTER.	HOURLY EMISSION DARHT (2) AND ALTER. (ESTIMATED)	NMED AQCR 702 PERMIT REQUIRE.
Depleted Uranium	700 Kg	79.9 g/hr	6 g/hr
Lithium Hydride	100 Kg	11.4 g/hr	0.76 g/hr

(1) Annual emission value from Table C1-7 from Appendix C, DEIS.
(2) Hourly average (8,760 hrs/yr) based on annual total emission value from Table C1-7, Appendix C, DEIS.

Air quality concerns would also be addressed in any operating

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permit issued under AQCR 770 - Operating Permits, for the entire LANL Facility. The DOE has indicated in the DEIS that they expect to submit an operating permit application to NMED in 1995. Permit conditions would be determined upon review of the permit application(s). Permit(s) would be subject to review and comment by the public and EPA.

RADIATION PROTECTION ISSUES

A number of observations related to radiation protection of the public may be made from the information provided in the DEIS:

* Projected depleted uranium use by Preferred Alternative is 700 kg as compared to present use at PHERMEX of 200 kg.

8 * Increased testing could lead to increased release of hazardous materials, and thereby to the possibility of having to classify the firing-site as a mixed-waste site.

* Tests conducted are "implosions" rather than "explosions", therefore most of the materials would be deposited at or near the firing point. Materials released during open-air tests at the PHERMEX facility have resulted in low but observable quantities of lead, beryllium, and mercury on or near the firing site. Those materials were not observed beyond 460 ft. of firing site.

* Based on average amount of depleted uranium used per year at PHERMEX, the amount of depleted uranium of respirable size available for dispersal beyond the immediate vicinity of the firing site would amount to about 10 kg annually.

* Tests at four LANL locations have indicated tritium migration to the main aquifer from overlying contaminated perched aquifers. The method of communication between intermediate perched and deep aquifer formations is unknown.

9 * The solubility of uranium in LANL waters appears to be substantially above its proposed maximum contaminant level (MCL) value (National Primary Drinking Water Regulations: 40 CFR 141). Concentrations of depleted uranium in surface waters could be slightly above the proposed MCL immediately below PHERMEX.

10 * Radiological impacts may result from exposure to depleted uranium and tritium released to the atmosphere. Assume that 10% of all materials become respirable following a test.

* DOE estimates up to 25% of all tests might be "uncontained". Plutonium tests to be done in double-walled steel vessels.

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DOE assumes failure of single-walled containment vessel 5% of the time (gasses and small fragments), double-walled vessels show full containment.

* Under the Enhanced Containment Alternative, DOE expects to use containment for any experiment with materials made from beryllium, depleted uranium or RCRA characteristic metals. At least 99% by mass would be contained.

Two general comments may be made on the basis of the aforementioned observations. The Enhanced Containment Alternative would appear to be the preferred option relative to environmental protection and
11 testing optimization. Although the most costly to put in place, operate, and maintain, it may be the more cost-effective to implement in the long run-- once account is taken of future clean-up costs and changing standards. In addition, given the prior statements on solubility of uranium and tritium in water, the uncertainty in the method of communication between perched and deep
12 aquifers, and increased testing, DOE should seriously consider making a commitment to contain a higher percentage (if not all) of the tests, regardless of the selected alternative, in order to keep contamination at least at current or--preferably-- lower levels.

We appreciate the opportunity to comment on this document. Please let me now if you have any questions.

Sincerely,

Gedi Cibas, Ph.D.
Environmental Impact Review Coordinator

NMED File No. 903ER

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State of New Mexico
ENVIRONMENT DEPARTMENT
DOE OVERSIGHT BUREAU
P.O. Box 1663, MS/J-993
Los Alamos, New Mexico 87545

GARY E. JOHNSON
GOVERNOR

MARK R. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

June 26, 1995

M. Diana Webb
DOE/LAAO
DARHT EIS Project Manager
528 35th Street
Los Alamos, NM 87544

RE: Review of Los Alamos National Laboratory's (LANL) Draft Environmental Impact Statement (EIS) for the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT), Technical Area 15.

Dear M. Webb:

The DOE Oversight Bureau (DOE OB) has reviewed the subject document. The following comments are provided for the purpose of communicating the results of the DOE OB review. These comments are not provided or intended for the purpose of representing the regulatory position of the New Mexico Environment Department.

DOE OB General Statement on the proposed completion of the DARHT facility

1 DOE OB recommends and supports the "Enhanced Containment Alternative" (Section 3.7) for the proposed completion of the DARHT facility at TA-15. In addition to the obvious benefits of limiting releases to the environment and therefore being more protective of the public health and the environment, there are a number of specific issues elaborated on and listed in the comments below (i.e., perennial stream and spring flows, aquatic communities in the adjacent canyons and the presence of threatened and endangered species (TES)) which support our
1 backing of this alternative. In addition, DOE OB does not feel that DOE has adequately
2 demonstrated that this alternative would compromise the diagnostic capabilities of the proposed facility. One major question that should be addressed by DOE is: Why will it be necessary to conduct 25 percent of the tests in an uncontained mode? LANL is purportedly working on reusable containment vessels which can be used with higher explosive loadings and accommodate
2 a full diagnostic suite. DOE OB feels that the 25 percent figure was not adequately justified.
1 In summary, DOE OB recommends that the "Enhanced Containment Alternative" should be re-written as to fully mitigate environmental impacts by the DARHT facility.

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DOE OB Review of LANL's Draft EIS for DARHT
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GROUND-WATER AND SURFACE-WATER

1. Page 4-26, Section 4.4.1

3 General Statement: It should be noted that surface-waters discharged off-site (San Ildefonso Pueblo, Bandelier National Monument, Rio Grand River, etc.) via Pajarito and Los Alamos Canyons from 1992 to 1995. Pueblo and Acid Canyon surface waters may have flowed off-site; however, we have no direct evidence. Ancho Canyon surface waters may have connected with Ancho Spring and subsequently discharged off-site (Rio Grande River); however, we have no direct evidence.

2. Page 4-26, Section 4.4.1, Second paragraph, First sentence

4 Comment: Recent investigations conducted in 1994 and 1995 indicate that there is a perennial reach in Cañon de Valle. A total of three springs: Burning Ground (long 106 20 15; lat 35 50 56), SWSC (long 106 20 25; lat 35 51 02), and Peter (long 106 20 25; lat 35 51 02), contribute to perennial flow in Cañon de Valle whose total combined flow has been measured at the culvert below MDA P, ranging from 18 gpm (1-20-95) to 80 gpm (5-5-95). Visual observations have determined that Burning Ground and SWSC emanate at a relatively constant rate. On December 9, 1994, flow was encountered in Cañon de Valle approximately 0.8 miles up from the confluence of Water Canyon and Cañon de Valle. Flow continued some unknown distance down Water Canyon. More surveillance is needed to determine if flow in this reach is perennial.

3. Page 4-26, Section 4.4.1, Second paragraph, Second sentence

5 Comment: NPDES Outfall #05A056 discharges approximately 700 ft upgradient (southwest) from SWSC Line Spring. Should be noted that Material Disposal Areas (MDA) M is located near springs that contribute to perennial flow in Pajarito, and MDAs P and R are located near springs that contribute to perennial flow in Cañon de Valle. Solid Waste Management Unit (SWMU) 22-015(c), a former outfall and plating etching facility, is also located at the upper area of perennial flow in Pajarito Canyon.

4. Page 4-26, Section 4.4.1, Third paragraph, Third sentence

6 Comment: Recent investigations in Pajarito Canyon have shown that there are several (9) additional springs (4 perennial, 5 ephemeral) which feed a perennial reach in Starmers Gulch (tributary to Pajarito Canyon). This perennial flow joins with the flow from Homestead Spring (long 106 20 21; lat 35 51 31) for a combined discharge that ranges from 46 gpm (8-9-94) to 120 gpm (2-24-95) and extending for up to 3 miles downstream, near the confluence of Two Mile Canyon (depending on climatic conditions). The flow in this reach is supplemented by a smaller canyon, consisting of several perennial springs and seeps whose total combined flow has been measured to be 12 gpm to 15 gpm (2-10-95). This canyon joins Pajarito about 1/3 mile below the junction of Starmers Gulch and Pajarito Canyon.

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5. Page 4-26, Section 4.4.1, Fourth paragraph, First sentence

7 Comment: Springs that supply perennial flow in Pajarito Canyon emanate from elevations that range from approximately 7,456 ft to 7,400 ft are: Charlies Spring (long 106 20 21; lat 35 51 31) located in southern tributary to Pajarito Canyon, Bulldog Spring (long 106 20 17; lat 35 51 24) located in a southern tributary to Pajarito Canyon. Springs that supply perennial flow in Cañon de Valle emanate from elevations that range from approximately 7,370 ft to 7,400 ft are: Burning Ground Spring, located in Cañon de Valle; SWSC and Peter Spring, also located in Canon de Valle.

6. Page 4-26, Section 4.4.2

8 General Statement: It should be noted that perched ground water in canyon alluvium and volcanics exist at the subject area. Little or no investigation has occurred.

7. Page 4-27, Section 4.4.2, Second paragraph, First sentence

9 Comment: Recent field surveillance indicates that a saturated perched zone within the canyon alluvium and an associated wetlands exists in the lower section of Threemile Canyon. The existence off a perched zone within the bandelier tuff and/or basalts beneath Threemile canyon has not been investigated.

8. Page 4-27, Section 4.4.2, Second paragraph, Second sentence

10 Comment: It should be noted that hydrologic characteristics of the "Discharge Sink" in Potrillo Canyon have not been determined.

9. Page 4-27, Section 4.4.2, Third paragraph

11 Comment: A total of three springs: Burning Ground, SWSC and Peter, contribute to perennial flow in Cañon de Valle, east of West Jemez Road, and the possibility of a perched zone within the canyon alluvium is probable.

10. Page 4-27, Section 4.4.2, Fourth paragraph, Fifth sentence

12 Comment: The thickness of the alluvium at Beta Hole and WCO-1 is 8 and 24 ft respectively. Hence, Beta Hole may have been drilled at an inappropriate location (i.e., side of canyon) for ground-water detection. Beta Hole was drilled for geologic information, not ground-water exploration (Purtymun, 1995). "Near saturation" conditions existed at a depth interval of 24 to 32 ft at observation well WCO-1 in October of 1989 (Purtymun, 1995). It appears that perched ground water does indeed exist in Water Canyon because two shallow wells, WCM-1 and WCM-2, were drilled due south of TA-15 and ground water was encountered (Purtymun, 1995).

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11. Page 4-27, Section 4.4.2, Sixth paragraph, Sixth sentence

13 Comment: No direct evidence exists to support this statement. The usage of the word "may" or "could" may be more appropriate.

12. Page 4-30, Section 4.4.3, First paragraph: "Important contaminant transport mechanisms associated with surface water include:
*Erosion and sedimentation (sediment and contaminant accumulation) of contaminated surface and near-surface materials
*Infiltration of surface water that may be contaminated, or movement of water through a contaminated deposit that in turn carries contamination deeper into the soil/rock profile
*Movement of contaminants in surface water as solutes, suspended sediments and bedload phases."

14 Comment: Though storm water monitoring stations at the PHERMEX site exist (station #'s SWO-15-184A, B, & C), no data is presented that characterizes the water quality resulting from storm water runoff resulting in the movement of contaminants as solutes, or suspended sediments from a facility with known contamination levels (approximately the same levels projected for the DARHT facility). PHERMEX storm water quality data, displaying the dissolved and suspended components, must be obtained and presented to verify that the model described in appendix E3 correctly simulates the transport of depleted uranium, beryllium and other heavy metals.

13. Page 4-30, Section 4.4.3, Fifth paragraph: "Surface water sampling station locations near TA-15 are presented in figure 4-14. The radiochemical, trace metals, and chemical quality analysis of samples taken at Pajarito Canyon, Water Canyon, and Ancho Canyon at the Rio Grande are listed in tables 4-6 and 4-7 (LANL 1994a)."

15 Comment: The surface water monitoring station for Water Canyon is located just below the junction of Water Canyon and Cañyon de Valle. The data presented in Table 4-6 and 4-7 is representative of springs, NPDES outfalls and snowmelt runoff from watersheds upstream from the potential effects of PHERMEX and the proposed DARHT facilities. The data presented in table 4-6 is for dissolved constituents (filtered prior to analysis) and therefore does not include the suspended sediment component. This data does not adequately characterize the water quality of Water Canyon and does not assess contaminant contribution from the PHERMEX facility.

14. Page 4-30, Section 4.4.3, Fifth paragraph, Second sentence

16 Comment: It should be noted that Ancho Canyon surface-water data may actually be from Ancho Spring. Ancho Spring water is ground water, not surface water.

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15. Page 4-33, Section 4.4.3, Tenth paragraph

17 Comment: It should be noted that isotopic data from LANL test wells are questionable due to the fact that the wells are not adequately grouted which could cause wellbore leakage. Hence, results may yield erroneous results. We question all analytical and aquifer data from these test wells.

16. Page 5-18, Section 5.1.11.1, First sentence: "Environmental monitoring currently performed at LANL would continue under the No Action Alternative. Existing stations for monitoring external penetrating radiation and radioactive and hazardous substances in air, water, soil, and sediment would be used to monitor the environmental impacts of the facility." This section is repeated for all alternatives.

18 *Comment: Existing surface water monitoring stations are inadequate to assess the impacts of the existing PHERMEX facility (see comment 13). The Water Canyon surface water monitoring station needs to be located further down stream in Water Canyon to adequately assess all runoff Water and Cañon de Valle from the existing PHERMEX and the proposed DARHT facilities. Storm water monitoring stations at the PHERMEX site need to be monitored to verify that the surface water model adequately predicts contaminant transport from the existing facility. The construction of a new facility on LANL property (DARHT) may require a modification of LANL's general storm water permit. Mitigation measures (i.e., the installation of catchment basins) should be addressed in the EIS in order to prevent the transport of contaminants to Water Canyon, Cañon de Valle, and Potrillo Canyon and to monitor storm water runoff from these facilities.

THREATENED AND ENDANGERED SPECIES

17. Page 4-43, Section 4.5.4, First paragraph, First sentence: "Surveys conducted at TA-15 in 1992 (Risberg 1995) did not locate any currently listed threatened or endangered species (Table 4-12), although suitable habitat may exist for many of these."

19 Comment: The statement that suitable habitat may exist for TES species does not adequately address the location of suitable habitats, what surveys were conducted and according to what protocol. Recent investigations have determined the presence of suitable Mexican Spotted Owl habitat within approximately 1/4 mile of the proposed DARHT site.

18. *Page 4, Section 3.1.2, Fourth paragraph in: Draft Biological and Floodplain/Wetland Assessment for the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT), Debra Risberg, February 1995, LAUR 95-649: "Results from initial modeling indicate three areas within Laboratory boundaries that could have potential owl habitat, one of them being an area near the junction of Water Canyon and Cañon de Valle. Because the model is based on topographic features, the nature of the forest stand is unaccounted for;

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thus, this area would not be suitable for nesting spotted owls due to the extensive burn caused by the 1977 La Mesa Fire."

20 Comment: The model used to determine potential Mexican Spotted Owl habitat underestimates suitable owl habitat. Extensive field checking is required when this model is used. Recent field investigations have determined that suitable owl habitat exists in Cañon de Valle, Threemile Canyon and Pajarito Canyon. Ongoing Spotted Owl surveys (ESH-20) in these canyons indicate that at least one pair of Spotted Owls is present in the project area. Until the nest and/or roost area is located, all suitable habitat must be considered occupied.
*Note: This comment is related to the Draft HIS for DARHT but refers to a different document referenced above.

19. Page 5-59, Section 5.8.1, Last sentence on page: "Disturbing wildlife as a result of blast noise from detonation of high explosives"

21 Comment: This addresses impacts due to uncontained tests. This would require seasonal restrictions (from March 1 - August 31), on uncontained tests, to prevent the disturbance of Mexican Spotted Owls during the mating/nesting season. These seasonal restrictions apply to noise due to construction as well as the blast noise from detonation of high explosives. This disturbance may result in the disruption of mating, or disrupted feeding of nestlings, resulting in reproductive failure of a pair of owls. Intensive studies should be initiated to determine the effects of current blast noise on nesting/roosting spotted owls and mitigation measures need to be addressed to prevent a takings issue.

20. Page 5-18, Section 5.1.11.1, First sentence: "Environmental monitoring currently performed at LANL would continue under the No Action Alternative. Existing stations for monitoring external penetrating radiation and radioactive and hazardous substances in air, water, soil, and sediment would be used to monitor the environmental impacts of the facility."

22 Comment: Additional studies, especially biological studies must be initiated to monitor the impacts of the proposed facility. Small mammal studies need to be initiated that will determine the current contamination levels present in prey that may be utilized by Mexican Spotted Owls. The impacts of feeding contaminated mice to nestling Spotted Owls must be evaluated to prevent a takings issue. Studies also should be initiated to determine the concentration of contaminants found in pellets found near Spotted Owl roost/nest sites.

21. Page 5-11, Section 5.1.5.4, First sentence: "It is unlikely that activities at PHERMEX would change the attractiveness of the area for potential use by threatened or endangered species. The concentration of depleted uranium and metals in foodstuffs of threatened and endangered species is expected to remain negligible. Ingestion of these substances is not expected to have any consequences to these populations."

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23 Comment: See above comments. What studies of foodstuffs have been completed which allow these expectations to be stated?

22. Page 5-26, Section 5.2.5.1.2, Second paragraph: "Impacts upon wildlife would be caused by repetitive, short-term disturbances from site activities. However, these impacts would be insignificant to overall population levels."

24 Comment: Populations of TES species is not the issue, individual animals and the impacts upon each individual or their habitats need to be addressed.

23. Page 5-27, Section 5.2.5.4: "It is unlikely that completion of DARHT construction would change the attractiveness of the area for potential use by threatened or endangered species."

25 Comment: This statement needs qualification. Seasonal restrictions would need to be placed on construction for the protection of TES species.

AIR QUALITY AND HUMAN HEALTH

24. Page 3-21, Section 3.5.2, Sixth paragraph, First sentence

26 Comment: It is presumed that the limits established under the NESHAPS permit would not limit testing under the Enhanced Containment alternative. These limits apply to the release, not the use of depleted uranium.

25. Page 3-24, Section 3-7, First paragraph

27 Comment: The need for conducting 25 percent of the tests in an uncontained mode is not adequately justified. The only satisfactory explanation given is the need to conduct optical diagnosis. However, it is not clear whether the prototype containment vessel, stated to be able to accommodate a full suite of diagnostics, would accommodate laser/optical diagnosis.

26. Page 4-14, Section 4.2.5, Last paragraph: "Later in 1993, three air monitoring stations ... were added downward of the firing site for PHERMEX and DARHT. The monitoring stations are about 320 to 3,200 ft (100 to 1,000 m) northeast of the firing site. The samples collected at these stations are analyzed for isotopic uranium, isotopic plutonium, gross alpha, beta gamma, and beryllium (Jacobson 1995)."

28 Comment: The significance of these stations is unclear. No data is presented from these three stations, nor is there any reference to the possible future use of these stations for monitoring any of the operational alternatives presented. Since the soil around PHERMEX is contaminated as a result of previous experiments, it may be worth while to examine the possibility that these stations can detect the effects of soil resuspension

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28 due to wind or construction activities in the vicinity.

29 Comment: Does the term "downward" mean down wind or down gradient? The samplers would be most effective if they are place down wind of the prevailing daytime winds.

27. Page 4-69, Section 4.8.1.1, Third paragraph, Second sentence: "In 1992, the estimated maximum EDE resulting from LANL operations was 6.1 mrem, taking into account shielding by buildings (30 percent reduction) and occupancy (100 percent of residences, 25 percent for businesses)."

30 Comment: It should be noted that EPA Region 6 issued DOE a Notice of Noncompliance (NON) with the National Emissions Standards for Hazardous Air Pollutants (NESHAPS), 40 C.F.R. part 61, Subpart H, on November 23, 1992 for taking into account the shielding by building (30 percent reduction) in assessing the dose for 1990 LAMPF emissions. It is recommended that the shielding criteria not be used in dose calculations.

28. Page 4-70, Section 4.8.1.1, First paragraph

31 Comment: Comparison with the DOE 100 mrem/yr PDL is misleading when as is stated 95 percent of the dose is attributable to the airborne emissions from LAMPF. A more appropriate comparison would therefore be made to the EPA's 10 mrem standard for radionuclide air emissions.

29. Page 5-4, Table 5-1 "Impacts on Air Quality from Hydrodynamic Testing in the No Action Alternative"; Page 5-37, Table 5-12 "Impacts on Air Quality from Hydrodynamic Testing in the Enhanced Containment Alternative"

32 Comment: Intuitively, it is unclear why the values for beryllium, heavy metals, and lead are greater for the Enhanced Containment Alternative (Table 5-12) compared to the No Action Alternative (Table 5-1).

30. Page 5-50, Section 5.4.12

33 Comment: The range provided for the lessening of the required soil cleanup under the Enhanced Containment Alternative (25-90 percent) is too broad. This is an important component of the cost savings associated with the Enhanced Containment Alternative and should therefore be more accurately estimated.

31. Page 5-36, Section 5.4.2.1.2 "Operations"; Page C-4, Section C1.3 "Source Term"; and Page H-4, Section H2.2 "Atmospheric Release" :

34 General Statement: There are inconsistencies through out the document regarding the elevation of pollutant release for the uncontained alternatives. On page 5-36, Section

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34 5.4.2.1.2, first paragraph, the statement is made that the emissions for beryllium, heavy metals, and lead are higher for the Enhanced Containment Alternative compared to the other alternatives because the calculations are preformed as a ground level release rather than as an elevated release. Page C-4, Section C1.3, states that pollutants were assumed to be released from a ground level point source with the exception of fugitive dust emissions during construction. Page H-4, Section H2.2, third paragraph, deals with determining the effective release height to be used in the GENII and MEPAS models. It is very unclear under which circumstances an elevated height release was assumed, and exactly how these assumptions affected the final outcome of the model calculations.

32. Page D-3, Section D.2, Second paragraph

Comment: The term "area-weighted integration" should be defined as it applies to this context.

DOE correspondence to NMED DOE OB comments on this document should be directed to John Parker at (505) 827- 4355.

SY:sy:mp:mrd:bs:rfs:jwp

Sincerely,

Stephen Yanicak

Steve Yanicak, DOE Oversight Bureau, POC/LANL
New Mexico Environment Department

cc:: Ivan Trujillo, DOE POC/ LAAO
Barbara Driscoll, EPA Region 6
Gilbert Sanchez, Environmental Director San Idlefonzo Pueblo
Neil Weber, Bureau Chief, NMED DOE Oversight Bureau
John Parker, Program Manager, NMED DOE Oversight Bureau
Ralph Ford-Schmid, NMED DOE Oversight Bureau
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LOS ALAMOS COUNTY

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COUNTY COUNCIL
Chairman
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Vice Chairman
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Members
J.R. "Scotch" Fretwell
Louis Hall
Mary (Ginger) Welch
Jim Greenwood
Morris B. Pongratz

June 5, 1995

1 | Los Alamos County supports the Department of Energy recommendation to complete construction of the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility.

2 | We believe that DARHT is a necessary implement for stockpile safety and reliability. This science based stewardship is a mission for which Los Alamos National Laboratory (LANL) is uniquely qualified and LANL is the only facility capable of performing this mission in its entirety. The United States of America must be prepared with nuclear weapons expertise in case of the unexpected. DARHT assures reliable stewardship by demanding the highest of technological skills. Upon review of the draft E.I.S., the Los Alamos County urges the Department of Energy to complete this facility without further delay.

2 |

1 |

Lawry Mann, Chairman
Los Alamos County Council

"A Consolidate City and County Government"

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technadyne
engineering consultants, inc.
P.O. Box 13928 Albuquerque, New Mexico 87192
Tele. 505-299-8697 Fax 505-296-0895

May 11, 1995

Ms. M. Diana Webb
Re: May 1995 DAHRT Draft EIS
Los Alamos Area Office
U.S. Department of Energy
528 35th Street
Los Alamos, NM 87544

Dear Ms. Webb:

1 | The DAHRT DEIS is to be used by the DOE decisionmaker in choosing from among the analyzed alternatives, one of which is Plutonium Exclusion. The DEIS is totally lacking in any analyses on which could be based a rational choice on whether or not plutonium experiments should be conducted at the DAHRT. For example, there is nothing in the DEIS to answer the following questions, which would seem crucial to the decisionmaking on that point.

2 | 1) What is the exact design (dimensions, type-of-material, etc.) of the "double-walled containment vessels" which would be used to contain plutonium experiments?

3 | 2) What would be the maximum allowable amount of plutonium involved in a single experiment?

4 | 3) What is a reasonable assumption for the isotopic composition of the plutonium?

5 | 4) Would plutonium test assemblies be assembled outside of, or inside of, the containment vessels?

6 | 5) What would be the consequences of potential accidents involving plutonium?

7 | 6) After a plutonium experiment, how would the resultant TRU waste be processed and disposed?

8 | 7) What would be the programmatic impact to DOE of Plutonium Exclusion?

I believe that the incorporation of additional material in the EIS addressing these points would contribute greatly towards improving public confidence in the safety of DOE operations.

Sincerely,

David I. Chanin
Senior Risk Analyst

cc: Carol M. Borgstrom (DOE/EH-25)

30004229
US DOE/LAAO - IN

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Your Community Voice in the Carson

Re: Comments - DARHT Facility DEIS

Carson Forest Watch
Box 15 Llano, NM • 87543 • 505-587-2848

May 9,1995

Diana Webb
DOE, Los Alamos Area Office
528 35th St.
Los Alamos, NM 87544

Dear Ms. Webb.

On behalf of our citizens group in northern New Mexico, the following are some comments regarding the DEIS for the proposed DARHT facility:

1 | 1) The DEIS preferred alternative (construction of the dual facility) would violate the National Historic Preservation Act (NRHP) by impacting a site eligible for the National Register of Historice Places, and under this alternative, mitigation would not be sufficient to avoid impact to this site. The DEIS states that further consultation will be conducted with SPHO, however, this preferred alternative currently does not have concurrance from this office, and it is likely that the preferred alternative would not avoid damage to the site, even with mitigation measures. We cannot support any alternative which damages any cultural resources, especially one with such importance as the Nake'muu site. The DOE should not have released this DEIS before final concurrance was reached or final consultation conducted with SHPO, because it omits the possible effects to important cultural sites under this alternative, which is the preferred alternative. The public needs this information before determining the significanseof the impacts of each alternative - and the DEIS failed to do this. By merely stating that further consultation will be conducted with both the Pueblo of San Idelefonso and SHPO, the DEIS fails to adequately disclose the real impacts of the preferred alternative on important resources - which violates NEPA.

2 | 2) The DOE should choose a less environmentally damaging alternative - it is clear from the DEIS that several other action alternatives could accomplish nearly the same results as the preferred alternative - and would cause less damage to important cultural resources. NEPA requires that an action agency explain clearly all reasons it chose not to implement the most environmentally preferrable alternative. In this DEIS, the DOE failed to do so.

3 | 3) Once again - the purpose and need for this proposed action is not clear, nor not backed up by reasoned scientific analysis or fact. While the DOE did give discussion to bogus reasons involving national security - it failed to fully describe current world nuclear dis-armament treaties and peace efforts, and give a comprehensive analysis of the need for LESS testing of nuclear materials, weapons reductions, etc. NEPA requires a greater discussion of other factors - including the cumulative impacts of continued hazardous and radioactive materials testing on the Parajito Plateau. The DEIS fails to do this. We doubt the judge will buy the DOE arguement for purpose and need - especially since the DOE is continuing to propose this dual facility alternative, as the judge expected. The course of action was clearly pre-determined, and this DEIS merely is an effort to justify a decision already made by the DOE. Violation of NEPA.

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4) We question the ability of the DOE to prepare an adequate document for this facility in such a short amount of time. A Forest Service timber sale takes a longer amount of time to prepare - and this DEIS was released only months after the judge ruled that the DOE prepare such a document to

7 | comply with NEPA. Again - it is clear that the DOE is hurrying preparation of its environmental review to justify a project it has already started.

5) The DOE has failed to receive Section 7 ESA concurrance from the US Fish and Wildlife Service regarding this projects impacts on T. and E. species. The DEIS should have disclosed the results of the Biological Opinion from the USFWS BEFORE releasing this DEIS, and each alternative should have been

8 | rated regarding the USFWS position on their impacts to T. and E. species. We also did not see the Biological Evaluation or Assessment required by the DOE that determines effects, by alternatives, on each T. and E. species that may be affected by this project. Without disclosure of the results of the Section 7 Consultation (formal) with the US Fish and Wildlife Service - the public has no information whether any alternative or which alternative would be likely to adversely affect or even jeopardize any Threatend or Endangered species - or their habitat in this DEIS. Violation of NEPA.

9 | 6) What will be the effects of each alternative upon the Suitable habitat for the Mexican spotted owl? Again - the DEIS fails to disclose the presence of suitable habitat for this species near the project area, and fails to disclose the fact that Criticial Habitat for this species has been proposed by the US FWS, and much of this involves habitat in the Jemez Mountains. Without complete Section 7 concurrance for each alternative, or at least a disclosure of comments from the USFWS regarding impacts, by alternatives, to any T. and E. species that may occur within this project area - the public has no information regarding the impacts of this project upon many species of concern.

10 | 7) Mitigation is not the same as protection - and the DEIS is relying upon mitigation to insure protection for important cultural sites and forT. and E. species. We disagree that mitigation can be sufficient to insure protection for these important resources - and the DEIS fails to rate the effectiveness of the mitigation measures. NEPA requires that mitigation measures not merely be listed - which the DEIS failed to do - but also be rated for the effectivenss and liklihood of actually aceiving these protection measures.
The DOE has a terrible past track record of protecting natural resources and cultural sites. Mititigation measures in the past have not been sufficient to protect groundwater pollution and contamination from LANL and DOE operations. There is continuing contamination from DOE facilities to groundwater and soils,

11 | and air quality, and leaking waste facilities and discharge sites. The DEIS fails to acknowledge the ineffectiveness of current mitigation to keep radioactive and hazardous waste materials out of soil and groundwater resources throughout the LANL complex, and extending far outside of the boundaries of DOE lands, as far as the Rio Grande.

We appreciate the opportunity to comment on this DEIS, and would like a reply to our concerns both now, and in the Final EIS.

We hope that in the future, the DOE and LANL will not wait for a citizen group and a judge's order to comply with the law.

Sincerely, Joanie Berde for Carson Forest Watch and La Comunidad Citizens Groups

Copies to: Congressman Bill Richardson, Los Alamos Study Group

Comment 12, page 1

Citizens for Alternatives to Radioactive Dumping
144 Harvard SE
Albuquerque, New Mexico 87106
June 21, 1995

Ms. Diana Webb, DOE/LAAO
528 35th Street
Los Alamos, New Mexico 87544

Dear Diana:

The following are CARD's comments on the DARHT:

CARD opposes projects which continue to nuclear weapons work which has for fifty years produced contamination for which there are no acceptable environmental solutions.

The DARHT program is a "stockpile stewardship program" and should be examined along with all other such programs in that programmatic EIS. In his decision Judge Mechem ordered the DOE to place the 1 DARHT in context, considering all related actions. That is best done in a programmatic EIS. The DARHT is also part of the site-wide EIS process and therefore should not receive any decision until that process is completed.

2 There are many complex environmental aspects to this project which are not addressed in the EIS. Among these are the geology of the site, the potential for migration of contaminants into groundwater and the dangers of transporting reprocessed plutonium to LANL.

3 The need for DARHT has not been established to our satisfaction. All the evidence we have read indicates that the stockpile does not age. There is not clear reason for this huge project given that 4 evidence. The environmental danger of a project which has no practical value to the citizens of New Mexico must be seriously questioned.

5 LANL is notoriously out of compliance with environmental laws. This situation must be rectified before any new facilities are constructed. The DARHT should receive the No Action alternative.

Sincerely,

Garland Harris

Garland Harris
Public Information/
Liaison Director



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US DOE/LAAO - IN

Comment 13, page 1

Comments to the

United States Department of Energy

on the

Dual Axis Radiographic Hydrotest Facility

Draft Environmental Impact Statement

June 29, 1995

Submitted by

Jay Coghlan, Research Analyst

for

Concerned Citizens for Nuclear Safety

to

Ms. Diana Webb
DARHT EIS Project Manager
Los Alamos Area Office
U.S. Department of Energy

DARHT's Purpose and Need

Until 1993, DOE and LANL budget requests described DARHT as a weapons design facility. LANL and DOE now argue that DARHT is critically needed to ensure the safety and reliability of an aging stockpile of nuclear weapons. Existing American nuclear weapons have already been demonstrated to be safe and reliable through more than a thousand full-scale tests. Because the great majority of defects (if any) are found in the first few years of a weapon's life, confidence in a weapon actually increases with age. Furthermore, virtually all defects are mechanical and nonnuclear in nature and have nothing to do with the primaries that DARHT would study. Nevertheless, the Purpose and Need Section of the DARHT DEIS carries a number of unsubstantiated and ominous warnings. *"The sooner that DOE can obtain better diagnostic information, the sooner the Nation can determine if its existing nuclear deterrent is sufficient."* Who is there that argues that our nuclear deterrent is not sufficient? If it is not sufficient, why is the U.S. engaging in strategic arms talks? Another unsubstantiated statement reads, *"DOE has considerable evidence to indicate that, as weapons age, problems related to the deterioration of weapon components can and do occur."* Statements like these demonstrate a replay of the national security argument that was found wanting in the DARHT preliminary injunction proceedings. As the Judge stated in granting a preliminary injunction, "Ample evidence points to the fact that the existing nuclear stockpile is, at this time, safe and reliable."[1] With present safety and reliability established, purpose and need questions are then directed to the future, based on what past experience has taught and where DARHT fits into the reconfigured nuclear weapons complex.

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In dismissing programmatic review in advance of the DARHT DEIS, DOE states in the DARHT IP:

[1] Memorandum Opinion and Order, Judge E.L. Mechem, January 26,1995, p.30. The Judge was referring to, among other things, to March 15, 1994, testimony to Congress by Dr. Harold Smith, Assistant to the Secretary of Defense, Atomic Energy, DOD:

> I am pleased to report the stockpile is safe, secure, reliable, and meets the current military requirements...Our stockpile is becoming safer and more reliable simply because we are retiring older weapons...Thus, we should enter the 21st century with a modern, safe and reliable stockpile consistent with the demands of START I and with anticipated military requirements.

This statement was made in the presence of Dr. Victor Reis, Assistant Secretary for Defense Programs, DOE, who added:

> Right now, as Dr. Smith has said, that stockpile is safe and reliable.

> [I]t is appropriate to proceed at this time with the DARHT EIS because the enhanced diagnostic capabilities proposed for DARHT are urgently needed to evaluate and assess the safety and reliability of the existing but aging nuclear weapons stockpile, particularly in the absence of nuclear underground testing testing.[2]

This statement contains a number of issues which deserve careful examination. Safety and reliability will be discussed separately. With respect to other issues, the stockpile, rather than "aging", is becoming "younger" due to planned retirements of individual weapons systems. DOE has data on weapons with lifetimes as long as thirty years. In contrast, of the seven remaining weapons systems in the enduring stockpile, the oldest is now 17 years old, as shown below:

Remaining weapons systems	Year first placed in use
B61-3/4/10 (tactical bombs)	1979
B61-7 (strategic bomb)	1985
W76 (SLBM)	1978
W80 (ALCM)	1981
B83 (strategic bomb)	1983
W87 (ICBM warhead)	1986
W88 (SLBM)	1989[3]

The 1993 SNL *Stockpile Life Study Summary* ("Study") shows that 58% of existing defects have been discovered in a weapon's first five years and 80% in fifteen years.[4] Hence, it can be argued that confidence in a weapon actually increases with age and that due to ostensible future uncertainties that the stockpile (after planned retirements) is after all things considered, at an optimal age.

The new and reportedly adverse conditions imposed by the loss of underground testing are being used as the underlying rationale for the entire Stockpile Stewardship Program. Why then does the Study clearly state that "actionable" defects have never been first discovered in stockpile confidence UGT.[5] To the contrary, "actionable" defects have been first discovered in existing and robust surveillance programs with existing facilities. Of the 257 "actionable" defect types discovered, only 5% have involved the weapons primaries that DARHT would

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[2] *DARHT Implementation Plan*, USDOE, February 1995, ch.1-p.8

[3] Year first placed in use from *U.S. Nuclear Weapons*, Chuck Hansen, Arcofax, 1988

[4] Graph entitled "Average 'Actionable' Defect Types per Weapon-Year for Each Year Beyond FPU," 1993 SNL *Stockpile Life Study Summary*.

[5] Ibid, Graph entitled "Where the 257 "Actionable" Defects Types Were First Discovered"

study.[6] So, based on experience, of this 5% class of defects that DARHT would study, would not any age-induced phase change in pits be better examined by
3 metallurgical assay of the primary itself, rather than by hydrotesting of surrogate material? Or by detailed small-scale experiments using equation-of-state techniques? These analytical capabilities already amply exist.

The argument can be made that metallurgical assay and other techniques are not sufficient because potential mixing/boosting problems at the last stages of implosion need examination. But here DARHT is apparently not of great use.[7] These
4 comments then address the remaining, and perhaps key question: what is DARHT's utility in addressing aging effects on the implosion process. For example, DP Deputy Asst. Secretary Everett Beckner has alluded to the possible accumulation of helium along a "grain boundary" that would presumably affect implosion symmetry. Bearing in mind appropriate classification boundaries, potential aging effects such as
5 this need to be explained to in order to fully justify DARHT's rationale. What will be yet more difficult to explain is how existing surveillance programs and existing facilities cannot meet this type of problem. This is especially true given the planned FXR Upgrade, a possible single-axis PHERMEX Upgrade (see later section) and the lack of consensus on the benefits of dual-axis imaging. [8]

In combination, DOE's rationale of DARHT's critical urgency due to the aging of the stockpile and the absence of UGT is weak, compounded by doubts over the value of dual-imaging. These comments now turn to safety and reliability.

Nuclear Weapons Safety

In July 1991, Senior LLNL Physicist Dr. R.E. Kidder (now retired) completed his *Report to Congress: Assessment of U.S. Nuclear Weapons and Related Nuclear Test Requirements.* To the question of what fraction of nuclear safety problems

6 Ibid, Graph entitled 257 "'Actionable' Defect Types Grouped by Design Skill Categories"

7 "For a number of stockpile systems, particularly those that are designed with insensitive high explosives and fire-resistent pits, planned radiography upgrades do not provide resolution adequate to observe the gas cavity configuration of the primary stage late in the implosion process." *FY 1995 LANL Institutional Plan*, p.43

"The next frontier in radiography is in determining mix. It would appear that DARHT will not be capable of addressing the mix issue," Phillip Sprangle, DARHT Feasibility Assessment Independent Consultants *Final Report*, March 1995, p. 39.

8 "There was no consensus position presented to this panel on the needs and benefits of two beam radiography," Juan Ramirez, DARHT Feasibility Assessment Independent Consultants *Final Report*, March 1995, p.36.

have been traced to warhead aging effects, he responded:

> Safety problems within the warheads are generally inherent in the design of the warhead itself, not the result of aging or other causes....Metals corrode, and other organic materials such as plastics, adhesives, and HE that are present in a warhead will deteriorate with age. Such aging effects degrade a warhead's reliability rather than its safety....A severe case of aging was the deterioration of the HE in the W68 Poseidon warhead....The reliability, but not the safety, of the warhead was effected.

Aging effects on HE are frequently cited as of particular concern by DOE officials. To repeat, this poses potential reliability problems, but not safety problems. Dr. John Immele (LANL Associate Director for NW Technologies) stated at the December 8, 1995, DARHT scoping hearing that HE aging has never impacted weapons safety.

With respect to warheads whose designs are not considered inherently safe, Kidder states that: "a key element in improving the safety of the U.S. nuclear weapons stockpile is the timely retirement of most older warheads in the present stockpile." Planned retirements are already in process, as previously noted. Kidder creates a safety "report card" for warheads as follows:

A: Has ENDS, IHE, and RFP
B: Has ENDS and IHE
C: Has ENDS

In combining Kidder's report card and the seven remaining weapons systems in the post-year 2003 enduring stockpile, we have the following grading:

B61-3/4/10 (tactical bombs)	B
B61-7 (strategic bomb)	B
W76 (SLBM)	C
W80 (ALCM)	B
B83 (strategic bomb)	A
W87 (ICBM warhead)	A
W88 (SLBM)	C

Note that all of these warheads are already certified one-point safe, that is the chances of significant nuclear yield is less than one in a million if the warhead's HE is detonated at any one single point. The B83 and the W87 have already have the highest modern safety ratings. With respect to the remaining warheads that lack RFPs and particularly RFPs and IHE, Kidder points out that modifications to operational handling procedures, rather than improved inherently safe designs, would vastly improve weapons safety. One modification would involve keeping

missiles and warheads apart during loading. Another would prohibit air transport in the case of the SLBM warheads, for which air transport is not necessary anyway. Both of these operational procedures have, for the most part, been implemented since Kidder's report.

Hence, safety areas that DARHT could ostensibly study would be the introduction of RFPs and IHE to warheads that currently lack them, or the substitution of warheads already incorporating these features to replace them. Retrofitting FRPs to missile-launched warheads would likely have little benefit because of the high burn rates of missile propellant. Fueling changes to nondetonatable propellant would have higher benefit. Ironically, the SLBM warheads were not designed with the less energetic IHE to begin with because its use would have produced less yield. The following testimony by Dr. Robert Barker (former Assistant to the Secretary of Defense on Atomic Energy) is an admission that these warheads are considered safe enough:

> The Air force and the Navy, in cooperation with the Office of the Secretary of Defense and the Energy Department, evaluated the safety of all ballistic missiles that carry nuclear warheads. It was determined that there is not sufficient evidence to warrant changing either the warheads or the [missile] propellants."[9]

6 Finally, huge costs would be necessary to affect marginal improvements in safety. It is CCNS' view that DARHT would have little, if anything, to do with addressing safety issues. We feel that the burden is on the Department to demonstrate otherwise.

DARHT and Stockpile Reliability

It is difficult for the public to get an idea of the reliable status of the stockpile. Fortunately, the 1993 SNL *Stockpile Life Study Summary* exists to shed some light on what past defects have been and what can be expected in the future. The aging process, of course, begins for a nuclear weapon immediately at its "birth." According to the Study, defects as a whole have been relatively rare. By inference, all past defects deemed serious enough to be "actionable" have been fixed with existing surveillance programs and existing facilities. Fully half of the proposed change orders to correct "defects" have been prompted by changes in mission or newly desired military characteristics, rather than by the weapon being defective as the

[9] Quoted in Tom Zamora-Collina, "New Jobs for Old Labs," *Bulletin of Atomic Scientists*, November 1992, p.16.

word is commonly understood.

According to the Study, aging defects have remained essentially flat over weapons life times as long as 28 years. To the question of how long do nuclear weapons last, the Life Study responds "although nuclear weapons age, they do not wear out; they last as long as the nuclear weapons community (DOE and DoD) desires."[10] It further states that "we can find no example of nuclear weapon retirement where age was ever a major factor in the retirement decision." It also graphically illustrates that out of all types of defects, only 4% have caused a reliability decrement greater than 10% and that only 5% have involved weapons primaries. Finally, the Study anticipates that only one "actionable" defect will be discovered per year.

In CCNS' view, reliability and overall stockpile confidence are tightly linked to the preservation of original warhead designs that have already been fully proof tested. We note that one expressed purpose for DARHT is the development of stockpile improvements.[11] This begs the question of what is a stockpile improvement. If this is a design improvement that varies significantly from original design, CCNS feels that it undermines the stated mission justification for DARHT as a facility necessary for ensuring stockpile reliability. Substantial modifications to a warhead (or more precisely its primary) would introduce large uncertainties. To the extent that DARHT would encourage modifications, it would work counter to stockpile reliability.

7 In sum, Chapter Two of the DEIS, *Purpose and Need for DOE Action*, is artificially constricted to a discussion of DARHT's proclaimed criticalness in helping to ensure the safety and reliability of the stockpile. We believe that the DARHT safety and reliability argument is greatly exaggerated, if not totally invalid. Chapter Two is capricious in ignoring two other likely and significant areas of activity for DARHT. These are DARHT's possible roles in design and weapons remanufacturing, which are discussed below.

DARHT's Possible Role in New Weapons Designs

The DEIS frequently states that current national policy prohibits new development of nuclear weapons. *"The United States has halted the development of new*

[10] The Study also asks the question what is required to keep nuclear weapons in the stockpile. Its conclusion is that the stockpile needs active stewardship which requires a complete RDT&E team. CCNS does not argue with that conclusion, only that ample stewardship (surveillance) is already amply available and that DARHT is not required.

[11] Quotes from the FY 1996 LANL Capital Assets Management Plan DARHT Activity Data Sheet.

nuclear weapons systems." (DEIS page 2 - 11) *"In 1991, the President stated that the United states would not design new nuclear weapons in the foreseeable future."* (DEIS page 2 - 9)

There is much evidence to the contrary. In reaching a decision to proceed with DARHT, DOE relied heavily on the advice of the HPAIC. One member of that consulting group quotes the Defense Science Board Task Force on Pit Re-Use's conclusion:

> Although the size of any future nuclear weapon stockpile is likely to be very much smaller than the one we have today, it is most unlikely that this stockpile would be merely a subset of the existing stockpile.

This HPAIC member (Richard Wagner, former LLNL Executive Associate Director and former Assistant to the Secretary on Defense Atomic Energy) writes

> A major thrust during the current transition period should be to develop warhead designs which, if retrofitted into the smaller enduring stockpile, would be better suited to live with the ensuing decades of the new era. Being sure that the stockpile is able to conform to even more stringent future safety and security standards, by retrofitting with warhead designs which are inherently safer and more secure, is one much discussed aspect of this. Less discussed, but even more important in my view, is the question of confidence in the reliability over long periods of time, especially if there were to be a cessation of nuclear testing. This can be addressed by retrofitting with warhead designs that are less likely to experience physical degradation over long periods of time, that have more margin to retain performance if degradation occurs, whose performance can be assessed more easily (preferably with less reliance on nuclear testing), and that, if needed, could be more easily retrofitted or remanufactured in the more austere production facilities of the future.[12]

Mr. Wagner is presumably referring to the "robust" warhead. That design work on robust concepts is both ongoing and anticipated in the future is indicated in both the SNL FY 1995 Institutional Plan[13] and the LANL FY 1995 Institutional Plan.[14]

[12] (HPAIC *Hydrotest Program Assessment*, October 1992, page D-15)

[13] "The former paradigm of Phase 1 and Phase 2 feasibility studies is being largely replaced by less formal taskings that relate to the foregoing issues.... Newer taskings address robustness, long life, command and control, and nonproliferation. [ch. 7-p. 12, emphasis added] *FY 1995 SNL Institutional Plan*

Wagner goes on to state [in context] that hydrotesting capability is indispensable for assessment of primary performance issues addressing robustness.

In addition to work on robust concepts, design teams may be working on new earth-penetrating weapons as the SNL FY 1995 Institutional Plan indicates.[15] This is buttressed by comments on radio June 20 by the head of LANL's hydrodynamic program. If I heard him correctly, he stated that the B-53 warhead was being studied for earth-penetrating applications. The B-53 has the largest yield (9 megatons)[16] of any American warhead ever deployed.[17]

This earth-penetrating work may not involve the development of new physics packages, but instead the mating of existing physics packages to new delivery systems. Dr. Kidder points out how hydrodynamic facilities are particularly useful to effect that mating:

> If nuclear test restrictions were such that no new warhead or bomb designs could be added to the stockpile, an important question that would arise is the extent to which weapons already in the stockpile could be used in new and different delivery systems from those for which they had originally been designed....The materials, and their location, that surround the nuclear assembly system of the warhead or bomb can influence its performance in two ways. They can influence the HE-driven implosion hydrodynamically, and they can influence the nuclear performance neutronically....The hydrodynamic influence can be checked by conducting a test implosion producing less than 1kt of explosive yield, *or under conditions in which there is no nuclear yield at all.* The neutronic influence would be calculated with existing large "super-computers."[18] [emphasis added]

[14] Under *Extended Weapons Lifetimes and Options for Improved Safety and Security*: "Future initiatives may include the application of robust design concepts from a current DoD/DOE study to assess proposed strategies for replacing weapons in the stockpile in the absence of nuclear tests and an extensive production complex." (*FY 1995 LANL Institutional Plan*, p. 36)

[15] "We are working with Phillips Laboratory to support its Ballistic Missile Technology Program with maneuvering, guidance and control, kinetic energy penetrators, and earth-penetration warhead technologies...." (emphasis added, *FY 1995 SNL Institutional Plan*, ch.7 - p. 61)

[16] *U.S. Nuclear Weapons*, Chuck Hansen, Areofax, 1988, page 199

[17] The Draft FY 1996 Interagency SSP Plan contains the topic header of Replacement of the B-53 with discussion deleted.

[18] *Maintaining the U.S. Stockpile of Nuclear Weapons During a Low-Threshold or Comprehensive Test Ban*, Dr.R.E. Kidder, October 1987, page 9

8 Given substantial evidence that design work is continuing (or is anticipated) in some capacity on both robust concepts and earth-penetration weapons systems, the DARHT DEIS needs to modify its assertions (or implications) that there is no ongoing design. Distinctions need to be made as necessary between the possible development of new physics packages and the mating of existing physics packages to new delivery systems. The role that DARHT can play in both tracks needs to be made clear and included in the FEIS.

DARHT's Role in Weapons Remanufacturing

On February 14, 1995, DP Asst. Secretary Victor Reis was quoted in *The Albuquerque Journal* as stating to a Los Alamos audience, "The laboratories have to take on a manufacturing role." In the article, he also acknowledged that using the laboratories as production sites is the primary option under study for the reconfiguration of the complex.[19] As reported, Reis pointed to the need to begin remanufacturing pits for warheads sometime in the years 2000-2003, with the numbers being in the hundreds. That LANL officials have been aware of this likely remanufacturing role for some years now is amply demonstrated by the following:

> "The capability to fabricate a modest number of new warheads or remanufacture those in the enduring stockpile will be optimally located at the chosen nuclear-materials storage and processing site. (One way of assessing the needed capacity for fabrication is to compare the number of weapons in the long-term stockpile with a typical weapon lifetime. From this basis we can estimate a need for about 100 to 200 units per year).....In the future the traditional distinction between responsibilities of the production complex and the design laboratories will become somewhat more diffuse."[20]

Bear in mind that LANL has the only presently operating processing site for plutonium (PF-4 at TA-55) in the country. Additionally, the Nuclear Materials Storage Facility's design problems are currently being corrected, which may provide for a possible expansion in capacity.

[19] In CCNS' view, this effectively demonstrates a predetermination to pursue the upgrade and modification alternative proposed in the 1993 Reconfiguration PEIS Revised Notice of Intent. This is further discussed in the programmatic section of these comments.

[20] "Redefining the U.S. Nuclear Weapons Program and the DOE Nuclear Weapons Complex", *1993 Los Alamos Science*, John D. Immele (LANL Associate Director for NW Technology) and Phillip D. Goldstone (Chief Scientist for LANL ICF Programs), page 47.

The 1993 LANL Strategic Plan ("Plan") is explicit in stating that the Lab's "unique reason-to-be" will remain nuclear weapons technologies, and makes clear that LANL's goal is to become "the prime...steward for the nation's stockpile."[21] According to the Plan, the expanded LANL role would involve the following manufacturing capabilities:
--fabrication of plutonium triggers,
--manufacture of uranium components,
--manufacture of lithium components,
--fire-testing of new plutonium pits at full scale,
--expanded plutonium and SNM storage,
--loading of tritium into nuclear weapons,
--further development of plutonium and uranium processing technologies,
--development of tritium manufacturing techniques,
--manufacture of detonators for weapons, and
--fabrication of beryllium components.
The attainment of these capabilities would then give the Lab the ability to manufacture compete nuclear weapons.[22]

The June 1995 SS&M PEIS Notice of Intent states that the following matrix of proposed alternatives has been developed for Stockpile Management (attached):

Note that under this matrix, LANL would be assigned responsibility for five out of six capabilities. LANL also has obvious capabilities for the one nondesignated activity (weapons assembly/disassembly).

A February 16, 1995 LANL memo anticipates and discusses likely production activities assigned to LANL in the future SS&M PEIS ROD. Of the four assignments, it is the plutonium production assignment that DARHT would likely directly or indirectly support. That memo states:

> This [SS&M] PEIS will likely cite Los Alamos as the source of something like 150 pits per year to be supplied for renewal builds. Present thinking involves the dedication of one of the four wings of our plutonium facility, PF-4, to be modified to demonstrate modern process and, incidentally, produce 50 pits per year....The other 100 pits to make up the 150 total per year would be obtained by examining and requalifying pits from disassembled weapons of the same type.[23]

[21] *The 1993 LANL Strategic Plan*, p. 13

[22] Ibid, p.27

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The point of the above discussion is to illustrate that expanded plutonium production and weapon remanufacturing operations are certainly reasonably foreseeable activities for LANL.

The use of DARHT's capabilities *"is a cornerstone* of Los Alamos nuclear competence, stockpile maintenance, and *potential weapons remanufacture."* DARHT's time-sequenced view capability "not only improves design capability ...but also *provides a benchmark for comparison for remanufacturing or stockpile maintenance."* Without DARHT, *"development schedules for stockpile improvements*...will be longer than necessary."[24] (emphasis added)

The FY 1996 LANL CAMP is explicit in pointing out DARHT's future strong role in weapons remanufacturing, which all of the evidence cited above points out will be a likely activity at LANL. The DEIS is completely deficient in even mentioning the
9 subject of weapons remanufacturing and the role that DARHT will play in that activity. Judge Mechem, in issuing a preliminary injunction against construction of DARHT, ruled that DOE must prepare a comprehensive EIS that includes disclosure and evaluation of "how each major federal action involving the construction and operation of the DARHT facility, *in conjunction with all related or connected actions, as well as past, present and reasonably foreseeable future actions,* cumulatively or synergistically impact the quality of the human environment."[25] (emphasis added) Hence, the DEIS must discuss programmatic concerns and impacts surrounding weapons remanufacturing activities at LANL and the role that DARHT can play as a magnet facility in attracting those activities to begin with. DOE is better yet advised to complete the SS&M PEIS in advance of the DARHT EIS in order that these programmatic concerns can be adequately addressed.

DARHT's Impact on Nonproliferation Issues

CCNS and LASG requested that a proliferation analysis be performed for DARHT analogous to the one being prepared for the National Ignition Facility. Asst. Secretary Victor Reis responded in an April 1995 letter denying the request. His basis for denial was that DARHT (unlike NIF) "would be used solely in support of Defense Programs activities such as counter-proliferation and support of the Stockpile Stewardship Program to maintain the safety and reliability of the

[23] LANL Memo, "Manufacturing Assignments and the PEIS", February 6, 1995

[24] Quotes from the *FY 1996 LANL Capital Assets Management Plan* DARHT Activity Data Sheet.

[25] Decree of Preliminary Injunction, Judge E.L. Mechem January 26,1995, p. 2

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remaining U.S. stockpile of nuclear weapons. However, under present U.S. policy, the DARHT facility will not be used to support the design of new nuclear weapons." His reasoning was that as a DP facility, users of DARHT would not include foreign nationals and that strict classification barriers would prohibit the proliferation of weapons-relevant data. Possible new weapons designs have already been discussed in the preceding section.

CCNS agrees with the Asst. Secretary within the narrow question of the future composition of users that direct proliferation of weapons-relevant data is unlikely to occur. However, the intent of our request was to raise broader and, we believe, more serious proliferation concerns. Note that it is only present policy that prohibits the use of DARHT as a weapons design facility. The Nuclear Weapons Posture Review explicitly directs that design capabilities be maintained. The Draft Interagency FY 1995 Stockpile Stewardship Program (SSP) Plan follows that directive, even to the point of maintaining the capability "if it becomes necessary, to reconstitute the nuclear force." CCNS believes that there is no safety and reliability crisis that necessitates the construction of DARHT before programmatic review. CCNS believes that the SSP provides political cover for reconfiguring the nuclear weapons complex. The Sandia National Laboratory FY 1995 Institutional Plan states that "new nuclear weapons may be developed in response to changing military requirements" and that "the new weapons procurement strategy calls for ongoing development of advanced weapons systems" which may not be immediately produced in quantity, but the capability to do so, if needed, will be preserved. To summarize, it is only present policy that reportedly prevents the use of DARHT for design purposes even as the capability for design is being deliberately preserved.

10 CCNS desires that the DARHT FEIS and ROD will explicitly state that current national policy prohibits the use of DARHT as a design facility. This question then logically follows: what if national policy changes such that DARHT is used for design purposes? What vehicle exists to examine both that policy and the role that DARHT could then play in encouraging proliferation through the undermining of the NPT and possible commitments made in the future CTBT? Is it then appropriate to revisit the purpose and need section of the DARHT FEIS? On the assumption that increased activity would coincide with the use of DARHT as a design facility, would there likely be additional environmental impacts above those currently projected? Finally, would the use of DARHT as a design facility trigger the need for a proliferation analysis as we had originally requested, either within DARHT's established NEPA framework, or outside of it?

Underlying the question of whether DARHT could be used for future nuclear weapons design is the more fundamental issue of whether DARHT is helping to

achieve national and international nonproliferation objectives. Even if one accepts at face value DOE's contention that DARHT will be solely used to help ensure the safety and reliability of the stockpile, there are still major nonproliferation issues. Thus far, the primary instrument in curbing the proliferation of nuclear weapons has been the NPT. The bargain at the core of the NPT is that non-weapons states forswore the acquisition of nuclear weapons. In exchange, the weapons states pledged to

> pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control." (Article VI, NPT, 1970)

Hence, to the extent that DARHT helps to preserve the U.S. nuclear weapons stockpile, it works directly against this international commitment to disarm. Future NPT review conferences may not not be as favorable for the U.S. as the one just completed in May 1995 should the weapons states not demonstrate a real commitment to disarmament.[26]

Lastly, there is the problem of international perception of DARHT's capabilities. The JASONS, writing before the recent NPT renewal conference, put it well:

One worrisome aspect of the Stewardship program is that it may be perceived by other nations as part of an attempt by the U.S. to continue the development of ever more sophisticated nuclear weapons. This perception is particularly likely to be held by countries which are not very advanced technologically since they are less able to appreciate the limits on advanced weapons design that a lack of testing enforces. The stewardship program, *unless managed with restraint and openness*, including international collaboration and cooperation where appropriate, might end up as an obstacle to the Non-Proliferation Treaty.[27]

[26] CCNS is not advocating unilateral disarmament. CCNS believes that eventual global disarmament should be accomplished through deliberate and carefully phased multilateral arms reductions such as continuing and progressive START schedules involving all declared and undeclared weapons states. Important initial steps towards disarmament are the achievement of a CTBT, a global freeze on the development of nuclear weapons systems (not just physics packages), and the proportional reduction of all stockpiles into the hundreds. CCNS believes these worthy goals are attainable if the U.S. would provide critically needed global leadership.

[27] *Draft Stewardship Report*, JASONS, August 1994, p. 16

11 With the above discussion in mind, CCNS finds the DARHT DEIS section 2.5 *Nonproliferation* far too brief, full of erroneous assumptions and therefore inadequate. Through omission, DOE is demonstrating that it is not taking DARHT'S potential impacts on proliferation into serious consideration. The FEIS and ROD need to correct this deficiency.

DARHT DEIS quotes (Sec. 2 - p. 11) and comments follow:
"DOE has determined that enhanced hydrodynamic testing capability in support of the science-based stockpile stewardship program is consistent with the United States policy on nonproliferation." "The hydrodynamic program, when used to assess the safety and reliability of the nuclear weapon primaries in the remaining stockpile, does not constitute proliferation." In the case of DARHT, its use for design could have severe international implications and impact the NPT and future CTBT. Even without design work, it can still impact these treaties, as discussed.

"The Nation's commitment to nonproliferation is demonstrated by... our goal of achieving a comprehensive test ban treaty." Fortunately, as of this writing, proposals being advanced by the Pentagon, with the apparent strong backing of LANL personnel, seeking permissible testing limits of up to 500 tons TNT equivalent under a future CTBT are being rebuffed by the present administration. These proposals demonstrate that our national commitment to a CTBT is shaky and often contradictory.

"The United States has halted the development of new nuclear weapons systems." In CCNS' opinion, the Department and the weapons laboratories have misled the public through the use of phrases that imply that all nuclear weapons research has been terminated. The DARHT FEIS should use precise language in describing what phases of nuclear weapons research still continue, and distinguish between research and development on physics packages and delivery systems, as needed. DARHT's possible role in both should be acknowledged as well.

In the past there have been seven specific phases in a weapon's life cycle. Phase 3 and 4 are development engineering and production engineering. In the phrase quoted above, does DOE mean that no new weapons have reached these phases? In any event, the FY 1995 SNL Institutional Plan makes clear that the formerly sharp distinction between design and production will be greatly blurred in the future complex[28] and that new designs can be held "on the shelf" waiting for

[28] "Sandia has demonstrated feasibility of a very tight coupling of design and production processes... Weapon system designers will be able to determine quickly if their designs are manufacturable within the available production systems." (ch. S - p.3) "Flexible integration of research,development, and

production.[29] Hence, the question of whether a weapon has actually gone into engineering and production as opposed to just design is becoming less relevant. The SNL Institutional Plan also indicates that some Phase 1 and Phase 2 work is ongoing, though the nomenclature for these two phases may be obsolete.[30]

12 A final proliferation concern with DARHT is that the facility can spread technologies that while unclassified nevertheless directly support nuclear weapons technologies. Once these technologies are transferred, there is no practical way to restrict their further proliferation, no matter how stringent possible transfer agreements might be. The linear accelerator and radiographic technologies being developed for the facility are being actively shared with France.[31] France has proliferated nuclear weapons technologies in the past to Israel and Iraq (even building military reactors for both countries).[32] Israel, in turn, proliferated nuclear weapons technologies to South Africa.[33] With Iraq, the U.S. of course had a major war, partially out of concern over its development of a nuclear weapons program. Hence, sharing nuclear weapons-relevant technologies can ultimately have unintended and unanticipated effects.

Finally, it is worthwhile to note the JASON *Draft Stewardship Report* quote: "[I]n contrast to ICF, hydrotesting can be of great use to a proliferator designing a first weapon, or refining an existing device."[34]

Experimental Plutonium Use at LANL

DOE has a position that hydrodynamic experiments involving the use of plutonium will not be conducted at Lawrence Livermore National Laboratory. The DARHT

production sites into seamless virtual factories... will involve some production responsibilities." (ch. 5 - p.57) *FY 1995 SNL Institutional Plan*

29 Ibid: "The new weapons procurement strategy calls for the ongoing development of advanced weapons systems...In contrast to past practice, however, these new weapons systems may not be immediately produced in quantity. Instead, the nation will retain the capability to produce them quickly in response to threatening world conditions." (ch.7 - p.13) *FY 1995 SNL Institutional Plan*

30 Ibid: "The former paradigm of Phase 1 and Phase 2 feasibility studies is being largely replaced by less formal taskings that relate to the following issues...Newer taskings address robustness, long life, command and control, and nonproliferation." (ch.7 - p. 2) *FY 1995 SNL Institutional Plan*

31 Asst.Secretary Victor Reis letter to CCNS and LASG, April 1995

32 Critical Mass, Burrows and Windrem, Simon & Schuster, 1994, pp. 186 - 187

33 Ibid, p. 449

34 *Draft Stewardship Report*, JASONS, August 1994, p.31

DEIS (section 3.3.4.) states "even with the planned upgrades [to the FXR] and the inclusion of the containment systems, DOE has no plans to conduct experiments with plutonium at Site 300." This smacks of being a political decision, rather than a technical decision. Obviously, the same laws of physics exist in California as they do in New Mexico. Why is New Mexico (and most probably Nevada as well) given the distinction of hosting these experiments? The DARHT FEIS should fully explain

13 why Livermore is excluded from plutonium hydrodynamic experimentation. Alternatively, if that experimentation is as vitally needed as DOE claims, a plutonium-use-at-Livermore alternative should be created for consideration in the FEIS. Given the age of Phermex and the Livermore plutonium prohibition, the exclusion of plutonium hydrodynamic experiments at LLNL demonstrates an inherent prejudice towards completing the preferred alternative and conducting plutonium hydrodynamic experiments at DARHT.

It is reasonable to assume that plutonium hydrodynamic experiments at DARHT would involve plutonium 242 as a substitute for plutonium 239. Plutonium 242

14 would likely be obtained and transported from SRP. The FEIS needs to analyze plutonium transport to DARHT from across the country.

DOE states that if plutonium testing were to be conducted at DARHT, those experiments would be performed in either separate containment vessels or in the full containment structure proposed in the Enhanced Containment Alternative.

15 Preliminary DOE information (October 1994) states that up to 10% of tests will be conducted in containment vessels, thus indicating that up to 10% of tests will involve plutonium. The possibility of leaks from the use of containment vessels (as proposed in the Preferred Alternative) needs thorough review. What is the demonstrated safety and reliability track record of these containment vessels?

A second issue related to the use of containment vessels is the necessary treatment of hazardous and radioactive constituents accumulated from vessel cleaning and recycling. In the case of the use of single-wall vessels, a separate recycling facility is to be built near DARHT (Sec. 3.7.1.). Description of that facility in the DEIS is only rudimentary. Double-wall vessels, according to the DEIS, would be handled the

16 same as under the No Action Alternative. The FEIS needs to provide information on both possible tracks. What are expected waste volumes and composition? Are liquid wastes created during the cleaning process? What analysis leads to the decision to use single- or double-walled vessels?

A DARHT Alternative in the Draft FY 1996 LANL Institutional Plan?

DOE is all too aware of DARHT's NEPA history and LANL's NEPA compliance in general. There is little point in reviewing it here other than to note that, in CCNS' view, programmatic review in advance of all other levels of review is required to fully correct that history. In any event, one would assume that DARHT's NEPA history would have by now instilled a great degree of caution in DOE?LANL. The court ordered DOE to disclose and evaluate in the DARHT EIS a "reasonable range of alternatives to each major federal action involving the construction and operation of the DARHT Facility, as listed in the Notice of Intent referred to above [the DARHT EIS NOI]." As a result, six alternatives are now listed in the DEIS, including an Upgrade PHERMEX Alternative. That alternative is described as

> Construction of the DARHT Facility would not be completed although its building would be completed and put to other uses. Major upgrades would be constructed at PHERMEX, and the high-resolution radiographic technology planned for DARHT would be installed at PHERMEX, including a second accelerator for two-axis imaging.. DOE would perform some hydrodynamic experiments; those involving plutonium would be conducted in containment vessels.[35]

In the Draft FY 1996 LANL Institutional Plan is the following:

> The Laboratory will continue to develop the capabilities of its Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX) while preparing for DARHT's availability, assuming favorable disposition of the Environmental Impact Statement. Plans are to provide PHERMEX with a double-pulsed capability that, combined with Laboratory developments on a time gated, large-format gamma camera, will provide two images late in the implosion, giving important information about the time evolution of implosion features. The upgraded PHERMEX will also provide higher doses. These PHERMEX improvements will help meet experimental needs until DARHT is available and then will enable scientists to take immediate advantage of the greatly improved capabilities of DARHT.[36]

17 Is this not a second Upgrade PHERMEX Alternative, which also can be a valid alternative to DARHT? Is this not essentially an introduction by LANL of a new

[35] *DARHT DEIS Executive Summary*, May 1995

[36] *DRAFT FY 1996 LANL Institutional Plan*, May 30, 1995, pp.14-15

17 deck after formal alternatives have already been designated and scoping comments and the DEIS already prepared? What is the difference between this PHERMEX upgrade and the other? The obvious answer is that the first PHERMEX upgrade would provide the facility with two-axis imaging. However, it remains to be determined if DARHT will receive two-axis imaging, based on the performance of the first axis. That is the precise reason why the DARHT project was divided into the two distinct line items of installation of the first axis followed by the second. Secondly, it should be noted that a significant minority (3 out of 9 members) of the HPAIC expressed doubts over the cost benefits of a second axis.[37]

As stated, LANL PHERMEX Upgrade plan is to provide the facility "with a double-pulsed capability that, combined with Laboratory developments on a time gated, large-format gamma camera, will provide two images late in the implosion, giving important information about the time evolution of implosion features. The upgraded PHERMEX will also provide higher doses." The JASONS, a group of scientists who advise DOE, discuss an FXR upgrade in its Draft Stewardship Report:

> A proposed $5M upgrade to the FXR accelerator will allow double pulsing (and hence, when coupled with the active gamma-ray camera, dual images separated by several microseconds) in 1997. This advance will be at the expense of a decrease by a factor of 7 in dose, which should be more than compensated for by the higher sensitivity of the gamma ray camera.[38]

The above suggests that an upgrade without dual-axis imaging can provide important new capabilities to PHERMEX, especially given that its dose would not only <u>not</u> be reduced, but increased. Replacement parts for PHERMEX would not an insurmountable problem if the will is there to ensure supply. CCNS believes that this type of upgrade to PHERMEX is a valid alternative to DARHT, and would
17 address the proliferation concerns addressed in these comments as well. It should be recognized as such and analyzed in detail in the FEIS.

[37] "Prior to the construction of the second leg of the facility, I would suggest a comprehensive review of the experience of others with dual-axis experiments," Dave Hall. "The second DARHT leg will be useful, but no nearly so important as attaining or exceeding the accelerator performance goals for the first leg," Ray Pollack. "However, these uses and possibilities [of dual-axis experiments] seem to be nicities rather than significant capabilities, And they hardly justify the cost (and relative inflexibility) of a second LIA axis, with a fixed focal point and severe constraints on containment sphere design," Seymour Sack. *Hydrotest Program Assessment*, HPAIC, October 1992

[38] *Draft Stewardship Report*, JASONS, August 1994, p. 26

Hydronuclear Testing at DARHT?

It is clear that DOE and the weapons laboratories desire expanded hydronuclear testing programs. A May, 1995, LANL publication on nuclear weapons stewardship states "our plan is to gather baseline hydrodynamic and hydronuclear data on all stockpiled weapons systems." The 1995 LANL Institutional Plan says essentially the same.[39] The 1995 Draft Interagency Stockpile Stewardship Plan has six references to hydronuclear testing. Described as a planned activity for FYs 1996 and 1997 is the performance of baseline hydronuclear experiments. In all documents, hydrodynamic and hydronuclear experiments are often mentioned in some combination to each other.

It is well known that LANL conducted underground hydronuclear experiments during the testing moratorium of October 1958 to September 1960, reportedly to solve one-point safety problems. In their 1988 LANL publication *Hydronuclear Experiments*, authors Thorn and Westervelt state that in the late 1950's it was recognized that contained hydronuclear experiments were theoretically possible. The operating procedure of "creep-up,"which involves the graduated addition of fissile materials until a subcritical nuclear reaction becomes detectable, makes contained hydronuclear experiments feasible.

We know that in FY 1992, work was being done at LANL on CONVEX projects. The FY 1997 LANL CAMP states that the LANL Physics Division continues to have an important involvement in CONVEX projects. The 1988 Westervelt article states that the largest fission yield in the 1960's experiments was four tenths of a pound (HE yield not given). In early 1993, LANL took possession of a vessel that can contain up to 22 pounds TNT blast equivalent. As previously mentioned, up to 10% of experiments at DARHT can be contained plutonium experiments. Under present U.S. proposals for the CTBT, nuclear experiments with fission yields of four pounds TNT equivalent would still be permissible. Given this, and the feasibility that hydronuclear tests at this level can be contained, can DOE and LANL categorically state that no experiments at DARHT at any time will be hydronuclear experiments? 18 Can DOE categorically state that no experiments at DARHT will ever result in fission reactions? If the answer is yes, that should be so stated in the FEIS and reflected in the ROD. A future decision to perform hydronuclear tests at DARHT

[39] Under Stockpile Surveillance: "Initiatives include an expanded materials evaluation program to determine weapons-material properties as a function of age, a high-fidelity joint test assembly (JTA) flight test program, a proposed stockpile hydrotest/hydronuclear experiments program, and development at LANSCE [the Los Alamos Neutron Scattering Center] of fast-neutron radiography to provide a valuable new tool for nondestructive component evaluation." (emphasis added) *FY 1995 LANL Institutional Plan*, page 36.

would then constitute a significant change of mission.

18 On the other hand, if the answer is that hydronuclear testing may be performed at DARHT, the section on nonproliferation in the Draft EIS should be rewritten. That section states that our country's commitment to nonproliferation is evidenced by our goal of achieving a CTBT as soon as possible. The main obstacle presently in place towards achievement of a CTBT is the declared weapons states' intention to retain varying levels of permissible testing. If there are to be hydronuclear tests at DARHT, an analysis needs to be performed on the facility's possible impacts on the 18 CTBT, in addition to appropriate environmental analysis. It is not sufficient to hide behind classification barriers on this subject. DOE needs to completely rule out hydronuclear testing at DARHT or, in the alternative, open up the NEPA process to a full discussion of its implications.

The Need for Programmatic Review in Advance of the DARHT EIS

19 An inverted pyramid of DOE NEPA compliance presently exists where specific projects are driving broad programs. DARHT is the most timely and cogent example. In the case of this facility, ongoing construction began before its recently announced EIS which in turn will be completed before an updated LANL Sitewide EIS is prepared. All of these are advancing before broad programmatic review of the reconfiguration of the complex. The heart of NEPA is public participation in federal decision making before decisions are implemented. The federal government should be expected to both logically formulate policy and to implement it through its NEPA analyses.

As previously noted, a 2/14/95 *Albuquerque Journal* article quotes Asst. Secretary Victor Reis as saying "The laboratories have to take on a manufacturing load" and that using the labs as production sites is the primary option under study for the reconfiguration of the complex. LANL is the only remaining facility with the capability to fabricate significant numbers of plutonium pits. LANL's assumption of a manufacturing role obviously represents a significant change in mission. To date, there is no NEPA foundation for review of that option on either the programmatic or site-wide level. The site-wide NEPA level may be "fixed" in a couple of years, but the public can have no confidence that it will address the programmatic drivers that will truly determine LANL's future.

The argument for programmatic analysis in advance of the DARHT EIS is as follows:

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1) The urgent need cited by DOE for DARHT and then used to dismiss programmatic analysis in advance of the DARHT EIS is doubtful, as discussed in the Purpose and Need Section;
2) Asst. Secretary Reis' remarks indicate that the prime option under study for the consolidation of the complex is that the labs will take on a manufacturing role. Specifically, LANL will be remanufacturing warheads in the near future.
3) There is presently no programmatic or site-wide NEPA basis for this prime option. Furthermore, pursuit of this prime option constitutes a predetermination to follow the upgrade and modify alternative proposed in the 1993 Reconfiguration PEIS Revised Notice of Intent. This PEIS was then terminated;
4) DARHT's capabilities are a "cornerstone for potential weapons remanufacturing." Judge Mechem ruled that all actions connected and related to DARHT must be disclosed and evaluated in the DARHT EIS. He also retained jurisdiction for the purpose of resolving potential disputes over the adequacy of the DARHT EIS;
5) There are then two possible remedies:
a) The DARHT EIS must be radically expanded beyond the scope of the present Implementation Plan and DEIS; or
b) The present Stockpile Stewardship and Management PEIS must be prepared in advance of the DARHT EIS.
6) Given that the ongoing consolidation of the complex is inherently programmatic in nature and DARHT's central role in that consolidation, programmatic review in advance of the DARHT EIS is appropriate.

Facts that directly or indirectly support the need for programmatic review in advance of the DARHT EIS: [all emphasis added]

Judge Mechem's ruling: In granting a preliminary injunction against further construction of DARHT, he ruled that DOE must prepare a comprehensive DARHT EIS that includes disclosure and evaluation of "how each major federal action involving the construction and operation of the DARHT facility, *in conjunction with all related or connected actions*, *as well as past, present and reasonably foreseeable future actions*, cumulatively or synergistically impact the quality of the human environment."

DARHT's relationship to future programmatic activities: : The use of DARHT's capabilities "*is a cornerstone of Los Alamos nuclear competence, stockpile maintenance, and potential weapons remanufacture.*" DARHT's time-sequenced view capability "not only improves *design capability* ...but also *provides a benchmark for comparison for remanufacturing* or stockpile maintenance."

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Without DARHT, "development schedules for *stockpile improvements*....will be longer than necessary."[40]

DARHT's relationship to the DOE complex: "*DARHT is intended as a user facility for the entire DOE complex*. Los Alamos has, in fact, recently conducted major hydrotests for both Sandia and Livermore. The DARHT facility can expand such cooperation, even to the extent of accommodating diagnostic equipment and personnel from other laboratories."[41] As such, DARHT transcends mere site-specific significance.

DARHT programmatically leads to further investments in hydrotesting facilities: 1) to begin with, $31 million for DARHT's second axis; and 2) the Advanced Hydrotest Facility (total estimated cost of $422 million; construction start date 9/1/08).

DARHT's central importance as a facility critical to the maintenance of stockpile safety and reliability has not been demonstrated: Until 1993 DARHT was described in DOE and LANL budget requests as a weapons design facility. It's sudden switch to a stockpile maintenance role is not credible given the declarations by senior authorities of a satisfactory level of stockpile safety and reliability. The September Nuclear Weapons Posture Review directed DOE to retain design capabilities for future, presently unforeseen needs. DARHT's design capabilities are no secret.[42] Given the likelihood of continuing testing constraints, DARHT's largely irrelevant utility to safety and reliability issues, and a commitment to retaining design capabilities, the conclusion that DARHT's real purpose remains as a design facility is reasonable.

The SS&M PEIS: A Notice of Intent was published days after CCNS' and LASG' first meeting with DOE HQ over DARHT's NEPA compliance. Our original DARHT letter demanded programmatic review. Implicit in the Department's agreement to perform a SS&M PEIS is its recognition of programmatic issues involving DARHT.

The DARHT EIS Implementation Plan (IP): In the IP, DOE acknowledges that DARHT's capabilities are related to the programmatic analysis planned for the

40 Quotes from the *FY 1996 LANL Capital Assets Management Plan* DARHT Activity Data Sheet.

41 Ibid.

42 "Although DARHT could be used to collect information relevant to the design of new weapons, no new weapons are anticipated to be designed in the foreseeable future" (DARHT EIS Notice of Intent, 11/18/94). Thus, it is only current political winds that prohibit overt use of DARHT as a design facility.

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SS&M PEIS. From there, DOE immediately and wrongfully concludes that it is appropriate to proceed with the DARHT EIS in advance of the SS&M PEIS. The sole justification given for this position is that "the enhanced diagnostic capabilities proposed for DARHT are urgently needed to evaluate and assess the safety and reliability of the existing but aging nuclear weapons stockpile." There is no urgent need as previously discussed.

The IP, which drives the DEIS, acts counter to public scoping comment: The IP categorizes scoping comments. "The most recurring issue ..asserted that the proper sequence of NEPA actions was not followed because DARHT construction began before completing the EIS and its subsequent ROD. The commentators asked that DOE stop construction on DARHT, complete the Stockpile and Stewardship PEIS, and complete the DARHT EIS before making decisions on DARHT."[43] This largest single category of response is then dismissed..

The DEIS is inherently prejudiced in that it assumes that enhanced radiographic hydrotesting is immediately needed regardless of alternatives analyzed or actions selected in programmatic review. Furthermore, DOE contends that a Record of Decision on DARHT will not prejudice the outcome of the SS&M PEIS. The premise that underpins these dubious suppositions is that there is some kind of safety and reliability crisis in the nuclear weapons stockpile that justifies proceeding with a decision on DARHT in advance of programmatic review. As DOE knows, while granting a preliminary injunction against construction of DARHT, a senior federal judge stated that "ample evidence points to the fact that the nuclear weapons stockpile is, at this time, safe and reliable." He was referring to testimony in March 1994 by Asst. Secretary of Defense Programs Victor Reis who reported that the stockpile was safe and reliable. In addition, Dr. Immele, at the DARHT scoping hearing of last December, stated that no safety problems related to aging have been found.

It is interesting that the judge issued his ruling without knowing about the 1993 Sandia Stockpile Life Study. The Life Study states that while nuclear weapons age, they do not wear out and are not allowed to degrade. They last as long as the weapons community desires. Defects have been discovered, but have been fixed with existing surveillance programs and existing facilities. Historically, defects involving primaries, which DARHT would ostensibly study, have been a very small percentage.

If there is no real crisis in safety and reliability since these reports and testimony,

[43] *DARHT Implementation Plan*, USDOE, February 1995, page 4-2

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what has changed? DOE cites the termination of full-scale underground testing as justifying the urgent need for DARHT. But the Stockpile Life Study explicitly states that no safety or reliability defects have been first discovered through full-scale stockpile confidence underground testing. Hence, the loss of underground testing is not justification for the urgent need for DARHT in advance of programmatic review. In addition, the Study states that, based on historic data, only one actionable defect will be discovered each year. For the sake of emphasis, the defects that have been discovered have been found and fixed with existing programs and existing facilities. So where then is the real need and purpose of DARHT? DARHT's purpose and need should be analyzed and justified in programmatic review.
In sum, DOE does not have a reasonable basis for justifying a decision on DARHT in advance of programmatic review. There is not now, nor is there likely to be in the next couple of years, the urgency for DARHT that DOE contends. There is not a crisis in the safety and reliability of the stockpile. There is not a study of interconnected actions and reasonably foreseeable actions in the Draft DARHT EIS. The programmatic ROD is expected only one year after the DARHT ROD. This still puts the programmatic ROD two years in advance of completion of DARHT's first axis. DOE commitment to programmatic review, first made in 1989, still has borne no results. The Department is well advised to complete the SS&M PEIS in advance of the DARHT EIS.

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Capability	Site Alternatives: KCP	LANL	LLNL	NTS	Y-12	PX	SNL	SRS
Weapons Assembly/Disassembly				X		X		
Nonnuclear Components	X	X	X				X	
Nuclear Components								
- Pit Reuse (minor)		X		X		X		X
- Replacement Pit Fabrication and Reuse (major)		X						X
- Secondaries and Cases		X	X		X			
High Explosives Components		X	X			X		

In addition, the PEIS will also evaluate the no action alternative. For Stockpile Management, no action is described by the following matrix:

Capability	Sites: KCP	LANL	LLNL	NTS	Y-12	PX	SNL	SRS
Weapons Assembly/Disassembly						X		
Nonnuclear Components	X	X					X	
Nuclear Components								
- Replacement Pit Fabrication and Reuse (major)		X	X					
- Secondaries and Cases					X			
High Explosives Components						X		

Stockpile Stewardship. The PEIS will assess the alternatives for conducting the Stockpile Stewardship mission. New facilities and upgraded facilities that will enable the Department to maintain confidence in the safety and reliability of the stockpile in the absence

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Acronyms Used

ALCM:	Air Launched Cruise Missile
CAMP:	Capital Assets Management Plan
CCNS:	Concerned Citizens for Nuclear Safety
CONVEX:	Contained Nuclear Explosions in Vessels Experiments
CTBT:	Comprehensive Test Ban Treaty
DOE:	Department of Energy
EIS:	Environmental Impact Statement
ENDS	Enhanced Nuclear Detonation System
DARHT:	Dual Axis Radiographic Hydrotest facility
DEIS:	Draft EIS
DP:	Defense Programs
FEIS:	Final EIS
FPU:	First Placed in Use
FXR:	Flash X-Ray Facility at LLNL
HE:	High Explosive
HPAIC:	Hydrotest Program Assessment Independent Consultants
ICBM:	Intercontinental Ballistic Missile
ICF:	Inertial Confinement Fusion
IHE	Insensitive High Explosive
IP	Implementation Plan
LANL:	Los Alamos National Laboratory
LASG:	Los Alamos Study Group
LLNL:	Lawrence Livermore National Laboratory
LIA:	Linear Induction Accelerator
NEPA:	National Environmental Policy Act
NPT:	NonProliferation Treaty
PHERMEX:	Pulsed High Energy Radiographic Machine Emitting X rays, DARHT's predecessor hydrotesting facility
SLBM:	Submarine Launched Ballistic Missile
SNM:	Special Nuclear Materials, i.e. plutonium and highly enriched uranium
SNL:	Sandia National Laboratory
SS&M PEIS:	Stockpile Stewardship and Management Programmatic EIS
SSP:	Stockpile Stewardship Program
SRP:	Savannah River Plant
PHERMEX:	Pulsed High-Energy Radiographic Machine Emitting X-rays
RFP:	Fire Resistent Pit
ROD	Record of Decision
UGT:	Underground Testing

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Comments on the DARHT Draft Environmental Impact Statement

Prepared by
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Concerned Citizens For Nuclear Safety

June 28,1995

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In addition to my oral comments presented at the DARHT hearing on May 17 in Santa Fe, I present the following:

DOE's claim that DARHT will not cause significant environmental impact is based on the stated assumptions that DARHT will be no more dangerous than PHERMEX and that PHERMEX has not caused significant environmental impact. Both of these assumptions need to be examined carefully.

• Differences Between DARHT and PHERMEX

1 The assumption that DARHT will be no more dangerous than PHERMEX is called into question immediately by table 3.3. of the DARHT Draft Environmental Impact Statement. Many potential environmental impacts are described as being exactly the same under several alternatives. It seems exceedingly unlikely that this would really be the case, which implies that some of these numbers are entered as theoretical values rather than being based on the true engineering and design of the alternatives under consideration. For instance, with the stated value for the distribution of
1 depleted uranium contamination being 15 acres for all alternatives, it seems that this value may be considered a maximum and that real values are not used.

It is far from clear to the public that these assumptions of similar individual impacts for all alternatives is in any way justified. Indeed, page d1 describes the amount of depleted uranuim (DU) currently at PHERMEX as "similar" to that proposed at DARHT while the exact same sentence shows
1 that DARHT will actually use 30 percent more DU. The appendix goes on to state " ...the maximum average soil contamination level observed at PHERMEX in the vicinity of the firing point under either the No Action or Upgrade alternatives would be approximately double that currently at PHERMEX " (the document does not explain how contamination under the
28 No Action alternative which is the continuation of the status quo can be more than the status quo contamination at the facility). In addition,
1 appendix E estimates a drainage rate for the DARHT site (under unvegetated conditions) 2.1 to 2.9 times higher than for PHERMEX. Deep drainage is viewed as a significant environmental pathway which has caused contamination in other DOE sites. The appendix goes on to state that due to
1 the huge variability between individual sites, only site-specific data can effectively tell to what extent deep drainage actually exists. Thus there are significant differences between DARHT and PHERMEX which need to be specificallly detailed inthe EIS.

DOE's use of estimated values in the DEIS for specific environmental
29 impacts is inappropriate. The point should be to provide accurate data about the facilities, which can serve as a basis for judgment whether there will in fact be a difference of environmental impacts under alternatives. DOE inserts values based on the assumption that there is no difference in alternatives and

then turns around and claims that there is no difference in the alternatives based on the inserted values.

In addition, for all alternatives, it is far from clear that the number or size of the shots would be the same as they are currently. These values are impossible to obtain without some programmatic understanding of what the facility would be used for, how necessary the so-called Stockpile Stewardship program is, and whether DARHT's application to weapons design will be used.

2

The rest of my comments deal with potentially significant environmental impacts which may be present under many or most of the alternatives presented in the Draft EIS (DEIS). Many of these potential impacts should be regarded more seriously than seems to presently be the case.

• **Environmental Effects of Plutonium**

It is disturbing that no mention of the potential environmental effects of plutonium is made anywhere in the Draft EIS. This material is of prime concern to the public on account of its longevity and toxicity. The potential effect of vessel failure should definitely be included in the SWEIS due to the likelihood and severity of vessel failure during the lifetime of the facility (page i4), particularly if a large number of plutonium-bearing shots are performed per year.

3

Even if no vessel breaches were to occur, the plutonium would still form a waste stream which must be included in the EIS. If the plutonium - contaminated material is kept in its solid form, there would presumably be some intention of sending this material to WIPP. However WIPP is a highly problematic facility which, even if it is shown to be safe enough to open, does not have nearly enough capacity for all the transuranic waste presently produced or expected to be produced in the near future. In addition, characterization of waste which will be sent to WIPP must occur before the facility accepts the waste. This charecterization would be impossible to obtain for either the DARHT or PHERMEX facilities in the absence of programmatic planning which could guide the number of plutonium test shots a year.

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Another alternative is that the plutonium would go into a liquid waste stream through some sort of rinsing or washing process. If this waste stream does occur, it should be considered in the EIS. Presently, the Radioactive Liquid Waste Treatment Facility is in a state of transition, awaiting site-wide and programmatic decisions. Waste streams arriving from DARHT or PHERMEX cannot be appropriately calculated until programmatic decisions are made about these facilities. Approriate waste stream calculation is required in order for the EIS to fully evaluate environmental impacts.

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Plutonium transport is also of great concern to the public. Sources and routes of all off-site radioactive and hazardous materials should be included

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in the EIS so that a full analysis of potential impacts of transportation can be undertaken.

6

• **Amount of material accessible to the environment:**

The DEIS is not clear as to the amounts of DU (and presumably other materials) which will be used for the proposed alternatives. For instance, the water modeling systems use a value of 460 lb of DU per year. However, page 3-21 refers to this amount as being based on the amount of DU used at PHERMEX during the mid-eighties. However since that time, "programmatic objectives have changed and a limit of 1540 lb would be required to meet all objectives under this (preferred) alternative." This is a 3.3 fold difference! These so-called programmatic needs have never been made public and should not even exist before the programmatic Stockpile Stewardship and Management PEIS is completed. It is extremely serious if DOE is intending to make use of such large amounts of DU and has not included this amount in its assessments of environmental impacts in the EIS.

7

Even the smaller amounts of DU historically used at PHERMEX have had a great effect on the surrounding environment. 34,200 lbs. of DU have been used of which 30 % remains in the environment, and of which 2% is directly respirable. While DU is a problematic radioactive substance which releases radon daughter products for an extremely long period of time, it is far from the only dangerous material released from PHERMEX, and which would continue to be released from DARHT. Historically, 480 lbs. of beryllium, 704 lbs. of lead, 2325 lbs. of copper, 9470 lbs. other metals, 2325 lbs. of lithium hydride, and 76,800 lbs. of high explosive have been used at PHERMEX. Since little cleanup information exists on many of these materials, the DEIS itself makes the assumption that much of this material has remained in the accessible environment. The material which was recovered and treated as waste should also be considered as part of the environmental impacts of PHERMEX (and potentially for DARHT), due to the environmental contamination which has resulted from waste areas such as LANL's Area G where much of this waste has been buried. CCNS believes that if this facility were not part of the LANL complex, and were judged by the same standard as other industrial facilities, such large amounts of environmental contaminants as are presently at PHERMEX would not be dismissed as nonsignificant. It is not sufficient merely to claim that these facilities have not been as harmful as the E-F firing site which was also operated at TA-15. DOE seems to favor this highly inappropriate type of argument to claim that DOE and PHERMEX have no significant environmental impacts. Just because a bad facility was built in the past, is no reason to build an only slightly less bad facility in the future.

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• **Air Quality**

Air Quality models used are stated to be appropriate for flat or rolling terrain (page c1). Los Alamos is neither. The steepness and variability of the canyon-mesa structure produces highly variable winds which may act in a

9

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considerably more complex manner than modeled. As a result, contaminants may remain suspended for different periods of time or may reach areas not previously considered by the models. These are very important issues since population rates increase within a few miles from the site which could cause the overall dose rate to increase.

9 In addition, because there are no air monitors on site at TA-15 III, air quality data must necessarily be based to a certain degree on guess work. Page c4 states: "the use of more realistic pollutant release heights accounting for buoyant and mechanical plume rise and the consideration of initial plume spreading (e.g. as would result from hydrodynamic testing) are factors which would tend to reduce maximized ground level impacts but were not included in this analysis". Page c5 and c6 discuss how mixing layer height is taken 9 from values appropriate for Albuquerque. These values are of only questionable application to Los Alamos, and increase the uncertainty of modeling procedures. In addition the models used to describe health effects "could significantly underestimate atmospheric dispersion of explosive material (page h4)". These models are all considered conservative by the authors of the DEIS. Taken together, however, they present a picture of a 9 series of models which may bear little resemblance to the actual behavior of airborne contaminants from TA-15 III. The EIS needs to better support the conclusion that factors which would lead to the increased suspension of contaminant gases and particles will protect human health and the environment rather than create an additional adverse effect. The discussion on the health effects model illustrates this problem quite well. Page h5 states: "for large amounts of explosives,the estimated dose for a stem and cap, double-plume release (such as that found in explosions) could be a maximum of forty percent higher than that modeled for an elevated, single-point release."

There is cause for concern even if the picture presented by the air quality models is valid. One problem is that there are materials from the explosions which are estimated to remain in the accessible environment, yet appear in neither cleanup calculations nor estimates of soil contamination 10 (see geology and soils section below). It seems possible that the aerosolization values may be underestimated. If this is the case, doses of radioactive and toxic materials would be higher than is presently calculated. Presently, little attention is paid by the DEIS to either lithium hydride or explosive residues, both of which can be considerably dangerous materials.

Another concern is the dose which may result from fugitive dust emissions. With potential DU contamination rates of 9300 ppm and the 11 above-mentioned high and variable winds, there seems to be a great potential for so-called non-respirable particles to be transported to areas where they could degrade and become respirable. The effect may be something equivalent to having a small uranium mine in the area, a disturbing thought when one realizes that airborne uranium has been linked to adverse health

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11 effects such as lung cancer in uranium miners[1] . Doses from high dust conditions (high winds after a dry spell) should be specifically calculated.

- **Geology and Soils**

Soil contamination rates are expected to be quite high, up to 9300 ppm under either the No Action or Upgrade alternatives. At the northeast drainage channel, the total uranium at PHERMEX is approximately 31 times background and is highly accessible to the water supply of the region. The 12 DEIS states that "the general pattern and number of tests would be virtually the same over the next thirty years " (page d1). Although it is not clear how this statement can be made without programmatic support from the SS&MPEIS, the EIS should analyze whether having a larger area contaminated to 4600 ppm or a smaller area contaminated to 9300 ppm would be more likely to adversely affect the environment. In addition, because the highest level of DU contamination was observed near the base of a wall near 13 the firing point (page d3), the potential of buildings such as Nake'muu to similarly concentrate DU contamination should be estimated. This may prove particularly important when estimating adverse effects of DARHT on this unique archaeological and cultural site.

Appendix D estimates that 30% (11,000 lbs) of the DU historically and currently used at PHERMEX has not been not recovered by cleanup processes. As stated on page d6 and d7, 1300 lbs has been accounted for in a contamination circle of 200 feet from the firing point. This figure is approximately 11% of the DU which should be in the environment. Although the appendix points out that the 200 foot contamination circle is only 20% of the total contamination circle (radius 460 feet), surely this circle should contain most of the DU contamination since contamination is known to decrease with distance from the firing point (see page d5). Page d5 shows that by the edge of the 200 foot contamination circle, the DU concentration is already down to about 8 times background as opposed to the very high concentrations which occur closer to the firing point. There is thus an enormous amount of DU which remains unaccounted for. It has not been cleaned up and has not been found in the contamination circle of 460 feet, and was not part of the amount estimated to be aerosolized. Where is this material? This question must be answered in order to fully evaluate the 14 environmental impacts of either PHERMEX or DARHT.

A similar problem seems to exist with other environmental contaminants in the soil. Page b3 states that no detectable high explosive residues were found in the soil around the firing point at PHERMEX. However, in the lifetime of the PHERMEX facility, Over 76,000 lbs. of high explosive were used. No mention is found in the EIS of the fate of these residues. It is hard to believe it would all be contained when so much DU

[1] For annotated bibliography on this subject see "Low Dose Epidemiological Findings on Child Health and Adult Risks of Low-Level Radiation". Prepared by the Child Cancer Research Institute, Concord, Ma.

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escaped during operations at PHERMEX. High explosive residues have been found at other LANL sites where high explosives are used routinely. Because high explosive residues often require environmental remediation (i.e. the E-F firing site at TA-15) , the fate of these materials is far from trivial, particularly if a large portion of them are becoming aerosolized and subject to transport in
14 the highly variable winds around Los Alamos. There is not much documentation of the fate of the 2,325 lbs. of Lithium hydride mentioned on page b9. When the recent fire occurred at PHERMEX which burned lithium hydride contaminated materials for nine hours, the aerosolization of this material caused considerable concern to LANL firefighters. What happens to
14 the lithium hydride in the course of normal operations? Page d8 states that the entire inventory of copper, lead, beryllium and other metals is "assumed to be dispersed within the soil contamination circle and available for migration in hydrologic pathways". There are no calculations in the EIS which might show that this is indeed the case. If these metals behave similarly to the DU, it is possible that not all of them can be accounted for by measurement within the contamination circle. If this is the case, further information must be provided about the fate of these materials.

• **Water Resources**

As mentioned in the first section of these comments, the deep drainage issue is not fully resolved in the EIS. Page e1 states : "at other DOE sites, deep drainage has transported solubilized contaminants to underlying ground water systems,... the potential exists for deep drainage at both (DARHT and PHERMEX) sites. "Appendix E goes on to stress that site specific measurements must be taken in order to determine the extent of potential
15 deep drainage. Because the deep drainage models do not contain two-dimensional fracture structures (i.e. cracks and fissures), it would be useful for the public to know if drainage rates could possibly be more than suggested by the one-dimensional flow model used.

Because DU becomes more radioactive as time goes on (due to the production of radon daughter products), protection of the public must remain a priority well into the future. Page e13 states: "if the analysis of deep
16 drainage were to extend much beyond 100 years, consideration would have to be given for analyzing for greater precipitation amounts and intensities than used in this study." This consideration must be given due examination in the EIS.

While deep drainage is definite possibility, particularly at DARHT, runoff contamination is also significant and must also be thoroughly considered. Present models do not include runoff from seasonally heavy rains which have been known to be heavy enough to lead to flash floods at LANL. Corrosion rates of most of the metals that would be found on site
17 would make these metals available to runoff. Appendix E shows that, under both the No Action and Preferred alternatives, the source of depleted uranium would be completely removed from the firing site in less than 1000 years and would be available for subsequent surface and subsurface migration.

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Like other models used in the EIS, the amount of DU modeled as being accessible to water systems is based on the 460 lbs. per year rates suggested in
18 1988 NESHAPS permit, rather than the proposed 1540 lbs. proposed to meet programmatic objectives (see above). It is also not clear that potential contamination to water supply is taking into account materials such as lithium hydride and high explosive residues.

Another pathway which is mentioned in the DEIS is through well extraction of dissolved contaminant through the highly desirable wells which may later be drilled in TA 15. The DEIS states that modeling of this alternative is not necessary, because the the contaminant must be available at
19 the surface, and be transported vertically down to the main aquifer, which the author claims would take centuries to millennia. However, the presence of corrosion- available metals and deep drainage mentioned above seem to contradict the hypothesis that travel times would take that long. Presently the state of contamination is unknown. The deep aquifer has <u>not</u> been proven uncontaminated. To the contrary, tritium has been found in the deep aquifer. LANL and the New Mexico Environment Department are presently engaged in a major project to dig test wells in order to ascertain if significant contamination of the aquifer by other radionuclides has, in fact, occurred.

Finally, the because of the uranium present in the discharge sink in Portrillo Canyon described on page e32, the hydrogeology of the region
20 should be more thoroughly examinedto ascertain the rate of flow and extent of features such as this sink. At the very least, in order for the inflow rates into the sink to be effectively evaluated, a two-dimensional flow model should be developed to model this sink and its potential to transport contaminants to accessible water.

• **Archaeological and Cultural Resources.**

Because the closest public exposure would be to workers and visitors to Bandolier National monument, one of the area's prime tourist attractions, more attention should be paid to the potential of the DARHT facility to
21 adversely affect tourism to this site. In addition, it is conceivable that Nake'muu and other sites within the 4000 foot radius of the DARHT facility will take on considerable economic value as tourist attractions. Potential recreational and socioeconomic effects should be calculated in addition to the considerable cultural and paleontological costs which may result from the DARHT facility (see Oral Comments).

22 The Draft EIS states that approximately 95% of the over 975 prehistoric sties at TA-15 III are considered eligible or potentially eligible for the National Register for Historic Places, and that an additional 40 % of the area around the DARHT and PHERMEX sites has yet to be fully characterized. The Pajarito Plateau is, in its totality, a unique archaeological and cultural site. While many of the impacts of LANL overall will presumably be dealt with in the
22 LANL Site-Wide Environmental Impact Statement, the impact of piecemeal destruction of these resources must also be considered. Because of its unique

architectural features and unusual state of preservation, Nake'muu is a particularly valuable site within this immensely =important area.

While tribal representatives are much better suited to address the
23 Native American cultural resources which are present at TA-15 III, CCNS strongly supports the preservation of these resources.. Past practices which have resulted in the destruction of these types of resources must not be
23 continued. A discussion of these resources should also be contained in the environmental justice issues section of the EIS.

• Accidents

The DEIS contains a disturbing discrepancy between appendices B and I. In appendix B, accidental detonation, which is the only accident with a critical rating, is given the annual probability of under 10E-4. In appendix I that same
24 accident is rated as having an annual probability of between 10E-2 to 10E-4. Unless DARHT is considerably more likely to have an explosion of this type than PHERMEX, this discrepancy makes no sense. Since accident dose rate calculations are made in appendix I, the larger value seems more likely to be correct. This is certainly not a trivial problem, given the seriousness of the consequences of this type of accident. Such an accident would probably prove fatal to all persons on the firing site (page i2).

For a vessel failure accident, the potential dose to the public of 11
25 mrems from one accident is above the 10 mrem yearly public exposure limit for LANL as a whole, seriously threatening compliance with the federal Clean Air Act.

26 In addition to the annual probabilities, the lifetime probability of accidents should be calculated. If the annual probability of an accidental detonation is between 10e-2 and 10e-4 than the lifetime probability would be at least one order of magnitude higher than that.

Potential accidents which would involve plutonium are also cause for public concern and are not properly addressed in the DEIS. The public has no
27 access to information which would suggest how much plutonium could be accessible in such an accident, so the best we can do for now is to try to make some reasonable guesses as to the danger posed by this material. For instance, at ground level a release of .1 gram of Pu 242 would result in doses of 5.1, 3.6 and 1.7 mrem to the public at St. Rd. 4, Pajarito Rd, and Bandolier, respectively, and 8.2 person rem (see table i9). Doses would be considerably higher if other plutonium isotopes (excepting Pu 244) were present. Since a full weapon assembly can use up to 4.1 kg. of plutonium, a release of .1 gram is a highly conservative value. These dose rates, conservative as they are, certainly emphasize the need for a further analysis of the risks to the public from accidents involving plutonium.

lrg

Reaching out from a common experience

Laboratory Retiree Group, Inc.

June 21, 1995

Ms. M. Diana Webb, DAHRT EIS Program Manager
Los Alamos Area Office, U. S. Department of Energy
528 35th Street
Los Alamos, New Mexico

Dear Ms. Webb;

1 The Board of Directors of the Laboratory Retiree Group, Inc. (LRG) endorses the Department of Energy's intention to complete and operate the Dual Axis Radiographic Test Facility as stated in the Department of Energy's Draft Environmental Impact Statement on the Dual Axis Radiographic Hydrodynamic Test Facility (DAHRT). DAHRT is an integral component of science-based stockpile stewardship.

2 The Board of Directors further endorses the concept that the Department of Energy should take extraordinary measures, including adopting the Containment option, to minimize harm to the environment and the quality of life in Los Alamos.

Sincerely,

Charles R. Mansfield
President

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Los Alamos County
Chamber of Commerce
Phone 505-662-8105 Fax 505-662-8399
P.O. Box 460 Los Alamos, New Mexico 87544-0460

June 17, 1995

Ms. Diana Webb
DARHT EIS Project Manager
U.S. Department of Energy
528 35th Street
Los Alamos, NM 87544

Dear Ms. Webb:

1 The Los Alamos County Chamber of Commerce is in support of the completion and operation of the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT).

1 1 DARHT is acknowledged to be a vital component in the Nation's stockpile stewardship program. Its completion is critical to the national security interests of the United States.
1 1 As you proceed with the Environmental Impact Statement, we also urge you to consider the importance of the DARHT project on the economic vitality of Northern New Mexico. Los Alamos National Laboratory has been a good neighbor to Los Alamos County and laboratory activities have contributed to the well-being of local businesses.

Please take the action necessary to allow the completion and full operation of the Dual Axis Radiographic Hydrodynamic Test Facility.

Sincerely,

Janet Rose
Executive Director

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US DOE/LAAO - IN

Comment 17, page 1

Los Alamos Study Group

June 26, 1995

Ms. M. Diana Webb, DARHT EIS Document Manager
DOE/LAAO
528 35th St.
Los Alamos, NM 87544

DARHT Draft EIS Comments

The Los Alamos Study Group (LASG) submits the following comments on the draft Environmental Impact Statement (EIS) for the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT). These comments are organized according to this outline:

I. DOE must complete the SS&M PEIS and the LANL SWEIS before the DARHT EIS (p. 3)
Introduction.
- A. Completion of the SS&M PEIS is necessary to define the SS&M program (p. 4)
  1. The DARHT project is not independent of the SS&M PEIS.
  2. DARHT will prejudice the hydrodynamic radiography portion of the PEIS
  3. DARHT will prejudice the remanufacturing and other portions of the PEIS, as detailed at II., below
- B. DOE should complete the LANL SWEIS before the DARHT EIS (p. 13)
  1. Analysis is needed of the site-wide cumulative impacts of DARHT and all connected actions reasonably foreseeable at LANL
  2. The 1979 LANL SWEIS is inadequate for this analysis
- C. DOE's "safety & reliability" justification for ignoring the required order of NEPA analyses is legally and factually inadequate (p.16)
  1. There is no "national security urgency" exception to NEPA
  2. There is no safety and reliability crisis of confidence in the US nuclear weapons arsenal, nor is one likely to arise in the future
  3. The PEIS will be complete long before DARHT could contribute in any case

II. The draft DARHT EIS fails to include any analysis of connected and related actions and their cumulative impacts (p. 23)
- A. DARHT would be a "magnet" facility for LANL
- B. DARHT is part of a planned and in-progress consolidation of the nuclear weapons complex at LANL

III. The draft DARHT EIS does not provide an adequate analysis of a reasonable range of alternatives to the proposed action (p. 32)
- A. The PHERMEX Upgrade(s)
- B. Proliferation impacts
- C. Plutonium operations and the exclusion option

IV. The draft DARHT EIS fails to provide an adequate analysis of the isotope production, waste

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generation and disposal, and decontamination and decommissioning activities associated with the proposed action and alternatives (p. 38)

A. DARHT would cause the production of hazardous plutonium isotopes
B. DARHT would cause the generation and disposal of hazardous and radioactive wastes
C. The decontamination and decommissioning impacts of DARHT must be analyzed

V. The environmental and program analysis of the draft DARHT EIS is biased and lacks scientific methodology and credibility (p. 39)

1 **I. DOE must complete the SS&M PEIS and the LANL SWEIS before the DARHT EIS**

Introduction

On October 28, DOE published in the Federal Register a Notice of Intent (NOI) to prepare a Programmatic EIS on its Stockpile Stewardship and Management (SS&M) plan, the details of which, according to the NOI, are yet to be defined. DARHT, the DOE has long asserted, is an essential tool for maintaining confidence in the safety, reliability, and performance of the nuclear weapons stockpile in the absence of underground nuclear testing. This is, according to the NOI, an activity of stockpile stewardship.

On August 10, 1994, DOE published in the Federal Register an Advance Notice of Intent to prepare a site-wide EIS (SWEIS) for Los Alamos National Laboratory (LANL). The purpose of the SWEIS, the first programmatic environmental analysis of LANL in more than 15 years, is to consider the environmental, socioeconomic, and other impacts of present and reasonably foreseeable LANL programs and their alternatives.

The DARHT EIS, were the process valid, would determine the impacts of DARHT construction and operation and those of reasonable alternatives to the project.

Thus, it is clear that the proper logically- and legally-mandated order of these analyses and actions is:

A) Complete the SS&M PEIS, thus defining the program and determining its components in the light of analyzed need, utility, costs, and impacts from a nationwide perspective;

1 B) Complete the LANL SWEIS, documenting the impacts of the SS&M program components and reasonable alternatives at LANL from a sitewide perspective;

C) Complete the project-specific DARHT EIS, determining whether the project should go forward as proposed or whether a reasonable alternative means of accomplishing the mission goal should be preferred; and

D) If preferred, proceed with the DARHT project.

1 The draft DARHT EIS, however, proposes to invert this order, asserting that

"The information on environmental impacts of the course of action selected in the DARHT ROD will be included in the analysis of cumulative environmental impacts for the SWEIS." [and]

"The environmental impact analysis of the course of action selected in the DARHT

ROD will be incorporated into the PEIS." [draft EIS at 2-12]

1 | This is an astonishing and indefensible position, one which leads ineluctably to the conclusion that the Department's plans are the result of considerations wholly outside logic and the law. The obvious consequences are vitiation of the programmatic and environmental analyses, decreased respect for the Department, and, ultimately, bad decisionmaking. It hardly needs to be pointed out that decisionmaking here is on national security and significant environmental
1 | matters, and that such decisionmaking which so lacks a logical and legally-sufficient basis is itself an impairment of national security and a dereliction of the duty and trust reposed in DOE.

A. Completion of the SS&M PEIS is necessary to define the SS&M program

1. The DARHT project is not independent of the SS&M PEIS.

The most immediate consequence for the DARHT EIS of DOE's failure to complete the SS&M PEIS and thereby define the nature and scope of the stockpile stewardship program is to
2 | cut the analytical ground from under the Purpose and Need section, leaving only unsupported assertions as justification for the project. We are told that

> "The DOE program that responds to the President's challenge to ensure confidence in the nuclear weapons stockpile in the absence of nuclear testing is science-based stockpile stewardship." [draft EIS, S-1]

But the science-based stockpile stewardship program (hereinafter, SBSS) is, at best, only the Department's **proposed action** under the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SS&M PEIS). DOE has admitted that the development and implementation of a stockpile stewardship program is a significant federal action within the meaning of the National Environmental Policy Act (NEPA), and it initiated the SS&M PEIS to consider, from a connected and programmatic standpoint, its proposed action and alternative means of achieving the Department's goals. Manifestly, under NEPA, it is not within the power of DOE to prescribe, by fiat, the nature and scope of any stockpile stewardship program before the completion of the PEIS. It is therefore not possible, logically or practically, to consider DARHT - its need, value, and utility, and that of the alternatives to DARHT - without first knowing the definition and scope of the SS&M mission that is to be performed.

2 | Further, the Presidential Decision Directive cited as justification for the proposed action makes no reference to DARHT or any other hydrodynamic test facility; it is up to DOE, with the aid of other interested agencies, to fashion a stockpile stewardship program which best serves all of the nation's interests, from stockpile safety and reliability to non-proliferation and arsenal reductions. The development and implementation of such a program is a federal action with the potential for significant environmental impacts and, as such, DOE is required to complete the process of public participation in program development and consideration of alternatives. The SS&M PEIS is that process, as DOE has admitted.

During the SS&M PEIS and the SWEIS, which is a type of programmatic EIS (10 CFR 1021.330), the DOE must refrain from undertaking any major actions unless such action is 1) justified independently of the program, 2) has its own EIS, and 3) will not prejudice the ultimate decision on the program, i.e. will not determine subsequent development or limit alternatives (40 CFR 1506.1 (c)). These tests are not satisfied for either the SS&M PEIS or the SWEIS in the case of the DARHT project, as will be discussed shortly.

As to the first prong of the interim action standard, the draft EIS alleges:

> "The DOE proposal to provide enhanced high-resolution radiography capability responds to Presidential and Congressional direction, and is independently justified compared to the stockpile stewardship management program." [draft EIS, 2-12]

The presidential direction referred to (Presidential Decision Directive 15, November 1993), was previously cited by the draft EIS on p. 2-5. Even in this abridged version, it is clear that the presidential call for upgraded hydrodynamic testing facilities lies entirely within the context of the proposed stockpile stewardship program. It does not provide an independent justification for DARHT; indeed DARHT is not even mentioned. In fact, the letter and intent
2 | of the presidential directive could be satisfied by upgrades planned and now being carried out at Livermore's FXR and LANL's PHERMEX facilities, without the DARHT project at all.

2 | The congressional direction referred to is the National Defense Authorization Act for Fiscal Year 1994 (PL 103-160 (IIR 2401) 107 Stat 1547; November 30, 1993), which establishes the stockpile stewardship program. It reads in relevant part:

> SEC. 3138. STOCKPILE STEWARDSHIP PROGRAM.
>
> (a) ESTABLISHMENT.--The Secretary of Energy shall establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear weapons, including weapons design, system integration, manufacturing, security, use control, reliability assessment, and certification.
>
> (b) PROGRAM ELEMENTS.--The program shall include the following:
>
> (1) An increased level of effort for advanced computational capabilities to enhance the simulation and modeling capabilities of the United States with respect to the detonation of nuclear weapons.
>
> (2) An increased level of effort for above-ground experimental programs, such as hydrotesting, high-energy lasers, inertial confinement fusion, plasma physics, and materials research.
>
> (3) Support for new facilities construction projects that contribute to the experimental capabilities of the United States, such as an advanced hydrodynamics facility, the National Ignition Facility, and other facilities for above-ground experiments to assess nuclear weapons effects.

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(c) AUTHORIZATION OF APPROPRIATIONS.--Of funds authorized to be appropriated to the Secretary of Energy for fiscal year 1994 for weapons activities, $157,400,000 shall be available for the stewardship program established under subsection (a).
(d) REPORT.--Each year, at the same time the President submits the budget under section 1105 of title 31, United States Code, the President shall submit to the Congress a report covering the most recently completed calendar year which sets forth--
(1) any concerns with respect to the safety, security, effectiveness, or reliability of existing United States nuclear weapons raised by the Stockpile Surveillance Program of the Department of Energy, and the calculations and experiments performed by Sandia National Laboratories, Lawrence Livermore National Laboratory, or Los Alamos National Laboratory; and
(2) if such concerns have been raised, the President's evaluation of each concern and a report on what actions are being or will be taken to address that concern.

2 As can be seen, this law provides no independent justification for the DARHT or any other hydrotesting project apart from that provided for the stockpile stewardship program taken as a whole. Were this passage to be interpreted as an independent justification for the DARHT project, then the National Ignition Facility, the Jupiter weapons effects project, and every other proposed stockpile stewardship project would also have an independent justification. The National Ignition Facility and the Advanced Hydrotest Facility--the proposed successor to DARHT--together with the High Explosive Pulsed Power Facility, the Jupiter Facility, and the Atlas Facility are, however, all mentioned in and pendent upon the SS&M PEIS (SS&M PEIS Notice of Intent, pp. 17-18). Even the Contained Firing Facility, which, like DARHT, is an enhancement of hydrotesting capabilities, is dependent upon the outcome of the SS&M PEIS. Why then, is the decision about whether to complete DARHT being made prior to any decision about the scope, activities, purpose and need, and program elements of stockpile stewardship?

3 In the final analysis, there can be no justification for DARHT independent of the stockpile stewardship and management program because the work to be done at DARHT is by its nature intimately and inextricably connected to the entirety of the stewardship program. Much of Chapter 2 in the draft EIS is directed to establishing this very point. Thus by formal presidential directive, by law, by the nature of the technological enterprise DARHT is meant to
3 serve, and by admission, DARHT clearly fails the first of the three tests required at 40 CFR 1506.1(c) for allowable interim actions.

2. DARHT will prejudice the hydrodynamic radiography portion of the PEIS.

3 DARHT also fails the third test for allowable interim actions, namely that any such action must not prejudice the final programmatic decision. The draft EIS asserts a contrary opinion. It says at page 2-12 that

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"Because enhanced hydrodynamic capability is needed in the near-term regardless of the alternatives analyzed in or the courses of action selected as a result of the stockpile stewardship and management PEIS, DOE believes that a decision on whether to implement the proposed action analyzed in this EIS would not prejudice any ultimate decision regarding the stockpile stewardship and management program."

The scope and alternatives proposed for the SS&M PEIS analysis were published in a June 9, 1995 NOI. This NOI is extremely vague, reflecting underlying uncertainty in the size of the stockpile, and the methods used to maintain it. DOE's previous two attempts at a PEIS on this subject had to be withdrawn because their proposed scope was too narrow and left out less capital-intensive options; this could occur again. The public comment period is just beginning, and it coincides with a serious push by the Pentagon, supported by weapons laboratory
3 personnel, to resume nuclear testing. The long and short of it is that the Department cannot be sure of the shape of its stockpile stewardship program, or that DARHT will not prejudice the PEIS analysis.

DOE is no doubt free to provide for some degree of upgrades to its hydrodynamic radiography capability, but when the proposed upgrade action is the construction of a $ 124+ million facility that is a crucial element of a particular stockpile stewardship plan, and when that stockpile stewardship plan has not yet been developed and considered, as it must be, within the already-existing SS&M PEIS, the only possible conclusion is that the proposed action (DARHT) must await the ROD on the PEIS.

4 Further, there is evidence that DARHT, far from enhancing national security, will decrease that security by stimulating a new type of arms race. Under a comprehensive test ban, the nation with the best hydrodynamic testing capability will be the one able to most reliably design and field new and destabilizing nuclear weapons, such the much-desired low-yield tactical weapons, enhanced electromagnetic pulse weapons, and others. DARHT will improve that capability, as well as provide a three-dimensional capability to examine nuclear directed-energy explosives and other advanced weapons.

4 Already other nations (France, Russia, and China) have cited the U.S. technological lead in surrogate testing facilities like DARHT as a reason to continue nuclear explosive testing. While DARHT is not needed for stockpile stewardship and management, the technical capabilties ascribed to it in that context, such as giving designers the ability to accurately predict the implosion of cracked and defective pits, are more than enough to design symmetric new weapons, which is an easier task.

DOE admits the crucial role of enhanced hydrodynamic radiography in its "science-based stockpile stewardship program":

"To develop its science-based program, DOE identified five critical issues regarding stockpile stewardship and management and strategies to address them.

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Two of these strategies acknowledge DOE's need for improved hydrodynamic testing capability..." [draft EIS, 2-4]

DOE also admits the crucial importance of DARHT to its science-based stockpile stewardship program:

"The DARHT facility will be the key experimental capability for adequately evaluating the continuing safety and reliability of the remaining nuclear weapons stockpile over the next few decades in the absence of nuclear testing." [Declaration of John D. Immele, LASG et al v. DOE, 11/29/94]

"The Department's Science-Based Stockpile Stewardship program is of critical importance to the nation... Delaying DARHT could undermine confidence in relying upon hydrotest-based stewardship to the extent that, in the absence of nuclear testing, we may not be able to assure the safety and performance of aging weapons." [Declaration of Victor H. Reis, LASG et al v. DOE, 11/29/94]

"The DARHT Facility is a critical component of this Presidentially directed stockpile stewardship program." [Declaration of John M. Deutch, LASG et al v. DOE, 11/30/94]

But SBSS is only the DOE's early development of a stockpile stewardship plan; it has not even been described in detail as the Department's proposed action under the SS&M PEIS. In fact, "Primary Physics Issues," which DARHT is designed to address, is the first listing among the issues to be addressed in the stockpile stewardship program, both under the preferred and the no action alternatives (SS&M PEIS NOI, pp. 17 and 18). More important, the nature and scope of this nation's provisions for maintaining its nuclear arsenal in the future are presently the subject of intense and widespread debate, within the government and without it. Further, the range of strategies, budgets, equipment, and personnel proposed for the various stockpile programs are extraordinarily broad, and it is clear that a facility such as DARHT would be an inappropriate element of many of them. Jonathan Medalia of the Congressional Research Service has recently reviewed this range of proposed stockpile programs in the publication "Nuclear Weapons Stockpile Stewardship: Alternatives for Congress (preliminary draft, April 7, 1995). Attached as Exhibit A is his Figure 1, which illustrates the wide range of current proposals. DOE's current proposal, SBSS, fits in the "Enhancers" category of stewardship plans, as DOE would actively seek to incorporate "enhancements" to stockpile weapons, using advanced radiographic design capabilities (such as DARHT and/or AHF) and hydronuclear testing. This plan is far more expansive, and expensive, than all other types of stockpile stewardship proposals, save only those that would retain and utilize full-scale underground nuclear testing. The Department's approach mandates a very large nuclear weapons research and development infrastructure and very large capital expenditures, including DARHT. As the Medalia work makes clear, the "best" stockpile maintenance program for the nation must be developed by balancing the political goals of international non-proliferation and arsenal reduction goals with the political and economic costs of an aggressive research and

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development infrastructure and large capital equipment funding.

The point, of course, is not that DOE is obliged to accept any of these (or other) stockpile maintenance programs - on the contrary, the very breadth of the present debate makes clear that DOE must develop its program and consider broad alternatives to it within the context of the SS&M PEIS, as it is now doing. The corollary is that the Department may not implement one enormously expensive and crucial component (DARHT) of a particular plan until the conclusion of the PEIS process.

There is no doubt that some SS&M program proposals include an element which may be called "enhanced hydrodynamic radiography capability" (EHC). By contrast, other proposals eschew the acquisition of EHC, deeming present capability entirely adequate and in harmony with our national efforts to limit the spread of nuclear weapons. One such proposal is that of Professor J. I. Katz of the Department of Physics, Washington University, St. Louis, which may be called the "curatorship" approach. For completeness, we attach as Exhibit B an essay by Dr. Katz on this subject titled "The Case Against Science-Based Stockpile Stewardship." As noted therein, Dr. Katz takes the position that

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"...it is better to describe the future task as curatorship rather than as stewardship, and emphasize the distinction between these two concepts. In *stewardship* the human resources required to design and develop weapons are maintained, with skills honed on classified and unclassified experiments conducted at facilities such as NIF and in hydronuclear tests. In *curatorship* these facilities are not built, and design and development skills are allowed to atrophy; only those skills required to remanufacture weapons according to their original specifications are preserved...The chief nuclear danger in the present world is that of proliferation, and stewardship will exacerbate this danger, while curatorship will mitigate it while preserving our existing nuclear forces. [Exhibit A, p.1, emphases in original]

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The quoted excerpt should serve as good evidence for three propositions that are fundamental to whether DARHT can be considered outside the context of the SS&M PEIS:

a) There is a very broad range of SS&M proposals, many of which do not include DARHT or any other enhanced radiographic capability;

b) The nation's SS&M program must be considered and developed as a whole, not in piecemeal fashion; and

c) The enhanced radiography element of proposed SS&M programs is connected to, and not independent of, other elements, including weapons manufacturing and remanufacturing capabilities and facilities.

Further, even as to those SS&M proposals which do include some form of EHC, there is no consensus on the utility or nature of that capability. Indeed, the JASON report on stockpile stewardship which the DARHT EIS repeatedly cites as evidence of the need for

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6 DARHT is in fact quite explicit that the nature of the nation's radiographic capabilities needs to be determined:

> "The crucial question in considering improved hydrotest capabilities is the cost/benefit trade" [op. cit., p.32.].

We strongly agree, and it is precisely this subject on which there is the greatest dearth of public information and the greatest need for a more careful analysis of mission. That analysis must occur in the context of the NEPA process specifically designed to accommodate it - the SS&M PEIS.

More specifically, the JASON report previously cited contains a comparison, in Table 6.1 at page 30, of seven radiographic machines and facilities, including PHERMEX at LANL, FXR at LLNL, three upgrades of these facilities, DARHT, and the Advanced Hydrotest Facility (AHF). (A copy is attached to these comments as Exhibit C.) It takes only a glance at that comparison to see that, with the exception of the AHF, the operating parameters of the machines compared are remarkably similar, and it is apparent that any analysis of the need, utility, and value of DARHT must look closely at the relative merits of these various approaches in furthering the mission goal at minimum taxpayer cost. That analysis is obviously impossible if
6 the mission has not been well defined (as it has not been) and if the SS&M PEIS has not been completed. To continue with the same paragraph from the JASON report cited above, we can state some of the most important questions to be answered in an analysis of alternative hydrodynamic test facilities:

> "How useful is a given level of spatial resolution in assessing primary performance?, or how many views at how many different times are required to diagnose a 3D implosion and adequately benchmark a 3D computation?...How accurately can [the time-dependent neutron multiplication rate] be deduced from radiographs?"

These questions, of course, are appropriate only after the more fundamental question of the purpose, scope, and size of the SS&M program has been answered, which is the role of the SS&M PEIS. At this time, there is no basis on which to address questions like those posed in the JASON report, because there is no agreement among experts, nor any decision, that would define the level of primary modeling and understanding that best serves the interests of the US SS&M program, because the program is undefined. If US interests in encouraging non-proliferation and nuclear arsenal drawdown are deemed paramount, for example, then the SS&M program that best serves these interests may eschew the highly visible acquisition of sophisticated design tools like DARHT in favor of emphasis on physical inspection and exact-component replacement capabilities.

7 Unfortunately, the draft DARHT EIS completely ignores the lack of a defined SS&M mission and, worse, attempts to leapfrog the very questions the PEIS should address (such as the JASON report questions quoted immediately above) by elevating to the level of dogma a

7 the JASON report questions quoted immediately above) by elevating to the level of dogma a hypothesized "need" for three-dimensional radiographic hydrotest data. Thus, the statement appears that "One important type of information that is currently lacking concerns the three-dimensional condition of the various internal components of aging weapons." This statement is seriously misleading. It suggests that DARHT will be the weapons equivalent of a CAT-scan machine, able to produce a tomographic x-ray picture of the inside of a stockpile weapon; indeed, LANL official Dr. John Immele said precisely that at the 12/8/94 scoping hearing:

> "J. Immele: And so the experiments that we'll do will begin with an assessment of the weapons we have before they get older, kind of like a CAT-scan baseline before someone develops heart disease."

That, of course, is completely false. Neutron radiography or conventional static x-ray analysis may produce an internal view of a stockpile weapon; DARHT will not. No "aging weapons" from the stockpile will be imploded at DARHT. Attempting to sell the DARHT project by explicitly stating that it will produce the equivalent of a CAT-scan of stockpile weapons is unethical and DOE should publicly repudiate the Immele statement. In addition, it must be seriously questioned whether, in fact, DARHT could ever produce the tomographic reconstructions as alleged. The Activity Data Sheet for the Advanced Hydrotest Facility, as it appears in the 1997 LANL Capital Assets Management Process, states:

> "At least six radiographic lines-of-sight will be generated from a single long accelerator pulse by chopping the pulse in time with fast kicker magnets. Six
8 lines-of-sight are the minimum required for complete, three-dimensional, tomographic reconstruction."

8 DARHT, with only two lines-of-sight, would thus appear to be unable of fulfilling the "3-D promise." Unfortunately, the draft DARHT EIS not only ignores this critical fact, it cynically attempts to manipulate this falsely imagined 3-D capability of DARHT to equate it with the generic demand of DOE for enhanced radiographic capability.

The necessity of acquiring any EHC must be determined within the SS&M PEIS process, as we have noted above. Nevertheless, even if some EHC turns out to be part of a coherent, PEIS-defined SS&M program, it is a gross error to attempt to equate EHC with "3-D views." Besides the fact that DARHT will not be able to provide these 3-D views even if its second axis is funded, **DOE will soon have <u>two</u> radiographic facilities with double-pulse capability** - the upgraded FXR and the upgraded PHERMEX facility. In contrast to the dispute over the value of two radiographic axes, there is <u>no</u> dispute over the value of rapid time-sequencing, and it is this valuable capability that DOE will soon possess, with redundancy.

Without the false and misleading image of DARHT as a CAT scanner for stockpile weapons, the focus of analysis can properly be on the value and utility of dual-axis flash
9 radiography of an imploding simulated pit. This second axis feature is the only <u>unique</u> characteristic of the proposed project, provided that Congress actually and eventually approves

9 it. The draft EIS does not note that, if in fact the second axis is not built for any reason, the only distinguishing technical characteristic of DARHT will be its enormous cost. As to the necessity for, and value of, the DARHT second axis, we note the submission of Dr. Seymour Sack to the HPAIC:

> "The second axis of DARHT is intended to allow more accurate tomographic reconstruction and/or a reduced number of hydrotests, especially for systems without axial symmetry. Apart from possible increased background/noise problems for each image, and somewhat decreased flexibility in device location, the proposal seems to once more assume the need for a purely experimental determination of detailed implosion geometry - ignoring or at least slighting the computational developments of the last three decades. There is no benefit justifying the cost of a second axis - considerations should be limited to a single-axis machine, SARHT."

9 **There is no agreement on the value or utility of the DARHT second axis.** Therefore, the PEIS must specifically address and answer this question in light of the availability of far less expensive upgrades to other facilities, specifically including those compared in Table 6.1 of the JASON report, and in light of the possibility of using its two double-pulse machines until the Advanced Hydrotest Facility is available. Only when the PEIS ROD makes clear what radiographic capabilities are needed for the longer term can legally and intellectually sound decisions be made about DARHT.

The PEIS must also address the question of obtaining requisite stockpile stewardship capabilities at lowest cost. This is, given present budget realities, almost as important as minimizing the proliferation and nuclear security impacts of DARHT and the SS&M program. As noted, Table 6.1 of the JASON report shows that the operating parameters of the various hydrotesting facilities listed are remarkably similar, with the exception of the AHTF. Further, it appears to us, as discussed above, that even the no action alternative would allow DOE, by continued use of its existing facilities, to fulfill all known or plausible requirements of its SS&M
10 program. And that SS&M program, so far as we know it, seems far more ambitious, in terms of design capabilities, that would be required by a minimal stockpile maintenance and evaluation (and possibly remanufacture) program. Because DOE and the public lack the benefit of the SS&M PEIS, it is not possible to identify which capabilities, if any, beyond a "minimal" program are either necessary or desirable. Indeed, the well-recognized conflict between our nuclear security goals (including non-proliferation and the preservation of the NPT) and the acquisition of highly capable design tools may weigh heavily against completion of DARHT and in favor of alternatives. Add to these considerations the fact that DARHT is vastly more expensive than its alternatives, and it becomes clear that DOE is obligated to make a careful analysis of exactly which capabilities are necessary for its SS&M program and how they may be achieved at the lowest cost.

9 We believe it is well established that DARHT, in single axis form, represents only a marginal improvement in capability over existing or upgraded facilities. As such, it does not

seem cost-effective. Further, most of the anticipated future qualitative improvement in hydrotest capability would result from planned upgrades allowing pulsed use of existing facilities, and DARHT, in either single or dual axis form, is not a cost-effective facility in this respect either. Not until one considers the dual axis form of DARHT, with the possibility of simultaneous radiographs from different angles, is there any unique capability. But there is no agreement on the value of this capability, nor is there any assurance that Congress would ever fund a second axis. Even for the attainment of highly provocative advances in weapon design capabilities, there is no showing that this dual axis characteristic is particularly useful; what is clear is that the ability to take two or more radiographs per shot is a significant advance, but DARHT is not a cost-effective means of acquiring this capability. We believe that DOE, in order to find that DARHT is necessary for the SS&M program, must demonstrate either the existence or the plausibility of some substantial stockpile safety or security problem which would require the dual axis nature of DARHT for resolution. That is a tall order: it would involve a significant, inherently asymmetrical effect, one without historical or design precedent. It would also require a showing that even such an effect could not be appropriately modeled, diagnosed, and corrected by the use of upgraded (i.e., pulsed) facilities and the laboratories' highly sophisticated 3D computer codes. LASG is not aware of any expert who represents that such a case is plausible, and we are aware of several who represent that it is not.

2. DARHT will prejudice the remanufacturing and other portions of the PEIS.

DARHT would be a crucial component of other elements of stockpile management programs, including the existence, nature, and location of facilities for remanufacturing stockpiled weapons. However, because the discussion of the influence of DARHT in this respect is most easily accomplished in terms of "connected and related actions," we present this argument in detail under major heading II., below, which deals with the requirement of analyzing the impact of such actions in the DARHT EIS. It should be noted that the while the substance of the actions is the same, the effects are slightly different in the two NEPA contexts. The point in the SS&M PEIS context is that a decision to implement DARHT would **prejudice the PEIS** by tending to implement a whole suite of expansive SS&M program components, including extensive new production and remanufacturing facilities and capabilities. By contrast, the point in the DARHT EIS context is that the **EIS will be inadequate** unless it contains analysis of the impacts of these connected and related actions on the LANL site.

B. DOE should complete the LANL SWEIS before the DARHT EIS.

1. Analysis is needed of the site-wide cumulative impacts of DARHT and all connected actions reasonably foreseeable at LANL.

11 The SWEIS is critically important in order to examine in context the connected, cumulative, and similar actions at LANL - of which DARHT is an example - which have direct, indirect, and cumulative impacts, as those terms are defined at 40 CFR 1508.25.

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One obvious example of the deleterious effect of the lack of a currently valid SWEIS on the DARHT EIS concerns the hazardous and radioactive wastes that would be generated by DARHT operations. The draft DARHT EIS assumes that the wastes produced at DARHT will be handled, stored, treated, and disposed in an environmentally-sound and regulatorially-compliant manner. In effect, this assumption is tantamount to tiering the draft EIS off a non-existent SWEIS. 11

In fact, the waste management (WM) program at LANL is in serious risk of being cut below what is necessary to keep its existing degree of compliance, let alone improve it. Current proposals now before Congress involve cuts in waste management funds at DOE facilities in New Mexico of $ 12 million (5/9/95 letter, O'Leary to Rep. Duncan Hunter). 12

Already, on Feburary 13 of this year, Deputy LANL Director Jim Jackson wrote to Bruce Twining, Manager of the DOE Albuquerque Operations Office, saying

> "This letter is to inform you of a serious concern about the ability to continue waste management operations at Los Alamos.
>
> "As requested by you, we have reexamined the funding requirements for waste management, and have concluded that for FY95, $75M is required for a safely operating, compliant program...
>
> "The total waste management budget authority available from Albuqerque is $53M...At this figure the facilities cannot be operated safely...Therefore, we will cease operations in the March/April timeframe and place the facilities in safe standdown modes.
>
> "The consequences for the Laboratory are severe. We will require that all of our other facilities cease the active generation of radioactive and hazardous wastes..."

The following day, a memorandum was widely distributed within the Laboratory which included the following language.

> "If...efforts to secure the required funding to support Laboratory waste management operations are unsuccessful, we plan to begin shutting down operations.
>
> "In line with this, we regrettably must request that each of you begin planning for a cessation of the generation of both chemical and nuclear wates. At the same time, those nuclear facilities which depend critically on the waste management facilities must be placed in a safe stand-by mode." (Memo from Gancarz and Baca, 2/1/4/95, CST-DO-95-036).

The current Capital Assets Management Process Report (CAMP 97) describes nine

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capital projects in waste management, the funding for which is uncertain, which are described as needed to either comply with existing environmental law, DOE health and safety orders, or to prevent environmental contamination. These projects compete directly with DARHT for funding, and in many cases have been pushed farther into the future because current funding is inadequate. While we do not, in every case, support each project in its current configuration, the underlying environmental concerns are quite real and should figure prominently in planning for the DARHT project.

In addition to building these capital projects, money is required to operate them. As we have seen, funds are lacking to operate existing facilities, let alone additional and improved ones. None of this includes the monies needed to decommision and dismantle existing structure, some of which represent a continuing hazard and expense, or remediate past environmental contamination.

Not only will DARHT produce low-level, hazardous, TRU, and sanitary wastes, but funding DARHT now will damage LANL's efforts to comply with existing laws, compliance orders, thus exposing workers, the public, and the environment to increased risks and LANL to litigation and fines. 12

2. The 1979 LANL SWEIS is inadequate for this analysis

The Tiger Team investigation of LANL and LAAO looked at, among other NEPA inadequacies, the practice of "tiering" (40 CFR 1502.2) NEPA documents off the 1979 LANL SWEIS. The conclusions were:

> **"NEPA documents reviewed by the Tiger Team at LANL, including the sitewide EIS, exhibit shortcomings of procedure and/or content when judged against the rwequirements of the current CEQ regualtions and applicable DOE Orders and guidelines.**
>
> "The 1979 sitewide EIS exhibits various technical and/or procedural shortcomings. Additionally, in light of changes in environmental regulations and standards, evolving methods of analysis, and modofications to the LANL site since preparation of the EIS, the age of the EIS limits its usefulness as abaseline document from which other NEPA documents can be tiered. Further, in some cases, the sitewide EIS has been cited inappropriately as the only required NEPA document for new activities...The impact analysis provided in the EIS is inadequate for the following reasons:
>
> 1) It does not reflect appropriate consultation with authoritative sources;
> 2) It does not reflect current knowledge as required by 40 CFR 1502.9(c)(1);
> 3) It was prepared by the University of California rather than a contractor with "no financial or other interest in the outcome of the project" as currently required by CEQ regulations (40 CFR 1506.5(c))." [emphasis in original]

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Needless to say, the 1979 LANL SWEIS has become more inadequate with the passage of some four years since the Tiger Team considered the matter. Further, this subject is highly germane, as this very project, DARHT, was the subject of a blatantly invalid attempt at tiering off this inadequate SWEIS in 1987, and again, in 1993:

> "...the described action is [s]ubstantially the same as actions previously evaluated in existing NEPA documentation and found to be insignificant...the impacts remain within the scope of the LANL Environmental Impact Statement." [Action Description memorandum - Memo to File, 11/6/87, Soden, Albuquerque Operations Office]

> "The proposed action appears to be encompassed within the original Action Description Memorandum, Dual Axis Radiographic Hydrotest Facility, dated November 6, 1987. It is our opinion that no further NEPA documentation is required for this proposed action." [Memorandum, 11/1/93, Vozella, LAAO]

12 DOE's record of use of the inadequate 1979 SWEIS in this very case is an egregious example of mis-use and ab-use. It would be a mistake to think that the same error can be compounded yet again. To repeat, the 1979 SWEIS is not an adequate foundation to allow the conclusion either that the wastes generated by DARHT can be adequately handled at LANL, or that the vast number of reasonably foreseeable actions connected and related to DARHT will result in no significant impacts on the LANL site. Only the LANL SWEIS now in progress can do that.

C. DOE's "safety & reliability" justification for ignoring the required order of NEPA analyses is legally and factually inadequate

Given the existence of an ongoing programmatic environmental impact statement process designed to determine the best stockpile maintenance program, what justification does DOE provide for pushing ahead with the DARHT EIS? We find:

> Proceeding with the DARHT EIS in advance of the completion of either the SWEIS or the PEIS is necessary because a decision on whether to proceed with DARHT, or pursue an alternative, is needed as soon as possible to help ensure the continued safety and reliability of the nuclear weapons stockpile." [draft EIS, 2-12]

Stripped to the basics, DOE's argument has not changed since it asserted that the DARHT project could not be delayed for the preparation of the admittedly-required EIS. Only months ago, DOE declared:

> "The Department needs to proceed with construction and procurement activities related to DARHT while the EIS is being prepared for reasons of national security... [Declaration of Victor H. Reis, LASG et al v. DOE, 11/29/94]

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13 Now the claim is that the DARHT project cannot wait for the admittedly-relevant PEIS due to DARHT's "urgent need" to help ensure weapons safety and reliability. Now, just as then, the argument is specious: there is no safety and reliability "crisis" with the U.S. arsenal which DARHT is urgently needed to solve. We will address this question in some detail. Briefly, we find, as have others, that:

13
1. There is no "national security urgency" exception to NEPA;
2. There is no safety and reliability crisis; and
3. The PEIS will be complete long before DARHT could contribute, in any case.

As to number 1, we note the immediately-quoted Reis declaration and the draft EIS statement; the Department obviously believes that recitation of the mantra "national security urgency" overrides NEPA requirements. No extensive citation is necessary in rebuttal; we may simply agree with DOE's Deputy General Counsel for Environment, Safety, and Health, addressing DOE managers on the occasion of the 25th anniversary of NEPA:

> "...I am in a bit of a cranky mood these days about our ability to get NEPA right. If you are among those who has seen the light and believes NEPA really does help the Department make better decisions, you can tune me out...At the same time, however, I am confident that many are still lingering in, or at least occasionally visiting, the camp of those who think that NEPA is a great idea for other peoples' projects, or that **your situation is an exception, or -- better yet -- an emergency. (That one has been particularly popular around the Department during the last year.)** You may want to stay tuned in to what I have to say...

> "Finally, I think that our recent litigation losses send a clear message that courts are not persuaded that the national security and nonproliferation objectives that underlie many of our projects justify giving us a pass on NEPA compliance. **There is no national security exemption from NEPA,** and unless we can establish some imminent risk of dire consequences resulting from the application of NEPA, the fact that a project will ultimately serve some vital national security function is not likely to be determinative of NEPA litigation. And that is as it should be, since there is rarely a genuine conflict between serving the purposes for which NEPA was devised and serving our very important national security missions. Indeed, I think when we use NEPA as we should -- to help us make better decisions -- NEPA advances those missions." [emphasis added]

As to number 2, the draft DARHT EIS, without justification, attempts to link DARHT to efforts to ensure that the stockpile is "safe" and "secure." The safety and security of the US nuclear weapons arsenal is not now in question, nor will it be in the foreseeable future. On March 15, 1994, Dr. Harold Smith, Jr., Assistant to the Secretary of Defense, Atomic Energy, Department of Defense, testified to Congress that:

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"I am pleased to report the stockpile is safe, secure, reliable, and meets the current military requirements...Our stockpile is becoming safer and more reliable simply because we are retiring older weapons...Thus, we should enter the 21st century with a modern, safe, and reliable stockpile consistent with the demands of START I and with anticipated military requirements."

This statement was made in the presence of, and with the approval of, Dr. Victor H. Reis, Assistant Secretary for Defense Programs, DOE, who added:

"Right now, as Dr. Smith said, that stockpile is safe and reliable."

The draft EIS's attempt to link the "urgent" need for DARHT to the safety of the stockpile thus appears to have no basis in fact, as these quotes make clear that there is no safety crisis. Indeed, Dr. John Immele, Director, LANL Nuclear Weapons Technologies Program, confirmed the fact and went further when he explicitly stated at the 12/8/94 Santa Fe scoping meeting:

"Audience: I have one more question...in a deleterious way, they may age or crack. What do you mean, is there a risk to the public?

"J. Immele: No, there's not a safety risk. There's a performance problem...because insensitive high explosive is so insensitive that sometimes if it's cracked it won't light on the other side when it's supposed to, so it's basically a performance problem.

"Audience: A reliability problem?

"J. Immele: That's right, it's a reliability issue. We have not found aging problems that affect safety, that make the explosive more sensitive." [emphasis added]

14 These statements from the most authoritative sources on the subject establish beyond any doubt that the draft EIS is incorrect in calling aging effects assessments an "urgent" need. The conclusion that follows ineluctably is that there is no need for DARHT prior to the ROD on the PEIS, and that the DARHT EIS process should incorporate the results of the SS&M PEIS.

15 It is also clear that the *security* of the stockpile has nothing to do with the effects on pits of aging, and nothing to do with DARHT. The first element of security is ensuring, by physical controls (predominantly guarding), that the weapons remain only in the hands of authorized personnel. The second element consists of the sophisticated use control mechanisms incorporated in US weapons. DARHT, or any hydrodynamic test facility, has no relation to either of these. The one element of the overused triad of "safety, security, and reliability," which might plausibly be affected by aging and to which hydrodynamic testing might have application is that of reliability. We now turn to it.

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We note at the outset that it is not at all clear that any need exists, or is likely to develop, for hydrodynamic testing assessment of aging effects on the US stockpile. DOE and the nuclear weapons laboratories appear to possess all the experience, maintenance, inspection, design skills and computational resources necessary for resolving any imaginable stockpile reliability problem without resort to hydrodynamic testing. Current stockpile evaluation, maintenance, and modification programs are both mature and successful. Further, the budget for these programs is on the order of $ 20 million per year, and we are aware of no case in which hydrodynamic testing was part of any fix. **The simple fact is that DOE is attempting to justify billions of dollars of new-facility expenditures for so-called stockpile maintenance programs when indisputable evidence and history of DOE's own actual maintenance programs is that problems are few and routinely fixed without resort to hydrodynamic or other expensive simulations, and that total program costs, even for large arsenals, are a few tens of millions of dollars per year.** The most compelling and comprehensive unclassified discussion of the US stockpile maintenance history and future needs is the Sandia Stockpile Life Study. Exhibit D is a set of some of the most relevant pages from this document. They clearly show that:

16

14 * - **"Nuclear Weapons age, but they do not "wear out" and they are not allowed to degrade."**

* - "It is clear that, although nuclear weapons age, they do not wear out; they last as long as the nuclear weapons community (DoD and DOE) desires. In fact, we can find no example of a nuclear weapon retirement where age was ever a major factor in the retirement decision."

* - "On the order of 70,000 nuclear weapons have been produced and, in fact, full system tests have been conducted on approximately 20% of them. Failures, defects, and aging problems have been discovered, but these have been rare."

Charts prepared by Sandia and included in the study report show:

* - The US has substantial experience with nuclear weapon systems more than 25 years old, even some experience with systems more than 35 years old. Yet the conclusion stands: they don't wear out.

* - Aging defects are rare.

* - Weapons are retired not for aging problems, but rather due to: "Usually a combination of factors in the retirement decision, but policy and DoD requirements predominate (mission eliminated, replacement/retirement of delivery system)."

* - Age of weapon is a consideration, but we can find no example where age is the sole or even primary factor in the retirement decision.

* - Most production changes in weapons are made for operational reasons (new mission or delivery system, for example); only 29% relate to improving reliability and only 9% relate

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to improving safety.

* - Of all the defect types deemed serious enough to warrant corrective action, only 4% affected the reliability of the weapon by 10% or more.

* - The DOE has well-developed and highly effective formal programs for testing its weapons, the New Material and Stockpile Evaluation Programs, which does not include any of the expensive new experimental facilities being demanded by DOE - not the National Ignition Facility at $ 4.3 billion, not the Dual Axis Radiographic Hydrodynamic Test Facility at $ 124 million, and not the Jupiter weapon effects facility at $ 240 million.

* - The enduring stockpile tends to follow historical trends for defects, implying that:
- only about 1 significant weapon production change every 6 or 7 years will be safety-related.

It is clear from this citation that existing stockpile surveillance programs have been comprehensive and successful. A few comments more directly relevant to any possible contribution by DARHT to this process are worth adding.

A typical nuclear weapon is a moderately complicated machine. Of its approximately 5,000 parts, about 200-300, some 5%, are in the nuclear explosive (the "physics package"). This part of the weapons is "sophisticated but not complicated." (Drell, p.287). It must be made very robust to withstand the large forces of re-entry and/or impact, the wide temperature swings encountered in flight through space and re-entry, and possible intense radiation and shock from nearby nuclear blasts. It is not delicate.

LANL has been responsible for the design of the bulk of the weapons in the enduring arsenal. All agree that the nuclear package is robust, strong, and well-engineered. Only about 1 in 20 Significant Finding Investigative Reports (SFIR) involve the physics package. More commonly bottle problems, welding problems, electrical problems, or chemical degradation of the conventional explosive have been found on inspection over the decades. This situation is not expected to change. Since these problems have been readily fixed in the past without resort to facilities such as DARHT, there is no plausible argument that DARHT would be useful in the future for stockpile maintenance and repair.

DOE repeatedly has raised the specter of aging as justification for facilities such as DARHT, but in fact the enduring stockpile is still young: these systems are between 6 and 15 14 years old, and data has been collected on weapons 32 years old or more. Further, as the Sandia study pointed out, actionable defects decrease with age. In addition, we are talking about the primary and secondary, the simplest and most reliable parts of the bomb. In the past 32 years, there have been 13 "actionable" defects found in the nuclear parts of nuclear weapons, out of 257 actionable defect types overall.

There have been no significant problems with secondaries, which are basically stable and

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inert objects whose design is well-understood. The reliability question (insofar as there is one for the physics package) is thus one of primary reliability. But primaries already have a large 14 margin of performance, being designed to produce a yield 2 to 3 times that necessary to set off the secondary. This large allowance provides a comfortable engineering margin to allow for the effect of aging and other influences (including manufacturing variations) and also provides the necessary operational margin to cover the predictably decreasing yield as the tritium in the boost gas decays. Taking the simple step of refilling the gas canisters on a more frequent basis would provide a much greater increase in yield and reliability than any (necessarily complex and expensive) attempt to eliminate the effects of aging or manufacturing variations.

17 Nor is it plausible that DARHT, or any other enhanced radiographic facility, could play any significant role in maintaining the arsenal. DARHT is not needed to certify the manufacture of pits at LANL, as LANL and LLNL pits (two <u>different</u> pit assembly lines) have been exploded at NTS and have produced an excellent and impressive record, as analyzed, for example, by Kidder (classified and unclassified versions) and Axelrod (classified only, no unclassified summary yet). DARHT cannot explode pits from the arsenal, new or aged, without a nuclear yield. It cannot explode HE or IHE from a stockpile weapon, as the explosive cannot be disassembled without destruction of its stockpile configuration. DARHT can only explode 17 simulated stockpile pits (non-Pu, scaled Pu-239, or full-scale Pu-242) with new or artificially aged HE/IHE, which is critical to primary design, but essentially irrelevant to stockpile maintenance.

Furthermore, it is clear that DARHT will be unable to achieve late-stage penetration of some of the pits of most interest in the enduring stockpile. According to the FY1995 - FY2000 LANL Institutional Plan, at p. 43:

> "For a number of stockpile systems, particularly those that are designed with insensitive high explosives and fire-resistant pits, planned radiography upgrades do not provide resolution adequate to observe the gas cavity configuration of the primary stage late in the implosion process. For effective monitoring of stockpile weapons of this type, a next-generation hydrodynamic testing capability will need to be developed. Such an Advanced Hydrotest Facility (AHF) will include multiple beams that produce x-rays from four to six directions at various times to characterize the physical state of the pit more thoroughly."

DARHT's projected operational advantage over existing facilities already appears to be a small improvement obtained at inordinate cost. If DARHT's resolution will be inadequate for effective imaging of a significant portion of the enduring stockpile, then it appears even more irrelevant to stockpile maintenance and less competitive with the available alternatives.

Therefore, it is not credible to postulate a crisis in reliability for the near term of ten to fifteen years, and it is ridiculous to maintain that DARHT is urgently needed now to address safety and reliability questions of the present arsenal. In accord is the view of Dr. Harold Smith (whose testimony of March 15, 1994, was quoted above), expressed to a Senate Armed Services

subcommittee in May of this year, that any near-term decline in confidence would be "more than acceptable" until the non-nuclear testing program comes fully on-line.

Also in agreement is JASON principal Professor Sidney Drell. In a recent article titled "Technical Issues of a Nuclear Test Ban," Drell and co-author Bob Peurifoy write:

> "In the mid-1980s the evaluation program was again rebalanced to further emphasize the new-material assessment based on expanding data bases, which continued to indicate that most defectiveness resulted from design or production errors, not from degradation. The stockpile-evaluation portion of the program was relaxed to biennial sampling of 11 weapons per cycle after completion of production, another indication that the weapons types in the stockpile, when well designed and produced, exhibit good age stability. For example, some weapons types have been in the national stockpile for 25-30 years and with periodic attention exhibit no significant reliability degradation.
>
> "Given that the stockpiled weapon types underwent thorough and complete design development, testing, and evaluation, we have no compelling arguments for the necessity of continuing yield testing to retain confidence in the reliability of hardware for an extended period of time...Most importantly, in the case of a test ban, one should not tamper with the device hardware once it has been certified." [op. cit., appearing in *Annual Review of Nuclear and Particle Science*, Volume 44, 1994]

The inescapable conclusion is that there is no reliability problem at present, and that the high quality of the design, production, and certification process will continue to allow existing modestly-funded, mature stockpile surveillance programs to maintain an extremely high degree of reliability well into the next century. Ironically, as is clear from the last comment above, the only real threat to the reliability of the arsenal comes from DOE itself, which, according to its Stockpile Stewardship Program Plan (February 27, 1995 draft), is committed to doing the very thing that all experts agree will affect reliability: changing the hardware. And in that case, few believe that any suite of non-nuclear test facilities would be sufficient, DARHT or no.

Finally, as to number 3, DARHT simply will not be available, even under the most improbably optimistic schedule, before 2000 in its dual-axis form. Prior to that date, DARHT will not provide any capability not substantially available at DOE's two other flash radiography facilities. But that is some four years after the expected date of the ROD on the SS&M PEIS. To claim that DARHT cannot await the outcome of the PEIS when it could not possibly contribute until some four years after the PEIS ROD is not just incredible, it is demonstrably wrong.

18 **II. The draft DARHT EIS fails to include any analysis of connected and related actions and their cumulative impacts.**

A. DARHT would be a "magnet" facility for LANL.

It is obvious that the proposed and partially-built DARHT facility is not an aberration, an anachronistic product of LANL Defense Programs planning without connection or relation to other planned and present facilities. On the contrary, the project was conceived and executed
18 as part of a coherent strategy for creating at LANL an integrated nuclear weapons design complex with capabilities far exceeding those of any other nation. In very recent times, DOE and LANL have found DARHT's *raison d'etre* - primary design - to be uncomfortably in conflict with Presidential decisions suspending further development of new weapons. Thus, DARHT has been marketed as capable of contributing to stockpile "safety and reliability," a claim which, as discussed above, is not credible. LASG has discussed in detail the history of DARHT in its EIS Scoping Comments submitted January 10, 1995, and we will not repeat that analysis here. Suffice it to say that DARHT was conceived and sold solely as a weapons design facility - in fact, as a major advance in weapons development. This was true as late as spring 1993, with the DARHT line-item project being justified in the DOE's Congressional Budget Request as contributing to the development of "third-generation weapons systems." Although the siren song has now changed to "safety and reliability," the product is the same, and so is the suite of facilities and capabilities that DARHT will tend to bring with it to LANL.

The most immediate and undeniable effect of the DARHT project has already been accomplished (without NEPA review, of course) - the construction and operation of the Radiographic Support Laboratory. This facility, in itself, designed and used for engineering development of the DARHT accelerators, tends to establish further state-of-the-art radiographic accelerator research at LANL, and makes LANL the leading contender for research and even
18 siting of the $ 422 million Advanced Hydrotest Facility.

But hydrodynamic radiography is not accomplished in isolation. Indeed, as DOE has pointed out in this very case, it is considered necessary for hydrotesting to be done within close proximity to design facilities and personnel, to achieve "synergism and efficiency," as the draft EIS puts it. A more detailed discussion appears in the Project Data Sheet for the LLNL Contained Firing Facility:

> The testing areas at Site 300 offer combined diagnostic capabilities that exist nowhere else. **Most test shots are one-of-kind, each being assembled under the day to day scrutiny of the weapons designer. Since most shots are of a development nature,** it is important that they be transported a minimum distance from their assembly point to the test facility. Finally, because of the intense level of interaction between the weapon designer, the shot diagnosticians and firing facility operators, these testing facilities must be located close to the design laboratory.

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> The contained firing chamber concept is consistent with the development and application of advanced diagnostic techniques. **Such new diagnostics are required in order that reliable new weapons may continue to be put into the arsenal, especially considering the current moratorium on nuclear testing and the pending Comprehensive Test Ban Treaty.** Weapons safety testing is another area of increasing importance that will be supported by this facility. Advanced diagnostics include such items as time sequenced x-ray imaging of the fission implosion, and multiple beam laser velocimetry. (emphasis added) [FY1996 DOE Congressional Budget Request, Volume I, pp. 321-322]

In addition to pointing out the synergy of proximity, the excerpt also makes clear the principal application of hydrotest facilities - weapon design. And this close relation inevitably means that acquisition of state-of-the-art hydrotesting facilities will lead to pressures for state-of-the-art design facilities. LANL has already proposed exactly this: a $ 150 million Nuclear Weapons
18 Design Laboratory. To properly support the advanced DARHT and other experimental facilities, LANL and DOE have proposed to construct the Experimental Physics Weapons Support Complex, also at $ 150 million. This complex would also support the other aboveground experimental facilities proposed by LANL to complement DARHT: the $ 81 million Explosives Pulsed Power facility and the $ 150 million Nuclear Environment Simulation Facility. Directly connected with DARHT is the $ 30 million Contained Explosives Test Complex.

Similarly, the fact that LANL and DOE have given credence to the notion that DARHT will contribute to the safety and reliability of the arsenal has resulted in plans for other stockpile stewardship and maintenance facilities at LANL, including the $ 722 million Advanced Neutron
18 Source, recently repackaged as the $ 783 million National Center for Neutron Research.

It is thus not too much to say that DARHT is a "magnet" facility for LANL, and that it will, to a high degree of probability, tend to the location of these related facilities at LANL. The proper place to consider the impacts of these suites of related facilities is in the LANL SWEIS, and we believe DOE should complete the SWEIS before the ROD on DARHT. If the SWEIS is not completed before the DARHT EIS, the latter must include analysis of the impacts of these reasonably foreseeable connected actions.

We also note at this point that the very same tendency for colocation of these design and experimental facilities will inevitably prejudice the SS&M PEIS, as noted in I.A.2. above. The only acceptable course is also the only sensible one: complete the PEIS before the DARHT ROD.

19 **B. DARHT is part of a planned and in-progress consolidation of the nuclear weapons complex at LANL.**

The above discussion has been in terms of the likelihood of colocation at LANL, arising from DARHT, of other significant facilities and functions of the DOE's SBSS program - a

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process which can hardly be denied, even though the SS&M PEIS has not been completed. A second, although related, difficulty with proceeding with the DARHT EIS now is that a significant consolidation or collapse of the nuclear weapons complex is occurring at LANL, and DARHT is a pivotal element of this phenomenon. Less than decade ago, DOE's nuclear weapons complex was huge and diversified. Now, environmental outrages and the end of the Cold War have decimated the complex, turning vast and costly facilities into uninhabitable, economically unusable shells. From Savannah River in the east, to Oak Ridge, to Fernald, to Rocky Flats, and to Hanford in the west, nuclear weapons production facilities have been closed and their functions transferred to LANL. LANL has become the only operating plutonium
19 processing facility in the country, and it is slated to soon take on a principal weapons manufacturing and remanufacturing role.

According to the Activity Data Sheet for the DARHT project in the 1997 LANL/DOE CAMP, "The use of intense resolving flash x-ray machines and more than a single high-fidelity picture from each expensive local system's hydrotest is a cornerstone of Los Alamos nuclear competence, stockpile maintenance, and potential weapons remanufacture." If it is indeed a cornerstone of these functions, then constructing DARHT will inevitably prejudice both the PEIS and the SWEIS. That is, if many functions are being consolidated at LANL, as alleged. How **reasonably foreseeable** is it that LANL will become the "Jiffy-Lube" (see below) of the complex?

A wide variety of evidence, some quite recent, suggests that this course - the Department's *de facto* reconfiguration and consolidation of a variety of nuclear weapons functions at LANL, outside the formal PEIS process - is in fact not merely "reasonably foreseeable," but is being rapidly accomplished now. LANL tasks include secondary fabrication
19 and pit manufacture and, with them, a variety of related stockpile support functions. Detonator manufacture, neutron tube loading, beryllium manufacture, calorimeter manufacture, and stainless steel pit support manufacturing are already being moved to Los Alamos. Los Alamos also hopes to inherit some or all of Y-12's uranium and lithium roles, Livermore's plutonium roles, and to construct tritium facilities for weapons reservoir filling, which, together with the above functions, will give LANL the capability to prototype entire warheads and to manufacture the nuclear components of warheads as they are needed for the stockpile. These roles complement LANL's existing weapons research, development, and testing functions.

19 Meanwhile, LANL's plutonium storage capacity is being expanded and further expansion is planned in the near future. Large new facilities for plutonium manufacture and processing have been proposed in the past, but may not be needed if the stockpile is small enough, especially if existing capabilities in the Chemistry and Metallurgy Research (CMR) Building can be upgraded to supplement those at Technical Area (TA)-55, LANL's primary plutonium facility, which was called the Plutonium Processing Facility when it was built in the late 1970's.

Supporting all this are a variety of waste minimization and waste treatment and disposal proposals which will, we are told, soon allow LANL to manufacture warheads without the generation of transuranic (TRU) waste and hence without the necessity for offsite disposal of

wastes. The existing low-level waste (LLW) dump (Area G) is to be greatly expanded, and a new low-level mixed waste (LLMW) dump with a capacity of 475,000 cubic yards--over twice the size of the Waste Isolation Pilot Plant (WIPP)--is now in design. In addition, a 20-year old radioactive waste incinerator, designed to burn both TRU waste and LLW, both straight radioactive and mixed, and both from LANL and elsewhere in the complex, continues to be supported by LANL, despite some recent DOE reservations. Also planned are a mixed waste treatment facility, a TRU waste treatment facility, a high-explosives waste treatment facility, and a large new radioactive liquid waste treatment facility. All these facilities, if permitted and built, will allow LANL to operate as a self-contained full-service nuclear weapons "park" with legal on-site disposal of all radioactive waste streams--what the LANL Public Affairs Officer has (in a candid moment) referred to as "the Jiffy-Lube of the nuclear weapons industry."

Paul Cunningham, the Director of Nuclear Materials Operations at LANL, told us two years ago that he and others at TA-55 see no realistic alternative to the complex consolidating largely around Sandia, Los Alamos, and the Nevada Test Site in the coming decades, once the stockpile reaches a lower equilibrium size and Pantex is no longer needed.

LANL official spokespersons have repeatedly stated that production roles would damage the Laboratory's scientific mission and are therefore not desired by LANL management. Perhaps they doth protest too much.

o LANL continues to portray its weapons manufacturing capabilities, and its plutonium processing and machining proficiencies in particular, as purely for research and development (R&D), and not for production. As early as 1981, however, the publication Los Alamos Science proudly stated that 1500 kg of plutonium had been processed that year for the weapons programs. Subsequent years' issues spoke of the improvements and automation that was added to the processes. 1500 kg is enough Pu for perhaps 300 weapons.

o The design throughput capacity for TA-55 was published on December 8, 1994 by the Albuquerque Journal in a story written by John Fleck. In 1978, that capacity was 100 kg/mo for pit casting and machining, or roughly 20 weapons/month. LANL has said that TA-55 has been reconfigured, and newer stricter exposure standards (i.e. 2 rads/yr instead of 5 rads/yr) would limit pit production to less than this.

o In 1989 the National Research Council wrote in its report The Nuclear Weapons Complex: Management for Health, Safety, and the Environment

> "The Plutonium Facility at LANL..., operating for the most part on a one-shift, 5-day schedule, can process almost half as much plutonium as Rocky Flats can...and turn out a purer product...Although there may be resistance at LANL to converting Building TA-55 into a full-scale production facility, an administrative solution should be possible."

o On November 6, 1990, the Ahearne Committee (the DOE Secretary's Committee on

Nuclear Facility Safety) reported to Admiral Watkins that LANL's plutonium-processing capability and expertise "are a significant but under-utilized asset to DOE...We recommend that serious consideration be given to how the capabilities at TA-55 could be used to provide greater benefits to the complex." It was in January of 1990 that Rocky Flats stopped shipping pits.

o The Secretary of Energy's Advisory Board (SEAB) Task Force on the Laboratories found in January 1992 that

> "When the production levels get sufficiently small the traditional roles of development and production become diffuse. Therefore, the Defense Laboratories must be considered as one element of the total manufacturing, dismantling, and disposal process and their role needs to be integrated into a streamlined process that is highly effective."

This conclusion was strengthened in their final report, which contains the statement that "as the nuclear weapons development and manufacture cycles coalesce due to reduced weapon needs, the Defense laboratories may take on the future production responsibilities" (p. 10, emphasis added).

o The DOE's Draft Protocol for the Lead Laboratory Plan, distributed by Howard Cantor on August 14, 1992, gave to Los Alamos lead responsibility for oversight of 6 out of 11 nuclear weapons functions throughout the complex, including tritium, uranium, and lithium technologies, plutonium recovery and storage, and nuclear subassemblies. (One of these "nuclear subassemblies" is Pu-238 thermal batteries, of which LANL has manufactured thousands for the stockpile.) Sandia, also primarily in New Mexico, was given oversight of non-nuclear components and overall assembly, while Lawrence Livermore National Laboratory (LLNL) was given oversight of plutonium pit manufacture, case materials (described as uranium), and high explosives. As the Plan said,

> "The lead laboratory approach increases the scope of the laboratories' functions and responsibilities into areas that were previously the purview of the production elements. As a result, the role and relationships of the laboratories and other production complex participants will change."

o In August 1992, reports from DOE's Plutonium Strategy Task Force were made public. These reports suggest limited production at LANL as the best mid-term option for the complex (if the options involving production at Rocky Flats are, with hindsight, omitted). The Task Force's conclusions were subsequently confirmed by Leo Duffy (Alb. Journal 8/19/92).

o Plutonium storage at LANL is being upgraded. DOE has declared the bizarre intention of rebuilding the NMSF using as NEPA documentation the old EA that was produced for the original fiasco. Although representations have been made that the design capacity will remain about 6 metric tons, it is also clear that tripling that capacity could be easily and economically (less than 10% of the construction cost) accomplished with straightforward cooling system

upgrades. Very convenient for a manufacturing role.

On December 7, 1993, Secretary O'Leary released some figures on plutonium disposition; LANL at that time was storing 2.6 metric tons of weapons-grade plutonium. This is actual storage, rather than capacity.

o On January 22, 1993, the 120-page Los Alamos Strategic Plan was released for internal use only. This document maps out a detailed strategy whereby LANL would obtain for itself a growing share of the dwindling nuclear weapons pie by capturing many programs from other facilities. These activities include:

--fabrication of plutonium pits,
--manufacture of uranium components,
--manufacture of lithium secondary components,
--full-scale fire-testing of new plutonium pit designs,
--development and industrial demonstration of a variety of plutonium and uranium processing technologies,
--development of tritium manufacturing techniques as well as an upgraded facility to load tritium into weapons,
--manufacture of detonators for weapons,
--fabrication of beryllium weapons components, and
--manufacturing of complete prototype warheads.

While elements of these plans had been made public before, what was new in this document was the sweep and specificity of LANL's ambitions, along with the assignment of responsibilities to carry out these plans. It is obvious that this plan, which was developed in an intensive process lasting many months and requiring tremendous amounts of management time, reflects a serious commitment of resources. Twenty-four large defense-programs construction projects, with design dates ranging from 1993 to 1998, are listed to support this consolidation, along with 9 new waste management projects and a variety of infrastructure projects. These projects are not all the same as those shown in the publicly-available LANL Institutional Plans, and include:

--Materials Science Laboratory*
--Dual-Axis Radiographic Hydrotest Facility (DARHT)*
--High-Explosive Materials Test Facility*
--Test Transition/Safeguards Facilities*
--DARHT Second Axis*
--Weapon Explosives Safety Test Facility*
--High-Energy Radiographic Facility*
--Weapons Component Testing and Development Laboratory*
--Explosive Pulsed-Power Facility*
--Materials Science Initiatives Laboratory*
--Chemistry-Metallurgy Research (CMR) Building Upgrades
--Nuclear Materials Storage Facility

--Radiographic Facility, TA-55
--Integration and Consolidation of Livermore Plutonium R&D
--Sigma [Complex]/CMR Uranium R&D Upgrades
--LiH/LiD Component R&D Facility
--Tritium Laboratory
--Special Nuclear Materials Storage and Processing Facilities
--Non-Nuclear Consolidation, five subprojects
--Complex 21 Modeling Laboratory
--Nuclear Safeguards Technology Laboratory
--Special Electronics Shop
--Nonproliferation and Arms Control Center
--Energetic Materials Pilot Plant

(* indicates the project was identified by LANL as important for nuclear weapons research, development, and testing, or "RD&T;" see p. 8)

For the record, the nine WM projects are:

--ES&H improvements
--Mixed Waste Receiving and Storage Facility
--Air Exhaust Modifications, TA-53
--Mixed Waste Storage and Disposal Facility
--High-Explosives Wastewater Treatment Facility
--Sanitary Landfill
--Radioactive Liquid Waste Treatment Facility
--Transuranic Waste Treatment Facility
--Accelerator Produced Tritium/Accelerator Transmutation of Waste (ATW) R&D Facility

o On September 15, 1993, Bruce Twining, Manager of the Albuquerque Field Office (AL), wrote a memo to Don Pearman, Acting Assoc. Dep. Sec. for Field Management, describing options for NEPA compliance at LANL. As Twining put it,

> "...many new projects under the auspices of DP [Defense Programs] are planned [for LANL] over the next several years as an adjunct to current missions and operations. Additionally, a large number of new projects and facilities will be required to support continuing waste operations programs...LANL is a high priority among AL sites for updated NEPA documentation because of the very large number of new actions planned over the next few years, and its focus under most reconfiguration alternatives and consolidation strategies."

Twining went on to list some of these new programs. He began with the following Defense Programs (DP)-funded environmental assessments (EAs) now in progress:

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--TRU Waste Compactor and Drum Storage Building
--Uranium Oxide Reduction
--High Vacuum/Atmospheric Furnace Installation
--Decontamination Oven
--HE Material Test Facility (*?)
--Metal Sphere Project
--Isotope Separator Building
--Deactivate, Disassemble, and Decontaminate Bldg. 86, TA-33
--Accelerator Prototype Laboratory
--Weapons Component Testing Facility (*?)
--Low-Level Waste Drum Staging Bldg at the Weapons Engineering Tritium Facility (WETF), TA-16
--Fire Protection Improvement Program
--CMR Building Upgrades, Revised Plan
--Fire Resistant Pit Project*
--Nuclear Material Storage Facility

As can be seen, some of these items were mentioned in the Strategic Plan. It is not completely clear what all of these projects actually are; the projects marked with an asterisk (*) appear to support RD&T functions (see discussion on p. 8).

In addition to these EAs in progress, LANL's FY1993 Technical Task Plans for Stockpile Support include the following (this list does not, Twining says, include any RD&T projects, or any projects which are to begin after 1995):

--Uranium Technology - Re-establishment and growth of the highly enriched uranium recovery and technology program, centered around the initial startup of the Uranium Line for Special Separation Science, research and development of optimum processes for the line, with equipment and glovebox additions to the line as capability is tested and selected. Re-establishment of uranium casting and machining capability and replacement of outdated equipment/facility."

--Surveillance - Pit surveillance (transfer from the Rocky Flats Plant) pit refabrication - development/enhancement of capability to maintain the technology base to build pits.

--Pit Disassembly Technology - Development, installation, startup of a process line to demonstrate innovative technologies for site return processing (pit disassembly, plutonium consolidation, americium removal, and non-destructive assay). Refurbishment, operation of the Special Recovery Line.

Nuclear Material Storage - Vault upgrade at TA-55.

Chloride Based Processing and Pyrochemistry - Consolidation and upgrade of processes and equipment in TA-55 in support of current inventory and future facility design.

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Nitrate Based Processing - Test/demonstration of new recovery technologies; workoff of vault inventories and hard to recover and special residues; development/test/installation of computer-aided process control and automation of recovery operations.

As can be seen, the projects described in the Twining memo implement some--many--of the hopes expressed in the LANL 1993 Strategic Plan.

o The [Livermore] Valley Times reported on January 31, 1994 that DOE is delaying its reconfiguration PEIS, due to budget declines and public comment. More emphasis is to be placed on the modify-in-place and no-action alternatives. In the July 1993 Notice of Intent which began the R-PEIS scoping process, LANL is shown as a possible site for six out of twelve nuclear manufacturing jobs under those alternatives. It was rumored that the R-PEIS was being re-scoped in a way that omits nuclear weapons production alternatives from the process, focussing the R-PEIS on dismantlement and disposition issues.

o In LANL's "News from the Laboratory Leadership Council," Vol. 2, No. 3, we find these notes from the weekly Council meetings:

"Pit Requalification Program.

"We propose to manage aging of pits in the stockpile with requalification of 100 pits to "new" status, combined with manufacture of up to 50 pits per year.

"Manufacturing Roadmap.

"In response to the DOE's planning for the future complex, it is important to consider how we might integrate possible manufacturing roles into Los Alamos, yet preserve the R&D nature of the Lab. Neal discussed the...PEIS...It was noted that as long as the number of items manufactured remains in the category of small lots, it appears manufacturing and R&D activities can coexist and in many cases become synergistic."

The "Neal" referred to is Tim Neal of LANL's office of Nuclear Materials and Reconfiguration Technology, whose February 6, 1995 memo titled "Manufacturing Assignments and the PEIS," concluded:

"This PEIS will likely cite LANL as the source of something like 150 pits per year to be supplied for renewal builds. Present thinking involves the dedication of one of the four wings of our plutonium facility, PF-4, to be modified to demonstrate modern processes and, incidentally, produce 50 new pits per year.

"A second SSM-PEIS mission that could come is related to highly enriched uranium, salt, and CSA assembly/disassembly/surveillance.

31

"Tritium will also be proposed for additional missions such as reservoir surveillance or contingency weapon storage system fill. We could even be considered for the full fill mission in lieu of the APT site.

"Finally, the non-nuclear Kansas City products should be mentioned. In this arena, the big issue is not space to perform the nuclear package work here, but whether these latter assignments would revert to us as the design agency, which incidentally has most of the capabilities in place as part of our R&D program...

"...The plutonium mission is highly probable...We are the leading contender for the tritium assignments as well. The enriched uranium/CSA assignment will be strongly contested by Y-12...Thus, the probability of this mission assignment is a real tossup."

In sum, the intention and the direction are clear, and DARHT's role is, according to the Laboratory, fundamental. These connected and related actions are not merely "reasonably foreseeable" - they are blindingly apparent. The proper vehicles and order of analyses are, we repeat, the PEIS, the SWEIS, then this EIS. But if DOE refuses to delay this EIS, it must
18 analyze the impacts of these connected actions. To fail to do so is to produce a document that will invite, and will not withstand, judicial scrutiny.

20 **III. The draft DARHT EIS does not provide an adequate analysis of a reasonable range of alternatives to the proposed action.**

A. The PHERMEX Upgrade(s).

According to the draft EIS, at p. 3-13:

"The No Action Alternative describes the continuation of the current situation (status quo) that would be expected in the future if DOE did not implement the Preferred Alternative or any other alternative analyzed in this EIS...For this EIS, the No Action Alternative would be to continue to operate PHERMEX at LANL and FXR at LLNL **and not acquire an enhanced radiographic hydrodynamic testing capability.**" [emphasis added]
21

Yet in the draft LANL FY1996 - FY2000 Institutional Plan, we find at pp. 14 - 15:

"Plans are to provide PHERMEX with a double-pulse capability that, combined with Laboratory developments on a time-gated, large-format gamma camera, will provide two images late in the implosion, giving important information about the
21 time evolution of implosion features. The upgraded PHERMEX will also provide higher doses."

21 This, then is the "real" PHERMEX Upgrade Alternative, as opposed to the EIS's phony formulation. We have three comments.

First, it is more clear than ever that the DARHT ROD must await the SS&M PEIS analysis of the effects of DOE having in the complex two high-dose, double-pulse radiographic hydrotest facilities, one capable of doing plutonium experiments, and both apparently capable of substantial core-punching ("providing two images late in the implosion"). Will or will not these dual facilities provide the hydrotest capabilities necessary to support the chosen SS&M plan, either indefinitely or until a next-generation machine such as AHF is available? Only the PEIS can determine, and DARHT, by sinking $ 124+ million of SS&M funds for a questionable dual axis feature, may not go forward until that determination is made.

21 Second, the "real" PHERMEX upgrade must be evaluated in the DARHT EIS, as it represents a genuine and reasonable alternative to DARHT.

21 Third, the EIS "PHERMEX Upgrade Alternative" is absurd and should be dropped. The definition of this alternative is essentially "DARHT at PHERMEX" - that is, build a new DARHT-type accelerator at PHERMEX. The description is at p. 3-22 of the draft EIS:

"Because only the enhanced radiographic technology developed for DARHT is currently available to provide the capability needed, and because the linear induction accelerator planned for DARHT is the only available technology to provide the needed capability, the radio-frequency accelerator now at PHERMEX would be removed and replaced with a linear induction accelerator.

Thus, the "upgrade PHERMEX" alternative is really just "build DARHT (over) at PHERMEX." Given that substantial construction has already occurred at the DARHT site, there is no cost saving, only extra costs, so this is simply a higher-cost DARHT. It is an absurdity masquerading as an alternative, a sham plainly designed to effectively reduce the only real alternatives to "no action" and "build DARHT". This shabby attempt to dress up the preferred
21 action by comparison with an absurdity is a litmus test of whether the analysis of alternatives in this EIS is in good faith, and the result is negative.

B. Proliferation impacts.

22 **The draft DARHT EIS does not contain any analysis of DARHT's proliferation impacts.** The nonproliferation analysis on p. 2-11 is almost too brief and facile to criticize. It contains several errors of fact:

23 • The science-based stockpile stewardship (SBSS) program was <u>not</u> devised to be a "key component of the United States nonproliferation strategy." Were this the case, Congressional concerns about the proliferation impacts of a central project in the SBSS
23 program would not have arisen (see below). SBSS was not designed to minimize the proliferation impacts of maintaining an arsenal but to maximize the maintenance and

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23 advancement of nuclear weapons capabilities that could be achieved under a CTBT.

• The nation has not had, nor does it yet have, a CTBT as an unambiguous goal. Last year, US negotiators proposed a ten year "easy-out" clause, which would effectively limit the duration of any CTBT to ten years. Now the ambiguity of the U.S. position in Geneva regarding low-yield testing will continue to delay a CTBT until it is resolved. The outcome may not, in fact, be a CTBT.

• SBSS has nothing to do with any "U.S. commitment to Nonproliferation Treaty goals." In fact, it contradicts them, specifically Article VI, in which the U.S. agreed to nuclear disarmament, not multi-billion dollar investment in long-term facilities that are needed to maintain and certify new kinds of weapons indefinitely.

• The reliance of nonnuclear weapons states on "the U.S. nuclear deterrent for security assurance" is questionable. That is one theory, by no means a consensus view.

• The implication that there is any threatened "loss of confidence in the safety and reliability" which could cause a "corresponding loss of credibility...[in] a nuclear deterrent" is flat wrong, as discussed above. Still less would DARHT be necessary to redress any such loss of confidence, as also noted in these comments.

• It is not completely true that the U.S. "has halted development of new nuclear weapons systems." Development has halted, perhaps, if the word is used narrowly to mean near-term preparations for production of entirely new weapons, but design continues. As recently as this month, Dr. Don Wolkerstorffer, Director of Dynamic Testing at LANL, told one of us and a radio audience that a new earth-penetrating weapon was being considered to replace the old 9-megaton B53 gravity bomb. Whether this weapon actually is produced will depend on a Presidential decision that has not yet been made, but design work is occurring now. There are literally dozens of references to new and upgraded weapons under design in DOE documents, and it is clear from several sources that the DOE and interagency approach to stockpile management is to upgrade and replace existing weapons where possible under a CTBT.

• DARHT is not needed to assess the "safety and reliability of the nuclear weapon primaries in the remaining stockpile," and, as noted elsewhere, cannot be used directly to test them. Safety is in any case not an issue, and reliability is maintained by other methods.

24 • It is false to imply, as this draft EIS does here and in several other places, that failure to build DARHT would lead to a "lack of hydrodynamic testing capability." Without DARHT, and even without PHERMEX, DOE would maintain a hydrodynamic testing facility - FXR in Livermore - now upgraded to be better than any other such facility in the history of the U.S. or any other nuclear weapons program.

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What is most disturbing, however, is not just these errors, but the complete omission of any discussion or analysis of the politics of nonproliferation and arms control, the importance of U.S. surrogate testing in rationalizing the nuclear testing plans of other nations (e.g. France), as well as its influence on the CTBT negotiating strategies of France, Russia, and China.

22 While there is no specific NEPA requirement to analyze the proliferation impacts of DARHT and its related actions, we note that the proposed National Ignition Facility (NIF), a laser fusion facility of only indirect use in designing nuclear weapons, is now receiving a special proliferation impact analysis by the DOE because of concerns raised by Congress. There is no question that DARHT is much more centrally important in the design of new weapons than is NIF. Accordingly, the DOE should conduct a careful proliferation analysis of this project as a part of, or in addition to, its EIS effort.

We also note that DOE has, as recently as March of this year, completed an analysis of the proliferation impacts of its policy concerning foreign research reactor spent nuclear fuel as part of a draft EIS.

These precedents aside, the proliferation impacts of DARHT act to undercut and negate its purpose and need. These impacts are severe and we believe they should be considered fatal to the project.

Rather than relying on its own internal judgement, fraught with conflicts of interest, the DOE should collect data on the proliferation impacts of DARHT by discussing the project with the leadership of the non-nuclear weapons states, who are the main actors in the proliferation arena. What do they think about DARHT, about SBSS, and about the Nuclear Posture Review requirement to retain the ability to certify new weapons under a test ban?

The proliferation impacts of the DARHT project were discussed in some detail on pp. 13-19 of the Los Alamos Study Group's January 10, 1995 scoping comments. Please refer to that document for further applicable comments.

C. Plutonium operations and the exclusion option.

This is another example of sharp practice. In fact, it is clear that the "plutonium exclusion alternative" does not refer to operations at PHERMEX, only DARHT. The draft EIS 25 wholly fails to fulfill the obligation of discussion and disclosure related to the Department's use of plutonium in hydrodynamic testing. We note that the Natural Resources Defense Council, in scoping comments submitted January 10, 1995, stated clearly and succinctly the necessity for analysis and disclosure in the EIS:

> The plutonium-related matters that must be discussed in the EIS include the following issues. First, the Department must describe in reasonable detail the scope and character of its potential plutonium testing plans, including the isotopes to be used and the reasons for using plutonium instead of some other, less

troubling material. Second, the Department must present a full discussion of the nuclear proliferation implications of plutonium usage at DAHRT. This discussion must encompass the potential effects of such testing on both nuclear weapons states (e.g., the potential for U.S. hydrotesting with plutonium to encourage similar activity by other nations) and non-nuclear weapon states (e.g., the potential for U.S. hydrotesting with plutonium to encourage other nations to pursue nuclear weapon development in light of the special weapon-design utility of hydrotesting using plutonium) in a world with or without underground nuclear testing. In this regard, the Department must discuss whether the planned tests with plutonium are strictly hydrotests or might also include hydronuclear tests. Third, the EIS must treat fully the waste-generation implications of plutonium usage, including quantities, treatment and disposition of waste produced. Fourth, the document must include a detailed discussion of the risk of containment-vessel breach during the hydrotesting process.

Because of plutonium's special toxic properties and special proliferation implications, the public is particularly concerned about its possible usage at DARHT. While we support keeping secret information that is truly proliferation sensitive, to date the Department has overclassified in this area. In the DARHT EIS, the Department should make a clean break with its past practices and provide the public with the information to which it is entitled about the environmental and non-proliferation implications of hydrotesting using plutonium. In addition to meeting legal requirements for disclosure, a full and fair discussion of plans and practices in this area would gain the Department important credibility with the public.

25 Unfortunately, the draft EIS completely fails to implement any of this excellent advice, in the process rendering the document legally insufficient on this crucially important aspect.

The DOE is to be congratulated for producing its "Summary of Environmental Impacts from the Classified Supplement." The analysis, and the alternatives analyzed, are not, however, adequate. Further, it appears that too much remains classified to allow an adequate review of
26 this document. Since the relevant material that remains classified has nothing to do with weapons design, it is not clear why the Department has chosen to retain such a restrictive security blanket over the use of plutonium in hydrodynamic testing. We are concerned that the Department is not being frank about its plans and that future revelations, having negative effects on public trust and international relations, could be the result. Worse still, the lack of effective outside oversight could lead to failure of institutional learning, as it has in the past, and a serious accident or serious environmental contamination.

As already noted, the choice of alternatives with respect to plutonium use is not reasonable, especially since senior weapons designers like Dr. Sack question the very use of plutonium at all.

Given the limited information available, our comments on this summary will be brief:

27 1. On p. 3, DOE asserts that no nuclear explosions will occur under any alternatives. Will DOE certify in a clearly-demarcated portion of the ROD that no experiments involving nuclear yield from the explosive assembly or implosion of fissile material will ever again be conducted at LANL? As DOE is aware, a series of 35 such experiments has already been conducted at LANL.

28 2. On p. 4, the 50th percentile meteorological condition should not be "considered to be conservative."

29 3. On p. 9, it is not clear why the detection limit of monitoring instruments should be used as the upper bound for plutonium releases under routine operations.

30 4. On p. 9-10, it is not clear why only the 50-year committed population dose was used. It does
31 not appear that resuspension of dust was considered in DOE's analysis. It appears that the
32 growing population in the La Tierra/Las Campanas area was overlooked. Overall, the extremely low number (12) of latent cancer fatalities over all time) that was found in a supposedly worst-
33 case analysis of the accidental open-air detonation of a primary assembly containing easily 40,000,000 fatal cancer doses upwind from a residential area only a few miles away and large town two dozen miles away is not, on its face, credible.

34 5. On p. 10, the omission of radiological doses to LANL workers in the event of an uncontained explosion with Pu is inexcuseable.

Nowhere in this document does DOE discuss the devastating effect that such an accident could have on Native American sacred lands, on public uses of public lands, on grazing, on real estate development in the rapidly developing suburbs of Santa Fe located some miles northwest
35 of the city, or on the public perception of Santa Fe and northern New Mexico as a wholesome and sane alternative tourism and residential destination, a refuge from other more polluted sites in the United States. In short, one plutonium accident could very easily engender long-term economic impacts and endanger or eclipse the livelihoods of thousands of people, quite independent of any actual health effects.

The safety analyses (as opposed to the impact analyses) that DOE has conducted on these
36 operations--if it has conducted any at all--are neither summarized nor cited in this document. In meetings with DOE in late 1994, the very existence or nonexistence of safety analyses was deemed classified.

The Defense Nuclear Facilities Safety Board has decried the lack of such analyses at LANL, which are required by DOE Order 5480.23, along with a lack of "clear lines of responsibility and accountability" concerning hazards associated with an experimental program involving plutonium pits. Further, they judge that

design and construction processes at LANL may not be sufficiently well-defined and formalized to ensure that new and upgraded facilities will meet health and safety requirements. (letter, Conway of DNFSB to V. Reis of DOE, Nov. 25, 1994)

In sum, there is no evidence yet that the DOE has conducted a thorough and impartial analysis of the risks of using plutonium in explosive experiments, or the environmental, safety, and health impacts should an accident occur. Perhaps as a final example of the inadequacy of the draft EIS on this subject, we note the statement that

> "Under the [enhanced containment] alternative, if single-wall steel vessels were used, a separate recycling facility would be built near the DARHT site to recycle the vessels after each use. Double-wall vessels would be handled the same as under the No Action Alternative...Appropriate NEPA reviews will be conducted if this facility is required.

36 Saying that plutonium cleanout will be the same as it is now is not an analysis of consequences! This EIS is the appropriate time and document in which to do the facility analysis - it's required in order to evaluate the alternative! This final example on this critically important subject is good evidence that this is a less-than-objective EIS.

37 IV. The draft DARHT EIS fails to provide an adequate analysis of the isotope production, waste generation and disposal, and decontamination and decommissioning activities associated with the proposed action and alternatives.

A. DARHT would cause the production of hazardous plutonium isotopes

37 The Department has stated its intention to continue using plutonium for hydrodynamic radiography. All of these experiments would require the "production" of plutonium in the sense that material would have to be reprocessed, refined, and machined. Of particular interest and concern, however, is the prospect of use by DOE of isotopes of plutonium requiring production at other sites. One example is that of Pu-242, currently one of the subjects of the Interim Management of Nuclear Materials EIS. Although the Department has refused to discuss its hydrotesting plans for this material, it is under a legal obligation to do so, both in this draft EIS and the Interim Management EIS. Further, we note that there is a serious question wther the Department can make a decision on reprocessing Pu-242 solutions before reaching the ROD on the SS&M PEIS. That is, the Department must determine the need and utility of hydrotesting using Pu-242 before it may legitimately embark upon Pu-242 solutions reprocessing. Reprocessing may be far less desirable than stabilization of these dangerous solutions if there is no real hydrotesting need for the product. DOE admits that the conversion of the Pu-242 solutions to glass is a reasonable approach to stabilizing the material, but insists it needs the Pu-242 for programmatic use. This insistence on programmatic (i.e., hydrotesting) use must be determined in the context of the SS&M PEIS, however.

38 B. DARHT would cause the generation and disposal of hazardous and radioactive wastes

38 As noted above in section I.B., DARHT will generate wastes of all types. Regardless of how the legal issue of writing an EIS for DARHT prior to the SWEIS that will analyze these issues is resolved, this EIS should analyze the disposition of those wastes. Especially in the absence of a SWEIS, any DARHT EIS must analyze the impacts of wastes generated by the facility. This has not been done in the draft EIS; in the table of impacts provided in the Executive Summary, there is not even an entry for waste generation/waste management.

DARHT cannot be considered in isolation, of course. The fabrication of the test devices will generate wastes, as will the related program activities that these activities are meant to serve. The absence of these analyses in this EIS underscores the need to either place the SWEIS prior in time or conduct a thorough and SWEIS-level analysis of waste management in this document.

39 C. The decontamination and decommissioning impacts of DARHT must be analyzed.

The position of DOE on the subject of decontamination and decommissioning is, according to the draft EIS, at p 3-13:

> "DOE cannot anticipate which options may be considered reasonable in the future and so cannot assess these alternatives in this EIS."

To refuse to perform an analysis does not, obviously, satisfy the requirement to analyze these unavoidable and important impacts.

V. The environmental and program analysis of the draft DARHT EIS is biased and lacks scientific methodology and credibility.

40 In our opinion, the impacts analysis in the draft EIS is biased in favor of DOE and the preferred action. This bias is reflected in failures to adequately disclose and discuss missing or omitted data which is significant and relevant, the use of conflicting assumptions, and substitution of conclusory and unsupported allegations for analysis. The consequence is that the document lacks scientific credibility because it lacks scientific methodology. No one error or omission is sufficient to demonstrate this bias. Therefore, we have arranged this section in the form of a series of excerpts from the draft EIS, with comments. The page citation is at the left margin; our comments are in brackets.

3-25 Experiments using plutonium would always be done within double-walled vessels
41 that have been demonstrated to fully contain these types of tests and would not lead to environmental release.

[Where is the justification for such a conclusion? Considering that the failure of a

plutonium containment vessel could dwarf in environmental consequences all other scenarios, this section is inadequate without experiment, data, and analysis. More than "trust us" is needed.]

42 | 4-11 Data from the 1987 and 1990 inventories represent the only available listings of chemical emissions for LANL.

[And these data, besides being 5 and 8 years old, show large differences. This is at least
42 | an incongruous gap in the data base for this EIS, and it needs to be fixed. How can DOE, and we, not have a reasonably current and complete emissions inventory for a facility like LANL?]

4-13 The 1992 sampling network for ambient airborne radioactivity consists of 55 continuously operating air sampling stations.

[As noted in our scoping comments, the sampling stations closest to TA-15 are upwind;
43 | downwind stations are considerably farther away. This obviously impairs the usefulness of the data obtained and shows a need to get more relevant data. Further, it would be proper here to
44 | note the well-known existence of widespread inadequacies of the air monitoring systems at LANL, that LANL admits it is in violation of the NESHAPS standards for air monitoring, and that it is being sued for its non-compliance. The failure to mention these facts which would go directly to the reliability and appropriate weight to put on the presented data shows a lack of skeptical, scientific analytical orientation.]

45 | Later in 1993, three air monitoring stations were added downward [sic] of the firing site for PHERMEX and DARHT...Samples collected at these stations are analyzed for isotopic uranium, isotopic plutonium, gross alpha, beta, gamma, and beryllium.

45 | [But no data from these stations is presented or used! Nor is there any explanation. This is not a credible or objective environmental analysis.]

4-16 [Table presents "1992 Airborne Releases of Radionuclides from LANL" showing only
46 | microcuries of uranium released - because, as footnote points out, "Does not include uncontained hydrodynamic testing." What is the point of presenting this table if it omits: a) the most important contribution, and 2) it is the omitted fraction that is the principal subject of the environmental effects analysis? Again, evidence of shoddy, non-objective analysis.]

47 | 4-69 ...EPA restricts the EDE received by air to 10 mrem/yr...In 1992, that EDE was 7.9 mrem, which is in compliance...

[An honest discussion would have pointed out that LANL exceeded the standard and
47 | overdosed the public in 1990 and has been cited by EPA for that and for continuing non-compliance, and that LANL is being sued for same.]

4-71 [Shows background as about 340 mrem/yr. This is based upon the LANL practice of
48 | adding to the objectively measurable background (about 140 mrem) a large (200 mrem) "radon contribution." This is a slippery practice, designed to make LANL's exposures look very small in comparison to background. But there is no "standard" or "average" radon exposure, and this misleading practice has been explicitly disapproved by DOE. Adoption of this disapproved practice in this EIS is yet more evidence of bias and non-objectivity.]

49 | 4-74 LANL has developed and maintains an emergency management system that, through emergency planning, emergency preparedness, and effective response capabilities, is capable of responding to and mitigating the potential consequences of emergencies.

49 | [This is not analysis, it is purely conclusory recitation. The Tiger Team has provided telling criticism of inadequacies of LANL emergency planning and management. At any rate, a complete failure to provide any data or discussion supporting such conclusion constitutes analytical and intellectual bankruptcy.]

50 | 5-3 The assumption is that ten percent of the metals would be aerosolized...The estimate of concentrations is based on two experiments per month.

50 | [Both of these assumptions are contradicted in other sections of the EIS; see below.]

5-15 Experiments with plutonium would always be conducted in double-walled
51 | containment vessels, and these experiments could not reasonably be expected to result in any release of plutonium to the environment.

[Events with potentially catastrophic consequences are usually not disregarded in environmental analyses unless the probability is less than, say, 1 in a million. Do they really think that the probability of a vessel failure is that small? That LANL could set off one of these plutonium explosions in vessels each day for three thousand years without any failure? That's dream stuff: it's the claim of an interested party, just like the NASA manager who estimated the probability of a Shuttle loss at 1 in 100,000 launches - i.e., a launch every day for 300 years
51 | before a loss. The engineers, by contrast, estimated about 1 in a 100. Similarly, analysis here demands engineering data and evaluation, not promotional fluff. This is a serious error which destroys any claim of validity of the analysis. Second, the experiments are integrally coupled to cleanout and disposal practices, and it is absurd on its face to claim that these "could not reasonably be expected to result in any release of plutonium to the environment." If the most serious potential consequences are dismissed with no analysis, no data, no discussion, and the mere recitation of an unsupported conclusion, then the EIS is worthless.]

52 | 5-58 The [transportation] accident rate used, about 4 accidents per 10 million mi, is a combination of accident rates for rural and federally aided highway systems.

52 | [Why use these rates? What does this have to do with the realities of transport at TA-15

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and TA-16?]

52

5-58 It was assumed that 10 percent of the material aerosolized was respirable.

53

[Why 10%? This assumption seems completely arbitrary and at variance with assumptions used in other places - e.g., on page B-11 below.]

B-11 The remaining depleted uranium (about 10 of the total) may be released as an aerosol, of which 20 percent (2 percent of the total depleted uranium) is considered respirable.

[As noted, conflicts with assumptions used above.]

54 B-12 Test assemblies that include high explosives are shipped using DOE and LANL trucks, containers, and tie-down techniques from the assembly area at TA-16 to the PHERMEX site.

54 [Yet another reassurance based on wishful thinking instead of analysis. To repeat, citing the existence of regulations and Standard Operating Procedures (SOP) is not a substitute for analysis. It is particularly ironic here because we have documentation of a case in which a "device" fell from a truck exactly because proper tie-down was not accomplished: "LANL did not have the required DOE/AL approved tiedown procedures for the Department of Transportation Specification 7A containers used to ship special assemblies. A special assembly was dropped from a truck because tiedown procedures did not exist." - p. 23, FY1994 Annual Performance Appraisal of LANL. This incident completely destroys EIS's reliance on SOPs and makes clear that it is a public reassurance document rather than a scientific analysis.]

55 C-6 For the No Action Alternative, the construction activities are assumed to be negligible, so no area is disturbed.

[Then what is the $12.6 M in capital spending shown on 5-12?]

C-8 For purposes of this analysis, it was assumed that 10 percent of all the material (high explosive and other test metals) become respirable following a test.

[This is the third different assumption so far - see 5-58 and B-11 above. How much internal inconsistency can you have before the document fails legal muster?]

C-9 Ten percent of the metals available for aerosolization are assumed to be respirable.

[This may be the same as the assumption at 5-58; then again, it may be the fourth different assumption regarding this critical parameter.]

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56 C-17 The maximum number of firings in an 8-h period, assuming 20 minutes between shots is 25...

[What happened to the assumption of 2 shots/month?]

E-1 The potential exists for deep drainage at both sites...One component of the DARHT EIS is an analysis of the potential for deep drainage beneath the DARHT and PHERMEX sites to carry contaminants to the main aquifer.

57 E-2 Core data were unavailable for the DARHT and PHERMEX sites.

[If this important, why not get the data rather than speculate?]

E-26 It is important to note that the long term observations of precipitation, streamflow, and sediment yield necessary to calibrate and validate the model were not available for the Water and Potrillo Canyon watersheds.

[In other words, speculation and guesstimation.]

58 E-42 Since 1991, advanced techniques, not commonly applied to ground water samples, have been used to detect tritium at ultra-low levels and to determine that recent water (no more than a few decades old) has recharged the main aquifer from the land surface in several locations at LANL.

[Yet all modeling for TA-15 uses/finds times for transport to the main aquifer to be in tens of thousands of years, as shown in table on this page.]

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June 28, 1995

BY FACSIMILE: (505) 665-1506

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Re: Comments on the Dual Axis Radiographic Hydrodynamic Test Facility Draft Environmental Impact Statement

Dear Ms. Webb:

The Natural Resources Defense Council ("NRDC") hereby files the following comments on the Department of Energy's ("the Department's") draft environmental impact statement ("EIS") concerning the Dual Axis Radiographic Hydrodynamic Test ("DARHT") Facility.

While the DARHT EIS contains a variety of useful information and analysis, the document is markedly deficient in numerous ways. We discuss those areas of deficiency below.

A. Issues Related to the Purpose and Need for DOE Action.

1 The discussion and analysis presented in Chapter 2, "Purpose and Need for DOE Action," is biased, incomplete, replete with errors of fact and analysis, and therefore exceedingly misleading to the public. The discussion fails to demonstrate that a range of reasonably foreseeable safety or reliability problems in the enduring nuclear weapons stockpile will require *the increment of enhanced capability represented by DARHT* for either their detection or resolution.

2 It is incumbent on the EIS analysis to demonstrate that reliance on existing or upgraded hydrotest facilities, such as FXR or Pharmex, would fail to permit the maintenance of adequately high levels of nuclear weapon reliability and safety in an era without underground nuclear explosive tests. The discussion and analysis in this section fails to

3 identify the specific instances in which dynamic radiography techniques have been employed

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3 to either identify or resolve post-deployment problems in nuclear stockpile problems, particularly in those modern weapons that will remain part of the enduring stockpile. For example, what fraction of problems affecting post-deployment reliability and safety in enduring stockpile weapons were identified or resolved using *existing* radiographic capabilities, and why are these capabilities no longer adequate to address the range of foreseeable problems?

4 The current draft discussion apparently relies on an overly narrow, and thus biased selection of sources [EIS at 2-13], and fails to reference a number of well-known and highly regarded studies on nuclear weapon performance and stockpile reliability: (1) R.E. Kidder, "Maintaining the U.S. Stockpile of Nuclear Weapons During a Low-Threshold or Comprehensive Test Ban," UCRL-53820, Lawrence Livermore National Laboratory (LLNL), October 1987; (2) M.C. Axelrod, "A Statistical Analysis of the Accuracy of the Measurement and Prediction of the Yields of U.S. Nuclear Weapons Tests, LLNL, Livermore, CA UCID-21186, 24 September 1987; (3) "Sandia Stockpile Life Study," Sandia National Laboratory, December 1993.

Specific inadequacies of the analysis are as follows:

The EIS asserts, "DOE needs to improve its hydrodynamic testing capability as soon as possible. Uncertainty in the performance of the enduring stockpile will continue to increase with the passage of time since DOE can no longer use nuclear testing to assess the safety, performance, and reliability of the weapons." EIS at 2-2.

5 No analytical or empirical basis is offered for this assertion. In particular, no basis is offered for the assertion that *an improved* hydrodynamic capability is required on *a time urgent schedule*, or that once available, that this improved capability would actually and materially diminish the inherent (but to date tolerable) performance uncertainties that arise from D-T fusion and material mixing in the primary *after* substantial fission yield has already occurred. Far from assuring adequate stockpile performance in the future, elsewhere in the

5 analysis, the argument is made that the ability of enhanced radiographic capabilities to reduce *these* performance uncertainties "is not completely known," and that "the possibility exists that, without nuclear testing, the Nation cannot ensure the continued viability of a nuclear deterrent based on the existing weapons in the nuclear stockpile." EIS at 2-6. On the one

5 hand, DARHT's enhanced capability is portrayed as absolutely vital for preserving stockpile reliability and safety, but on the other hand, it might not provide enough information to ensure such safety and reliability, thereby requiring a return to nuclear explosive tests!

According to the EIS, "the sooner that DOE can obtain better diagnostic information, the sooner that the Nation can determine if its existing nuclear deterrent is

6 sufficient." EIS at 2-6. In other words, DOE urgently needs DARHT for stockpile stewardship without UGTs under a CTB, but actually getting information from DARHT

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could tell us that we need to abrogate the CTB and return to underground testing! This argument is thoroughly specious, directly contradicts and undermines the President's policy in support of a permanent Comprehensive Test Ban Treaty, and insults the intelligence of test ban supporters everywhere, including the representatives of the 175 nations that recently voted in favor of achieving a CTB in 1996. 6

No basis is offered for the assertion that uncertainty in weapon performance "will *continue to increase* with the passage of time," or that the weapons to be retained in the enduring U.S. stockpile would have continued to require "*nuclear* testing to assess the safety, performance, and reliability...," and thus now require enhanced radiographic imaging as a substitute. EIS at 2-2.

On the contrary, such empirical evidence as exists suggests that the incidence of problems in stockpile weapons actually *decreases* with age, and that underground nuclear testing was not critical in either identifying or resolving these problems. The data base for all U.S. weapons reveals that 61 "actionable defect" types (i.e. resulting in remedial action) occurred during the first year of stockpile life, 14 occurred in the fifth year, 9 occurred in the tenth year, 3 in the fifteenth year, 1 in the twentieth year, and 1 in the 25th year. Of these 257 actionable defects types, only 10 were determined to have a reliability decrement of 10% or more. None (0) of the 257 defects were first discovered by underground nuclear tests (UGTs), and only 4 (2.8%) of the 141 "Product Change Proposals" (PCPs) implemented for stockpile weapons involved UGTs. (See Sandia Stockpile Life Study cited above.) 7

The EIS asserts, "DOE has determined that no other currently available advanced techniques exist which can provide a level of information comparable to that which can be obtained from enhanced radiographic hydrodynamic testing." EIS at 2-2. This statement begs the question at issue. The issue is not the *mere existence* of some higher performance technique for radiographic imaging that surpasses other available techniques, but whether such enhanced capability is *required* to maintain a nuclear weapon stockpile in a safe and reliable condition, and whether reasonable alternatives to DARHT, including the no-action alternative, are capable of accomplishing this mission at less cost and with less environmental risk. 8

The EIS asserts, "In the past, DOE has been able to accomplish that [nuclear deterrence] mission by retiring weapons before the end of their design life and by upgrading or redesigning weapons *if potential problems were detected through nuclear testing* and hydrodynamic tests and dynamic experiments (emphasis added)." EIS at 2-2. This statement is misleading. As noted, zero (0) post-deployment defects in stockpiled weapons were first discovered via underground nuclear tests, and only 4 tests since 1970 have been conducted specifically for the purpose of implementing changes to remedy such defects. 9

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The EIS asserts, "...the President has placed a moratorium on underground nuclear testing and has decided that the United States will not build new nuclear weapons for the foreseeable future (even to replace those past their design life). Now DOE must rely on the data from hydrodynamic tests and dynamic experiments to ensure the safety, security, and reliability of the existing weapons." This statement presents a misleading picture of the current situation. The President has approved a Nuclear Weapons Stockpile Plan that contains no approvals for the engineering design or production of nuclear weapons. It would be more accurate to say that, under current plans, the United States will not build "nuclear weapons of new design," -- rather than "new nuclear weapons" -- as the possibility exists for new production (remanufacture) of existing, proven designs. 10

Moreover, the statement as written misleadingly suggests that there is some link between the President's test moratorium and DOE's current inability to produce nuclear weapons, when in reality these are completely independent conditions, the former arising from an Act of Congress and reasons of international diplomacy, and the latter from the prolonged managerial shortcomings of DOE and its contractors. The statement also strongly, and wrongly, implies that the President has somehow directed DOE to maintain the nuclear weapons stockpile far beyond the "design life" envisioned for such weapons, as if "design life" were a firmly established empirical limitation with known risks associated with exceeding it. 11

In fact, as noted by the Sandia Stockpile Life Study, "nuclear weapons age, but they do not 'wear out,' and they are not allowed to degrade....We can find no example where age is the sole or even primary factor in the retirement decision." There are several examples of nuclear weapons, and indeed mechanical systems of all kinds, lasting far beyond their nominal "design-lives," which is usually an engineer's or manufacturer's projection of the *minimum* service life that can be expected for a system that is properly maintained. Obviously, "old" functioning mechanical devices of all kinds, from airplanes to bombers to xerox machines, indicate that "design life" is a very fungible concept indeed.

The EIS likewise ignores the possibility -- indeed, the very strong likelihood -- that proper procedures for regular maintenance, periodic component replacement, and eventual remanufacture of the nuclear subsystem, can ensure an indefinite service life for as many nuclear weapons as we wish to pay for, with or *without* any improvement over current hydrodynamic testing capabilities. The virtues and limitations of such a custodial approach to nuclear weapons must be fully analyzed before rash conclusions are drawn regarding the indispensable requirement for DARHT or other advanced radiographic hydrotest facilities. 12

Subsection 2.2.2, "Stockpile Stewardship," presents a misleading picture of the purposes of the "science-based stockpile stewardship" and "stockpile management" aspects of DOE's proposed program. The assertion is made that "stockpile stewardship includes those activities required to ensure a high level of confidence in the nuclear weapons stockpile, whereas stockpile management includes facilities and capability for maintenance, surveillance, 13

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repair, or replacement of weapons in the stockpile." EIS at 2-3. In fact, the so-called *stockpile management* activities are the most likely to contribute to continuing confidence in the
13 nuclear weapons stockpile, whereas science-based stockpile stewardship activities are oriented toward maintaining a cadre of nuclear weapon scientists with the skills needed to quickly resume a meaningful and innovative weapon design effort in the future.

The EIS asserts, "To ensure the continued viability of the smaller stockpile, DOE must *improve* its scientific understanding of the physics of a nuclear weapon, and develop a *better understanding* of how a nuclear weapon behaves during the complex interactions that occur in the brief interval between detonation and nuclear explosion. This information is needed to assure the continued safety, performance, and reliability of existing weapons. (emphasis added)" EIS at 2-5. At no point does the EIS substantiate the claim that
29 an "improved" or "better" understanding of nuclear weapons science is required to maintain acceptably high levels of nuclear weapon safety and reliability, or to provide for eventual remanufacture of the weapons to be retained in an enduring stockpile. An improved understanding of some aspects of nuclear weapons science might well be achievable with DARHT, but this fact alone does not establish a national purpose and need for DARHT. To
29 the contrary, the justification that DARHT will provide an improved understanding of nuclear weapons science will be viewed by many as inconsistent with the purpose and spirit of the U.S. commitment to completion of a Comprehensive Test Ban, which is intended precisely to deny countries an improved understanding of nuclear weapons.

The EIS asserts that "current diagnostic capabilities are insufficient to make all of the necessary types of measurements of an imploding primary, or to make refined measurements at the high level of detail needed." EIS at 2-6. The EIS likewise asserts that this enhanced measurement capability is needed because "DOE has *not yet* determined how *to predict with sufficient accuracy from computer calculations alone* the rapidly changing shape of a weapon primary during the last stages of implosion," and because "DOE needs to be able to predict the implosion movement of the three-dimensional weapon assembly to provide an integral measure of the expected performance of the fission drive, to assess nuclear safety in accidents, and for render-safe and disablement effectiveness." EIS at 2-5.

What is one to make of these statements? We are told that DARHT is needed to supplement computer calculations in order to better *predict* the course of a weapon primary implosion in its late stages. The goal described is a generic one – to achieve a true computer-based simulation capability for predicting the performance of "a nuclear weapon primary" –
14 not merely the primaries of weapons to be retained in the enduring stockpile. Of course this generic statement of purpose stands to reason, because *the performance and nuclear safety of enduring stockpile designs have already been verified* by previous underground nuclear tests as well as above ground hydrotests, so there is in fact no requirement for new capabilities to "predict" their primary stage performance. The parameters for maintaining the operability of

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these weapons are known, and need merely be observed through careful maintenance, inspection, and component replacement using already established techniques and facilities.

The EIS appears to be endorsing the view that DARHT should be – and will be – used to *improve DOE's broad-based nuclear weapon design capabilities*, even to the extent of ultimately freeing these design capabilities from the constraint of step-by-step empirical confirmation. Again, that justification contravenes the spirit of a Comprehensive Test Ban Treaty, and would appear to undermine established Executive Branch policy that the United States will not seek to design new nuclear weapons, but instead merely exercise responsible stewardship over the existing stockpile.

The EIS continues to cite the old DOE canard, thoroughly demolished by independent studies, that "of the weapon types introduced since 1970, nearly one-half required
15 nuclear testing after their development was complete (either while they were deployed, or still being produced) to verify, resolve, or certify that problems relating to safety or reliability have been resolved." EIS at 2-8. In fact, from 1965 to 1980, *no tests* were conducted to identify or correct stockpile problems. From 1980 to 1992, six warhead designs – the W80 ALCM/ACM warhead, B61(Mod 4) tactical bomb, W84 Ground-launched Cruise missile warhead, W79 artillery fired atomic projectile (AFAP), W48 AFAP, and W68 SLBM warhead – are said to have "required" so-called "post-deployment" nuclear explosive tests to identify or correct safety or reliability problems. Of these weapons, only the W80 and B61 (Mod 4) are still in the active stockpile. The others have been retired. However, the only case specifically highlighted in the EIS is that of the rebuild of the W68 warhead because of deterioration in its LX-09 high explosive. We are told that DOE "performed a nuclear test to verify that the rebuilt weapons would perform as designed and was surprised to find that the weapon yield was degraded. However, DOE decided that the lower yield was acceptable." EIS at 2-8.

This is an inaccurate and misleading description of this episode, and thus the unwary reader could well draw the wrong lessons. In fact, the test of the W68 referred to in the EIS was not a "surprise;" but intentionally conducted with a "limited-life component [probably the tritium reservoir] with an age that was over that of any to be used in the stockpile. This extreme test device performed successfully, *confirming the Laboratory's confidence*." Kidder, 1987, at 18. In fact, the test led to modifications in the Navy's *maintenance procedures* for the weapon – not further tests – to ensure that the weapon would perform as designed.

The other cases indirectly cited in the EIS (by reference in the text to the 1987 Miller, et. al. study) likewise fail to support the argument that the recent record of stockpile problems justifies a continuing requirement for nuclear explosive tests that must now be replaced by an enhanced radiographic imaging capability. The W80 cruise missile warhead and the B61(Mod 4) were both deployed prior to *the first ever low temperature nuclear test of a new*

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type of Insensitive High Explosive (IHE), which confirmed a serious problem with IHE low temperature performance in the W80. (Kidder, 1987)

For a weapon designed to carried on the external pylons of a bomber flying at altitude over the arctic (-60 deg. F), the failure to conduct this test earlier is an obvious and glaring omission to the W80's development program, not proof of the likelihood of inherently "unpredictable" changes occurring in stockpiled nuclear weapons. This test likewise was not a "surprise," but was conducted at the urging of Livermore scientist based on the results of laboratory tests. The problem was readily corrected with a change to the nuclear assembly system.

In the case of the B61 (Mod 4) at low temperature, the measured primary yield was 25% lower than expected, but the overall yield of the weapon was not significantly below the expected value, a result that actually supports the conclusion that U.S. nuclear weapons are robust as long as the primary yield exceeds a certain minimum threshold. In the case of the W84, a post-deployment test of a randomly selected stockpile weapon revealed a modest degradation in the expected yield, but this production version *had not been tested prior to deployment* to ascertain the effect of tritium decay on its nominal design yield. *The problem was remedied without changing the nuclear assembly system*, and no further testing was required. (Kidder, 1987).

In the case of the W-79, the weapon was knowingly placed in stockpile without first determining the effects of changes in warhead parts following termination of the controversial enhanced radiation version of the warhead. A stockpile war reserve unit was tested under relatively severe end-of life conditions (i.e. with aged tritium), and its overall performance was deemed satisfactory. This weapon was retired from the stockpile in 1991.

15 Thus, this testing record does not support the EIS inference that a previously well-tested modern weapon, with a good record in the stockpile to date, is likely to develop problems that formerly would have required nuclear explosive tests for identification or resolution, and now must urgently be addressed by the specific enhanced radiographic capabilities of DARHT. This conclusion is confirmed by the results of the Sandia Stockpile Life Study. As noted, less than 3% of the post-deployment changes made in stockpile weapons since 1970 involved nuclear explosive tests. This supports the conclusion that the No Action Alternative, or the upgrade of existing facilities such as FXR, would be sufficient to maintain an enduring nuclear weapon stockpile with acceptably high levels of reliability and safety.

16 The EIS asserts that "dynamic experiments with plutonium" are required because "the body of knowledge regarding the behavior of plutonium is inadequate." EIS at 2-9. Inadequate for what? For assuring weapon reliability and safety of the enduring stockpile? Or for designing new weapons in the absence of nuclear explosive testing?

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The EIS asserts, "DOE needs a better understanding of the properties of plutonium; more accurate equations of state to predict the behavior of plutonium, especially at high pressures and temperatures; [and] more information regarding the behavior of the plutonium surface following a physical shock." EIS at 2-9. Of course, every nation seeking to develop or refine a nuclear weapon capabilities would like this information also. DOE's continued vigorous pursuit of this information will only legitimize its acquisition by others, and may indeed, if the past is any guide, directly contribute to it. The national laboratories have a rather poor record of keeping this type of basic data secret.

The EIS asserts that "DOE also needs more information [to be acquired via DARHT] on other issues related to nuclear deterrence and nuclear materials science," including a need to "continue to assist other nations with evaluating the condition, safety, and expected performance of their weapons and *weapon designs* under current international agreements (emphasis added)." This is an overly broad interpretation of DOE's mandate, in a number of respects. First, "other nations" should read "those nuclear weapon states with
17 whom we have nuclear cooperation agreements covering the sharing of nuclear weapons information." To our knowledge, there are only two – the U.K. and France. Second, even this cooperation is constrained by the obligation under Article I of the NPT "not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly;..." To many non-nuclear countries, U.S. assistance to another country in the design of nuclear weapons would amount to an "indirect transfer" of U.S. nuclear weapons to that nation, and thus be in violation of the NPT. Finally, it is unbecoming and wildly premature for the DOE to be discussing its
17 "need" to assist other nations in evaluating the "expected performance...of their *weapon designs* when an international treaty intended to prevent or at least severely inhibit such activity is in the final stages of negotiation.

18 The EIS's brief discussion of the FXR's limitations (relative to those theoretically achievable with DARHT) is utterly inadequate. EIS at 2-10. The relevant comparison is between DARHT and various pending and proposed FXR upgrades. Nowhere, for example, does the EIS establish that an upgraded FXR (with an active gamma ray camera and double pulsing capability) would fail to meet the stockpile stewardship requirement of assisting in the maintenance and eventual remanufacture of the enduring stockpile.

B. Issues Related to Nuclear Proliferation and Arms Control

19 A serious deficiency of the EIS is its failure to give all but the briefest, most conclusory attention to issues related to nuclear proliferation and arms control. Since the proliferation consequences of developing, building and operating a facility for 3-dimensional imaging of nuclear weapon implosion systems may well be the DARHT's most important environmental impact, the Department's failure to thoroughly address these issues constitutes

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19 a glaring inadequacy in the EIS. It is also surprising, in light of the emphasis the Department has properly placed on proliferation issues during the Clinton Administration.

19 The EIS's discussion of nonproliferation issues consumes less than one page. EIS at 2-11. Some of this discussion seems quite implausible. For example, it seems very unlikely that a failure to build DARHT would trigger a chain of circumstances leading certain advanced industrial nations to develop nuclear weapons because they harbor doubts about the technical reliability and safety of U.S. nuclear weapons. This line of reasoning represents a strained adaptation of the more often heard argument that other advanced countries, such as Japan and Germany, might turn to the development of their own nuclear deterrent because they harbor doubts regarding the *political* reliability of the U.S. deterrent threat to use nuclear weapons first in their defense. This argument has nothing to do with their technical level of confidence in the performance of U.S. nuclear weapons, and everything to do with the inherent and dangerous dilemmas of continuing to rely on nuclear weapons as the ultimate guarantors of national security.

19 More important than what this brief nonproliferation discussion contains, however, is what it omits. Nowhere in the EIS does the Department address the impact of DARHT's greatly enhanced capabilities on the generation, proliferation, and control of information useful to the design of nuclear weapons, or the impact of U.S. possession of these capabilities on (a) other nuclear weapon states, (b) nations that have undertaken not to develop nuclear weapons; and (c) nuclear weapon threshold states that are considering whether and how to improve their nuclear weapon capabilities.

If, in a world without nuclear test explosions, the United States is building and operating facilities with significant capabilities for nuclear weapons design and engineering, some non-nuclear weapon states may no longer be willing to forego nuclear weapon development, and other nuclear weapon states may also move to acquire additional information relevant to the design of new weapons. Moreover, what if some nuclear weapon states conclude that they are unable to compete effectively with the United States in the area of computer intensive, highly-diagnosed "core-punching" radiography and other advanced above-ground experimental (AGEX) facilities? Already in the test ban negotiations, some nuclear weapon states are suggesting that maintaining a substantial loophole for underground nuclear tests may be the only way to stay even with the United States technologically under a test ban treaty, thereby undermining the achievement of a *comprehensive* treaty.

These potential developments could have critical consequences for global security and for the global environment. The potential proliferation consequences of DARHT's weapon-design capabilities are obvious effects of completing the facility, and as such they demand full discussion and analysis in the EIS. Moreover, without a direct and comprehensible discussion of DARHT's utility for generating nuclear weapon design information, the public cannot weight the relative need for, and consequences of, the preferred

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alternative, the single axis alternative, and other reasonable alternatives for carrying out the radiographic component of the stockpile stewardship mission.

C. <u>The EIS Fails to Discuss Adequately Issues Related to the Use of Plutonium in Hydrotesting.</u>

20 One specific plutonium-related issue that demands discussion is what plutonium isotopes the Department would use in its hydrotesting; this issue has relevance for both nonproliferation and public health reasons. Two options appear plausible and worthy of analysis: full-scale contained implosions using non-fissile Pu-242, and sub-scale contained implosions using weapon-grade plutonium.

21 In addition to ignoring nonproliferation issues, the EIS's discussion of plutonium matters has other inadequacies. For example, the document contains no analysis of the waste-generation and waste-management issues posed specifically by using plutonium in hydrotesting. Since plutonium waste poses dangers that are qualitatively different than other forms of waste (in terms of toxicity and duration of contamination), these waste-related issues must be discussed fully in the EIS.

22 In addition, the EIS appears to assume that there is <u>no</u> risk of a double-walled containment vessel breach in hydrotesting involving plutonium. The Department must explain the basis for this assumption, so the public may evaluate it and draw its own conclusions.

D. <u>The EIS Fails to Include a True Plutonium Exclusion Alternative.</u>

23 The Plutonium Exclusion Alternative is improperly defined, as it excludes plutonium use at DARHT but not at PHERMEX. Exclusion of plutonium from all hydrotesting is an entirely reasonable alternative for all of the reasons already discussed in this comment letter, and it is a necessary component of a reasonable range of alternatives in the DARHT EIS. As such, the Department must include a true plutonium exclusion alternative in the EIS.

The Department cannot argue that excluding plutonium from all hydrotesting is outside the scope of this EIS, because the EIS already discusses the environmental consequences of PHERMEX operation throughout the document.

E. <u>Upgrading the Flash X-Ray Facility is a Reasonable Alternative that Must Be Discussed in the EIS.</u>

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24 The EIS rejects inclusion of the alternative of upgrading the Flash X-Ray ("FXR") Facility on the ground that "DOE does not conduct dynamic experiments with plutonium at LLNL." EIS at 3-38. This is an illogical and inconsistent reason for exclusion. By including a Plutonium Exclusion Alternative in the EIS, the Department has acknowledged
24 that a facility without a plutonium capability is a reasonable alternative for purposes of the EIS. Since upgrading FXR is a reasonable alternative, the EIS must assess it fully.

F. If the Department Chooses to Complete DARHT, It Should Include a Containment Structure.

The EIS indicates that operation of DARHT as an open-air firing site would have a variety of significant environmental consequences. Among other things, it would result in uranium discharges to surface water that would exceed established maximum contaminant levels. EIS at 5-23 &-24. It also would impact the nearby standing walls of Nake'muu, an enclosed plaza pueblo considered to be the best-preserved Anasazi ruin in the
25 region, with significant air waves from blasting and possibly with blast fragments up to one inch in diameter. EIS at 4-55 &, 5-28.

In addition to being serious, these environmental impacts are avoidable through construction of a containment structure. If the Department decides to move forward with DARHT, we urge it to take the modest amount of additional time and money to do the job right by building a containment structure as part of the facility.[1] The Department is currently planning construction of a containment structure at the FXR Facility, and the people of New Mexico deserve no less in this regard than the people of California.

We question the Department's analysis of the Enhanced Containment Alternative in two respects. First, the analysis asserts that there would be an increase in
26 worker exposures if a containment structure were built, due to an asserted need to clean the inside of the structure regularly. EIS at 5-46. We do not understand why a containment structure could not be designed so that most or all of the cleanup activity took place remotely, thus limiting worker exposures. The final EIS should assess and discuss this issue directly.

Second, the EIS indicates that discharges to the air would be somewhat higher in the Enhanced Containment Alternative both during normal operations and in case of accident because the release would take place at ground level rather than 325 feet into the air.
27 EIS at 5-36 &-47. We do not understand why the Department considers releases to take place 100 meters in the air in the open-air firing alternatives when all of the test explosions likewise

[1] The EIS makes clear that a containment structure is superior to use of containment vessels in all areas of environmental impact.

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27 take place at ground level. The Department should reassess this issue and at the very least explain clearly its assumptions in the final EIS.

G. Failure To Estimate Cleanup, Decontamination, and Decommissioning Costs for All Alternatives.

28 The EIS consistently fails to include analysis of the cost of cleanup, decontamination, and decommissioning for each of the alternatives considered. This is an insupportable omission, both because these are important environmental and financial costs and because they provide an important ground for distinguishing among the alternatives considered.[2]

We understand that because cleanup standards do not yet exist, the Department cannot quantify its cleanup costs with certainty. This area of uncertainty, though, does not excuse the Department from analyzing the issue at all. In a similar context marked by even greater uncertainty, the Baseline Environmental Management Report, the Department was able to estimate its cleanup costs within a range. In the course of doing so it explained the assumptions it used, and readers could thus understand where in the range the ultimate cleanup costs might fall. The fact that cleanup costs cannot be specified with precision does not excuse the Department from analyzing the matter.

Sincerely,

Christopher E. Paine
Senior Research Associate

Andrew P. Caputo
Attorney

28 [2] For example, soil remediation costs for DARHT would be dramatically lower if a containment structure were built than if an open-air firing site were chosen.

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REPUBLICAN PARTY OF LOS ALAMOS COUNTY

P.O. BOX 832 LOS ALAMOS, NEW MEXICO 87544

June 19, 1995

Ms. M. Diana Webb, DAHRT EIS Program Manager
Los Alamos Area Office, U. S. Department of Energy
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Los Alamos, New Mexico

Dear Ms. Webb;

Mr. M. G. Lockhart of the Responsible Environmental Action League addressed the Central Committee of the Republican Party of Los Alamos County at its meeting of June 8, 1995. Mr. Lockhart made the following points regarding the Draft Environmental Impact Statement on the Dual Axis Radiographic Hydrodynamic Test Facility (DAHRT):

1. For fifty years, nuclear testing was the key to ensuring a safe and reliable nuclear stockpile. Nuclear weapons were certified in the context of the missions they were designed to serve and the length of time they were expected to remain in the stockpile. Through limited post-deployment nuclear testing, safety and reliability problems were discovered and remedied in approximately one-third (1/3) of stockpiled weapons.

2. With President Clinton's decision to extend the nuclear testing moratorium, the Nation may lose the necessary confidence in the stockpile unless nuclear testing is resumed, or unless a partial alternative to nuclear testing is found. The immediate establishment of a vigorous, state-of-the-art science-based stockpile stewardship program is needed to retain that confidence.

3. DAHRT is an integral component of science-based stockpile stewardship. DAHRT presents the best current means for evaluating the safety and reliability of an aging stockpile; is without question a vital tool for maintaining confidence in an enduring stockpile; and therefore is key to the Nation's nuclear deterrence policy.

4. Mr. Lockhart had reviewed the Department of Energy's conclusions concerning environmental impacts in the Draft EIS; found them to be carefully drawn; and believes that they fully consider the appropriate environmental issues and possible mitigating factors.

1 The Central Committee of the Republican Party of Los Alamos County endorses the Department of Energy's Preferred alternative to complete and operate the Dual Axis Radiographic Test Facility as stated in the Department of Energy's Draft Environmental Impact Statement on the Dual Axis Radiographic Hydrodynamic Test Facility (DAHRT).

Sincerely,

Norma H. Tech
Chair

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REAL
Responsible Environmental Action League

June 21, 1995

Ms. Diana Webb
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Los Alamos , NM 87544

RE: Comments on Draft EIS - DARHT

Dear Ms. Webb:

As a member of the Responsible Environmental Action League, I submit these comments on the Draft Environmental Impact Statement (DEIS) regarding the completion of construction of the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT).

1 **Purpose and Need.** In our view this chapter can be strengthened considerably. There is a compelling need for DARHT. The Department needs to articulate that need with greater specificity.

1 I suggest that the Overview section be strengthened by stating the national policy that DARHT is designed to support. Although I recognize that the national policy decisions that lead to the heightened need for DARHT are referred to in the summary of events on p. 2-1, these events should be more clearly described for the public. For example, this section should emphasize that the President's adoption of a voluntary nuclear testing moratorium was based on his understanding that most of the necessary monitoring and testing of the nuclear stockpile could and would be achieved through Science Based Stockpile Stewardship (SBSS). DARHT is a vital component that program (see the Jason Report and additional comments below).

1 My assessment that this was in fact President's Clinton's two-pronged national security strategy is reflected in the Presidential Decision Directives (PPD's) 11 and 15 that were issued in July and November 1993, respectively. PPD 11 captures the President's decision to continue the country's testing moratorium. However, that moratorium extension is stated to exist in the context of SBSS, a presidentially mandated program which encompasses hydrodynamic testing. Notably, the President forcefully endorsed hydrodynamic testing as a key to a safe and reliable stockpile when he stated in November 1993:

> Major new hydrodynamic testing programs will include developing baseline hydrodynamic experimental data for the enduring stockpile and increasing the number of hydrodynamic experiments as part of the stockpile sampling and aging

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programs. Hydrodynamic testing will also support a development program necessary to help retain and exercise weapons design engineering skills and to examine safety modifications in existing nuclear warhead designs that could be introduced into the stockpile without nuclear testing in case they are needed in the future.

2 Although these points are alluded to in the DEIS, in most cases through the boxed highlights, the discussion should be more pointed. A clear discussion along these lines will improve the DEIS in two important ways. One, it will inform the public of the basis of the President's decision: reliance on DARHT and similar programs is the best, if not the only means of maintaining US nuclear forces, without nuclear testing. Two, because the decision to maintain the nuclear stockpile was made by the President, it is not subject to change by the DARHT NEPA so the anti-nuclear sentiments expressed by various commentors in the DARHT NEPA process are irrelevant.

2 I am concerned that some public participants have unrealistic expectations about what NEPA can accomplish. It cannot change the direction of national security policy. The only way to influence that policy is through our elected officials. This fact must be clearly articulated in the EIS. Otherwise I fear that commentors who believe, perhaps unreasonably, that NEPA is a means to achieving a nuclear-free country will feel betrayed by the process, and by DOE.

3 With regard to why the DARHT technology is needed, our overall comment is that greater specificity is needed throughout. To the extent it is unclassified, the document should describe the precise problems that have been uncovered through nuclear testing. Many critics of the projects contend that safety and reliability are not real issues. They argue in essence that these issues are not only bogus, but designed to justify a "new toy" for nuclear weapons enthusiasts. A strong case for DARHT is there - the EIS needs to better describe it to the public.

3 The discussion of this point is engulfed in too many generalities, without sufficient detail to be persuasive. For example, the Miller report describes in great detail stockpile problems that were rectified through nuclear testing. One of these problems is noted in the DEIS (see p. 2-8, W-68 problem). The Miller report clearly documents numerous instances where safety and reliability problems were discovered. In fact safety and reliability problems have been found in nearly 1/3 of
4 the weapons in the stockpile. Points such as these should be included in the DEIS to ensure that the public is better informed of the issues that have arisen and are expected to arise over the life of the stockpile.

The Sandia Life Study is the only study I am aware of which apparently questions whether there are stockpile safety issues. I am unaware of the substance of the report; it was never issued as a final document and for this reason alone I regard its contents as suspect. Obviously, it does not carry the weight of JASON or Miller, both of which have been fully aired and subject to peer review. Moreover, Sandia National Laboratory's expertise with respect to nuclear weapons is not in the area of the "physics package" that is studied in hrdrodynamic testing, but rather in the peripheral equipment in the warhead that supports and triggers the physics package. Acknowledging that I have not seen the draft Life Study report, I nonetheless question whether it actually addresses the issues encompassed by the DEIS.

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5 In our view section 2.5 is deficient in several respects. The second paragraph suggests that the testing moratorium is tied to the Nation's commitment to non-proliferation. I suggest that you avoid discussion that draws such a connection, however slight. As a signatory to the Non-Proliferation Treaty (NPT) and as an active world participant in working toward halting the spread of non-peaceful, nuclear technology (note the Country's active export control regime), the United States was performing nuclear tests until 1992. Certainly, the DOE should not suggest that by performing those tests, the United States was a nuclear proliferant. Nuclear testing does not equal proliferation; nor does a testing moratorium equal non-proliferation.

5 It is important for the DOE to reiterate what non-proliferation is as defined by the NPT. Under Article I of the treaty, the United States has made the following commitment:

> [As a nuclear-weapon State Party, the United States] undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage or induce any non-nuclear-weapons State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

The sum and substance of this commitment is that the United States will not assist non-nuclear-weapons States to obtain nuclear weapons technology. The US has conscientiously met this commitment. Nuclear testing is unrelated to the Nation's non-proliferation responsibilities.

Moreover, tying the testing moratorium and the CTBT negotiations to the concept of non-proliferation is problematic in another respect. Recent press articles suggest that the United States is considering a resumption of nuclear testing (see for example Washington Post article of June 19, *Perry Calls Renewed Nuclear Tests a Possibility*). In addition, new articles are also
5 reporting that a movement may be afoot to include a provision in CTBT that would allow nuclear tests up to a certain explosive yield (see Tri Valley Herald article of June 7, *Limited Nuclear Testing Sought*). If either of these possibilities comes to fruition, the EIS summary under the non-proliferation heading could be interpreted as inconsistent with the US government's, perhaps soon to be redefined, stance on nuclear testing.

5 The DEIS discussion of how the United States acts as a nuclear umbrella for countries who may otherwise develop nuclear weapons for self-defense(p. 2-11, 4th paragraph) is good. I recommend that this point be called out explicitly. I would note that South Korea is a notable example of a country that may have developed nuclear weapons in response to the threat of the North had it not been for the security provided by the presence of reliable US nuclear forces.

Comment 20, page 4

Proposed Action and Alternatives.

6 As an initial point, I would emphasize that because SBSS is presently the only means to ensure the safety and reliability of the nuclear stockpile, the design of DARHT should provide all options that will enable the United States to meet that goal to the fullest extent scientifically possible. Thus if in the view of experts in the field, tests involving plutonium are necessary to achieve a complete body of information on the stockpile the plutonimu exclusion alternative should not be adopted.

7 In addition, if containment alternatives present impediments to gaining necessary information, containment should only be used for those experiments which are compatible with containment. Hydrodynamic tests represent an important source of information on nuclear weapons. They are expensive, and efforts should be made to collect as much data as possible from them. It is likely that a program that requires containment of all hydrodynamic tests will preclude a number of experiments that could be added on, at relatively little expense, to the basic tests. Because the environmental benefits of containment of these shots are small, and thepotential benefits to the nation of increased data collection from add-ons is large, I recommend that the DOE include this criterion in weighing these particular alternatives.

I espouse this position because nuclear testing was a vital tool in ensuring the integrity of the Nation's nuclear weapons. Without it, DOE as the stockpile steward, is faced with a doubly difficult job: to provide safety and reliability assessments of the enduring weapons stockpile that
4 will extend far beyond the their design lifetimes. DOE needs to be fully equipped to fulfill the imperative of maintaining a reliable nuclear deterrence.

Noise.

With regard to the sections on noise, I recommend providing more relevant data. For, example, only one noise test is reported and no data from Los Alamos townsite are presented although the prevailing daytime winds from TA-15 are in that direction rather than toward White Rock. Even the White Rock data are incomplete. Table C2-4 contains typographical errors.
8

More noise tests should be performed under different meteorological conditions and data should be recorded at the nearest townsite dwellings as well as Bandelier and White Rock.

Results are reported (Table C 2-4) in hertz and dBA. Some sort of equivalent in loudness understandable to the general public needs to be presented for comparative purposes.

Comment 20, page 5

Air Quality.

9 We suggest that the air quality sections be strengthened in the following ways:

Annual emissions of criteria pollutants are presented in Section 4.2.4 and Table 4.1. However,
9 cumulative impacts (section 5.9) does not roll up the annual increases in criteria pollutant by alternative. As there are differences by alternative in heating and other attributes, this information should be presented.

Section 4.2.5 and Table 4.4 present uranium emissions from the Laboratory without dynamic
9 testing additions included. Some table should present all uranium emissions, dU as well as other forms.

Section 3.11 and Table 3.3 show for enhanced containment alternative greater emissions of Be, heavy metal, and Pb. This must be an error.
9 Releases for all alternatives except enhanced containment are modeled at 325 ft. elevation whereas the enhanced containment is model at ground level. Strong justification needs to be provided or, preferably, model all as ground-level releases with a puff model.

Cultural Resources.

I believe that the discussion of cultural resources could be improved by explaining more fully the extensive review many of the affected sites have already received by the laboratory in accordance with the National Historic Preservation Act. Although there is some reference to the section 106 review (though not specifically called out as such) a chronology or summary of the many consultations with the local pueblos and the various interactions with the State Historic Preservation Officer would be useful in informing the public of the extensive review most of the
10 affected ruins have received. Moreover, such a summary will document the sensitivity that the DOE and the Laboratory has shown toward Native American concerns. One notable example of the Laboratory's receptiveness to the preferences of the pueblos is the fact that on at least one occasion the Laboratory choose to follow the a pueblo's preference of burying some sites rather than pursue the option proposed by the State to excavate a few sites close to the construction area. Examples of Laboratory/DOE consultations with the pueblos are important to inform the public of how the Laboratory and DOE are respecting these cultural sites and mitigating possible damage.

International Oversight.

Although not proposed in the DEIS, some public commentors have suggested that an international oversight body should be constituted to ensure that DARHT is only used for tests that are safety- and reliability- based. I strongly object to such an approach for several significant reasons. First, it would have the effect of reducing the Country's flexibility with respect to its nuclear weapons. The President in consultation with Congress, defines national security policy.

Comment 20, page 6

Our elected officials need to have the ability to shift that policy to meet changing needs and priorities. No one has suggested that DARHT cannot be used to help design weapons although at present the policy is not to do so. That policy could change and should be allowed to change based on national needs. Such a decision should not be made hostage to an international body whose interests may not be consistent with US national security.

Moreover, international oversight has the effect of undermining US sovereignty. As US citizens we elect officials to carry out our will. The collective citizenry has consistently elected federal officials who have legislatively maintained some level of nuclear deterrence. Through the democratic process, it is clear that the Country's citizens acknowledge the need for some nuclear weapons. It is an affront to the democratic process to set in place an oversight body (not elected by the American people) which could contravene the electorate's national security priorities.

Sincerely,

Christine Chandler

Christine Chandler
940 Los Pueblos
Los Alamos, NM 87544

Comment 21, page 1

REAL
Responsible Environmental Action League

June 25, 1995

Diana Webb
Project Manager, DARHT EIS
Department of Energy
Los Alamos Area Office
528 35th
Los Alamos, NM 87544

RE: Comment Draft EIS

Dear Ms. Webb·

I have a number of comments on the DARHT draft EIS. Thank you for considering them.

Alternatives:

1 Single-axis alternative: The summary table seems incomplete; the increased number of tests required to achieve the same level of information from the single-axis machine is not apparent in the numbers. The environmental impact of the increased number of tests is inevitably higher and should appear in the table.

2 Upgrade PHERMEX alternative: A very important aspect of this alternative is overlooked: To do the upgrade, PHERMEX would have to be shut down for four to five years. The program would be without its flagship facility and the impact on the stockpile stewardship mission would be enormous, and perhaps fatal. The cost to catch up, after PHERMEX is brought back on line, would be enormous.

3 Plutonium Exclusion Alternative: This alternative seems political: it is certainly not supportive of a weapons program that depends strongly on Plutonium. Knowledge of the properties of Plutonium under shock conditions should be extended to elucidate the performance and degradation of performance of nuclear weapons.

4 Environmental: I would like to plead again for the inclusion of a radiation primer and relative risk assessment or risk comparisons for the radioactive emissions from DARHT and the laboratory. Although it is true that the decision-maker will have an understanding of the data presented here, this is a public document and if the public is to understand it there should be a section on radiation and radiation risks that will provide the basis for understanding. I have included for your perusal an example of an introduction to radiation health effects. This is copied from a training manual for Radiation Workers and is very successful at teaching people of all

educational levels from PhD to high school dropout. It could serve as a basis (it belongs to the DOE) for the primer I request. In addition, I have just learned that Julie Johnston in ESH-20 is preparing a summary document that includes a primer section to go with the Environmental Surveillance Reports.

5 Enhanced Containment Alternatives: Hydrodynamic tests represent an important source of information on nuclear weapons. They are expensive, and efforts should be made to collect as much data as possible from them. It is likely that a program that requires containment of all hydrodynamic tests will preclude a number of experiments that could be added on, at relatively little expense, to the basic tests. Because the environmental benefits of containment of these shots are few, and the potential benefits to the nation of increased data collection from add-ons is large, I recommend that the DOE include this criterion in weighing these particular alternatives.

Sincerely,

George I. Chandler

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940 Los Pueblos
Los Alamos, NM 87544

RETIRED PUBLIC EMPLOYEES ASSN.
Chapter 97, Los Alamos/Northern New Mexico
P.O. Box 1252
Los Alamos, New Mexico 87544

June 17, 1995

M. Diana Webb
DARHT EIS Program Manager
Los Alamos Area Office
U.S. Department of Energy
528 35th Street
Los Alamos, NM 87544

Dear Ms. Webb:

I am writing for the Board of Directors of Chapter 97, Retired Public Employees Association of California (RPEA), in support of the DARHT facility at Los Alamos National Laboratory. RPEA is an organization of retirees from California state agencies and has a primary mission of protecting Retiree benefits. This is the first time the Los Alamos/Northern New Mexico Chapter, whose members are primarily LANL retirees, has taken a stand on an issue not directly related to retiree benefits.

1 Our Board believes that DARHT is important to maintaining the future safety and reliability of the nuclear weapons that we as a nation require for our defense program. The Los Alamos National Laboratory is in a unique position to move forward with this program now. DARHT is the most cost-effective and prudent way to
1 implement the nuclear policies of the United States; it is needed to support a fully balanced program to maintain an adequate nuclear capability and also assure that existing nuclear weapons remain stable.

2 Our RPEA Chapter 97 Board of Directors supports DARHT.

Sincerely,

George A. Sawyer

George A. Sawyer
President, RPEA Chapter 97

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US DOE/LAAO - IN

WESTERN STATES LEGAL FOUNDATION
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COMMENT OF THE WESTERN STATES LEGAL FOUNDATION

DRAFT ENVIRONMENTAL IMPACT STATEMENT

DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST FACILITY

Submitted June 26, 1995

by: Andrew M. Lichterman
Jacqueline Cabasso
John Burroughs

Western States Legal Foundation
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INTRODUCTION

Western States Legal Foundation (WSLF) is a non-profit, public interest, environmental and peace organization which, since 1982, has participated in administrative proceedings, litigation, and grassroots activities to further the end of the nuclear arms race and related technologies, conversion of military activities, and the cleanup of federal facilities engaged in nuclear weapons production. WSLF is a member of the nation-wide Military Production Network (MPN), and a founding member of the international Global Anti-Nuclear Alliance (GANA).

WSLF participated as an observer in its capacity as a registered Non-Governmental Organization (NGO) in the recent round of international negotiations in Geneva, Switzerland on the Comprehensive Test Ban Treaty (CTBT) and the Nuclear Non-Proliferation Treaty (NPT). WSLF executive director Jackie Cabasso and staff attorney John Burroughs spent a month at the United Nations in New York monitoring the NPT Review and Extension Conference.

WASTE MANAGEMENT

1 | There is little in the way of substantive analysis of waste management in the DEIS. The DEIS at several points merely states that waste from the DARHT will be sent to LANL waste management facilities, where it is asserted that waste will be managed in compliance with applicable state and federal regulations. It
1 | appears that DOE intends to do a substantive analysis of LANL waste management only in the LANL site-wide EIS, a document which has not yet been prepared.[1] As we stated in our scoping comment,
1 | a NEPA environmental review document cannot be "tiered" off another environmental review document which does not yet exist.[2]

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2 | [1] See, e.g. DEIS at 5-17 "The LANL site-wide EIS will address the water [sic-- waste?] management matter at LANL."

[2] "Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement by reference and shall concentrate on the issues specific to the subsequent action. The subsequent document shall state where the earlier document is available." 40 C.F.R. sec.1520 (excerpt, emphasis added). It is contrary to the logic of this regulation to attempt to "tier" a project specific document using as a basis a programmatic document which will be prepared in the future.

ACTIVITIES WHOSE IMPACTS ARE NOT ADDRESSED IN THIS DEIS WHICH ARE PART OF THE PROJECT OR ARE CONNECTED ACTIONS

3 Devices tested at the DARHT must be produced somewhere. These devices would be fabricated out of a wide array of hazardous and radioactive materials, including plutonium. Components for these devices may be produced at other DOE facilities, since the DARHT is described as a DOE "user facility," implying that other laboratories (most likely LLNL) may use the facility. The DEIS briefly describes all of these activities, but merely states that this "complex infrastructure needed to support hydrodynamic tests and dynamic experiments would not change" regardless of the alternative chosen, (DEIS 3-2-33), and that "hydrodynamic testing and dynamic experiments at LANL are only a small proportion of the total workload at the LANL support facilities." (DEIS 3-4; see DEIS Table 3-4 at pp.3-6-38 for summary of the wide range of activities which in fact constitute hydrodynamic testing).

3 But the DEIS provides no analysis of the environmental impacts of making the devices which will be exploded at the DARHT or at an alternative facility, or of disposing of the hazardous and radioactive waste from those fabrication processes. Apparently, for these impacts as well, DOE is attempting to tier from a site-wide EIS which has not yet been drafted. As we noted in our scoping comment, DOE has admitted that existing sitewide NEPA documents for LANL are outdated and inadequate.[3]

CUMULATIVE IMPACTS

4 Also absent from the DEIS is any analysis of cumulative impacts of reasonably foreseeable activities in the same area. LANL is being proposed as the site for a wide range of nuclear weapons manufacturing functions under DOE's new "Stockpile

[3] The 1979 sitewide EIS exhibits various technical and/or procedural shortcomings. Additionally, in light of changes in environmental regulations and standards, evolving methods of analysis, and modifications to the LANL site since preparation of the EIS, the age of the EIS limits its usefulness as a baseline document from which other NEPA documents can be tiered....
It does not reflect current knowledge as required by 40 CFR 1502.9 (c)(1) (e.g., current sitewide resource data bases and current facility configuration), or the requirements of Federal statutes, Federal or DOE regulations, and/or DOE guidance implemented since 1979 (e.g., the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and wetlands)." U.S. Department of Energy, Environment, Safety, and Health, Tiger Team Assessment of the Los Alamos National Laboratory, November 1991, p.3-308.

4 Stewardship and Management" program, including replacement pit manufacture and reuse, fabrication of secondaries, fabrication of high explosive components, pit reuse, and fabrication of non-nuclear components, as well as a number of new weapons test facilities. U.S. Department of Energy, "Notice of Intent to Prepare a Stockpile Stewardship and Management Programmatic Environmental Impact Statement," June 9, 1995, pp.16-17.

RELATIONSHIP TO OTHER NEPA REVIEWS

It may appear backwards to demand a broad review of the impacts of nuclear weapons testing and component manufacture as part of the NEPA review of a single testing facility, but it appears so only because DOE has insisted on doing its NEPA review backwards. DOE apparently plans to complete its site-specific review and make a project decision for DARHT, one of the most
5 important "stockpile stewardship" facilities first, then complete the LANL sitewide review which could have provided analysis of cumulative impacts and site-wide environmental management issues; and only then, after many of the decisions affecting the next decade have been made, complete a programmatic review for a stockpile stewardship and management program whose major components already will be in place.

6 This is being done without evidence of any real urgency or any real reason for proceeding to decisions on specific projects before broader programmatic reviews are complete. The DEIS merely asserts that at some unspecified time in the future, problems may arise with the stockpile which will need to be
7 detected and remedied.[4] There has been little evidence presented that DOE is incapable of assuring stockpile safety and reliability using existing facilities, including existing hydrotest facilities. There also has been no public case made that existing hydrotest facilities are deteriorating so quickly as to be in need of immediate replacement. Certainly, no case has been made that there is an emergency so pressing as to require curtailment or distortion of the NEPA process.[5]

[4] In this regard, the most recent Sandia Institutional Plan noted that "The evaluation program has shown over the last four decades that serious defects in nuclear weapons have been relatively rare" and that "[o]verall, stockpile reliability has been excellent for the last forty years." Sandia National Laboratories, Institutional Plan FY 1995-2000 (October 1994), p.10, p.11.

[5] In any event, the NEPA regulations provide a procedure for emergencies, which has not been followed here. See 40 C.F.R. 1506.11.

DOE's argument that DARHT represents an acceptable interim action which will not prejudice the outcome of either the LANL sitewide EIS or the Stockpile Stewardship and Management PEIS rests on two principal assertions: first, that DOE already has decided to proceed with improvement of its hydrodynamic testing facilities, and second, that this decision is pursuant to "Presidential and Congressional direction." DEIS, p.2-12. If this is the case, when did the NEPA review for this programmatic decision, which will evidently require construction of hundreds of millions of dollars worth of facilities, occur? If DOE here is referring in part to the general language establishing the Stockpile Stewardship program in the FY 1994 Defense Authorization Act, the same argument could be made for any stockpile stewardship project. If so, DOE's intentions in initiating its Stockpile Stewardship and Management PEIS appear to be cynical at best. Apparently, if at any point in the Programmatic EIS process, DOE decides that its own programmatic NEPA review is proceeding too slowly to satisfy purely bureaucratic budget line imperatives, DOE believes a project can simply be declared an acceptable interim action, dropped from the scope of programmatic environmental review, analyzed separately, and built.

8

9

The history of the Nuclear Weapons Complex PEIS process, which the Stockpile Stewardship and Management PEIS is intended to replace in large part,[6] suggests that this is DOE's viewpoint. The original Reconfiguration PEIS process was intended to address questions about the long-term mission of DOE facilities, including the Laboratories. When we asked DOE to address such issues in its LLNL site-wide EIS, DOE replied that

> The Reconfiguration PEIS will address the long- term mission of LLNL and SNL, Livermore; in contrast, this EIS addresses the near-term continued operation of LLNL and SNL, Livermore. The focus of possible new long-term missions cannot be addressed until after completion of the Reconfiguration PEIS. U.S. Department of Energy, Record of Decision; Continued Operation of the Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories, Livermore (SNL, Livermore), Livermore, California, Wednesday, January 27, 1993, 58 FR 6268-01.

The Nuclear Weapons Reconfiguration Study process as originally described by DOE was intended to consider fundamental questions about future facility needs, including "delineating the weapons RD&T activities and capabilities that are essential to support the Nation's nuclear deterrent and for maintenance and

[6] See U.S. Department of Energy, "Notice of Intent to Prepare a Stockpile Stewardship and Management Programmatic Environmental Impact Statement," June 1995, pp. 3-4.

modernization of the nuclear weapons stockpile." U.S. Department of Energy, Nuclear Weapons Complex Reconfiguration Study, January 1991, p.112. Presumably, the Reconfiguration PEIS was supposed to have the same scope.

When the Reconfiguration PEIS was rescoped in 1993, DOE suggested alternatives which would have resulted in the relocation of a number of activities, including research, development and testing activities. In particular, DOE was then considering "integrating" certain "RD&T activities, i.e., those dealing with the use of special nuclear materials, into the proposed Complex 21 modules." U.S. Department of Energy, "Revised Notice of Intent to Prepare a Programmatic Environmental Impact Statement for Reconfiguration of the Nuclear Weapons Complex," July 23, 1993, 58 FR 39528, 39533-4. These modules would

> contain those facilities necessary to accomplish the particular function. For example, the Pu module would contain facilities capable of storing Pu, processing Pu, and fabricating Pu components. Additionally, both the plutonium and uranium functional modules would be designed to accommodate the option of integrating RD&T activities within the module so that these RD&T facilities could be collocated with other materials involving like materials at a single site if desired." ibid. at 39532.

The sites contemplated for the Plutonium "module" did not include Los Alamos, although various plutonium activities would remain at LANL under other Reconfiguration PEIS alternatives (e.g. the "Modifying/Upgrading Existing Facilities" alternative). Ibid., at p.39532. The Revised Scoping Notice also stated that "...following the PEIS, more detailed site-specific NEPA documentation would be prepared as required to analyze the synergism of any selected combinations at a site." id. At that time, the reconfiguration programmatic environmental review apparently encompassed a fundamental reevaluation of site functions, followed by appropriate NEPA review of most significant new projects.

Here, the need for the DARHT (e.g. as opposed to an upgrade of the FXR at LLNL), and for its construction at Los Alamos, is being justified in part because Los Alamos does plutonium hydrodynamic testing, while LLNL, for example, does not. (DEIS 3-36-3-38). This appears to be a decision-- where to locate a testing facility which uses plutonium-- which falls within the original Reconfiguration PEIS scope. But as the Reconfiguration PEIS in its various guises has been postponed again and again, decisions are being made by default, and the programmatic review itself is becoming narrower in scope, its range of possible alternatives more restricted. The very issues which seem so elusive from the perspective of the DARHT DEIS, limited as it is

to the impacts of operating accelerators and blowing up devices--the effects of producing surrogate nuclear weapons, using some of the most toxic materials on earth, of tracking and disposing of the waste, of the cumulative effects of these and other similar activities at sites already badly contaminated from decades of nuclear weapons testing and production-- were exactly what the reconfiguration PEIS was intended to bring into focus for the first time.

10 DOE appears essentially to have already chosen the "Modifying/Upgrading Existing Facilities" alternative proposed in the Reconfiguration PEIS Revised Scoping Notice, without bothering to complete the promised Reconfiguration PEIS. It is now proceeding with individual projects, and with a sharply narrowed programmatic review. The proposed scope of the Stockpile Stewardship and Management PEIS falls largely within that single "Modifying/Upgrading" alternative from the Reconfiguration PEIS. Further, DOE's approach to the Stockpile Stewardship and Management PEIS converts it into a kind of pastiche of programmatic and project-specific NEPA reviews (for the National Ignition Facility, the Contained Firing Facility, and the Atlas Facility). This implies that basic go/no go decisions for those projects-- which, together with DARHT, constitute a large proportion of the next generation of nuclear weapons test simulation facilities-- already have been made without NEPA review. Programmatic NEPA review is not intended to provide a kind of one-stop shopping convenience for decision makers anxious to keep up with the budget cycle; it is supposed to actually inform decisions about whether to go forward with programs.

The DEIS interpretation of general Presidential Decision Directive and Congressional language as a mandate requiring specific projects to go forward suggests that the Stockpile Stewardship and Management PEIS is a post hoc rationalization for decisions which already have been made.[1] We hope that this will not be the case. The Stockpile Stewardship and Management PEIS should inform not just DOE but Congress, the President, and the public concerning the impacts of a range of alternative technologies and facilities appropriate to a range of stockpile sizes, with an explicit vision of the intended role of U.S. nuclear weapons. Further, DOE's assertion that the Department 11 "will continue to maintain and improve its hydrodynamic testing capability regardless of the outcome of either the SWEIS or the PEIS" (DEIS, p.2-12) appears to rule out the "No Action"

[1] The NEPA regulations state that an EIS "shall be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made [cross-references deleted]." 40 CFR 1502.5.

alternative in this DEIS before even this project-specific environmental review has been completed. We hope that this was not DOE's intention.

The changes in U.S. weapons policy resulting from the disintegration of the Soviet Union undoubtedly have forced the DOE to revise repeatedly its long-range plans for the nuclear weapons complex. The most grandiose schemes for rebuilding the complex have been dropped, which is a positive development. But just because the range of options DOE considers to be plausible has been narrowed is no reason to lose the real advantages of a careful, programmatic review. Even if the projects DOE currently is most committed to now seem feasible only at one or two locations, significant new nuclear weapons testing and production weapons projects should be considered in the context of a thoroughgoing analysis of the entire complex. The existing nuclear weapons complex was built piecemeal, with little thought of the long-range, cumulative environmental consequences. In the absence of a provable urgent need for particular projects like the DARHT to go forward before a PEIS can be completed, DOE should take this opportunity to avoid repeating the ecological tragedies of the past.

PROLIFERATION IMPACT ANALYSIS

The inclusion of a nonproliferation discussion in the DEIS is a positive step. Unfortunately, however, the DOE section on nuclear weapons proliferation impacts provides little in the way of analysis. The analysis does not address the possibility that 12 a U.S. policy which contemplates an entire new round of nuclear weapons testing and production facility construction might encourage other nations to develop nuclear weapons or to improve their own nuclear arsenals. The DEIS states instead that "proliferation drivers for other states...would remain unchanged regardless of whether DOE implemented the proposed action analyzed in this EIS." DEIS at 2-11. Hydrodynamic testing is considered in isolation, without taking into account that the DARHT is part of a larger program of proposed new weapons testing and production facilities.

Other nations will evaluate our intentions in large part by the capabilities we choose to retain or develop-- just as we have evaluated the intentions of other nations in this way in the past. DOE is proposing the construction of new nuclear weapons facilities which appear modest only in comparison to the fearsome excesses of the height of the Cold War, retaining for this nation the capability to design new weapons and to build hundreds of new

warheads per year.[8] At the same time, we are witnessing a significant debate within the government over whether the United States should seek a threshold test ban allowing tests with yields of hundreds of tons rather than a truly Comprehensive Test Ban.[9] The full range of stockpile stewardship and management facilities, in combination with an underground test limit in the range of hundreds of tons, might well give the United States the capability to design and deploy new nuclear weapons. To many nations, this will represent a clear effort to maintain devastating nuclear superiority as an instrument of national policy well into the next century.[10] To remove proposals for new hydrodynamic testing facilities from this broader context, and by doing so to imply that this and other "stockpile stewardship" proposals are somehow no different from merely

[8] See, e.g., Herbert York, Interview, April 1982, In Robert Scheer, With Enough Shovels: Reagan, Bush, and Nuclear War (New York:1982), Appendix, at p.266: "Throughout this period, most of our Presidents have taken the attitude when they've become President and really seen what the situation is, that my God, this is awful, these forces are simply beyond belief, beyond what is necessary..."

[9] See, e.g., Ann Devroy and R. Jeffrey Smith, "White House Defuses Nuclear Test Proposal, Top Adviser Orders Study After Disclosure of Possible Loophole in Draft of Treaty," The Washington Post, June 23, 1995, p.A7.

U.S. nuclear testing policy, furthermore, may have a significant effect on the international nonproliferation regime:

> "Sri Lankan ambassador Jayantha Dhanapala, who presided over the NPT conference, told a disarmament conference in Japan last week that 'we . . . hear disturbing reports of a Threshold Test Ban Treaty (allowing nuclear blasts below an agreed level) being foisted on us in the guise' of a comprehensive ban.
>
> Dhanapala said that if such a proposal is put forward by one of the nuclear powers, it would confirm widely held suspicions among nonnuclear states that 'political expediency'lay behind the promise of such a ban." R. Jeffrey Smith, "Administration Debates Pentagon Proposal to Resume Nuclear Tests," The Washington Post, June 18, 1995, p.A17.

[10] See generally Michael Veiluva et al., Above Ground Experiments Threaten Compliance with Article VI of the Non-Proliferation Treaty: Laboratory Testing in a Test Ban/Non-Proliferation Regime, Western States Legal Foundation and Greenpeace USA/International, April 1995 (Attachment A)

maintaining our existing facilities, simply ignores reality.[11]

In the nonproliferation context, too, the only approach that makes sense is to look at the proposed "stockpile stewardship and management program"-- which is nothing less than the blueprint for the U.S. nuclear establishment for the next several decades-- as a whole. In a letter to Secretary O'Leary in December 1994, the Military Production Network asked that the National Ignition Facility proliferation impact analysis include "the entire array of Stockpile Stewardship and Management technologies," and stated that "[t]he nonproliferation analysis will be most meaningful and effective if it is, essentially, a companion in scope to the proposed Stockpile Stewardship and Management PEIS." Letter, Andrew M. Lichterman, on behalf of the Military Production Network, to Secretary Hazel O'Leary, U.S. Department of Energy, December 1, 1994 (attachment B). Individual project decisions, including DARHT, should be delayed until a truly comprehensive environmental review, and a proliferation impact review of similar scope, is completed. The approach to proliferation analysis taken by DOE-- discussing only the purported benefits of new nuclear testing facilities, while refusing to acknowledge that the path DOE prefers carries real risks-- are unlikely to improve DOE's credibility or to help regain public trust. It also is contrary to the most basic requirements of meaningful NEPA analysis: if you choose to claim certain types of benefits for a program, you must address as well the corresponding negative impacts or costs.

In May, the parties to the Review and Extension Conference on the Nuclear Weapons Non-Proliferation Treaty (NPT) agreed to an extension of the Treaty. As part of that agreement, the parties, including the United States, adopted a set of "Principles and Objectives for Nuclear Non-Proliferation and Disarmament." This document included a "programme of action", which calls for "determined pursuit by the nuclear-weapon States of systematic and progressive efforts to reduce nuclear weapons globally, with the ultimate goal of eliminating those weapons, and by all states of general and complete disarmament under strict and effective international control." 1995 Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, "Principles and Objectives for Nuclear Non-Proliferation and Disarmament," adopted May 11, 1995, NPT/CONF.1995/L.6, p.2. This programme is intended to implement Article VI of the Treaty itself. In a post-Conference interview, the U.S. Ambassador to the Conference, Ralph Earle, Deputy

[11] e.g., "Because the United States is already a nuclear weapons state, and has had a hydrodynamic testing program for several decades, continuing to maintain a hydrodynamic testing capability does not change our Nation's status in regards to proliferation-- we would remain a weapons state." DEIS at 2-11.

Director of the Arms Control and Disarmament Agency, stated regarding the Principles that "we are prepared now to begin their implementation as if they had the same standing as the Treaty itself". BASIC Reports, June 1, 1995, p. 3 (newsletter of the British American Security Information Council, 1900 L St. N.W. #410, Washington, D.C. 20036). In another post-Conference interview, the President of the Conference, Ambassador Jayantha Dhanapala of Sri Lanka, observed: "Unless there is substantial progress evidenced in the nuclear disarmament field, we are going to have very serious erosion of the confidence of states parties to the Treaty. This could be quite dangerous for the future . . ." Id., p.2. (See generally Jacqueline Cabasso and John Burroughs, Beyond the NPT: "Abolition 2000!" As Non-Proliferation Treaty Review Process Breaks Down, Non-Governmental Organizations Launch Initiative for a Nuclear Weapons Free World, a special report of Western States Legal Foundation, June 14, 1995, Attachment C.)

A meaningful nonproliferation analysis of new nuclear weapons facilities must address how proposed new facilities will contribute to "systematic and progressive efforts to reduce nuclear weapons globally, with the ultimate goal of eliminating those weapons".

# # #

Laboratory Testing in a Test Ban/Non-Proliferation Regime

Above Ground Experiments Threaten Compliance with Article VI of the Non-Proliferation Treaty

April 1995

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About the Organizations

WESTERN STATES LEGAL FOUNDATION (WSLF) is a non-profit organization dedicated to a peaceful and nuclear free future. We seek to abolish nuclear weapons, compel open public environmental review of hazardous nuclear technologies, and ensure appropriate management of nuclear waste. Our program challenges an array of policies which taken together risk nuclear catastrophe. Our legal, technical, and organizing activities support the growth of nonviolent public participation in shaping U.S. and global nuclear policy.

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ABOVE-GROUND EXPERIMENTS THREATEN COMPLIANCE WITH ARTICLE VI OF THE NON-PROLIFERATION TREATY

Introduction

The United States and other nuclear weapons states (NWS) are developing advanced technologies for conducting above-ground experiments (AGEX) to maintain the readiness of their arsenals of nuclear weapons. The largest and most ambitious program is planned by the United States under the name "Science Based Stockpile Stewardship" (SBSS). SBSS, and related efforts by other NWS, are intended to mitigate or overcome limitations on nuclear weapons programs imposed by the current moratorium on underground nuclear explosions as well as the anticipated Comprehensive Test Ban Treaty (CTBT). By the turn of the century, the United States plans to spend billions of dollars to construct and operate new facilities to preserve its capacity to maintain, test, modify, design, and certify nuclear weapons.

The development of advanced above-ground testing facilities by any nuclear state is inconsistent with treaty obligations imposed under Article VI of the Non-Proliferation Treaty (NPT). Article VI requires the signatory nuclear states "to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament..." The Preamble to the NPT explicitly calls for a Comprehensive Test Ban Treaty. When the NPT was signed in 1968, the intention of the parties was to halt nuclear tests in order to stop the development of new nuclear weapons; the CTBT was to be a disarmament measure. Using new technological capacities to undermine this intent is not conducive to "negotiations in good faith". The construction of expensive new above-ground test facilities frustrates Article VI's disarmament goals by allowing the host countries to continue nuclear weapons research and testing despite the cessation of underground nuclear explosions. According to statements by government officials, the above-ground testing regime now underway in the United States is intended not only to ensure the "reliability" (that is, the performance) of existing nuclear weapons, but also to preserve the capacity to design and produce new weapons.

Fundamentally, the large scale investment by the NWS in more advanced above-ground testing facilities is an effort to maintain their technological advantage in nuclear weaponry. The United States' SBSS program presumes that the United States will maintain a large, sophisticated, diverse nuclear arsenal at or near START II levels, rather than adopt a posture consistent with continuous reductions towards eventual nuclear disarmament as contemplated by Article VI

of the NPT. Once the nuclear powers invest considerable political and economic capital into advanced AGEX programs, the incentive and political will to take further effective measures towards zero stockpiles will diminish. The public policy rationale of SBSS as a "hedge" against new aggressive NWS or a resurgent Russian weapons program must be called into question when viewed against the treaty commitment to nuclear disarmament made by the NWS signatories to the NPT.

To the extent that AGEX programs are planned as substitute methods for obtaining weapons design information previously derived from underground explosions, they are contrary to the spirit, if not the letter, of a Comprehensive Test Ban Treaty. The conflict between AGEX and Article VI (as well as any eventual CTBT) is even more pronounced if the United States resumes *hydronuclear* experiments which involve low-yield releases of fission energy. The United States and several other nuclear powers have already taken public positions arguing for "thresholds" for "permitted" nuclear explosions to allow for hydronuclear tests. The drive to permit hydronuclear testing poses the specter of a threshold test ban in lieu of a comprehensive test ban as contemplated by Article VI, or worse, an ambiguous CTBT which leaves the definition of a "permitted" test to the whim of individual nations.

The Commitment To Nuclear Disarmament

The 1968 Treaty on the Non-Proliferation of Nuclear Weapons established mutual commitments and obligations between the nuclear and non-nuclear weapon states. In return for the non-nuclear states agreeing to forego nuclear weapons programs, the nuclear powers agreed in Article VI of the NPT to cooperate in halting the nuclear arms race and to proceed down the road to the complete elimination of nuclear arsenals. Article VI provides:

> Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

The text of Article VI does not merely call for reductions in the number of weapons. Instead, as a condition to obtaining the non-NWS' commitment to forgo nuclear arsenals, it requires that the nuclear powers take affirmative steps to halt the competitive development of the weapons and to reduce existing stockpiles to zero.[1] Article VI further embraces (as recognized in the 1968 agenda established by the nuclear states) the early ratification of a Comprehensive Test Ban Treaty, a halt to production of weapons-grade fissionable materials, and binding commitments not to use nuclear weapons against non-nuclear states (security assurances).[2]

At the present time, Russia, the United States, France and the United Kingdom are observing a self-imposed moratorium on below-ground nuclear explosions. The United States and Russia have also suspended mass production of weapons-grade uranium and plutonium, although environmental and safety issues are among the key factors in this decision.[3] Security assurances have not been made in a form acceptable to the non-nuclear states.

The current cessation of explosive tests and production of weapons-grade fuel does not constitute sufficient compliance with Article VI—especially while the nuclear weapons states develop new capacities to conduct advanced weapons tests, maintain the capability to augment the existing large arsenals, and refuse to unambiguously and bindingly renounce first use. National programs which have as their goal the indefinite maintenance of large arsenals (including those contemplated by START II) and which continue to develop sophisticated nuclear weapons-testing technologies frustrate the NPT's objective of nuclear disarmament. Continuation of extensive "simulated" nuclear weapons testing programs also would compromise a CTBT, even more so if these programs include miniature nuclear explosions (hydronuclear tests).

U.S. Above-Ground Experimental Test Programs

In the United States, responsibility for the development, testing, production, and maintenance of nuclear warheads rests with the United States Department of Energy (DOE). The Department of Energy is charged with the operation of nuclear weapons production facilities, the

"Without underground testing, above ground experiments (AGEX) are the best means available to exercise and validate design judgement."
-- U.S. DOE FY 1996 Cong. Budget Request, Project Data Sheets, Feb. 1995, vol. 1, p. 306.

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"The new weapon procurement strategy calls for ongoing development of advanced weapons systems to retain America's technological edge in military systems. In contrast to past practice, however, these new weapon systems may not be immediately produced in quantity. Instead, the nation will retain the capability to produce them quickly in response to threatening world conditions."
-- Sandia Nat'l Laboratories Institutional Plan, FY 1995-2000, Oct. 1994, p. 5-13.

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two principal weapons design laboratories at Livermore, California and Los Alamos, New Mexico (where the first atomic bomb was developed), the Sandia weapons engineering labs at Livermore and Albuquerque, New Mexico, and the Nevada Test Site (where weapons were exploded until 1993).

The United States tested its nuclear weapons by actual explosions aboveground until 1962 (except for a brief period between 1958 and 1961), and belowground thereafter. For most of this period, the weapons laboratories advised political leaders that the "safety" and "reliability" of existing nuclear weapons, and the capability to develop new weapons, could be assured only by a regime of actual nuclear explosions.[4] The United States SBSS program, in concept, is an important shift of weapons doctrine because it represents that these goals can now be accomplished in the laboratory.[5]

Any discussion of SBSS and AGEX programs must initially confront the ambiguities in terminology employed by weapons designers and policymakers, and in particular, the use of the words "safety" and "reliability" to describe the purposes of AGEX. The term "safety" refers to at least two aspects of the nuclear weapon: (1) its ability to survive aging, fire, or other destructive environmental influences or insults without releasing significant nuclear energy, and (2) the compatibility of safety features with the weapon's performance.[6] Initially, weapons safety was accomplished by mechanically separating the component parts of the warhead.[7] At the present time, insensitive high explosives, fire resistant pits, and "one-point safety" features are employed to prevent a nuclear warhead from detonating in the event of an accident such as an air crash.[8]

The term "reliability," on the other hand, pertains to the weapon's performance to the specifications required by the military, which include the yield of the warhead, its likelihood to detonate under proper commands, and its ability to survive war conditions.[9] Reliability is closely linked to another pervasive term of the nuclear age, "deterrence." True deterrence is the capacity to deter another state's first use by credibly threatening second use. Reliability in the sense of a demonstrated ability to meet exacting specifications for the likelihood that a weapon will explode at a given yield is necessary not for the credible threat of second use, but rather for the threat of first use or first strike with a high probability of destroying precise targets, most importantly the elements of an enemy's nuclear capability. Nuclear policymakers have eradicated the distinction between true deterrence and threatened first use, and thereby justified demanding requirements for reliability, by referring to the ability to credibly threaten nuclear use under any circumstance as "deterrence." A policy of true deterrence based on the capacity to threaten second use does not require "reliability" but only a reasonable chance that the second use would result in a nuclear explosion.

Before a weapon enters the U.S. arsenal and is available for deployment,

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it must be "certified" by the U.S. Department of Energy as meeting the safety, reliability, and performance criteria specified by the military.[10] Prior to 1994, this was principally accomplished through actual underground nuclear explosions of representative test weapons at the Nevada Test Site.

In 1994, the Department of Energy, in response to the voluntary moratorium on below-ground explosions declared by the United States and Russia in 1993, proposed an advanced technology program to upgrade its capability to test weapons in the absence of actual underground explosions.[11] The program, known as "Science Based Stockpile Stewardship," encompasses many of the Department's activities related to nuclear weapons research and development.[12] Its principal mission is to maintain the "reliability, safety and capability" of the nuclear weapons stockpile.[13] The United States Department of Defense, in its Nuclear Posture Review, has required the Department of Energy to ensure that it can "maintain capability to design, fabricate and certify new warheads" without underground nuclear testing.[14]

At the center of the above-ground testing program are sophisticated testing technologies designed to study and simulate the physics associated with nuclear weapons explosions. The Science Based Stockpile Stewardship program integrates a number of facilities and projects whose principal missions involve nuclear weapons experiments, component testing, or weapons-related nuclear physics,[15] although individually, some such programs (for example, Inertial Confinement Fusion (ICF)) may have applied physics and materials-science applications apart from

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"The NPR (Nuclear Posture Review) also directs the Departments of Defense and Energy to maintain nuclear weapon capability without underground nuclear testing and without the production of fissile material. Specifically, it directs the development of a stockpile surveillance engineering base; retention of the capability to refabricate and certify weapon types in the enduring stockpile; *maintenance of the capability to design, fabricate, and certify new nuclear warheads should that prove necessary*; and maintenance of the requisite supporting science and technology base."
-- Statement by Dr. Harold P. Smith, Jr., Assistant to the Secretary of Defense (Atomic Energy), before the Senate Energy and Water Development Appropriations Subcommittee, March 1, 1995 (emphasis added).

> **"Without underground tests, we will require better, more accurate computational capabilities to assure the reliability and safety of the nuclear weapons stockpile for the indefinite future. To achieve the required level of confidence in our predictive capability, it is essential that we have access to near-weapons conditions in laboratory experiments. The importance of nuclear weapons to our national security requires such confidence. For weapon primaries, that access is provided in part by hydrodynamic testing. For secondaries, the NIF will be the principal laboratory experimental physics facility."**
> -- U.S. DOE FY 1996 Cong. Budget Request, Project Data Sheets, Feb. 1995, vol. 1, p. 330.

weapons. These "dual use" facilities have confused the discussion over SBSS and AGEX, since proponents of particular SBSS facilities such as the National Ignition Facility (NIF, see below) tend to describe such facilities outside the context of the entire SBSS program, and emphasize their capability for energy and "pure science" research as well as their AGEX role.[16]

(a) *Inertial Confinement Fusion* (ICF). The United States has developed advanced facilities for studying high-energy and high-density physics approaching the conditions for ignition of the tritium secondary component of a nuclear bomb. Two such facilities, Trident (at Los Alamos) and Nova (at Livermore), already exist.[17] These will be dwarfed by the planned National Ignition Facility (NIF), expected to be built at Livermore. NIF, which according to the latest government projection will cost approximately US $4.5 billion to construct and operate,[18] will be the world's largest laser, intended to bring about thermonuclear fusion within small confined targets.[19] According to a November 1994 report prepared by a consulting team commissioned by the U.S. Department of Energy (the "JASON Report"), NIF represents "the closest laboratory approach . . . to a number of critical parameters in the weapons environment."[20] NIF's objective is to attain actual thermonuclear ignition by using 192 laser beams to produce 500 trillion watts of energy for 3 billionths of a second.[21] NIF is the largest and most expensive of the United States' AGEX programs now underway.

The memorandum from Assistant Secretary of Energy for Defense Programs Victor Reis to Undersecretary Charles B.

Curtis recommending approval of preliminary design for the NIF, and signed by Secretary of Energy Hazel O'Leary, states:

> In the absence of underground testing, the National Ignition Facility would be a critical tool for the Department's Science Based Stockpile Stewardship program. It would play an important role in maintaining the continued safety and reliability of the stockpile by creating experimental conditions that approach certain aspects of nuclear weapons physics. In particular, this experimental capability would allow nuclear weapons scientists to assess stockpile problems, verify computational tools, and increase their understanding of weapons physics.[22]

The U.S. Department of Energy's FY 1996 Budget Request describes NIF as "a key element in the DOE-Defense Programs above-ground simulator experimental capabilities for maintaining nuclear weapons competence and *nuclear weapons effects simulations*."[23] Its importance as an AGEX program is further emphasized elsewhere in the budget documents:

> Since the Hatfield Amendment to Public Law 102-377, Section 507 calls for the end of underground testing in 1996, the weapons laboratories will begin to lose the ability to certify the safety and reliability of this country's nuclear weapons. (Department of Energy-Defense Programs) is developing a stockpile stewardship program to respond to the loss of underground testing capability. The NIF is one of the most vital facilities in that program. The NIF will provide the capability to conduct laboratory experiments to address the high energy density and fusion aspects that are so important to both primaries and secondaries in stockpile weapons.[24]

Other NWS have or are developing inertial confinement fusion or related technologies, although on a smaller scale than NIF. The Russian laboratory at Arzamas-16 is reported to have an advanced laser facility "Iskra-5" capable of studying thermonuclear fusion physics.[25] The French Department of Military Applications, which has worked with Livermore Laboratory since 1981 on cooperative laser fusion programs, is now collaborating with Livermore to build a megajoule ICF laser facility in France.[26] A further concern is that ICF facilities might be valuable to proliferant states in developing advanced weapons already possessed by the existing NWS. [27]

(b) *Pulsed Power Facilities.* The United States, in cooperative arrangements with the United Kingdom and Russia, is developing advanced electrical "pulsed power" facilities capable of studying the effects on weapons and

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"Above ground experiments (AGEX) that address secondary weapons physics require an energy rich, high energy density environment. To simultaneously achieve the full spectrum of conditions present in a nuclear weapon, an underground test is required. In above-ground experiments in the laboratory, one can examine individual aspects of secondary weapons physics using three classes of facility: pulsed power for high energy; high energy lasers for high power; and ultra high-intensity lasers for extreme energy-density conditions. No single technology can access the full range of conditions to meet the needs of the weapons program for above-ground experiments."
-- U.S. DOE FY 1996 Cong. Budget Request, Project Data Sheets, Feb. 1995, vol. 1, p. 305.

military hardware of extremely high pulses of energies simulating those created by nuclear explosions.[28] Current active programs include the Particle Beam Fusion Accelerator II (PBFA II) at Sandia National Laboratory in Albuquerque, the "world's fastest particle accelerator," which creates an intense ion beam to study weapons effects.[29] Sandia also operates SATURN, a fast-pulsed accelerator used in weapons effects studies in cooperation with the United Kingdom and Russia.[30] At Los Alamos, PROCYON is an explosive pulsed-power system for direct-drive plasma implosions to produce "soft x-rays" for weapons physics experiments.[31]

Two important new pulsed power facilities are planned under SBSS. ATLAS will be capable of conducting hydrodynamic experiments on larger targets (in excess of 1 cm) as well as studying the melting and hydrodynamic properties of primaries. Its anticipated construction cost is US $43 million.[32] ATLAS is intended "to support the above ground experiments required to provide some kinds of data no longer available from underground nuclear testing."[33] At the conceptual stage is JUPITER, construction cost estimated at US $240 million, which will provide the world's "most powerful above-ground nuclear weapons effects test machine for x-rays."[34] Construction of JUPITER has not yet been authorized. The November 1994 JASON report commissioned by the Department of Energy recommended deferring any decision on JUPITER in part based on their conclusion that "experiments involving radiation or burn" could be accomplished by NIF.[35]

The French atomic weapons research laboratory at Gramat also conducts ther-

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mal pulse and electromagnetic flash experiments. Using generators developed in cooperation with an American company, the latter tests simulate the effect on equipment of a high altitude nuclear blast.[36]

(c) *Hydrodynamic Test Facilities.* These facilities study the physics of the primary component of thermonuclear warheads by simulating, often with high explosives, the intense pressures and heat on weapons materials. (The behavior of weapons materials under these extreme conditions is termed "hydrodynamic" because they seem to flow like liquids.)[37] Hydrodynamic experiments are intended to closely simulate, using non-nuclear substitutes, the operation of the primary component of a nuclear weapon, which normally consists of high explosive and fissionable material (the plutonium "pit").[38] In hydrodynamic experiments, the properties of surrogate pits can be studied up to the point where an actual weapon releases fission energy.[39] High explosives are used to implode a surrogate non-fissile material while special X-ray devices ("dynamic radiography") monitor the behavior of the surrogate material under these hydrodynamic conditions.[40] Hydrodynamic testing is considered as "crucial to the continued confidence in the safety and reliability of nuclear primaries."[41]

Two existing facilities, the Flash X-Ray (FXR, at Livermore) and the Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX, at Los Alamos), currently provide advanced radiographic

"Lawrence Livermore National Laboratory maintains and operates open-air high explosive test facilities at Site 300 as part of their Stockpile Stewardship Program. Many of the devices involved in these tests contain toxic and/or low-level radioactive materials (depleted uranium). . . The contained firing table concept is consistent with the development and application of advanced diagnostic techniques. Such new diagnostics are required in order that reliable new weapons may continue to be put into the arsenal, especially considering the current moratorium on nuclear testing and the pending Comprehensive Test Ban Treaty."
-- U.S. DOE FY 1996 Cong. Budget Request, Project Data Sheets, Feb. 1995, vol. 1, p. 321-322.

"Instead of test shots, our understanding will be based on computer simulations and analyses benchmarked against past data and new diagnostic information obtained from carefully designed above-ground and laboratory experiments."
-- S. Drell, et al., Science Based Stockpile Stewardship [JASON report], November 1994, p. 88.

monitoring of hydrodynamic experiments.[42] Over the next five years, the Department of Energy plans to complete the Dual Axis Radiographic HydroTest (DAHRT) facility at Los Alamos, at a construction cost in excess of US $100 million.[43] The laboratories have also proposed construction of an even larger facility currently known as the Advanced HydroTest Facility (AHTF), which is estimated to cost at least US $400 million to build and take ten years to complete,[44] with participation by both major weapons laboratories and the United Kingdom.[45]

While the usefulness for advanced NWS of inertial confinement fusion programs (such as NIF) in designing new weapons is disputed, there is little question that hydrodynamic tests provide valuable information in designing actual weapons primaries.[46] For this reason, detailed technical information on hydrodynamic tests remains highly classified.[47]

(d) *Advanced Supercomputer Simulations.* In the absence of actual nuclear explosions, the United States plans to substitute advanced computer modeling using supercomputers. Within SBSS, the Department of Energy has undertaken the Accelerated Strategic Computing Initiative (ASCI), to develop "the computer simulation capabilities to establish safety, reliability, and performance of weapons in the stockpile, virtual prototyping for maintaining the current and future stockpile, and connecting output from complex experiments to system behavior."[48] The ultimate goal of ASCI is to create a "virtual testing and prototyping capability for nuclear weapons."[49] Reportedly, the U.S. has offered to provide China with computers that could aid in nuclear explosion

simulations, in order to persuade Chinese military leaders to halt underground testing.[50]

(e) *Hydronuclear Experiments.* A much debated component of SBSS is the possible resumption of hydronuclear experiments. These experiments, which were conducted during the 1958-1961 testing moratorium, involve the actual testing of extremely low-yield fission devices (as low as the equivalent of several pounds of TNT) within a confined environment.[51] At this stage, the Clinton government has not announced a decision to proceed with hydronuclear tests, although there apparently is substantial pressure from the Defense Department and the weapons establishment to do so.[52] Congressional budget documents reveal that the laboratories in recent years have designed hydronuclear experiments "to investigate one-point safety, reliability and performance issues for current and past stockpiled primaries."[53]

As discussed below, any resumption of hydronuclear experiments has grave implications not only for compliance under Article VI of the NPT, but also for a Comprehensive Test Ban Treaty.

Above-Ground Experiments and Article VI

During the 1968 NPT negotiations, the nuclear weapons states proposed an agenda of actions that would be recognized as "effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament" under Article VI. These included:

(1) the cessation of testing;
(2) the non-use of nuclear weapons;
(3) the cessation of production of fissionable materials for weapons use;
(4) the cessation of weapons manufacture; and
(5) the reduction and eventual elimination of nuclear stockpiles.[54]

Since 1968, the lack of progress of the NWS toward these goals has attracted great concern among the non-nuclear countries.[55]

Under AGEX, Nuclear States Will Continue to Test Nuclear Weapons

Under SBSS, the United States is investing billions of dollars in new equipment, technologies and physical plants in order to retain intact the infrastructure and technical capability for research, development, engineering and production of nuclear weapons in the absence of actual underground nuclear explosions.[56] As Dr. Vladimir Iakimets of the Russian Academy of Science recently commented, the result of these new technologies is that "instead of an (actual) test site we will have an informational test site."[57]

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The aim of AGEX is "the full integration of the kind of capabilities that we've always been able to achieve in developing nuclear warheads and in our nuclear testing program."
-- 12-1-93 talk at Los Alamos Nat'l Lab, "The State of the Nuclear Weapons Programs," John Immele, Associate Director for Nuclear Weapons Technology, Los Alamos.

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"[T]he development of rapid prototyping and agile manufacturing techniques must build on emerging simulation capabilities so advanced that they enable virtual prototyping and processing and, ultimately, computational design of entire systems."
-- Sandia Nat'l Laboratories Institutional Plan, FY 1995-2000, Oct. 1994, p. 5-28.

Under the SBSS umbrella, the United States' high level above-ground experimental programs including ICF, ASCI and hydrodynamic test facilities are promoted as allowing a continuation of reliability (that is, yield and confidence) tests of weapons systems even under a CTBT.[58] Proponents of these technologies have stressed both the non-weapons applications of these technologies (particularly ICF) and the need to assure weapons safety. However, it is reasonably clear that the intent and design of these technologies extends far beyond the safety of the primary systems. Instead, the stated goal of the program is to ensure that the weapons systems work as intended, and are survivable.[59] Since one of the principal objectives of inertial confinement fusion as well as pulsed power facilities is to study the effects of nuclear weapons on sensitive equipment (including the weapon itself),[60] these uses must be distinguished from the more benign "safety" rationales for AGEX programs.

The vigorous AGEX program now underway in the United States is at odds with Article VI's mandate to the nuclear states to end nuclear testing and take other concrete steps towards halting the arms race and eliminating nuclear arsenals. Whether the tests are conducted in an underground explosion or in a high technology laboratory, the goal of maintaining weapons performance remains the same. The stated goal of AGEX as a replacement for underground tests[61] fundamentally misperceives the purpose of the CTBT, which is to be an "effective measure" to stop weapons development and move towards disarmament, rather than an end in and of itself. A CTBT affecting only underground explosions inevitably will perpetuate a discriminatory non-proliferation regime if advanced nuclear states retain the functional equivalent (or approximation) of underground explosions by way of aggressive AGEX programs.

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The CTBT is an "effective measure" under Article VI only if it inhibits weapons advancement. If sophisticated AGEX programs provide the "informational testing" needed to remove technological barriers otherwise imposed by the elimination of actual nuclear explosions, the CTBT's effectiveness will be seriously eroded.

The Maintenance of Large Weapons Stockpiles under SBSS, and the Retention of Production and Design Capability, Is Inconsistent with Article VI

One of the principal goals of the Science Based Stockpile Stewardship program is to enable the maintenance of thousands of warheads in a state of readiness. Currently, under START I and II, the United States envisions using SBSS to preserve a stockpile at or greater than START II levels (some 3,500 warheads deployed on strategic systems plus thousands in reserve or deployed in tactical systems). It is reasonably clear that the investment of billions of dollars into SBSS is inconsistent with any meaningful attempt to materially reduce the number of warheads in the arsenal towards zero. Indeed, the construction of expensive new facilities for stockpile maintenance will become a potent economic force blocking further arms reduction.

Another impact of SBSS will result from its stated purpose as a "hedge" in the case of a resurgent nuclear power or

"The weapons laboratories must assume more responsibility for production capability in addition to their responsibilities for scientific understanding. Having a capability of creating a larger stockpile in an emergency could permit the U.S. to further reduce its active stockpile if international conditions so warrant."
-- Statement of Dr. Victor H. Reis, Assistant Secretary for Defense Programs, Department of Energy, before the Senate Energy and Water Development Appropriations Subcommittee, March 1, 1995.

"Capabilities in Conceptual Design and Assessment are exercised through the exploration of concepts and technologies that offer potential options for meeting future needs. Through these efforts, future weapons and components are conceived. Although these activities do not involve formal hardware development, they may include a limited amount of prototyping or experimentation to assess or demonstrate conceptual feasibility. These efforts are often computationally intensive. Emphasis is placed upon the anticipation of future national security requirements and missions. Current areas of interest include, but are not limited to, advanced electromagnetic radiation, stealth, and enhanced safety features such as fire resistant pits (FRP), insensitive High Explosives (IHE), insertable nuclear components, paste explosives, and advanced containment. These capabilities are critical to sustaining the longterm operational safety and the credibility of the nuclear deterrent."
-- U.S. DOE FY 1996 Cong. Budget Request, Atomic Energy Defense Activities, Feb. 1995, vol. 1, p. 74.

new proliferation threat.[62] Under this scenario, the combined AGEX facilities are expected to allow new weapons design and facilitate resumed production.[63] Over the next ten years, the United States will develop an advanced infrastructure not only for supervising the existing stockpile but also, if ordered, for developing and manufacturing new weapons and reconstituting the nuclear force.[64] Proposals for stockpile stewardship in conjunction with "stockpile management" include not only new nuclear weapons research, development, and testing facilities at the Livermore, Sandia, and Los Alamos laboratories, but also a retooled nuclear weapons production complex, centered at the labs and at the Pantex plant in Texas. This complex would be capable of turning out approximately 150 weapons a year, and more if needed on an emergency basis ("surge capacity").[65] United States planners have also recommended that SBSS provide for the contingency of resuming underground testing at the Nevada Test Site within 6 months up to FY 1996 and within two to three years thereafter.[66]

Since SBSS is a new program containing both conceptual and operational AGEX facilities, its actual capability to meet the demands of the Defense Department is uncertain.

Based on the recent Nuclear Posture Review and related documentation, it appears on paper that military planners expect SBSS to fulfill most, if not all, historic stockpile design and maintenance functions.[67] This includes the capability to design and certify new nuclear weapons though there is no current requirement for their manufacture.[68] These demands have triggered a secondary discussion about whether SBSS in fact has capabilities that would permit the design of new deployable weapons. The discussion is confused by the fact that the term "design" may be a term of art among weaponeers which excludes matters such as upgrades, modifications, or improvements on existing systems which are anticipated to continue under SBSS.[69] The theoretical debate over the ultimate capability of SBSS to generate deployable "new" weapons (as defined by the weapons designers) obscures the more fundamental question of whether the aggressive commitment to weapons modernization and maintenance of production capacity truly moves the United States and other NWS any closer to disarmament.

Like underground testing, laboratory testing is important not only for its contribution to the military readiness of the arsenal; it also signals the NWS' attitude towards the weapons as instruments of national power. The emphasis on reliability in SBSS underscores that the premise of broadly defined nuclear "deterrence," including the option of first use, remains unchanged in NWS' nuclear policies.[70] Article VI contemplates renunciation of the threat of use of nuclear weapons as a tool of national policy. SBSS and similar testing regimes undermine compliance with Article VI by sustaining the NWS' commitment to national security policies premised upon substantial arsenals and threatened first use.[71]

The United States' economic and technological commitment to SBSS is therefore at odds with the Article VI goals of halting competitive weapons development and eventually achieving a treaty on the elimination of nuclear weapons. Having "hedged their bets" with SBSS and similar programs, the nuclear states' incentive to further disarm beyond START II will be lessened. Even more consequential will be the perception of many non-nuclear states that the "haves" have failed to live up to the promise made in Article VI.

Resumption of Hydronuclear Experiments Would Diminish the Effectiveness of a Comprehensive Test Ban Treaty

In hydronuclear tests, the laboratories combine explosives with a small amount of fissile material. Weapons designers sometimes refer to these as "zero yield" tests, although (unlike other AGEX technologies) actual energy is produced from fission.[72] The amount of fission energy produced is measurable in terms of pounds of TNT, rather than the kilotonnes or megatonnes TNT-equivalent normally associated with deployed nuclear weapons.[73] The resulting fission energy from the imploding core can be measured, matched against predic-

tions, and used to gauge the performance of primary designs.[74]

Substantial debate exists within the arms control and weapons establishments concerning the potential resumption of hydronuclear experiments. Two particular issued have been identified: (1) whether such tests (of varying magnitudes) are "activities not prohibited" under a CTBT or testing moratorium,[75] and (2) whether they pose a proliferation risk.[76]

When hydronuclear experiments were conducted during the 1958 to 1961 moratorium, the United States government assumed that tests of such small yield were not a violation of the moratorium.[77] There is no technical definition of a "nuclear weapons test explosion" within the current CTBT draft text.[78] In recent discussions, certain NWS have pressed for a threshold of several hundred tons below which tests would be exempted from the CTBT.[79] United States negotiators have proposed a four pound TNT-equivalent threshold, which corresponds to the safety certification standard for American primaries in the event the nuclear warhead is detonated at a single point.[80]

The hydronuclear test crosses the barrier between a "simulated" test and an actual fission event. While the ultimate amount of atomic energy resulting from hydronuclear tests may be small in comparison to even the conventional explosive "trigger," it is nonetheless a nuclear test. Once the decision is made to conduct actual hydronuclear experiments, a "comprehensive test ban" is transformed into a "threshold test ban." Such tests can be of value to both NWS and proliferant states in weapons design, especially if the threshold is set at tons or hundreds of tons of yield.[81] Hydronuclear testing thus presents a double threat. 13
It undermines a CTBT as a true disarmament measure, reinforcing a discriminatory status quo, and it potentially encourages the spread of technology for the design of fission weapons outside existing NWS.[82]

CONCLUSION

. . . But the overall impression that they (NWS) give is that of business as usual. The Cold War may be over and yes, the strategic nuclear competition between the Russian Federation and the United States shows signs of abating, but the relationship of NWS to their own nuclear weapons has not registered the kind of basic change that one might expect. They continue to rely on nuclear weapons and do not seem prepared to give them up in the foreseeable future. Quite the contrary, they are looking for ways to freeze the NPT's dichotomy between the nuclear haves and the nuclear have-nots. This does not bode well for the NPT or nuclear non-proliferation in general.

Statement by Mexican Ambassador Miguel Marin-Bosch at the Fourth Session of the Preparatory Committee of the Review and Extension Conference of the Treaty On The Non-Proliferation of Nuclear Weapons, New York, January 23, 1995 (unofficial translation)

Fifty years after Hiroshima, the arms race between Russia and the United States has dissolved into each nation's preoccupation with its own economic future. Among the declared nuclear states, there are no outstanding nuclear rivalries. Russian and United States weaponeers are actively engaged in technology transfer and other cooperative arrangements.[83] In theory, the prospects for disarmament initiatives have never been brighter.

Unfortunately, none of the NWS appears to be prepared to renounce nuclear weapons as a core instrument of foreign policy. The United States' SBSS program is born of the insecure legacy of the Cold War. Its stated purpose as a "hedge" against over-the-horizon rivals will inhibit further "effective measures" toward disarmament promised by the signatory NWS in 1968. The NWS' commitment to development of advanced AGEX facilities to circumvent a CTBT is contrary to the reasonable expectations of the international community in signing the NPT.

The United States and other NWS should reaffirm their commitment to Article VI of the NPT by formally adopting the following "effective measures" toward disarmament:

(1) Current plans to undertake an aggressive AGEX program under the guise of Stockpile Stewardship should be terminated, and weapons stewardship activities limited to only those necessary to ensure the safety of existing nuclear weapons in their stockpiled condition while they await disablement and dismantlement under further arms reductions toward Article VI's objective of zero weapons. There is no existing need for further experiments to refine or develop designs, to evaluate weapons "effects," or to establish the "reliability" of particular weapons. Any stockpile stewardship program should encourage, not inhibit, the ultimate goal of eliminating nuclear weapons.

(2) The United States and other nuclear states should accept a zero yield Comprehensive Test Ban Treaty with no threshold for permitted nuclear tests. The preamble of the CTBT should state the purpose of the treaty, consistent with NPT's Article VI, to preclude weapons development and preparations for nuclear tests.

◆◆◆

ENDNOTES

1. See, for example, Bunn, Timerbaev and Leonard, "Nuclear Disarmament: How Much Have the Five Nuclear Powers Promised in the Non-Proliferation Treaty?", Lawyers Alliance for Word Security, June 1994, i (Bunn I); Bunn, "Extending the Non-Proliferation Treaty: Legal Questions Faced By The Parties In 1995", American Society of International Law, October 1994, 7-8 (Bunn II).

2. Bunn I, 11, 13: "In the eyes of the NPT parties not having nuclear weapons, there is no question that a CTB is the most important measure the nuclear weapons states can adopt in satisfying their Article VI obligations."

3. See, for example, U.S Department of Energy, FY 1996 Congressional Budget Request: Budget Highlights, February 1995, DOE/CR-0032, 15-6, 84-8. Similar statements were made by Arzamas-16 laboratory personnel at a four day conference attended by two of the authors in Nizhny-Novgorod, Russia, in July 1994.

4. For example, see Thorn & Westervelt, "Hydronuclear Experiments", Los Alamos National Laboratories, LA-10902, February 1987, p. 7: "The most important lesson learned from this experience [the 1958-1961 testing moratorium] was that a nation that depends upon nuclear weapons for its security can get into serious trouble during a testing moratorium or prohibition."

5. Drell, et al., "Science Based Stockpile Stewardship," JASON, The MITRE Corporation, November 1994, 1, 3 ("JASON"). The Jason Report was commissioned by the U.S. Department of Energy to assess the proposed SBSS program and make specific recommendations. The reports concludes that all of DOE's proposed AGEX programs are of value to maintaining confidence in a stockpile program except for hydronuclear experiments.

6. See Cochran and Paine, "The Role of Hydronuclear Tests and Other Low Yield Nuclear Explosions and Their Status Under A Comprehensive Test Ban", National Resources Defense Council, March 1995, iv.; Thorn, et. al., supra at 2-3.

7. Thorn et al., supra at 1, 2.

8. Id.

9. U.S. Department of Energy and Department of Defense Interagency Working Group, "Stockpile Stewardship Program Plan for Fiscal Years 1995 through 1997", Draft, February 27, 1995, 5 ("Inter-Agency Working Group").

10. See Inter-Agency Working Group, supra at 4.

11. The FY 1994 National Defense Authorization Act (P.L. 103-160) called upon the U.S. Secretary of Energy "to establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear

weapons, including weapons design, system integration, and certification." In response, the U.S. Department of Energy proposed the Science-Based Stockpile Stewardship program. See JASON, supra at 11. See also U.S. Department of Energy, FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, DOE/CR-0030, vol. 1, February 1995, 21.

12. Atomic Energy Defense Activities, supra at 22-3, 27.

13. Id.

14. U.S. Department of Defense, "Nuclear Posture Review", p. 27 (overhead projection), September 22, 1994.

15. Atomic Energy Defense Activities, supra at 41-43.

16. For example, the press packet provided by Lawrence Livermore National Laboratory in November 1994 emphasizes the NIF's applications to nuclear fusion energy research and pure physics, with little mention of its technical role as an AGEX program. Similarly, in Lawrence Livermore National Laboratory's January-February 1994 Energy and Technology Review, the National Ignition Facility is categorized as a "laser program" (p. 30) along with other civilian energy programs. The ambiguous public pronouncements concerning NIF have confused policy makers and the public as to its role and relevance to a weapons stewardship program.

Earlier policy statements leave less in doubt as to the interrelationship of advanced laser fusion facilities such as NIF and AGEX. "The Department of Energy program in inertial confinement fusion (ICF) is not now an energy program. It is an excellent program within Defense Programs (DP) that is generating information valuable to the nuclear weapons program. It is developing understanding and facilities that will permit the completion of the design and initiation of construction of a Laboratory Microfusion Facility (LMF) which in turn will have a major defense role . . .

We accept the NAS [National Academy of Sciences] judgment that the defense applications of ICF as embodied in the LMF are of great importance to weapons physics and weapons effects studies, and can be realized more certainly and much sooner than the energy goals. These applications would become urgent in the case of nuclear explosive testing limitations. It is thus appropriate that ICF remain primarily a defense program. Nevertheless, the promise of an inertial fusion energy program (IFE) seems to us to be sufficient to begin investment now in a small collateral program covering those areas not required for the DP program, e.g. repetition-rated, efficient drivers and reactor studies. We stress that the energy program makes sense only if the NAS recommended target-physics program is pursued vigorously by DP, and care should be taken that adding an explicit energy mission not in any way impede or slow down the ICF progress." Fusion Policy Advisory Committee, Final Report (U.S. DOE September 1990), 39. The "LMF" may be a successor facility to NIF.

17. JASON, supra at 40-42 (NOVA); Los Alamos Science, No. 21, 1993, p. 67. These programs are summarized in Collins, "Above Ground Experiments (AGEX): What and Where They Are", Institute for Science and International Security (paper), July 7,

1994.

18. FY 1996 Congressional Budget Request: Project Data Sheets, Vol. I, 332, February 1995, DOE/CR-0031.

19. JASON, supra at 39-43.

20. Id., 37.

21. Id.; FY 1996 Congressional Budget Request Project Data Sheets, supra, vol. 1, 328-9.

22. See also Lawrence Livermore National Laboratory; FY 1996 Capital Assets Management Process Report, April 15, 1994 UCRL-AR-[illegible] at FIII.5-42: "The mission of the National ICF program is threefold: (1) to play an essential role in accessing physics regimes of interest in nuclear weapon design and to provide nuclear weapon related physics data, particularly in the area of secondary design; (2) to provide an aboveground simulation capacity for nuclear weapons effects on strategic, tactical, and space assets (including sensors and command and control); and (3) to develop inertial fusion energy for civilian power production."

23. U.S. Department of Energy, FY 1996 Congressional Budget Request: Project Data Sheets, vol. I, DOE/CR-0031, 328 (emphasis ours)

See also Lawrence Livermore National Laboratory; Press Background Materials (undated) distributed November 1994: "Only the NIF of the various proposed facilities allows on a laboratory scale the study of the fusion aspects of a weapon. Both fusion and high energy density physics questions can be answered with NIF experiments, helping answer specific primary and secondary questions. Beyond direct stockpile inquiries, the NIF experiments provide empirical data to test the 'virtual laboratory' of complex computer simulations."

24. Project Data Sheets, supra at 329.

25. Dr. Vladimir Iakimets, Russian Academy of Sciences, "Laboratory Conversion and CTB Negotiations," paper delivered at Russian-US seminar in Nizhny-Novgorod, June 22-24, 1994.

26. "Le Projet de Laser Megajoule," Objectif (French scientific journal) 1994.

27. The U.S. Department of Energy has undertaken an unprecedented review of the potential impacts of the NIF on the proliferation of nuclear weapons. The study will analyze the usefulness of NIF to proliferant states as well as to U.S. nuclear weapons designers. Federal Register/Vol. 59, No. 249/Thursday, December 29, 1994/Notices, 67284: Notice of Public Meetings and Request for Comment Concerning the National Ignition Facility and the Issue of Nonproliferation.

28. JASON, supra at 71-2; Collins, supra at 5, citing Sandia National Laboratories, Summary Description of Facilities and Operations, August 1, 1992, 41.

29. JASON, supra at 72; Collins, supra at 5.

30. JASON, supra at 72; Collins, supra at 5.

31. JASON, supra.

32. Id. at 75.

33. FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, supra, vol. 1, 42.

34. JASON, supra at 79.

35. Id

36. Interview with Paul Rovaldes, Gramat laboratory worker, October 24, 1993.

37. Timothy R. Neal, "AGEX I, The Explosive Regime of Weapons Physics," Los Alamos Science, Number 21, 1993, 57.

38. JASON, supra at 3.

39. Id.

40. Id. at 4; Collins, supra at 1.

41. JASON, supra at 32.

42. JASON, supra at 28; Collins, supra at 1.

43. JASON, supra at 28-9.

44. Id. at 4.

45. Id. at 32. A preliminary report on the AHTF is expected in summer 1995.

46. Id. at 34.

47. Id.

48. FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, supra, vol.1, 42.

49. Inter-Agency Working Group, supra at 21.

50. "Perry Emphasizes Pacific Stability," The Washington Post, October 19, 1994, A34.

51. The early hydronuclear experiments are described in Thorn and Westervelt,

supra.

52. While the JASON group discouraged the resumption of hydronuclear tests (JASON, supra at 22), in its draft report, the federal Inter-Agency Working Group recommended them as part of the SBSS program (Inter-Agency Working Group, supra at 11).

53. FY 1996 Congressional Budget request: Atomic Energy Defense Activities, supra, vol.1, 75.

54. Arms Control and Disarmament Agency, Documents on Disarmament, 1968, 591, 593, cited in Bunn I, supra at 9.

55. Bunn I, supra.

56. Inter-Agency Working Group, supra at 3.

57. Remarks by Dr. Vladimir Iakimets during an NGO presentation to the Fourth Preparatory Committee Meeting for the Nuclear Non-Proliferation Treaty, January 27, 1995. (Transcript of panel presentation, "Laboratory Testing in a Test Ban/Non-Proliferation Regime," available from Western States Legal Foundation.)

58. Inter-Agency Working Group, supra. at 5; FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, supra, vol.1, 21-22.

59. See previous note.

60. See Inter-Agency Working Group, supra at 14; FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, supra, vol.1, 41: "Because of its conceptual similarity to certain aspects of nuclear weapons, the achievement of thermonuclear fusion will provide nuclear weapon physics data, particularly in the area of secondary design, *and aboveground nuclear weapon effects simulation capabilities.*" (emphasis ours)

61. Inter-Agency Working Group, supra at 3.

62. U.S. Department of Defense News Release, "Remarks Prepared For Delivery By Secretary of Defense William J. Perry To The Henry L. Stimson Center," September 20, 1994, 2-3; U.S. Department of Defense News Release (Press Conference Comments by Deputy Secretary of Defense Dr. John Deutch), September 22, 1994, 7.

63. Inter-Agency Working Group, supra at 8 (recommendations for SBSS include: "5. Maintain the capability to design, engineer, and certify new weapons.") See also Nuclear Posture Review (overhead slide), supra at 27 (same).

64. U.S. Department of Defense News Release dated September 20, 1994, supra at 3; U.S. Department of Defense News Release dated September 22, 1994, supra at 6-7.

65. Viewgraphs, Larry Woodruff, Presentation, "Downsizing the Capacity of the Nuclear Complex," August 1994, part of "The Weapons Laboratory System," presented to Secretary of Energy Advisory Board Task Force on Alternative Futures for the Department of Energy Laboratories, National Security Subgroup, August 8, 1994. See also U.S. Department of Energy, Reconfiguration of the Nuclear Weapons Complex, "Notice to Separate the Current Reconfiguration Programmatic Environmental Impact Statement (PEIS) into Two Separate Analyses: Tritium Supply and Recycling, and Stockpile Stewardship and Management," October 24, 1994.

66. Inter-Agency Working Group, supra at 8.

67. Id. at 26-7.

68. Nuclear Posture Review (overhead slide), supra at 27.

69. The February 27, 1995 Draft Inter-Agency Working Group report, supra, lists a number of these "upgrades" of existing nuclear weapons systems at pages 28 and 29.

The Sandia National Laboratory FY 1995 - 2000 Institutional Plan purports to project a future downsized and consolidated nuclear weapons complex with continuing design work and "tight integration" of production to design. Much of this design/production is to take place in 'virtual reality' with 'agile manufacturing technologies' performed by robotics to meet future advanced weapons needs. Sandia National Laboratory Institutional Plan FY 1995 - 2000, October 1994, SAND94-1931 at 4-5, 5-2, 5-3, 5-5, 5-13, 5-28, 7-2, 7-6, 7-7, 7-10, 7-12, 7-16, 7-28.

In addition, the Department of Energy's FY 1996 Budget reflects conceptual work in 1994 and 1995 on at least two new weapons systems: the Precision Low Yield Warhead (PLYWD) and the High Power Radio Frequency Weapon. FY 1996 Congressional Budget Request: Atomic Energy Defense Activities, supra, vol. 1, 52. No budget allocation for these systems appear for fiscal year 1996. There also appears to be discussion in trade publications of conceptual work around a so-called "robust nuclear warhead" permitting a short, off-the-shelf time frame between design and deployment. "USAF, Los Alamos Eye Robust Nuclear Weapon Design for Future Generation," Inside The Air Force, April 1, 1994, 12.

70. See, for example, Inter-Agency Working Group, supra at 5: "As long as nuclear deterrence remains an essential element of national security policy, the safety, security, reliability and effectiveness of weapons systems in the nuclear stockpile must be assured."

71. See also Dr. Vladimir Iakimets , "CTBT Negotiations In Geneva, Nuclear Weapons States' Attitudes and Possible Pitfalls," paper presented in Hiroshima, Japan, August 1994, for discussion of United States and Russian 'first use' policies.

72. Thom & Westervelt, supra at 4.

73. Id.

74. Cochran & Paine, supra at 10-11.

75. Cochran & Paine, supra at i, ii.
76. JASON, supra at 21-2.

77. Thorn & Westervelt, supra at 5.

78. Report of the Ad Hoc Committee on a Nuclear Test Ban to the Conference on Disarmament, 5 September 1994, CD/1273/Rev.1.

79. Id.; von Hippel, "The Problem of 'Permitted Experiments' Involving the Explosive Release of Fission Energy from Imploded Fission Cores Under a Comprehensive Test Ban", draft paper, March 8, 1995 ('von Hippel'), 1. Frank von Hippel reports that some states have proposed limits as high as 1000 tons.

80. von Hippel, supra at 2.

81. JASON, supra at 21-22.

82. A third rationale that has been advanced for discouraging hydronuclear experiments is the technical argument that the information that arguably would be obtained from such experiments can be obtained by other ADEY methodologies such as advanced hydrodynamic tests. See, for example, von Hippel, supra; Cochran & Paine, supra. We do not advocate this position in this article since we believe that the ADEY experiments that are now underway as a whole do not advance the progress of NWS toward their weapon development goals, and have as their central purpose the preservation of the existing stockpile of thousands of nuclear weapons. Basing hydronuclear tests is of small solace to non-NWS if NWS invest billions of dollars in advanced ADEY facilities and in order to maintain virtually all aspects of a nuclear weapons program whether hydronuclear experiments are conducted or not.

83. Those are described in the paper by Dr. Vladimir Iakamets of the Russian Academy of Sciences, "Labs Conversion and CTB Negotiations", delivered in Nizhny-Novgorod, Russia in June 1994.

Source documents available from Western States Legal Foundation.

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Comment 23, page 39

TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS

ARTICLE VI

"EACH OF THE PARTIES TO THE TREATY UNDERTAKES TO PURSUE NEGOTIATIONS IN GOOD FAITH ON EFFECTIVE MEASURES RELATING TO CESSATION OF THE NUCLEAR ARMS RACE AT AN EARLY DATE AND TO NUCLEAR DISARMAMENT, AND ON A TREATY ON GENERAL AND COMPLETE DISARMAMENT UNDER STRICT AND EFFECTIVE INTERNATIONAL CONTROL."

U.S. LAW SINCE 1970

"This important report, which should be widely publicized, reveals the truth about the United States government's plans to continue nuclear weapons development well into the next century."

-- **Theodore Taylor, former nuclear weapons designer, Los Alamos National Laboratory**

"An eye-opening expose of what's really happening in the weapons laboratory. A revealing, important contribution."

-- **Michio Kaku, Professor, Physics Department City University of New York**

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ATTACHMENT B

COPY

Military Production Network

A national alliance of organizations working to address issues of nuclear weapons production and waste clean-up

Member Groups

American Friends Service Committee
Denver, CO

Citizen Alert
Reno, NV

Citizens for Alternatives to Radioactive Dumping
Albuquerque, NM

Citizens for Environmental Justice
Savannah, GA

Coalition for Health Concern
Berea, KY

Concerned Citizens for Nuclear Safety
Santa Fe, NM

Environmental Defense Institute
Troy, ID

Female Research for Environmental Safety and Health, Inc.
Ross, OH

Florida Coalition for Peace & Justice
Gainesville, FL

Government Accountability Project
Seattle, WA
Washington, DC

Greenpeace USA
Washington, DC

Hanford Education Action League
Spokane, WA

Heart of America Northwest
Seattle, WA

Knolls Action Project
Albany, NY

Miamisburg Environmental Safety & Health
Miamisburg, OH

Military Toxics Project
Sebastol, ME

Native Americans for a Clean Environment
Tahlequah, OK

Neighbors in Need
Englewood, OH

New Mexico Al Dente
Albuquerque, NM

Nuclear Safety Campaign
Seattle, WA

Oak Ridge Environmental Peace Alliance
Oak Ridge, TN

Panhandle Area Neighbors & Landowners (PANAL)
Pamanela, TX

Peace Action Education Fund
Washington, DC
Nashville, TN

Physicians for Social Responsibility
Washington, DC

Peterson/Piketon Residents for Environmental Safety & Security
McDermott, OH

Rocky Mountain Peace Center
Boulder, CO

Rural Alliance for Military Accountability
Carson City, NV

Snake River Alliance
Boise, ID

Southwest Research and Information Center
Albuquerque, NM

STAND of Amarillo, Inc.
Amarillo, TX

TriValley CARES
Livermore, CA

Western States Legal Foundation
Oakland, CA

December 1, 1994

Secretary Hazel O'Leary
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary O'Leary:

The Military Production Network is an association of local, regional and national organizations working together to promote education and action addressing issues pertaining to the Department of Energy Nuclear Weapons Complex. As citizens who live in the shadows of nuclear weapons production plants, we have a legitimate interest in the recognition and observance of our fundamental rights to public safety, environmental quality, government accountability and due process.

We are writing to you concerning three closely related matters: the proposed Programmatic Environmental Impact Statement for Stockpile Stewardship and Management, your recent announcement of plans to proceed with design for the National Ignition Facility (NIF) and of the Livermore National Laboratory as a preferred site, and the continuing National Environmental Policy Act noncompliance represented by the construction of the Dual Axis Radiographic Hydrodynamic Test facility (DARHT) at Los Alamos National Laboratory. Our specific concerns and requests for action are the subject of this letter.

We are pleased with the Department's decision to pursue programmatic review of proposed aboveground simulated nuclear weapons testing facilities, related technologies, and scaled down warhead production and/or "remanufacturing" facilities. We also appreciate your commitment to the process initiated by Congressman Dellums to assure broad public participation in a comprehensive review of the potential proliferation effects of the National Ignition Facility, viewed in context as part of the broader program of "stockpile stewardship."

The nature of the announcement at Livermore, however, implying that the National Ignition Facility proliferation issues already had been largely resolved within the Department and that both project approval and selection of the Livermore site are virtually assured, has given us cause for concern. The resulting press coverage in many California newspapers conveyed the impression that any further environmental or policy

review by the Department of Energy is a mere formality. Viewed in a broader context within which the Department is continuing to construct the other main near-term above ground experiment facility -- the DARHT -- without proper NEPA review, the NIF announcement has raised doubts concerning the commitment of the Department to environmental review which plays a genuine role in decision making. Because we believe that the Stockpile Stewardship and Management PEIS can play a significant role in improving DOE NEPA review and public participation therein, we wish to offer at this early stage some thoughts on how to make the PEIS process as meaningful as possible.

In its Federal Register notice announcing the new PEIS, the Department stated that

> "The purpose of the Reconfiguration PEIS was to establish the locations for the future weapons complex missions. It was envisioned that, once future mission locations were established through the PEIS process, project-specific environmental analyses would follow the PEIS and cover in detail the projects necessary to implement the PEIS decisions at each site." U.S. Department of Energy. "Notice to Separate the Current Reconfiguration Programmatic Environmental Impact Statement (PEIS) into Two Separate Analyses: Tritium Supply and Recycling, and Stockpile Stewardship and Management," October 28, 1994, 59 FR 54175-01.

We agree that the environmental review sequence stated above is the only one which will allow the proposed Programmatic review of Stockpile Stewardship and Management to play any significant role in decisions about the future of the weapons complex. Programmatic environmental review should come first, to be followed by project and site-specific environmental review only after fundamental policy alternatives have been considered, informed by the public participation NEPA provides. To proceed with site specific or project specific analyses for major new weapons research, development, testing, or fabrication facilities prior to that Programmatic review will render the PEIS process virtually meaningless. In particular, proceeding with the environmental and policy reviews and decisions for the NIF and
14 the DARHT prior to completion of the Stockpile Stewardship and Management PEIS will essentially predetermine the character of the two weapons laboratories involved for the foreseeable future, and will commit the Department as a whole to a vision of "stockpile stewardship" centered on the long-term maintenance of a formidable complex of nuclear weapons research and testing capabilities. In addition to their central role in stockpile stewardship generally, these two projects are likely to serve as "magnets" at the laboratories where they are located, assuring that other nuclear weapons research programs and facilities will be located there. For these reasons, both NIF and DARHT are actions which threaten to prejudice the ultimate decision being

Comment 23, page 43

analyzed in the Stockpile Stewardship and Management PEIS, and should proceed no further prior to the completion of that PEIS.

In regard to the proliferation impact analysis for the NIF, we appreciate your commitment to a "Key Decision One Prime" which will come only after the public process initiated by Congressman Dellums. We would emphasize, however, that in this context the NIF cannot be addressed in isolation from the entire set of proposed nuclear weapons research, development, testing, and simulation programs referred to as "stockpile stewardship." Other nations, in evaluating U.S. nuclear weapons capabilities and intentions, will be considering the NIF as part of a broader program which includes both these technologies and any "stockpile management" facility upgrades which will restore our capacity to remanufacture existing weapons, or perhaps even to manufacture new warheads. In order to provide a genuine national debate on these issues, the Department should provide a public participation process for the nonproliferation analysis which will allow, in Congressman Dellums' words,

> a comprehensive examination of this question that allows the public an opportunity to respond fully to the issues that are on the table, something akin to a programmatic environmental impact statement. "Dellums Applauds Secretary O'Leary's Decision to Pursue Proliferation Impact of Proposed National Ignition Facility," News and Views of Ronald V. Dellums, October 21, 1994.

In the three years since the Department of Energy first announced its intended Programmatic Environmental Review for the Nuclear Weapons Complex, the public repeatedly has been promised a comprehensive review which will address the fundamental policy and environmental choices represented by the many new facilities proposed at the various Department of Energy sites. In those three years, design and construction for several facilities has proceeded without the comprehensive policy and environmental review which is needed to provide the public with both an accounting of environmental impacts and a rationale for both policy and siting choices. We can no longer accept the piecemeal reconstruction of the Nuclear Weapons Complex while the promised Programmatic review is endlessly pushed off into the future. In order to restore public confidence in the integrity of the Department's policy decision making and in its public NEPA processes, we ask the Department to:

-- Clarify that no decision has yet been made by the Department to proceed with construction of the National Ignition Facility, and that no site for the facility has been selected.

-- Delay project specific environmental review and construction of proposed Stockpile Stewardship and Management projects until completion of the proposed

Comment 23, page 44

Stockpile Stewardship and Management PEIS. If the Department believes that particular projects are so pressing that they must go forward outside the Programmatic EIS process, the justifications for doing so should be publicly explained.

-- Along with a rigorous and detailed analysis of the NIF, include in the proposed proliferation analysis the entire array of Stockpile Stewardship and Management technologies. The nonproliferation analysis will be most meaningful and effective if it is, essentially, a companion in scope to the proposed Stockpile Stewardship and Management PEIS.

-- Include in the Stockpile Stewardship and Management PEIS a range of alternatives from a "zero" stockpile, through very small stockpile sizes, to the higher ranges proposed by the Department of Defense. These alternatives also should be tied explicitly to alternative policies for use of the weapons themselves. A nuclear weapons policy, for example, which does not anticipate first use against an adversary with high numbers of "hard" targets may require both a smaller stockpile and a lower reliability requirement, with consequences for both remanufacturing and "stewardship" technology requirements.

We stand at a critical juncture in the realm of nuclear weapons policy. As we move toward review and debate on extension of the Nuclear Non-Proliferation Treaty (NPT) and toward completion of a Comprehensive Test Ban Treaty (CTBT), the nuclear weapons powers, and the United States as the most powerful among them, will be watched closely, both by those nations which staunchly oppose nuclear weapons and by those which may wish to acquire them. Our behavior -- whether we appear to be pursuing further technological superiority in nuclear armaments, and so implicitly legitimating their existence as instruments of national power, or instead renouncing their use and committing ourselves to their eventual elimination -- will help to determine whether a CTBT and an extended NPT, if achieved, will be meaningful and effective. In Article VI of the NPT, the U.S. has committed already to the latter path:

> Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

Although the policy alternatives we ask the Department to analyze may not all be within the range of current Defense policy options, the reconfiguration of the Nuclear Weapons Complex, and the operation of the Complex as reconfigured, involves a time horizon stretching well into the next century. These are

Comment 23, page 45

decisions which affect all our futures, and the public deserves the opportunity to participate in the debate -- and to decide what will be debated.

Sincerely,

Andrew M. Lichterman
Western States Legal Foundation

for the MILITARY PRODUCTION NETWORK

Note: Please respond c/o Western States Legal Foundation, 1440 Broadway, Suite 500, Oakland, CA 94612; phone (510)839-5877; fax (510)839-5397.

Comment 24, page 1

Dual Axis Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
U. S. Department of Energy

Written Public Comment Form

379 46 6341 | | | First Name | MI | Last Name

MYSCIE | | Representing? | Telephone

Street Address

City | State | Zip Code

Meeting Location ☒ Los Alamos, NM ☐ Santa Fe, NM
Session ☐ Afternoon ☒ Evening
Meeting Date ☐ May 31, 1995 ☐ June 1, 1995

COMMENT(S) (If possible, please identify the specific section/page(s) of the DEIS that your comment addresses.)

1 • I BELIEVE DARHT IS PART OF AN ARMS RACE BETWEEN LOS ALAMOS AND LIVERMORE, FUNDED BY A COLOSSAL WASTE OF OUR TAX MONEY. PLEASE EVALUATE THE FXR OPTION AND DO NOT DUPLICATE FXR CAPACITY WITH DARHT.

2 • I AM CONCERNED THAT DARHT AND THE OTHER SURROGATE TESTING PROGRAMS ADD TO THE DANGER OF N-WEAPON DESIGN & CAPABILITY AND THEREBY TO INCREASED N-WEAPON PROLIFERATION POTENTIAL. I WANT MY COUNTRY TO ABANDON N-WEAPONS ULTIMATELY.

3 • THE PAJARITO PLATEAU IS TOO GOOD A PIECE OF NEW MEXICO TO CONTINUE TO RUIN WITH LANL-GENERATED TOXIC AND RADIOACTIVE WASTE. THE ENVIRONMENT IS WORTH MORE THAN LANL IS.

4 P.S. I DON'T TRUST WHAT LANL TELLS ME. I CAN'T NAME ANY BENEFITS
5 OF A TECHNOLOGICAL NATURE THAT 4 TRILLION ($ dollars) DOLLARS OF TAX MONEY SPENT ON N-WEAPONS SINCE WWII HAS SECURED FOR OUR NATION.

Please submit to the registration desk at the public meeting.

Comment 25, page 1

DARHT EIS Comment
Received via telecon 5/24/95 3:58 p.m.
Caller: Jerry Berry

1 Comments: 1) How is "Other Metal" defined? 2) Does "Other Metal" include plutonium? 3) Discussion of plutonium and ites impacts should be
2 included in the unclassified EIS so the general public can understand the total impacts of the DARHT Facility.

Comment 26, page 1

Dear Ms, Webb, oops
What are set-backs except an opportunity to learn? How do the recent signings of the non-proliferation Treaty and the older Comprehensive Test Ban Treaty effect the final outcome of this process? Certainly the example set by our federal policy will impact all countries. A stand of firm support for disarmament will help further to relax ~~global~~ hot political. Global strategy implications must be held in high reguard as our National Labs contrive to keep the funding levels at growing heights.

"AS IS ABOVE, SO IS BELOW" is a reasonable view of the arms race. As head and shoulders leaders in the competition the USA sets standards and guildined which others may choose to replicate. The US defense industry has sought to delude the public long enough. It is exactly that tendancy to deceive which creates the fears which feed that beast. If the Lab could be honest with itself, then with public in general, perhaps we can make this world a better place.

1 To be a complete EIS the Darth Vadar initiative should have a positive, life afirming alternative which allows for complete change to be quick and sure. Not the intention to give the bombs over to the military, but mega stockpile reduction. This work to disarm the devices should be done on sight, with a mobile operation like the cleanup fellows at the Espanola SWEIS have.
1 We need a new era, a change of mission for DOE. Historic secrecy traditions and walls need to come down and more walls do not need to go up at DARHT or any other facility designed to continue the planetary death wish mission.

Comment 26, page 2

page 2

It takes short times to make mistakes. Mistakes which have been made cannot always be corrected. Many of us amerikans believe we have enough radioactive waste already. If the lab needs new 1 facilities they should be devoted to finding safe, simple ways to detoxify nuclear materials. If all of the waste in Hanford or Savannah River gets innundated the way the Mississipi did in '93, it will not be pretty. Department of Energy should deal with the energy which exists in the waste materials.

Study Alternative energies like SOLar, wind, electrostatic and whatever the brilliant scientists think would be good to live in a world after petrolium. Bomb making is like conspiracy to committ murder, genocide, ecocide. When you wipe out as many folks as one bomb would kill, certainly innocent lives will be lost. Consider the butterflies and flowers, the birdies and childrens, like the Nazi's you plod toward mass murder. If we want a world in peace we should fork for peace and put in the energy of funds and research. It is clearly a good time to look at new ideas.

2 Conflicts with the historic preservation and cultural respect of native ruins are serious. The health and well being of all living species is an aspect of our responsibility to the Creator. Your choice to honor ancestors of Pajarito Plateau, the neighbors down hill and stream; could save downwinders too. Future and past generations are the stakes which people hold in this gambling. Reason and ethics must prevail over buraucracy and funds. Stop 2 pillaging our earth. Respect our sacred sites and privacy.

The purpose and need as you state it is paramount to success of one political system, yet degrading to life on earth, as is the mission of the whole capitalistic techo power trip.

Comment 26, page 3

page 3

Can you possible step back and see the impact of western civilization on America's west. The past fifty years has been exponential change. What do you want to see in the next fifty? Cumulative Impacts and Irretrievable and/or Irreversibility of constant weapons perfection practices are real on so many levels of socipolities from local to international. However the Cumul. 3 Impact to lab workers of 239 person-rem (is that per year?) is alarming.

Your should remember that the background is added to this and the high altitude factor make this not a question of comparison, but addition of more person-rems. Cumulative impact should add the 3 x-Rays, background, accidents, waste emmissions, etc. to the one in question and under study in the document.

You need an alternative that shuts down the PHERMEX... A true non-proliferation alternative will minimize the rem dose to trees and people with a sustainable cleanup agenda. The No Action is only 1 a continued action alternative and the action in question is bad. The lack af a clear alternative to change from business as usual shows a clear inability to see the big view. Nor is there info about how many tests per week, month, day or year in this big facility 4 will do at capacity and what the scientific validity of the findings. Would a quarter of the tests be enough? What are the tests used to prove? What new research is projected? 5-5 last paragraph indicates 5 probabilities of on-site damage to Facility from seismic impacts, what does this mean? Too many issues are vague. Re-do the EIS!

Thanks and peace, bonnie bonneau

bonnie bonneau

Comment 27, page 1

CHRISTINE GRAY CHANDLER
940 Los Pueblos
Los Alamos, NM 87544

18 May 1995

Ms. Diana Webb
DOE/LAAO
528 35th
Los Alamos NM 87544

RE: DARHT EIS

Dear Diana:

Enclosed is the list of individuals that Rhonda requested I send you. You apparently prefer to keep track of who is receiving the draft DARHT EIS. While I am willing to comply with your preference I request that you hold the list in confidence and use it only for the purpose of transmitting the document. I suggest that you check the list against the one you have been compiling as I believe a few of the people on the list may have already received one.

1 On another topic - I continue to be perplexed by whose responsibility it is to provide information and answer questions on the DARHT project. I frankly found our conversation of a couple of weeks ago very confusing and circular. Perhaps I misunderstand the process but I thought that DOE was charged with administering the EIS process. It seems to me that inherent in the process of soliciting public comment is providing the information the public seeks to education itself on the proposal (within reasonable limits). Otherwise all the public can provide is uninformed comments. I recognize that you did give me the name of one lab person who can
1 assist me. However, if he is so busy that he is having difficulty getting back to me, who can I contact to get the information I need? I recognize that you are understaffed and that you are not a scientist. I do not expect you to be able to answer the questions yourself. But it does seem to me that DOE should be able to facilitate the access we seek.

I apologize for pressing the point - I sensed some irritation during our conversation of a couple weeks ago and again yesterday about my expectations. But the public comment period is very short. I and others are scrambling to meet the deadline.

Whatever clarification that you can provide regarding gaining access to information would be greatly appreciated.

Sincerely,

Christine Chandler

Christine Chandler

Comment 28, page 1

6/7/95

U.S. Department of Energy
Los Alamos Area office
528 35th Street
LOS ALAMOS, NM 87544

ATTENTION: Ms. M. Diana Webb,
DARHT EIS Document Manager

Dear Ms. Webb:

Thankyou for your courteous, people oriented managing of the recent hearing in Santa Fe. Your equanimity and attention are appreciated. One small suggestion: if, indeed
1 the subject matter of comments is to be restricted to the environmental impact chapters, as you announced while I was there, should that not be printed in the call for comments? I heard complaints, from both camps, about the quality and effectiveness of Chapter 2, for example. Were these not germane?

2 I write primarily, however, to register my objections to the so-called round table format, though I am sure you hoped it would provide open and free discussion. Unfortunately, that was not its effect.

- LANL has had a $2 million, well staffed, resource backed chance to make its case in the draft EIS.

3 - In contrast, the public (unpaid, volunteer, often without convenient access to materials) has only the hearing to ask for clarification, locate weaknesses, and make its points.

In some cases, questions were answered directly, and that was useful--except the question why the available material publically stated was not included in the EIS. But in many cases, the "answer" gave factually armed, heavily invested, and unaccountable angry Lab personnel an chance to argue their positions; creating an unfortunate magnification effect to their already significant advantage.

I would be very happy to discuss this with you further should you desire.

Sincerely,

Helen Corneli

Helen M. Corneli
2528 Av de Isidro,
SANTA FE NM 87505

30004440
US DOE/LAAO - IN

Comment 29, page 1

176 Barranca Road
Los Alamos, NM 87544
June 15, 1995

Diana Webb
Los Alamos Area Office
U. S. Department of Energy
528 35th St.
Los Alamos, NM 87544

Dear Ms. Webb:

This letter is in support of DAHRT. I am an engineer, retired from LANL, who has been involved in the design of weapons systems, both nuclear and conventional, for almost 40 years. The United States has invested enormous resources in the development of weapons systems which have effectively deterred the start of any world wide war and maintained peace for 50 years.

1 | It is a very important goal to achieve nuclear disarmament around the world and the USA should be a leader in that effort. However, one need only read any daily newspaper to realize that nuclear weapons are still abundant all over the world and that there are governments which would use them were they not fearful of massive retaliation.

2 | It is imperative that the USA continue to maintain a smaller but still reliable and
3 | superior stockpile of nuclear weapons so long as there are weapons in the hands of other governments in the world. Honoring of present test ban treaties is also essential.

4 | Therefore, the only tool available to test reliability and operational readiness of our nuclear weapons systems is with a facility such as DAHRT. The construction of DAHRT should resume as soon as possible and be finished quickly so that it is available for the testing that is needed to maintain the superiority of the United States nuclear arsenal.

Sincerely,

Robert O. Hedges

Robert O. Hedges

C:\WP61\RO\DAHRT1.RO

30004547
US DOE/LAAO - IN

Comment 30, page 1

COMMENTS ON THE DRAFT DAHRT EIS, June 6, 1995
By M. G. Lockhart, 91 Mimbres Drive, Los Alamos, NM 87544

Table S-1 (pages S-5 thru S-7) and Table 3-3 (pages 3-41 thru 3-43):

I challenge the impacts presented and assumptions used for calculating Air Quality for uncontained versus enhanced containment.

a. NO_2, PM_{10}, and SO_2:

1 | **I could not identify a Table or Exhibit which explained the NO_2, PM_{10}, and SO_2 emissions for all alternatives except No Action. The numbers in Table S-1 appear to be an inconsistent mix from Tables 5-1 and 5-2 (No Action, page 5-4), 5-6 and 5-7 (Preferred Alternative, page 5-21), and 5-12 (Enhanced Containment Alternative, page 5-37).**

2 | **Table 5-6 for fugitive dust appears to conflict with Table C1-3 (page C-7).**

3 | **Table 5-7 (Construction Equipment) appears to conflict with Table C1-6 (page C-8).**

4 | **Every table for air quality contained scaling factor errors (exponents of 10). Calculations (or possibly data) using the regulatory limit from Table 4-3 to calculate "Percent of Regulatory Limit" are wrong in many tables – Example: Nitrogen dioxide in Table 5-12 is shown as .92 for 24 hours average. When divided by .10 (New Mexico Standard) this calculates to 920%, not 6.3 x 10^{-1} as shown in Table 5-12. Table S-1 shows 3.3% (the same as for the Preferred Alternative from Table 5-7), but Table 5-7 calculates to 4800%.**

b. Depleted Uranium, Beryllium, and Lead: Par 3.7 states that the Enhanced Containment Alternative prevents the release of most or all airborne emissions; that
5 | **25% of the Preferred Alternative tests would be uncontained; and that contained tests might result in a release up to five percent of the time.**

This results in a release in 26.75% of tests under the Preferred Alternative, versus 5% in the contained case.

Ten percent of the metals are assumed to be respirable (presumably vaporized or small particulates).

6 | **Table C1-8 shows that quantities used in contained tests are generally lower or equal to the uncontained tests. So the only factors which could result in higher emissions come from calculating the containment option as a ground level release versus an elevated release at 325 feet (par 5.4.2.1.2, page 5-36). This results in a percentage of regulatory limits 67 times higher for beryllium, 4.7 times higher for heavy metals, and 1.5 times higher for lead.**

7 | **There is a factor called 1 hr *X/Q'* (Table C1-8, page C-10) which is 28 times higher for containment and which is unexplained anywhere. I am told by knowledgeable**

1

COMMENTS ON THE DRAFT DAHRT EIS, June 6, 1995
By M. G. Lockhart, 91 Mimbres Drive, Los Alamos, NM 87544

7 | Individuals that this is the dispersion term for continuous release and that the dispersion term for short, "puff" releases should be E/Q.

8 | Why is the air burst assumption used? Uncontained tests will be on platforms, but not that much higher than for the containers.

9 | Par 5.1.2.1.2 states that the ambient air concentrations for uranium, lead and beryllium are for an exposed individual located at 0.9 mi southwest of the site. Could the elevated release assumption for uncontained tests (325 feet) lob contaminants over the .9 mile surface level point?

10 | Table S-1 and 3-3 show uncontained lead emissions of 1.8×10^{-3} for the No Action alternative. Table 5-1 shows 1.5×10^{-3}.

11 | Table S-1 and 3-3 show 2.5 emissions for Heavy Metal for the containmentalternative. Table 5-12 shows 2.5×10^{-2}.

12 | Table 5-12 shows 3.3 as the Percent of Regulatory Limit for beryllium. This should be 3.3 x 10-2. All of the air quality tables seem to show the same problem with calculation which I noted for NO_2, PM_{10}, and SO_2. This leads to the conclusion that all tables are suspect.

13 | The terms "Average dose" and "Collective doese" in Tables S-1 and 3-3 appear to be mislabeling. The 0.6 rem average annual worker dose for Enhanced Containment Alternative (Table S-1 and 3-3) conflicts with par 5.4.8.3 (page 5-46) and par H5.2.3 (page H-21), which state the average annual worker dose would not exceed .02 rem and the annual collective worker dose (100 workers) is 2 rem. 2 rem is congruent with 60 rem collective lifetime (30 year) dose and with the .3 rem annual collective dose used for the uncontained alternatives. I recognize that workers will be exposed more

14 | because of container cleanup, <u>but I question a factor of 7</u> (2/.3). Since no worker data are given for the uncontained alternatives, no calculation could be made to extend the .01 rem average annual dose, however, the FTE count would have to be 30(which seems low).

15 | Page MC-2: an acre is 1/640th of a square mile, not 640 square miles.

16 | I thought that Chapters 2 and 3 were well presented but did not explain the unique capabilities of DAHRT.

17 | I do not understand Appendix C. The data are not tied together well. The discussions throughout the document were not rigorous in defining terms. The reader's knowledge level was assumed to be higher mine, with intimate knowledge of air quality and other models.

18 | I suggest that Tables S-1, 3-3, and 3-4 refer to the sources in other parts of the EIS.

COMMENTS ON THE DRAFT DAHRT EIS, June 6, 1995
By M. G. Lockhart, 91 Mimbres Drive, Los Alamos, NM 87544

19 | I suggest that someone not involved with preparation of the document needs to cross check text and tables against each other and do a hoho test on data. Any data, assumptions, or descriptions which are not intuitively obvious needs to be justified.

<u>Socioeconomics</u>:

20 | No data are shown for the No Action Alternative. Since the other alternatives are stated in terms of incremental dollars and FTEs in relation to the No Action Alternative, the writers must have these data. They should be incorporated.

21 | The EIS does not state the socioeconomic impacts on other parts of the weapons complex for the different alternatives.

22 | I suggest adding a Total column in Tables in Chapter 5 and Appendix G. These costs appear to conflict with the cost presented in Tables S-1 and 3-4.

<u>Plutonium</u>:

23 | The unclassified summary from the classified portion of the DAHRT EIS should be incorporated in the unclassified EIS.

Comment 31, page 1

Dual Axis Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
U. S. Department of Energy

Written Public Comment Form

CHRIS | J | Mechels
First Name | MI | Last Name

Self | 982-7144
Representing? | Telephone

RT 4, Box 2-B
Street Address

SANTA FE | NM | 87501
City | State | Zip Code

Meeting Location ☐ Los Alamos, NM ☒ Santa Fe, NM Session ☐ Afternoon ☒ Evening
Meeting Date ☐ May 31, 1995 ☒ June 1, 1995

COMMENT(S) (If possible, please identify the specific section/page(s) of the DEIS that your comment addresses.)

1 I believe that Two very reasonable alternatives were dismissed and should have been evaluated.
3.10.5 Dismissal reasons "DOE does not conduct dynamic experiments with plutonium at LANL". So that experiments are confined DOE could do so!

2 3.10.1.2 This option is dismissed with a "hardware" with phrases such as "the number of shots could be limited" and "LANL would have to maintain expertise and maintain Pharmex". To date has ever been presented to support these statements, should seem contrived to eliminate the perfectly reasonable option.

3 This lack of consideration for a complex wide strategy is evident in the fact that LLNL, LANL and Sandia are all proposing upgrades of facilities with duplicative functions. This suggest that DARHT and the FXR upgrade etc should be done after a Stockpile Stewardship EIS not before. There seems to be a new "arms race" developing between the labs. and a downsized complex this is unwise and extremely wasteful!

Please submit to the registration desk at the public meeting.

Comment 32, page 1

Marion M. Morgan
75 Loma Vista
Los Alamos, NM 87544

June 9, 1995

Ms. Diana Webb
NEPA Compliance Officer
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

ATTN: DARHT EIS

Dear Ms. Webb:

On behalf of the Democratic Party of Los Alamos County, I submit the following official comments on the Department of Energy's Draft Environmental Impact Statement on the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT):

1 DARHT presents the best current means for evaluating the continuing safety and reliability of an aging stockpile.

For fifty years, nuclear testing has been the key to ensuring a safe and reliable nuclear stockpile. However, with President Clinton's decision to extend the nuclear testing moratorium, an alternative means for responsible stewardship is imperative. That means is the immediate establishment of a vigorous, state-of-the-art science based stockpile stewardship program.

1 DARHT is an integral component of science-based stockpile stewardship. Nuclear weapons have been certified to be safe and reliable in the context of the missions they were designed to serve and the length of time they were expected to remain in the stockpile. Through limited post-deployment nuclear testing, safety and reliability problems have been discovered and remedied in approximately one-third of stockpiled weapons. Thus over time, the Nation may lose the necessary confidence in the stockpile, without the resumption of nuclear testing, or without a partial replacement for nuclear testing.

In evaluating the Draft EIS, we have reviewed the Department of Energy's environmental assessments. We find those assessments to be carefully drawn and believe that they fully consider the appropriate environmental issues and possible mitigating factors.



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US DOE/LAAO - IN

Comment 32, page 2

1 DARHT is without question a vital tool for maintaining confidence in an enduring stockpile and therefore key to the Nation's nuclear deterrence policy . For this reason, the Democratic Party of
2 of Los Alamos County endorses the Department of Energy's preferred alternative which is to complete and operate the Dual Axis Radiographic Test Facility.

Sincerely,
Marion M. Morgan

Marion M. Morgan
Chairperson
Democratic Party of Los Alamos County

Comment 33, page 1

320 Valle del Sol Drive
Los Alamos, NM 87544
June 26, 1995

Ms. M. Diana Webb
Los Alamos Area Office
U. S. Department of Energy
528 35th Street
Los Alamos, NM 87544

Dear Ms. Webb:

Re: Draft EIS for DARHT

Enclosed are some comments on the draft Environmental Impact Statement for DARHT that I request be taken into consideration when the document is revised.

Sincerely,
Ann Pendergrass

Enclosure: a/s



Comment 33, page 2

COMMENTS ON DRAFT EIS FOR DARHT

Ann Pendergrass
320 Valle del Sol Drive
Los Alamos, NM 87544

1.0 Noise

1.1 Limited data

Only one noise test is reported and no data from Los Alamos townsite are presented although the prevailing day time winds from TA-15 are in that direction rather than toward White Rock. White Rock data are extremely incomplete. Table C2-4 contains typographic errors.

1 More noise tests should be performed under different meteorological conditions and data should be recorded at the nearest townsite dwellings as well as Bandelier and White Rock.

1.2 Lack of comparison

Results are reported (Table C 2-4) in hertz and dBA. Some sort of equivalent in loudness understandable to the general public needs to be presented for comparative purposes.

2.0 Air Quality

2.1 Criteria pollutants

Annual emissions of criteria pollutants are presented in Section 4.2.4 and Table 4.1.

2 However, cumulative impacts (Section 5.9) does not roll up the annual increases in criteria pollutants by alternative. As there are differences by alternative in heating and other attributes, this information should be presented.

2.2 Uranium Emissions

3 Section 4.2.5 and Table 4.4 present uranium emissions from LANL without dynamic testing addition included. Some table should present all uranium emissions, dU as well as other forms.

2.3 Summary of potential air quality impacts

4 Section 3.11 and Table 3.3 show for enhanced containment alternative greater emission of Be, heavy metal, and Pb. This doesn't make sense and needs to be reevaluated.

2.4 Release models

5 Releases for all alternatives except enhanced containment are modeled at 325 ft ewlevation whereas the enhanced containment is modeled at ground level. Strong justification needs to be provided or, preferably, model all as ground-level releases using a puff model.

Comment 34, page 1

Dual Axis Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
U. S. Department of Energy

Written Public Comment Form

Donivan | | Porterfield
First Name | MI | Last Name

Representing? | Telephone

PO Box 1417
Street Address

Los Alamos | NM | 87544
City | State | Zip Code

Meeting Location: ☑ Los Alamos, NM ☐ Santa Fe, NM
Meeting Date: ☑ May 31, 1995 ☐ June 1, 1995
Session: ☐ Afternoon ☑ Evening

COMMENT(S) (If possible, please identify the specific section/page(s) of the DEIS that your comment addresses.)

1 - Indicate if Phermex upgrade would/wouldn't require EIS.

2 - Indicate whether enhanced containment or plutonium exclusion could be implemented post operation of DARHT.

3 - Address current NPT/CTBT impact on hydrotesting, ie. do these forbid hydrotesting?

4 - Address impact on Phermex use if Phermex upgrade choose is made.

5 - Would a forest fire impact contaminant migration model?

6 - Would Enhanced Containment negatively impact ability to do optical interferometry, ie. would containment walls interfere with optical path?

Please submit to the registration desk at the public meeting.

Comment 35, page 1

Dual Axis Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
U. S. Department of Energy

Written Public Comment Form

First Name: _____ MI: _____ Last Name: Risley

Representing? _____ Telephone _____

Street Address _____

City _____ State _____ Zip Code _____

Meeting Location ☐ Los Alamos, NM ☑ Santa Fe, NM Session ☐ Afternoon ☐ Evening

Meeting Date ☐ May 31, 1995 ☐ June 1, 1995

COMMENT(S) (If possible, please identify the specific section/page(s) of the DEIS that your comment addresses.)

excellent that so many LANL employees came in metaphorical "civilian clothes" but perhaps there need to some reminder that the purpose of the hearing is for DOE to hear from the public (including LANL employees) on the DARHT EIS, rather than to provide a forum for debate among members of the public — a vector of from public to DOE is appropriate, but personal attacks on the testimony and motivation of other members of the public or arguments among the LANL folks over detail

1

Defending the need for DARHT in detail is not appropriate as all that will be heard is a single yes/no for the preferred alternative

2

Please submit to the registration desk at the public meeting.

Comment 36, page 1

Robert Sander
1442 47 st.
Los Alamos, NM. 87544
June 21, 1995

Diana Webb
DARHT EIS project manager
Dept of Energy Area Office
528 35 st.
Los Alamos, NM 87544

30004667
US DOE/LAAO - IN

Dear Ms. Webb:

I have a few comments on the draft EIS for the DAHRT project which I hope can be addressed in the final draft. I believe consideration of these comments will make a technically stronger and more defensible final document.

1 1. In the EIS there is no comparison of the costs of decommisioning and cleanup for the various alternatives. Without including the cost of cleanup the enhanced containment alternatives appear to be far more expensive than the preferred alternative. This is due to the higher initial construction costs. Because eventual decommisioning and decontamination is a certainty for all these options, and with the preferred alternative decommisioning of the PHERMEX site will begin only four years after completion of the new DARHT facility, it should be possible to estimate the relative costs of cleanup. Major decisions such as DARHT construction should be based on complete lifecycle costs rather than on arbitrary cutoffs of essential parts of the lifecycle. The cost of cleanup of the DARHT site can be expected to be substantial. In appendix D it is stated that for PHERMEX the contaminated area is 630,000 square feet; the cost of cleanup of an uncontained DARHT site should be estimated and compared with the cost of a contained option. There is no reason to assume that DARHT will not eventually reach a facility lifetime and require decommisioning.

1

2 2. There is an increased estimated cost of operating the enhanced containment alternative due to the fact that the radioactive wastes are RCRA (Resource Conservation and Recovery Act) wastes. Apparently the EIS assumes that the same material when blown into the atmosphere as aerosols is not a RCRA regulated waste. This inconsistency in treatment apparently drives up the cost of the enhanced containment alternative. This must be inconsistent with the intent of the RCRA law. In fact RCRA regulates liquid wastes, so it does apply to the uranium and other materials which are used in hydrodynamic experiments, because these experiments create materials in a state which is fluid, or acts like a fluid or liquid (hence the name hydrodynamic). While one can argue that the material state produced in hydrodynamic tests was not envisioned by the RCRA authors, the fact that fluids create wastes which can readily disperse into the environment is still a characteristic of the material state produced in the hydrodynamic

tests. The DARHT tests are for the purpose of measuring x-ray images, so the wastes are created after the x-ray pulse while the materials are in this fluidlike state. With a consistent treatment
2 of wastes as RCRA regulated materials a consistent comparison of construction alternatives can be made. The current assumption that the hydrodynamic tests of materials do not produce those materials in a state which is a RCRA waste is probably not tenable.

3. The EIS should be more quantitative in the discussion of
3 safety levels and reliability, otherwise it is just a collection of unsubstantiated opinions. It should state what level of safety is desired in quantitative and probabilistic terms, and what levels of reliability are desired. It should state how those levels where derived and the rationale for those particular levels. In 3.10.7 of the draft EIS an attempt is made at discussing alternatives, but this is really an unrealistic strawman of relinquishing reliability. It should examine the need for various levels of reliability such as 99%, 95%, 90%, and 50% in terms of their effectiveness in missions and as nuclear deterrence, and in terms of the capabilities of the various options to meet these levels.
4 Clearly, it is unrealistic to state that the only alternative to DARHT is an unreliable stockpile.

Similarly, the level of safety can be defined in terms of a probability of a given unwanted explosive yield for various accident scenarios. The effects of the various alternatives on the ability to determine these yields should be given in a quantitative discussion, rather than the current drafts circumspect and
5 qualitative discussion.

4. In section 4.8.1.1 the draft EIS states that no significant differences in the level of radiation had been found in elk found in Los Alamos county compared to offsite locations. The reference (Fresquez 1994) is being misread in this case. Actually the levels of uranium found on the elk hair are quite significant. The average values are high in the L.A. sample but the standard deviations
5 given are also larger than the other samples. These sample standard deviations are not counting errors, but I believe, are due to at least one of the elk samples having very high levels of uranium contamination. If one asks the limits set by the sample standard deviation on the other samples from the total elk population the possible degree of contamination is quite significant. I don't know of federal standards for elk hair
5 contamination, but the amounts, if inhaled during dressing the carcass, would exceed the federal limits. The EIS should correctly read the reference, and should note the true hazard of transport of uranium through this mechanism.

Yours Truly

Robert Sander

Robert Sander

Dual Axis Radiographic Hydrodynamic Test Facility
Draft Environmental Impact Statement
U. S. Department of Energy

Written Public Comment Form

Clement | T. | SWITLIK
First Name | MI | Last Name

Consulting Engineer
Representing? | Telephone

816 Calle Chamisal #226
Street Address

Espanola | NM | 87532
City | State | Zip Code

Meeting Location ☒ Los Alamos, NM ☐ Santa Fe, NM
Meeting Date ☒ May 31, 1995 ☐ June 1, 1995
Session ☒ Afternoon ☐ Evening

COMMENT(S) (If possible, please identify the specific section/page(s) of the DEIS that your comment addresses.)

1 1. Would all experiments be contained in the enhanced containment option?

2 2. Can all experiments desired be run in the enhanced cont. opt.? (ie size & configuration of device)

3 3. Why is air quality poorer under contained option? (Possible typo?)

4 Overall, The DEIS process is excellent. This one is "Wonderful" considering the shortened time to do it.

Please submit to the registration desk at the public meeting.

Comment 38, page 1

Bernie Weinstein, 2:03 PM 5/23/9...,DAHRT 1

X-UIDL: 801324931.015
Date: Tue, 23 May 1995 14:03:30 -0600
X-Sender: weinstein@esa.lanl.gov
Mime-Version: 1.0
To: pto@Lanl.GOV
From: weinstein@esa.Lanl.GOV (Bernie Weinstein)
Subject: DAHRT
X-Mailer: <PC Eudora Version 2.0.1>

I believe the Santa Fe contingents will raise any legal barrier they can in order to prevent the Lab from doing any weapons work. I suspect they would favor unilateral disarmament.

1 I'm an avid reader of current events and have never seen any reliable evidence of environmental damage caused by 3 decades of work with PHERMEX. I believe that DAHRT will also be benign.

2 I hope that our government will show some courage and ignore the ravings of special interest groups. DOE should do what's right for the country as a whole. It saddens me that the last sentence needed to be written.

Printed for pto@lanl.gov (Patricia Trujillo-Oviedo) 1

Comment 39, page 1

June 17, 1995

Ms. Diana Webb / DOE/LAAO,

1 Just for the record, I am angry that LANL was able to begin construction of DAHRT before providing a SWEIS. I am appalled that

2 our government condones construction of such a facility while we expect every other country to halt and dismantle nuclear testing & production.

3 And, I am disgusted that #124 million dollars will be spent ~~in~~ such a frivolous way while school lunch programs are being de-funded.

Please stop the insanity.

Sincerely,
Chrysa G. Wikstrom
Chrysa G Wikstrom
1830 Kiva Rd.
Santa Fe, NM 87505

Comment 55, page 1

4404 Kennett Pike
Greenville DE 19807
July 31, 1995

Dept of Energy
528 35th St.
Los Alamos NM 87544

ATTN: Ms Diana Webb

1 I write in reference to plans by Los Alamos National Laboratory to spend up to $3.5 billion for nuclear weapons programs to be built by the year 2007. The entire list should be carefully scrutinized to eliminate new or continuing projects in support of new weapons systems or improvements in old ones. Those funds are desperately needed elsewhere for maintenance of more critical social programs, efforts to economize in government, or deficit reduction.

Please count this as a vote for prudence in the face of pressure for continuing largesse to the nuclear industry.

Sincerely
John R Davis

Transcript 1: Comment Code 40
Los Alamos Public Hearing – Afternoon Session

Multi-Page™

LOS ALAMOS PUBLIC HEARING
for the
DRAFT ENVIRONMENTAL IMPACT STATEMENT
DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST FACILITY

WEDNESDAY, MAY 31, 1995
2:10 P.M.
LOS ALAMOS INN
2201 Trinity Drive
Los Alamos, New Mexico

REPORTED BY: Irene Delgado, NM CCR 253
Joe Jameson Court Reporters
Suite 800, 320 Gold, S.W.
Albuquerque, New Mexico 87102

ROUND-TABLE APPEARANCES

M. DIANA WEBB
DOE/LAAO
528 35th Street
Los Alamos, New Mexico 87544

BARBARA A. STINE
LANL
P. O. Box 1663
Los Alamos, New Mexico 87545

JAMES MERCER-SMITH
LANL
P. O. Box 1663 MS A105
Los Alamos, New Mexico 87545

MS. WEBB: Good afternoon. I'm Diana Webb. I am with the Department of Energy, the Los Alamos Area Office. This is the Los Alamos afternoon session of the public hearing on the DARHT draft EIS. With me today at the round table is Barb Stine. Barb is the deputy division director for the Dynamic Experimentation Division at Los Alamos National Laboratory, and Jas Mercer-Smith. Jas is the deputy program director for the Nuclear Weapons Technology at Los Alamos National Laboratory.

This is a round-table session. Any of you are welcome to sit with us at the table. It's not reserved for me, Barb, Jas and Jerry. So please, feel free to come forward to sit at the table with us and join us in our conversation here.

We are here today to listen to your comments on the draft DARHT EIS. DARHT stands for dual axis radiographic hydrodynamic test facility, the DARHT facility. The Environmental Impact Statement is a comparative analysis that has been prepared by the Department of Energy with assistance from the contractors to provide a look at the potential environmental impacts that could occur if the DARHT facility were to be completed and operated, or if one of the other alternatives examined in the document were pursued instead.

Our format for today is, we have three areas. This is, as I said, the round-table room. This is a place where you can present formal comments for the record. Irene Delgado is our court reporter. She will be taking a verbatim transcript of the session this afternoon. That will serve as the formal record of these proceedings.

We will also have a scribe. Tom Alexander will be the scribe. As we go through the comments, he will be taking down, encapsulating, the statements, comments, questions that you ask, and we will be hanging those sheets around the room, also.

We are particularly asking today for your comments on the adequacy and the accuracy of the draft DARHT EIS. The draft DARHT EIS looks like this. It's this big book that we have here, and there's copies of it around. If you would like a copy, please see the attendant at the front desk; give her your name and address, and she'll make sure that you get a copy.

The back of this room is our information area. We have a lot of information displayed on this project, on radiography, on different aspects regarding the environmental program at the laboratory, and I think that you will find that very interesting. Please feel free to look at that. You can wander back there at any time. As you can see, it's just an open area. We will also have breaks from time to time when you can feel free to go back there, ask questions of the people who are standing there. We have representatives of the Los Alamos area office, of the Department of Energy, the Albuquerque area office of the Department of Energy, and various specialists from Los Alamos National Laboratory, and from Battelle Pacific Northwest Laboratory, who is the contractor who prepared this document for us.

In the transportable, slightly down, outside, a little bit behind this building, is a room where, for want of a better term, I will call it the quiet room. We have some people in there. Feel free to go in there, sit down. If you would like to record a statement for the record, we have a tape recorder in there.

If you would like to provide written comments, we have some comment forms in there. Or if you just want to have a lengthy conversation with someone that you want to sit down and do it where there aren't so many people around, please feel free to use that room.

The format today is somewhat interactive. We are here to listen. We are also here to answer questions that you might have, engage in dialogue with

you, if that is what you would like to do, and do whatever we can to facilitate the public participation with this draft EIS.

I'm going to tell you a little bit about what the EIS is. I'm not going to take a lot of time. I do not have overhead projection slides. I do have a few things up on the wall. The Department of Energy has proposed to provide an enhanced high resolution radiographic capability to perform hydrodynamic tests and dynamic experiments in support of the department's historical mission and the near-term stewardship of the nuclear weapon stockpile.

That is the proposal that is analyzed in the DARHT draft EIS. The department's preferred approach would be to complete and operate the DARHT facility. The department has looked at six alternatives in total in the Draft EIS.

The first is what we call the no action alternative. That would be to maintain the status quo, in other words, continue to provide radiographic capability as we do now with the PHERMEX facility here at Los Alamos and the flash X-ray facility at our sister laboratory, Lawrence Livermore in California. The preferred alternative I just mentioned would be to complete the DARHT construction, phase out PHERMEX, and

operate the DARHT facility. DOE may delay operation of the second axis of DARHT pending evaluation of the success of the first axis under this alternative.

We've also looked at four other alternative ways to accommodate the proposed action. The first would be to upgrade PHERMEX, the existing facility. Under this alternative, we would not complete the construction of the DARHT facility for radiographic hydrodynamic test facility. We would complete it for some other use. We would construct major upgrades at the single axis PHERMEX facility to make it have the dual axis high resolution enhanced capability that we have proposed for DARHT.

We have looked at an alternative where we would provide additional containment over what we do now. At this time, we do perform some experiments on containment vessels. Under the enhanced containment alternative, we would conduct the same operations at DARHT as would be taking place under the preferred alternative, but tests would be contained either by use of a containment building or by use of -- greater use of portable steel vessels that is now the case.

In the information room on the other side of this portable wall, we do have a model of the DARHT facility as it is proposed. It has a nice little

lift-off containment building. You will see what the containment building would look like. And it also has a scale model of the type of containment -- modular containment vessel that is discussed in EIS under that particular enhanced alternative.

Under the plutonium exclusion alternative, we would continue to construct DARHT. We would phase out PHERMEX as very similar to what is -- I'm sorry, I'm saying this wrong. We would complete DARHT as we would under the Preferred Alternative. However, the department would conduct dynamic experiments involving plutonium either at PHERMEX or some other facility.

The last alternative is the "Single Axis Alternative." Under this alternative, the DARHT facility would have one axis completed for enhanced radiographic capability. The other axis would not be completed for that type of use, but would be completed for some other use.

There are several things that the EIS discusses that are common to all of the alternatives. Under all alternatives, the department plans to continue to use the flash X-ray facility at Lawrence Livermore. Under all alternatives, the dynamic experiments involving plutonium would take place in the future. Under all alternatives, the infrastructure involving research,

waste management, security, maintenance, environmental monitoring and other types of support services would continue to take place. And under all alternatives, eventually, at some point in the future, all of these facilities would be eventually decontaminated, decommissioned and demolished.

In addition to the analysis that is contained in this unclassified document, the Department of Energy did prepare a classified supplement to this EIS that contains additional information and analysis. While that particular document is not available to the general public, we have prepared a summary, an unclassified summary of the environmental impacts that are identified and discussed in that classified document. This summary has been made available and has been placed in the Los Alamos Community Public Reading Room, and there are copies of this for your information out on the information table that we have in the hall.

The department has also put a lot of other information in the Los Alamos Community Reading Room. In addition to the some 200 -- 250 documents that are referenced in here, there are some 60 to 70 additional documents that are available that may shed additional information regarding this project and regarding this analysis, and we will continue to put that type of

information in the public reading room as we go through this review process.

This chart here shows a summary of the potential environmental impacts of the different alternatives. This is very hard to read from a distance. There is a similar chart back in the information room, but again, I invite you to come up here, look at this information when we have breaks or whenever it's convenient for you to do so.

On this chart, you can see that the other five alternatives are compared to the status quo, to the no action alternative. That would be what would happen if we continued doing what we do now indefinitely over the period of time that this analysis is examined.

For many of the environmental aspects that were analyzed, the environmental impacts do not change across the alternatives. On this chart, things that are in black type remain the same for all alternatives. Things that show up in red type indicate where there would be a greater adverse impact than is the case under the no action alternative. Things that show up in green type indicate a greater beneficial impact than is the case under the no action alternative.

This picture here shows what the DARHT site looks like today -- well, it looks like that today.

This photograph was taken very recently, on May 19. It is an aerial photograph. It shows the two accelerator halls of the DARHT facility, and it shows how the site is in a stand-down condition. Construction activities have stopped pending resolution of this EIS process.

The chart back here on the wall shows the steps in the DOE EIS process. We issued a Notice of Intent for this Environmental Impact Statement in November. We had a public scoping period in December and in January. Many of you came to talk to us during the public scoping meeting we had at that time. We issued an implementation plan for this EIS process in January. We have, in May, issued the draft EIS that is the subject of these particular meetings.

After we consider your comments -- and the comment period, incidentally is open until June 26 of this summer -- we will then make changes, revise the text, do what we need to do to take your comments into account. We plan to issue the final Environmental Impact Statement in August of this year.

No sooner than 30 days, by regulation, the department will reach a final decision on whether or not to proceed with the DARHT project as proposed or whether or not to take some other course of action that has been analyzed in this Environmental Impact Statement.

The Record of Decision now can be issued no sooner than mid September. The Record of Decision will include with it what we call a mitigation action plan. Those are ways that we come up that are part of the decision that would be used to mitigate or lessen the adverse environmental impacts that are identified in this Environmental Impact Statement.

This meeting is your meeting. We are prepared to be quite flexible regarding the format here today. If you would like, Barb can give a five-minute overview of the programmatic aspects of the DARHT project and of the hydrodynamic testing program in general. If you would prefer not to take that time in that way, then we can move on directly into taking comments.

Also, if there is anyone here who is an elected official or tribal official, who is speaking for the state, the tribes, or one of the local governments, I would like to give them first chance to talk. Otherwise, we do not have a sign-up sheet; it's sort of your meeting, your format, your forum. Feel free to come up and sit with us at the table and give your comments to us and Irene will take them down.

When you do give comments to us, I would appreciate it very much if you would tell Irene your name. One of the reasons we like people to come up a

little closer is so we can hear a little better. Tell Irene your name and, if necessary, spell it for her so we can have names of the people who spoke to provide a formal record of this meeting.

Okay. Would people like to hear a five-minute talk from Barb on programmatic aspects of the DARHT project, what the program is all about? Okay, I see some nods, "Yes, we would," so, Barb, the floor is yours.

MS. STINE: I will stay seated, if you will permit me to. I broke my toe over the weekend, and I'm not all that stable standing up and walking around. So what I will try to do is speak loudly and move my head around so that you will all know that I'm speaking to all of you, but I will stay seated unless someone really is unable to hear me or needs to have me standing for some other reason.

I would like to spend just a couple of minutes talking about dynamic tests, hydrodynamic tests, and DARHT as part of the programmatic areas of the laboratory and our weapons program.

We have done, historically, a great number of dynamic tests; that is, experiments on a broad variety of materials that we look at to determine their properties and their behaviors at high pressures, in

motion, and under shock conditions, that are all generally driven by high explosives. These are high-explosive materials involving high explosives moving other things.

One of the materials that's been of interest, historically, has been plutonium, and we have gathered a fair amount of information by dynamic experiments on plutonium always contained in double-walled, steel vessels. Because of the specific and inherent characteristics of the plutonium, we have taken cautions beyond those that we take normally for high-explosive experiments and done these experiments in double-walled, steel vessels.

Hydrodynamic tests, as opposed to dynamic tests, tend to be full up systems kinds of tests. We are looking at primary components for weapons systems. We do hydrodynamic tests in addition to dynamic testing and a large variety of other smaller high explosive driven experiments, and we look here at the full geometry interactions, shape interactions and the various materials involved in weapons systems.

We use, for these hydrodynamic experiments, surrogate materials for the fissionable materials. Some of the materials that we use typically are depleted uranium and tantalum and lead. Choice of

these materials is a function of what kind of information we're trying to get out of a specific hydrodynamic test, but each of these materials has behavior and characteristics significantly different from those of plutonium.

There are several kinds of hydrodynamic experiments that we do on a somewhat routine basis. One of those kinds is called pin shot, and there we use electrical sensors inside a mock device that is made with a surrogate material for plutonium. These pins, electrical sensors called pins, record the movement of the implosion. They look at how the pit surface moves as it approaches critical time. We do extrapolations based on these measurements to estimate what actually is happening at critical time from these experiments, but the blast pipe, that is, the piece that holds the pins and the pins themselves affect the behavior and geometry and the implosion and they skew the shapes.

There are also certain sets of critical information that we are unable to obtain from these experiments. Another set of experiments that we do routinely that we call hydrodynamic experiments are radiographic shots where we use, again, the full shapes, the full system shapes, without a blast pipe or pins. We again have surrogate material for the fissionable

material in a mock device driven with high explosives. We detonate the HE and take very high-speed X-ray pictures of the implosion to get information on things like density and shapes during the implosion of the pit.

We add this information to very small-scale experiments, to dynamic experiments, to pin shots, and use the information to refine our calculational models to allow us to predict material and component behaviors in a more reasonable fashion.

Right now we have PHERMEX, which is a machine that was brought on-line in about 1963, and FXR at Livermore brought on-line in about 1983, as our principal diagnostic tools for these experiments. These machines provide the X-rays that allow us to take the pictures. When these present diagnostic machines were brought on-line, were designed and brought on-line, they were viewed as assisting technologies for the final proof tests for systems that occurred at the Nevada test site.

We are now in a time of a moratorium on underground testing. Even before we moved into the underground testing moratorium, the weapons complex, the technical people charged with getting information from these shots and others, determined that there was a need to improve the diagnostic capabilities available in the present machines, and so the design and concepts for

DARHT were begun.

These two tools have been important throughout the recent history of weapons, diagnosis, surveillance, and development when the complex was still designing and developing new weapons. We are not involved in those activities anymore, and we are using these tools now and proposing to use DARHT to allow us to have an increased, enhanced surveillance program to determine the reliability, the safety, and the performance of our stockpile to allow the American public, the United States Government, the Department of Energy, to have confidence in the nuclear deterrence that our stockpile provides.

DARHT, as proposed, increases the information obtainable by these tests by approximately tenfold, especially in its dual-axis mode. Both of the present diagnostics are single-view tools. We get one view. To provide you with a better feel for it, the difference between the single view and dual view, I would suggest that, if you have the opportunity, to go around the boards here to the information area, and there is an illustrative set of calculated X-ray pictures that show the difference between a single view and a dual view and the kind of additional information one can obtain.

Right now DARHT gives us more dose and

more resolution, allows us to see more deeply into systems and devices than we can, and as we continue in the time of moratorium, where we have no final proof test, the information that DARHT allows us to provide to the modelers, to the calculational people, becomes ever more important.

The weapons that are stockpiled are approaching their original design lifetime. We don't have much experience with weapons older than their design lifetime because in the past, new designs were coming in as old designs were coming out. The information that DARHT provides is critical to our enhanced surveillance program and to allow us to retain confidence in our nuclear deterrence.

I would suggest that if you have questions of a specific technical nature on DARHT, on radiography, on any of the impact analyses, that you take an opportunity to go and look at the information area and talk to the people there. There are experts in all of these areas there who are more than willing to answer your questions or engage in discussion with you. Thank you.

MS. WEBB: Thank you, Barb. All right. Is there anyone here that is representing the state or tribal government or a local government? And if not,

then I will open this up to whoever would like to speak first.

We have two folks here at the table with us. Would you guys like to go first? Jerry, do you want to break the ice?

MR. BEERY: You want me to break the ice? Sure, I will break the ice. As you pointed out the alternatives, vary -- or have very little variance in terms of their environmental impact. And now I'm, of course, giving you my own opinion, not as representative of the lab. The only issue, as far as I am concerned, is the plutonium. I'm not the least bit concerned about the other things in your table which might be released, like depleted uranium; there's probably some beryllium, and even the lithium hydride, but I'm coming back to that later.

1

So to me, the only issue of the environmental impact is plutonium, and I was very glad that they extracted some of the classified -- there is some information there. But what's not in there at all is the source term for per shot. Some people think it's classified, but the unclassified world knows it's a few kilograms, so one can calculate the dose.

2

For example, in the unclassified one it says, "Should you have a breach," and in here, the

"What-if accident is the inner -- inner container is breached totally and a one-inch hole appears in the outer container?" And then that leads to, according to this, a 14 REM dose, too close to the LANL boundary, to PHERMEX and DARHT. Of course there's no probability given of that accident, and I think I know why. I don't believe there's been a careful enough study of the containment vessels to be able to calculate a reasonable probability of that exposure --

3

But what's totally missing in here, then, is the consequent soil and surface contamination from such a breach. Now, I scale from some other things I have done, and if you do that and assume, you know, 312 curies or so released, you will get within or up to 10 kilometers away, so along way you will get numbers of 100 microcuries per meter square, which is 500 times the EPA threshold cleanup. So in terms of environmental impact, it would seem to me that one needs to include the potential of the surface contamination and that I don't find anywhere in the unclassified part here.

4

The other issue has to do with the fact that no matter what alternative is chosen -- well, I shouldn't say that -- for most of the alternatives chosen, there will still be plutonium experiments, no matter what.

For example, if one took the no action alternative, plutonium experiments would be continued at PHERMEX, as I understand it. I mean, that's what it says up there. And I realize, it cannot properly fit into your DARHT EIS; I understand that, but now I'm speaking in terms of personal things. I would like to see the public be able to give input on whether or not they think we should be doing plutonium experiments at all.

1

Now, I know all the arguments. You have to do plutonium because plutonium bombs all have plutonium and so forth, but I would claim we have enough history on it that we can use surrogates other than plutonium isotopes for the plutonium experiments and probably get most of the information we need.

So in a nutshell, I don't want to see any plutonium experiments at all. I don't think the alternatives were designed to fit that issue very well, the issue of whether or not we should use plutonium, particularly when the no action alternative still allows plutonium.

1

And now to just summarize on the plutonium, if you should get a breach with a plutonium experiment of a few kilograms of plutonium, probably the major impact would not be the doses, even though they would be fairly large, but the major impact would be the

4

potential of actually rendering unusable a fairly large area, depending on which way the wind was blowing that day, and that concerns me. I work in White Rock; I don't want the wind blowing towards White Rock. I live in Los Alamos; I don't want the wind blowing that way.

So I think the potential economic impact could be tremendous if the surface contamination happens to go out over the heart of TA 55 or, you know, that mesa that has a lot of things, or the heart of the town. So I think there's not enough in there about plutonium, either the source terms for the basic experiments or enough given about what surface contamination would do, and that's all I want to say about that.

As a footnote, I would like to say a word about lithium hydride. Most of us from around here know about the recent fire, and that seems to be not treated in the Environmental Impact Statement, the possibility of what actually happened, and that is, trash piled up, lithium hydride from the shot landing on the trash, the trash then burning. That is likely more of an occupational hazard for people in that area than environmental hazard to the public, I understand that, but I don't see that treated as a potential problem.

I anticipate, knowing the way things work, that we will no longer pile the trash nearby so it might

potentially catch on fire, so I suspect that issue is, perhaps, now going to go away, but it is nowhere treated in here as -- you understand what I'm saying? The lithium hydride is only over in the explosion, but there is no secondary thing treated here. What happens if the lithium hydride goes on the trash which then burns on and on and spreads things around.

MS. WEBB: Thank you, Jerry. Jerry, you actually did not give your name for the record.

MR. BEERY: I'm sorry. Jerry Beery, B-e-e-r-y. Before I leave, I meant to compliment you and Randy, and I don't know who else worked on it. I don't know, those of you who have been around for a long time realize most of us thought it would be a totally impossible task to put this thing together by May. So here it is, May, and it's done. So you get a gold star in heaven for putting this together so fast and getting this done.

MS. WEBB: Thank you, Jerry. We always like to hear about things like that. Just a couple of remarks. You said that you did not see the probability in the unclassified summary here. It is there. It does reference the fact that related departmental studies would indicate that this accident scenario that you describe would have a probability of less than one in a

million of occurring.

MR. BEERY: I saw that, but at the same time in the EIS, I saw the discussion of the single vessels, and there they talk 5 to 10 percent. When you multiply 5 to 10 percent by itself, you don't get less than 10 to minus 6. So it doesn't sort of jive. You're claiming that somehow the double wall, each wall of the double wall somehow has a much lower probability of breaching than a single wall by itself. So I realize it says less than 10 to minus 6. I don't believe it.

MS. WEBB: I accept that, and I also want to mention that there are significant differences in designs, and I invite you to discuss with some of the gentlemen from DX in the information room. Thank you very much, Jerry. Ed, would you like to talk next?

MR. GROTHUS: Yes. I just had a couple of technical questions. Do you only get one picture per shot? Do you only get one radiograph per shot, or do you get multiple pictures? Anybody in the room can answer.

MS. WEBB: I will let Barb answer that.

MS. STINE: From our current -- from PHERMEX and FXR, we get one picture per shot.

MR. GROTHUS: One?

MS. STINE: Yes.

MR. GROTHUS: And each shot costs?

MS. STINE: Lots. A million -- about a million dollars a shot.

MR. MERCER-SMITH: In addition to the infrastructure costs.

MS. STINE: In addition to the infrastructure costs.

MR. GROTHUS: How big are radiographs? What size of film do you use to get that one picture?

MS. WEBB: Mike, can you help out?

MR. GROTHUS: Is this the size of film you get, or is this an enlargement of the -- of the real thing?

MS. WEBB: Is that the size of the film or is that an enlargement?

MR. GROTHUS: Anybody in the room can answer.

MR. WATSON: It's the smallest -- the smallest film cassettes are 17 centimeters in diameter, the largest ones are a meter wide.

MS. WEBB: Could you please identify yourself?

MR. WATSON: Scott Watson.

MS. WEBB: Thank you, Scott.

MR. WATSON: The small film cassettes, the small film they use are 17 centimeters in diameter and

the largest ones are a meter wide.

MS. WEBB: Ed, so we'll have an idea for the people that are reading the transcripts later, the films that you have just held up look to me to be 12 by 18, or on that order, inches. Okay, Ed, do you have anything else and would you like to identify yourself for the record?

MR. GROTHUS: No.

MR. BEERY: It's Ed Grothus. He forgot his name.

MR. GROTHUS: There's no way of doing dual -- dual axis at the present time? I have a couple of pictures here. It looks to me -- I'm no expert and I asked one of the experts and they denied even recognizing the damn stuff. And it looks like to me that these two were dual axis and I wondered if they were doing some kind -- if they have to do two million-dollar shots to get these things.

MS. WEBB: That is exactly right. That is exactly right. It's just like if you had a camera and you wanted to take two pictures of this glass of water here -- and I would turn it sideways except I would pour water all over myself -- that if you want to take it, first you have to take that picture, and then you have to set the wine glass down and you have to advance

your film and you have to take the glass again and turn it another way and then you have to take another picture.

MR. GROTHUS: I see.

MS. WEBB: So that's precisely what they have to do.

MR. GROTHUS: Thank you. I have no other questions.

MS. WEBB: Thank you. Don, did you want to clarify something?

MR. WOLKERSTORFER: I just want to clarify the cost. When we talk about a million dollars, that's for a large hydrotest.

MS. WEBB: Don, could you please identify yourself.

MR. WOLKERSTORFER: My name is Don Wolkerstorfer -- W-o-l-k-e-r-s-t-o-r-f-e-r. So a major hydrodynamic test might be $1 million, but we do many smaller ones; for instance, possibly the ones you showed, those are not a million dollars because we do maybe 40 or 50 here at PHERMEX. Each one of those is not $1 million, and I think that needs to be made clear. They may be 20-, $30,000. I think that's important to realize there is a difference in cost depending on the complex.

MS. WEBB: Thank you, Don.

MR. GROTHUS: If there's anybody in the room that would like to take a look at these and maybe tell me. I don't think anything about it, and I would hope that somebody in the room might be able to tell me what this is.

MS. WEBB: I'll bet that somebody in the room could help you look at those, and when we take a break again, I invite you to the information area and perhaps Don could discuss that with you.

MR. VENABLE: Excuse me, Ed. Tell the audience where you got them.

MR. GROTHUS: These came from the salvage yard, of course.

MR. BEERY: He bought them for less than $1 million a shot.

MS. WEBB: All right, Ed. Anything else?

MR. GROTHUS: No.

MS. WEBB: Would you like to have someone else come up to the table and join us. My goodness, you're a quiet group. Doug, how about you? I'm sorry, Ma'am. Please come up. Welcome. Glad to see you here today. And if you would be so kind as to provide your name for Irene, we would appreciate it.

MS. MORGAN: I'm Marion Morgan, chair of the democratic party of Los Alamos County. This spring

our central committee passed unanimously, as I recall, a resolution supporting the completion of the dual axis radiographic hydrodynamic test facility and its operation. We believe that DARHT represents a vital means of ensuring that US nuclear weapons remain safe, secure and reliable.

That's all of the statement that I have now. I think that within a week or two, we will have a more detailed written statement to submit.

MS. WEBB: That would be fine, and you can either bring any comments that you have by the Department of Energy office, or mail them to me. My mailing address is up there on the wall. I also have an internal laboratory mail stop number, which is Mail Stop A316, for those of you using laboratory mail.

MS. MORGAN: I came in late and didn't get your name.

MS. WEBB: I'm Diana Webb. I'm the DARHT EIS project manager. I'm sorry, perhaps I should have introduced myself again for those people that came in late.

MS. MORGAN: Thank you.

MS. WEBB: Thank you very much, Marion. Who else would like to talk to us? Please come forward, sir.

MR. LOCKHART: My name is Milton Lockhart -- M-i-l-t-o-n L-o-c-k-h-a-r-t -- and I would like to read two statements.

MS. WEBB: That would be fine.

MR. LOCKHART: One is from Sid Singer who sent the statement to me on electronic mail yesterday and asked me to read it today.

My name Sidney Singer and I request that the following summary comments be placed in the record of this meeting, a review of the draft DARHT EIS.

My comments reflect my personal opinions and I have been encouraged to present them here by REAL as part of their effort to provide alternative credible review sources to this process. I understand that this process is intended to develop and present for public review an assessment of the socioeconomic impact of the proposed DARHT project.

In my first reading of the draft, I concluded that, one, the basis for DARHT's role in the SS&M mission is not adequately developed. The statement of need on Page 2-4 deals with the need for this type of resource and does not explain the need for enhanced resources nor what they are or are expected to accomplish. The discussions of paragraphs 2.2 and 2.3 are superficial and do not define in sufficient detail

how DARHT would be used to support meaningfully the SS&M mission.

Two, in the absence of that background, it is impossible to evaluate properly the various alternatives. Such evaluations require knowledge of the consequences of the various alternatives on DARHT's mission, but that mission has not been stated in terms of performance criteria and desired outcomes so that meaningful comparisons of alternatives based on mission impact are not feasible.

Three, of considerable importance is an explanation presently absence in the Draft EIS of why the containment alternative is not the preferred one. The notion of releasing into the environment the indicated quantity of heavy metals when presumably a containment technique is feasible boggles the imagination.

Finally, I suggest that a comprehensive discussion of the socioeconomic impact of the no action alternative, which may be very great since it deals with the nation's security, is an important part of the EIS process. While the DOE may prefer to deal with this issue elsewhere, only from such a discussion can the true role of the DARHT be discerned, explained, justified.

This is from Sidney Singer -- S-i-d-n-e-y S-i-n-g-e-r.

MS. WEBB: Thank you very much. You can give that estimate to me.

MR. LOCKHART: This one is in my name, Milton Lockhart.

DARHT is the first in a progression of more advanced hydrotest facilities planned by DOE, will provide data for the design of later facilities and help identify unknown problems. The stockpile has never been allowed to become this old before. Delaying DARHT until problems are identified to be solved is akin to waiting until the flames are consuming your house before applying for fire insurance. Nuclear testing was an integral part of the program for 50 years and has been discontinued.

Having not foreseen the demise of nuclear testing, scientists do not have the data necessary to construct accurate computer models which DARHT and its successor can furnish. DARHT would study chemical explosives and any other part from disassembled weapons, which might be suitable for studying aging effects, but particularly primaries. Weapons primaries use chemical high explosives.

Page 29 of the JASON report states, quote, "The design community has properly judged that improved hydrotesting capabilities are important in the absence of underground tests. The ultimate goal would be a

tomographic movie of the late stages of the imploding pit," unquote.

DARHT's data can be used in the computer simulations to verify the results of computer simulations and to identify problems which are not readily detectable by inspection. Can these data be used to design new weapons? Of course; data are data. If the national policy changed tomorrow, these data could be used for designing new weapons. But more importantly, the data can be used in improving safety and reliability of nuclear weapons. This is also a design function, and the improved weapons could be considered a, quote, "new," unquote, weapon, but not under the president's definition.

DARHT is currently the most cost effective and prudent way to implement the nuclear policies of the United States. I suggest that the draft EIS be rewritten to specify what the mission is and to choose the containment option to protect the environment. Thank you.

MS. WEBB: Thank you very much, Milton. I appreciate that, and also thank Sid Singer for us.

MR. LOCKHART: Will do that.

MS. WEBB: All right. Who would like to speak next? Everyone is shy.

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MR. SHANKLAND: I have a question. I'm Steven Shankland from the Los Alamos Monitor. There are these three terms you hear all the time; safety, security and reliability. Which of these aspects of nuclear weapons would be under investigation -- would be researched at DARHT, all three or just reliability?

MS. WEBB: Security is not so much what is looked at. When the term -- you hear the term that nuclear weapons needs to remain safe, secure and reliable, the security aspect is not particularly extremely relevant to the types of tests and experiments that would take place at DARHT. That's why the phrase that's used in this EIS is "safety, performance and reliability."

The purposes of the data that would be obtained from these types of experiments and tests would be used to judge the safety of nuclear weapons, the performance measures, and the reliability of the weapons over time. So there's been some confusion with that, even amongst our own troops. We have had to re-edit a lot of editing. Does that answer the question? Great. Who else would like to speak?

MS. WEBB: Yes, sir. Please come forward.

MR. ROSEN: May I?

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MS. WEBB: Yes, you certainly may.

MR. ROSEN: My name is Louie Rosen, and I must say, I agree completely with what Mr. Lockhart has told you. And in addition, I talked to your group on December 7 of last year and gave you a statement which was probably much more than you wanted to hear and there is nothing in that statement I would retract at this point. I think you have done a great job with the EIS that you've developed. I also agree with the notion that containment ought to be seriously considered, especially when hazardous materials are being used.

However, there's one reason for DARHT that I have not heard here, and which I think may be as important as any other reason that can be provided, and that reason is that DARHT will permit maintaining the personal and technological skills that we just have to have if we're going to have science made stockpiles and storage. There's no -- nothing -- nothing can replace those skills, and the way to do it is to have on-site and on-board here the people and the technologies that one will need to address unexpected eventuality, and that is what this is all about. DARHT is a microscope to get new knowledge. It's not possible to say what that knowledge is. It depends on what happens to your stockpile. We don't know what's going to happen.

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So let's not shortchange this particular reason for DARHT. I personally think it may be as important as any other.

MS. WEBB: Thank you, Louie. Yes, I certainly do remember you at our meetings in December, and if you would like, we can take the statement that you gave us at the scoping meeting and re-enter that for the record as a comment at this stage of the process. Would you like for us to do that?

MR. ROSEN: I will be glad for you to do that.

MS. WEBB: Okay, we will do that. You don't have to resubmit it; we know where it is. Thank you. All right, anyone else? Again, we have, early on at the meeting today, we issued a special invitation for anyone speaking on behalf of our local governments, if they would like to speak.

MR. PONGRANTZ: Diane, has anyone else from the county council shown up?

MS. WEBB: No one else from the county council has shown up.

MS. STINE: Ginger is here.

MS. WEBB: I'm sorry, Ginger.

MS. WELCH: Just because I am a woman, Diane. Just because --

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MS. WEBB: I'm so sorry. I even said hello to you when you came in. Ginger, I apologize profusely.

MR. PONGRANTZ: So self-effacing.

MS. WELCH: Yes, I will let Morrie speak.

MS. WEBB: Thank you, Ginger.

MS. WELCH: I will yield.

MS. WEBB: Again, I apologize.

MS. WELCH: The county does have a statement we will submit in writing.

MS. WEBB: I appreciate that, and also I will be speaking to the county at the regularly scheduled meeting next week.

MR. PONGRANTZ: Diane, I'm Morrie Pongrantz, I won't be able to be there on Monday night; I'll be in Omaha. And I had previously -- I don't know -- last fall, sent a letter to Secretary O'Leary endorsing the DARHT project. And then I participated in the council as endorsement of that project before. I see no reason to change my mind.

I guess what I would be interested in with respect to the containment alternative is some sort of total life cycle cost analysis. Is it -- is it cheaper to not build a containment device and then clean it up, or to build a containment device? And that's how I would

make that decision.

MS. WEBB: We do have a little bit of cost comparison information at the end of Chapter 3 of this document. It is very summaried, however, so we'll take your comments for the record. If you again have questions regarding this when we take a break, please discuss them in detail with the gentlemen over there that will be standing next to the DARHT model.

Anyone else? My goodness, I hadn't intended to take a break this soon, but if none of you are going to be interested in speaking for the record, and Jerry wants to speak.

MR. BEERY: I waited until nobody said anything because I wanted to add on the item of containment, as you call it, if I might.

MS. WEBB: Surely.

MR. BEERY: Jerry Beery. There's a lot of unclassified reports out there on testing of the various containment vessels, and there's a series of reports with 12 pound HE shots, 40 pound HE shots. And I believe from those, since there seems to be a lot of interest among some of the commentors, at least, in considering containment, I wonder maybe if it doesn't make some sense to put some of the technical information, or at least a summary of it that's been found in those tests, so that

those of us who are in the public and not directly involved can better judge whether your probabilities for the breach of containment would be -- so my suggestion is, pull some of that unclassified information in, perhaps, for the containment. And I just reiterate, so you understand my -- I don't feel strongly that you need containment except for plutonium. There is a lot of feeling apparently that people would like to see containment of all the shots, but I don't feel that that's an environmental impact for the nonplutonium shots, to keep those in the open. Thank you.

MS. WEBB: Thank you, Jerry. Would anyone else like to speak to us here formally on the record at this time? Seeing no one stepping forward, then I suggest we take a break. It's five after 3:00, by my watch, to 3:30. Again, appreciate your coming, comments here are on the record, and please feel free to have informal conversation in the information room.

(Break taken at 3:05 p.m.)

MS. WEBB: It's 3:30. We said we would convene at 3:30. If there is anyone else that is a member of the general public that would like to give a statement for us at this time, we would be glad to have

you come forward and talk to us. And if not, do any of you -- do you want to say anything at this time?

THE AUDIENCE: (No response.)

MS. WEBB: Dan, do you want to say anything at this time? All right. Since it's 3:30, nobody else wants to talk to us at this moment, we will take another adjournment, and we will reconvene right at 4:00 and see if anybody wants to talk to us then, if they don't, then we will adjourn for the afternoon. Thank you.

(Break taken at 3:30 p.m.)

MS. WEBB: It is now 4:00. For the record, we are reconvening. Would anyone else like to speak to us at this time? And seeing no one, this meeting is adjourned until the evening session at 6:30 in this room. Oh, I am sorry --

MR. SWITLIK: I have something written, and I want to make a comment.

MS. WEBB: Of course. All right, for the record, Tom would like to say something to us.

MR. SWITLIK: My name is Tom Switlik, and I live in Espanola, and I have no connection with DOE, LANL and anyone else right now, but I have 24 years with

the government from California. And I just want to say that I like the EIS process, and I think that this one I read, because I got a copy of it, was a real good one because it was indepth, even though it was a short fuse that they had to try to get it done and stuff. And I would have to say that, being in the government, I was taught to try to do the assessment so we can say there is not a whole lot of impacts, so we don't have to go through the costly thing, but you can see, if you don't weigh the other public interest and that sort of thing, you end up having to do them beleagueredly and all that. So I just want to go on record saying that it's a good job and I hope that everything turns out for DOE.

MS. WEBB: Thank you very much. We always like it when people tell us we did a good job. Okay. Is there anyone else who would like to say anything at this time?

THE AUDIENCE: (No response.)

MS. WEBB: I'm hearing no one, seeing no one coming forward. I will say, then, that this session is adjourned. We will reconvene in this room tonight at 6:30. Thank you very much for coming.

(Hearing adjourned at 4:01 p.m.)

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, IRENE DELGADO, New Mexico CCR 253, DO HEREBY CERTIFY that I did report in stenographic shorthand the foregoing proceeding as set forth herein; that the foregoing pages are a true and correct transcript of my stenographic notes and were reduced to typewritten transcript through Computer-Aided Transcription.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case, and that I have no interest in the final disposition of this case in any court; that on the date I reported these proceedings, I was a New Mexico Certified Court Reporter.

IRENE DELGADO, NM CCR 253
Notary Public Expires: 5-1-96

Transcript Attachments
Comment Codes 41, 42, and 43

FROM: INTERNET:ssinger@roadrunner.com,
INTERNET:ssinger@roadrunner.com
TO: Milton G. Lockhart, 75244,432
DATE: 5/30/95 1:20 PM

Re: Re:EIS Meeting

Sender: ssinger@roadrunner.com
Received: from beep.roadrunner.com by dub-img-4.compuserve.com (8.6.10/5.950515)
id PAA15273; Tue, 30 May 1995 15:00:03 -0400
Received: from dial130.roadrunner.com (dial130.roadrunner.com [198.59.109.130]) by beep.roadrunner.com (8.6.5/8.6.5) with SMTP id MAA18783 for <75244.432@compuserve.com>; Tue, 30 May 1995 12:59:55 GMT
Date: Tue, 30 May 1995 12:59:55 GMT
Message-Id: <199505301259.MAA18783@beep.roadrunner.com>
X-Sender: ssinger@roadrunner.com (Unverified)
X-Mailer: Windows Eudora Version 1.4.3
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: "Milton G. Lockhart" <75244.432@compuserve.com>
From: ssinger@roadrunner.com (Sidney Singer)
Subject: Re:EIS Meeting

My name is Sidney Singer and I request that the following summary comments be placed in the record of this meeting, a review of the draft DAHRT EIS. My comments reflect my personal opinions and I have been encouraged to present them here by REAL as part of their effort to provide alternative credible review sources to this process.

I understand that this process is intended to develop and present for public review an assessment of the socioeconomic impact of the proposed DAHRT project. In my first reading of the draft, I concluded that

1 | 1. The basis for DAHRT's role in the SS&M mission is not adequately developed. The statement of need (p. 2-4) deals with the need for this type of resource and does not explain the need for enhanced resources nor what they are or are expected to accomplish. The discussions of paragraphs 2.2 and 2.3 are superficial and do not define in sufficient detail how DAHRT would be used to support meaningfully the SS&M mission.

2 | 2. In the absence of that background, it is impossible to evaluate properly the various alternatives. Such evaluations require knowledge of the consequences of the various alternatives on DAHRT's mission.

3 | But that mission has not been stated in terms of performance criteria and desired outcomes, so that meaningful comparisons of alternatives based on mission impact are not feasible.

4 | 3. Of considerable importance is an explanation (presently absent in the draft EIS) of why the containment alternative is not the preferred one. The notion of releasing into the environment the indicated quantity of heavy metals when -- presumably -- a containment technique is feasible boggles the imagination.

5 | Finally, I suggest that a comprehensive discussion of the socioeconomic impact of the no-action alternative, which may be very great since it deals with the nation's security, is an important part of the EIS process. While the DOE may prefer to deal with this issue elsewhere, only from such a discussion can the true role of DAHRT be discerned, explained, and justified.

Milton G. Lockhart

Sidney Singer
188 El Gancho
Los Alamos, NM 87544

Comments on Draft DAHRT EIS, May 31, 1995
by M. G. Lockhart, 91 Mimbres Drive, Los Alamos, NM 87544

DAHRT is the first in a progression of more advanced hydrotest facilities planned by DOE, will provide data for the design of later facilities, and will help identify unknown problems. The stockpile has never been allowed to become this old before. Delaying DAHRT until
1 problems are identified to be solved is akin to waiting until the flames are consuming your house before applying for fire insurance.

Nuclear testing which was an integral part of the program for fifty years has been discontinued. Having not foreseen the demise of nuclear testing, scientists do not have the data necessary to construct accurate computer models which DAHRT and its successors can furnish.

DAHRT would study ~~old pits, liners~~ chemical explosives and any other part from disassembled weapons which might be suitable for studying aging effects, but particularly primaries. Weapons primaries use chemical high explosives. Page 29 of the JASON report states "The design community has properly judged that improved hydrotesting capabilities are important in the absence of underground tests. The ultimate goal would be a tomographic movie of the late stages of the imploding pit."

DAHRT's data can be used in computer simulations, to verify the results of computer simulations, and to identify problems which are not readily detectable by inspection. Can these data be used to design new weapons? Of course. Data are data. If the national policy changed tomorrow, these data could be used for designing new weapons. But more importantly, the data can be used in improving safety and reliability of nuclear weapons. This is also a design function, and the improved weapons could be considered a "new" weapon, but not under the President's definition.

2 DAHRT is currently the most cost effective and prudent way to implement the nuclear
3 policies of the U. S. Rewrite the draft EIS to specify what the mission is, and choose the containment option to protect the environment.

1.

Environmental Impact Statement for DARHT
Los Alamos, Dec 7 1994

I am a retiree (who refuses to retire) with 50 yrs. experience at LANL, in nuclear science & technology. I represent only myself & receive compensation from no-one. My credentials are documented for your perusal.

It was on this date that the Japanese military triggered the eventual birth of Los Alamos National Laboratory, born in secrecy but now open to the world scientific community.

I very much applaud the DOE policy of openess, and willingness to receive input from everyone. However, I worry that DOE may be defeating its objectives by lavishing undue attention (such as invitations to Washington) on representatives of small groups which may not have the knowledge, experience and technical background to provide credible advice on highly technical issues, such as the DARHT facility.

2 DARHT is an extention of FERRET, which has operated for decades with impressive positive impact on our national security, and very limited impact on the physical environment.

Although I believe it to be a waste of time and money, and an unnecessary

deviation from important tasks, I do not object to yet another environmental impact study. However, as a supporter of public involvement, I am embarrassed that any group would go to court to interrupt construction on a major facility designed to enhance the safety and credibility of our nuclear deterrent, while our nuclear stockpile is being reduced. This to me is the height of irresponsibility, a serious disservice to our National well-being and an abuse of our judicial system. Claims of thousands of supporters are insignificant compared to the interests of those whose livelihood are at stake, of the other 1.5 million citizens of New Mexico and of the 250 million citizens of our Nation. Los Alamos is obligated, by Congressional mandate, to serve all these citizens; and it has been doing so, magnificently, over the past 50 yrs, while also contributing very substantially to international stability.

If DOE wishes to know how the citizens of New Mexico feel about the programs at Los Alamos and Sandia, ask our Congressmen, all of whom, Republican & Democrat, have ~~just~~ ~~now~~ been returned to the Congress. And if you want to know what the Nation thinks about these facilities, look at the platforms of those elected to the new Congress. If DOE does otherwise

it will become irrelevant, in my opinion.

All human activity impacts the environment. One must always make an objective cost-benefit-risk assessment before implementing any major initiative. However, ~~all~~ government agencies should consider the credentials of their sources of advice. Uninformed judgements or superstitions should not be given as much prominence by the Government and by the news media, as appears to be the case in recent time. Catering to "political correctness" not only leads to waste of scarce public resources as, for example, the recent study of a postulated brain tumor cluster in the Truchas Area, which (appears to have been) appeared by someone who misinterpreted a radiation-measuring instrument; but, more importantly, it demoralizes and diverts the attention of skilled and gifted people who are working in the National interest. Should we continue on our present course, I predict that within 10 - 20 years all of us will be consumed regulating each other. In the meantime we will be overwhelmed by pollutants - the pollutants of unemployment, disease, energy shortages and climate change. That is not a proper legacy to leave to our progeny. I thank You for listening.

3

LOUIS ROSEN
1170-41 ST
Los Alamos, N. M., 87544

Transcript 2: Comment Code 44
Los Alamos Public Hearing – Evening Session

Multi-Page™

LOS ALAMOS PUBLIC HEARING
for the
DRAFT ENVIRONMENTAL IMPACT STATEMENT
DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST FACILITY

WEDNESDAY, MAY 31, 1995
6:33 P.M.
LOS ALAMOS INN
2201 Trinity Drive
Los Alamos, New Mexico

REPORTED BY: Irene Delgado, NM CCR 253
Joe Jameson Court Reporters
Suite 800, 320 Gold, S.W.
Albuquerque, New Mexico 87102

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MS. WEBB: Good evening. My name is Diana Webb. I'm from the Department of Energy, Los Alamos area office. This is the evening session in Los Alamos of the public hearings on the Draft Environmental Impact Statement for the dual axis radiographic hydrodynamic test facility or DARHT.

With me tonight are Barb Stine, who is the deputy director for the Dynamic Experimentation Division of the Los Alamos National Laboratory, and Jas Mercer-Smith, who is the deputy program director for Nuclear Weapons Technology, also at the laboratory.

We have with us tonight Irene Delgado, who is our stenographer tonight, and we have Jay Boettner who is going to be your scribe tonight. The meeting tonight is to get your comments on the adequacy, the accuracy of the Draft DARHT EIS, along with any other information that you would like to share with us on the document or this Environmental Impact Statement review process.

Our format tonight is somewhat informal. We have three areas. This is the round-table discussion. This is where your comments will be transcribed as part of the formal record for this Environmental Impact Statement process. At the far end of this room, we have information displays. There will be people there or they are here -- they are sitting down

in here right now -- that can answer questions informally regarding the DARHT facility, the alternatives that were looked at, and other information related to the laboratory or this program.

Any comments that you make in there will be considered informal and off the record and will not be entered into the formal record for this proceeding. The transportable, which is right outside and a few steps out the door, we have a comment room. That is a quiet room where you are welcome to come in, sit down. There's a tape recorder in there where you can make oral statements into the tape recorder, if you would like. You can talk as long as you want into that tape recorder. We can switch tapes if you talk a long time, and there are also comment response forms if you care to give written comments. You can also hand in written material you may have tonight, to me. I would be glad to accept it in here as well. We will listen. We will answer questions. We will have an informal discussion, whichever you would prefer. This is your meeting, and the format will be up to you.

I would like to explain just a little bit about the DARHT Environmental Impact Statement and the process that we have gone through. The Department of Energy has proposed to provide enhanced high resolution

radiographic capability to perform hydrodynamic tests and dynamic experiments in support of the department's historical mission and near-term stewardship of the nuclear weapon stockpile.

To support this proposed action, we have prepared this Environmental Impact Statement. On the wall over here we have the steps in the Department of Energy Environmental Impact Statement process. In November, we issued a formal Notice of Intent in the federal register that started this process. We had a public scoping period in December and January including public scoping meetings. Many of you attended those meetings, and we are glad to see you back. We issued an implementation plan that explained the results of that process in January. In May, we have just recently issued the Draft Environmental Impact Statement on DARHT. It is now available for your review and comment.

The comment period on this document will extend -- the formal comment period will extend until June 26. We will, however, accept late comments to the extent we can as long as we can. We anticipate preparing the final Environmental Impact Statement that takes into account your comments and concerns. We anticipate that that document will be published in about the middle of August.

No sooner than 30 days after that publication, the department will issue a final decision that is documented in a Record of Decision. That Record of Decision will explain the decision factors that we went through including these environmental considerations that are documented in the Environmental Impact Statement.

Along with the Record of Decision, we will be issuing what's called a Mitigation Action Plan. The Mitigation Action Plan is part of the decision and will include those actions which we propose -- or that we will be taking to mitigate or lessen any adverse environmental impact that we anticipate would occur based on the analysis in this document.

This is the Draft DARHT Environmental Impact Statement. If you would like a copy and do not have a copy, please give your name and address to the staff at the front desk and they will make sure that you get one as soon as possible.

In the Environmental Impact Statement, we analyzed six alternatives. An Environmental Impact Statement is comparative environmental analysis. It looks at what would be the environmental consequences if we took an action, and we compare those to what would happen if we did not take the action. That is called the

no action alternative, sometimes called the status quo alternative.

In this Environmental Impact Statement, we look at, under no action, the continuation of the PHERMEX facility at Los Alamos National Laboratory to continue to do the program regarding hydrodynamic tests, dynamic experiments without the enhanced capability that we are proposing to provide.

Under that alternative, we would not complete the construction of the DARHT facility as a hydrodynamic testing facility, but the building would be completed and put to other uses. The department's preferred approach for meeting the proposed action would be to complete and operate the DARHT facility here at Los Alamos National Laboratory and to phase out the PHERMEX facility, the existing facility, over about a four-year period.

The department may choose to delay the operation of the second axis pending installation of the equipment in the first axis and testing and proving of that equipment to make sure that it performs as expected.

In addition to those two alternatives, we have looked at four other alternatives. We have looked at upgrading the existing PHERMEX facility. We would not

complete the construction of the DARHT facility for use as a hydrodynamic test facility, but we would complete the building for other uses.

The existing single axis PHERMEX facility would be enlarged and expanded to provide a dual axis capability using the same enhanced radiographic capability that has been proposed for DARHT.

Under the enhanced containment alternative, the department would provide more containment than would be the case under the DARHT proposal. The department does now and plans to conduct some experiments in containment; anyway, the difference is that under the enhanced containment, most or all experiments would be contained.

We have looked at two options; one is a constructed building. There is a model in the information area around on the other side of this portable wall that shows how that containment building fits into the dual axis construction that's now in place. It's a fairly large building, would fit over the firing site, and you can see what that would look like in the other room.

A second option under the contained -- enhanced containment alternative would be a greater use of containment vessels than would now be done. These are

modular transportable vessels that would be used to contain most experiments that would be conducted at the DARHT facility.

We also looked at a plutonium exclusion alternative. This weighs the consequences, the environmental impact comparing what it would be like if we operated DARHT with contained experiments involving plutonium, comparing that to what would happen if we operated DARHT without doing contained experiments with plutonium at that facility. However, the department would conduct dynamic experiments involving plutonium at PHERMEX or some other facility under that alternative.

The last alternative is a single axis alternative. It's very similar to the preferred alternative, except only one accelerator hall of the DARHT facility would be completed for hydrodynamic tests. The other hall would be completed and used for some other use.

There are certain things that are common to all alternatives. Under all the alternatives, analyzed under this Environmental Impact Statement, the department would continue to use the flash X-ray facility at our sister laboratory at Lawrence Livermore, California. Under all alternatives, dynamic experiments involving plutonium would take place and hydrodynamic

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testing would continue.

The infrastructure involving research, waste management, security, maintenance, environmental monitoring and other types of operational support would be very much the same under all of the alternatives. And for all alternatives, eventually both of these facilities would be decontaminated and decommissioned.

This photograph shows the DARHT facility as it is today. This photograph was taken on May 19, just a couple of weeks ago, a few days ago, and it shows the facility as it now sits. As you can see, the site is in a stand-down mode. The construction operations have been halted. This accelerator hall on the east side would be the first one completed if the department were to continue with this option. Under the single axis option, this is the axis that would be used for the radiographic hydrodynamic test program.

This is a map of the Los Alamos National Laboratory. The white area is the laboratory. This is White Rock. This is the Los Alamos townsite. The proposed DARHT site and the PHERMEX site, which is very close to it, are located here in the central part of Technical Area 15 in the center of the existing high explosive test area.

Based on the analysis in the Environmental

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Impact Statement, we have first looked at the alternative of continuing to operate the PHERMEX. That's called the no action alternative, remember, and looked at what would be the environmental impact if that were to continue. This is a comparative analysis. So with the other five alternatives, we have compared the other impacts to that.

On this particular chart, the black type represents environmental impacts that would be the same as the no action alternative. The red type indicates those environmental impacts that would be expected to be a greater adverse impact than those for the no action alternative. The green type indicates those impacts that would be expected to be a greater beneficial impact than the no action alternative.

In addition to the analysis that's contained in this unclassified version of the Environmental Impact Statement, the Department of Energy has prepared a classified document that contains additional analysis and information. The department has prepared an unclassified summary of the impacts that would be expected from the classified analysis. The unclassified summary is available to the public and there are copies on our information table in the lobby. I invite you to pick up a copy of this if you have not

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already done so.

In addition to the 250-odd references that are in our Los Alamos Community Reading Room that are part of the Environmental Impact Statement and referenced in that document, the department has placed in the Public Reading Room some 67 other documents. And we plan to continue to place other documents in the Public Reading Room as this project unfolds.

You may find it useful to go to that -- to go to the Public Reading Room. It's located next to the Science Reading Room here in Los Alamos, and take a look at those other documents. They may provide insight into the program and their Environmental Impact Statement. And we have several other pieces of information. We have fact sheets. We have information on related environmental analyses that the department is doing. There's quite a bit of information out there, and I invite you to take a look at that.

Tonight we did not have, as you may have noticed, a specific sign-up sheet for people. We will be inviting you to come up here. This is a round-table discussion. Please feel free. You are welcome to sit at this table. This is not reserved for us. This is your table. Please feel free to come up here and sit with us.

As I said, Irene is providing for us a

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verbatim transcript of your comments tonight. When you give a comment, we would appreciate it very much if you would give your name for the record. This is a recorded proceeding, as I had said, and if you think that it might be a good idea, we would appreciate it if you would spell your name for Irene.

Tonight I will ask first if there are people representing the state, Indian tribal governments, or local elected officials, when we get started with the comment period, to see if any of those people would like to speak on behalf of their constituencies. Before we do that, we would be pleased to provide for you a short discussion on what the programmatic aspects of DARHT and hydrodynamic testing are. Barb Stine will give that. Is there anybody that -- is it the consensus of this group that you would like to hear that or that you would not like to hear that?

(No Response.)

MS. WEBB: Seeing no particular reaction here, I'm going to let Barb give her five-minute talk.

MS. STINE: Thank you. I'm going to stay seated as long as everyone can hear me. I recently broke a toe, so that indicates I'm not very stable when my feet are both well, let alone wandering around when they're not, and it's almost impossible for me to stand and speak

without walking. So I will just have to make do with this kind of action seated, but if you can't hear me, please indicate and I will try to speak even louder.

I would like to spend just a very few minutes this evening talking dynamic experiments, hydrodynamic experiments, and enhanced capability that DARHT as proposed would represent. We do a number of experiments in the weapons programs in DX division, and among them are two kind of tests that you've read about in the Environmental Impact Statement. The first is dynamic tests.

These tests are experiments on a broad variety of materials that we use to determine material properties and behaviors at high pressures, materials in motion, and materials under shock conditions. Most of the conditions that these materials see are induced by the application of high explosives.

We do a large number of dynamic experiments of different sizes and complexities, having to do with the investigation into the property of different materials, many different materials. One of the materials of interest has been plutonium. And because of the unique characteristics of plutonium, the information that's been gathered on plutonium in these dynamic experiments has always been performed in

double-walled steel vessels so that there were not any products into the environment.

Another kind of test that we do are hydrodynamic tests or hydrotests. Where the dynamic tests tend to be more single or sets of material tests, the hydrodynamic tests are more aimed at full systems in weapons geometries to gather information about materials in the primaries of weapons systems and to get the interactions of the shapes and geometries as the system is imploding.

In these hydrodynamic tests, we use surrogate materials for the fissionable materials. Typical surrogates might be depleted uranium, tantalum or lead. The choice of surrogate is a function of what kind of information we're trying to get out of a hydrotest. Each material is a reasonable surrogate for some aspect of the pit material, but no surrogate matches the plutonium behavior exactly.

We do several kinds of hydro experiments in order to get different data sets. One kind is called a pin shot. In a pin shot we have a series of electrical sensors that are inside a mock device that is built with surrogate material, surrogate pit material. These electrical sensors called pins record the movement of the implosion; that is, they record the movement of the pit

surface as the device implodes and gets to near its minimum size, near to critical time or what would be critical time.

We can extrapolate the data obtained in these pin shots by calculation to estimate what might be happening at this critical time. But the blast shield for all the diagnostic cables and pins themselves can affect the behavior, the ultimate geometry and skew the shapes as the implosion occurs. Therefore we do not get completely realistic data, particularly as the size gets smaller and smaller. There are also other aspects of the data that we need that we cannot obtain in pin shots.

Another kind of hydrodynamic test that we do fairly regularly is called a radiographic test. In these tests, we again have full shapes. This time we have no blast shields or pins. We have a mock device again with a surrogate material for the fissionable material. We detonate the high explosive which drives the metal inward in an implosion and takes very high-speed X-ray pictures of the implosion.

From this high-speed X-ray picture, we can get information on density and shape during the implosion. We take the data that we have gotten from a series, many series of dynamic experiments on materials involved, from pin shots, from these radiographic shots,

and use this data to refine our calculational model so that we can predict behaviors and improve our predicted models.

Currently, the complex of principal tools for these hydrodynamic experiments are PHERMEX, which became operational in 1963 at Los Alamos, and FXR at Livermore, which became operational in 1983. These two substantial dynamic tools were brought on line to assist us in the full program for nuclear weapons development, surveillance and testing that included the capability for final proof testing underground at the Nevada test site.

There is now a moratorium on underground testing at Nevada. Even before the moratorium was brought about, it was recognized within the complex that we needed an enhanced diagnostic capability to give us better information, more detailed information, more accurate information from hydrodynamic testing. And so the process of designing and proving technology for DARHT was started.

Part of the reason that we needed to improve the capability was that both PHERMEX and FXR provide now a single view, basically a one-dimensional view, and do not deliver enough dose to see clearly the level of detail we need at sufficient depth into the systems that we need to look at. As proposed, DARHT

would increase the total available information from each shot by about tenfold, especially in the dual axis configuration.

The kind of information that would be obtainable from DARHT is particularly important within the confines of the underground testing moratorium where we have no final proof test. We need more and better information than our present diagnostics can deliver in order to be able to do effective computer modeling and to fold in the detailed experimental data that will truly model the material's behavior effectively and properly and allow us to make predictions.

Safety and reliability via an active surveillance program from the stockpile also now have no final underground proof test. We are building more and more predictive capabilities into our computer codes, but in order to do that, we must have data that's based on what I've characterized as old information, old tests of then new systems and now new tests of existing systems, baseline information, surveillance information from the stockpile.

Although we all understand that the stockpile is safe and reliable now, the weapons that are there now are approaching their design lifetimes and very soon will be in the stockpile for longer than they were

ever intended. This is a new situation for the United States stockpile. In the past, when we were doing new design work and new production work, weapons were being replaced in the stockpile much faster than they were approaching their design lifetime. The United States is no longer designing and producing new weapons. The weapons that are in the stockpile are approaching their design life. We have no experience with weapons that are that old.

Active surveillance programs and the diagnostics that will allow us to determine problems, potential problems, early, become more and more important as each day goes past. One of the major problems in diagnosing aging concerns is that most aging problems don't happen in one dimension. There are many problems associated with aging that we may not be able to see in one dimension, and to be able to get a three-dimensional representation is extremely important in these cases. I would invite you to take the opportunity to go and look at the information area and look at a representation of a one-dimensional X-ray photograph versus two views that give you some three-dimensional information. The difference in the information obtainable from those -- from the two views, is striking.

Also, as the Department of Energy

Production complex changes, if we find, if and when we find problems in the existing stockpile that need to be addressed, that need to be fixed, materials or components that may need to be replaced, the old technologies that were used in the early production complex are no longer viable in the new smaller complex where some of the production agencies are closed. We need to be able to verify that any repairs or fixes for problems that we would do and replace components or materials in the stockpile, do not negatively affect reliability or safety or performance.

The enhanced level of information that DARHT would provide is particularly urgent now that we have moved into and continue within a time of moratorium on underground testing. I would invite you to ask questions of a technical nature in the information area where we have people from the laboratory who are technical experts, people from DOE who understand the regulatory concerns and people from PNL Battelle, who did much of the analysis and impact analysis for the EIS and I would to invite you again to take an opportunity to go into the information area and ask people these detailed questions. That's all I have, thank you.

MS. WEBB: Thank you, Barb. There's lots of chairs over here. Again, you are also invited to sit

at the table. This is a round-table discussion, and so please, feel free to join us at the table. There's also a lot of chairs over here on this side.

All right. Having heard our talk tonight, I would like to ask first if there are any representatives of state, tribal, or local governments that would like to speak of behalf of their constituencies.

(No response.)

MS. WEBB: And seeing no one coming forward, then, the floor is yours. Who would like to talk first? Surely someone would like to talk first. Yes, sir?

MR. BARR: Are you still -- this has been under study a few years. Are you still state-of-the-art in your analytical techniques in the building, or are you fixed as far as the development of the DARHT facility goes five years ago?

MS. WEBB: Mike, would you like to answer that?

MS. STINE: I will let our technical experts answer on DARHT technology.

MR. BURNS: It's hard to be called an expert. My job is a project leader for the equipment that would be installed if DOE continues to complete the facility at DARHT. Technology, as you said, is a very

important thing for DARHT. In the early '90s -- or from February '91 through 1993, we demonstrated new technology that would be working in DARHT. That technology exists today and has been demonstrated and is still state-of-the-art for X-ray machines of this type. Right now it's still the definition of how these X-ray machines should be built.

MS. WEBB: Thank you, Mike. Do you have any other questions? Okay. As you may notice, our scribe here, Jay, is capturing short summaries of the comments that are given. The comment summaries from this afternoon are on those sheets that are stuck to the transportable wall over here if you want to look at those during break to see what transpired this afternoon. All right. Who would like to speak next? All right. Chris?

MS. CHANDLER: My name is Christine Chandler. In reviewing the DARHT Draft EIS, I was struck by the generalities that were contained in it for supporting it and was concerned that not enough specific information was contained in it. For example, I went and 2 checked out the Miller Report, which is a reference that you all cite. There's a lot of information contained in that report about specific weapons problems that have been uncovered through testing, nuclear testing,

specifically safety issues that have been uncovered by nuclear testing, and I think that there is some very 2 compelling information in that report that could be used to -- or in the EIS to inform the public about what you're really talking about, because really -- there are really just bland statements in the document itself, but when you go to the Miller Report, particularly, there are numerous warheads documented as having issues with regard to safety that were uncovered, as well as other kinds of issues, performance issues.

For example, you cite on Page 2-8, the W-68, I think it would be useful to talk about how DARHT 2 would play into a situation like that and explain to the public how DARHT, instead of nuclear testing, will outline the problems, define the problems and assist the lab and federal government in evaluating that warhead, and that is not done anywhere in the document. So for what that's worth, that's a comment.

MS. WEBB: That's great. That's the kind of thing that helps us finalize the document in the final process. Thanks. Anything else, Chris?

MS. CHANDLER: Not now. I have a whole list, but I don't want to dominate.

MS. WEBB: Well, you may get your chance unless there's someone else who would like to step

forward. Who would like to speak next? And again, we do have chairs over here. You don't have to stand over there unless you really want to.

MR. McCORKLE: My name is Melvin McCorkle, and although I work for the laboratory, I am here as an interested citizen, but I used to work for EPA, so I have some insight into some of the regulatory approaches. And while I haven't read the entire document yet, I intend to and would make comments as part of the record later.

But I would encourage the department to really look at the enhanced containment option from the following perspective: I think that preferred option probably meets many of the regulations as they exist today; that we are going to continue to see, in my opinion, a reduction in the amount of disbursement that occurs during the explosive test and this sort of thing, 3 which I understand would occur under the preferred options, would be disbursed around the ground.

So I would encourage to plan for increasingly stringent regulations with respect to the regulatory aspects of what we're going to be allowed to -- I'm going to use the word discharge. We see it happening in the NPDES permit continually to get more stringent limits. We continue to see more stringent limits in the air monitoring that's required. I'm sure

we are going to see more stringent limits with what we can disburse through the air.

So I would encourage the consideration of 3 the enhanced containment alternatives up to and including that it might become the preferred option because it allows to increasingly mitigate environmental laws that are associated with the experiments.

MS. WEBB: Okay, thanks. Anything else?

MR. McCORKLE: No.

MS. WEBB: All right. Who else would like to speak? Yes, please?

MS. MULKA: My name is Linda Mulka. I think to a large extent, DARHT is based on the premise 4 that we will continue to need large numbers of nuclear weapons in the future, and I think that, you know -- the reason I think things should probably be on hold is that, you know, I'm not sure that, you know -- I suspect 4 nuclear weapons are -- they're nearly obsolete right now, the concept of nuclear weapons, and DARHT is trying to protect that, the concept of nuclear weapons. And by the time DARHT is finished, I kind of suspect that they'll just be -- the whole focus is going to be on dismantling them and how -- you know, how few can we get by with.

So I kind of suspect that it's a moot -- it's almost a moot issue. I mean, I would feel that

considering if they're obsolete, then existing -- since the cost is enormous and our government supposedly has many, many problems today and the greatest of which many people feel is the balancing the budget, that it's a cost that may be, you know, other economic costs that we can't afford to, you know, pay on something that's becoming obsolete.

MS. WEBB: Okay. Thanks, Linda, anything else?

MS. MULKA: No. When I finish reading it, I will definitely -- I will have more comments.

MS. WEBB: That would be great. And again, comments are -- written comments are welcome until -- well, as long as we can receive them. But the formal comment period lasts until June 26. Send the comments to me. My address is up there on the wall. It's also in the front of the document. My address is just right up there bound in the front of the documents. For people within the laboratory, I would like to just mention, if you want to send comments through the laboratory mail system, my mail stop is A-316. Thanks, Linda. Okay. Who else would like to say something to us tonight?

MR. BARR: Diane, this is just a comment on previous comments, not for the sake of argument, but a

counterviewpoint could quite well be that pronouncing the death of nuclear technology is a bit premature. There's a lot of involving nations that look upon nuclear capability as a status symbol and, in fact, it's one the major concerns is controlling new propagation of weapons. And also a comment that was made earlier that our stockpile is getting older. Even if we do reduce this quantity, which we are in the process of doing, you still have to justify the safety and integrity of those few that are left. I think that DARHT is essentially well-justified on those bases.

They are still a deterrent against a small nation. You may not like -- I don't think anyone likes the idea of accepting the use of nuclear weapons so indiscriminately, you know, essentially in its application, but nevertheless, the fact that we did have a large stockpile, in the view of myself and I'm sure a few others, was a strong deterrent to the use of any nuclear weapons. Since World War II we have essentially had, with the exception of atmospheric tests, no use of any weapons since 1945. That's 40 years of nuclear technology that's essentially been relatively dormant as far as its usefulness goes. That's my comments and responses.

MS. WEBB: Thank you, Mike. And you are

speaking tonight as a private citizen.

MR. BARR: Yes, I am. I'm not an employee of the lab.

MS. WEBB: In the back. John, feel free to come up here and sit at the table.

MR. USSERY: I'll stay where I am. Realizing where the PEIS is in this, because some of these programmatic large questions of national debate on this subject, it seems like it should precede any of these changes as we restructure our labs and decide what's necessary and what's not. And I sort of feel that there was so much national opinion against the development of more weapons that they just decided to cancel the PEIS. I don't know what happened to it, but it really should be going before this process. And so I do want to object that we're going ahead with this without having done that. It's like the sitewide EIS should precede this as well, but, okay --

Now that we're out of order -- I think the responsibility of where other nations are looking to nuclear weapons as the way to go, I sort of wonder where they got their idea, especially when we're doing the best we can to circumvent the comprehensive test ban because we do have these computers and engineers and technicians that can do it all in theory, and with a couple of little

experiments to confirm the code.

And I think that this is test -- nuclear testing. And if we're trying to ban nuclear testing, it's not a good thing to spend a lot of money on, and I look at this as a way to just skate around and say, "Well, technically this isn't nuclear testing. This is just an experiment itself that we're imploding." And so I'm sad about us doing that, and that's what my response is, "Where did they get this idea about the nuclear weapons," because in deterrent paradigms, I've been telling people that, you know, the militia that bombed Oklahoma, they're from Michigan, so we should go bomb Michigan. The paradigm doesn't really work. The retaliatory strike worked on a mutual and joint destruction. One of them was paradigm. I think it's getting increasingly useless, so better weapons are equally useless.

Okay. And I'm disturbed by EIS because I guess I haven't been paying enough attention to what's been going on up here, and that we've been doing this all along is something that was new to me. And I think a lot of us, and I think a lot of people in the valley have no idea that this is going on and we are spilling beryllium and uranium and all that as normally would have been done at the previous facilities.

Now, looking at the amounts and all of that and 40,000 years to reach the atmosphere and all of these other kinds of details that I pick up in the EIS, it seems like I'm dealing with everything from microscope cells. You can't see the elephants, you can only see the tree or other little parts, and there are some of these -- the incredible thickness that you have to read in your spare time when this isn't your job, the amount of details are impressive, but I think it sometimes obscures the bigger picture that we are really just trying to keep things in a state of nuclear development, nuclear funds to develop better weapons. Even though we say it's for safety, I think safety is better achieved by dismantling, unless you take the high explosives from the plutonium and, you know, just take the thing apart, that would ensure safety a lot better than any kind of design.

MS. WEBB: Thanks, John. You point out that there's lots of little details and lots of information in the EIS, although Barb just mentioned a little while ago that the department has operated PHERMEX in the laboratory since 1963, as it's stated in the Environmental Impact Statement, the Department of Energy and its predecessor agencies have conducted hydrodynamic testing at the laboratory since the 1940s. And you also

made reference to the PEIS SS&M and I presume that you're referring to the Stockpile Stewardship and Management Programmatic Environmental Impact Statement. There's quite a bit of information on that document that is out on our related information table.

You also made reference to the sitewide EIS. And I presume you meant the Los Alamos sitewide EIS that's going on at this time. May I presume those things, John?

MR. USSERY: Yes. This is in the proper order here. It's the first time I've seen this.

MS. WEBB: We have copies of this programmatic report, like I said, on our information table regarding the Stockpile Stewardship and Management Program. Please feel free to pick up a copy, and if you want more information on that, leave your name and that written request with our front desk and we will get you all the information that you can imagine.

Who would like to be next? My goodness. All right, George.

MR. CHANDLER: I would like to just point out what I think is a part of what we can possibly afford when considering the alternatives here. In the plutonium exclusion alternative, you don't show any increment in the operating cost. Under that alternative, you would

have to operate both PHERMEX and DARHT, and the cost of keeping PHERMEX open under that circumstance would be substantial, I think. It does show up in the -- in the Table 3-4.

MS. WEBB: All right. Thank you for that comment. George, you did not introduce yourself for the record. Would you like to?

MR. CHANDLER: George Chandler.

MS. WEBB: Thank you. Yes, someone else? I thought I saw a hand over here, but maybe I didn't. Who else would like to -- thank you.

MR. THOMPSON: I'm Dave Thompson, and I speak as a private citizen, retiree of the laboratory. I've been here for over 40 years, and I guess I would like to address the comments that were made with respect to the obsolescence of nuclear weapons, for example. I am a strong proponent of arms control and have been for many years, and I guess, given the present treaties, for example, START, which will take at least eight, ten years to get down to the START II level, assuming START II is ratified by the Russians -- well, our own senate hasn't ratified START II, but the Russians, I think they will. I think the signal is the Russians might, and it's very questionable right now when the Russians are going to do it.

But START II gets you down to 3500 warheads for each of the two sides. There's no treaty -- it will take further treaties to get down to some lower level. There's no treaty yet that includes the Chinese and British and French. We are very fortunate that the Nonproliferation Treaty was extended indefinitely just a couple of weeks ago, 170 nations, but there are eight or nine nations that are not members of the Nonproliferation Treaty that include India, Pakistan, Israel and several other nations who want to -- who think at the present time they want to keep a nuclear option. It's not clear what they're going to do in the next 5 to 10 to 20 years.

But as near as I can see, there's going to be thousands of nuclear weapons out there, even under best arms control we have in place now for the next 10 to 20 years. And it's never been -- it's not my personal view, contrary to many people and contrary to the present administration that a CTBT with zero yield is in the -- really the best interest of arms control or for the long-term future.

A CTBT with very limited numbers of tests, and a CTBT with a threshold at the -- let's say a threshold set at the verification level, which right now is generally believed to be in the ballpark of 5 kilotons or could be in the interest of arms control, but to go to

a level for us to sign up to a CTBT of zero yield that we couldn't enforce or verify around the world, and to go on 10 or 20 years and lose our capability here, and someone else, Saddam Hussein or no telling who, to develop it, and that's to be at the short end of the stick 20 years from now, is not in the interest of world peace or the United States nationally.

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And so I just feel that if you really want to go as far as you possibly can in arms control, but retain our national interest, you have to, at a very minimum, have facilities like DARHT and Los Alamos has to retain the capability to understand nuclear weapons so that 20 years from now we don't understand it and somebody else does. I think that's all I should say at this point.

MS. WEBB: Well, thanks, Dave. I appreciate your comments there. Appreciate that. All right. Who else would like to speak to us now? Yes?

MR. BROWNING: I had a question. My name is Richard Browning. I am representing myself. In the -- I forgot which section it is, but one of the beginning sections of the DARHT EIS, addresses the issue of political need for nuclear weapons, and it's spelled out in terms of presidential decision directives or other political documents, and I thought that was a reasonably

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good, clear statement of the continued need for nuclear weapons. And I was just curious how other people felt about it. If they had read it in -- was it clear to -- appear clear to a nonweaponneer.

MS. WEBB: All right. Richard has asked how other people felt about the section of the DARHT EIS that discussed the need for nuclear weapons. Feel free to chime in. If we don't already have your name, please, I would appreciate it if you could tell us your name for Irene. Anybody?

MR. BROWNING: Did anybody read it? Not clear. Okay.

MS. WEBB: This is sort of towards the front. If you have the document sitting on your lap, it's sort of in the front of Chapter 2. And on the next following pages there's some gray boxes among -- sitting in there amongst the text that have some highlights of different statements by the President, the Department of Defense, the Department of Energy and other entities regarding the need for nuclear weapons. There's also related discussion in the main text. Anybody want to answer Richard's questions? How does anybody else think about this. Dave, I think he specifically asked me to ask you. Did you address your question to Dave or just anybody?

MR. BROWNING: Well, anybody.

MS. WEBB: Anybody?

MR. THOMPSON: A specific question? I didn't quite -- I'm sorry; I didn't get it close enough.

MR. BROWNING: Had you read the words in the document itself that described the need for nuclear weapons?

MR. THOMPSON: Only in a very brief and cursory way. I have had it and I've been on the road and haven't had a chance to fully study it. I'm sure it can be improved, but I'm sure they did a good job of trying to address the topic.

MS. WEBB: Anybody else want to answer that? Yes, please.

MR. McCORKLE: Melvin McCorkle, again. I didn't pay a lot of attention to that particular section as I haven't read the document, I only perused through it. And one of the reasons I didn't is, this issue of whether we ought to have nuclear weapons or not, I thought was pretty clearly stated in Appendix A of the

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DARHT's mission plan wherein it stated that DOE did not intend in this EIS to analyze alternatives under the construction or operation of DARHT.

So the point is, while I think it might be reasonable to put it into the EIS, it's not -- it's not

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something that I believe should be addressed at this point in time. And the department has clearly stated that they're willing to address that issue if it's underneath their purview as part of the programmatic EIS, and I think at some point in time, it's going to have to be addressed. And that to me is a more political question than a technical question and that's how I view DARHT.

So consequently, I didn't pay any attention to that because the clear intent, as I understood the implementation plan of DARHT, stated that

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the department would address those issues in another venue and that that was not part of the DARHT EIS. And at some point in time, we as a nation have to address that as an issue, and I'm sure it will continue to be contentious, but I personally don't believe it's appropriate to simply stop all development of everything while we do a programmatic EIS and while we do a sitewide EIS. In fact, we have done a sitewide EIS in the late '70s, and clearly it's time to do another one, so I support that action by the department that we need to do another sitewide EIS.

MS. WEBB: Thanks. You point out a couple of things that I think I would just like to pick up on. The Environmental Impact Statement by -- as one might

assume -- by virtue of its name, looks at the environmental impacts of different operational alternatives to the proposed action. The preferred option of the department being to complete DARHT and other operational aspects. While the department has tried to clearly state the purpose and need for the action, it is not the intent of the Environmental Impact Statement to analyze the need for the proposed action.

Anybody else want to pick up on Richard's question or give us any other comments? Irene said that she would like to take a break. You are welcome to state your preference to keep on talking to me at this point in time, and I'm not seeing a whole lot of people raising their hands and coming forward. So what I'm suggesting what we do, then -- it's half past the hour -- is to take a 15-minute break until a quarter 'til.

I invite you to please go to the information room. As Barb indicated, there's a lot of really good information in there. We have this nice model of DARHT. It has this lift-off version of what the containment version would look like, and we have a lot of other good stuff there, too. We also have a lot of information out in front on the handout table such as information on the Stockpile Stewardship and Management Program. And seeing no one, okay, we will now take a

15-minute break.

(Break taken at 7:29 p.m.)

MS. WEBB: We are ready to reconvene. It's now 8:00. It's 15 minutes past the time where we said we would reconvene. Hello?

All right, thank you. Thank you. It's now 8:00, a little bit past when we said we would reconvene. I would like to give you the opportunity to, again, give us any comments. And I believe George said he had a few more comments he would like to give, and I believe Christine said she had a few more comments for us, so we would like to do that, then, at this time.

Before we start, Carlos, perhaps you could get the noise level down a little bit back there. We appreciate the fact that you're all having a good time in the information center, and we put a lot of good work into it and there's a lot of good stuff back there. I'm particularly fond of the model that has the lift-off little containment hall. That's my favorite back there.

We have let this run a little bit longer -- let this break run a little bit longer because there were so many good conversations going on in the information area. Having said all that, George, would

you like to talk to us?

MS. CHANDLER: I defer to you, as always.

MR. CHANDLER: I would like to make another point about the alternatives. The Upgrade PHERMEX Alternative, I think, should be acknowledged or recognized in there, that that would involve shutting down PHERMEX and the shutting down of all the hydrotesting for, I don't know, probably two or three years while DARHT was installed at PHERMEX, and that would have the effect of setting off a lot of the stockpile surveillance that could be done for the next period of time. I think that's a cost of that alternative. That's not listed or acknowledged in that report.

MS. WEBB: Thank you. You're absolutely right. If PHERMEX were converted, it is a major construction project for PHERMEX. The existing fairly short axis would have to be lengthened and the other axis built. The facility would have to be shut down for some period of time. Some probably what, Mike?

MR. BURNS: 51 months.

MS. WEBB: Some 51 months, plus or minus a couple of hours. Thanks, George. And I would like to introduce -- we have a different scribe. This is Don McClure, different scribe. Jay is taking a break.

Christine, would you like to follow.

MS. CHANDLER: I will follow up on something George said, and I have some others, which means the baselines are going to be off by four years and it's already off now by a year or two base because we haven't been doing nuclear tests, I presume. But have we been doing PHERMEX tests that act as a baseline since the time we haven't been nuclear testing?

MS. WEBB: Could you explain to us what you mean by "baseline"?

MS. CHANDLER: Well, that's a good question. It's referenced in this document throughout. I read that to mean there is going to be some review to get an assessment of where the weapons are now, so that periodically -- and perhaps I am wrong -- when DARHT tests are done, one can see if there's any degeneration. Is that a fair --

MS. WEBB: The benchmarking process?

MS. CHANDLER: Yes, that's what I interpreted that to mean.

MS. WEBB: Yes. Mike or Jas, would you like to explain what benchmarking is? Let's put Jas on the spot here.

MR. MERCER-SMITH: The problem that we face is that understanding the performance and safety of

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weapons as they age is actually a far harder task than designing brand new weapons. The reason for that is when you're designing new weapons, you can control things. When you are allowing weapons to age, you are no longer in control of the processes.

Specifically, if you think of the problem that you might have with a new car, you can go turn the key on and expect that it will work. If you go out to my 25-year-old Ford and turn the key on, it may not. Without nuclear testing, we can't turn the key, so we're asked to rely on trying to understand how aging impacts the performance of these things. It's a very difficult task.

Part of the process to understanding this will be to get basically zero time snapshots of what the weapons were supposed to look like, in order to understand how things will age. They're going to age in a variety of ways that you know about. Generically, every material or process or whatever, you're going to see develop chips, gaps, cracks, corrosion, somebody dropped it; things like that actually happen, and that changes the characteristics. Beyond that, the materials involved in the nuclear weapons, plutonium, for instance, is radiolitic, and it decays, and that changes its properties. There is corrosion that will tend to occur.

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All of these things may change the safety and performance characteristics.

Therefore, baselining, before we can affect those changes, we're going to have to understand exactly and in better detail than we have had in the past of what we thought we had there.

MS. CHANDLER: There's some mention in the Draft that DARHT can be used for counterproliferation purposes. To my mind, it's not very well articulated, and I think it would be helpful to articulate particularly in light of some of the previous comments which seem to assume that we are the only ones that are driving the arms race, and I think for some of us in the audience, we believe that certainly there are other nations that are pushing arms and are in fact doing so illicitly. So if someone could address that issue, that would be helpful.

MS. WEBB: I understand that you are talking about addressing that in the final EIS, but again, Jas, would you like to say anything about counterproliferation uses for this facility?

MR. MERCER-SMITH: There are potentially ways to disable nuclear weapons if you could get hold of an adversary's nuclear weapon. This has to be done very carefully. There are potentially ways to disable weapons

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that in fact would result in significant amounts of yield, which is what you want to avoid, very much so. It tends to kill the people trying to do it.

A facility like DARHT allows you to look at disabling schemes for various potential classes of devices to ensure that in fact when you disable them, you are not producing significant problems for yourself.

MS. WEBB: Does that answer or kind of give you a brief answer? And then we will take your comments as something we should consider further in the final EIS.

MS. CHANDLER: Yes, happy to comment.

MS. WEBB: Yes?

MR. McCORKLE: My name is Melvin McCorkle, again, in the lighthearted vein, I will tell you, my 25-year-old Ford does start when I turn the key because I do, with respect to DARHT, I replace things from time to time, as opposed to today just rebuilding, which is the PHERMEX option which is what led us to address this, and that is my view of what PHERMEX is, that it's like a B-52, you can only rebuild things so often and so frequently, and when you get to the end of a cycle, what you have married together is some old technology and some new technology and the interfaces between those two technologies don't work very well together.

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And while I'm not in the business of weapons development, I am in the business of facilities and operations of facilities, and one of the places that we continually have problems is when we try to marry a direct digital control system with a pneumatic system, and I suspect that even if you were to do the Upgrade DARHT Option -- I'm sorry -- the Upgrade PHERMEX Option, that you still have to deal with marrying some old technology and some old equipment up with some new technology and new equipment and that can be sometimes difficult to do and can put some unreliability in the system that's not intended.

MS. WEBB: Thanks. I don't have a 25-year-old Ford, so I can't add too much to the Ford stories. Who else would like to talk to us? If not, we'll let Chris -- yes, sir, please.

MR. WATANABE: Diane, I'm Harry Watanabe. I'm speaking for myself tonight. I wanted to make a comment about the enhanced containment alternative. The first sentence there talking about similar to the preferred alternative, except that most or all of the tests would be conducted in a containment vessel or containment structure. Okay, that sounds like a mild statement, but when you start talking about making modifications for containment and so on or trying to

reduce the environmental impact, that doesn't come without cost increases. Okay? That, I'm not sure, has been discussed in detail here.

MS. WEBB: Okay. You're talking dollar cost?

MR. WATANABE: Dollar cost.

MS. WEBB: Yes, okay. Thanks. We will take that under consideration as we prepare the final. An Environmental Impact Statement is not the document that the department generally uses to develop costs, but it is appropriate for us to reference costs when they -- when they bear on the advisability of one alternative over another. So we'll take that comment into consideration here, thanks. Anything else? Yes?

MS. CHANDLER: Can I follow up on Harry's comments? Because I think that's a really key point for some of us who have been discussing this question and wondering why the lab and DOE is not pushing for the containment option. We all assume there must be a cost factor, but it's never entirely clear to us what that is. Frankly, most of us who have been working in this group that we have been environmentally responsible and we have talked about this, why is it the case that the lab is not pushing us since it seems to be more environmentally responsible to go that route? And I think to make your

case to the public, you're going to have to talk about in some detail, why it is that is not the preferred option, because for the layperson out there, that would strike you as the preferred option just automatically because it seems to be more respectful of the environment in which you are going to be performing the tests.

MS. WEBB: Okay. Yes?

MS. McCORKLE: I just want to say -- I'm Anita McCorkle -- (indicating document) on this out there it tells you how much more it would cost to do the containment option rather than do the -- just the regular option.

MS. WEBB: That's the DARHT fact sheet that Anita is holding up. It does have some costing information on it which perhaps not all of that costing information was included in the EIS, so thanks for pointing that out, Anita. Yes?

MR. BROWNING: Just a comment. It is in the EIS Table 3-4.

MS. WEBB: Table 3-4 at the back of Chapter 3 does have a kind of a programmatic summary of

some of the cost and other programmatic decision factors.

MR. BROWNING: It might not be broken out as well as you would like, but there are some costs.

MS. WEBB: It's not a really detailed cost study, but thanks for pointing that out, Richard, that, yes, it does have a summary of cost info in there at the end of Chapter 3. Thanks. Okay, anything else? Christine, anything else?

MS. CHANDLER: I'm sure there are.

MS. WEBB: We will give you a minute to collect your thoughts. If anybody else would like to have anything to say to us while Christine is collecting her thoughts -- yes?

MS. CHANDLER: This is sort of one kind of a controversial question, maybe. Everyone, when they're talking about DARHT is very clear to say, although the stockpile is presently safe -- yaddi yaddi yaddi om -- how do you know that? When you have -- the whole case about DARHT is that there are uncertainties involved in the materials, etc., the components that we need to keep monitoring, how do you know that?

MS. WEBB: Well, the position of the Department of Energy and the Department of Defense and the laboratory directors is that the current stockpile remains safe, secure and reliable.

MS. CHANDLER: That's like a mantra thing. I mean, we all say that and so --

MS. WEBB: And I'll let Jas expand on that

in a minute, but primarily those are based on observations such as through the direct surveillance program. The difference, of course, with DARHT is, when do you know you're going to have an earthquake? I suspect that on the Russian island that just had an earthquake, if they knew they were going to have an earthquake the other day, they probably would have braced those buildings a couple of weeks before the earthquake came.

It's sort of a similar thing. You don't exactly know when there's going to be a problem. You have to be prepared, though, in advance in the event that a problem occurs. And Jas, I will let you speak a little bit more about our mantra.

MR. MERCER-SMITH: There is a surveillance process in which every system in the stockpile is surveilled every year on a regular basis, and a given number of weapons from each system is taken as a representative sample and examined, torn down and looked at. Statistically -- I've forgotten how it works -- you have some 95-percent probability of finding a common mode system failure within two years within surveillance, traditional surveillance process.

MS. WEBB: Jas, would you like to explain what a "common mode failure" is?

MR. MERCER-SMITH: A type of failure that would occur across the system randomly or distributed across the system.

MS. WEBB: Across the entire weapons system or across several systems?

MR. MERCER-SMITH: Across the individual system.

MS. CHANDLER: Okay.

MR. MERCER-SMITH: So there is an active surveillance program that has been going on for 40 years or more.

MR. CHANDLER: Now connect that to hydrodynamic testing.

MR. MERCER-SMITH: When you see the class of failure that -- let's see. There are types of failures that will affect the dynamic performance of either the high explosives or materials in the weapon dynamic basis during the implosion process. Those are classes of aging effects that you may be able to determine the consequences of by looking at the dynamic systems such as the DARHT facility.

MR. CHANDLER: Why would you do --

MS. WEBB: George, I'm not sure we can hear you.

MR. CHANDLER: Why would it be better with

DARHT than with PHERMEX?

MR. MERCER-SMITH: Eventually the multiple use, high energies, you can look more deeply into the system.

MR. CHANDLER: Can you write that in the EIS, all of those things?

MS. WEBB: Well, we will take that comment under advisement and see what we can write in the final EIS. We will get Jas to dictate notes for us. Anything else, George, Christine?

MS. CHANDLER: Computer calculations. Those who oppose the construction of DARHT rely heavily on the notion that we can do it all with computers. How do you disspell that? I mean, there is some reference to it in here, but I don't think it's very well articulated. I think I have a sense of it now that I have been reading about dynamic testing, but I think that needs to be clearly articulated because it's used a lot as a counter in DARHT.

MS. WEBB: Okay. We will take that under advisement. In Chapter 2 there is a little diagram that shows some arrows chasing each other around in a circle. And the point of that diagram is, in the past, when we had underground nuclear testing, it was used in conjunction with computational theory read computers. Of

course, in the olden days, I guess we did it without a computer or something -- but read computers, and hydrodynamic testing was an adjunct of that. In other words, they were both used, both underground and nuclear tests and hydrodynamic tests were used to verify the computational codes, and then computational codes were used to predict what would be expected.

Once this part of the equation is removed, then it is a smaller circle; it is only the inner circle, the relationship between the computational theory, read computers and the hydrodynamic tests. Hydrodynamic testing has never been used all by itself. It has always been used in conjunction with computational development. And I will let either Jas or Barb expand on that if you would want to.

MS. STINE: Well, they have also -- both of those also in the past have been used with underground testing. That goes as well for the effectiveness of the surveillance program in the past, which also had underground testing as a major portion to allow final proof testing of systems even after they had aged. Without underground testing, both were to add data to computational analysis and to provide proof testing for surveillance activities. The level of detail and amount of information available from hydrotesting becomes more

and more important.

DARHT provides significantly increased levels of information over PHERMEX and FXR. That leads directly to the importance that we see for DARHT in this environment of no underground testing. Models, calculations, computer simulations need data in order to build accurate models. That data we can -- the best data we can get would come from PHERMEX -- I'm sorry -- from DARHT. The best data we have now comes from PHERMEX.

MR. MERCER-SMITH: The computer does lie. That ought to be the real answer.

MS. CHANDLER: I mean, that's a good answer, and it's direct. I mean --

MR. MERCER-SMITH: Remember, you're doing -- let me know if it's too high of a technical level. You're solving the wrong set of equations on a computer. When you're looking at the hydrodynamic equations, those are differential equations. You solve them on a computer on a mesh that does a different equation. That introduces something called truncation errors. So you are not even solving the right set of equations when you go to a computer. You approximate them, but you are solving the wrong equations. Unfortunately, you're taking the amounts and they go back down into the feedback loops into yourself and they lie.

MS. WEBB: Okay, Melvin?

MR. McCORKLE: Let me offer a way to demonstrate that better in the EIS. And I'm going to preface it with, as I understand the JASON Report, it indicates that about a third of the underground tests had to do with -- I'm sorry; I'm looking at this one right here. (Indicating documents.) It's the Miller Report.

MS. WEBB: Yes, that is the JASON report.

MR. McCORKLE: The Miller Report. I'm wrong. I will apologize. But in any case, one third of the underground tests had to do with looking at postemployment testing safety and reliability of the device itself. And so if you're going to claim that DARHT will increase the safety and reliability, if you can tie that to a previous underground test that was used to address a safety and reliability issue, and you can make a case that DARHT would have eliminated that underground test, then I suggest that it then demonstrates the need for DARHT in a stronger fashion because you're tying it back to a previous underground test. And that may be difficult to understand that, but I would argue it would strengthen the case for DARHT, if that was a possibility to discuss.

MS. WEBB: Thank you. Scott, our man at

PHERMEX, also has his hand up back there.

MR. WATSON: I'm speaking for myself, Scott Watson. It seems to me that because you have better information with DARHT than you would have with PHERMEX or FXR, you would potentially fire fewer shots and not have to repeat shots, and presently addresses -- this addresses that the shot rate would be the same under the no action alternative as it would be under the DARHT alternative. It's reasonable to suggest there were going to be fewer shots fired at DARHT, and I think that's an important environmental impact.

MS. WEBB: Okay. Thank you. Do you want to say anything about that, or should we just take His comments?

MS. CHANDLER: Because you're taking two pictures?

MR. WATSON: Right. For example --

MS. STINE: I think that's correct. The supposition is that, under the no action alternative, you might actually result in more testing than would need to be done at DARHT in order to get the same level of information.

MS. WEBB: Because of the two axes --

MS. STINE: Because of the two axes of DARHT.

MS. WEBB: -- you get two for the price of one. Anything else, Scott?

MR. WATSON: No.

MS. WEBB: Thank you. Okay, anything else? Yes, Christine?

MS. CHANDLER: One last question.

MS. WEBB: Please, ask away.

MS. CHANDLER: It seems to me that one of the keys is, we have no nuclear testing, and we know nuclear testing provided certain data about weapons systems. I think what you need to do in this draft is to show how DARHT will provide similar or the same, if possible, but I suspect it's not quite the same. I suspect there is a deficiency there that nuclear test would give because that's what you are, in a sense, attempting to replace now that there's a moratorium on testing, and there may be a purpose if the CTBT gets passed in 25 years from now, but that seems to be a key point that needs to be made very clear in this document, which I'm not sure is to the general public.

I think those of us who have been thinking about it a little more lately have sort of put some of these pieces together, but it strikes me, you need to put those pieces together for people and share those with them.

MS. WEBB: I will let Barb and Jas speak to that, but first I would like to say that the department believes that the best source of this type of information has been in the past and would remain to be underground nuclear testing. However, the nation has chosen not to do underground nuclear testing, so given the fact that we would not be doing underground nuclear testing, then the hydrodynamic testing process is the next best thing. So it's not quite a one-on-one substitution, but that's why it says in there several times, "in the absence of nuclear testing, DARHT would provide the best capability." And I will let either Barb or Jas expand on that.

MR. MERCER-SMITH: There is crucial data involved in nuclear testing that DARHT will not deliver. We're doing the best we can.

MS. STINE: And we need the best technology available.

MS. WEBB: Did I see another hand, or was somebody just stretching over here, out of the corner of my eye.

MR. McCORKLE: I will go back and address Harry's issue a little bit; that is, if you take the preferred alternative, I think one of the most nebulous cost considerations in the preferred alternative is what

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the clean-up costs are at the end of the useful life of DARHT without containment and, granted, if we go to containment, that the immediate cost and up-front cost may be higher and, in fact, I think are demonstrated to be higher, roughly 123 million versus 154 million or 259 million, but I think that would be offset by the
29 mitigation cost of cleanup of the D&D effort that takes place at the end of a useful life of DARHT and/or PHERMEX, you know. We're beginning to understand, the department has a lot of information that the initial estimates regarding what D&D turns out to be is rather relatively low and that the actual cost of mitigation are much higher.

So granted, I think pollution control would cost a little bit of money, but those costs are borne up front, and they are difficult to prove a cost benefit ratio in all cases because you are trying to estimate the benefits of 30 years from now of not having to mitigate pollution or some environmental concern in 30 years from now. So I don't agree with his observation.
29 There is some additional up-front cost, and I don't think it can be offset by mitigation in the future, and these estimates are the ones I distrust the most. The farther out you go with the cost estimate, the more concerned I become with its reliability.

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MS. WEBB: Okay. That's sort of the near-term cost trade off against long-term, very long-term --

MR. McCORKLE: Term costs that are difficult to estimate.

MS. WEBB: You are absolutely right. As we go out into the future, the 30-year life, the end of the 30-year life of the project, it's very hard to estimate what costs would be.

MR. McCORKLE: And on occasion the laboratory has taken that position. For example, in the Sanitary Waste System Consolidation Project, it was actually built so that we could return treated waste water back to the TA-3 area and reuse that treated waste water so that it allows us to not use as much potable
30 water, well water, as we would otherwise. So the laboratory has taken this initiative in some specific cases; that is, yes, they have increased the cost of a particular project because it does buy some beneficial return that may be difficult to quantify.

MS. WEBB: Okay, good point. Anything else? I would like to just explain a little bit about the decision process. As I mentioned, when I was talking about the steps in the Environmental Impact Statement process, the department will, after going through the

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environmental analysis, we will make a final decision that will be documented in a Record of Decision.

That decision will be based on many factors, including costs, including programmatic concern, including national need, national security needs and including the environmental aspects that are analyzed in this environmental impact statement.

So when I said that the environmental impact statement itself does not do an indepth discussion or analysis of costs, I didn't mean to imply that those considerations are not important in the final decision that the department will make, rather than to just kind of point out that the Environmental Impact Statement focuses on, obviously, environmental impacts and does mention summaries of costs and other types of programmatic considerations for the information of the -- of the reader, and to explain a little bit about the relative merits of the various alternatives. I just wanted to point that out.

Okay. Anything else? If we are winding down, I would entertain the suggestion to take another break and -- yes, Tom?

MR. SWITLIK: Yes. Tom Switlik, free agent. I want to back up the gentlemen here saying that
31 the present things are safer, reliable and they perform

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31 properly. That's assuming that they are getting periodic maintenance, like replacing the batteries or tires, and the main thing that people need to understand is that
31 they go into their -- as long as they are in their shelf life or life cycle, that's a good assumption.

Now, if you're trying to project 30, 40 years after they are designed, that's why you are at a higher risk and start doing something. So that is a good assumption. Right now they do teardowns. It costs a lot of monies to keep these things because it's not sitting there like a -- it's relatively inert. They are designed for 30 or 40 years, but it might be 100 years. But the thing about radioactive stuff, you are putting out the heat that could be tearing up rubber and plastics and all that sort of thing, and it makes it really hard to try to predict what's going to happen.

MS. WEBB: Yes, you're right. Thanks. Yes, Morrie?

MR. PONGRATZ: My name is Morrie Pongratz. I am a member of the Los Alamos County Council, and I -- I was here this afternoon and made a brief statement, but after I left, it occurred to me that one of the concerns
32 I have about a containment vessel, my job at the laboratory is involving treaty verification and making sure that people aren't detonating weapons in the

clandestine modes, and I think that you should seriously look at the CTB implications and the nonproliferation treaty implications of admittedly tested weapons, like things behind something that I can't see in to. I -- I think that is a very serious impediment to disarmament treaties to be doing that.

MS. WEBB: Thank you. And would you like to clarify for us, Morrie, are you speaking tonight --

MR. PONGRATZ: That time I probably was speaking not as a county councilor.

MR. McCORKLE: I have a question, Morrie. Would you be willing, under that scenario, to provide some sort of auditing capability to get to see it before it goes behind the vessel that you can't see?

MR. PONGRATZ: Those things are state department things, and I play a little bit in that game, and it very quickly gets out of the realm -- rationale and into the realm of almost religious organizations, and they have great pomp and circumstance, so I don't know.

MS. WEBB: Thank you for explaining the state department.

MR. McCORKLE: Use see-through containment vessels.

MS. WEBB: Actually next door Mike has a model that looks like it's out of tupperware, sort of a

model of a modular containment vessel. Does anybody else have any comments for us tonight, remarks that you would like to make for the formal public record? It's a little bit after 8:30. This meeting was called to continue until 9:00. We will be here until 9:00, and if we have people at 9:00 who want to speak to us, we will reconvene. Until that time, then, it being 8:35, we will take a break. Again, I invite you to look at the information displays, take a look at the sheets that are on the board of this afternoon's session and this evening's session, and particularly if you came in late, and I appreciate very much all of you taking the time to be here tonight.

(Break taken at 8:35 p.m.)

MS. WEBB: All right. It's now 9:05. We said we would reconvene at 9:00. I do not see anybody else that wants to say anything to us tonight. So seeing no one step forward, we will now adjourn for the evening. We will have our next session tomorrow afternoon in Santa Fe starting at 2:00. Thank you very much and good night.

(Hearing adjourned at 9:05 p.m.)

STATE OF NEW MEXICO)

COUNTY OF BERNALILLO)

I, IRENE DELGADO, New Mexico CCR 253, DO HEREBY CERTIFY that I did report in stenographic shorthand the foregoing proceeding as set forth herein; that the foregoing pages are a true and correct transcript of my stenographic notes and were reduced to typewritten transcript through Computer-Aided Transcription.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case, and that I have no interest in the final disposition of this case in any court; that on the date I reported these proceedings, I was a New Mexico Certified Court Reporter.

IRENE DELGADO, NM CCR 253
Notary Public Expires: 5-1-96

Transcript 3: Comment Code 45
Santa Fe Public Hearing – Afternoon Session

Multi-Page™

SANTA FE PUBLIC HEARING
for the
DRAFT ENVIRONMENTAL IMPACT STATEMENT
DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST FACILITY

THURSDAY, JUNE 1, 1995
2:17 P.M.
HIGH MESA INN
3347 Cerrillos Road
Santa Fe, New Mexico

REPORTED BY: Irene Delgado, NM CCR 253
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MS. WEBB: Good afternoon. Good afternoon. My name is Diana Webb. I am with the Department of Energy, Los Alamos area office. This is the Santa Fe afternoon session of the public hearing for the DARHT draft EIS in the High Mesa Inn. DARHT stands for dual axis radiographic hydrodynamic test facility.

With me today are Bob Day, who is the director of the Dynamic Experimentation Division of the Los Alamos Laboratory, and Jas Mercer-Smith, who is the deputy programs director for the Nuclear Weapons Technology Program. We also have Irene Delgado. Irene is our stenographer who will be making the verbatim transcript of our meeting today. We have a scribe, Tom Alexander. Tom will be capturing your comments in summary form, and we will be putting them around so you can see, if you can come in later, or for people who come in later to see whose comments were made this afternoon.

We are here today to listen to your comments on the draft Environmental Impact Statement for DARHT. We are interested in the comments regarding adequacy, the accuracy of the analysis in that document, and any other comments you might want to make regarding this process, these public meetings, or the DARHT program in general.

Our format today consists of three

separate areas. This is our round-table discussion area. As you can see, this is a round table, it's not quite round. This is a round-table discussion area. This is a formal proceeding here, and like I said, Irene is making a verbatim transcript, and that will serve as the formal record of this portion of the meeting.

In a few moments, feel free to come forward, sit at the table with us, give us your comments. We are flexible. We can either sit here and listen as you provide spoken or written comments to us; we will be happy to answer questions the best we can, or entertain an open discussion amongst you, the members of the public.

On the other side of this partition, this gray partition, is an information area. We have a lot of displays regarding the DARHT project, the alternatives that we are analyzing, Environmental Impact Statement, and other information pertaining to Los Alamos National Laboratory and various aspects of this project. Out in the hall, we have, besides the cookies and ice tea and coffee that most of you have already discovered, we have a table that has information handouts, and we have another table that has information that has been provided for alternative points of view. You might be interested in looking at that information also during the break.

We do have some evaluation forms, if you care to, we would be very interested in your ideas on whether or not you like this type of meeting or your suggestions, comments on how we can make it better. We also have, kind of across the lobby, a separate room I'll call the quiet room -- I believe it says "Comments Room" on the door -- where there is a tape recorder. There are forms, if any of you would like to either give a comment to us in a separate setting than this room, feel free to go in there. That material also will be made part of the formal public record of this process.

While we encourage you to ask questions of our folks in the information room, I do want to point out, however, that that is an informal discussion and that those comments are not being recorded and will not be made part of the record.

The Department of Energy has proposed to provide enhanced high-resolution radiographic capability to perform hydrodynamic tests and dynamic experiments in support of the department's historical mission and near-term stewardship of the nuclear weapon stockpile.

The Department of Energy's preferred approach would be to complete and operate the DARHT facility at Los Alamos National Laboratory. An Environmental Impact Statement provides a comparative

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analysis of the environmental impact of the, in this case, the preferred alternative and the other alternatives analyzed in that document.

The DARHT EIS analyzes six alternatives. The no action alternative, which is the status quo. That serves as a basis for comparison for all other alternatives or all other impact analyses. We look at a comparison of what would happen if we went forward with the DARHT preferred alternative or one of the other alternatives and weigh that against what would happen if we did not -- if we maintain the status quo of the way we run the program today.

Under the no action alternatives analyzed in the DARHT EIS, we would continue to use the PHERMEX facility at Los Alamos National Laboratory, and we would not complete the construction of the DARHT facility for use as a hydrodynamic test facility. The preferred alternative, as I have already mentioned, would be to complete the DARHT construction and operate the facility to provide the enhanced high resolution radiographic capability that we have proposed to acquire.

DOE may delay operation of the second axis of that facility until after the accelerator and X-ray equipment in the first axis is tested and proven. We have looked at four other operational -- alternatives in

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the DARHT EIS. Upgrade PHERMEX, would be an alternative where we would not complete the construction of the DARHT facility for use as a radiographic hydrodynamic test facility. It would be completed for our uses. We would enlarge the existing PHERMEX facility beyond its current small single axis to be larger and to provide the dual axis capability and the enhanced high-resolution radiographic equipment that we would put on -- under DARHT, in the preferred alternative.

Under the enhanced containment alternative, the facility would conduct its operations in a very similar manner to the preferred alternative except we would use containment for most or all of the experiments that took place. We have looked at two options. We have looked at a building, a containment building, in which case, all experiments would take place inside in containment buildings and we have looked at a containment vessel.

At this time, the department does conduct some experiments inside a vessel. Under this alternative, we would conduct most experiments inside a vessel. Under the plutonium exclusion alternative, we would conduct essentially the same operations as under the preferred alternative, but we would not conduct any experiments involving plutonium at the DARHT facility.

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However, if the department does foresee a need to conduct dynamic experiments involving plutonium, these would be conducted at PHERMEX, our other facility.

The sixth alternative is a single axis alternative. Under that alternative, the department would conduct its operation very much under the same alternative but only one of the two axes of DARHT would be completed for use in hydrodynamic testing. The other accelerator hall would be completed for other uses.

All other alternatives examine the continued use of the flash X-ray facility at our sister laboratory Lawrence Livermore in California. Under all alternatives, the department foresees that dynamic experiments involving plutonium would be conducted and hydrodynamic tests would be continued. Under all alternatives, alternatives involving research, waste management, security, maintenance, environmental monitoring, and other related support functions, would continue.

And under all alternatives, eventually both the PHERMEX and DARHT facility would be decontaminated and decommissioned. We are in about the middle of the steps in the EIS process. We started out with a Notice of Intent in November. We had a public scoping period in December and January. Some of you

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attended the public scoping meetings with us the first week of December.

Our implementation plan, the document of that scoping period, was issued in January. The draft Environmental Impact Statement has been issued for public review and comment in May. We are now, of course, in the comment period for that draft. The formal comment period will run until June 26; however, we will continue to accept late comments as long as we are able.

After we receive and analyze the comments from you and others that we get during this comment period, we will prepare the final Environmental Impact Statement. No sooner than 30 days after the final Environmental Impact Statement, we would issue a Record of Decision. The Record of Decision would serve as the formal record of the decision that the Department of Energy would make based on this analysis and other decision factors as to whether or not to continue to construct the DARHT facility and operate it, or whether or not to take one of the other courses of action that has been finalized.

At the same time of the Record of Decision, we would issue a Mitigation Action Plan. That is a brief document that explains the mitigation measures that we would take to lessen any adverse impacts that we

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have identified during this process.

This photograph over here shows what the DARHT facility looks like today. The construction has been shut down. This photograph is looking essentially due north. This east accelerator hall is the hall that, if we decide to proceed with DARHT, would be the first hall to be completed, and would be the first hall to have accelerators and X-ray equipment installed. In the event that the department would decide to go forward with the single-axis alternative, it would be the east accelerator hall that would be the hydrodynamic test facility.

This is a map, a generalized -- actually, it's not very general at all; it's fairly specific. That's a map of the Los Alamos townsite. This is the White Rock townsite. This is the site of the DARHT facility, and right adjacent to it is the site of the PHERMEX facility. They are located in Technical Area 15 within the explosive test area of the laboratory.

This is a summary of the results of the environmental analysis in the -- in the EIS. As I mentioned before, there is a comparative analysis. The first column shows the no action alternative, what would happen -- what we would expect to happen if we continue to operate PHERMEX at the Los Alamos area -- Los Alamos National Laboratory. We have compared the impact of the

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other five alternatives to that.

If you look at that closely, you can see that it does have different colors of type. The black type represents those impacts for which we do not foresee a change across the six alternatives that were analyzed.

The red type indicates where we see that there would be a greater adverse impact that would occur under one of those alternatives when compared with the no action alternative. And the green type indicates those aspects of the environment where we would expect a greater beneficial impact than those that would occur under the no action alternative.

This is the DARHT EIS. If any of you have not received a copy or would like a copy, please leave your name and address with the staff at the front desk. In addition to this unclassified document, the department did prepare a classified supplement that includes additional information of analyses. The department has prepared an unclassified summary of the impacts that are contained or identified through that classified analysis. Copies of that unclassified summary are available outside on the information table.

The department has placed quite a bit of information in Los Alamos Community Public Reading Room. In addition to the 200 or so references that are

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mentioned in the draft EIS, we have included at least 60 other documents in the public reading room. A list of those documents are also included in the information that's contained on the table outside.

Following my remarks, which are going to end here very shortly, if you would like, we could have Bob Day give a five-minute overview of the programmatic aspects of the hydrodynamic testing program that's conducted at Los Alamos National Laboratory. If you would prefer not to take the time to do that, we will defer to your wishes. As I said before, this is your meeting and we will do what you want to do.

If there are any elected officials that represent the state, tribal governments, or local governments, that are speaking on behalf of the constituencies, I would invite those people to speak first after we discuss whether or not Bob is going to do his talk.

What is the consensus, then? I'm asking you, would you like to hear a short overview from Bob regarding the hydrodynamic testing program? I see one yes and one no. How about then that we pass that at this time, and if we still want to hear that later at this meeting, we can go ahead and do that later.

Then I would ask, are there any elected

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officials or people that are representing the state, Indian tribal governments, or municipal or local governments. And I see no one. We will then open the floor then to the public to come forward and make your comments.

Since this is a recorded proceeding, I would ask that you give your name for the record and, if necessary, spell it for Irene. Irene will also indicate for you if she's having a hard time hearing you or if you need to speak louder. Again, these chairs at the table are for you to sit in. They don't have to remain empty. Feel free to join us up here. And Marilyn, you asked if you could speak first because --

MS. HUFF: I don't have to speak first; I have to speak pretty soon.

MS. WEBB: Marilyn says she would like to speak pretty soon. Other than that, I'm willing to find out who would like to talk first. Greg, would you like to talk first?

MR. MELLO: I'm very ill-prepared, but --

MS. WEBB: I doubt that.

MR. MELLO: No, please don't doubt.

MS. WEBB: Please feel free to join us at the table. Other people can sit here besides Bob and Greg. And if you would be so kind as to mention your

name for Irene.

MR. MELLO: My name is Greg Mello, Los Alamos Study Group. And thanks for all the work you guys have done and I'm not as prepared. We were really spread thin, and it's kind of senseless for me to come so ill-prepared as I am considering all the preparation you have done.

MS. WEBB: We understand you are busy and appreciate your taking the time to come.

MR. MELLO: My questions revolve around the purpose and need for the facility. Reading the purpose and need chapter of the draft EIS, what it looks like from this reader is that there are some fairly vague statements used to paint a picture of the necessity of 1 this project without really making a very convincing case. It's our experience in working on these issues that -- that vague statements are repeated within the laboratory and Department of Energy and other contractors until they become -- they gain credibility and weight by repetition rather than by accuracy, and it seems like this has happened here.

There's just a bald statement DOE needs to 1 improve its hydrodynamic testing capability as soon as possible. This is not clear. The statements that follow; "uncertainty in the performance of the enduring

stockpile will continue to increase with the passage of 1 time." Well, that's certainly talk-logical. It doesn't point to any for DARHT, exactly.

Yes, DOE no longer uses nuclear testing, although that's being discussed again right now. There's a confusion throughout this language between the maintenance of existing weapons or kind of a curatorship 2 program and the kind of build-down options that the department has been looking at in the congressional budget requests, and in our documents, such as this interagency draft stockpile stewardship program plan that I would like to submit to the record.

And in a -- there are a lot of weapon upgrades planned. This is a February 27th document which contains statements like discuss B-52 replacement. That's a nine megaton city-busting bomb. There's statements in here about finishing a Phase II study for a Navy warhead for a high-powered radio frequency warhead. There's some modifications to various stockpile weapons B-6 -- B-61s.

We usually hear the purpose and need for these facilities is related to the existing stockpile, 2 but when you actually look at the plans, that it doesn't look like the existing stockpile at all. It looks like a continual, gradual improvement or modification. There's

reference here to retrofitting of fire resistant pits that could be done transparently without nuclear testing.

There's reference here to the concept of self-aware weapons systems and the use of hydrodynamic testing facilities, DARHT, to retrofit pits with sensors 3 that would monitor the aging of the pits and provide, as it says here, a dynamic real time analysis of each weapon's state of health. While the state of the health of the country falls to pieces, we will be able to have real time, instantaneous analysis of the state of health of our nuclear weapons, I guess.

This is a big program outlined in this document. It looks like actually billions of dollars of work. And it doesn't comport with what is put in the DARHT draft EIS. The use of the FXR facility, from our 4 view, seems completely adequate to solve the curatorship problems of the enduring stockpile.

The use of radiography facilities, dynamic radiography, generally seems greatly overstated as a tool for dealing with aging problems and with safety problems. 5 As numerous high-level officials have testified to Congress, there are no safety or reliability problems in the current arsenal. In the long run, problems you expected the way that this is -- this is a copy of the

Sandia Stockpile Life Study, which can also enter into the record. These problems have been solved in the past relatively simply. There haven't been a lot of problems with pits. Most of the problems are in the nonnuclear 6 components, and we don't see any real impediments to simply remanufacturing pits to the original specifications as needed, if problems are detected through metallurgical examination and ordinary stockpile surveillance.

The upshot of this is that, it's not clear that DARHT needs to be pushed rapidly as a project, especially given that its technology is kind of perhaps even a little old now, given that its order in the -- in the grand scheme of NEPA analysis is wrong; that is to say, as an integral part of the stockpile stewardship program, the direction of the stockpile stewardship 7 program, its scope, its philosophy, ought to be determined before the facilities that would implement those philosophies are built.

There are some -- I'm not sure that that last thing was a sentence. If not, please bear with me. -- FXR, there may have been an experiment last month at the FXR. There are rumors of a significant experiment 8 last month. I would be interested in any comments you might have about this, or if that gave a pretty high-

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resolution shot. The completely unchecked source I had was as good as DARHT. There are people, you know Seymour Sack, Jim, who does not think that DARHT is a good idea, particularly, and these are very qualified people, and Seymour is highly regarded in Livermore.

MR. MERCER-SMITH: And Los Alamos, but then again he never had a nice thing to say about Los Alamos.

MR. MELLO: To conclude these comments, I would be very interested in your responses. I want to give to Jim some draft papers on stockpile stewardship.

MR. MERCER-SMITH: I have a copy.

MS. WEBB: If you are submitting them for the record, why don't you just hand them over to me and then Jas can look at those.

MR. MERCER-SMITH: I have a copy.

MS. WEBB: We will make a copy. And Greg, you asked a direct question to Bob before you -- before he answers that, you have given us an interagency stockpile stewardship program plan. I would just like to point out also that the Department of Energy has just completed a stockpile stewardship and management plan. Copies of this are available to anyone who wants them outside on our information table. And having said that, then I will --

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MR. MELLO: One other of the questions that I would also like to ask before it's forgotten; can someone comment on the draft interagency stockpile stewardship program?

MS. WEBB: Bob, can you do that, or would that be more appropriate for Jas?

MR. MERCER-SMITH: I'm not sure if I read this. Let me see if I --

MS. WEBB: All right. Well, you take a look at this and Bob can go back to your first question which has to do with this test last week with FXR.

MR. MELLO: Last month, supposedly.

MR. DAY: FXR, for those who are not in the know, FXR stands for the flash X-ray radiographic machine. It's a machine that exists at Livermore. It's site 300 -- which is another location where hydrodynamic testing is done. There are actually two machines that are presently being used, and this one and PHERMEX, which is the machine we use at Los Alamos. It presently has the capability of something under a couple of millimeters in resolution and something approaching a couple of hundred rads in radiation.

The capability of FXR is essentially the same in terms of resolution and a little bit higher in terms of total dose, maybe up to 300 rads. And those two

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parameters are really important in terms of our ability to understand these devices and understand the kinds of questions we are after, because what we're trying to do is see deep into thick material and take X-rays of that material, and we have to look at finer detail. And actually, if you are interested, you go look at some pictures on the back wall over there, and what they will do -- it's over in the information area behind that wall -- what they will do is sort of give you a visual representation of what the different capabilities of the machines are, a real life picture.

And the present PHERMEX capability is fuzzy. FXR capability is comparable. The doses from the two machines are getting comparable now as well because these machines undergo evolution. What we need is a revolution; we need much greater information. FXR is undergoing an upgrade program which is starting, and that's going to improve the resolution of that machine up -- well, we hope it will improve the resolution of that machine to maybe one and a half millimeters, so it will be a little bit better than the pictures on the back wall. The dose will stay approximately the same. We need to get the resolution down closer to a millimeter.

That's the technological goal we have for DARHT, and if you look at those pictures, you will see so

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much finer detail you can see, as a matter of fact, compared to where we are at the present time. Each and every shot we do with DARHT will have ten times more information than we get at the present time and much greater detail. The FXR upgrade is an important technological demonstration. It's going to help us in the very -- in terms of gaining information, just like the upgrade in PHERMEX was helping us.

In PHERMEX, we're doing two things. We are doing a project and have done a project to help improve the dose. That's so that we can get more information through thicker material. We have taken that dose out of PHERMEX from about 100 Rs to 200 Rs. A lot of good work I mean or the basis of good people working on this technological issue. We are also going to be able to get two pictures out of PHERMEX, so we can get twice as much information out of one of those -- out of that machine, and that will help us in terms of understanding the time evolution.

It's also a technology that may be applied at FXR in a different way. Those kinds of technologies can also be applied at DARHT, again, to be able to try to get more information from this investment that we're all making, and ensuring that major part of our nuclear weapons capability -- this major part of our national

defense -- will perform as expected without underground nuclear tests, because that's one of the big changes.

Always in the past when we wanted to know about a nuclear device, when we wanted to know whether it was a safe device or reliable device, or whether we wanted to know if they function properly, we took them to Nevada and we proved them. Now we can't do that, so what we're trying to do is use the very best possible other means we have, and these kinds of capabilities, being one of the dominant ones, to try to get information to tell us what we used to be able to find out through the testing. So it is a major step in helping to support the national goal, the stated national goal, of comprehensive test ban probably sometime next year.

MS. WEBB: Do you want to add to that, Jas?

MR. MERCER-SMITH: No.

MS. WEBB: And Greg also asked if either one of you wanted to comment on the interagency stockpile stewardship program. This is a February 27 draft, and Greg asked if anyone could tell him about what the current status was.

MR. MERCER-SMITH: I hadn't read that particular draft. I've seen pieces that went into it before, but that specific draft, I haven't read before

and haven't read now carefully. No, I don't know the status.

MS. WEBB: Bob, do you have anything to say on that?

MR. DAY: I have one underlying comment, and that is, at the present time, the United States is not developing any nuclear weapons. This is a matter of national policy, and it certainly is a matter of actuality at Los Alamos; developing and developing and putting into the stockpile. The Department of Defense asks us questions about nuclear technology. They ask us questions about present devices and what they can do, and ask us questions about devices that are retiring and how -- and how the missions that they have can be replaced. They ask us questions about what effect various requirements that they have might have on future shot.

We study those questions in great detail, and some of the issues that Greg refers to are studies that were done. They are not commitments to new nuclear weapons. They are not developing nuclear weapons. They are the Department of Defense and laboratories in support of that mission, doing what is expected of us.

MS. WEBB: Okay. Thanks, Bob. I will just note for the record that Greg -- we get that one,

Bob. I will note for the record that Greg has submitted to us five documents -- I'm sorry -- five documents and we will enter those. You have a lot of other paper there. Do you want the rest of that to be submitted today for the record?

MR. MELLO: No. Can I ask one --

MS. WEBB: Sure.

MR. MELLO: -- follow-up question? Was the Phase II study completed in March on the high-powered radio frequency weapon at Los Alamos and/or Livermore?

MR. DAY: I will defer that one to Jas because that's more in his area of expertise. We have been looking at it.

MR. MERCER-SMITH: This is a holdover case that study was started before the end of testing and was continued through as that was followed up as long as we had the sources. I don't know that it was completed in March.

MR. MELLO: When was the scheduled complete date?

MR. MERCER-SMITH: I don't know. It was a two-and-a-half-year study. I mean, when we went into the study, it was planned to be two and a half years, and I don't recall the starting date.

MR. DAY: There is an underlying issue here that is really important, and that is, the laboratories don't -- nuclear weapons are an important part of the nation's defense in this country, and the laboratory has a series of jobs in support of that mission, and that defense posture and this process of better acting with the Department of Defense in terms of how the present systems behave, what the issues are with the present systems, and how those kinds of capabilities impact various missions that they have, is one of the functions that we perform for the government.

We also look at issues associated with foreign technology, counterproliferation, technology potential, that potential proliferation could be building. They could be issues associated with proliferation devices that might be found to be unsafe. There's a whole series of questions like that that we do deal with, and actually, we do some experimentation to try to understand, especially in the proliferation and counterproliferation, experimentation associated with how technology might be disabled. Those technologies and what they might mean to the security of this country are really important parts of things to test. Some of the issues and questions that he referred to are definitely in support of that kind of thing.

MS. WEBB: Okay. Anything else, Greg?
MR. MELLO: I shouldn't take up much time.
MS. WEBB: You can take as much time as you want, but you may want to take more time later. Thank you. Who would like to speak next?
Marilyn, would you like to speak now?
MS. HUFF: I have a whole lot of respect for the scientific method as a way of ferreting out, you know, what is true from what is not true. And my understanding of it is that one of its purposes is to weed out the subjectivity from the viewing of data so that personal opinion and things like that can't really obtrude them, and what we really want to know is the object of truth, and it posits if there is such a thing as objective truth, and nonetheless, I do see a few thought -- flaws in this.
One is that, in the formulation of a hypothesis, you are already making a subjective projection of what is real, and the other is that because -- because you placed so much faith in the scientific method and the fact that it is actually operating to weed out the subjectivity, you make some kind of false assumption that subjectivity can be weeded out. And I think this operates in two ways; subjectivity

intrudes itself through human ambition and greed and also through prevailing modes of thought; for instance, when people in general believed that the world was flat, science came up with a theory of the movements of planets that was in fact entirely not true until the premises were changed, so that everything is based on current premises and a lot of them are current perceived political realities.
Now what has happened in Los Alamos is that, to my mind -- I don't think I'm being cynical -- lies have been told, and this, I will state, a purpose of
12 science has been corrupted in service to things like that the need for funds or the desire for funds or the -- the ambition of particular people -- I think the best example of this in our world is the alteration of data, when people were trying to get funding for Star Wars, was blatant, and I'm really surprised it didn't become a major scandal, but it didn't because it was inconvenient, I think, for political reality. I happen to know about this because I was serving as an editor for John Manley at the time.
John Manley, I think most of you know,
12 except maybe in the audience, was second in command to Oppenheimer during the Manhattan Project, and he was very concerned about Star Wars at this time, and I think

really upset because he was really, like, devoted to pure science.
What John Manley said at the time, I think that pertains to this, is that he really rather scoffed at the idea that nuclear underground testing was necessary for the stewardship of the nuclear stockpile.
12 He said, there isn't that much that needs to be known about bombs that are already made, and that he did not believe that that was what the purpose of a nuclear underground testing was, was that it was really for was in order to develop new nuclear devices, especially nuclear trigger devices for Star Wars.
Now, I bring all of this to bear on the Environmental Impact Statement of DARHT, and I begin to
13 wonder, also, then about this purpose, mission of DARHT, which is once again the stewardship of a nuclear weapons stockpile and cannot believe that this is an adequate justification for the building of DARHT, you know, even in my common sense way of thinking about. It, and this is a very arcane document and isn't really accessible to public understanding, and I'm wondering, you know, why
14 couldn't it have been made more accessible? Except I think there is some kind of -- I'm not sure -- deliberate or subconscious attempt to intimidate people from making public comments because, you know, we're not scientists.

We don't know, but I don't believe that what, you know, however many thousands of thousands of
15 bombs we have in our arsenal, that we need to devote, you know, millions of dollars to a billion that will make sure that they all go boom. It all defies common sense to me, and I don't believe that other members of the
16 community of nations are going to believe that, either. They're going to see DARHT not as something that is going to promote comprehensive test ban or promote a nuclear nonproliferation treaty, they are going to see it as
16 United States arrogantly and hypocritically continuing with nuclear development at a time when they're being asked to abstain. I don't see how that, in any way, is going to help us close down the nuclear establishment.
So I distrust this as -- as a justification for DARHT. And in that context, I see all
17 of these alternatives that you're proposing as based on a prevailing premise that may be a false one, which is that we should continue to maintain this nuclear arsenal, that we should continue with this and that, I think promotes an armory status even more dangerous than a bipolar because it's an arms race that can get out of hand, so that you know it wouldn't necessarily be a truck parked in front of a federal building in Oklahoma City, someone can come with a suitcase and lay it down and the building

would be destroyed. All of Oklahoma City would be destroyed.

I mean this is a dangerous situation in which I think the United States has to start showing restraint in what it's prepared to build, and there is no alternative proposed there that isn't at least continuing what we're doing already. There is no alternative proposed that says, "Let's stop this. Let's start redirecting funds to environmental cleanup, to human needs." This is a meaning -- this is just one more step in the continuation, which I think is a continuation, you know, what everybody perceives as their precious jobs, because, you know, here we have Congress' purse strings that we're trying, you know, to open up at a time when who have we got in charge here? People who say, "We will shut down the budget," except these are particular people who will, at least under the threats of the barbaric hoards, will open up the purse strings to things that are destruction oriented.

I would simply like to propose that another alternative be considered, unless -- unless it is -- I don't think it's -- I don't think it's a valid choice. I mean I do not want to choose from any of those alternatives that you are presenting to us, and I would like one proposed that is directing Los Alamos to all of

these purposes for which it, you could call it -- serve pure science again.

MS. WEBB: And, thank you. Marilyn, would you please give your full name to Irene?

MS. HUFF: What?

MS. WEBB: Would you give your name to Irene for the record? I forgot, Irene.

MS. HUFF: Marilyn Huff, H-u-f-f.

MS. WEBB: So you are suggesting we look at another alternative?

MS. HUFF: Yes.

MS. WEBB: Thank you very much.

MS. HUFF: You are welcome.

MS. WEBB: All right. We have a hand back here. Would you like to either come forward speak -- it's easier for Irene to hear if you do come forward to the table, but it's not absolutely mandatory.

MR. LOCKHART: My name is Milton Lockhart -- M-i-l-t-o-n L-o-c-k-h-a-r-t.

DARHT is a first in a progression to provide data for the design of later facilities and to help aside unknown problems which may not be detectible by inspection. DARHT's data can be used to validate the results of computer simulations, and as Dr. Louis Rosen pointed out on May 31, to furnish data for training new

generations of physicists and material scientists. The stockpile has reached an average age never before achieved and the average age is increasing in spite of retiring older weapons systems.

Delaying DARHT until specific problems are decided to justify DARHT's use is on the same logical level as deferring a treadmill test until after the patient has suffered a coronary. Safety and reliability today does not equate to safety and reliability tomorrow.

Opposition has been stated to the need for DARHT'S capability to provide three-dimension time sequential data. Statements have been made that, quote, no goal, unquote, has been reached for this enhanced capability. Page 9 of the JASON Report states the design community has properly judged that improved hydrotesting capabilities are important in the absence of underground tests. The ultimate goal would be a tomographic movie of the late stages of the imploding pit. This and other statements indicate agreement on the need for enhanced capability.

Let's put this capability in simple terms. I have long been frustrated over the inability of my 35 millimeter to take good landscaping, particularly of mountains at a distance. I have been envious of friends who have 155 millimeter zoom capability and take

great pictures. DARHT has the capability to take great pictures of different materials under stress, which no other facility on the face of this earth has. These pictures provide previously unobtainable data which aids in the design of DARHT successors and makes the scientists' job easier in modeling and evaluating the reaction of materials to different stresses. With time lapse photography, and later the facilities, the movie effect could be a reality.

Computer models are only as good as the data on which they are based. Can these data be used to design new weapons? Of course. Data are data. If national policy changed tomorrow, these data could be used for designing new weapons, but more importantly, the same data can be used in improving safety and reliability of nuclear weapons and other peaceful materials for certain. The alternatives presented in the DARHT EIS are not all optimal for solving the problem.

The single axis alternative only provides enhanced resolution without the 3-D radiography which two beam lines furnish. The plutonium exclusion alternative does not furnish data on any important weapons material, while costing as much as the preferred alternative. The upgrade PHERMEX alternative costs more than the preferred alternative. The no action alternative is not really an

alternative because of the present condition of the PHERMEX facility which needs reinstrumentation and renovation.

DARHT is currently the most cost effective and prudent way to implement the nuclear policies of the United States. However, the draft EIS assumes that the readers know all of this information about DARHT. Rewrite the draft EIS to make clear what DARHT's mission is, how DARHT will be used, what peaceful nonweapon uses are possible. Justify the enhanced capability. Explain the environmental impacts and assumptions used in terms which can be grasped by the educated but uninitiated reader.

While I'm sure that initial cost, not life-cycle cost, was a major factor when the preferred alternative was chosen, the fact that that EIS is being prepared, emphasizes changed circumstances since the 1980s. One of the containment alternatives is probably the more cost effective when D and D costs are considered on a life-cycle cost basis. Thank you.

MS. WEBB: Thank you. If you would like, you may submit that to me for the record. Thank you. All right. Yes, Richard, please?

MR. DEYO: Thank you.

MS. WEBB: Thank you, Richard.

MR. DEYO: I should say, I'm going to guess, perhaps, maybe that this might be more effective in stockpile stewardship management and all this other stuff, but some time ago, you know, I was reading this little thing about the -- there's a bunch of statements in here from Clinton and Congress and everybody that seem to me to have been taken out of context. And it's the sort of thing -- well, history sort of thing. They mention in this letter that's all there, too.

It's, like, I happen to be very critical of science, as you know, psychiatry. I mean, I learned about the scientists that wanted to study concentration camp conditions and, you know, in this country, and beat his own, beat people. And then I learned about Niels Bohr and how he would testify, and not to -- it's like my history of the atomic bomb. Mr. Clinton makes a lot of statements about the history of the atomic bomb, too, he -- I mean, he wasn't even born when they did it, and neither was I.

I wrote this one thing that I remember reading, and I can't even remember which one of these DOE hearings it was in, which the former mayor of Albuquerque spoke after me and after he got up. So I would like to repeat that, what I had said, and maybe some of what he said to me afterwards. He said it to the record, too,

but I basically had said that -- that the atomic bomb was not only ineffective against this, it was counter-productive, that those people back then who tested and deployed, criticized nuclear weapons implicitly, and in not being deliberate, they gave weight to Hitler's scheme for global conquest and even warned the Pacific from it because they didn't want to be called all that they really are or have to answer for all the mess that they swindled. I don't know if that's true or not. That's what I guess would be called a scientific theory, a conjecture, if you will.

I -- I very much believe in it, however, because -- and there's not enough in this thing -- there's a lot of talk in here about foreign countries, nonproliferation and everything. I don't think -- I think this country -- for example, nuclear policies, we should probably be looking at two or three countries, and I would almost list them. We should be looking at Japan. We should be looking at Germany and Iraq and maybe four or five other countries and see what their policies are for these sorts of things, whether they are even serious about this sort of stuff, because I don't think that most of the countries in the world want, need, ever plan to -- I mean, I don't know.

Things always change, you know. I heard

Daniel Elsburg one time sit back and say, there's no country in the world today that would, from a military stand point alone, would build a nuclear arsenal as large as the French are today. Okay? And you know the French have got a lot of nuclear weapons. Most of the other countries in the world that, if they have them, they are not going to use them. You have here Clinton saying missile systems, they are not going to use missile systems. They are going to make nuclear bombs.

They will probably rent a room on Wall Street in New York or in Chicago or a place like that, and if they wanted to declare war on this country and they would take it and put it in their car and drive it to some place and set it off in the 300 largest cities in this country, and that would totally ruin this country. It would ruin any country.

I hold nothing against those scientists that -- those and soldiers or scientists that dropped bomb on Japan. I think they believed in what they were doing. I think they were crazy to do it. I think Japan was going to surrender, anyway. I don't think Germany -- I mean, I'm certain Germany didn't try to build a bomb. I don't think that the conditions in Japan or Germany, for example -- Japan is a country -- Japanese is a language that has no past tense for verbs. I think after

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they dropped the bombs on Pearl Harbor, they were ready to surrender, but this country got so angry and so vengeance full of it that we did bomb a lot of people in Japan.

The Japanese made a lot of mistakes. I think they were willing to go live with them. I don't know. That's probably not -- I don't know if that's true in Japan at that time or not. I know they're talking building nuclear bombs there. I think if they were -- if they are doing that, they're not going to do anything -- they are not going to give a damn whether they -- whether the bombs in this country are optimally designed.

I don't think they're going to drop a bomb anywhere. I think they already have learned from their World War II mistakes that the best way to -- to deal with the rest of the world is to trade with them. Japan was a very isolated country. It was one of the most isolated countries in the world. It was -- if foreigners went to Japan in the '30s before Perry went there, they killed them.

There are ways of other societies where they have a way of welcoming people. That way of welcoming people is that they take a spear and they throw it and come as close to your feet as it can without harming you, and you are supposed to stand there and say,

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"Gee, that's nice." And actually, you are supposed to pick up it and throw it as close to their feet as you can.

I don't know, I heard it from a couple of places, someplace in the Pacific or someplace like that, but it's -- I mean, like I learned about science sitting back, and before they set off the first nuclear bomb 50 years ago, they were talking about incinerating the entire -- an it was their own world, they were giving way to Hitler for global conquest of the -- it was their own deeds that do that.

And it's like I know I have talked on a level about these things before, but I mean, it's like nowadays, traditionally, like in Japan, they would never call a machine personal or friendly. All of those alternatives are based on computers, things the folks up in Los Alamos and Livermore and University of California, you know, they are the ones that call machines personal and friendly. I don't know how they would even view that sort of mentality of calling something -- I mean -- I mean, it's like -- it's like those bombs are their babies and these machines are their babies. It's like you just -- I don't know. It makes me sick.

MS. WEBB: Thank you, Richard. Anything else? Anything else? Okay.

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MR. DEYO: Well --

MS. WEBB: Thank you. All right. Who would like to speak now? Anybody? Yes, thank you, Maurice.

MR. WEISBERG: I'm Maurice Weisberg and my background has been in radiology. So I have a lot to do with use of radioactive materials and X-ray machines. Of course I didn't use accelerators. And I have been listening to these gentlemen from Los Alamos talking getting finer and finer detail and tomographic studies of the cause of these -- cause of these bombs, and this other previous gentlemen talking not being able to use a 155 millimeter camera to get better pictures of what's going on.

My concern, actually, is our public health, problems associated with the use of all this material. And just so I don't leave out some of these more relevant matters, I'll just read a few paragraphs of what I put down. The national labs are grasping for rationale to maintain their budget to higher real trends during the '70s. Thus they have to look for new enemies and new threats to justify the current and proposed projects which seem never ending and more expensive.

So now they come up with this DARHT thing, which is the centerpiece of the whole stockpile

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stewardship, and they propose -- or have used uranium and depleted uranium previously, and this material will be used outdoors and will be bombarded -- bombard the cause which will contain this material, and depleted uranium and these toxic and radioactive particles will be scattered on adjacent plateaus together with heavy toxics present earlier which happen to be a carcinogenic material.

This Dr. Strange Love scenario gets more ghoulish since we have not ruled out the option of using plutonium 239 and plutonium 232. They use this, apparently, containment vessels on the PHERMEX, but they may elect to use it outdoors as well. In the press release put out several weeks ago, LANL explained the necessary to reduce the risk to its workers. Are we now getting a kinder and gentler DOE putting out a thousand dollars of light in all directions? This attitude change is new and commendable, and we all hope it is sustainable.

It's regrettable DOE did not show the same concern for plutonium workers in Rocky Flats or uranium workers in Ohio. The plutonium fires and spills at Rocky Flats were not reported to the people, but to the people of Denver, which were 16 miles downwind of the plant. It was independent researchers like Dr. Martel who did

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independent studies of the soil around the Rocky Flats plant and found significant amounts of plutonium in the soil and in the water.

And it was Dr. Carl Johnson who followed
30 up with studies of the people in the area surrounding the Rocky Flats and found an increase in excess cancer rates. Neither the federal government nor the crack responsible for operations ever informed the public about these matters. Neither did the national studies inform the risk to the public, and under the Four Corners area of New Mexico, thousands of Navajo Indians were employed in the uranium mines without any proper equipment. There was no ventilation in the mines so that they received large doses of radon and its daughter products. So that they suffered crippling respiratory ailments, and many of
31 them came down with cancer of the lung. In fact, Indian children under the age of 15 had excess cancer rates in the central nervous system, bone, as well as the lymph node areas.

This will give you some idea of how dangerous uranium is and all of its daughter products. When uranium decays, it lays the path for 12 radioactive forms before reaching stable forms of lead. All of those in between radioactive materials or almost of them put out alpha rays, and most of them are toxic and

carcinogenic. One of these intermediate forms is radon.

And everybody knows what the terrible allegation of radium was with the workers who put these radium on dials. Many of these people ended up with cancer of the jaw and cancer of the bones and died as a result of it. Radon gas is another decay product. It is estimated by Dr. Martel that with the wind velocity of ten miles an hour, this radon gas could travel a thousand miles before half of it even disintegrated into its solid daughter products. Of course the daughter products of radon are also alpha emitters, also carcinogenic, and
32 mostly fall to the ground, and they're insoluble, but they do get absorbed into plants and go up the food chain, and of course, affects animals as well as humans.

Of course if you've inhaled radon or its daughter products, you end up with having cancer of the lung. But this -- what these daughter products do is they emit -- as they emit their particles they actually blast the tissues in particulars if they get into -- if they are as small as five microns and they get inhaled into the deeper part of the lung, it ends up in lung tissue and bronchial, small alveoli of the lung, and it's like hitting the tissue with a wrecking ball.

The national labs employees, physicists, chemists, and engineers within, suffer background and

social studies -- I'm not trying to compare them with the Japanese -- with the Japanese students who have been brainwashed all through their careers and who, instead of actually using their own heads for their own -- to make their own decisions are brainwashed into following whatever is given to them as -- as facts.

They think in terms of technological things, the beauty of chemical reactions or the beauties of being able to get one and a half millimeters of
33 tomographic effects so they can study the core of all of these causes of all of these bombs, and less in terms of public health consequences of their bomb experiments. There should be zero tolerance for such radioactivity, and show conclusively that there is no safe dose or any acceptable dose.

We must stop making nuclear war on our own population. The lab has tried to present DARHT as necessary to maintain safety, reliability. Greg has
34 mentioned all of that. I don't want to go through that again, through all of these items. There should be no new toys until they clean up the mess they made in the past 50 years.

Depleted uranium is not less toxic than forms of radioactivity, and this idea of spent uranium is actually an oxymoron. It's not spent uranium. It's not

35 spent. Uranium is still there with all of its dangerous aspects that I mentioned above. Using the euphemism deplete our spent uranium is ridiculous. It will deplete your immune system. It will deplete your life span, and destroy the integrity of the genetic legacy.

This nuclear speaking is to seduce you into accepting the unthinkable, as in the last paragraph, as in the Peacemaker Missile and the Peaceful Atom. I have just been told by Greg that actually it was not five megatons but only 100 tons of this depleted
35 uranium that has been deposited on the plateaus around LANL. And they use plutonium, but Greg tells me that the plutonium was actually inside of contained vessels, so apparently none of the plutonium got out, as far as we know.

What possible rationale could be used to justify adding to the 10 or 20 million radiation casualties already produced by nuclear power and nuclear bombs and inappropriate use of medical and dental X-rays. Dr. Martel, who is the internationally acclaimed radiation researcher, maintains that the continued designing and production by a pronuclear crowd will inevitably result in the crisis of our species. Physicians of Nuclear Responsibility, I am a member of that and have a prescription to salvage the planet by

rapidly reducing the bombs; reduce the number of our bombs very shortly to a few hundred, and then phasing them out completely by the year 2000, together with the completion of a real comprehensive test ban treaty which would not allow these explosions to occur in any of the alternatives that are proposed today.

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I will just submit that as part of the record --

MS. WEBB: That you, Maurice.

MR. WEISBERG: -- what I feel about the public health disaster which I think will occur if we continue with the bombs. We never do -- we never explode a bomb just to use all of this nuclear power, and the efforts to get uranium by mining, milling, the whole process from front end to back end will result in a public health disaster.

MS. WEBB: Thank you. Do you want to submit that written statement for the record, too, or are you going to give us written comments later?

MR. WEISBERG: Oh, I can submit this for the record.

MS. WEBB: That would be wonderful.

MR. WEISBERG: Probably get you a better copy.

MS. WEBB: This is just fine, just fine.

Just to clarify one point, did you say that Greg said something about the plutonium experiments in the past were conducted in containment vessels?

MS. WEISBERG: That's what I understand.

MS. WEBB: That's -- yes, and that's what we say in here, that in the past, plutonium dynamic experiments were conducted always in double-walled containment vessels, and those could be conducted in the future and will always be conducted in double-wall containment vessels.

MR. WEISBERG: Was there any safety analysis that you know of, Greg, about this containment vessel? Was there any release or displacement of plutonium?

MR. MELLO: Dr. Everett, before, Beckner, said that he could neither confirm or deny that any safety analysis had ever been done.

MS. WEBB: Thank you. All right. Who would like to speak next?

MS. WEBB: Irene asked if we would take a short break for Irene to change her tape. Although this meeting is advertised to run until 4:00, we are perfectly willing to stay here later to accommodate anyone who wants to speak, so we will take a ten-minute break. I invite you to look at the information displays on the other side of the wall.

(Break at 3:20 p.m.)

MS. WEBB: All right. It's a quarter to 4:00, and let's go back on the record. Again, thank you for coming, and thank you for staying. I believe that first we have Helen that would like to speak to us. And if we can sort of keep the noise down a little bit, then we can all hear a little bit better. And Helen, would you like to go ahead?

MS. CORNELI: Yes, thank you.

MS. WEBB: And please state your full name for Irene, our stenographer.

MS. CORNELI: My name is Helen Corneli. I come here as a private citizen. I was mailed the EIS and I thank everyone for the courtesy of providing it. I have read it with careful attention, and I present several pages of comments herewith. I'm not going to read them all. I think some of them may have been addressed here before, but I want to speak to something that speaks to me very strongly and that is that the illogical, illegal and impermissible order in which these environmental reviews are taking place have been glossed over. In the EIS there is a rather circular and muddy

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statement on Page 2-11 and 12. It is based on assumed needs.

There is no consideration of related action in the PEIS. The implication there is that a presidential directive exempts the lab from compliance with EPA regulations. That may not be intended. The implication is there, and as a citizen and taxpayer who works hard to follow some hopeless rhetoric of federal requirements, I object very strongly to that presumption.

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I found no satisfactory explanation, nothing acknowledging this violation of normal order, anywhere in the EIS. Nothing is said in Chapter 6, regulatory requirements; an interesting omission. Obviously it may be, I can't imagine that that's a -- it was not intended; it may be because of the untimely haste in which the whole facility was started, before an environmental study had been made.

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The statement that the relationship of the DARHT EIS to, quote, alternative means to conduct the nation's stewardship programs, end quote, will be analyzed in the future PEIS referred to in Chapter 3 on Page 39. That statement violates all common approaches that I know of as well as common sense. And one further small point, I saw no consideration -- I don't think I missed it -- of the fact of bringing bomb production to

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Los Alamos as I believe was ordered by Judge Mechem. So with that verbal underlining, I would like to leave this with all of you. And thank you very much.

MS. WEBB: Thank you very much, Helen. All right. Who else would like to speak to us? Were you getting up to come and speak, John? Would you like to speak.

MR. STROUD: I'm John Stroud, S-t-r-o-u-d. I practice law in Santa Fe, and I have worked with the Los Alamos Study Group. I'm here strictly in my interested citizen capacity. We will begin perhaps with the disclaimer. I don't -- I don't profess to know much about these policy matters. Others can speak to that much better than I can. I have more interest, I suppose, in the preservation of democratic civil liberties and our democratic institutions and making sure, I suppose, that the process is proper. And making sure the process of dialogue and decision in this case is proper is not trivial because you -- all institutions -- you have great potential for harm to our democratic institutions.

A nuclear weapons priesthood that operates in super secret has the power to do grave injustice. And I think the record is that that has happened in the past. The most recent and highly visible example, I suppose, is the radiation experiments on people without

their consent in an -- arguably in a cold war fever or hysteria. We -- at a minimum, that was a tort, a battery on someone, and perhaps more than that. It's very close to what we prosecuted people for at Nuremberg.

The atmospheric testing by this country and its statement of the lying and mistreatment of the downwinders, our own citizens, is a sad episode in the history of the nuclear weapons establishment, and that is quite aside from the enormous number of additional latent fatal cancers that people have estimated be on the order of perhaps 500,000 to 5 million.

I would argue, therefore, that it is proper to demand that this establishment live up to the highest legal standards of disclosure and public policy discussion. This forum arises because the agency didn't do that. We're here because you didn't do it right the first time and a judge said you had to do it. With all of your resources, I don't think its unfair to demand that you produce the highest quality of public disclosure and information for proposing it, and the National Environmental Policy Act, which provides and requires the completion of the Environmental Impact Statement where significant government action has, as a major goal and part of the act, the public policy discussion on the purpose and need for the proposed action and its

desirability.

I think, on that level, the draft EIS that's been produced is quite inadequate. It avoids the policy discussion in a manner in which I think will ultimately be seen to be fatally unfirm. There is -- it seems to me the document is mostly a combination of, "it's true because we say it's true," together with considerable thrashing of the unimportant. The matters which should be discussed, documented, and discussed openly are the purpose and need for the action. It's very difficult, it seems to me, to justify going forward with the DARHT EIS when you have omitted the relevant programmatic environmental impact statement.

DARHT, everyone agrees, is a cross almost of the science based stockpile stewardship program as the agency wants to structure and implement, but that is not within the power of the agency, I would argue, to do that without going through the Environmental Impact Statement process which tacitly, admittedly begins the programmatic impact statement in the first place. If you do that, then it must be the case that the elements of the stockpile stewardship program are to be developed in the SS&M PEIS, and they are not to be determined by fiats by the agency beforehand.

Therefore, I think you're going to have a

serious problem if you -- if there's a Record of Decision on the DARHT EIS before there's a Record of Decision on SS&M PEIS. That order is both logical and a legal requirement, I would say. And the only justification I have seen for pushing on with the DARHT EIS without waiting for the PEIS is that there -- that DARHT is urgently needed to help ensure the safety, reliability of the US nuclear weapon stockpile. But that's the very same argument that was found wanting in the preliminary injunction action. And the documents released since then seem to me to undermine that argument further, rather than support it.

As for the purpose and need of the DARHT facility itself, I have some questions about it. Two that occur to me are -- there is the statement in the LANL Institutional Plan of 1995 that DARHT will not be useful for -- or DARHT will not be capable of penetrating the pits of some stockpile systems of considerable interests, specifically those with insensitive high explosive and fire resistant pits. If that is the case, then the justification for moving ahead with this facility, which will not be on-line until 1998 or perhaps 2000, in its two axis form is seriously undermined.

Secondly, it seems to me that the EIS has played fast and loose with the so-called requirements for

enhanced radiographic capabilities. The general statement was built upon there, quickly, in the EIS, then it lists specific necessities, such as time or a pulse beam, time sequencing and the much wanted 3-D capability. The JASON report is cited as justification for what the department wants to do, but in fact, the JASONs were quite explicit in saying that one of the things that needed to be determined was, in fact, what kind of improved dynamic radiography is necessary and for what purposes. What kind of resolution is necessary? Is three-dimensional imaging necessary? For what purposes?

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There may be a consensus in the community on the value of pulsed imaging, but as far as I know, there doesn't seem to be a consensus in the community in the value of dual axis capability. And there is the statement in the activity data sheet for the advanced hydrotest facility that some six beams are necessary for accurate tomographic reconstruction, and DARHT clearly is far away from that. If so, that tends to wipe out perhaps the only distinguishing feature of this facility, other than its enormous costs.

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Moving down just a little bit in specificity about the EIS, it seems to me, and I realize it's a draft document, and that things will be corrected before the final document is issued, it seems to suffer

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at this point from a multiplicity of authors. It seems to be a collection of free-standing sections rather than an integrated document.

In particular, there seems to be conflicting assumptions used in the various sections. I had one in mind, and as far as I can tell, there are three and maybe four different assumptions appearing in the document on the fraction of material that will become -- that will be respirable. Those assumptions range from -- well, they are described as 10 percent of the material are aerosolized. In another place, the assumption is, [?] of the materials aerosolized will become respirable, there is a third one, which I can document, but I don't want to take the time to now, it speaks in terms of, I think, 2 percent of the total material, and perhaps a fourth one that speaks in perhaps 10 percent of total material.

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I don't see how a nonexpert can make any sense of that, and I hope that will be cleaned up by the final EIS. I was also surprised to see in the document that there was a mention of two air sampling stations, which are closer to the DARHT and PHERMEX facilities than the well known air monitoring stations that have been there for a while.

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I believe the statement was that they had

come on-line in 1993. And that would be good because they appear to be close and downwind from the facility. But the document didn't reference or use any data from those air sampling stations, as far as I can tell. And if they have actually been operating for a year or two, then that data is relevant and needs to be included.

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MS. WEBB: Anything else, John?

MR. USSERY: I'm just taking inventory of my head, and my head is empty right now. So if I have further comments, I will do it later.

MS. WEBB: That would be fine. I also, after this -- when we take a break, I invite you to go to the information room -- well, it's an information area. The gentlemen from Pacific Northwest Laboratories who did the analysis regarding the percent respirable is here. He is over there. I invite you to talk to him and share your thoughts with him in more detail. There is also some gentlemen regarding the air quality aspects of the air monitoring aspect of the laboratory. You asked several questions. Some of them I understood to be direct questions for Bob and Jas, but before we go to that, I would like to just kind of indicate with a show of hands if there's anyone else that would like to provide us with spoken comments this afternoon.

MS. WEBB: I will call on you. Just a

second. It is slightly after 4:00, which was our advertised time to end this session, but we will run long enough to take the people that are here this afternoon. Also, I did neglect to mention, after we came back from break, that our scribe is Jay Boettner.

Now, having said those things, you asked a question, I believe, of Bob regarding the institutional planning and whether or not DARHT was incapable of certain things. Bob, would you like to respond to that?

MR. DAY: It's true DARHT is incapable of some things. One capability can't do everything. And there will -- and we have an ongoing program and have had since 1950 in developing the technology of being able to do this kind of work. Actually, one of the reasons -- one of the reasons we could -- we saw a fairly significant decrease in the underground nuclear test over time was the fact we did a lot more work up front. We did more work with computer codes. We did more work with our aboveground capability, getting more information. We saw improvements of radiography. We saw improvements in computer code, and all of that allowed us to use the resources that are provided by the taxpayers more effectively to meet that need.

DARHT is a facility which is based on a proven technology, technology that we proved in the first

part of the DARHT process, at the integrated test stand, which has a very significant improvement and allows us to bridge this time when we don't have nuclear testing anymore. It is not a capability which can do everything that we need to maintain and we would like to be able to do everything for all time, and that ongoing look at the technology is part of what we're doing in the -- I think it was referred to the as advanced hydro capabilities.

The advanced hydro capability right now is -- it's vapor machine. It exists in minds. It exists in some design studies that are being done. It is further in the future. It allows us to do better reconstruction and get additional information. It would allow us to provide some additional time steps because, as we try to validate the devices that we have perform -- if the devices that we have perform like they did before when we could test them underground, there will be a need for additional information.

The need for additional information, however, is with us right now. The DARHT and good capability, demonstrated capability of getting much more information out, up to ten times more information at once, right now is needed. It's needed because of the comprehensive test ban. It's needed because of changes the advanced capability that an FXR would have in the

future would be very helpful to us as well, but that which is needed is new data now.

MS. WEBB: Thanks. Jas, did you want to add anything to that?

MR. MERCER-SMITH: No. I think that's a good part of it, the issues that we're going to be facing with the stockpile have to do with, say, things, age generically, chips, gaps, cracks, corrosion, dents. Also understanding that is an intrinsically harder problem than you welcome, that is actually the case. If you think about it terms of going out and turning the key on an automobile, a brand new car is fairly reliable, you can turn the key and expect it works out in the parking lot. I have a 25-year-old Ford, I am always amazed when I turn the key and it works. It's a very different problem and we are required to assess the performance of those devices and guarantee their safety and reliability in the absence of other testing. Testing is equivalent to turning the key. DARHT is equivalent -- we need to get a chance to at least open the hood.

MS. WEBB: Thanks, Jas. I would like to invite the gentlemen who raised his hand then to come forward.

MR. VELARDE: My name is Archie Velarde. I am here as a private citizen and I won't sit down

because there are only two lines. I was reading, you know, where it says the proposed action DOE is proposing -- this is a public policy question, you might say. It says, DOE is proposing -- if I have been reading the paper correctly -- the DOE is demised, especially if republican-controlled congress gets its way. That means that -- that means that possibly DOD will be in charge or they're the ones that are going to be proposing this. Now, has DOD accepted this alternative? Have they been contacted? Have they been asked for their input? I -- I think it's, you know, whatever you do in terms of public policy and make a decision of grave importance, I think usually it's deferred until the new incoming administration takes over. And this is where DOD comes in. I think maybe we don't want to rush too much.

MS. WEBB: That's an interesting point. Those of us that work for the Department of Energy are extremely interested in the rumors in the paper that you referred to. The Department of Energy evolved in the late 70s from a former departmental -- I'm sorry -- a former department agency called ERDA, the Energy Research Development Agency. Thank you very much. There were NEPA reviews that were on going at the time that that transition took place and I'm sure people then were wondering the same things. Government agencies evolve

over time. They pick up functions; they drop functions; functions come together in new agencies that hadn't previously existed.

We are required by the law, the national environmental policy act to state what the federal agency proposed to do. In this case it's the Department of Energy. If the Department of Energy were to cease to exist, it is fairly well recognized with them -- within the different entities that have been talking these reorganizations -- that some other agency would step forward, and be the steward of a nuclear weapons function for the Department of Energy. Now, it could be that that -- the Department of Defense -- it could be that that would be some other agency. It could be that there's some new agency that does not now exist --

As part of the transition, that agency would look at the ongoing action, the ongoing proposal, since you are probably aware there are many, many NEPA reviews, as well as many other kinds of reviews, that are going on now for the different sites within the Department of Energy. So we have to work with some presumptions and we work here with the presumption that even if this agency were to go into another agency, and yes that agency would carry forward the proposals, just as in the past the Department of Energy picked up and

carried forward proposal of the Atomic Energy Commission and other predecessor agencies. Regarding whether or not we have discussed this particular proposal with the Department of Defense, I believe that we have. And I invite Bob or Jas to respond to that.

MR. DAY: There have been -- we interact with the Department of Defense on a routine basis and the Department of Energy interacts with the Department of Defense on a routine basis. As a matter of fact one of the interactions that we have had recently is this discussion of what the DOE's plan was. As a matter of fact, the Department of Defense has been very concerned about the fact of long-range planning stockpile surveillance and stewardship. As a part of those discussions there has been interaction on a variety of issues associated with stockpile and mechanisms that we can use to help provide assurance of safety, reliability and proper function. And in those discussions, DARHT has been discussed as one element of that process, and also as one element of a very large set of issues that the DOE and DOD deal on daily. So that has happened. Specific dates? Oh, golly, I can't give a specific date just for specific interaction. It's part of an ongoing routine discussion.

MS. WEBB: Do you want to address that,

Jas?

MR. MERCER-SMITH: The decision falls neutral. Weapons programs are guided by an interagency group, nuclear weapons councilors, that is, the members of the nuclear weapons council sit at the deputy secretary level.

MS. WEBB: And so yes, I can't say, Jas --

MR. MERCER-SMITH: Under secretary, deputy secretary of, again, deputy secretary of energy.

MR. MELLO: I think it's --

MS. WEBB: Greg thinks its -- under secretary, also.

MR. MERCER-SMITH: It'd occur at this --

MS. WEBB: I'm sorry, Peggy, you just -- I believe you just raised your hand?

MS. PRINCE: When you talked about DARHT being used to test the safety and reliability of the current stockpile, what is the point of testing for safety and reliability first of all. And that's sort of a rhetorical question because the answer is, if I know correctly, to be able to explode the bombs. You want to test them for safety and reliability so that you can use them.

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In my opinion, that is an unusable philosophy. We need to be moving away from the use of

nuclear weapons. We need to be moving toward the entire dismantlement of the nuclear arsenal, not only here, but in other countries, and we need to abolish nuclear

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weapons. There are many countries of the nonnuclear states at the nonproliferation treaty hearings last month who want precisely that. They want to abolish all nuclear weapons, dismantle and store someplace safe. Plutonium is well known to continue to become safer and safer and safer, as time goes by. All you need to do is watch them degrade. What you're really testing, if I'm assuming correctly, is the means by which to activate the implosion so that the bomb will explode. So the bomb will work.

I think that it's unrealistic,

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unnecessary, illogical, and dangerous to be pursuing this course at all, in addition to the fact that DARHT is an extremely expensive proposition, will be more expensive by the time, if you have your way against them, and we need to be working on the clean-up of the radioactive

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waste that is already in the world and at the labs, not creating more.

MS. WEBB: Thank you, Peggy. Would you like to give your name for our stenographer?

MS. PRINCE: Peggy Prince.

MS. WEBB: Thank you. You asked a

rhetorical question. Would you like for Bob or Jas to speak to that, or do you want to just leave that?

MS. PRINCE: If you would like to speak to this, that would be fine, Jas.

MR. MERCER-SMITH: The only comment that I have regarding the statement was that the half-life of plutonium is approximately 24,600 years.

MS. PRINCE: Yes, it is.

MR. MERCER-SMITH: It's decay probability is uranium 235. The half-life is 700 million years. You are disarming material long past the time when expanding super -- the expanding, giant, super-red sun is upon the earth.

MS. PRINCE: What do you plan with doing

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with all of that disarmed material you currently have?

MR. MERCER-SMITH: It will have to be cared for and maintained indefinitely.

MS. PRINCE: That's right, but it doesn't require tests on safety an reliability in order to babysit that.

MR. MERCER-SMITH: The material itself, however, changes as it decays, and safety and reliability does change as with the function of age.

MS. PRINCE: Well, I will let some of the experts answer that.

MR. MERCER-SMITH: Let the experts answer.

MS. WEBB: When we refer to safety and reliability in the DARHT EIS, we are actually referring to the safety and reliability of the weapons, the weapons systems themselves, rather than the material itself. I don't know if that helps a bit. And Greg, you're raising your hand.

MR. MELLO: Only to let you know that if there's time in a minute I would like to add some more comments.

MS. WEBB: Okay. Anything else?

MS. PRINCE: No, I will defer.

MS. WEBB: Okay. All right.

MR. MELLO: Things that weren't mentioned before, the need for most of these have to do with the purpose and need for DARHT, again. You know there was a letter from the director of Los Alamos laboratory in the late '70s to president Carter also signed by Dick Garwin and Carson Marks, former director of the theoretical division, and Norris Bradbury then said that -- that there was no -- there were no serious reliability problems that would prevent the assessing of nuclear testing. This was not the problem. These experts banded together to reassure the president that the reliability concerns that were then being raised about nuclear

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testing were coming from institutional interests rather than from science. This letter was written, what, 15 years -- more than 15 years ago before DARHT was even considered. Now, we learn that DARHT is needed, even though we have had 15 years more experience. Now we have to have DARHT or all the weapons -- or the weapons will become unreliable or unsafe. It's difficult to reconcile this. The -- we -- at a previous DARHT hearing and there's a lot about safety in here, Jas's boss, John Immele said at a previous DARHT hearing that there were no safety problems relative to aging. And I certainly haven't been able to think of any convincing safety problems.

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In the Sandia Stockpile Life Study, the changing safety standards were a reason for retirement of three warheads, but as Ray Kidder made clear in the study commissioned by Congress in 1987 -- actually it wasn't '87, it was in the '90s, about 1991, the first question they asked was, are there safety problems related to aging of weapons? And the answer is, no, there aren't any. Sometimes safety problems that were there from the beginning are discovered later. But there aren't any safety problems that occur as a result of the aging process. The -- so it's very unclear why this litany, almost like a mantra of safety and reliability is sort of

vaguely thrown out here.

Actually in the court of presentation today in the draft EIS there is no data. There's no science. All we hear is we need it. These are hard problems. This is like starting an old car. Well, most people don't try -- unless they are rich, they don't try to keep a car forever. They get a new car and that turns out to be cheaper and easier.

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MR. MERCER-SMITH: You're --

MR. MELLO: Let me finish -- and there's a whole group of very experienced nuclear weapons people that argue against the approach that Los Alamos laboratory is advocated with, and namely they say there is no problem and just -- just make a pit again by the original specifications. You don't have to keep it there for 50 years, 100 years or whatever it takes until you get some insoluble kind of problem. The age argument, the whole aging question seems actually irrelevant. The argument, in essence, when you talk to people again and again, what often it comes down to is that in order to preserve the weapon, we must preserve the stewards of the weapons. It's a logical -- it's a circular argument. As Dr. Hecker says, confidence in the stockpile equals confidence in the weapons lab, gives us money, is what it boils down to. There isn't really -- it's not logically

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consistent.

We here on this document and here today, that we have to have this facility because we are not doing any nuclear tests. Well, actually, Los Alamos laboratory and the Pentagon are actually arguing for nuclear tests right now. So on the one hand we have to have this facility because there's no nuclear test. That's what was said here, but behind closed doors we are saying, "got to have testing. Got to have testing." It seems like that there's -- the lab wants everything, wants the toys and the tests and you know its really -- it seems like a case where narrow institutional interests, really stovepipes, are driving these programs and an using the cloak of secrecy and -- to more or less intimidate naive decision makers who -- who are frightened by words like safety problems or reliability problems, when -- when actually, if you think about these things a little bit more rationally, these problems aren't as severe as they appear.

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Now leaving all of that aside. I want to say something about proliferation impacts and the importance of having such an analysis in this EIS. Yesterday many of us heard a Dr. VonHipple recently of the White House Science and Technology Policy where he was assistant director for national security, decried the

painful lack of holistic thinking in governmental policy making in this area. The division between those who consider only the technical questions and those looking at the political implications of those questions, are in our systems have discourse in this society. Technical questions, technical considerations often are dominant because they seem more solid. And in this administration -- well, basically the point here is that there's always more data that one can get.

One can always be more sure. Even though we have had something on the order of 11 hundred nuclear 60
tests in Nevada and 10,000 hydrotests like at DARHT, or more, whatever, however many there have been in the last 50 years, I used to hear the shots every day. You don't hear many anymore, but in the early '70s, you used to hear them every day here. Even with all of that data, 60
there's -- there's a call for more data, that we don't have enough; that even though we're not designing any new weapons, we -- you must have lots more knowledge and more data to maintain the weapons we have.

At the same time there's a cost to this information. DARHT is part of a suite of stockpile stewardship facilities that will cost, in their actual cost alone, in the order of $3 billion. If you add it up, it's about three -- it's 2.6, plus the advanced

strategic computing initiative and then operating costs which are some large multiple times that. The other countries, other nuclear powers, can't afford these kinds of facilities, and they don't have the extensive test data base that these facilities will be used in 60
conjunction with to maintain and improve the design codes. As a result of, they're envious and frightened of being left behind in a new kind of technological arms race.

The French are concerned about this; they are proud. The Russians are concerned; they are proud. China is concerned and considers itself technologically backwards to us, which it is. And in this context these countries are saying we have to continue nuclear testing. We have to actually blow them up to achieve the 60
kind of data which you people are going to be able to get with your advanced stockpile stewardship facilities.

The result is that the comprehensive test ban negotiations in general have gone a full 40 weeks of active negotiation, without a treaty. There is no treaty in sight. The president is about to complete in a couple of weeks, with president of France -- and it's quite likely that the goal of a comprehensive test ban treaty that's been the goal of most Americans presidents in 1950s will go down in flames because of a desire for more

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data, for a desire to be perfectly sure that we can maintain and improve our nuclear weapons, that we can add those fire resistant pits, even though the Navy and Air Force don't want them. We want to keep our people busy because we're afraid they will forget how to do those things.

There is a cost to all of this activity and the Environmental Impact Statement is meant to integrate these costs and benefits. There needs to be analysis of the proliferation impacts of this facility, we have the most critical facility in the entire science 61
based stockpile stewardship program for the design of nuclear weapons. It will be perceived as such a facility outside of the borders of the United States because of its capabilities, even if you say it won't be used for that, that's how people are going to look at it. We never looked at Soviet armament and said we know they're never going to use them. And we looked at them for what it could do, and other people will look at this facility for what it could do, not for what we say it will do.

There are important precedents for analyzing the proliferation impact in other DOE actions. 61
There is, as you know, a special proliferation impact analysis going on with the national ignition facilities in Livermore, which is, some people say, almost

irrelevant from a nuclear weapons design point of view. There is a nonproliferation analysis going on in spent 61
fuel programmatic EIS, in the foreign reactors, spent fuel EIS. This is a facility that has potentially great proliferation impacts and it's this other side of the balance scale that we need to look at in order to be serious about reducing the nuclear danger which Dr. Hecker has said is the primary mission of the laboratory. It looks to us like this facility increases the nuclear danger rather than decreases the nuclear danger. That's it.

MS. WEBB: Thank you, Greg. Is there anyone else that wants to speak today? I see no hands. I would just like to mention your organization did write to the Department of Energy headquarters asking for the department to prepare a proliferation impact analysis on the DARHT facility. That correspondence, including the department's response back to you as to why the department did not feel that that was appropriate, is included in the information that is in the public reading room. So for those members of the public that might be interested in that exchange, I know that Greg knows what the exchange is for. The rest that might be interested in that exchange, those pieces of correspondence are included in the information exchange in the Los Alamos

Community's reading room. I think then that it being somewhat after 4:30, being somewhat after the time that we advertised this session to close, unless anyone else wants to come forward and speak, and unless Bob or Jas want to make any final statements here, then I would entertain an idea that perhaps we would adjourn until our 6:30 session this evening.

Jas, do you have anything to add?

MR. MERCER-SMITH: No thanks.

MS. WEBB: Bob, do you have anything to add at this time?

MR. DAY: No. Thank you very much for all the good information.

MS. WEBB: We do thank you. We know that this is taking time out of your schedules to come here and talk to us today; we appreciate that very much.

With that, this session is adjourned. We will reconvene in this room this evening at 6:30.

(Hearing adjourned at 4:31 p.m.)

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, IRENE DELGADO, New Mexico CCR 253, DO HEREBY CERTIFY that I did report in stenographic shorthand the foregoing proceeding as set forth herein; that the foregoing pages are a true and correct transcript of my stenographic notes and were reduced to typewritten transcript through Computer-Aided Transcription.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case, and that I have no interest in the final disposition of this case in any court; that on the date I reported these proceedings, I was a New Mexico Certified Court Reporter.

IRENE DELGADO, NM CCR 253
Notary Public Expires: 5-1-96

Transcript Attachments
Comment Codes 46, 47, 48, 49, 50, 51, and 52

DARHT DEIS PUBLIC HEARINGS
QUIET ROOM TRANSCRIPTION

Verbal Comments 2 p.m. Session, June 1, 1995, High Mesa Inn, Santa Fe, NM.

Pat Wolff – Hello, my name is Pat Wolff W-o-l-f-f. This is the most bizarre public hearing I have ever been involved in. Here I am sitting in a hotel bedroom where a tape machine is taking public comments, so that no one else in the public can hear what other members of the public are saying. I know most people with common sense don't participate in hearings like this because they consider them charades, nevertheless here I am. I would like to make a statement on the Dual Axis Radiographic Hydrotest Facility. On January 26 of this year, just four months ago, Federal Judge E. L. Mecchem ordered DOE to stop it's illegal construction of its DARHT Facility at Los Alamos pending the completion of a comprehensive environmental impact statement on this facility, as required by NEPA. In record breaking time, the DOE bureaucracy hastily put together a woefully
2 inadequate document that does not begin to address the issues Judge Mecchem ordered DOE to look at. I have never in my life seen a agency put together a draft EIS document and hold hearings on it within a four month time frame. We're talking here about a facility that deals with the most horrific weapons of mass destruction. A facility being built at a projected cost of over $118 million dollars. And DOE can crank out a draft EIS on it in less than 4 months time? How long does it normally take a federal agency to go through the NEPA process? For comparison sake lets look at another federal agency, USDA and their EIS for the Animal Damage Control Program. This is the agency that spends our tax dollars poisoning and trapping coyotes, and other so called varmints. It's a relatively minor program that costs about 50 million dollars annually. USDA issued a draft EIS on this program in June 1990, then a supplement to the Draft EIS in January 93, and finally, a final EIS in April 1994.
1 How come it takes the federal government four years to produce an EIS on coyote killing, but just four months to crank out a document on a major nuclear weapons facility? Let's look at another example, the Santa Fe Ski Area expansion EIS process involving the US Forest Service. In that case the first public scoping meetings were held in 1988, the EIS process continued into 1989, 90, 91, 92, and 93. The draft EIS was issued in February 94 and here it is June 95 and there is no projected completion date for the final EIS. How come it takes the federal government 7 years to produce an EIS on expansion of a ski area, but just four months to crank out a document on a major nuclear weapons facility? Clearly, DOE has not taken a careful comprehensive look at DARHT's impact on
3 those of us who live in northern New Mexico. How many cancer deaths are linked to environmental carcinogens already coming from DOE's nuclear weapons complex? How many more cancer deaths

3 will DARHT and its associated activities cause? According to a report in the British medical journal the international agency of research in cancer has determined that 80 to 90 percent of all cancers can be linked to diet or environmental carcinogens. The carcinogens we are exposed to here in New Mexico include the radioactive and toxic byproducts of DOE's nuclear weapons programs. Those radioactive and toxic byproducts are contributing to New Mexico's cancer epidemic, the second leading cause of death in our state. 2,544 people in New Mexico died of cancer in 1993, and the
3 death rate keeps rising. When will DOE start telling the truth?

Richard Deyo - Perverse are those who measure space in light years. The distance between their heart and mind and nothing more. There are a few other lines in that statement. In Japanese there's no past tense for the verbs, though. And it is quite well to speak of the future. I guess I don't ever see any sort of future from those sort of decisions that were made in the past. English speaks of the past an awful lot more talk about burning up the world's atmosphere. Einstein siting back and saying, "I am god" and how all of his colleagues and associates would report that fact. That Albert Einstein is a divine essence. That, they are, Robert Oppenheimer was a god of murder, destroyer of worlds. And I've read all kinds of sorta things from like the fonner Deputy Director of Livermore you know siting back and saying "Those that murder some of their kind are better than those who sit back and don't do anything and stop them". Whatever sort of culture ... is it a machine? Science is all a machine they say. They're just a machine, a machine, a machine. And I am very afraid that they believe it. Maybe I'm not afraid, maybe its like ... it's just sorta sad. Graffiti – enough graffiti on paper. A very simple Japanese haiku I once heard, Graffiti haiku, Japanese nature poem "Do I love you now?" You never say that in Japanese. Either.

End of comments for the 2 p.m. Santa Fe Session.

Helen Corneli 6/1/95
DARHT PEIS meeting

MEMO

TO: Diana Webb, DARHT EIS Document Manager

FROM: Helen M. Corneli

RE: Call for comments on EIS

DATE: 5-27-95

1 I appreciate the obvious effort that has been made to make this document available,
2 responsible, and understandable to the public. I did miss an Index, surely easy to construct with computers, and invaluable in the necessary cross checking through these many pages. In spite of the pages of "helpful information", the generally clear graphics and illustrations, the glossary, and the rather complete list of preparers and contributors, I'm sorry to report that a document which reportedly cost $2 million dollars and many man-years to produce still leaves me with some perplexity. I record some of it, hoping to generate more clarity.

3 Nothing mitigates the fundamental lack of this EIS: It comes in illogical, illegal, and
4 impermissible order in relation to the promised SWEIS and PEIS. The rather circular and
5 muddy statement on p. 2-12 is based on assumed need, with no consideration of related actions. It does not, for example, consider the effects of bringing bomb production to Los Alamos, as ordered by Judge Mechem. Even if it did all these things, it would leave me with other concerns, some of which I state herein.

The original Notice of Intent made the purpose, and scope of the proposed facility clear in under two pages. Somehow, in expanding those two pages to the three chapter (nearly seventy page) opus on which I intend to concentrate in these comments, clarity was lost and many
6 questions generated. Indeed, the length of the EIS, daunting in itself, may have poorly served DOE's intent. Perhaps because of the many writers, repetition abounds. The Purpose stated succinctly in the first line of the Executive Summary, was expanded into 3 short paragraphs on 2-2, and echoed numerous times, and almost exactly on 3-1 and 3-2. A certain suggestion of protesting too much was the effect, especially when combined with the lacks of congruity I discuss below.

7 I. The impression is given that the need for DARHT arose as the result of 1993 'policy changes'--an idea belied by the historical record. In fact. design of DARHT was begun in early 1980's (1-1) --twelve years before the last underground test of Sept. '92, (2-1). The facility was authorized by Congress in 1988 after a series of (unpublished?) environmental reviews. When 'science based stockpile stewardship' became a policy in Nov. 93 it was defined as an ongoing program, evolved from and based on former DOE weapons research, development and testing, and stockpile support programs. (I would like to know what, exactly, is the difference between stewardship and stockpile support.) Chapter II raises a further number of problems:

A. This EIS states that previous testing was key for certifying security, reliability, and weapons accidentally detonating during storage and handling, etc. (2-3) and that the effects of aging on weapons were well known. (It is common knowledge that we actually armed airplanes and flew them all over under SAC, presumably with safe atomic warheads.)

I wonder what underground tests actually showed about aging weapons. Even if specific data is classified, conclusions applicable to current stewardship responsibilities could surely be stated in general terms. Citizens have read reports in the paper ("Activists: LANL arms projects are unneeded" by Keith Easthouse in recent New Mexican) that aging problems have not caused the removal of any nuclear weapons from the stockpile, and only 257 defects relating to safety and reliability have been found out of 70,000 nuclear weapons (003%).

8 Moreover, the EIS begs a fundamental question. Surely a "greatly reduced" stockpile means fewer "shots," and less testing is needed with more leeway in destroying weapons which have aged beyond their "design life."

B Another major concern is proliferation. Our national stance on limiting and perhaps preventing proliferation is used constantly by lab personnel to justify activities, budgets,
9 etc. But, to my surprise and dismay, I found no discussion of the proliferation impacts of DARHT. I expected to read considerations of the following questions:

10 1) What effect will the very large sum invested in a facility like DARHT have on proliferation, especially given the very fragile non-proliferation treaty reaffirmed this month?

11 2) What is the meaning of "core intellectual and technical competencies of the United States in nuclear weapons"? I call this a 'weasel' phrase that could certainly mean very different things to different people. Indeed, if the object is to prevent proliferation, I suggest that this phrase be extirpated, since in the minds of a suspicious "unfriendly power" it could easily be translated as "the ability to build bombs how and when we want to."

12 3) How can hydrodynamic testing be used in "proliferation assessment and disablement?"

13 4) And, perhaps most importantly, as this kind of testing spreads (as it surely will), will not its widespread use make detecting proliferation essentially impossible?

C. This EIS leads inescapably to the fact (stated explicitly on page 3-18, that
14 "hydrodynamic testing at DARHT, in conjunction with underground nuclear testing, was intended to assist in designing new nuclear weapons and replacement parts.") I note the past tense, but I need an explanation. Why is not a clear delineation now made
15 between the actual safety applications of DARHT and its possible design uses: Why not

15 be specific about the explosive & high velocity impact industrial uses, as well as the "diagnostics" used by LLNL (3-18)? Why not be as honest as possible? Anyone mildly science literate knows that genuine research is rarely applied in narrow ways.

16 In turn, that leads to the disturbing question: Will not DARHT and the data it generates, still be so applied? It appears that stated current aims for DARHT could not have been achieved by nuclear testing, particularly the information sought on plutonium (2-9). The weakness of other rationales (how did we previously assess weapons designed by enemies or terrorists? By exploding them?) and the 18% rise in the

17 requested weapons RD & T budget of LANL this year, suggest that the stated aims are a screen for DARHT's real purpose--weapon design.

18 D. The EIS states that the Preferred Alternative "will not affect future operations of the FXR at LLNL." (3-17) No justification is given for maintaining <u>two</u> of these expensive facilities in the face of a shrinking stockpile. The arguments used are circular: "We need these because we say we need them." Since the cost of one firing can reach $2 million, my concern would seem justified, particularly in these times of austerity for citizen based programs.

19 E. Moreover, the discussion of a "conceptualized" Advanced Facility, based on the "rapidly advancing state of the art accelerator technology," whose development might take "several years" (3-37) raises another question: <u>what's our hurry for DARHT</u>? You've stated that we have five years before many weapons get worrisomely old. Surely we can limp along until we can asses more clearly a genuine need for all this technology? (I must point out to the writers of this EIS that I have heard that funds for the AHF have already been asked for. I would be relieved to hear that his was not true.)

I appreciate your attention to these concerns.

Milton Lockhart 6/1/95
DARHT DEIS meeting

Comments on Draft DARHT EIS, June 1, 1995
by M. G. Lockhart, 91 Mimbres Drive, Los Alamos, NM 87544

DAHRT is the first in a progression of more advanced hydrotest facilities planned by DOE to provide data for the design of later facilities and to help identify unknown problems which may not be detectable by inspection. DAHRT's data can be used to validate the results of computer simulations and (as Dr. Louis Rosen pointed out on May 31) to furnish data for training new generations of physicists and materials scientists.

1 The stockpile has reached an average age never before achieved, and the average age is increasing in spite of retiring older weapons systems. Delaying DAHRT until specific problems are identified to justify DAHRT's use is on the same logical level as deferring a treadmill test until after the patient has suffered a coronary. Safety and reliability today does not equate to safety and reliability tomorrow.

Opposition has been stated to the need for DAHRT's capability to provide 3 dimensional, time sequenced data and statements have been made that "no agreement" has been reached for this enhanced capability. Page 29 of the JASON report states "The design community has properly judged that improved hydrotesting capabilities are important in the absence of underground tests. The ultimate goal would be a tomographic movie of the late stages of the imploding pit." These statements indicate agreement.

Let us put this capability in ~~photography~~ terms. I have long been frustrated over the inability of my 35 mm camera to take good landscapes, particularly of mountains at a distance. I have been envious of friends who have 105 mm zoom capability and take great pictures. DAHRT has the capability to take great pictures of different materials under stress which no other facility on the face of this earth has. These pictures provide previously unobtainable data which aid in the design of DAHRT successors and make the scientists' job easier in modeling and evaluating the reaction of materials to different stresses. With time lapse radiography in later facilities, the movie effect would be reality.

Computer models are only as good as the data on which they are based. Can these data be used to design new weapons? Of course. Data are data. If national policy changed tomorrow, these data could be used for designing new weapons. But more importantly, the data can be used in improving safety and reliability of nuclear weapons and in other, peaceful materials research.

The alternatives presented in the DAHRT EIS are not all ~~viable~~ optimal for solving the problem. The Single-Axis alternative only provides enhanced resolution, without the 3D ~~and time lapse~~ radiography which 2 beam lines furnish. The Plutonium Exclusion alternative does not furnish data on this important weapons material while costing as much as the Preferred alternative. The Upgrade PHERMEX alternative costs more than the Preferred alternative ~~without providing the environmental protection of the Containment alternatives~~. The No Action alternative is not really an alternative because of the present condition of the PHERMEX facility, which needs re-instrumentation and renovation.

2 DAHRT is currently the most cost effective and prudent way to implement the nuclear policies of the U. S. However, the draft EIS assumes that the readers know all of this information about DAHRT.

3 Rewrite the draft EIS to make clear what DAHRT's mission is, how DAHRT will be used, what peaceful (non-weapons) uses are possible, justify the enhanced capability, explain the environmental impacts and assumptions used in terms which can be grasped by the educated, but uninitiated, reader.

4 While I am sure that initial cost (not life-cycle costs) was a major factor when the Preferred alternative was chosen, the fact that this EIS is being prepared emphasizes changed circumstances since the 1980 s. One of the Containment alternatives is probably the more cost effective when D&D costs are considered in a life-cycle cost analysis.

Maurice Weisberg
DARHT DEIS Meeting
June 1, 1995

DARHT

The National Labs are groping for rationales to maintain their budgets that are higher in real terms than during the '70s. Thus there must be a search for new enemies and new threats to justify their current and proposed projects which seem never ending and more expensive.

So now they have come up with this new generation gadget called DARHT which is the centerpiece of the stockpile stewardship. Uranium and depleted Uranium will be bombarded outdoors and these toxic and radioactive particles will then be scattered over the adjacent plateau together with other toxic heavy metals such as beryllium which is also a carcinogen. The Doctor Strangelove scenario gets more ghoulish since LANL has not ruled out the option of using PU-237 and Pu-242 as core elements as it did in previous years with an earlier machine called PHERMEX.

In a press release put out several weeks ago, LANL explains the reason for outdoor experiments as necessary to reduce risk to its workers. Are we now getting a kinder, gentler DOE, putting out a thousand points of light. The attitude change is new and commendable and in all hope it is sustainable. Its regrettable that the DOE did not show the same concern for its plutonium workers in Rocky Flats or it Uranium workers in Fernald, Ohio.

The plutonium fires and spills at Rock Flats were not reported to the people of Denver 16 miles downwind of the plant. It was an independent researcher Dr. Martell who discovered the pluton. pollution and reported the accident. It was Dr. Carl Johnson who reported the increased cancer rates in the vicinity of Rocky Flats and the Denver area. Neither the Federal Government nor the contractor responsible for operations ever informed the public; neither of them ever did any studies to determine risks to the public. In the four corners area of New Mexico, thousands of Navajo Indians were employed in the Uranium mines without proper equipment or ventilation and suffered crippling respitory ailments as well as cancer of the lung. Indian children under the age of 15 had excess cancers of the reproductive, central nervous system, and bone as well as lymph node areas.

When uranium decays it passes thru 12 radioactive forms before reaching stable lead. One of these intermediate forms is radium and everyone knows of the terrible consequences to workers who painted the dials of watches. Radon gas is another decay product. With a wind of 10 miles per hour, the gas could travel 1000 miles before half of it disintegrated into solid daughter products and then deposited on the soil, plants, water or be inhaled.

The National Labs employ physicists, chemists, engineers, with insufficient background in social science, psychology or the humanities. They think in terms of a technological fix, the beauty of chemical reactions and less in terms of the public health consequences of their bomb experiments.

1 There should be zero tolerance for all such radioactive materials for the animal and human epidemiology studies show conclusively that there is no safe dose nor any acceptable dose. We must stop making nuclear war on our own population.

2 The Lab has tried to portray Dahrt as necessary to maintain safety and reliability of its weapons. But its internal memos do no support this spurious claim. Because of the moratorium

on underground testing, it wants to continue to design new weapons and keep the jobs going for the bomb tribe. There should be no new toys until they clean up the mess they've made the past 50 years.

3 Depleted Uranium is not less toxic or less dangerous than other forms of this radioactive element. Using the euphemism depleted or spent uranium is an oxymoron. It will deplete your immuno system, your life span, and the integrity of your genetic legacy. This nukespeack is to seduce you into "accepting the unthinkable" as in the "peacemaker missile" and the "peaceful atom".

Some 100 tons of depleted uranium and other toxic materials have already been scattered over the plateaus near the Lab as well as plutonium used in 1% of the experiments with PHERMEX. What possible rationale can be used to justify adding to the 10-20 million radiation casualties already produced by nuclear power, nuclear bombs, and the inappropriate use of medical and dental facilities. Dr. Rosalie Bertell, the internationally acclaimed radiation researcher, maintains that the continued design, research and production by the pro-nuclear crowd will inevitably result in the death crisis of our species. The Physicians for Nuclear Responsibility have a prescription to salvage the planet by rapidly reducing the number of our bombs to a few hundred and then phasing then out completely by the year 2000 together with completing a

4 Comprehensive Test Ban Treaty. The only sensible alternative is to halt all work on DARHT and concentrate on cleaning up the radioactive and mixed waste pollution at LANL.

Maurice A. Weisberg M.D.
[signature]
Member Physicians for Social Responsibility

A Greg Mello 6/1/95
DARHT DEIS mtng.

No Serious Problems:
Reliability Issues and Stockpile Management

DRAFT

A Review for Tri-Valley CAREs

by

Greg Mello

February 6, 1995

No Serious Problems:
Reliability Issues and Stockpile Management

An Issue Brief for Tri-Valley CAREs by Greg Mello, February 6, 1995

DRAFT

<u>Summary</u>

- The U.S. nuclear arsenal has been extensively tested and is reliable.
- The arsenal is becoming more reliable each year as older weapon types are retired.

1

- The weapons which are to remain in the stockpile can be expected to last many more years if serviced. So far, age has tended to make nuclear weapons more, not less, reliable, and no weapon has ever been retired due primarily to aging problems.
- Although the nuclear arsenal is increasing in reliability, confidence in nuclear weapons is declining as nuclear weapons lose political importance. The two issues--reliability and confidence--should not be confused.

2

- U.S. nuclear weapons are adequately "robust" with respect to the minor variations in manufacture that have occurred throughout the prototyping and production processes.
- There is no serious technical impediment to remanufacturing existing kinds of weapons and weapon parts. For example, Los Alamos is now gearing up to remanufacture plutonium pits.
- Changing the design of nuclear weapons without nuclear proof-testing has been the source of serious reliability problems in the past and can be expected to cause more problems if it is done in the future.

3

- The present, effective process for monitoring the reliability of nuclear weapons places only small demands on weapons research and development personnel.
- A high level of weapons reliability can be assured with modest levels of funding and with current diagnostic facilities. New facilities, especially the $2 billion National Ignition Facility, are not needed. Engineering and production skills, rather than scientific research, are most essential to maintaining and remanufacturing nuclear weapons.

4

- The only purpose of reliable nuclear weapons is to deter a nuclear attack. Efforts to continually refine nuclear weapons conflict with U.S. nonproliferation goals and could well degrade confidence in the overall efficacy of our deterrent.

Introduction

In the debate over a nuclear test ban in the late 1980's, advocates of continued testing, led by the two weapons physics laboratories, took the position that the reliability of U.S. nuclear weapons would decline unacceptably under any kind of testing ban. Specifically, weapons labs managers argued that changes in manufacturing techniques, materials, and personnel would seriously degrade confidence in the U.S. nuclear deterrent.

These concerns were not shared by everyone in the weapons design community, however, and the lab managers' view, when weighed against contrary technical evidence from senior independent and retired experts, failed in the end to convince even the Pentagon. All relevant agencies of the government--including the managers of the labs--now agree that it is feasible to maintain a nuclear deterrent without nuclear testing. While not everyone in government wants a test ban--John Deutch, Undersecretary of Defense does not, for one[1]--everyone now finally admits, either implicitly or explicitly, that the U.S. nuclear stockpile can be maintained under a comprehensive test ban treaty (CTBT).

Indeed, the current leadership at the Pentagon "requires" that the nation retain the capacity--even under a test ban--to design, fabricate, and certify new weapons, a much more difficult task than simply refabricating existing weapon types.[2]

With a CTBT now an official goal, reliability issues, like safety concerns, are again being raised, this time to promote the new facilities and large appropriations proposed for the Department of Energy's (DOE's) expansive "science-based stockpile stewardship" (SBSS) program. Are these concerns real? Is it necessary to keep research, development, and testing (RD&T) spending at Cold War levels to maintain reliable weapons? Are major new facilities needed? This paper, part of a series on these and related questions, suggests that reliability concerns can be addressed in a much simpler and relatively cost-effective manner through more effective management of the nuclear weapons complex.[3]

Congressional testimony shows that the U.S. arsenal has no significant current reliability problems.

The best starting point for this discussion is the most authoritative testimony available. Speaking before Congress on March 15, 1994, Dr. Harold Smith, Assistant Secretary of Defense for Atomic Energy, said

> I am pleased to report the stockpile today is safe, secure, reliable, and meets current military requirements. We make that statement with confidence today and for the immediate future....Our stockpile is becoming safer and more reliable simply because we are retiring older weapons...Thus, we should enter the 21st century with a modern, safe, and reliable stockpile consistent with the demands of START I and with anticipated military requirements.[4]

So not only are U.S. nuclear weapons reliable, but they are, at least for the "immediate future," becoming even more reliable as older weapons are retired. This statement was made in the presence of, and with the approval of, Dr. Victor Reis, Assistant Secretary of Energy for Defense Programs, who added,

> Right now, as Dr. Smith said, that stockpile is safe and reliable.[5]

Make no mistake: nuclear weapons in the stockpile are certified to explode at nominal yield after experiencing all the environments that a deployed weapon could reasonably be expected to weather in its life, and after the severe accelerations, cold, heat, shock and radiation (e.g. from the explosions of other warheads) that are expected to occur during the stockpile-to-target sequence. This performance is exhaustively analyzed and tested in a diverse array of demanding tests coordinated primarily by Sandia, whose mission is to weaponize the physics packages[6] developed at the other two laboratories. It appears that most, or perhaps even all, of the weapons in the current stockpile have been tested in underground nuclear tests using not only prototypes but also actual production weapons, with simulated end-of-life and stockpile-to-target conditions.[7]

So the reliability concerns that have been raised are concerns over the long term. What, in this context, is the "long term?" And just how serious are these concerns?

No serious reliability problems are expected in the arsenal for many years, even without remanufacture.

Dr. Dan Kerlinsky investigated in detail the subject of reliability in relation to stockpile stewardship throughout the summer and fall of 1994 for the Secretary of Energy's Panel on the Future of the DOE Labs (the Galvin Panel). In the process, he attended and initiated numerous classified discussions and interviews with senior scientists and managers at all three weapons laboratories.

Kerlinsky found that data on historical reliability and repair had been systematically collected by Sandia National Laboratory in a two-year study commissioned by Secretary Watkins, called the Stockpile Life Study, which was completed in 1994. This study was designed to answer two basic questions: (1) "How long do nuclear weapons last?" and (2), "What programs and activities are required to keep them in the stockpile?" To answer these questions, the detailed history of the entire stockpile was examined over the past thirty years.[8]

Sandia was in an excellent position to gather this data, as it is the laboratory that coordinates the stockpile surveillance program for the Department. But in order to be sure that the Sandia study did not leave out any problems that might be known to Los Alamos and Livermore but not to Sandia, Kerlinsky interviewed weapons program personnel at these two laboratories as well. He found that the Sandia data was indeed comprehensive.

The thirty years of experience summarized in this study revealed that there is not known to be any upper limit on weapon life, given appropriate maintenance and renewal of perishable

materials and parts (e.g. tritium). No U.S. weapon has ever been retired due primarily to aging problems, even though some weapons have, in the past, been in the active stockpile for more than 30 years before being superseded by new designs. (The weapons in the present stockpile are, in contrast, believed to be all between about 6 and 15 years of age.) Aggregate data show that the rate of required modifications and repairs of stockpiled weapons decreases as the years go by, reflecting continually increased reliability as the "bugs" are gradually worked out of weapons systems.

Fully half of the 300-odd problems encountered in the stockpile over the years were judged to have no effect at all on the reliability of the weapon. At least another 40% of the problems investigated would have had only a slight impact on reliability. Only a small minority--less than 10%--of the problems found would have led to a decrease of 10% or more in the probability of achieving the certified yield. All of these problems have been fixed. Many of them were caused by rushing inadequately-tested weapons into the stockpile, as will be discussed below.

Overall, among the defects found, very few have been in the physics packages, which typically are the simplest part of the weapon, comprising less than 5% of the overall number of parts in the B83, to pick one example.[9]

What is most important to realize is that the weapons in the enduring stockpile have been designed and built using all this and more accumulated experience. Design and production mistakes that occurred with earlier weapons have not been repeated. The stockpile is more reliable than ever before, and is increasing in reliability as older systems are retired.

Before examining this subject in greater technical detail, it is important to step back and look at the difference between reliability of, and confidence in, the stockpile.

Reliability is sought only for the purpose of creating a convincing deterrent.

It is important to distinguish between the reliability of a warhead and confidence in a nuclear deterrent. Reliability is a technical problem. Confidence is based on reliability, but it is also based on psychological, social, and political realities and perceptions. Confidence is not at all the same to every observer. For most decision makers, confidence in a nuclear deterrent is the genuine objective of nuclear weapons expenditures, not simply reliability. They seek this confidence in an attempt to allay fears of a nuclear attack, and they attempt to project this same confidence to would-be aggressors and potential enemies in our foreign wars.

Confidence is eroded whenever the experts at the nuclear weapons labs, who have a strong financial and institutional interest in the matter, say there is a reliability problem of any kind, no matter how trivial or even false. So the scientists at the weapons labs, along with their sponsors at the DOE and DOD and the consultants who serve them, are presently in a position of considerable influence over confidence in the U.S. stockpile, quite independent of actual weapon reliability.

In a different and perhaps more fundamental sense, confidence in the stockpile is also eroded whenever the utility of warheads to accomplish national goals--including deterring non-nuclear aggression--is questioned. This is now occurring with greater and greater regularity. Many people believe that the 49-year *de facto* norm against the use of nuclear weapons, together with the repugnance with which the nations of the world would regard their use, make that use quite unrealistic and counterproductive for any purpose other than the narrowest one of deterrence of nuclear attack.[10] In a very real sense, nuclear weapons are becoming less reliable as instruments of policy and power. They are becoming politically unreliable--which makes everyone more secure.

In this context, senior bureaucrats, members of Congress, defense officials in the executive branch, and others who have focused years of their life on the production, maintenance, and deployment of nuclear weapons resonate readily with the fretting about long-term reliability now being done by the laboratories and their sponsors. Confidence in the ability of U.S. nuclear weapons to explode is not in any serious doubt, but the funding, purpose, direction, and meaning of the U.S. nuclear weapons program is very much in doubt, and the two kinds of doubt are very easily confused.

In any case, perfect reliability is not essential to deterrence. The technical--as opposed to the political and psychological--requirements of deterrence consist only of providing any aggressor with enough confidence that U.S. weapons might explode to deter his attack.[11]

A more detailed technical analysis of the reliability question does not reveal any serious problems.

The "reliability" question was authoritatively examined in a 1987 report to Congress by Dr. Ray Kidder, a senior Livermore weapons physicist, commissioned by former Congressman (and later, Secretary of Defense) Les Aspin. Kidder's overall conclusion was,

> It is found that a high degree of confidence in the reliability of the existing stockpile is justified, and that it is sufficiently robust to permit confidence in the reliability of remanufactured warheads in the absence of nuclear explosive proof-tests.[12]

Note that this confidence was warranted in 1987, without the new facilities that are proposed for the SBSS program.

In the course of his study, Kidder found that in the entire history of the U.S. stockpile, only one weapon (the W68) experienced reliability problems after being in the stockpile more than four years.[13] The Stockpile Life Study's conclusions, as we have seen, confirm this vote of confidence and bring it up to date.

In his paper, Kidder analyzed the fourteen often-cited cases of stockpiled weapons that required nuclear tests to evaluate problems. Nine of these occurred in the 1960's--Kidder calls these the

"Sixties Nine"--as a direct result of the rush to build and stockpile weapons during the 1958-1961 test moratorium. That rush led "to a stockpile that was very poorly tested by today's standards," he notes. Kidder continues,

> Our understanding of how nuclear weapons work, our experience with nuclear tests, and our computational capabilities were all significantly inferior to that which exists today [i.e., in 1987]. There has been no rush to build the present stockpile, and it has benefitted from a quarter-century of additional nuclear and nonnuclear tests since the hectic days of the Moratorium. For these reasons, it is concluded that experience with the Sixties Nine, long ago, has little or nothing to say about the reliability of the stockpile of nuclear weapons that exists today.[14]

Five other actual or potential reliability problems occurred in the 1980's, likewise as a result of inadequate testing. In two cases, the production weapons were different than the tested prototypes and had never actually been tested at all (one worked; one didn't). In two cases, weapons had never been tested after the rugged stockpile-to-target sequence of events (one worked; one didn't). And in one case, the high explosive in a weapon was changed; the explosive--unique to that failed weapon--had never been adequately tested in the first place and didn't work properly. All these problems, and the lack of testing that allowed them to go unnoticed prior to production, are irrelevant to the current stockpile.

Carson Mark, Director of the Los Alamos Theoretical Division for 26 years, summed up the situation in 1993 by saying that the reliability argument, as it was then being used against a test moratorium, was "utter rubbish."[15] Mark links reliability and stockpile confidence to preservation of the original warhead design, without change or "improvement."

> Most important, no changes or improvements in matters which could affect the behavior of the nuclear system in an existing, certified weapon design would be acceptable [during a test ban].[16]

Mark makes the further point that the real threat to confidence and reliability of the arsenal is the historical insistence that, to quote an old policy of the DOE, "the nuclear weapons stockpile must dynamically evolve to satisfy changing threats and deterrent requirements."[17]

<u>Reliable warhead remanufacture is feasible.</u>

The concept of maintaining confidence by preservation of design is at the heart of "warhead remanufacture," to which we now turn. Kidder tabulated the results of U.S. nuclear tests, dividing them into four groups, and found that the agreement between predicted and actual yield was "remarkably" good. He concludes that

> this impressive record would not have been possible if U.S. nuclear weapons were not comfortably tolerant of the small variations in materials and manufacturing that accompany any practical production process...The test record

> indicates that the nuclear weapons in the existing U.S. stockpile are sufficiently robust to allow for future replication...This conclusion is in agreement with earlier statements by nuclear weapons authorities Dr. Hans A. Bethe, Norris E. Bradbury, Richard L. Garwin, J. Carson Mark, and Andrei Sakharov affirming the possibility of reliable remanufacture without nuclear explosive proof-tests.[18]

This conclusion is reinforced by an experiment at Los Alamos in which an intentionally off-spec pit was made and successfully tested in Nevada.[19]

Kidder appends the convincing statements of these authorities to his paper. Needless to say, when he wrote these words in 1987 Kidder did not, nor could he have, made them contingent upon the existence of new science-based stewardship facilities.

Kidder added, however, that for later remanufacture to be feasible, original materials would have to be used. If changes were made, confidence would be undermined. When I spoke to him last year about this, he did not think that material substitution would be a problem in each and every case. Some changes could, in fact, be tolerated: parts which are supposed to be transparent to radiation, for example, could be replaced with parts which are at least as transparent, and parts which are supposed to be opaque, with parts at least as opaque. He noted that since his 1987 study, there have been further classified studies of this issue, including a "Stockpile Remanufacture Study" in FY91. At the present time, he is "not aware of any problems" with warhead remanufacture, provided adequate funding is available.[20]

Mark agrees. On the materials question, he says

> it is ridiculous to suppose that substitutes would ever be needed. Nuclear weapons production has never been dependent on commercial supplies or suppliers to meet its needs for obtaining and handling separated isotopes, polonium, plutonium, or explosives. The production system can certainly be set up, or arrange, to acquire safely any needed supplies of beryllium, plastics, asbestos, or whatever else may have served effectively in past production even if in the future it should be dropped from commercial use because of hazards or lack of demand.[21]

As for the level of expertise needed to implement such a remanufacture program, Mark points out that the only real need for experienced weapons designers would arise in the determination of "whether a particular problem found in the surveillance program did or did not require replacement of the stockpiled weapons with new ones built to the original, certified, and tested specification." Mark, for one, has no doubt that if the problem were considered important enough, a body of experienced experts could be convened <u>regardless of the level of staffing at the weapons laboratories</u>. Mark goes on to say,

> Past experience casts doubt on our supposed utter dependence on maintaining a corps of scientific and engineering veterans of the Nevada test site. There were no such persons anywhere in 1943 when the effort to build an atomic bomb was

> begun; and in 1950 when official hydrogen bomb efforts were announced, the corps of seasoned experts was very small and had very meager experience in testing - now said to be the *sine qua non* of capability. Yet in each case, the United States succeeded in developing and testing a weapon based on an entirely new physical principle within two to three years.[22]

Kidder points out that the institutional arrangements needed to maintain reliability are "nothing new." It would, in his opinion, take only relatively small teams, with focused responsibility for each weapon system, to resolve stockpile questions. At present, he said, it is rare for weapons designers to receive questions regarding changes in weapons specifications. Before this happens, several levels of expertise--the inspectors and production engineers at Pantex, then their supervisors, then the weapons engineering teams from the weapons labs which regularly travel to the production plants--must be exhausted first. He believes there is no reason to change this system, which works. The highest priorities for a strong remanufacture program would probably be product and production engineering, test equipment, and so on, rather than new science *per se*, although a scientific base must also be maintained, including hydrotesting facilities.[23]

In 1987 Kidder concluded, long before SBSS, with its proposed panoply of new design and diagnostic facilities, appeared, that

> The robust character of the nuclear weapons in the present stockpile, together with the ample time available to accomplish the task, suggests that it will eventually be possible to be confident of the reliability of remanufactured nuclear weapons without requiring the services of nuclear weapon design engineers and scientists that have themselves benefitted from direct experience with nuclear explosive tests. (p. 9)

At the same time--1987--as Kidder conducted his study, managers at Lawrence Livermore National Laboratory (LLNL) were writing their own report.[24] This report--a *cri de coeur* for nuclear testing--is very useful as a compendium of problems that had been experienced in weapon design and manufacture. Based on the historical record, these managers believed three kinds of problems would occur in a future without nuclear testing: the loss of both scientific and production experience, unavailability of materials (and/or subtle variations in them) with no way to test how substitutions and changes affected performance, and inadequate documentation and specifications for many materials and processes, leading to inadvertent production changes.

Yet the official LLNL conclusions of 1987--that exact remanufacture is impossible and that nuclear testing is necessary to retain the reliability of the arsenal--have both now been widely rejected. In the end, data like that of Ray Kidder have been strongly persuasive over the attempt to extrapolate future problems from problems discovered--and corrected--in the past. For if minor variations in manufacture, materials, or specifications were indeed a serious problem, we just would not see what Kidder called the "impressive" testing record in Nevada, either for new primaries or stockpiled weapons. Especially given the near-perfect record for <u>new</u> primaries, why should it be so difficult to merely maintain existing designs?[25]

<u>The JASONs believe the best approach to reliability is exact remanufacture.</u>

In their recent report on SBSS, the JASONs--an elite group of academic defense consultants convened by the MITRE corporation--endorse exact replication of weapons, especially plutonium pits, as the best way to ensure confidence in the arsenal.

> ...the primary--if not the sole--nuclear weapons manufacturing capacity that must be provided for in an era of no nuclear testing is the remanufacture of copies of existing (tested) stockpile weapons...the ultimate goal should be to retain the capability of remanufacturing SNM [special nuclear materials] components that are as identical as possible to those of the original manufacturing process and not to "improve" those components. This is especially important for pits...[26]

The plutonium pit forms the core of the fission primary, and its function is critical to the reliability of the entire weapon. Pits are composed of various materials which must be alloyed, shaped, and joined with great precision. Even so, the JASONs point out that it is the finished pit that must be the same as the proof-tested model, and not every manufacturing detail or process along the way. To ensure this, they call for "a narrowly defined, sharply focused engineering and manufacturing curatorship program."[27] This is an excellent approach to stockpile management overall, but the point here is that they found no serious obstacles to their exact remanufacturing proposal. That is, the inevitable inexactnesses of "exact" remanufacture evidently appeared quite tolerable to the JASONs, contrary to what is often said by the laboratories.

<u>Remanufacturing is not only practical--it is about to start.</u>

In addition to alleged reliability problems caused by declining expertise, unavailable materials, and inadequate documentation, it has more recently been suggested that there will be reliability problems associated with the adoption of novel production methods. For example, plutonium metallurgy is complex, and the processes formerly used at Rocky Flats to make pits are different in some respects from those now being set up at Los Alamos to do the same job. <u>But Los Alamos is remanufacturing pits.</u>

> Associated with pit surveillance activities is the Pit Rebuild Program, which will demonstrate the capability at Los Alamos to fabricate pits of war reserve quality. Specific technology areas that must be developed or enhanced at Los Alamos include certification of the beryllium machining capability, certification of the tubulation capability, development of the capability to interface pit materials, and development and certification of joining processes. The capability for manufacturing a pit for a W88 weapon will be in place in FY 1996...
>
> Los Alamos is currently the only DOE site capable of fabricating a plutonium pit and, as such, may be the only practical near-term upgrade-in-place option for plutonium processing and fabrication. In conjunction with its plutonium research and development responsibilities, Los Alamos will maintain

> those technologies and capabilities required to build plutonium pits for development and demonstration purposes...[28]

Thus the capability to produce W88 pits for the stockpile will be put in place long before any of the so-called "necessary" new diagnostic facilities, such as the Dual-Axis Radiographic Hydrotest (DARHT) facility, are available.[29] While both DOE and the laboratories are trumpeting exotic solutions to alleged reliability "problems," a fully-certified production line is being set up this year for the most critical and difficult-to-manufacture component in a weapon: the plutonium pit.

What is more, much of the slow start-up in the Pit Rebuild Program results not so much from the difficulty of being sure the pits produced will be good enough *per se*, but from the painstaking work of matching or modifying the specifications and procedures--the official cookbook--that LANL inherited from Rocky Flats. It is the quality assurance aspect that takes the most time. Asked how long it would take to produce a working pit for the stockpile in an emergency, independent of the formality of the certification process, LANL managers told Kerlinsky, "Three days."[30]

But this is not all--

> As part of the Stockpile Support Program, Los Alamos will maintain a capability to make the components for a complete nuclear physics package, thereby ensuring that the requisite technologies and expertise are retained in the DOE complex and that weapons RD&T requirements can be met in the future. Because upgrades in canned subassembly (CSA), assembly, and radiation-case capabilities will be required, Los Alamos and Livermore are preparing a study for DOE/AL to evaluate joint capabilities in both pit and CSA manufacturing.[31]

Thus LANL at least believes that it can manufacture not only pits but entire physics packages for RD&T purposes, if not also for the stockpile. And the two labs together not only have confidence in, but are actively seeking, manufacturing capability for complete physics packages for the stockpile.[32] Thus, what the labs said just a few years ago couldn't be done for all the reasons they trumpeted, they are now actively promoting--and at their own facilities, no less.

To the extent that nuclear weapons are to be retained, reliability and quality assurance issues will always require attention. But the inescapable conclusion from the labs' current programs and proposals is that they do not believe that reliability issues stand in the way of remanufacture of nuclear weapons.

There is no need to retain weapons in the stockpile long after their expected life.

It is often mistakenly asserted that, with an end to nuclear testing, weapons will have to remain in the stockpile for unprecedented periods of time. There is no reason why this need be the case. About six weapon types could remain in the "enduring stockpile" for a long time, should

further disarmament measures fail, but individual weapons can be remanufactured if it is decided to do so. Therefore there is no need to endlessly study how problems which develop only after decades in the stockpile might affect reliability--if reliable nuclear weapons are desired, new parts, or new weapons, of existing types can be made. This logic applies to the aging of insensitive high explosive (IHE), to metallurgical changes in plutonium pits, and in fact to essentially all potential long-term stockpile problems.

Stockpile problems are now detected by a variety of non-exotic means, such as physical inspection, static radiography, chemical analysis, and testing of subsystems. These problems can be simply remedied, if necessary, by replacement of the affected part from inventory or from remanufacture--or by retiring the weapon.

Conclusion

Retention of a nuclear deterrent is not a demanding technical requirement. Such a task is not a major scientific undertaking at all. It is rather an engineering and organizational problem with scientific components.

In particular, there is no need to construct advanced new diagnostic facilities. While these facilities could, in some cases, marginally advance the state of U.S. nuclear weapons science, to the extent they do this they will inevitably undermine the global nonproliferation regime.[33] Thus, while contributing little or nothing to the reliability of U.S. nuclear weapons, these new facilities could well decrease confidence in the overall efficacy of our nuclear deterrent.

What is more, a DOE budget centered around SBSS, with funding included for large, unnecessary, and distractive gadgets like the proposed National Ignition Facility, could overshadow and weaken those programs most useful for actually maintaining the existing stockpile. This fact has not escaped the notice of many analysts, including the Congressional Budget Office and the Natural Resources Defense Council.[34]

Fundamentally, the scale and direction of the science-based stockpile stewardship program envisioned by the DOE and the weapons labs is not so much driven by concerns about the reliability of weapons as it is driven by concerns regarding the reliability of funding. Creating new "products"--i.e. new weapons designs--in that program, an outcome which is probably necessary to maintain internal interest in the program in the long run if not also in the short run, may be the best way to create reliability problems in an arsenal which now has none.[35]

Endnotes

1. The following exchange occurred between Chairman Hamilton and Dr. Deutch during the latter's presentation of the Nuclear Posture Review to the House Foreign Affairs Committee, October 5, 1994:
   Rep. Hamilton: "Do we need more [nuclear] testing?"
   Dr. Deutch: "In the near term? How long do you have in mind, sir?"
   Rep. Hamilton: "You pick the time frame. It doesn't make any difference."
   Dr. Deutch: "The position of the administration, I believe, is that we don't need more testing..."

After three more attempts by Rep. Hamilton to elicit candor from Deutch, the latter finally admitted:

"Mr. Chairman, you catch me personally here at a rather awkward position, and let me explain to you straight why, and that is that I have written widely on this subject before I entered government, and so what I'm trying to answer to you now is the position of the administration."

Although Hamilton questioned Deutch closely as to reasons to continue nuclear testing, Deutch provided none, even though he was personally in favor of testing. Hamilton even suggested that safety as a reason to continue testing, but Deutch demurred, saying "It is my judgment that all the nuclear weapons that we have are adequately safe." At no point did Deutch bring up any reliability issues--either past, present, or possible future.

2. See the viewgraphs used to present the Nuclear Posture Review in late September and early October, 1994, available from the Pentagon; the one quoted here is titled "DOD requirements to DOE." The "requirements" terminology is both problematic and revealing.

3. Greg Mello, "Redefining Stockpile Stewardship," Tri-Valley CAREs, Livermore, CA, 1995.

4. Testimony before the House Appropriations Committee, Subcommittee on Energy and Water Development, Energy and Water Development Appropriations for 1995, Part 6, pp. 413-414.

5. Ibid., p. 419.

6. Physics packages: the nuclear "core" of a weapon, typically and schematically comprised of the fission primary, the thermonuclear secondary if present, related initiating and boosting devices, and the case.

7. Ray Kidder, "Maintaining the U.S. Stockpile of Nuclear Weapons During a Low-Threshold or Comprehensive Test Ban," October 1987, UCRL-53820, LLNL, pp. 4-5. His exact word or adjectival phrase has been omitted by the classifiers but the import of his sentence is clear. Kidder discusses stockpile confidence tests (SCTs) more extensively on p. 3 and in Appendix B of his report, both of which have been substantially classified as well. I do not know how many SCTs were done in the years between 1987 and 1992, when testing ceased, or whether there remain, at this point, any weapons which have not been so tested, or whether any systems without SCTs are to be retained in the START II arsenal. It is quite doubtful that inadequately tested weapon systems would be chosen for retention in the so-called "enduring arsenal." Even if so, the "remarkably accurate" predictability of SCTs (Kidder, p. 15) supports a high level of confidence in the reliability of any weapon (if there is one) which has not had this final, post-production, test. The large number of nuclear tests that were available for such tests argues that if any SCTs were not done, it was because they were not considered very important. The Nuclear Testing Moratorium Act specifically allowed testing for reliability purposes, but none has been requested.

8. Classified and unclassified results of this study were made available to the Galvin Panel. The unclassified summary is currently being suppressed by Assistant Secretary Reis and Undersecretary Curtis.

9. This information is found in viewgraphs prepared by Sandia National Laboratory.

10. Seth Cropsey of the Heritage Foundation is one such person (see "The Only Credible Deterrent," Foreign Affairs, March/April 1994, pp. 14-20. General Horner, head of the Air Force Space Command, is another ("U.S. Should Trash Nukes, Top Air Force General Says," Albuquerque Journal, July 16, 1994). Tom Thompson, dean of current weapons designers at Livermore, is another. As he recently put it, "I can't think of any target for anything in our stockpile" ("Science Comes in from the Cold," Los Angeles Times, 12/22/94).

Many senior military commanders have held and/or hold the view that nuclear weapons are useful only to deter other nuclear weapons, and not for any military use; Robert McNamara listed some he has known to hold this view in the United States and Britain in a speech to the Economists Allied For Arms Reductions in New York on May 19, 1994. Still other civilian and military defense leaders cited by McNamara have stronger views--that nuclear weapons should never, under any circumstances, be used at all. McNamara says he conveyed this opinion, which he has held since the early 1960's, to Presidents Kennedy and Johnson.

11. One senior weapons manager at LANL put the whole reliability question in perspective with a pointed question, "Would an aggressor gamble that Israeli nuclear weapons [which are far less tested than U.S. weapons] won't explode?" To be undeterred, any aggressor must have confidence that the U.S. deterrent as a whole won't work, i.e. that all, or essentially all, of the weapons launched by the U.S. will be complete duds. It is this aggregate reliability that counts for deterrence, and the burden of proof is solidly on those who would doubt that aggregate reliability. As described in the previous note, many people--the present writer included--believe it would be a mistake to retaliate against an attack, even a nuclear attack, with nuclear weapons. As General Horner put it,

"I just don't think nuclear weapons are usable. I'm not saying that we militarily disarm, I'm saying that I have a nuclear weapon, and you're North Korea and you have a nuclear weapon. You can use yours. I can't use mine. What am I going to use it on? What are nuclear weapons good for? Busting cities. What President of the United States is going to take out Pyongyang?"

If, however, nuclear weapons are to be maintained and deployed as just another weapon of war, ready for first use against an enemy in times of crisis, a higher standard of reliability is required. Yet even this dangerous and counterproductive posture can be readily and reliably supported by maintenance and remanufacturing of existing weapon types.

There is yet another reason why confidence in deterrence is robust relative to reliability of a weapon. In a nuclear explosion, the maximum radius at which a given overpressure is experienced is proportional to the cube root of the explosive yield. A five-fold decrease in explosive power thus causes only a 1.7-fold decrease in destructive radius and a 2.9-fold decrease in destructive area. (See Samuel Glasstone, The Effects of Nuclear Weapons, U.S.A.E.C., 1964, p. 127.) Even significant declines in expected yield are unimportant outside a warfighting context.

12. Kidder, op. cit., p. 1.

13. This problem, arising from chemical instability in a type of HE that is no longer used, is not relevant to the current arsenal.

14. Kidder, op. cit., p. 4.

15. Personal communication.

16. J. Carson Mark, "Do We Need Nuclear Testing?", Arms Control Today, November 1990, pp. 12-17; p. 14.

17. Mark, op. cit., cites DOE, Program Status of Preparations for Further Limitations on Nuclear Testing, February 1990. Far from being dead, this anachronism lives on, most conspicuously in the recent Nuclear Posture Review quoted above.

18. Kidder, op. cit., p. 6.

19. Daniel Kerlinsky, personal communication.

20. Ray Kidder, personal communication, 11/17/94.

21. Mark, op. cit.

22. Ibid.

23. Ray Kidder, personal communication.

24. George Miller, Paul Brown, and Carol Alonso, "Report to Congress on Stockpile Reliability, Weapon Remanufacture, and the Role of Nuclear Testing, October 1987, UCRL-53822, LLNL.

25. "During the past decade (1977-1986), new boosted primaries have been designed and developed by the weapons laboratories...performed satisfactorily the very first time they were tested, the observed yield in no case falling short of that expected by more than...The one new primary that failed was of a more complex, less predictable design than the others. This primary was subsequently redesigned, tested, and failed again. None of the primaries in the existing stockpile employ...

"This experience demonstrates that the ability of the weapons labs to predict the performance of newly designed, as yet untested, boosted primaries of the kind currently in stockpile is indeed impressive--there were no significant surprises. This could hardly have been the case had these primaries been sensitive to differences that inevitably exist between the weapon configuration calculated and the weapon tested." Kidder, op. cit., p. 25.

26. "Science Based Stockpile Stewardship," Sidney Drell et al, November 1994, MITRE, McLean, VA, p. 81. The chapter quoted proceeds from different assumptions than most of the rest of the report. That report is criticized in a paper related to the present study, available from Tri-Valley CAREs, "Ask Few Questions, Get Few Answers: A Critique of the JASONs' Stockpile Stewardship Study," Greg Mello, 1995.

27. Ibid., p. 85.

28. Los Alamos National Laboratory, Institutional Plan, FY1995-2000, pp. 50-51.

29. DARHT, like the existing Flash X-Ray (FXR) and Phermex facilities at Livermore and Los Alamos, respectively, would evaluate mock pits during implosion. DARHT, if built, is expected to be available for experiments in approximately the year 2000.

30. Dr. Daniel Kerlinsky, personal communication.

31. Los Alamos National Laboratory, op. cit., p. 51.

32. The overall outlines of the labs' proposal can be found in a presentation by Larry Woodruff of LLNL to the National Security subgroup of the Galvin Panel on August 8-9, 1994. The responsibilities of Rocky Flats, Savannah River, and the Y-12 Plant would all be moved to LANL and LLNL under this plan, with Sandia taking over for Pinellas and the Kansas City Plant. The production capacity would be 150 weapons per year, with LANL specializing in fabricating parts made from fissile materials.

33. Detailed discussion of this point will soon be available from the present writer and Tri-Valley CAREs.

34. Congressional Budget Office, "The Bomb's Custodians," July 1994, p. x; Christopher Paine, personal communication.

35. See Defense Week, 8/15/94. Dr. John Deutch, Undersecretary of Defense, and Dr. Vic Reis, Assistant Secretary of Energy, were and may still be pressing for development of a new warhead. This notion differs from the military's preferred road map for maintaining reliable nuclear weapons, which does not involve reliance on an untested weapon.

5 Greg Mello 6/1/95
DARHT DEIS ntg.

Ask Few Questions, Get Few Answers: The JASONs' "Science Based Stockpile Stewardship" Study

DRAFT

A Review for Tri-Valley CAREs

by

Greg Mello

February 14, 1995

Ask Few Questions, Get Few Answers:
The JASONs' "Science Based Stockpile Stewardship" Study

A Review for Tri-Valley CAREs by Greg Mello, February 1, 1995

Summary

DRAFT

- The Department of Energy (DOE) asked the JASONs, a respected group of academic defense advisors, to evaluate its science-based stockpile stewardship (SBSS) program. The JASONs were not asked, however, about the relative merit of specific projects in SBSS, or which of these projects--if any--were essential, or to evaluate projects by their benefit-to-cost ratio. As a result their report is not very helpful in evaluating the DOE program.
- The JASON group cannot be considered "independent," since many of the group, including the chairman Dr. Sidney Drell, are closely connected to the DOE.
- 3 In the JASONs' view, "compensation" to the weapons labs for the loss of underground testing is the "basic principle" of the SBSS plan. They recognize, however, that if other nations view SBSS as compensation, this could conflict with U.S. nonproliferation goals.
- The JASONs nowhere demonstrate the need for most aspects of SBSS to maintain a deterrent.
- The JASONs assume that new nuclear weapons must be developed and deployed and that SBSS is necessary to accomplish this. At the same time, the JASONs do not want the perception of this activity to be widely shared.
- The JASONs' analysis of the nonproliferation impacts of the SBSS is quite abridged. They essentially ignore the requirements of the Non-Proliferation Treaty.
- The JASONs propose declassifying many of the technical details of the SBSS program in order to defuse nonproliferation concerns. A senior DOE declassification officer strongly disagreed with this approach, citing direct proliferation risks. The JASONs' declassification proposal seems calculated to gain more scientific users of the new machines and therefore more political support for them.
- The JASONs endorse most of the proposed new facilities that will be the foci of the SBSS program, including all the hydrodynamic testing upgrades planned for this century and the National Ignition Facility (NIF). Yet they offer no reasons why these facilities, including 1 NIF, are in any way necessary. They call for a public-relations campaign to sell NIF within the scientific community.
- The JASONs' prescription for plutonium capabilities calls for a narrowly-defined "curatorship" and for exact reproduction of existing designs, contradicting the rest of the report.

Introduction

In November of 1994, 17 members of the JASON group published their study of the Department of Energy's (DOE's) science-based stockpile stewardship (SBSS) program, which is in its first year of implementation. Even in its draft form, DOE was very pleased with the results of the study and was, in October of 1994, looking forward to reprinting it for wide distribution.[1] The JASON study is likely to be influential in the policy debates of 1995 and beyond and so deserves careful scrutiny.

The JASONs are an elite group of academic defense advisors periodically convened to study selected scientific issues for the military. Their origins lie in the secret studies sponsored by the Pentagon in the late 1940s and early 1950s, most often coordinated by the Massachusetts Institute of Technology (MIT). The first of these was Project Lexington in 1948, which started the ridiculous nuclear-powered bomber program. This was followed by Project Charles, which studied civil defense against nuclear war, and then by many others. By 1966, the JASONs had become a permanent institution, enthusiastically advising McNamara regarding the promise of the "electronic battlefield" in Vietnam, an effort later described by one JASON as "very naive--extraordinarily naive."[2]

It is not clear from whence the name of the group was taken; one long-time JASON recently joked that it comes from the legend of Jason and the golden fleece. The JASON office is at the MITRE corporation, reflecting its MIT roots.

The point of this brief history is that even bright and well-meaning groups like the JASONs are often wrong, sometimes very wrong. They are especially vulnerable if the questions posed to them are too narrow or if those questions imply a narrow range of answers, all of which are yes. Such is the case in the present study.

Quoting from the abstract,

> The DOE asked JASON to review its Science Based Stockpile Stewardship program with respect to three criteria: 1) contributions to important scientific and technical understanding and to national goals; 2) contributions to maintaining and renewing the technical skill base and overall level of scientific competence in the defense program and the weapons labs, and to the broader U.S. scientific and engineering strength; and 3) contributions to maintaining U.S. confidence in our nuclear stockpile without nuclear testing through improved understanding of weapons physics and diagnostics.

Pointedly, the DOE did <u>not</u> ask the JASONs their opinion about which elements of the proposed SBSS program were necessary, or even to rank them in importance. Where multiple projects were being advanced toward the same end (as, for example, in hydrotesting) DOE did <u>not</u> ask the JASONs which facility or facilities to fund. DOE did <u>not</u> ask the JASONs to evaluate any other approach to maintaining the arsenal other than SBSS, or whether big-ticket SBSS projects could take resources from stockpile surveillance and remanufacturing. DOE did <u>not</u> ask how

many scientists and engineers were necessary to retain in the labs' nuclear weapons programs, with which skills, and DOE did not ask in detail about the nonproliferation impact of the SBSS program. Unbelievably, the JASONs were apparently not asked, nor did they volunteer, to evaluate the programs and projects proposed on the basis of cost.

In short, the DOE appears to have not asked any of the hard questions it should have asked to help set its programmatic priorities and overall funding level. Quite the contrary: it is difficult to see the above questions as anything but an invitation--indeed a requirement--to glorify SBSS, using the outline conveniently provided by DOE. The charge to the JASONs assured that their report would be positive and devoid of any detailed tradeoffs between policy options. And so it is.

While the narrow technical qualifications of the JASONs cannot be impugned, it is not obvious that the JASONs comprise a truly independent review. Many of the authors of this report have worked or still do work for institutions which receive substantial funding from the DOE.[3] Some are the recipient of awards from the DOE. Dr. Sidney Drell, chairman of this and other studies on related subjects for the DOE, works at the Stanford Linear Accelerator (SLAC), which receives some $180 million annually from the DOE. This is not to imply that Dr. Drell or any of the other authors of this report are dishonest. But it is difficult for any of us to provide an entirely dispassionate analysis when the funding, perhaps even the survival, of institutions to which we have devoted ourselves could be at risk.

Neither is it obvious that the JASONs have in every case carefully thought through, or sought expert advice on, some of their conclusions. An illustrative case concerns the nonproliferation impact of SBSS activities. When Dr. Drell was asked by Joe Cirincioni of the Campaign for the Non-Proliferation Treaty what scientific data he could provide to support his assertion that the National Ignition Facility (NIF) need not, in the eyes of other nations, compromise U.S. commitments under Article VI of that treaty, he replied that he had obtained no data--that he and the other JASONs had relied entirely on personal judgement and intuition for their conclusion in this area.[4]

Conversely, Jonathan Medalia of the Congressional Research Service reports that:

> Many nonnuclear nations...view a halt to all nuclear explosions of all types for all time as the *minimum* scope of a CTB [comprehensive test ban]. Some want to go further, restraining stewardship to cement shut the door to testing and encourage further denuclearization. For example, Indonesia would ban computer simulations of nuclear tests; Egypt, Germany, and Sweden would ban preparation for nuclear tests; and Iran, Nigeria, and Pakistan would close test sites. Nuclear states feel themselves to be on a treadmill of rising expectations...
> ...
> At the same time, a large stewardship program might jeopardize indefinite NPT [Nuclear Non-Proliferation Treaty] extension. Many nonnuclear states want the scope of a CTB drawn to eliminate the nuclear nations' *ability* to design, test, and

> certify new nuclear weapons. These states may view a large stewardship program as preparing to pursue the nuclear arms race by other means, circumventing the spirit of a CTB.[5] (emphasis in original)

This information is widely available. We must assume that the JASONs simply weren't interested in it or didn't take the time to obtain it. Unfortunately, the JASON study is replete with unsupported judgements such as the ones Dr. Drell described to Mr. Cirincione.

Unlike the JASONs, we cannot hope to convince by mere prestige. Nor do we have their access to classified information--information which is always carefully selected as it is provided to them. Our comments therefore seek to point out inconsistencies and to draw the reader's attention to facts and testimony the JASONs may have overlooked. We urge the reader to look beyond the knowledge of physics that went into the JASONs' report and to face the policy choices to be made regarding the future of the nuclear weapons program.

Overall Comments

"Compensation" (note the pun) for the ending of underground nuclear testing is understood by the JASONs to be the "basic principle" of the SBSS plan, to be achieved by "improved diagnostics and computational resources that will strengthen the science-based understanding of the behavior of nuclear weapons" (p. 1). Yet when the subject of nonproliferation is broached a few pages later, the JASONs say that the SBSS program

> must avoid the appearance that, while the U.S. is giving up nuclear testing, it is as compensation introducing so many improvements in instruments and calculational ability that the net effect will be an enhancement of our advanced weapons design capabilities." (p. 17, emphasis in original)

It is not clear how the SBSS program can "compensate" on p. 1 and "avoid the appearance...[of] compensation" on p. 17. This contradiction is a fundamental theme underlying much of the JASON report and indeed much of the SBSS program. It reflects poorly on the thoughtfulness with which the JASONs approached their subject. This quote makes clear, as we will see again below, that the JASONs think any nuclear weapons research and development (R&D) effort--short of one giving the appearance of designing advanced new weapons--does not conflict with nonproliferation efforts.

While the JASONs do not want the SBSS program to "be perceived as an attempt by the U.S. to advance our own nuclear weapons with new designs for new missions" (p. 3, item 2, emphasis added), we find later in the report that

> Over time it may become desirable to introduce design changes in some components of the present stockpile...It will require considerable computational analyses of both primaries and secondaries in order to develop even a limited capability for redesign of warheads without proof-testing. (pp. 89-90)

4 We have already seen elsewhere[6] how DOE, while publicly abjuring new weapons, is actually seeking to design and fabricate a new so-called "robust" warhead and has design teams working on several other concepts as well, some of which do indeed involve new designs and new missions.

So the "threefold" purpose of SBSS (p. 2) must really be expanded to "fourfold," with the additional purpose being to provide, to the greatest degree that is consistent with a CTB, the capability to certify new weapons. The Pentagon made this requirement crystal clear in its September 22, 1994 briefing on the Nuclear Posture Review, which included the following viewgraph language:

> DOD requirements to DOE:
> ...
> --Demonstrate capability to refabricate and certify weapon types in enduring stockpile
> --Maintain capability to design, fabricate, and certify new warheads
> ... (emphasis added)

This language is echoed by the JASONs on p. 12, where they assume that "The US nuclear infrastructure under the SBSS will retain a capability to design and build new weapons, which could be deployed should the need arise..."

Quite apart from this contradiction, it is not clear why it is necessary to "compensate" for the termination of underground testing, since: a) the reliability and especially b) the safety of existing nuclear weapons do not require such compensation, as is discussed elsewhere in depth.[7]

5 Improved diagnostics and computational resources are certainly not necessary to maintain reliability or safety; maintenance of a small core of technical staff, with continuing investments in surveillance and a small remanufacturing capability would be effective for these ends. The purpose of a CTB is to end the testing of new weapons, not merely shift its location.

The JASONs regard a "strong" SBSS program as an "essential component for the U.S. to maintain confidence in the performance of a safe and reliable nuclear deterrent under a comprehensive test ban" (p. 3). Nowhere do they, however, specify just how "strong" the program should be, nor do they ever clearly state why particular SBSS elements are actually needed. The entire question of need is simply dismissed with a wave of the hand and an invocation of the mantra of safety and reliability.

6 The JASONs assume that the same aging warheads will need to remain in the stockpile for "at least several decades" (p. 1). It is not at all clear why this need be the case. Warheads can simply be rebuilt whenever their reliability falls below some desired level. Furthermore, the United States has rightly committed to eliminating all its nuclear warheads in Article VI of the Non-Proliferation Treat (NPT). It is hard to understand why the JASONs see no conflict between keeping a nuclear stockpile for "at least several decades" and the clear language of the NPT. In this connection, note that their periphrasis of that Article on p. 18 bears shockingly little resemblance to the actual treaty language.[8]

6 Finally, it is by no means clear that an "improved understanding of warheads" is necessary or desirable for U.S. or global security purposes. Knowledge is not free of costs, and investments in the U.S. nuclear weapons program will have a variety of serious costs: to the federal fisc, to the effectiveness of the world's nonproliferation regime, to the environment, and to every other kind of scientific pursuit. It is not knowledge, but wisdom, that is in short supply in the nuclear weapons business. The JASONs have not improved this situation.

The JASONs' Chapter 2: Basic Assumptions

Much has been made, in the JASON report and elsewhere, of President Clinton's July 3, 1993 statement that "we will explore other means of maintaining our confidence in the safety, the reliability and the performance of our own weapons" (emphasis added). Note that the President said "explore;" he did not say "we will establish, for the indefinite future, a Cold War level of funding for science-based stockpile stewardship"--which is how his statement is being taken by the JASONs and others in the nuclear weapons community. The next sentence in the President's speech has been ignored, by both DOE and the JASONs:

> We will also refocus much of the talent and resources of our nation's nuclear labs on new technologies to curb the spread of nuclear weapons and verify arms control treaties.

Unfortunately, there has been no such refocus. The attitude at the weapons labs is instead typified by a conversation recently overheard by a UNM professor between lab managers on an airplane flight in which the two gentlemen assured one another that they would "outlast" the Clinton administration's attempted refocusing.[9]

The JASONs assume that old, more "robust," stockpile designs could be introduced into the stockpile, apparently with modifications to allow more modern "engineering and manufacturing practices" (p. 12). It is far from clear that this would be acceptable to the military. The assumption that new or redesigned warheads should and will be introduced and built is one that pushes the cost of stockpile stewardship very high, both in dollars and probably also in reliability. It is entirely unnecessary.

Missing from this chapter and this report are any quantitative assumptions about the arsenal or any descriptions of the warheads it will contain. The JASONs say the arsenal will continue to decrease in number and variety--but how? Failure to specify their assumptions about the arsenal more closely makes the reader suspect that the SBSS program they review is independent of the stockpile and its real-world requirements and problems.

Since the criteria by which the JASONs evaluated the SBSS program (their Chapter 3) have been strongly criticized for their narrowness already, we turn now to nonproliferation concerns.

The JASONs' Chapter 4: Nonproliferation

The JASONs understand that

> Ultimately, non-proliferation can only be successful if the NNWS [non-nuclear weapons states] are persuaded that their national security is better served without nuclear weapons than by possessing them (p. 19).

How can all these countries possibly be persuaded of this when the nuclear weapons states (NWSs) assert just the opposite for themselves--that nuclear weapons are central to their national security? These NWSs are of course not just armed with nuclear weapons, but also with qualitatively and quantitatively superior conventional weapons as well. Yet still they assert that nuclear weapons are indispensable. Nowhere do the JASONs face or even acknowledge the fundamental contradiction between their statement above and U.S. plans, not just to maintain its nuclear arsenal indefinitely, but to continually "improve" it, an effort the JASONs acknowledge, approve, and seek to facilitate.

The JASONs, in their rush to bless DOE's plans, have fundamentally misread the politics of nonproliferation. After squirming their way past the clear language of the NPT and failing to address the fundamental contradiction of U.S. nonproliferation policy, they limit their concerns about the proliferation impact of SBSS to basically just one:

> One worrisome aspect of the SBSS program is that it may be perceived by other nations as part of an attempt by the U.S. to continue the development of ever more sophisticated nuclear weapons. (p. 19)

But this is hardly the entirety, let alone the root, of the problem. They compound their error with arrogance in the next sentence:

> This perception is particularly likely to be held by countries that are not very advanced technologically since they are less able to appreciate the limits on advanced weapons design that a lack of testing enforces.

Yet on the same page, the JASONs confirm this "perception":

> While the potential for future developments cannot be excluded, the SBSS activities should not be interpretable as laying the basis for the development of newer generations of nuclear weapons...(emphasis added)

It appears that the only policy consistent with all these confused statements is a policy of deception, which is the height of folly. Such deception would have to be aimed at the American people as well as other nations, and cannot succeed even temporarily. Clandestine vertical proliferation would be implicitly or explicitly used as an excuse by some horizontal proliferant some day, and would, by its very nature, threaten the integrity of the nonproliferation regime, which requires clarity and transparency to work. Such a policy would be very costly to U.S. national security.

The impacts of the SBSS program on nonproliferation efforts are certainly not confined to problems caused by the "perception" or "interpretation" that the U.S is engaged in further

weapons development. This was thoroughly discussed at the September 8 workshop mentioned above, with Dr. Drell in attendance. It is worth reviewing the whole issue briefly from first principles.

The basic goal of nonproliferation, as it is perceived officially in the United States, is one of preventing other countries from acquiring nuclear materials and, especially, nuclear weapons. Most countries, of course, have no interest in taking on the dangers, cost, and opprobrium of nuclear weapons. But it is not the Danish bomb that is of concern. To effectively prevent proliferation in every case, even the difficult ones, a variety of tools are required: international treaties, national laws, bi- and multi-lateral agreements, and unwritten norms--all of which must, to be effective, carry with them an implicit or explicit possibility of political, economic, criminal, or military sanctions, directed against countries, companies, or individuals as appropriate. Positive rewards for compliance with nonproliferation norms also can be and have been used.

These potential sanctions, in their variety and comprehensiveness, are the real deterrent to proliferation in the most important cases. They must be credible to work. They are not likely to be credible if they are not very broadly based among nations, especially among the nuclear powers. And surely it is difficult to get very broad-based cooperation in enforcing tough nonproliferation sanctions if we ourselves violate the norms we would enforce. We cannot get treaties implemented by others that we do not follow or intend to follow. Nor can we easily enforce, except at great and often prohibitive cost, provisions of treaties--like the NPT--that we ourselves do not honor.

Let's get real: we will not stop nuclear proliferation unless we have tough laws and effective sanctions, actively supported by nearly every nation involved. This requirement is incompatible with our ongoing violation of the NPT, and with the maintenance and "improvement" of our own large nuclear arsenal, especially as this arsenal is accompanied by a declaratory policy of possible first use and configured to make this threat real.

The conflict between U.S. nuclear policy, including SBSS, and U.S. interests in nonproliferation is therefore much more fundamental than the perception that we might develop more advanced nuclear weapons. This perception would, of course, simply make our nonproliferation and credibility problems even worse, while advanced weapons and weapons science would provide no deterrent against a proliferant threat.

The JASONs faulty and superficial analysis of the nonproliferation problem leads them to a questionable recommendation for relieving the well-deserved "suspicions" of the non-nuclear weapons states. The JASON approach: declassify most of the SBSS program.

This strategy attempts to remove the potential complaints of the non-nuclear weapons states--which could, after all, have negative ramifications for SBSS funding--by simply inviting them to the weapons technology table. Any problems concerning proliferation of technology out of the SBSS program would be solved, in effect, by a redefinition of proliferation. Proliferation done officially wouldn't count anymore.

History provides a warning: in every case since 1950, programs to build fission bombs have been conceived, hidden, and matured within the womb of fission energy programs. If we follow the JASONs' advice, we may have fusion weapons being developed under the cover of fusion energy programs--using data, codes, and techniques developed and disseminated in and by the U.S.

Aside from the rationale the JASONs provide, another political motivation for the declassification they propose is that it will to create a broader user community--and hence a broader constituency--for the stewardship program and its funding. This is particularly the case for NIF.[10]

Of particular concern is the possible declassification of all but "critical" parts of the weapons codes (p. 21) in order to allay the "suspicions" of the non-nuclear weapons states. Even if these suspicions did comprehend the entire nonproliferation impact of the SBSS program, which they don't, why would the declassification of technical arcana allay anything? More to the point would be the declassification of policy and planning documents, such as the nuclear stockpile memorandum.

Looking at the problem of nonproliferation impacts of the U.S. nuclear weapons program as a whole, non-nuclear states' concerns--which are a matter of public record, not merely a possibility--could be better addressed by:

- a stronger and more successful effort toward a CTB;
- a change in U.S. declaratory policy on first use;
- the elimination of tactical weapons;
- bilateral reductions in strategic forces below START II;
- a ban on weapons-usable fissile material production;
- a limit on stockpile stewardship to the minimum that is actually needed; and
- opening U.S. weapons facilities to credible domestic and international inspectors, perhaps from Canada, Australia, or other appropriate non-nuclear-weapon states.

To succeed in its nonproliferation goals in the long run, the U.S. needs to accept the same level of transparency that it demands of other nations. Publishing major portions of U.S. nuclear weapons codes has not exactly been on the top of anybody's non-proliferation wish-list, however.

The JASONs assert that most new proliferators could derive no immediate benefit from these codes. Even if this is true, what about China, or Israel, or Japan--or India or Pakistan, for that matter? Wouldn't the knowledge that scientists from these countries get by using the NIF and its related computer codes train them to do secondary physics, just as U.S. scientists are trained? Or perhaps they could take the now-unclassified codes and modify them for weapons analysis, saving themselves person-years of work on the way to deliverable boosted fission or thermonuclear bombs. When the JASON declassification proposal was brought up in the context of NIF at DOE's September 8, 1994 NIF workshop, a senior DOE classification officer rose to vigorously contest the appropriateness of declassifying information from experiments at

temperatures and pressures at or approaching those of a nuclear explosion, data which would definitely be useful in the design of weapons.[11]

International scientific cooperation is in general a very good thing. But scientists at the weapons labs of the various countries have more in common with each other than they do with their respective governments, as Dr. Hecker at Los Alamos National Laboratory (LANL) once remarked about Russia. The U.S. weapons labs have already been the source of a great deal of knowledge for foreign weapons programs.[12] Why open the door wider?

The JASONs' Chapter 5: Stewardship Program Elements

To provide a justification for enhanced SBSS capabilities, the JASONs refer on p. 24 to the "limited" number of cases where nuclear testing was needed to remedy or validate the remedies to stockpile problems of the past. These cases--fifteen in number--are extensively discussed by senior Livermore weapons scientist Ray Kidder in his 1987 study of weapon reliability under a test ban, and his conclusions--(1) that these resulted from rushing inadequately tested designs into the stockpile, and (2) that these problems are all lessons learned, i.e. of historical, but not predictive, importance--still stand.[13] As discussed elsewhere at length, there are no known safety or reliability problems in the U.S. arsenal.[14]

7

Certainly we need to retain, at least for now, some nuclear weapons scientists, as the JASONs point out on p. 24. It is not clear that we need to retain the thousands of scientists, engineers, and technicians now working in this program. If the intent is merely to retain our existing knowledge and expertise about nuclear weapons, there are cheaper and less provocative ways to do it than SBSS, namely by emphasizing retention of unique knowledge in archives and in a relatively few staff members. The emphasis should be on uniqueness, not quantity.

The JASONs' Chapter 6: Hydrotesting

The JASONs' treatment of hydrotesting and the proposed Dual-Axis Radiographic Hydrotest (DARHT) facility at LANL provides further examples of their lack of careful analysis. The JASONs believe that this facility will provide "capabilities of importance" (p. 4) to the SBSS program. In fact, they appear to offer unqualified support for all the hydrotest upgrades planned for this century, drawing the line at the Advanced Hydrotest Facility planned for the out years. But nowhere do they say why these capabilities are important.

1

In Kidder's 1987 paper we find the following.

> During the past decade [1977-1986], new boosted primaries have been designed and developed by the weapons laboratories...performed satisfactorily the very first time they were tested, the observed yield in no case falling short of that expected by more than...(See Tables H1 and H2 and Fig. H1) The one new primary that failed was of a more complex, less predictable design than the others. This primary was subsequently redesigned, tested, and failed again. None of the primaries in the existing stockpile employ...

> This experience demonstrates that the ability of the weapons labs to predict the performance of newly designed, as yet untested, boosted primaries of the kind currently in stockpile is indeed impressive--there were no significant surprises. This could hardly have been the case had these primaries been sensitive to differences that inevitably exist between the weapon configuration calculated and the weapon tested.[15]

This "impressive" capability existed between seven and seventeen years ago, in the design of new primaries. It is not clear why it is not enough to simply maintain existing primaries today.

Kidder's last point, which speaks to the insensitivity of primary yield to minor variations in manufacture, was corroborated by a manager (name withheld) at Los Alamos, who told Dr. Kerlinsky of the Galvin Panel that deliberately "off-spec" pit(s) had been manufactured at Los Alamos and tested successfully at the Nevada Test Site.[16]

Then why are all these new facilities needed? The JASONs answer this question on p. 27.

> Such information [from hydrotests integrated with code development] will lead to greater confidence in our understanding of weapons and, perhaps ultimately, to a willingness to make relatively simple changes in primary design without underground tests. (emphasis added)

2 Once again, it is not simple maintenance of a deterrent through remanufacture of existing weapons that is driving the "acknowledged need" (p. 28) for increased radiography capability, but the desire to design and certify new weapons in the absence of nuclear tests. It is the "design community" (p. 29) that has this "need," not the stockpile surveillance program, and certainly not the nation. The surveillance program has never depended upon hydrotesting, let alone advanced hydrotesting, to do its job.

Overall, it is far from "clear" that "improved hydrotesting is crucial to continued confidence in the safety and reliability of nuclear primaries" (p. 32). As far as reliability is concerned, this statement is contradicted by the data collected and presented by Kidder. And in Kidder's paper, the JASON opinion is contradicted by that of Hans Bethe, Carson Mark, Norris Bradbury, Richard Garwin, and Andrei Sakharov, all of whom felt that simple remanufacturing--without advanced new hydrotesting facilities--was completely feasible.[17]

The JASONs' Chapter 7: The National Ignition Facility

The JASONs find the NIF "exciting" (p. 37). They are crazy about it. And crazy is hardly too strong a word, for they quickly gush: "Nuclear weapons operate under conditions...of great interest to astrophysics." Yes, no doubt this is true, but it is hardly the central point, and it is not reassuring to hear it put quite that way. Avoiding the "operation" of nuclear weapons is what this report is, or should be, about. In their passion for hotter hohlraums,[18] they neglect the human. It is not the JASONs' chilling objectivity which is distressing here, but their chilling lack of objectivity. Their enthusiasm is about physics, not nuclear weapons policy. And the

fact that nuclear weapons "operate" only with unimaginable horror is not a noticeably important factor in the JASONs' thinking about NIF.

Their discussion of NIF's importance as a "proof-of-principle" experiment appears overblown. Ignition of deuterium-tritium pellets has already been achieved in experiments at the Nevada Test Site. The NIF would not so much demonstrate the principle as demonstrate--what? That inertial confinement fusion (ICF) is feasible? No, not this either. Perhaps this: that ICF can be funded, papers can be published in the subject, and careers can be pursued by real people with real ambitions. ICF is, by all accounts, a remote and unlikely source of energy, one that has already been superseded by proven renewable sources that do not share its enormous costs, its environmental and social externalities, its proliferation problems, or its uncertainties.

The attainment of ignition is not the major problem in developing fusion energy, in any case. It is the engineering and materials problems in any practical ICF system that are more likely to be insurmountable at anywhere near a realistic life-cycle cost per unit energy produced.

While the JASONs downplay the uncertainty of ignition, some scientists at both LLNL and LANL do not.[19] The margin of uncertainty in the minimum energy needed to overcome instability and other difficulties may be significantly larger than the 1.8 megajoules NIF will deliver. Therefore, the statement on p. 41 that "...the attainment of ignition in NIF will demonstrate..." seems too confident and a little premature. It betrays the lack of objectivity that concerns us throughout this report.

There is no question that NIF could provide interesting experiments in several fields of physics. But a closer look at the JASONs' zeal for creating a user community for NIF (pp. 43-47) goes far beyond science to reveal the JASONs as a special interest lobby, calling for an active sales effort for the NIF project. They wrap up this four-page discussion by saying that:

> ...the growth of this nascent enterprise [user communities] needs to be further encouraged by way of the vigorous dissemination of information about the capabilities and accomplishments of the ICF program and about the scope of activities to be undertaken at the NIF...if scientific goals are to be a significant component in the justification of the construction of the NIF (as we strongly believe they should be), then the ICF community bears a special responsibility in fostering an "out-reach" program...Succinctly stated, the NIF represents a credible and powerful opportunity to strengthen otherwise disjoint efforts in the weapons, the ICF, and the university communities. (p. 47)

Why are the JASONs so interested in promoting NIF? Why are they, here and elsewhere, so preoccupied with the "credibility" of cross-linking the nuclear weapons community with ICF and university science? Why is it necessary to encourage a "vigorous" program of disseminating information about NIF--can't scientists decide for themselves whether it can help them? Why is it so desirable to recruit the ICF "community" to support NIF? The simple truth to which these questions point is that, when it comes to NIF, the JASONs themselves view their role as promotional, not objective.

The weapons applications of NIF, which the JASONs leave to last, are not convincing. There is no need to quantify the "effects of low tritium concentration" (p. 49) and no need to study cracked radiation cases (p. 50). Replacing the latter is cheaper than studying whether or not to replace them, and retiring them is the safest and cheapest solution of all.

The defects of the JASON analysis of the nonproliferation impacts of NIF have been discussed above. It is important to make one addition here. Contrary to what the JASONs say, "balancing non-proliferation objectives of the United States with responsible stewardship under a[n] SBSS program" (p. 50) is not the problem. Given that weapon safety and reliability "problems" are not difficult to solve and the requirement for an effective deterrent rather easy to meet, responsible stewardship can only be defined as that form of stewardship which best supports nonproliferation goals. Stewardship should be a subset of nonproliferation efforts.

The JASONs' Chapter 8: LANSCE, Stockpile Surveillance, and Materials Science

The JASONs assume that weapons will remain in the stockpile far beyond their lifetime, and therefore will require intensive study of issues relating to aging. It is not clear why this need be the case.

This chapter, like most of the others, does not really begin with the needs of the stockpile surveillance program but with what a particular facility--the Los Alamos Neutron Science Center (LANSCE)--might be able to do for the program. Again, the approach is one of a major facility looking for missions to justify it, and several possibilities are suggested. The JASONs are lukewarm, however, about these possibilities and make any endorsement of LANSCE contingent upon several "ifs."

The claim that a 1 mm resolution in neutron radiography would "perhaps" be enough to see cracks, etc. in pits seems optimistic (p. 61). A 1-mm crack is very large. It would be better to begin with, or at least mention, the needs of the program rather than the capabilities of the projects already being promoted.

The JASONs' Chapter 9: Pulsed Power

There is no real need for any of these facilities for stewardship of the existing stockpile, and the JASONs have not provided any justification for them. Further weapons effects testing, beyond what is already known, is a relic of warfighting strategies and should be dropped from the stockpile stewardship program. Likewise, the (further) study of cracks in implosion need not be of particular interest. If one wants reliable weapons of mass destruction, replace the cracked ones. Better still, help meet our treaty obligations and retire them. And why not? The START II strategic arsenal of 3500 weapons is enough to create a 5-psi overpressure spike--a lethal amount--over most of the area of all the cities over 500,000 people in the world. To deter one or two countries requires a very tiny number of weapons.

The JASONs' Chapter 10: Special Nuclear Materials (SNM) and Processing

This chapter does not share with the preceding and succeeding ones the assumption that new weapon designs are inevitable and desired; in fact, it assumes quite the contrary.

> ...the primary--if not the sole--nuclear weapons manufacturing capacity that must be provided for in an era of no nuclear testing is the remanufacture of copies of existing (tested) stockpile weapons...the ultimate goal should be to retain the capability of remanufacturing SNM components that are as identical as possible to those of the original manufacturing process and not to "improve" those components. This is especially important for pits...(p. 81)

If nuclear weapons must be manufactured at all, this is the best way to do it.

The JASONs point out that it is the finished pit that must be the same as the proof-tested model, not every manufacturing detail or process along the way. And they suggest that a production capacity of "ten or so" pits per year is adequate for the present time (p. 85).

This is a scale of activity consistent with practical maintenance of an arsenal. While it does not imply rapid drawdown of that arsenal, as we might wish, this approach is compatible with such drawdown. It is highly unlikely that a smaller scale of effort would meet current political realities. In any case, Los Alamos already has a nascent capacity to manufacture pits at least ten times this great.[20]

The JASONs do not take up the issue of how best to make tritium. They correctly point out that a number of options exist for procuring this material, and that any need for it may be postponed by further stockpile reductions. They appear to err, however, in saying that

> Dismantlement of U.S. nuclear weapons under START II and correspondingly large reductions in tactical nuclear weapons will result in a recovered amount of tritium adequate to supply the needs of the remaining operational stockpile until close to the end of the first decade of the twenty-first century. (p. 83)

The best information available to us strongly suggests that current supplies of tritium are adequate to maintain the larger START I, not just the START II, arsenal, until approximately 2014.[21]

The JASONs conclude this chapter by saying that

> Having an open research program on the physics and metallurgy of uranium and plutonium is highly undesirable from the perspective of nuclear proliferation. Consequently, we see the SNM manufacturing component of the stewardship program as a narrowly defined, sharply focused engineering and manufacturing curatorship program. (p. 85)

There is absolutely no reason that this excellent, common-sense approach cannot be applied to the other elements of the stewardship program as well, thus eliminating the "need" for expensive new SBSS facilities with their attendant proliferation impacts.

In fact, if this approach is to stand at all, it logically must be applied to the stewardship program as a whole. For what is the point of designing improvements in weapons if it is decided in advance not to make them? And making them would be a bad idea, for the sound reasons the JASONs articulate in this chapter. So not just the assumptions, but the conclusions of this chapter--with which we find little fault--are quite inconsistent with the rest of the report.

The JASONs' Chapter 11: Advanced Computing for Stewardship

Aside from the dangerous assumptions incorporated into this chapter on p. 89 (quoted on page 4 above) and what may be applied from our other comments to the question of the purpose and need for weapons computing advancements, we offer few additional comments.

Obviously, the proliferation dangers of weapons codes that have been brought up to date, documented properly, and translated to run on inexpensive and universally-available computers are increased in the event of any security breach. This is a specific case of a general rule: the more weapons activities that are going on, and the more open these activities are, the greater the likelihood that somebody will steal or be given something important.

Concluding Remarks

The JASONs are clearly enamored with science, and they clearly want to see the weapons labs fully funded to do work they consider interesting. Their approach to the issues surrounding stockpile stewardship is too narrow and too vague, however, to be of much use in evaluating even the technical questions, let alone the policy and nonproliferation questions. It is hoped that the DOE will seek further clarification of these issues before continuing its marketing of science-based stockpile stewardship, based as it is upon specious assumptions and the questionable goals of keeping weapons scientists busy and producing new weapon designs. These activities are costly and dangerous to this country and others.

Endnotes

1. Personal communication with Dr. Victor Reis, October 1994.

2. This history is from Gregg Herken, Counsels of War, expanded edition, Oxford University Press, NY, 1987. Quote is from p. 211.

3. Christopher Paine of the Natural Resources Defense Council made this point in a conversation with the present author.

4. This exchange occurred at the DOE workshop on NIF, Washington DC, September 8, 1994; Joe Cirincione, personal communication.

5. Jonathan Medalia, "Nuclear Dilemmas: Nonproliferation Treaty, Comprehensive Test Ban, and Stockpile Stewardship," Congressional Research Service, December 1994, 94-1107F.

6. See "Redefining Stockpile Stewardship," Greg Mello for Tri-Valley CAREs, Livermore, CA.

7. Ibid.

8. The actual language of Article VI of the NPT is: "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control."

The JASONs paraphrase this as "The NWS [nuclear weapons states] will reduce their nuclear weapons stockpiles and will reduce, over time, the reliance of their national security policy on nuclear weapons, thereby decreasing the discriminatory nature of the non-proliferation regime" (p. 18). The legal commitment made by the U.S. and the other nuclear powers to nuclear disarmament is entirely discounted by the JASONs.

Aside from this, the JASONs' "interpretation" is illogical: if a NWS like the U.S. decreases its arsenal to only 1000 or even 100 nuclear weapons, as versus zero for a non-nuclear weapons state, this does virtually nothing to "decrease[e] the discriminatory nature of the non-proliferation regime."

9. Denise Fort, personal communication.

10. It is not just the JASONs that recognize the importance of expanding the political constituency of the nuclear weapons program. In 1993, Dr. Immele of LANL waxed glowingly about the new corporate "sponsors" of the LANL weapons program in his "State of the Nuclear Weapons Program" address in December, available in video from LANL. Numerous other examples could be provided.

11. Marylia Kelley, personal communication. In the case of the NIF, and the inertial confinement fusion (ICF) program in particular, the Arms Control and Disarmament Agency (ACDA) recognized these direct proliferation dangers as early as 1980 in their FY 1981 Arms Control Impact Statements (written for the committees on Foreign Affairs and Foreign Relations of both houses of Congress). As they put it then, "If an advanced non-nuclear weapon state with an ICF research program undertook a nuclear weapon program, it might subsequently be able to move more quickly to develop boosted fission and thermonuclear weapons than would otherwise be the case."

The subject of direct proliferation impacts is discussed more fully in Mello, op. cit.

12. For examples, see William E. Burrows and Robert Windrem, Critical Mass: The Dangerous Race for Superweapons in a Fragmenting World, Simon and Schuster, NY, 1994.

13. Ray Kidder, "Maintaining the U.S. Stockpile of Nuclear Weapons During a Low-Threshold or Comprehensive Test Ban," LLNL, 1987, UCRL-53820, p. 25.

14. Mello, op. cit.

15. Kidder, op. cit.

16. Dr. Dan Kerlinsky, personal communication.

17. These men all speak with great authority on this issue. Nobel Laureate Hans Bethe directed the Theoretical Division at Los Alamos during the war and has consulted at LANL up to the present day; Carson Mark was his successor and directed that Division for 26 years; Norris Bradbury was Oppenheimer's successor and directed Los Alamos for 25 years; Richard Garwin has been a consultant to Los Alamos since 1950 and is highly regarded for his analysis of a range of defense issues; and Andrei Sakharov, preeminent among Soviet weapons designers, was responsible for the independent development of the Soviet thermonuclear bomb.

18. *Hohlraum* is a German word which means to physicists what "black body" does in English: an idealized non-reflective cavity which radiates energy in accordance with its temperature. The interior of a nuclear weapon, and the hollow target cylinder at NIF, resemble and are called hohlraums.

19. It is best not to say who, because even so senior a scientist as Dr. Steven Younger at LANL has already been called on the carpet by Assistant Secretary Reis for his true statement that NIF has nothing to do with safety of nuclear weapons, made at the September 8, 1994 DOE NIF workshop.

20. The original design specifications of Building PF-4 of TA-55 at LANL were reported by John Fleck of the Albuquerque Journal on December 8, 1993. In 1978, PF-4 had a capacity of 100 kg Pu per month for casting and machining, or about 20 weapons/month. Since then, occupational radiation exposure limits have decreased from 5 rads/yr to 2 rads/yr, and PF-4 has been reconfigured, both of which decrease this capacity, according to LANL.

A presentation by Larry Woodruff of LLNL to the Galvin Panel on August 8, 1994 entitled "Downsizing the Capacity of the Nuclear Weapons Complex" shows a capacity for making 150 pits/yr in the downsized complex, i.e. at LANL. While LLNL now has the capacity make pits, the presentation to the Galvin Panel, along with interviews with LLNL personnel by Dr. Kerlinsky of that Panel, make it clear that LLNL anticipates transferring its pit manufacturing technology to LANL.

The LANL FY1995-2000 Institutional Plan says on p. 51 that LANL's Pit Rebuild Program will be capable of building pits for W88 warheads "by FY1996."

21. The statement of Dr. Harold Smith, Assistant Secretary of Defense for Atomic Energy, to the House Appropriations Subcommittee on Energy and Water Development, March 15, 1994 contains the following.

> The Nuclear Weapons Stockpile Plan, which outlines specific requirements for the nuclear weapons program...requires an active nuclear stockpile that supports the START I limits through 1999 and then transition to START II in subsequent years. ...[The Plan requires the U.S.] to retain the capability to reactivate weapons from the inactive stockpile if necessary, to maintain a policy that provides an assured supply of tritium...
>
> In the absence of a new source, in [deleted] the U.S. may not have sufficient tritium to support the nuclear weapons stockpile and required reserves consistent with START I commitments...The current goal is to make a decision on a new source for tritium in FY95 with initial funding for the development of that source beginning in FY96." (pp. 737 and 741, Vol. 6, Energy and Water Development Appropriations for 1995, emphasis added)

In his oral remarks that day, Dr. Smith emphasized that the U.S. must be able "to return to START I in the 21st century" (Ibid, p. 415). This cannot be done without a tritium supply consistent with a START I arsenal.

Dr. Victor Reis, Assistant Secretary of Energy for Defense Programs, shed additional light on the subject during that same hearing in response to a question:

> If one assumes...that a new [tritium] facility is to be built, then based on the current stockpile plan and the conservative view that a new tritium production source could take as long as 15 years to produce new tritium, a funding decision would be necessary in FY1996. That would allow the facility to be in production 3 years before strategic reserves of tritium are exhausted. (Ibid, p. 458)

Congressman Myers was hearing different dates from DOE and DOD regarding the acquisition of a new source of tritium, and asked for clarification. Reis gave an enigmatic reply, then Smith said, "There is plenty of discussion going on between the two Departments, between Dr. Reis and myself. The driver here is the assumption on whether or not we want to have the ability to maintain or return to levels consistent with START I." (Ibid, pp. 423-424, emphasis added)

It appears that there is adequate tritium to support a START I arsenal until 1996+15 years for construction+3 years, i.e. until 2014. The "START II arsenal" appears to include the capacity to bring enough reserve weapons back into the active arsenal to reconstitute a START I force level.

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Nuclear Weapons Safety: No Design Changes Are Warranted

DRAFT

A Review for Tri-Valley CAREs

by

Greg Mello

February 14, 1995

I am pleased to report the stockpile today is safe, secure, reliable, and meets current military requirements. We make that statement with confidence today and for the immediate future....Our stockpile is becoming safer and more reliable simply because we are retiring older weapons...Thus, we should enter the 21st century with a modern, safe, and reliable stockpile consistent with the demands of START I and with anticipated military requirements.

--Dr. Harold Smith, Assistant Secretary of Defense for Atomic Energy, to Congress on March 15, 1994

[add Smith March 1, 1995 testimony]

Nuclear Weapons Safety: No Design Changes Are Warranted

An Issue Brief for Tri-Valley CARES by Greg Mello, February 14, 1995
With assistance from Kit Brewer

DRAFT

Summary

1 • The quest to make nuclear weapons "safe," in the fullest sense of the term, can never succeed and guarantees large appropriations without clear results.

2 • Weapons in the current U.S. arsenal are, technically speaking, safe and becoming more so as older weapon types are retired. All the weapons in the START II stockpile are fully protected against accidental nuclear explosion.

• The safety concerns raised at the beginning of this decade by the Drell panel have been mostly resolved by retirements and by changes in handling procedures.

• While it would in theory be possible to replace some warheads in the arsenal to make them safer still, neither the Air Force nor the Navy, nor the Department of Defense (DOD), nor the Department of Energy (DOE) believes this action is merited. Therefore no warhead replacements for safety are currently planned.

2 • No safety problems are expected to occur in the aging process.

• It is impossible to reduce the risk from nuclear weapons to zero, however, and in particular there will always remain some risk that plutonium will be dispersed by fire or explosion in an accident. The simplest and best ways to further minimize this possibility are

  o operational and deployment changes that reduce the chances of an accident and the risk to the public should there be one, and
  o further retirements, leading to a smaller arsenal.

3 • The proliferation risks of upgrading the U.S. arsenal for any purpose, safety included, are potentially great.

4 • If the countervailing risks resulting from weapons testing, production, waste management, and eventual decommissioning and cleanup are included, it is highly likely that efforts to produce "safer" weapons will degrade overall nuclear safety.

2 • Attempts to upgrade safety will decrease reliability, because new designs cannot be tested.

• None of the proposed new science-based stockpile stewardship (SBSS) facilities is needed to maintain the safety of existing nuclear weapons. Most proposed facilities, like the National Ignition Facility at Livermore, the Atlas facility at Los Alamos, and the Jupiter facility at Sandia, have no safety-related missions at all.

• The safety benefits per dollar spent on weapons safety upgrades are several orders of magnitude smaller than other federal safety investments, civilian or military.

• No one is known to have ever been injured from a nuclear weapon in an accident, and the risk of death from a nuclear weapons accident appears to be, very roughly, about a million times smaller than other causes of accidental death and about 100-1000 times smaller than the public health risks from exposure to environmental pollution at current health standards.

• The real purpose of the disproportionate and irrational drive to maximize safety in just one part of a complex system of risks is to make nuclear weapons jobs and funding, and not the public, safe.

• For all these reasons, weapons safety concerns need not and should not drive the stockpile management program.

Introduction

"Safe" is hardly the first word anyone would choose to describe nuclear weapons. After all, nuclear weapons have been designed and amassed precisely because they are enormously destructive, i.e. because they are not "safe." From the outset, it is obvious that the oxymoronic quest to make nuclear weapons "safe" can never succeed. To adopt such a quest as a goal of public policy is a way of assuring that no amount of money, however large, will ever be adequate to complete the job. What might be called "existential safety" for nuclear weapons will never be achieved.

Yet, if the problem of nuclear weapons safety is defined in the narrow sense of preventing accidental detonation of the weapons or dispersal of their nuclear materials, there is a consensus among authorities that current nuclear weapons are safe--if not absolutely so then at or near the practical limit of safety. What might be called "practical safety" for nuclear weapons has already been achieved.

The contradiction between what has already been achieved and what can never be achieved has been harnessed by the Department of Energy (DOE) to produce enormous amounts of rhetoric. Where logic has faltered, the nuclear weapons orthodoxy demands faith, and to this end maintaining and improving the "safety, security, and reliability" of the nuclear arsenal has become a constant litany that is ritually intoned to ensure support of the DOE's science-based stockpile stewardship (SBSS) program. This slogan is offered with little or no further explanation by the weapons laboratories and their sponsors whenever appropriations are

questioned. Of the "safety, security, and reliability" trinity, it is the quest for endlessly "safer" nuclear weapons that has retained the most political cachet, pandering as it does to existential fears whose solution entirely transcends further technical adjustments in weapons design.

The central theme of this paper is that nuclear weapons safety, as a technical problem for weapons designers, has been solved. Additional operational changes offer some further reductions in risk, but risks from nuclear weapon accidents are already orders of magnitude lower than in the recent past. Not only will further efforts to improve weapons safety be expensive and lead to greatly diminished returns in risk reduction, but when the safety issue is placed in its overall context, such "improvements" are shown to decrease overall nuclear safety.

At the same time, replacing selected weapons in the arsenal to "improve" safety will inevitably decrease reliability if the new weapons are not proof-tested. For these reasons, nuclear weapons safety is not an absolute good. The proper goal is an optimum level of nuclear weapons safety, not a maximum.

In some respects, the problem of "How safe is safe" is similar to the problem of "How clean is clean"--completely safe and clean are not the right answers. But there are differences: the nuclear weapons problem is relatively easy to solve politically, technically, and managerially; it has been a central goal since 1944; and it has been accomplished. None of these apply to the cleanup problem.

Often nuclear weapons safety and security are spoken of together, the two concerns being combined in the term "surety," which sometimes includes reliability concerns as well. With the planned addition of permissive-action links (PALs) to submarine-launched ballistic missiles, adequate use-control over the entire U.S. nuclear arsenal will in time be achieved.[1] Security will not be discussed in this paper.

The Drell panel

In December 1990, the Report of the Panel on Nuclear Weapons Safety, usually called the Drell Report after its chairman, Dr. Sidney Drell, published its strong recommendations for a greater emphasis on safety in nuclear weapons design and deployment and in the institutional arrangements governing weapons.[2] In brief, the Drell panel found that some weapons in the U.S. stockpile were not as safe from accidental detonation as had been thought (the particular weapons systems involved were kept vague). The panel also observed that most of the weapons in the stockpile were not equipped with state-of-the-art features to prevent plutonium contamination in the event of an explosion or fire.

To remedy these problems, Drell called for operational changes, some of which were quickly implemented, and the incorporation of the most modern safety features into all stockpiled weapons. To fully implement this latter recommendation for the large and diverse 1990 stockpile would have required dozens of underground nuclear tests and tens of billions of dollars

in appropriations for weapons design and manufacturing. It would have required the construction of a new nuclear weapons manufacturing complex and the operation of that complex over an extended period of time, and it would have required the costly modification of some delivery platforms.

Thus, although the scope of the panel's investigation was ostensibly technical, its recommendations called for an enormous amount of new work (and new funding) for DOE's nuclear weapons program and its laboratories, just as the Cold War was winding down. Fortunately, Drell's most expensive and controversial recommendations were mooted by events which led to the retirement of some weapon systems and the stand-down of others.

The first of these events was the START I treaty, signed by the United States and the Soviet Union in July of 1991, followed by the "joint understanding" in June 1992 which led to START II in January of 1993. Major reductions in the deployment of tactical nuclear weapons were announced by the U.S. and Soviet Union in the fall of 1991, together with the removal of nuclear weapons from bombers on alert. In 1992, President Bush announced that there was no need for further U.S. nuclear weapons tests to develop new weapons, and in July of 1993, President Clinton joined the Russian-led moratorium on nuclear testing.

In addition to improving nuclear weapons safety, all these changes collapsed the central mission of the DOE weapons labs, which had been the design of new weapons. The result has been that, even though the nuclear arsenal has become markedly safer, the labs and DOE are all the more vociferously clamoring for "more" safety as a new mission. "Safety" has thus become more and more of an empty slogan as it expands into the vacuum of purpose that characterizes large portions of the laboratories.

All authorities agree: U.S. weapons are safe

Are U.S. nuclear weapons, in fact, "safe?" The unequivocal and unanimous conclusion of the nuclear weapons establishment is affirmative. In his testimony on March 15, 1994, Dr. Harold Smith, Assistant Secretary of Defense for Atomic Energy, told Congress,

> I am pleased to report the stockpile today is safe, secure, reliable, and meets current military requirements. We make that statement with confidence today and for the immediate future....Our stockpile is becoming safer and more reliable simply because we are retiring older weapons...Thus, we should enter the 21st century with a modern, safe, and reliable stockpile consistent with the demands of START I and with anticipated military requirements.[3]

This statement was made in the presence and with the approval of Dr. Victor Reis, Assistant Secretary of Energy for Defense Programs, who added,

> Right now, as Dr. Smith said, that stockpile is safe and reliable.[4]

These two authorities together comprise two-thirds of the three-person Nuclear Weapons Council. There is no higher or more integrative authority on this subject. And what they said has been a consistent theme over the past few years. Smith's predecessor, Robert Barker, told the Senate in March of 1992,

> The Air Force and Navy, in cooperation with the Office of the Secretary of Defense and the Energy Department, evaluated the safety of all ballistic missiles that carry nuclear warheads. It was determined that there is not now sufficient evidence to warrant our changing either warheads or propellants.[5]

John Deutch, now Deputy Secretary of Defense, reiterated Barker's general conclusion for the specific case of the W88 warhead on may 3, 1993 when he told the House Panel on the Military Application of Nuclear Energy that incorporation of insensitive high explosive (IHE) into that warhead would not be worth its considerable cost (more than $3 billion).[6]

A few days later, Rear Admiral John T. Mitchell, Director, Strategic Systems Programs Office, U.S. Navy, was even more blunt. On May 11, 1993, he told a Senate committee that, for the W88 warhead, "We believe that there would be no gain in safety in changing to insensitive high explosive."[7] These comments by Deutch and Mitchell signalled that the safety questions that had been raised by the Drell Report regarding the W88 (see below) had been resolved, at least to the satisfaction of the DOD and the Navy.[8]

Deutch, a strong advocate of nuclear weapons design and testing, recently reiterated the government's consensus on the safety of U.S. nuclear weapons. On October 5, 1994, Chairman Hamilton of the House Foreign Affairs Committee suggested to Deutch, following the latter's presentation of the Nuclear Posture Review, that safety concerns might be a reason to resume nuclear testing. Deutch demurred, saying unequivocally, "It is my judgment that all the nuclear weapons that we have are adequately safe."

[add 1995 Smith and Deutch testimony here; reiterates same points]

The repeated testimony cited here was offered by the highest responsible sources after careful review of those portions of the Drell Panel's recommendations that remain outstanding. This testimony states with abundant clarity that no safety problem currently exists in the nuclear weapons stockpile. Yet, since the weapons labs still hawk greater "safety" as a mission, many decisionmakers conclude that nuclear weapons safety is an unresolved issue.[9]

What is the nuclear weapons safety problem?

Those responsible for designing, building, and maintaining U.S. nuclear weapons do so with a keen appreciation of the dangers inherent in these weapons and in the materials they contain. It is their job to make the protection of public safety a paramount concern in every aspect of their work. Their real goal is to effectively protect the public, not simply to build safer weapons

at any cost. These two goals are not the same, as can be seen from the following outline, which supplies a common-sense context for analyzing the safety problem and maximizing the safety benefits of federal spending.

The Overall Goal: Protect the public[10]

- A. from dangers other than those from nuclear weapons
- B. from nuclear weapons dangers (DOE: "reduce the nuclear danger"[11]), including
  1. nuclear attack
     - a. by an existing nuclear-weapons state
     - b. by a proliferant nation or group
  2. risks to workers from nuclear weapons testing, manufacture, waste management, deployment, decommissioning and decontamination, and cleanup
  3. risks to public health from the nuclear weapons operations listed above
     - a. risks to current populations
     - b. risks to future generations
  4. any environmental risks not included in 3, such as loss of tribal lands and sites, environmental damage that is not human health damage *per se*
  5. other, indirect, nuclear dangers (e.g. threats to democracy from counterterrorism activities)
  6. nuclear weapons accidents
     - a. unintentional nuclear detonation
     - b. dispersal of plutonium

Based on this outline, there are three relevant hierarchical levels of safety goals. The most fundamental goal is maximizing overall public safety. This means to minimize morbidity and early mortality, from whatever cause. Since it is clear that there is a finite amount of money available to the federal government to do this, it is certain that seeking to maximize safety from one type of danger without regard to cost, e.g. nuclear weapons, would damage overall public safety, not to mention impede other important goals of government. Choices will have to be made, then, and an optimum, not a maximum, level of safety chosen for each particular program, nuclear weapons included.

A subset of public safety is safety from nuclear weapons. Optimizing this--which is called by DOE "reducing the nuclear danger"--means to minimize morbidity and mortality from nuclear weapons operations taken as a whole: the production, storage, processing, and manufacturing of weapons materials, and the design, production, maintenance, deployment, and disassembly of the weapons themselves. It includes the public health aspects of waste management, as well as environmental restoration or the lack of it. It includes safety from any intentional use of nuclear weapons, and from nuclear accidents.

But since only a very limited amount of money is available for this task, it is possible, even certain, that seeking to reduce any one aspect of the nuclear danger without regard to cost--either cost in dollars or in environmental or proliferation risks--could well increase, not decrease, the overall nuclear danger.

Finally, a subset of safety from the dangers of nuclear weapons is safety from nuclear weapons accidents, which is served by the incorporation of safety features into the design of nuclear weapons systems. It is also served by operational changes that decrease the likelihood of accidents or the public health exposures from accidents, should any occur.

Thus the technical or design aspect of weapons safety is an important goal, but it is a subservient one. A sense of proportion is required. An optimum, not a maximum, amount of nuclear weapons safety is the inevitable and proper goal.

At present, however, the DOE weapons labs are promoting the quest for greater nuclear weapons safety as if it were an absolute good--as if it had no conflict with the other goals of the agency or with the other goals of the government as a whole. The damage that this quest could do to those larger goals is discussed briefly below, following a summary of the technical aspects of nuclear weapons safety.

Design aspects of nuclear weapons safety

In a nutshell, the nuclear weapons safety problem as it affects the design laboratories consists of minimizing the probability of two general kinds of untoward events:

1) unintentional nuclear detonation of a weapon, either from

   a) accidental activation of the firing circuits (e.g. by lightning or other electromagnetic pulse) or from

   b) accidental detonation of the high explosive (HE) in the primary from an impact, fire, or other non-electrical cause; and

2) dispersal of plutonium due to an accident of any kind.[12]

The following discussion reviews each of these safety concerns in turn, and concludes with an overview of problems related to aging of weapons.

Accidental activation of the firing circuits is a problem that has been solved

Electrical safety in U.S. weapons is addressed by means of a protection policy known as Enhanced Nuclear Detonation Safety (ENDS), which is achieved by a technology called Enhanced Electrical Isolation (EEI). The Drell Panel describes this system in detail.

> The ENDS is designed to prevent premature arming of nuclear weapons subjected to abnormal environments. The basic idea of ENDS is the isolation of electrical elements critical to detonation of the warhead into an exclusion region which is physically defined by structural cases and barriers that isolate the region from all sources of unintended energy. The only access point into the exclusion region for normal arming and firing electrical power is through special devices called strong links that cover small openings in the exclusion barrier...Detailed analyses and tests give confidence over a very broad range of abnormal environments that a single strong link can provide isolation for the warhead to better than one part in a thousand. Therefore, the stated safety requirement of a probability of less than one a million...requires two independent strong links in the arming set, and that is the way the ENDS system is designed...both strong links have to be closed electrically--one by specific operator-coded input and one by environmental input corresponding to an appropriate flight trajectory--for the weapon to arm.
>
> ENDS includes a weak link in addition to two independent strong links in order to maintain assured electrical isolation at extreme levels of certain accident environments, such as very high temperature and crush. Safety weak links are...designed to fail, or become irreversibly inoperable, in less stressing environments than those that might bypass and cause failure of the strong links.
>
> The ENDs system provides a technical solution to the problem of preventing premature arming of nuclear weapons subject to abnormal environments...ENDS was developed at the Sandia National Laboratory in 1972 and introduced into the stockpile starting in 1977.[13] (emphasis added)

While there are some older weapons in the U.S. arsenal that do not contain ENDS, these weapons are currently being retired.[14] With these retirements, the problem of electrical safety of U.S. nuclear weapons has been solved.

Note that the one-in-a-million standard applies in the case of accidents, which are themselves infrequent, and not in routine operations. The applicable specification for the probability of an accidental explosion during normal operations, including all environments in the stockpile-to-target sequence, must be less than 10^{-9} per warhead lifetime.[15] Since the probability of a highly abnormal environment, i.e. an accident, is now much lower than it was during the Cold War with its intensive airborne transport of nuclear weapons, projects to develop firing circuits with still greater isolation possess only very small benefits.

Such work is, in any case, unlikely to affect the nuclear components--the physics package--of the warhead. It is primarily Sandia which designs and maintains the arming and safing systems of warheads, not the two physics labs. Modifications to these electrical systems are relatively routine and need not trigger major stewardship expenses.

The possibility of an accidental nuclear explosion due to impact or fire has been the subject of intensive study and is extremely unlikely

The second aspect of preventing an accidental nuclear explosion consists in ensuring that impacts, fires, explosions, and any other causes not covered by the electrical safety system cannot set off any weapon's high explosive in such a way that any significant nuclear yield results. Recognition of this danger led to the adoption of the so-called "one-point-safety" standard in 1968. This quantitative standard requires all weapons in the stockpile to be "one-point safe," which is defined as achieved if the probability of a nuclear explosion with a yield of four pounds TNT-equivalent or greater from detonation of the HE at any single point is less than one in a million in an accident.[16] And this safety performance must be intrinsic to the design, i.e. it must obtain in the absence of any mechanical safing device.[17]

Using more detailed computational analysis than had previously been available, the Drell Panel found that "unintended nuclear detonations present a greater risk than previously estimated (and believed) for some of the warheads in the stockpile."[18] To solve these problems, the Drell Panel recommended a major competitive effort at the weapons laboratories to design new warheads. Yet other than an implicit recommendation to quickly retire the SRAM-A system[19] and make sure the entire stockpile has ENDS, the unclassified Drell Report contains no specific recommendations for improving the nuclear detonation safety of the U.S. arsenal.

However, the report did recommend a broad and in-depth review of the safety of the Trident II (D5) missile system, given the fact that the W88s used there do not contain IHE and are mounted in a ring around the third-stage rocket motor, which contains a detonatable propellant. Kidder concurred with this recommendation and suggested that the Trident I (C4) W76 system be closely examined as well.

The results of the examination, which set these worries to rest, were provided to Congress in the testimony quoted above. Meanwhile, operational changes in the way Trident missiles were loaded into submarines were immediately implemented. Trident missiles are no longer loaded into their launching tubes with their warheads in place, which means, according to Drell, that there is now "no worry" about a dockside warhead explosion.[20]

To prevent plutonium dispersal, operational changes are most effective

Plutonium--capable of causing cancer deaths from doses in the microgram range--can be dispersed into the environment in any accident in which the conventional explosive in a nuclear weapon burns or explodes. If the explosive involved is IHE, an explosion is highly unlikely, since IHE is remarkably difficult to detonate. In the case of a fire, the plutonium will burn

along with the IHE. Warheads made with HE may also burn in a fire rather than explode, and in fact this happened six times at U.S. Air Force bases between 1958 and 1965 when nuclear warheads were involved in fires.

The only good news here is that, in the absence of an explosion, the mean particle size of the plutonium oxide produced is larger and less likely to be inhaled, and is dispersed over far less area, resulting in many fewer potential casualties.[21] The Air Force in fact claims that these six accidents resulted in only localized contamination, which was cleaned up in some fashion in each case.[22]

All in all, between 1950 and 1980 there were 32 serious nuclear weapons accidents ("Broken Arrows"). None have occurred since 1980. During that 30-year period there were two accidents that involved explosions with plutonium. These were airplane crashes at Palomares, Spain in 1966 and at Thule, Greenland in 1968. Luckily, these occurred in relatively unpopulated areas, and no major public exposures resulted. It seems likely, however, that significant danger was experienced by the cleanup crews, which were probably not well trained or equipped, both in these cases as well as in the six accidents in which weapons burned.

Can the possibility of nuclear weapons accidents in which plutonium is dispersed be eliminated? The answer, of course, is no. Even with IHE, with fire-resistant pits (FRPs, which have a refractory shell[23] surrounding the plutonium), and with speculative "super-safe" designs in which the fissile material is somehow kept separate from the HE or IHE until the arming sequence--there will always be a finite chance of plutonium dispersal in the event of a fire or other accident. And this finite chance will continue to be much greater than the one-in-a-million standard adopted for electrical isolation and for one-point safety.

Still, the dangers from plutonium dispersal, while quite serious, are far less than those from a nuclear detonation. Claims by lab officials that a plutonium dispersal accident could be "worse than Chernobyl" are at least two orders of magnitude off base.[24] [add direct cite]

In order to prevent plutonium dispersal, the Drell committee recommended that "all nuclear bombs loaded onto aircraft--both bombs and cruise missiles--[be built] with both IHE and FRPs." On its face, this had some appeal, since some 84 percent of serious nuclear weapons accidents have involved aircraft.

Unfortunately, equipping all airborne U.S. weapons with IHE and FRPs would require redesigning and rebuilding thousands of nuclear weapons, entailing dozens of nuclear tests and the construction of new nuclear weapons factories, such as a replacement for Rocky Flats. Kidder's more practical recommendation was, instead, to implement cost-saving operational changes that would reduce the risk of accidents which could result in plutonium dispersal to near zero. These changes basically consist of not putting nuclear weapons on aircraft in peacetime. Carson Mark, Director of the Theoretical Division at Los Alamos for 26 years, had argued a month before Drell that operational limitations on warheads (e.g. no routine deployment for

airborne weapons) would be far more cost-effective than redesigning them to, for example, incorporate IHE.[25]

Removing nuclear weapons from aircraft has now largely been effected. In September of 1991, not long after Kidder's study, President Bush decided to take all U.S. strategic bombers off alert, meaning that all U.S. airborne strategic nuclear weapons have now joined U.S. tactical nuclear weapons in secure storage bunkers, out of harm's way. President Bush's initiative essentially solved the safety issues for airborne nuclear weapons.[26]

Since, according to Drell, the consequences of a plutonium explosion are roughly one hundred times worse than a plutonium fire, the addition of IHE to a weapon removes about 99 percent of the plutonium dispersal danger. FRPs could remove part of the remaining 1 percent of the danger. FRPs add no degree of safety if the explosive in the warhead detonates, so there is little point in adding FRPs to a weapon that does not also have IHE. FRPs cannot reliably withstand a rocket propellant fire, which could be much hotter than a jet fuel fire (about 2000 degrees centigrade versus 1000 degrees), so there is little point in adding FRPs to ballistic missile warheads.

So are FRPs worth the expense? Even before President Bush took nuclear weapons off airplanes, Assistant Secretary of Energy for Defense Programs Richard Claytor told Congress that "for weapons such as the B-61 family and the W-80, which already have IHE, this [addition of FRPs] will be a very costly upgrade to accomplish a modest improvement in safety." He added that "for tactical systems, where weapons are normally stored in bunkers, the reduction in risk may be very small."[27]

The Air Force's official response to the Drell Panel also panned the marginal benefits of FRPs.

> Qualitative assessment indicates that [the] safety risk associated with incorporating FRP into bombs and cruise missile warheads which already have ENDS and IHE would exceed the safety gain realized by FRP, [and so such weapons] should not be modified to incorporate FRP.[28]

The Drell Panel called for an aggressive study of "super-safe" designs, such as designs in which the plutonium was physically separate from the IHE or HE. In response, Kidder pointed out that such designs had been under study for at least 15 years (by 1991) without practical result. Furthermore, any designs finally created would very likely be quite complex, which means that they might have serious reliability problems. In any case they would require numerous nuclear tests. This recommendation, like the one calling for all airborne warheads to have IHE and FRPs, was evidently not considered practical by the Nuclear Weapons Council, leading to the testimony cited previously.

Note that IHE was intentionally not incorporated into the W88 Trident D5 warhead, because IHE is less energetic and reduces the yield of the weapon, the range of the missile, and/or the number of warheads it can carry. A conscious decision was therefore made to not make these

particular weapons as safe as possible, because they were, and still are, judged to be safe enough. In addition to the W88, IHE is also not present in the W62 and W78 Minuteman III warheads and the W76 Trident C4 warhead. The W62 and W78 warheads are being retired, which will leave the Navy's W76s and W88s as the only warheads in the START II arsenal lacking IHE.[29]

Interestingly, an FRP-equipped cruise missile warhead (the W84, one of only three such FRP-equipped weapons in the stockpile) has been taken out of the active stockpile, in favor of cruise missile warheads that lack FRPs (specifically, the W80-0 and W80-1).[30] Thus the Air Force, the Navy, and the Nuclear Weapons Council have, on at least three occasions if not also on others, concurred in decisions that chose warheads for the so-called "enduring" stockpile that lack some of the possible safety features that could have been incorporated. The decisions to forego FRP- and IHE-equipped weapons contrast sharply with the rhetoric coming from the labs calling for so-called "safer" weapons.

Finally, note that incorporation of an FRP and, especially, IHE into a weapon would require a substantial redesign and would, in effect, amount to a new weapon. Kidder suggests that roughly three nuclear tests per warhead or bomb would be necessary to proof-test the former and that six such tests would be required for the latter.[31] Thus these are not minor changes, and they would require perhaps two dozen nuclear tests to accomplish for the entire START II stockpile. It is certainly not accurate to call such changes "safety improvements to existing weapons," as is now commonly done.

Table 1 shows the planned U.S. stockpile and its safety features.

There are no safety problems related to aging of weapons

Although authorities agree that nuclear weapons are "safe" now, often vague reference is made to possible safety problems that could arise in the future. What these problems might be is never mentioned, however. After all this intensive review by the Drell Panel and subsequently by the labs--who were, it is fair to say, searching for every possible reason to continue nuclear testing and nuclear weapons design work in general--it is difficult to imagine that some heretofore overlooked safety problem of real significance would suddenly appear.

Likewise, no safety problems are expected to occur in the aging process. This was the first question posed to Dr. Kidder by the senators, and he makes it clear that aging does not create safety problems.

> Safety problems with nuclear warheads are generally inherent in the design of the warhead itself, not the result of aging or other causes. Such problems may not be identified until long after the warhead enters stockpile, but they were there to begin with.
>
> Metals corrode, and organic materials such as plastics, adhesives, and HE that are present in a nuclear warhead will deteriorate with age. Such aging

effects degrade a warhead's reliability rather than its safety. (The sensitivity to impact or fire of the HE used in nuclear warheads does not increase significantly with age.)

A severe case of aging was the deterioration of the HE in the W68 Poseidon warhead, which produced a harmful, chemically reactive effluent. This resulted in a potential loss of warhead reliability that necessitated a complete rebuild of all W68 warheads in stockpile. The reliability, but not the safety, of the warhead was affected.[32] (emphasis added)

Dr. John Immele, Director of Los Alamos National Laboratory's (LANL's) Nuclear Weapons Technologies Program, spoke to this same point on December 8, 1994 at a public hearing in New Mexico.

Audience: I have one more question...in a deleterious way, they may age or crack. What do you mean, is there a risk to the public?

Immele: No, there's not a safety risk. There's a performance problem...because insensitive high explosive is so insensitive that sometimes if it's cracked it won't light on the other side when it's supposed to, so it's basically a performance problem.

Audience: A reliability problem?

Immele: That's right, it's a reliability issue. We have not found aging problems that affect safety, that make the explosive more sensitive.[33] (emphasis added)

This testimony is very important, since the long-term behavior of IHE is not understood as well as that of HE, and it is sometimes mistakenly implied that this uncertainty extends to questions of safety, which it clearly does not.

The impression should not be left that once weapons are put into the stockpile they are forgotten. The stockpile surveillance program coordinated by the laboratories, especially by Sandia, routinely inspects weapons and their components and ensures, among other goals, that safety problems do not develop. Thus safety throughout the aging process is ensured by both the current weapons' inherent safety features and a coordinated surveillance program.

DOE's proposed new facilities have nothing to do with weapons safety

As part of its proposed SBSS program, DOE is planning to build a number of new experimental weapons science facilities with a total cost running into the billions of dollars.[34] The largest of these is the National Ignition Facility (NIF), a laser fusion machine with a currently-estimated capital cost of about $1.2 billion. The role of NIF in the SBSS program is to simulate the implosion process that occurs in the thermonuclear "secondaries" of nuclear weapons.

Throughout the 40-year history of the thermonuclear arsenal, no safety problems have ever been identified with secondaries, which contain neither plutonium nor high explosives. Nor are any expected. It is therefore patently obvious that NIF has nothing to do with nuclear weapons safety. Dr. Steven Younger, who was at the time Deputy Program Director of the LANL Nuclear Weapons Program, made statements to this effect at a DOE-sponsored workshop on NIF on September 8, 1994 in Washington.[35]

For the same reason, other facilities for simulating secondary implosion, like ATLAS (LANL's proposed new pulsed-power implosion facility) have nothing to do with nuclear weapons safety either. The only facilities with potential relevance for nuclear weapons safety are those being built or planned for the simulation of nuclear weapons primaries. These are the hydrodynamic testing facilities: the $124 million Dual-Axis Radiographic Hydrotest facility (DARHT), under construction at LANL but halted for environmental review, and the $422 million Advanced Hydrotest Facility (AHF), planned for the early years of the next century.

Hydrotest facilities cannot test either the high explosives or the plutonium pits of stockpiled weapons. The former cannot be separated intact from the pit they embrace, and the latter cannot be tested without a nuclear explosion. Therefore, these facilities test mock weapons assemblies. There is very little point in conducting hydrodynamic explorations of the safety of existing weapons. These weapons are already known to be one-point safe and their plutonium-dispersal properties are already clear--either they have IHE and FRPs or they do not.

The only purpose of these facilities, as far as safety is concerned, is that they can be used to design new primaries that have IHE and FRPs, either primaries for new weapons with new military characteristics or to retrofit into existing warheads and bombs. This can be done either directly, by testing mockups of these new primaries, or indirectly, by conducting precise hydrodynamic tests on existing designs for which nuclear testing data is available ("benchmarking"). Benchmarking allows the nuclear testing database to better inform the nuclear weapons codes, which can then be used to design new weapons.

Actually, DARHT may be inadequate either to design new weapons with IHE and FRPs or to benchmark some stockpiled systems, with or without these features.

Recognizing the importance of continued research in radiography, the Laboratory [LANL] cites DARHT as its top construction priority...For a number of stockpile systems, particularly those that are designed with insensitive high explosives and fire-resistant pits, planned radiography upgrades [i.e. DARHT] do not provide resolution adequate to observe the gas cavity configuration of the primary stage late in the implosion process. For effective monitoring of stockpile weapons [sic] of this type, a next-generation hydrodynamic testing capability will need to be developed. Such an Advanced Hydrotest Facility (AHF) will include multiple beams that produce X-rays from four to six directions at various times to characterize the physical state of the pit more thoroughly.[36]

It is difficult to avoid the inference that DARHT is useful primarily to design new weapons which lack IHE and FRPs. This is not at all unlikely from a policy point of view, given that these features have already been intentionally omitted from significant portions of the arsenal.

Any use of these new hydrotesting facilities to examine safety problems relating to aging of weapons is moot, since logic, together with Drs. Kidder and Immele, all agree that there are no such issues.

Reducing the nuclear danger

The risk to the public from a nuclear weapons accident is only one among many interrelated risks associated with nuclear weapons. Attempts to increase safety from nuclear weapons accidents through redesigning warheads may easily create countervailing risks throughout this interconnected system. For example, the replacement of hundreds or thousands of warheads, and especially the plutonium pits of warheads, will create risks to workers and the general public during the manufacturing process and in the management of its wastes, not to mention during the eventual decontamination of buildings and equipment that will later be required. Any environmental contamination that occurs will require cleanup. These considerable risks tend to be minimized or forgotten entirely by the advocates of weapons redesign.

In fact, these manufacturing, waste management, decommissioning, and cleanup risks are likely to be much greater than the risk reduction that could be achieved by the addition of, for example, IHE to W88s and W76s, to pick one modification currently under consideration. The historical record suggests this. While there have been no known or putative deaths due to accidents from explosions or plutonium dispersal from completed weapons--even during the Cold War when thousands of weapons were shuttled all over the world--numerous deaths have occurred due to ordinary occupational causes in the nuclear weapons complex as well as to chemical toxins and radioactivity.[37] Meanwhile cleanup, which could be quite hazardous, has barely begun.[38]

Moreover, should the U.S. elect to upgrade its nuclear arsenal for the sake of "improved" safety or for any other reason, it can be expected that the other nuclear powers, particularly Russia and China but probably also Britain and France, will do likewise. In that case, the morbidity, mortality, and environmental damage in other countries, again notably Russia and China, can be expected to be equal or greater than here.

Thus, the quest for greater nuclear weapons "safety," if allowed to proceed within the compartmentalized thinking that characterizes the bureaucratic "stovepipes" of the federal nuclear establishment, will likely saddle current populations and future generations, here and abroad, with increased, not decreased, risk. And, as has been the case up to now, this risk will tend to fall most heavily on the vulnerable members of society and the populations that are weakest politically.

The proliferation impacts of safety "improvements" must be examined

Another component of the overall nuclear danger is nuclear proliferation. A public opinion poll conducted by Sandia National Laboratory for DOE suggests that the public considers the risk from nuclear proliferation to be the number two danger facing us today, right behind world hunger and ahead of AIDS, drug trafficking, and global warming.[39] Thirty-two percent of the public thought nuclear proliferation was an "extreme risk." This opinion is matched by a widespread concern among experts that the proliferation problem, far from being under control, is a very serious threat to the security of the United States. Assuming this is true, we can conclude that if safety improvements in nuclear weapons design incur even a small incremental risk to the world's nonproliferation regime, such "improvements" are likely to increase, not decrease, the nuclear danger. On its face, nuclear proliferation is simply a much more serious problem than nuclear weapons safety.

It is beyond the scope of this paper to discuss in any detail the proliferation dangers inherent in upgrading the U.S. arsenal to achieve "increased" safety. Suffice it to say that even a heuristic analysis of comparative risk must embrace the reality that such safety upgrades attempt to prevent events whose probabilities are already very low. The probability of proliferation under current policies, however, is not low at all, and the probability of nuclear attack or threat of attack by proliferant nations or groups approaches certainty in the long run if more effective leadership on this issue is not forthcoming.

Any analysis of the nonproliferation impacts of contemplated weapons upgrades must therefore consider every possible impact, even those which are slight. Just as every credible nuclear weapons accident should be examined and prevented, so should every credible potential proliferation impact also be prevented. The probability of an accidental nuclear detonation is kept at 10^{-9} per warhead lifetime, or roughly 10^{-5} for the current arsenal taken as whole over the next few decades; any decision to upgrade U.S. weapons should likewise be examined to see whether, through their impact on the nonproliferation regime, such upgrades could cause an increase in the probability of an intentional attack on the U.S. as small as 10^{-5} over the next few decades.

Roughly one hundred countries recently repudiated the United States' attempt to indefinitely renew the Nuclear Nonproliferation Treaty.[40] These votes signalled deep international discontent with the failure of the nuclear weapon states to dismantle their nuclear arsenals pursuant to Article VI of that treaty. When even maintenance of an arsenal threatens to unravel the fragile fabric of the world's nonproliferation efforts, how much more so will upgrading that arsenal, for no matter what purpose, run counter to U.S. nonproliferation objectives.

Other nations may be concerned that "safety upgrades" can mask the development of entirely new weapons. There is considerable justification for that concern, as is discussed in detail by Arkin, Greenpeace, and Tri-Valley CAREs.[41] Foreign "safety upgrades" may also be used to mask new weapon development, an outcome with negative security implications for the United States.

Fewer deployments and further retirements are virtually the only way greater overall nuclear weapons safety can be achieved

Given that upgrading and replacing nuclear weapons is likely to create serious countervailing risks--risks which, on their face, are considerably greater than those gained from any purported safety "improvements"--the search for greater nuclear safety must be directed elsewhere. Clearly, all other factors being equal, the probability of a serious weapons accident is proportional to the overall size of the arsenal. A minimum deterrent force--however one may define "minimum"--is also, therefore, an optimum safety arsenal. It is a minimum cost arsenal as well. A smaller arsenal would assist U.S. nonproliferation objectives, and would cause fewer dangers to the environment, to worker safety, and to public health. A smaller arsenal, to the extent that it corresponds to smaller arsenals abroad and especially in Russia, reduces the number of missiles which could be targeted at the United States.

Indeed, given comparable reductions in other nations' stockpiles, it can be persuasively argued that the optimum safety arsenal is one that is extremely, if not vanishingly, small. Many military and senior civilian defense leaders, past and present, have come to adopt this view.[42]

In addition to reducing the size of the arsenal, the movement of additional weapon systems away from active deployment and into safe bunkers would also reduce risk from accidents, as would the movement of nuclear weapons away from bases located in populous areas (e.g. Hickam Field in Honolulu). Further restrictions on the airborne transport of nuclear weapons should also be considered.

Increasing safety will decrease reliability

The quest for "increased" safety has a very marked cost in terms of weapons reliability. That is, if weapons are changed to make them "safer," they will be less reliable--unless we are able to proof-test the new designs. Resuming nuclear testing, however, would conflict strongly with nonproliferation goals and our treaty commitments. Thus the quest for "safer" weapons, if accepted at face value, could keep the weapons labs in a booming business for a long time by eroding the reliability of the weapons.[43]

Public safety, not nuclear safety, is the goal

So far we have examined nuclear weapons safety issues from a narrow technical perspective and in the broader context of reducing the nuclear danger as a whole. From the still broader vantage point of public health and safety as a whole, further investments in safer designs for nuclear weapons have vanishingly small returns.

Further investments in nuclear weapons safety have a very low benefit/ cost ratio compared to other public safety investments

Would upgrading to IHE and FRPs be worth the expense? Analysis--not to mention common sense--shows that investments in other government programs (e.g. highway improvements, cancer screening) yield orders of magnitude greater safety benefits to the general public.

Steve Fetter and Frank von Hippel estimate that a worst-case accident involving explosion of the HE in ten W88 warheads at the Bangor Trident base directly upwind from Seattle would involve on the order of 1,000 plutonium-induced cancer fatalities in the long run.[44] They suggest, for the sake of argument, that the risk of this accident can be assumed to be on the order of 0.1% per year, in which case the expected fatality rate from this type of nuclear weapon accident is 1 death per year. The prevention of this accident by the spending of about $1 billion to equip some 3000 submarine missile warheads with IHE would represent a cost on the order of $100 million per fatality avoided.[45] This accident has, subsequent to their paper, been made very unlikely by loading the missiles and the warheads separately, lowering the expected fatality rate by probably at least one, if not two or more, orders of magnitude and correspondingly raising the cost per fatality avoided.

Fetter and von Hippel cite cost estimates in the range of $20,000 to $140,000 per life saved by cancer screening, $400,000 per life saved by kidney dialysis, and $30,000 to $300,000 per life saved for various highway safety improvements. Thus the IHE warhead upgrade program, even by their highly conservative calculations, would cost on the order of 250 to 3,000 times more than these other prevention programs per life saved--or, given the operational changes already put in place by the Navy, at least 10 to 100 times as much. This great disparity of benefit--at least 3 if not more than 5 orders of magnitude--signals that the overall sense of their conclusion is robust with respect to large changes in their assumed accident rate.

What is more, the government and private programs cited by Fetter and von Hippel are almost certainly not the most effective ones offered by government or private sources, either in terms of average cost or marginal cost per life saved. Programs targeted at populations at risk like the Women, Infants, and Children (WIC) program, for example, are arguably at least one order of magnitude more effective per dollar spent than highway improvements in preventing deaths. And, on average, WIC and other perinatal programs address a younger population--one young adult and one infant--than do the programs Fetter and von Hippel cite, giving more years of life saved per person in these cases.

It would be interesting to compare Fetter and von Hippel's numbers to the benefits of investments in strictly military health and safety. The military environment is a dangerous place, and large numbers of military accidents occur annually, sometimes with accompanying civilian deaths. It is highly likely that it would be more cost-effective to use a billion defense dollars to prevent unnecessary military mortality--through, for example, more complete training--than it would be to use this sum to upgrade Trident missiles and their warheads, for which purpose it would probably not be adequate in any case.

This, of course, is a peacetime comparison. Since, realistically, nuclear weapons are useless in actual fighting, any investment in them deprives the soldier, sailor, or airman of just that much supporting materiel or training when he or she needs it most.

The quest for nuclear weapons safety is inconsistent with other federal and DOE positions, past and present

In the United States, 32.5 persons per 100,000, or approximately 81,250 people, died from "accidents and adverse effects" in 1990.[46] This is a very large fatality rate, much more even than a major conventional war. In the same year (as in every other year since the beginning of the nuclear age) not one person died from the accidental explosion of a nuclear weapon or, as far as is known, from any other cause related to a nuclear weapon being involved in an accident. Actuarially speaking, nuclear weapons accidents don't even appear on the ledger.

But what about the future? A heuristic analysis, which can only be very crudely approximate, suggests that an estimate of risk of death due to a nuclear weapons accident is likely to be, on its face, two to three orders of magnitude below the risk factors typically used as a basis for federal environmental health standards, namely 10^{-5} per lifetime of exposure.[47] This comparison is made, for all its inevitable flaws, because the weapons laboratories from time to time engage in struggles to weaken these standards, notably in regard to ground and surface water quality, saying that the safety risks involved are "negligible." Irony aside, this comparison is a *prima facie* indication that the public health cost of weapons safety "improvements," even if they result in population exposures that are within federal guidelines, and even if no accidents ever occur in production, waste management, decommissioning, or cleanup, could be comparable to the public health "benefits" obtained from nuclear weapons design "improvements."

More ironic still is the fact that the same laboratories who are even now clamoring for money to develop "safer" nuclear weapons--this after the weight of evidence presented in the past four years and the military's lack of interest in the subject--are exactly the ones who were saying that above-ground nuclear testing was not dangerous just a few decades ago. Federal agencies, such as the Veterans Administration and the Department of Justice, as well as many individuals at the laboratories, still deny the legacy of this testing in specific cases and in general. They now pander to public anxiety about nuclear weapons with their talk of an accident "worse than Chernobyl" when, according to their own analysis, the radiation released from tests in Nevada alone was 148 times that released at Chernobyl.[48]

These institutions systematically lied to the public about the actual risks of nuclear testing when it was convenient to do so and even today they continue to withhold extensive information about measured fallout distributions.[49] Unlike nuclear weapons accidents, which have been the cause of no casualties, the casualties of this intentional exposure were immense. A special team convened by the International Physicians for the Prevention of Nuclear War calculated the expected mortality from this fallout worldwide to be 430,000 deaths by the turn of the

century.[50] Against this background, the call for "safer" nuclear weapons rings very hollow indeed.

Conclusion

We have seen how fears about the "safety" of nuclear weapons have been rhetorically advanced by the weapons laboratories and the DOE with little regard to these simple facts:

- current U.S. nuclear weapons have the benefit of fifty years of technical improvements in safety, and further design improvements can bring only marginal and diminishing returns in actual risk reduction at a very large dollar cost;
- upgrading the arsenal for the sake of safety will create countervailing risks throughout the complex and the world;
- upgrading the arsenal could have enormous nonproliferation impacts; and
- much more cost-effective and elegant non-technical solutions to decreasing risk are available--such as retirements and changes in deployment and transportation.

It is as if the Department were simply pandering to images of doom in order to generate political capital for its science-based stewardship program, which actually has very little to do with safety. The Department as a whole is unreasonably tolerant of the stark contrast between its own very public promotional rhetoric and that of its contractors, on the one hand, and its joint testimony with the DOD to Congress, on the other.

From a broader perspective, the nuclear weapons "safety" debate has lost its sense of proportion because it has focused on the safety of the weapons, rather than on the safety of people. In this all-too convenient process of linguistic contraction, weapons are made the primary reference reality, not the public. These distortions have occurred because the pitch from the labs and the DOE is actually not motivated by safety, but by a desire for a less-conflicted system of meaning, especially for the younger scientists, and for perpetual funding. It is this funding that would be made safer. Nothing else can explain the irrationality of the open-ended quest for so-called "safer" nuclear weapons.

Endnotes

1. Testimony of Deputy Secretary of Defense John Deutch before the House Foreign Affairs Committee, October 5, 1994: "...advanced permissive action devices, so-called coded control devices, will be introduced into the B-52, the Minuteman IIIs, and eventually into the Trident force as well."

2. Sidney Drell, John Foster, and Charles Townes, "Report of the Panel on Nuclear Weapons Safety," House Armed Services Committee, December 1990.

3. Testimony before the House Appropriations Committee, Subcommittee on Energy and Water Development, Energy and Water Development Appropriations for 1995, Part 6, pp. 413-414.

4. *Ibid*, p. 419.

5. Quoted in Tom Zamora-Collina, "New Jobs for Old Labs," Bull. Atomic Scientists, November 1992, p. 16.

6. Quoted in Frank von Hippel and Tom Zamora-Collina, "Testing, Testing, 1, 2, 3--Forever," Bulletin of the Atomic Scientists, July/August 1993, p. 28-32. Deutch went on to say, "...there are operational steps that one can take to...ameliorate the safety problems when you mate the warheads to the missiles that are being looked into, but I would not think this an immediate problem..."

7. Testimony before the Senate Subcommittee on Nuclear Deterrence, Arms Control, and Defense Intelligence, cited by von Hippel and Zamora-Collina.

8. Sidney Drell, John Foster, and Charles Townes, Report of the Panel on Nuclear Weapons Safety, House Armed Services Committee, December 1990.

9. The most authoritative and detailed review of these issues in the open literature is still that of senior Livermore weapons physicist Ray Kidder, who was requested to provide an independent analysis of the safety question by several members of the U.S. Senate. See Kidder, "Report to Congress: Assessment of the Safety of U.S. Nuclear Weapons and Related Nuclear Test Requirements," July 26, 1991, UCRL-107454, and also his "Post-Bush Initiative Update" of the same paper in December of 1991, UCRL-109503. His thorough investigation followed, and built upon, that of the Drell Panel and incorporates relevant portions of their work in summary fashion.

10. Public safety is only one of the goals of government, and so this hierarchy of goals is really just one component of a larger picture. While this outline is an oversimplification, the primary roles and risks of nuclear weapons are all included here. Some believe that nuclear weapons have a role in extended deterrence, i.e. in protecting against conventional attack against U.S. forces on foreign soil or against non-nuclear weapons of mass destruction. Others, such as the present writer, believe that nuclear deterrence in any form is counterproductive and illegal in the long run, if not also in the short run. These issues are beyond the scope of this paper.

11. This slogan has been in frequent use in the nuclear weapons community since at least 1993. It is the integrating principle of the draft DOE National Security Strategic Plan, dated November 3, 1993. Reducing the Nuclear Danger: The Road Away From the Brink is the title of a book by McGeorge Bundy, William Crowe, and Sidney Drell (Council on Foreign Relations, 1993).

12. These safety concerns are reflected in the military characteristics (MCs) required by the Pentagon during the weapon design process. Those requirements include, in order of priority, nuclear safety, size and weight, plutonium dispersal safety, operational reliability, yield, conservative use of nuclear materials, and operational simplicity. In the event of a conflict between design priorities, nuclear safety is the highest priority. See George H. Miller, Paul S. Brown, and Carol T. Alonso, "Report to Congress on Stockpile Reliability, Weapon Remanufacture, and the Role of Nuclear Testing," 1987, UCRL-53822.

Interestingly, this official paper, in its exhaustive review of all the reasons to continue nuclear testing, does not mention any unresolved safety issues with then-current warheads or bombs. It was only in the early 1990s that safety issues gained prominence, first during the nuclear testing debate, and now as a challenge for science-based stockpile stewardship.

13. Drell, Foster, and Townes, pp. 25-26.

14. These weapons are the 9-megaton B53-1 gravity bomb (which has only one electrical safety system rather than two independent ones) and the W62 Minuteman III warhead; see Christopher Paine, "CTB Negotiating Issues with Implications for Nuclear Nonproliferation," Natural Resources Defense Council, 1994, and Stan Norris and Bill Arkin, "Nuclear Notebook," Bulletin of Atomic Scientists January/February 1995, pp. 69-71.

15. Drell, Foster, and Townes, p. 13.

16. More recently, "multi-point" safety has also been made an objective. The discussion which follows includes both one- and multi-point safety concerns.

17. Mechanical safing, which has been available and in successful use for more than two decades, can virtually eliminate the possibility of an unintended nuclear explosion, even if many points of the HE or IHE are detonated at once. According to Frank von Hippel, mechanical safing can be added to a nuclear warhead without nuclear testing. See von Hippel, testimony to the Senate Foreign Relations Committee, July 23, 1992.

18. Drell, Foster, and Townes, p. 25. The only place these analyses could have been done, given the classification barriers, the specialized codes, and the data requirements, was the weapons labs. It is quite likely that at least preliminary analyses of this type had already been done when the Drell Panel began its work. Indeed, at least part of the impetus for the Drell Panel was testimony offered by the three weapons lab directors before the Senate Armed Services Committee in May, 1990, which all but said that the Short-Range Attack Missile-A (SRAM-A) was too dangerous to deploy in peacetime (see Drell, p. 40).

19. "It is not sufficient to pull such weapons off the alert ALFA force but retain them in the war reserve stockpile in view of the hazards they will present under conditions of great stress..." *Ibid*, p. 32.

20. *Ibid*, p. 29.

21. The Drell Panel estimates that a Pu fire or deflagration would contaminate about one square kilometer, while an explosion "could" contaminate an area of "roughly" one hundred square kilometers. *Ibid*, p. 30.

22. Frank von Hippel and Steve Fetter, "Worse than Chernobyl?" Arms Control Today, September 1992, p. 13. Descriptions of these accidents can be found in Chuck Hansen, U.S. Nuclear Weapons: The Secret History, Orion Books, 1988 or in the Congressional Record, August 3, 1992, pp. S11172-5.

23. Vanadium has been used; see Miller, Brown, and Alonso, *op. cit.*

24. von Hippel and Fetter, *op. cit.*

25. J. Carson Mark, "Do We Need Nuclear Testing?", Arms Control Today, November 1990, pp. 12-17.

26. See Kidder's December 1991 update, cited above, for the text of the President's announcement. Kidder notes this announcement did not go quite as far as to completely eliminate the air transport of nuclear weapons in peacetime, but points out that such transport "could be reasonably terminated after the mandated return of overseas nuclear weapons has been completed..." (p. 3).

27. Cited by Ray Kidder in "How Much More Nuclear Testing Do We Need?," Arms Control Today, pp. 11-14. Claytor spoke before the House Armed Services Committee, DOE Defense Nuclear Facilities Panel, February 20, 1991.

28. Air Force Response to the Drell Panel, Nuclear Weapons Council Standing Committee briefing, Lieutenant Colonel John R. Curry, Secretary of the Air Force/Assistant Secretary, Acquisition, August 1, 1991; cited by Kidder, 1992.

29. Norris and Arkin, *op. cit.*, and Paine, *op. cit.*

30. *Ibid.*

31. Kidder, July 1991, pp. 8-9.

32. *Ibid*, p. 6.

33. Colloquy at public environmental impact scoping hearing regarding the Dual-Axis Radiographic Hydrotest Facility (DARHT), December 8, 1994, in Santa Fe; transcript available from DOE Albuquerque or LANL.

34. Tom Zamora-Collina and Ray E. Kidder, "Shopping Spree Softens Test Ban Sorrows," Bulletin of the Atomic Scientists, July/August 1994, pp. 23-29.

35. Personal communication at LANL site-wide environmental impact statement hearing, Santa Fe, fall 1994.

36. Los Alamos National Laboratory, Institutional Plan FY1995-FY2000, p. 43.

37. A 900-page report on this subject is due from the International Physicians for the Prevention of Nuclear War in July of 1995, entitled A Global Guidebook to Nuclear Weapons Production and Its Health and Environmental Effects, MIT Press, Cambridge.

38. See Office of Technology Assessment, Hazards Ahead: Managing Cleanup Worker Health and Safety at the Nuclear Weapons Complex, OTA-BP-O-85, February 1993.

39. Released by Sandia on June 24, 1994.

40. "Atom Arms Pact Runs Into A Snag," New York Times, January 26, 1995, p. 1.

41. See "Changing Targets: Nuclear Doctrine from the Cold War to the Third World," Hans Kristensen and Joshua Handler, Greenpeace International, January 1995; "Nuclear Agnosticism When Real Values Are Needed: Nuclear Policy in the Clinton Administration," William Arkin, Federation of American Scientists Public Interest Report, September/October 1994. The potential proliferation impacts of the DOE's "science-based stockpile stewardship" program, and DOE's design program for new nuclear weapons, will be analyzed in forthcoming papers from Tri-Valley CAREs.

42. General Horner, former head of the Air Force Space Command and leader of the air war against Iraq, is one ("U.S. Should Trash Nukes, Top Air Force General Says," Albuquerque Journal, July 16, 1994). General Andrew Goodpaster, former NATO commander, is another ("Tighter Limits on Nuclear Arms: Issues and Opportunities for a New Era," and "Further Reins on Nuclear Arms: Next Steps for the Major Nuclear Powers," The Atlantic Council of the United States, 1992 and 1993 respectively). The views of Les Aspin, recent Secretary of Defense, are likewise well-known.

Even some weapon designers are beginning to agree. Tom Thompson, dean of current designers at Livermore, admits, "I can't think of any target for anything in our stockpile" ("Science Comes in from the Cold," Los Angeles Times, 12/22/94).

43. Dr. Steven Younger, Deputy Program Director for Nuclear Weapons Technology at Los Alamos, admitted to the writer that these arguments were "defensible." He concluded, for these reasons as well as reliability concerns, that "we should not open up existing weapons [to changes] unless it is absolutely necessary" (personal communication after Los Alamos Study Group panel discussion in Los Alamos, July 18, 1994).

44. Steve Fetter and Frank von Hippel, The Hazard from Plutonium Dispersal by Nuclear-Warhead Accidents, Science & Global Security, Volume 2, 1990.

45. Norris and Arkin estimate that the total number of W76s which will remain after START II is 1328, and that of W88s 400, making 1728 submarine-launched warheads without IHE after START II, slightly more than half the number von Hippel and Fetter used in 1990.

46. Statistical Abstract of the United States, U.S. Governmental Printing Office. The accidental death rate has declined some 40 percent over the last two decades, reflecting the effectiveness of societal investments in safety like the highway improvements cited by Fetter and von Hippel. These investments, which compete for funding with nuclear weapons, have apparently prevented tens of thousands of deaths annually.

47. These order-of-magnitude estimates are included here, for all their uncertainty, because it has been observed that rational thought often breaks down when nuclear weapons safety is discussed. This occurs even, or perhaps especially, at the top-most levels of the DOE. With the image of the mushroom cloud foremost in our minds--particularly in the minds of those who are responsible for nuclear weapons--no amount of funding for safety improvements seems too much. That, of course, is because they have not been asked to choose between their own programs and other societal means of reducing morbidity and early mortality. It may also be because safety as a goal is psychologically compensatory for those who participate in threatening other nations with weapons of mass destruction, which is, after all, what nuclear deterrence is all about.

These estimates suffer not only from attempting to quantify what cannot be quantified, but also from the implicit error of assuming that the risks of low-probability, catastrophic events are comparable to high-probability, less-severe events. An accidental nuclear explosion, or even a plutonium accident, would arguably have a qualitatively much more severe long-term effect on a society than a comparable number of automobile fatalities.

From 1950-1980, the rate of "Broken Arrow" accidents was approximately one per year. Current safety standards require that a warhead or bomb be able to endure such accidents with a 10^{-6} or less chance of nuclear detonation. Applying the 1950-1980 rate of serious accidents to the deployed START II arsenal, the probability of roughly 4,000 total weapons experiencing one accidental detonation per year with some nuclear yield greater than 4 pounds of TNT-equivalent is less than 4×10^{-3}. The current accident rate is much smaller than the historical rate, however, since (a) there are to be fewer deployed weapons than the height of the Cold War, (b) these weapons are now flown around on airplanes much less frequently than in 1950-1980, (c) dangerous exercises like airborne refueling are surely no longer conducted with live nuclear weapons, and (d) these weapons are not kept on alert aircraft parked on runways. These four factors, taken together, probably reduce the rate of "Broken Arrow" accidents by a factor of about 100. Our order-of-magnitude estimate of the current accident rate might therefore be about 10^{-2} per year, and of accidental nuclear explosion about 4×10^{-3}.

Most nuclear weapons are stored and transported away from urban areas, so the probability of an accidental explosion in a city is quite small. The size of an accidental nuclear explosion could, by definition, be anywhere between 4 pounds TNT-equivalent and about 1.2 megatons (see Table 1). Perhaps 10^5 people is a reasonable upper bound for the number that would be likely to die from an accidental explosion; that is approximately the number of fatalities that occurred when the center of a city largely made of light buildings--Hiroshima--was bombed. In other words, we might expect, in very round numbers, a reasonable upper bound of 4 deaths per year from a nuclear weapon explosion, with an expected number of deaths per year perhaps two orders of magnitude below this, or 0.04 deaths per year.

This compares with the worst-case scenario drawn up by Fetter and von Hippel for a plutonium dispersal accident, for which the corresponding number was 1 death per year. The probability of the particular accident scenario which Fetter and von Hippel analyzed has been greatly reduced if not virtually eliminated, however, by the simple expedient of separating warheads from rocket motors during loading. The possibility of a plutonium-

dispersing accident elsewhere than the Trident docks has not entirely vanished, of course, despite the fact that all of these non-Trident weapons have IHE and some of them have FRPs as well (see Table 1). Assume, arguendo, that these changes have reduced the expected annual deaths by a factor of 10 to 100, i.e. to about 0.01 to 0.1.

It seems therefore plausible that the *a priori* expected number of annual deaths from a nuclear weapons accident is on the order of 0.1 or fewer persons/year, or roughly one million times less than the expected number of deaths from other accidents. The probability of dying in any accident is, in turn, about 50 times less than dying of a disease, which is about 0.98. Our rough estimate of the probability of any given person in the U.S. dying from a nuclear weapons accident in a given year is thus about 4×10^{-10} or less, or less than 3×10^{-8} in a 75-year lifetime. These numbers are very low, and errors in them of up to three orders of magnitude will not affect the conclusions which follow in the text.

48. "The Containment of Underground Nuclear Explosions," Office of Technology Assessment, 1989. The OTA team drew heavily on weapons laboratory expertise, as the list of contributors shows.

49. See Stewart Udall, The Myths of August: A Personal Exploration of Our Tragic Cold War Affair with the Atom, Pantheon, 1994. Dr. Hugh DeWitt of Lawrence Livermore has recently drawn attention to the continued classification of historic fallout data and called for U.S./Russian bilateral release of this data.

50. Radioactive Heaven and Earth, Apex Press, 1991, available from the Institute for Energy and Environmental Research, Takoma Park, Md.

Table 1: The Projected U.S. Stockpile After Implementation of START II

Weapon	Use	Yield (kt)	Number	Design Lab	Produced	IHE	FRP
B61-7	Strategic bomb	10-350? (Hansen: 500)	450	LANL	1985-? (pits 1966-1971)	yes	no
B61-mods 3/4/10	Tactical bomb	1-150? (H: 300)	100	LANL	1979-1990	yes	no
W76	SLBM C4/D5	100	1,280	LANL	1978-1987	no	no
W80-0	SLCM	5 & 150	350	LANL	1984-1990	yes	no
W80-1	ALCM	5 & 150	400	LANL	1982-1990	yes	no
B83	Strategic bomb	low to 1,200	500	LLNL	1983-1990	yes	yes
W87-0	ICBM	300	500	LLNL	1986-1989	yes	yes
W88	SLBM D5	475	400	LANL	1989-1990	no	no
Reserve Stockpile After START II (estimate of Norris and Arkin)							
W76	as above		1,000	as above			
W78	ICBM	335	1,000	LANL	1979-?	no	no
B53-1? B61 & B83 W80-1	gravity bombs and ALCMs	5 to 1,200; 9,000 if B53-1	1,500	both	B53: 1962-1965	B53: lacks IHE, FRP, and full electrical safety	
Total weapons after START II: about 8,500 (includes spares)							

IHE: insensitive high explosive
FRP: fire resistant pit
LANL: Los Alamos National Laboratory
LLNL: Lawrence Livermore National Laboratory
ICBM: intercontinental ballistic missile (Minuteman III in this case)
SLBM: submarine-launched ballistic missile
ALCM: air-launched cruise missile
SLCM: submarine-launched cruise missile
C4: Trident I C4 missile
D5: Trident II D5 missile

Sources:

Tom Zamora-Collina and David Albright, ISIS Report, October 1993; Christopher Paine, "CTB Negotiating Issues With Implications for Nuclear Nonproliferation," Natural Resources Defense Council, April 1994; Stanley Norris and William Arkin, "Nuclear Notebook," Bulletin of the Atomic Scientists, Jan/Feb, 1995; Chuck Hansen ("II" above), U.S. Nuclear Weapons: The Secret History, Orion Books, 1988.

Transcript 4: Comment Code 53
Santa Fe Public Hearing – Evening Session

Multi-Page™

SANTA FE PUBLIC HEARING
for the
DRAFT ENVIRONMENTAL IMPACT STATEMENT
DUAL AXIS RADIOGRAPHIC HYDRODYNAMIC TEST FACILITY

THURSDAY, JUNE 1, 1995
6:30 P.M.
HIGH MESA INN
3347 Cerrillos Road
Santa Fe, New Mexico

REPORTED BY: Irene Delgado, NM CCR 253
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MS. WEBB: Good evening. My name is Diana Webb. I'm with the Department of Energy, Los Alamos area office. I would like to welcome you here tonight, ask you to come in, sit down, come as close to us as you would like. These seats at the table are for you, the public. We invite you to sit here with us or in one of these other chairs around the room.

This is the evening session in Santa Fe of the public hearing on the draft environmental Impact Statement on the dual axis radiographic hydrodynamic test facility, which I will refer to tonight as DARHT. With me tonight are Bob Day, who is the director of the Dynamic Experimentation Division at Los Alamos National Laboratory, and Jas Mercer-Smith who is deputy program director for the Nuclear Weapons Technology at Los Alamos National Laboratory.

Our court stenographer tonight is Irene Delgado. And we have our rotating scribe, Don McClure, who will be taking short bullet statements of the comments that are given here tonight. When we take a break, you might be interested in reading the summaries of the statements that were made this afternoon which are the similar looking sheets that are hung there on the wall behind you.

We are here tonight to listen to your

comments on the draft DARHT EIS. We are interested in your comments regarding the accuracy and adequacy of the environmental analysis document and any other comments you would like to make on the Environmental Impact Statement, the hydrodynamic testing program or any other matter relating to the environmental analysis.

The format tonight is such that we have three separate areas for you to get information and for us to hear your comments. This is the round-table discussion. This is the round table. We invite you to come and sit with us here and share your concerns with us tonight.

This session is being formally recorded. Irene is making a verbatim transcript which will be available for public review in the Los Alamos Community Reading Room. These transcripts should be available within a week or so.

In the back behind the portable wall there, we have an information area. There's a lot of technical information related to the DARHT project, the different alternatives that are analyzed in the Environmental Impact Statement and other information regarding environmental programs and other information regarding Los Alamos National Laboratory.

Across the hall, out across the atrium and

up to the side, we have a comment room or what I call the quiet room. That's a room where there is a tape recorder, if you wish to go in there and make spoken statements for the record. There are forms, if you wish to go in there and make written comments for the record. The transcription of that tape and those written comments are also part of the formal record of the proceedings here tonight.

We also have tables in the atrium out here that have additional information. There is a table where we have a lot of information regarding this Environmental Impact Statement, other related Department of Energy National Environment Policy Act reviews or NEPA reviews.

In addition to that table, there is a second table that has information that presents alternative points of view regarding this project and other matters pertaining to whatever is out there. We are here to listen to you tonight. We are willing to make this format your format. We will sit here and listen to your spoken statements, accept written comments. Bob, Jas and myself will answer questions or we will entertain an open discussion amongst the members of the group here tonight, whatever would be the wishes of this group.

A little bit about what the Environmental

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Impact Statement is about. The Department of Energy has proposed to provide enhanced high resolution radiographic capability to perform hydrodynamic tests and dynamic experiments in support of the department's historical mission near-term stewardship of the nuclear weapons stockpile.

The department's preferred alternative would be to complete and operate the DARHT facility at Los Alamos National Laboratory. The department is preparing this Environmental Impact Statement to weigh the environmental impact or the environmental consequences of what would happen if we went forward with our preferred alternative, measured against what would happen if we maintain the status quo or the no action alternative, and what would happen if we pursued several other alternatives.

The Environmental Impact Statement process has many steps. We are sort of here in the middle right now. A Notice of Intent for this Environmental Impact Statement was published in the Federal Register of November last year. That was followed by a public scoping period. In December and January, we had public scoping meetings. Many of you attended those meetings the first week of December last year.

At the end of January, we finished our

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implementation plan which documented the results of that scoping process and shows the road map that we would proceed to complete this environmental review. We have now issued the draft environmental Impact Statement. The date on that is May. We are now in a formal public comment period of which this hearing is a part to receive your comments again on the accuracy and adequacy of that review. That formal public comment period will extend until June 26. We will, however, accept written comments after that date to the extent that we are able, as long as possible.

After we consider the comments that we have received through this process, we will then finalize the document and issue a final Environmental Impact Statement on DARHT. We anticipate that that will take place in mid August.

No sooner than 30 days after that final EIS is issued, the department will issue then its Record of Decision. This will document the final decision that the department makes on whether or not to proceed with the preferred alternative to construct and operate DARHT, whether or not to follow one of the other alternatives analyzed, or whether to take no action and proceed with the status quo.

That decision will be accompanied by

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Mitigation Action Plan, which is a short document that will explain the mitigating measures that the department will take to mitigate or lessen the adverse impacts that might occur as identified in this Environmental Impact Statement.

The DARHT Environmental Impact Statement has analyzed six alternatives. As I mentioned, the no action alternative is to continue the status quo, to continue to use PHERMEX, the existing hydrodynamic test facility at Los Alamos National Laboratory. Under that alternative, we would not complete construction of DARHT as a hydrodynamic test facility, but we would complete the structure for some other use.

The second alternative analyzed, as I mentioned, is the department's preferred alternative, to complete and operate the DARHT facility. Under this alternative, the department may choose to delay completion and operation of the second axis of the two-axis facility until after the accelerator and X-ray equipment in the first axis has been installed, tested and proven.

The third alternative would be to upgrade the existing PHERMEX facility at Los Alamos National Laboratory. Under this alternative, the existing single axis, fairly short axis machine, would be enlarged; a

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second axis would be built, and the enhanced capability would be provided at that facility, similar to the DARHT equipment under the preferred alternative.

The enhanced containment alternative looks at ways to contain most or all of the experiments and tests that are planned for the facility. It is similar to the preferred alternative in that it does use the DARHT facility. There are two options that are looked at. One would be to construct a containment building in which all types of experiments would be performed. This building, then, would contain all tests.

The other option is an enhanced vessel containment option. Under this option, the department would conduct most tests and experiments in containment vessels. I would like to point out that the department now conducts some tests and experiments in contained vessels.

Under the plutonium exclusion alternative, the department would conduct essentially the same operations as under the preferred alternative, but would not conduct any experiments using plutonium at the DARHT facility. This alternative is analyzed to provide a comparative look at the difference of environmental impact if DARHT were used to perform -- I'm sorry -- to perform dynamic experiments with plutonium measured

against not using the DARHT facility to perform dynamic experiments with plutonium.

Under this alternative, however, the department would meet its need to conduct dynamic experiments involving plutonium at PHERMEX or some other facility. Under the single axis alternative, the department would complete and operate only one axis of the DARHT facility to conduct hydrodynamic and dynamic tests.

The other accelerator hall would be completed for other uses, but would not be used as a hydrodynamic test facility. Under all of the alternatives analyzed in this document, the department would continue to use the flash X-ray for FXR facilities at our sister laboratory, Lawrence Livermore, in California.

Dynamic experiments involving plutonium are planned for the future, and the department would continue to conduct its hydrodynamic testing program. The infrastructure involving research, waste management, security, maintenance, environmental monitoring or other support services would be the same or would be very similar under all of the alternatives analyzed. And the department would continue, over time, working towards the eventual decontamination and decommissioning of both

facilities.

This is a picture of the DARHT construction site as it appears today. This picture was taken on May 19, very recently. This picture is taken looking almost straight north. This eastern accelerator hall would be the hall that would be first finished under the preferred alternative. And under the single axis alternative for DARHT, it is the eastern hall that would be finished for hydrodynamic test facility.

This is a map of Los Alamos National Laboratory. The Los Alamos townsite is here. White Rock townsite is here. The Rio Grande river is here. The DARHT facility site is located here in the middle of Technical Area 15. The PHERMEX facility is located about a half mile away, very close to the same technical area. Those are in the middle of the existing explosive testing area.

The Environmental Impact Statement provides a comparative analysis of the environmental impacts that might occur under any one of those six alternatives. This chart shows a summary of those impacts, and there is another copy of this chart in the back in the information area, and I invite you to look at these during one of our breaks.

Although it's a little hard to see from

the back, the type on this is color coded. As I said, it is a comparative analysis. The environmental impacts that would be expected if we continued with the status quo, the no action alternative, are showed in the first column.

In the other five columns are the environmental impacts expected that would be under the other five alternatives. The environmental impacts that are shown in black type are those that would not change when compared to the expected impact if we continued with the existing situation.

The impacts that are shown in red are those that would be expected to have a greater adverse impact when compared with the impasse of the no action alternative. And those shown in green are those that would be expected to have a greater beneficial impact than those that would be expected under the no action alternative.

This is a copy of the Environmental Impact Statement that we are discussing tonight. If you would like a copy, would you please leave your name and address with the staff at the front desk and we will make sure you get copies of that and put you on our mailing list for any other information that we will be preparing under this project.

This is an unclassified analysis. In addition, the department has prepared a classified supplement that includes analysis and other information pertaining to this Environmental Impact Statement. The department has prepared an unclassified summary -- an unclassified summary of the impact analysis that is included in the classified document. This summary is available for you. It is out on the information table that I just mentioned.

The department has put in the public reading room at Los Alamos, the some 200-plus references that are -- were used to assist with the development of this draft environmental Impact Statement. In addition to that material, we have placed a lot of other related material in the public reading room. We have again, on the information table outside, a list of some 60-odd documents that are available there for your information. You may find them to be of interest when reviewing this material or to get a greater understanding of what the project is all about.

Tonight we would invite, first, people who represent the state, tribal governments, or local governments, people from those types of government entities who represent a constituency.

We are prepared tonight to have Bob Day

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here give us a five-minute chalk talk, and I think Bob is prepared to give us a five minute chalk talk on the DARHT project and hydrodynamic testing program in general, if you would like for him to. If you would prefer that he not give that, then we will go right into the gathering of public comments. And again, I'm going to ask you, this is your meeting, what would you like? You can nod your head, shake your head or -- I see a nod. I see a -- that's fine.

Bob, I think then it would be appropriate for you to give a five-minute Bob Day chalk talk.

MR. DAY: This is a chalk talk with no chalk. What I would like -- I would like to do a couple of things. I would like to introduce DARHT in the concept of the broader vision of the laboratory.

We hear a lot of about nuclear weapons and nuclear weapon stewardship and that is indeed a key to the DARHT project because it comes out of the -- it's an evolution of the lab's mission. And the stewardship and the ongoing maintenance of the nuclear weapons stockpile is an important mission for DARHT. But the lab's mission has evolved, and the lab's mission has been changing significantly, and DARHT plays a role in a number of areas, so I thought I would put that in context.

The other thing I thought I would do is

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introduce some of the terminology. You will hear a lot about plutonium. And you will hear a lot about conventional weapons and nuclear weapon technology and hydrodynamic testing. I will put in context a little bit of some of the terminology so we can talk about some of that as well.

But at the heart, Los Alamos has been picky about who it is and what its core capa -- capabilities are and key missions are. And at the heart of the laboratory, in the changing role that we have reducing the nuclear danger, is the key mission of the laboratory.

And there are five major components there. There are pieces that don't relate directly to DARHT or pieces that related in very strange ways. One of the pieces is environmental stewardship. This is the issue associated with the legacy of 50 years of production, not a big issue vis-a-vis DARHT, some D&D issues, but not a big issue because for over 50 years the complex, weapons complex, has a number of environmental problems that have to be addressed.

There are key capabilities out of Los Alamos that allow us to be able to address on the basis of the underlying science that's needed to address those problems efficiently and quickly, the capability to do

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that, the people have a core to do that quickly and efficiently. So that's a part of what we are at the laboratory; not a big issue with DARHT, but an important part.

Another is materials management. We at the laboratory have seen the evolution of materials, nuclear materials of all kinds, evolve in our 50 years. Part of that evolution has been in the nuclear weapons program. Actually, right now that's only a small part of that evolution of material, strongly dominated by nuclear materials in the commercial power sector. But again, a great deal of the expertise associated with maintain -- how to properly maintain, how to properly control and what possible disposition of this material could evolve is also a key part of what Los Alamos knows how to do.

A growing concern, a concern that's actually been in the news a great deal in the last months because of the renewal of the Nonproliferation Treaty is the issue of proliferating nuclear weapon technology and the ways we can counter that proliferation. Again, much of the expertise and capability in people that know that technology is important in this arena reside at the laboratory, and it's a key part of what we do.

But it's also a place where DARHT plays a role, and that's because -- because terrorist devices or

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proliferant devices are devices where we don't -- we haven't developed those. That kind of technology evolves. We learn new things about what might be done or possibly be done, and that kind of system needs to be investigated. We need to understand what is possible. We also need to understand ways to counter those kinds of systems.

Frequently they employ complex geometries of very thick materials, and that's what DARHT is all about, understanding, in detail, the interior workings of things you can't see inside. It's a radiographic machine just like an X-ray machine that you have in the medical business, only this is to look through very thick things and to get very good detail. So in the counter nonproliferation arena, the DARHT technology is a major improvement in terms of what we can know, what we can understand and how well we can impact that mission and capability in the laboratory.

There's also stockpile surveillance. We are not, as a country, certainly not as a laboratory, developing new nuclear weapons, but a large part of maintaining the stockpile is understanding the nature of the nuclear weapons we have at the present time and watching how they evolve in age. They are built of complex materials which evolve. They are built of

plastics. They are built of nuclear materials which decay and create radiation environment. They are built -- all of these objects are packed inside a relatively small volume and expected to last for very long periods of time.

Anybody who has a car knows that your dashboard decays. The plastics change. The very nature of the interaction of the radiation with material, it changes the very nature of the material. So that part of understanding what changes have occurred is again an important part of the laboratory. Understanding the nature of those parts is again a place where DARHT can play a role. It can look inside some of those parts and understand how they behave.

Another very important part of what we are doing is stockpile stewardship. This is different than surveillance. Surveillance is looking. Stewardship is much more related to understanding. As we see these changes, we see changes in the metallurgy, and we see changes in the material. What effect does that have? In a lot of cases there are no changes. Changes are seen all the time. Are the changes big or the changes small? Do they have a significant effect or insignificant effect?

We do a significant amount of work to

understand the basic nature of the material. This is what an awful lot of our dynamic experimentation is about. Usually when we use that term, it will mean the interaction of high explosives with various materials. It can be surrogate materials like steel, tantalum, depleted uranium. It can be plutonium. They can be any one of a variety of other materials that one might find in these kinds of geometries.

There's another term and that's hydrotesting. Hydrotesting is where you take a surrogate for the material that's actually in the nuclear weapon and understand its dynamics in detail. The interior parts are moved by high explosives and hydrotesting is understanding how that behaves in detail.

Again, it results in very thick, complex, highly-detailed parts. And it's the DARHT capability which allows us to understand the nature of the materials, where it is, and how it has evolved because it's those details which tell us whether or not the stockpile is reliable. And that's one of our major missions is to understand the reliability in the long run of materials of systems that were designed to last perhaps 20 years, which, at the present time, many of which are approaching their lifetime, and for which we expect and need them to last for much greater periods of

time.

So understanding what we have at the present time, that's called baselining, making sure we understand where we are now, because right now we are tightly tied to the data that we achieve from underground nuclear testing, and the last time we did a nuclear test on any device, we are sure that device works as expected to. As time goes on and changes accumulate, our confidence decreases, so understanding where we are now is important. Then going on and understanding how changes that we are seeing, that we have seen affect the devices, is also important.

Also nuclear weapons that -- issues associated with nuclear weapons -- issues associated with changes that we do in order to enhance the safety, to make sure that the safety -- safety is not affected, or changes for safety do not affect the reliability of the device, are again issues which we address with this capability.

So stockpile stewardship is the key to understanding the devices we have and the parts that they are made of. But why DARHT? We have capabilities at the present time. A couple of important reasons. We have had a 50-year evolution of this technology. It has allowed us to understand better. One the facts that it

allowed us to do more with -- with fewer underground nuclear tests and better uses and more efficient uses of resources.

The evolution of this technology has let us understand more quickly, and with aboveground experiments, how nuclear weapons work. And because of that, we've been able to have fewer underground nuclear tests. But now we're asked for something quite different. Now we are asked to maintain this capability for a long period of time without underground nuclear testing. And that's a sea change in terms of what we need to do. As a matter of fact, whether or not it is even possible is not completely known.

We need to understand what -- how these devices behave. We need to understand the inner working and materials, position, locations and shapes with much greater detail, and DARHT lets us do that. As a matter of fact, the information that we achieve on each and every one of the tests is about ten times larger than we achieve at the present time aboveground, and it has a resolution which is about three times better -- as a matter of fact, there's some very interesting pictures in the back that I highly recommend you go look at them.

It's an interesting image. You are looking at things as through a glass darkly, and as you

include the resolution, the detail that you can see improves dramatically. We have some pictures which shows how that resolution and kind of information we can achieve improves with DARHT. The other thing is, it allows us to have more dose. There is more X-rays there that allows us to go through thicker materials, it's going through the very thickest material of what we need, and that dose allows us to do that. So we see a significant increase in dose and we maybe get back to evolving further than the design parameters that we were working to at the present time.

So that's kind of the overall view of the laboratory and what we're trying to accomplish. A little bit of a piece of how it explains the nuclear weapons programs, the way in which this capability works in the nuclear weapons program. But the nuclear weapons program is not the only thing the laboratory is working on. There are other areas like conventional defense. As we rely less and less upon nuclear weapon technology, we depend more upon conventionalized. And the kind of capability we have developed here allows us to understand the details of many of our conventional munitions as well.

As a matter of fact, the interaction with the Department of Defense, coupled with our ability to

understand conventional weapons is another major mission for DARHT. So the Department of Energy, in support of the Department of Defense as one of its major missions in maintaining nuclear weapons confidence evolving in terms of technology of conventional munitions has worked with Los Alamos National Laboratory to improve our radiographic capability, improve our technology for doing this kind of work and DARHT is a piece of that process and piece of that answer.

MS. WEBB: Thank you, Bob. Again, I would like to invite anyone who represents the state, a tribal government, or a local government to let me know right now if you want to speak on behalf of your constituency. And seeing none, then we will open this up for general public discussion. I do not anticipate having to limit the length of time we talk tonight. This meeting was advertised to run to 9:30, but we will run as late as we need to accommodate everyone who wants to speak.

We will be taking breaks from time to time to give Irene a rest and allow you an opportunity to look at some of the other information we have. And having said that, who would like to speak first? Chris, would you like to speak first, since you are sitting with us at the table? Again, I invite anybody out there who would like to sit with us at this table, this is your table;

this is a round-table discussion. This is not the speaker's table. However, if you're going to speak, Irene can hear you a lot better if you do sit up here.

MS. CHANDLER: Do you want me to get things rolling?

MS. WEBB: Well, Christine, would you like to go first?

MS. CHANDLER: Sure. My name is Christine Chandler. If I could start off by reiterating a remark that I made last evening, I think perhaps that would be useful to get the discussion started. My review of the report leads me to the conclusion that it could be much stronger in that there is tremendous amounts of documentation which supports the notion that there are genuine questions of safety from stockpiles that is a point that is well documented. It's well documented. I would note the Miller Report which is cited in the draft EIS, yet not heavily drawn upon for its detail. 1

And I used this example last night and I'll use it again, that the WX-68 is cited as a warhead that was tested and the issues were discovered. There are numerous examples in the Miller Report like that one that could be used to enlighten the public as to the fact that, yes, there are safety questions that arise. In fact, Miller talks about the fact that one-third of the

stockpile of the tests related to nuclear tests done, one-third of those relate to safety questions and enlightened us on safety issues.

I think those sorts of points need to be made and are not made in the report and I think should be made so that the public understands what we're talking about here and the magnitude of the issues and the reality of the issues. 1

MS. WEBB: Okay, thank you very much. Who would like to speak next? We have a shy group here tonight, I guess. I see no one coming forward. In case you wondered what we were doing, we were suggesting that the noise level in the back be held down a little bit. And earlier we were doing things to the door, but apparently we have an imbalance of having airflow and being able to hear. Who would like to speak next? Yes?

MR. LOCKHART: I have a question on the summary from the classified EIS -- my name is Milton Lockhart.

MS. WEBB: Thank you.

MR. LOCKHART: Will those unclassified summary points be incorporated into the final EIS? The summary says that the original document will probably not be declassified by the time the final EIS is prepared. 2

MS. WEBB: One of the things we would like

to hear from you tonight is as to whether or not you think it would be a good idea to incorporate any of the additional information, including that piece of information, into the final Environmental Impact Statement. So I guess one of the things I would like to hear from you is; do you think that would be a good idea?

MR. LOCKHART: Yes, I do.

MS. WEBB: Thank you. We will take that under advisement. Who else would like to speak? Again, the final Environmental Impact Statement, we'll consider all of the comments that are made, whether they be a spoken comment at these meetings, whether or not they be written comments or other forms of information that you give to us.

We will consider all of those comments and we will make changes in the final Environmental Impact Statement in response to those. That's why we're having these meetings and why we have this comment period. And feel free; there's chairs, lots of chairs over here. There are some chairs here, and feel free to join us here at the table. Who would like to speak next? Mary, would you like to speak next?

MS. RISELEY: Okay. I will speak next. My name is Mary Riseley. I am with the Los Alamos Study

Group, and I believe you, Chris, were at the meeting on

3 December 8 when Dr. John Immele said there has been no question of safety that has been due to aging.

MS. CHANDLER: I don't recall that.

MS. RISELEY: I would be glad to send you the testimony. I will make sure to do that tomorrow. It's a flat statement.

MR. DAY: I think it would be interesting -- would you like a confirmation of that?

MS. RISELEY: I would rather have it from Dr. Immele.

MR. DAY: Well, John and I have talked about it. And I can tell you, the issue is, there are in stockpile, issues of reliability. There are issues of safety. There are issues of aging. There are issues of surety.

MS. RISELEY: I would like to suggest

4 there are also issues of ethics and morality.

MR. DAY: Okay. In relation to your question and the statement you made this afternoon as well, there are issues of reliability which come from the fact that the devices have aged, issues of reliabilities associated with their intrinsic nature. There are issues of safety related to the way it works, whether they have insensitive high explosives or conventional high

explosive.

Where there are issues related to -- there's also a combination of issues associated to the safety related to development over time. John's comment refers to the fact that of these combinations of about six or seven things, aging and reliability, aging and safety, reliability and safety, of those sets of combinations -- of those sets, the combination of aging and safety, those safety issues that we have seen because the devices have aged, we presently don't know of any such circumstances. So it's specific to that one case, not to the issue of whether there are questions of safety, not to the issue of whether there can be questions of reliability, but directly to the question of whether or not any safety issues we have seen because of this.

MS. RISELEY: I believe that Sandia National Laboratory did a rather elaborate study which was referred to as the Sandia Stockpile Life Study, and that study found that the number of problems that were found at all was extremely small, and I think Dr.

5 Kerlinsky can probably give you the exact numbers and most of the ones that related to reliability, only point 4 percent had a reliability difference of more than 10 percent.

MS. WEBB: Mary, for your information, Mr. Greg Mello entered that study this afternoon.

MS. RISELEY: Excellent, excellent. Very good. While we are on the subject of issues about the stockpile, I would like to bring up something that is going to happen next year, which may have a very extreme effect -- I hope, because I hope I belong to a law-abiding country -- on the United States nuclear

6 weapons posture. And that is the opinion that will be issued next year by the World Court at the request of the United Nations General Assembly on the legalities under international law of the threat, the use and threat of use of nuclear weapons.

And I think that that's very relevant to the DARHT project because DARHT does have to do with making changes in nuclear weapons. It has to do with

7 designing new weapons, at least it was justified that way for every year of its existence of the proposed project until two years ago, and if nuclear weapons are declared illegal under international law, I hope my country will proceed as quickly as possible to abide by the Article 6 obligations under the nuclear Nonproliferation Treaty to disarm.

Now, I would like to return to the DARHT EIS. And first, I want to say it is extremely impressive

that you were able to, Diana, coordinate the number of people you did and come up with a document, which, as far as it goes, is really a very commendable effort.

MS. WEBB: Thank you.

MS. RISELEY: I'm not a technical person, but I'm assured of that by the people who advise me on technical matters. But there are some things wrong with the DARHT EIS and first or foremost of them is it ignores the upcoming Stockpile Stewardship and Management 8 programmatic EIS by assuming that there is a need for a particular type of enhanced radiographic hydrotesting. That need has not yet been analyzed and will not be analyzed until the Record of Decision of the Stockpile Stewardship and Management, PEIS, so it is a premature document. And it is insufficient by definition because it is not -- you know, it ignores this other process which is ongoing.

The other thing that it doesn't consider 9 is all related actions. And that's a quote from Judge Mechem's ruling in the DARHT lawsuit which my organization and CCNF filed last fall. And there are a number of related actions. Having DARHT here would very 10 much influence the Department of Energy in its decision of whether to bring nuclear weapons manufacturing here and many of those decisions should be considered as part

of the decision as to whether to go forward with DARHT.

It also seems to me that since DARHT is one project among many in the plans for the future of LANL, that it is also out of order to do the DARHT EIS before the LANL sitewide was done. It would make a lot 11 more sense to do first the Stockpile Stewardship and Management PEIS, since that is the core mission of the whole Department of Energy now, and then do the LANL site wide EIS, and then do the DARHT EIS.

There are some areas in which it seems to us that there's 12 inadequate environmental data. And I know that other people have said these things, but since you talk up what people say and have tables that say how many people say what, I just want to go over these points.

It does not contain enough environmental data. There is no information on the geology on the 12 DARHT site, hence, there is no analysis for the potential for migration of heavy metal and radioactive materials which will be spewn onto the ground by the outdoor explosions.

A very important omission; it has been implied strongly that there will be plutonium experiments in containment vessels at the DARHT site, perhaps as many as 10 percent of the total number of experiments.

13 There's no information in this document about

13 reprocessing plutonium 242 at Savannah River and transporting it to DARHT for contained experiments there. And since that is going to happen and that is going to be a planned activity there, those environmental impacts should be considered in this EIS.

There is no analysis of potential breaching of these containment vessels, and there is no 14 analysis of the clean-out of what would be the effects of the cleaning out of the containment vessels in which the plutonium experiments will take place.

I would like to say that I was very confused by the upgrade PHERMEX alternative because it reads in this document as if what you really mean by upgrade PHERMEX is move DARHT to PHERMEX after you've 15 already halfway built DARHT at DARHT. And it seems to me that it would be better to consider simply upgrading PHERMEX than moving DARHT to PHERMEX. And in this connection, I would like to say that I understand that there was an experiment which took place at FXR at Livermore sometime I believe in April, that produced 16 images which are better than anything that is anticipated from DARHT, and I would just like to remind the people, we are talking taxpayer money here, and they spent $5 million upgrading FXR, and they got a result which is better than a one-armed DARHT.

The other possibility that we think should be considered is that, since LANL planning documents already consider or already propose building something called the advanced hydrotest facility, which would have five or six X-ray beams, and that the planning documents indicate that this facility would be commenced only one year after DARHT's second axis is on line, I really feel that you should consider the alternative of canceling DARHT and simply pushing harder for the advanced 17 hydrotest facility and see if you can get that brought forward in time. And I sincerely hope if you do build the advanced test facility, it is not within 1,000 feet of the Pajarito plateau.

The other thing that is sorely missing from the analysis is proliferation impacts. And since the Department of Energy has spent a lot of time and effort analyzing the proliferation impacts of NIF and the proliferation impacts of the initiative to bring spent fuel rods from other countries to the United States, I 18 think that proliferation impacts from DARHT should be considered. There's no mention of the possibility of any 19 kind of international oversight, and there's also no analysis of a programmatic constraint on the types of 20 experiments that would be done at DARHT.

21 And of course, our concern here is that we would have

much less objection to experiments which actually had to do with analyzing existing weapons than we would have objections to experiments that were clearly designed to look at new types of weapons. And if there were some kind of programmatic constraints and some kind of perhaps oversight from our allies, from, you know, members of the Nonproliferation Treaty or whatever kind of international oversight of the kind of experiments that were done there, we would be happy to see that kind of change.

I really want the construction of DARHT to stay on hold until the SS&M PEIS is finished. And I think it should also be on hold until the LANL plan is completed. So those are formal requests that we would make. Many experts do not believe that our weapons need any more than physical inspection, and so it is very much the burden of LANL to prove that aging weapons do need additional high-tech study.

Also, I just throw in here to the pot, that before LANL built any new weapons facilities, it should come into compliance with all relevant environmental laws; that means the Clean Air Act, the Clean Water Act and RCRA, and LANL has serious problems under all of those laws, and I think a moratorium on construction of the facility should be in place until LANL can be shown to be in compliance with all of these

environmental laws.

I spent the day today with one of the most eminent experts on nuclear weapons policy in the world. He reminded me that a building of the AGEX facilities, a suite of them of which DARHT is the flagship, followed by NIF and Atlas and Jupiter and so forth or so on, is a deal struck between the labs and Hazel O'Leary, basically; that the lab will give up their opposition to the comprehensive test ban in exchange for getting these new toys with which to design new weapons. And I would submit that the comprehensive test ban is not in hand. Comprehensive test ban is a long way from now, and it is threatened by many forces within and without this government, and I think that DARHT should not be built until we have a comprehensive test ban in hand. So thank you very much.

MS. WEBB: Thank you, Mary. Mary, you made reference to your group, and I don't remember if, for the record, you specified your group.

MS. RISELEY: It is the Los Alamos Study Group based in Santa Fe, New Mexico.

MS. WEBB: Thank you. Also, as I mentioned earlier this afternoon before you were here, when Greg Mello spoke, your group did make a request to the Department of Energy to prepare a proliferation

impact statement as you just mentioned. The correspondence -- exchange of correspondence on that issue is in the public reading room if any other members of the public would like to review that exchange.

I would also like to point out, there was an issue -- a question as to what was said at the scoping meeting in December. The verbatim transcripts of those meetings are available again in the Los Alamos Community Public Reading Room, as are all the written comments that were received on scoping. We will follow the same procedure for these meetings during this comment period. These verbatim transcripts will be made available, as soon as Irene can get them finished, in the public reading room in Los Alamos, along with all of the written comment and written statements that we receive during this period of time. Chris, you already spoke. The gentlemen next to you raised his hand.

MR. CUNNINGHAM: I would like to respond.

MS. WEBB: If you would not mind telling us your name.

MR. CUNNINGHAM: My name is Greg Cunningham, and I am a citizen of Los Alamos, and I also work for the labs, but I am here today representing myself. Mary had about, I think, 13 different comments, if I categorized them correctly. The first thing I would

like to point out is that Mary said that, I think, she and her group don't object to experiments on existing weapons.

MS. RISELEY: No, we said we would have less objection.

MR. CUNNINGHAM: Less objection?

MS. RISELEY: Yes.

MR. CUNNINGHAM: The point I would like to make is that, in fact, that your group's position and another's group's position referenced the legal foundation with which you worked, at least last fall, was essentially to try and force the stockpile to become so unreliable and potentially unsafe, that reliability is a big issue, to become so unreliable that the military leaders and political leaders would essentially mistrust them and would unilaterally disarm, and I have some testimony if you dispute that.

MS. RISELEY: That is Jackie's position, but not the Los Alamos Study Group.

MR. CUNNINGHAM: I think I have your statement from last fall. Let me read it. Let me see if I have it.

MS. RISELEY: I know Jackie said that very strongly, but that is not our position. We simply have a position that the world would be a safer place if no one

had nuclear weapons and if they were outlawed. And we hope that some of the resources of the $28 billion worth of resources that we spend on nuclear weapons in this country, we can spend that on policing and outright bans on nuclear weapons.

MS: WEBB: I'm going to ask you both to speak a little louder. Unfortunately, there is a noisy group next door. We sent out a convoy back there, found out it's not coming from our room; it's coming from next door. And I am having a hard time hearing both of you and I suspect Irene is. You can move forward and you can move into one of the closer chairs. And Mary, may I presume that by Jackie, you are --

MS. RISELEY: Jackie -- Jaqueline Cabasso, the executive director of the legal foundation. But Greg, I have to say, this is not my testimony, and I'm not going to defend it, so I don't know if it's relevant.

MR. CUNNINGHAM: Let me reject the statement. I don't have yours because the copy machine smeared everything and I can't read it. Jackie's -- my question was basically, when I went to the scoping process in the fall, I heard widely varying opinions on whether the reliability of the stockpile is important.

I believe that Jay Coghlan from CCNS, Concerned Citizens for Nuclear Safety indicated that his

group did not have an official position on reliability. And he can correct me if that's wrong.

MR. COGHLAN: I dodged it.

MR. CUNNINGHAM: Jackie Cabasso, I understood her to be working with the Los Alamos Study Group, she responded, "finally on the question of reliability, there was probably a difference of opinion around the table in the room, but I stated categorically, that I do not support -- I'm not interested in the reliability of nuclear weapons. I don't think they should be reliable. That's my organization's position. We don't think that reliability is consistent with the policy of true deterrence." And my recollection is that you essentially agreed with that statement, but maybe I am wrong.

The second comment that I have is noncompliance with environmental laws. There was an independent commission that was headed up by Robert Galvin, who is the CEO of Motorola, an excellent United States company. And Robert Galvin's committee, basically one of their conclusions was that it's fact that the laboratory is overregulated, that not only do they have to comply with state, local and federal regulations on environmental compliance, but the DOE actually puts a whole other set of compliance regulations on top of the

laboratory. And their commission's findings are basically that DOE needs to relook at how it does regulation and compliance.

So I just wanted to throw that in. The laboratory does have to meet an enormous amount of environmental regulation, and I think it tends to do so with a lot of vigor. I have -- I guess the next and most important thing that I would like to address is the safety issue because I think that is a real issue, and I think there's been a lot of misinformation about that. I have a fairly lengthy comment I would like to read, if that's okay.

MS. WEBB: That would be fine.

MR. CUNNINGHAM: It's about three pages long.

MS. WEBB: If it's three pages long, would you please summarize it and give me the three pages, unless the writing is really big.

MR. CUNNINGHAM: It's pretty big. Let me try and pick out some of the points. Basically in summary, there have been several reports, independent commissions and reviews that have indicated that there are and have been historical safety problems with the stockpile. Those historical safety problems have been detected and corrected through nuclear testing.

There's also a statement from Ray Kidder that basically flaws that the one-point safety of a -- one-point safety means when a device is initiated from a single point somewhere in the detonation around the pit that forms a nuclear part of the device, that one-point safety defects can take a long time before they are actually resolved. And they are due to an initial design flaw that remains undiscovered for a period of time and are discovered through a very vigorous testing program and continuously looks for those kind of flaws. So while there may not be significant safety effects relative to aging, there may be design flaws that remain undiscovered because they can remain undiscovered until a test shows that there's a flaw. And that has happened in the stockpile.

The second thing is that -- let's see. Another major point that I would like to talk about and read something from the Reality of Accidents Involving Nuclear Weapons. Accidents have happened involving nuclear weapons in this country's history. During the period of 1950 to 1980, there were 32 accidents involving nuclear weapons, including crashes of aircraft, including fire, including missiles, propellants exploding. It included dropping weapons, losing them at sea. Accidents happen with nuclear weapons and safety is a very

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important issue. And particularly one-point safety which needs continual testing to discover inherent design flaws that may have been undiscovered at the time of moratorium.

I would like to read a couple of quotes to substantiate what I'm saying. Basically I came up with a response to a set of questions that I thought the public might be interested in getting answers to. The questions are, why does the stockpile stewardship need to involve hydrodynamic testing? Aren't the weapons safe and reliable? Can't we just remanufacture them and encounter the design needs? Is reliability really that important? Is safety really affected that much by small factors? I have a long list of responses that I will submit for the final EIS.

I would like to read a couple of things from the Miller Report which was a response to a request from Congress. Congress, basically in the late '80s, was involved in a number of treaty negotiations and was highly concerned about the safety and reliability of our stockpile. They requested a report from Dr. Ray Kidder, Livermore, who was a theoretical physicist. He is not a weapons physicist. And Congress felt he was a very objective reporter of what the real needs are to ensure the stockpile.

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The Miller Report was a companion to that report that was prepared by a weapons physicist that had day-to-day dealing with the problems encountered with weapons and there was a lot more detail in the Miller Report than Kidder Report, but it may be somewhat biased due to the fact that it was prepared by a weapons physicist.

The Miller Report said that -- and I think these are facts. I can't imagine them being disputed -- "One-third of all the weapon designs introduced into the stockpile since 1958 have required and received post deployment nuclear test resolved problems related to deterioration or aging or to correct a design that's found to not work properly under various conditions." And that's a quote from the Miller Report.

A report from the Kidder Report, which I presume to be more objective since Congress specified this individual exactly to give them an objective analysis of the situation said, "Safety in the designing of the warhead -- safety problems with nuclear warheads are generally inherent in the design of the warhead itself, not the results of aging or other problems. Such problems may not be identified until long after the warhead and the stockpiles were there to begin with."

Then you question the -- let's see. On a

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safety issue -- let's talk quickly about that, I guess, accidents. There was a 1984 DOD report entitled Narrative Summary of Accidents Involving US Nuclear Weapons 1950 to 1980. And the list includes a variety of accidents involving nuclear weapons. And I think this is important for the public to know about because they have to know that this is a real issue, that accidents can happen; safety is important, and that there are -- there can be safety issues that we need to continually address, but some type of program has to replace the nuclear testing that we have a moratorium on.

The list of accidents includes crashes, accidental jettisons, missile fuel explosions and fires. In 11 of those accidents, the HE was detonated and there was radioactive contamination from plutonium disbursed. The threat of accidental detonation is real, and if the weapons were not one-point safe, a major nuclear accident might have occurred. The necessity to aggressively test weapons for one-point safety under many circumstances, should thus be clearly seen as a real mission, but not as a covert mission.

Furthermore, the one-point safety mission for hydrotesting has been and is an ongoing mission. Hydrotesting has been a vital part of discovering one-point safety problems. And Ray Kidder talks about

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that also in another report in 1991. He basically talks about the very recent ability of the weapons laboratories to be able to do 3-D computational predictions of the behavior of a weapon.

The reason that this is a relatively new capability is because the computers, essentially, were not capable enough to be able to handle the complex information that a true 3-D model may, and it's only been since 1988 that we have been able to attempt to try to predict the behavior of a one-point safety kind of issue.

MR. COGHLAN: I want to state a procedural objection. The purpose of NEPA is for --

MS. WEBB: Irene needs to change out her tape, and then you can make your comment again.

(Break taken.)

MS. WEBB: All right. Irene now has her paper back in. Jay is talking. Dan is raising his hand. Greg you have talked for quite a few minutes. Jay, would you like to repeat, now that we are back on the record?

MR. COGHLAN: Yes. 30 seconds. I want to preface this with the fact that I feel ambiguous about stating the problem because I want to promote the

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informed, but having said that, the purpose of NEPA at these hearings is to provide the public with the
35 opportunity to provide comment on the entire project and on alternatives, et cetera, et cetera. It is not a forum for the laboratory and DOE to effectively offer rebuttal. I respectfully remind DOE and LANL that they are under order from a federal judge to follow credibly the NEPA process, and I respectfully suggest that they better do exactly that.

MS. WEBB: Thank you very much, Jay. Greg has made it quite clear that he is speaking tonight as a private citizen, and although he works for the laboratory, he is speaking here tonight as a private citizen.

Any of you that are familiar with the Los Alamos Area Office Department of Energy Stakeholder Involvement Policy in the NEPA process, should be aware of the fact that the Department of Energy employees, laboratory employees, and other federal employees may take place -- may take part as stakeholders in this NEPA process, but we do ask that they identify whether they are speaking on behalf of the laboratory or whether they are speaking on behalf of themselves as individuals.

Greg has made it quite clear tonight he is speaking on behalf of himself as an individual. Also,

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before you came in, we did mention for the record that the forum tonight would be flexible; that we would be willing to either entertain comments directly related to this Environmental Impact Statement, or we would be willing to entertain a discourse amongst the people here.

You are the first person that has suggested that perhaps that this discourse has gone on long enough between Greg and Mary. If I understand that is what you are suggesting, you are suggesting that we return more strictly to the, quote, "typical," quote, format of giving spoken comments for the record.

I'm willing to entertain that suggestion, but before I do, we did interrupt Greg. And Greg I would like to know if you are finished speaking.

MR. CUNNINGHAM: I got through 3 of Mary's comments out of 12, so --

MS. WEBB: The reason, Greg, I do remind you that you have spoken for some 15 minutes and there are quite a few people here tonight.

MR. CUNNINGHAM: Maybe -- I believe I can split it up and talk later.

MS. WEBB: I would sort of prefer if you didn't mind if we did it that way because there are a lot of folks that haven't spoken here tonight. And if we have time later, we will be glad to have you continue,

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and on the other hand, we always entertain written comment. There are several hands that have gone up.

MR. MECHELS: This is just a procedural comment. I'm Chris Mechels, retiree of Los Alamos. I think you've got the makings of a real unequal contest here. You've got lab people that can say "I'm speaking on behalf of myself, but because I'm working for Los Alamos National Laboratory, therefore I have a lot of expertise in this area, therefore my expertise overrides
36 your scope." That's an effect that you are setting up here with Los Alamos people.

However they disqualify -- however, they say, I'm speaking on my own behalf and then they proceed to take up the technical issues. They are in the position of presenting expert witness, albeit as a private citizen to override citizens who don't have access to that kind of information.

MS. WEBB: Thank you.

MR. CUNNINGHAM: I'd like to --

MS. WEBB: Just a second. Thank you for your comments, Chris. Greg, I think perhaps it's time to go on to another speaker.

MR. CUNNINGHAM: One five-second comment?

MS. WEBB: Five seconds.

MR. CUNNINGHAM: I got all of this

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information -- all of these are reference documents in the DARHT draft EIS. None of this information came from my workplace. I took a day of vacation to type this up.

MR. MECHELS: Thank you for the clarification.

MS. WEBB: Thank you very much. We have several people raising their hands. There are people in the back. There's people in the front. I'm willing to entertain whoever would like to speak next, and apparently it's the consensus -- is it the consensus of the group at this time to kind of cut back on the interactive dialogue and stick with the straight comments at this time? We can return to a different type of format later. All right. Dan, I believe you had your hand raised before the gentleman in the back or before Jay came up to the table.

DR. KERLINSKY: That's okay. Would it be okay to make a few replies to some of Greg's comments and then go on to my comments, or would that be considered out of order at this point?

MS. WEBB: I would be perfectly willing to entertain that. I would appreciate it if you would keep your remarks somewhat brief.

DR. KERLINSKY: Okay. My name is Daniel Kerlinsky. I'm the president of the New Mexico

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Physicians for Social Responsibility, and I served on the Galvin Task Force and Alternative Futures for the National Labs and had an opportunity to review a number of documents and information that we are discussing tonight.

I want to compliment the department on really the DEIS. There is a much better description of what DARHT does and doesn't do in the section on describing it in the text, and I think that's a big step forward. I know sometimes when we're talking about these subject matters to kind of simplify things to explain to the general public how these things work, and I think that's happened tonight.

I share the concerns about Greg's comments as a private individual rebutting. And I think it's good, you know, that you spoke as an individual, because in that case, when you come back and have different points of view about what you say, you are not representing the lab, and it doesn't have to have the truth value that the EIS requires of the labs and in this document. And I believe there are some significant inaccuracies, you know.

One of the main issues that was presented early on was that DARHT takes static internal pictures of the components of nuclear weapons and that this is

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37 somehow critical for assessing the current state of the so-called benchmarking. And the EIS, even though it's improved, does not really specify whether, in fact, it found that these sorts of things actually say anything about the current status and condition.

My understanding of DARHT, and as the chapter explains, these hydrodynamic tests, as Bob described, are the pictures of the active implosion of the nuclear weapons primary. It's not a static picture, and no one in my Galvin Task Force ever said they needed a better static picture of the inside of a nuclear weapon

37 to be able to tell if it was safe, reliable or aging or whatever.

So I view some of the discussion that's been presented about this better X-ray picture as intentionally or unintentionally misleading the public. It's not the same as getting an X-ray or CAT scan or MRI of your chest and lungs, and I would challenge the laboratory to really specify in more detail, as we go

37 through this process, what exactly those static pictures really are and what value they are.

In Greg's comments, most of the safety

38 issues he raised were in fact resolved in the 1960s. And for those scenarios that were described, flying around with nuclear bombs on an airplane, those problems are

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resolved by not flying around airplanes with bombs on them anymore. In fact, that's where the safety improvements come from.

Nuclear weapons are safe to the one-in-a-million kind of level, and to think that an incremental

38 improvement in this one-in-a-million really makes a difference in safety is again misleading to people. The last one-point safety issue that came up with the design flaw turned out not to be a significant problem. And what I heard from the people was that the 3-D document was not significantly better than the two-dimensional code in whether to predict whether a concern about a primary having a safety problem in fact was a real concern.

If we are not tracking or currently discovering lots of safety problems with our nuclear weapons, then the Sandia Stockpile Life Study of the weapons that are in our enduring stockpile, there are only 27 things that needed to be fixed in the stockpile over the last about 20 years and only two of them had

38 anything to do with the nuclear weapon primary. And of those two things, neither of them had to do with safety or aging problems.

The first problem was, the department decided they wanted to conserve plutonium, so they

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redesigned the pit to use less plutonium. That was not a kind of problem that would seriously impair the stockpile.

The second problem was when the insensitive high explosive was introduced and they forgot to test it in the cold, and then scientists forgot they would be storing these weapons in a variety of very cold circumstances, they had to go back and retest these weapons in the cold and do hydrodynamic tests. They did underground hydrodynamic tests just to be sure, just to be on the safe side. Nobody said that they needed a DARHT facility to resolve that problem, and in fact, most of the problems over the last 20 years in the weapons that are going to be in our enduring stockpile and not what the Miller is talking about from the 1950s and the 1960s, they have not required this facility at all. They

39 have been changing tritium vials, tritium valves, cables, electric wires, parachutes, radar equipment; these are the things that have actually been fixed. They haven't required a lot of nuclear weapons primaries design changes.

In fact, these facilities, the DARHT and the hydrodynamic facilities, aren't as important in

40 discovering the safety problems as Greg said. It's only in resolving that the solution to the safety problem is

40 in fact successful.

In my comments last fall, I suggested an alternative be considered, that is represented on 3-39 in Chapter 3, weapons design. Unfortunately the language that was summarized from my comments got it totally backwards, and the alternative reads now, "An alternative to operating DARHT to ensure weapons safety and reliability, operate DARHT to design prototype weapon..." In fact, my comment and suggestion was that DARHT be

41 specifically restricted from designing nuclear weapons and only be used to study weapons safety and reliability problems that might evolve.

In fact, that was the position of the Galvin Task Force. When we looked at hydrodynamic testing in general, the hydrodynamic testing was important only to resolve safety and reliability

42 problems -- low probability that they might or if they arise, not to be developing new weapons. And they're really only useful confirming that a re-engineered weapon really works as expected.

The comment and why this was dismissed was

43 that the number of test shots, the size of the explosive charges, et cetera, is what makes the difference to the environment, not the intended application of test results, in fact, that's not so. When nuclear weapons

are designed, typically half a dozen, a dozen underground tests, big nuclear weapons explosions were done and hundreds of hydrodynamic test shots. So if you're designing a new nuclear weapon, you may need dozens or

43 hundreds of hydrodynamic experiments. If you are confirming that a fix to a weapon problem that arises really works, you only need a couple of shots.

So the environmental impact of DARHT will

44 vary significantly depending on whether it is used for new nuclear weapons design or just to confirm changes that are made. In fact, I believe the likelihood of weapons really being required is significantly low.

The problem of reliability -- I mean, people talk about reliability -- the way Greg discusses it, it makes people feel nervous. In fact, what reliability means, if you have a nuclear weapon that

45 isn't reliable, it means it doesn't explode. Right? Which, for most people, is considered safe.

And since we are no longer in a nuclear-war fighting situation where we want to launch thousands of weapons against an opponent to try to knock out his

45 missile silos, if we are only going to use nuclear weapons for deterrence, in a situation where we really need to use nuclear weapons, not just for deterrence but for retaliation, which is not really the United States'

45 policy, if the first weapon didn't work, you can send the second one and it really wouldn't make any difference in the outcome.

So reliability is not what it sounds like. It's not that your car isn't going to start and you're going to be stuck in the middle of nowhere. The likelihood of a problem occurring in the stockpile where

46 all the weapons go bad at once is extremely low, and I really ask that the EIS look at trying to get some quality, quantitative estimates of what that likelihood really is.

I appreciate Bob's comments, you know, underlying that there's been no problem found in safety in aging, in the interaction of the aging process in weapons and I appreciate that honesty and direct discussion.

Again, the statement in S-1 executive summary that says "Uncertainty in the performance of the enduring stockpile will continue to increase with the

47 passage of time," is not correct. The Sandia Stockpile Life Study shows that these weapons actually become more reliable with age. Most of the problems are found before the weapon goes into production. And after the weapons are in production, most of the problems are found in the first three years of the weapon's life.

From years 3 to 10, the frequency of finding problems in the stockpile goes down. And from years 10 to 15, the probability of finding weapon problems goes further down. And in fact, data currently exists for nuclear weapons out to about 32 years of age, and they do not show a significant rise in weapons

47 problems being discovered as weapons get to be 28, 29 or 30 years.

People need to understand that this proposed nuclear weapon design lifetime is an arbitrary number, and Dr. Hecker has been quoted as saying that nuclear weapons can last 30, 40, 50, 60, 70 years just by maintaining them on a regular basis.

48 What Victor Reis said in the Programmatic Environmental Impact Statement Prescoping Invitation is the following: "The primary goal of the Stockpile Stewardship and Management Program is to provide high confidence in the safety, security and reliability of the nation's stockpile and to ensure the effectiveness of the nuclear deterrence while supporting arms control and nonproliferation policy."

This is really the very first time that the department has acknowledged that arms control and

48 nonproliferation impacts of new weapons design facilities are actually significant. And by providing this opening

in the Programmatic Environmental Impact Statement, I think, as Mary said, we have to consider the PEIS before 49 we look at the EIS, because the environmental impact of starting up a whole new arms race, another 20 years of the arms race without realizing it, that's happened in the 1950s. That's happened when we developed hydrogen bombs. That's happened in the 1960s when we designed multiple warheads. It happened when we went into Star Wars and antiballistic missiles. And the likelihood of starting another arms race and having to go back into 50 nuclear weapons production, which in this country is a 300-billion dollar environmental impact for the cleanup of the last generation's cleanup of nuclear weapons facility has to be considered very significant.

MS. WEBB: Dan, are you almost done?

MR. KERLINSKY: That's it. Let me see if I have anything I desperately have to -- that's enough.

MS. WEBB: Thank you. Both of you have your hands raised. You have both spoken before. There's a gentleman in the back who hasn't spoken who has had his hand raised for quite some time. I recognize you, but --

MR. WATSON: My name is Scott Watson. I'm responsible for PHERMEX operations. I speak on my own behalf tonight. People's comments previously, I just wanted to comment on these issues which I have firsthand

knowledge. Mary has asked the question why PHERMEX itself is not being upgraded and that the PHERMEX upgrade option was basically just to rebuild DARHT in a PHERMEX building.

PHERMEX is a different technology than DARHT. It's a 30-year-old technology and runs up against physical limitations which are -- we basically are up 51 against as we speak today. PHERMEX will not see future upgrades that will improve its performance nature, and that's because of the physical nature of the problems involved in that type of facility. That's exactly the reason why DARHT is a new, different type of technology.

Another comment I would like to make, Mary also made a comment that FXR has recently produced data which is superior to that which will be produced by DARHT. That is incorrect. I have a copy of that data and have offered a number of reports on the radiographic 52 quality of images obtained by these machines, and I can give you a lot of details and reasons why that particular data is not superior to what DARHT could produce, but suffice it to say that's not the case.

MS. WEBB: Thank you, Scott. And you said you were speaking on your own behalf tonight. I would also like to mention that in the description of no action alternative in Section 3.4, it specifically states that,

"Under this alternative, the facilities would be upgraded, would be maintained, would be kept up," but the alternative does not imply that there would be a static PHERMEX -- that it would never change. We did specifically state that, and I just wanted to point that out that, yes, we do take care of PHERMEX. We have to; that's our facility.

Both of you still have your hands up. Jay has been here for a while. You have also spoken before, so let's let Jay speak. I believe that that was why he wanted to come up here.

MR. COGHLAN: My name is Jay Coghlan. I am a research analyst with Concerned Citizens for Nuclear Safety. For the record, I would like to state that, I think my main criterion tonight is whether I'm bored or not, and based on this criteria, I already judged this hearing right here a resounding success.

I got a prepared statement. It will take me about three minutes, I guess, to read.

MS. WEBB: That would be great.

MR. COGHLAN: It's roughly divided into two subjects; that on possible hydronuclear testing at DARHT and on the need for programmatic review in advance of DARHT. I will state as well that I certainly plan on offering detailed comment before the comment period is

over, but I'm just going to stick to these two little subjects right now.

Now, with respect to hydrodynamic or, I mean, hydronuclear experiments possibly being conducted at DARHT -- first of all, I appreciate Bob Day being here and Jas --

MR. MERCER-SMITH: Mercer-Smith.

MR. COGHLAN: Jas, yes. I wish Dr. Immele was present as well, but I understand he's at Moffet Air Force Base right now talking on this particular subject of hydronuclear testing. It's clear to me that DOE and 53 the weapons labs want hydronuclear testing. For example, a publication just during the month of May of this year on stockpile -- what was it? -- stockpile management, states that our plan is to gather baseline hydrodynamic and hydronuclear data on all stockpiled weapons systems.

The 1995 LANL Institutional Plan essentially echoes the same. And the 1995 Draft Interagency Stockpile Stewardship Plan has six references to hydronuclear testing, and in that plan described as a planned activity for fiscal years '96 and '97, is the performance of these baseline hydronuclear experiments. In all of these documents, hydrodynamic and hydronuclear 53 experiments are often mentioned in some kind of

combination to each other.

It's well known that LANL conducted underground hydronuclear experiments during the testing moratorium of '58 to '60. And in their 1988 publication on hydronuclear experiments, the LANL authors Thorn and Vestervelt, state that in the late '50s it was recognized that contained hydronuclear experiments were theoretically possible.

The operating procedure of CREPA, which involves the graduated addition of fissionable materials until a subcritical nuclear reaction becomes detectable makes contained hydronuclear experiments feasible.

In fiscal year '92, it can be documented that work was being done at LANL on "CONVEX" projects. "CONVEX" is an acronym for contained nuclear explosions and vessel experiments. The 97 LANL CAMP states that the LANL physics division is significantly involved in CONVEX projects. In early 1993, LANL took possession of a vessel that contained up to 22 pounds of TNT blast equivalent.

DOE presently states that up to 10 percent of experiments at DARHT will be contained plutonium experiments. All of these experiments are described as being hydrodynamic. Under the present US proposals for the comprehensive tests ban treaty, nuclear experiments

with fission yields of four pounds TNT equivalent would still be permissible.

Given all of this and the general feasibility that hydronuclear tests at this level could be contained, I would like to know if DOE and LANL can categorically state that no experiment at DARHT will ever be hydronuclear experiments? Can DOE categorically state that no experiment at DARHT will ever result in fission yield? I would like a direct response from present LANL and DOE people.

But in addition, should that answer be no, I ask that that be explicitly stated in the DARHT final EIS and its record of that decision. DOE would then be obliged to recognize that a decision to perform hydronuclear tests at DARHT would constitute a significant change of mission, which in turn would require public notification and due NEPA process.

On the other hand, if the answer is hydronuclear testing could be performed at DARHT, I suggest that the section on nonproliferation in the draft EIS be rewritten. That section states that our country's commitment to nonproliferation is evidenced by our goal of achieving a CTBT as soon as possible.

The main obstacle that I know of presently in place towards achieving a CTBT is the weapons states'

intention to retain various levels of permissible testing. If there are to be hydronuclear tests at DARHT, an analysis needs to be performed on the facility's possible impacts on CTBT negotiations, in addition to the usual environmental impact. I don't think it's sufficient to hide behind classification barriers on this subject. DOE needs to completely rule out hydronuclear testing at DARHT or alternatively open up the NEPA process to a discussion of its implications.

Second half of my comments on DARHT mission and the need for programmatic review. First of all, I think that the draft EIS is pretty well written, remarkably free of typos, and I assume that, in large part, that was due to your efforts and you are to be complimented, but from here I will go on to blast the EIS.

MS. WEBB: Thank you, Greg.

MR. COGHLAN: But it is a good piece of work. I think you are doing very well in attempting to impress a federal judge. The draft EIS -- excuse me -- the draft EIS is inherently prejudiced in that it assumes that enhanced radiographic hydrotesting is immediately needed regardless of alternatives analyzed or actions selected in future programmatic review. Furthermore, DOE

contends that a Record of Decision on DARHT will not prejudice the outcome of the future Stockpile Stewardship and Management Programmatic EIS.

The premise that undermines these dubious suppositions that there is some kind of safety and reliability crisis in the nuclear weapons stockpile that justifies proceeding with a decision on DARHT in advance to programmatic review, as DOE knows, while granting a preliminary injunction, a judge ruled or stated, rather, that ample evidence points to the fact that the nuclear weapons stockpile is at this time safe and reliable. He was referring to testimony in March of 1994 by Assistant Secretary Victor Reis who reported that the stockpile was indeed safe and reliable.

In addition, Dr. Immele, at the DARHT scoping hearing last December, stated no safety problems related to aging have yet been found. It's interesting that the judge ruled without knowledge of the 1993 Sandia Stockpile Life Study. The life study states that while nuclear weapons age, they do not wear out and are not allowed to degrade. They essentially last as long as the weapons communities wants them to.

Defects have, of course, been discovered, but they've been fixed with existing surveillance programs and existing facilities. Historically, defects

involved in primaries, which DARHT would ostensibly study, have been a very small percentage. If there is no real crisis in safety and reliability since these reports and testimony, what's changed since then?

DOE cites the termination of full scale underground testing as justifying the urgent need for DARHT. The life study explicitly shows that no safety or reliability defects have first been discovered through full scale underground testing; hence, the loss of underground testing is not justification for the urgent need for DARHT in advance of programmatic review. 58

In addition, the study states that, based on historic data, only one actionable defect will be discovered each year, and for the sake of emphasis, I repeat, that what defects have been discovered, have been fixed with existing programs and existing facilities. So what's the real need and purpose of DARHT? That purpose and need should be analyzed and justified in programmatic review. 58

The DARHT implementation plan shows that the largest single category of scoping comment was on this very subject. The public clearly stated that the programmatic review should precede the DARHT EIS. DOE effectively demonstrates its prejudice by disregarding this category of comment and falsely asserting that there is a safety and reliability crisis. 59

Am I doing okay on time?

MS. WEBB: Well, you're moving on there.

MR. COGHLAN: Okay. I will just sum up.

MS. WEBB: That would be good.

MR. COGHLAN: Okay. To sum up, DOE doesn't have a reasonable basis for justifying its decision on DARHT in advance of programmatic review. There is not now, nor is there likely to be in the next couple of years, the urgency for DARHT, but DOE contends that there is. There is not a crisis in the safety and reliability of the stockpile. There is no study of interconnected actions and reasonably foreseeable actions in the draft DARHT EIS. 60

That's part of my comment I just cut out. That was in reference to Reis' remark in February on potential weapons remanufacturing at LANL.

The programmatic Record of Decision is expected only one year after the DARHT's Record of Decision. It still puts the programmatic ROD two years in advance of completion of the first axis. DOE first committed to programmatic review in 1989. There is still nothing to show for it. I submit to DOE, that the department still has time to get it right. The department can still complete a bona fide programmatic

review that objectively considers the nature and content of the genuine stockpile stewardship.

DOE should let DARHT rise or fall on its own merits based on programmatic justifications and not on false pretenses. 58

MS. WEBB: Thank you, Jay. You asked some direct questions of Bob and Jas. And before they answer, Melvin and Christine have both had their hands up for a long time. Before they speak again, is there anybody that has not spoken that would like to speak --

MR. LOCKHART: Point of procedure.

MS. WEBB: And I'm sorry, Melvin has a point of procedure.

MR. LOCKHART: My name is Milton Lockhart. In view of the ruling to change the format, are direct questions allowable?

MS. WEBB: That was one of the reasons I didn't entertain it at this time.

MR. LOCKHART: So we're still in the dialogue?

MS. WEBB: At this moment, we are just sort of having people talk. We will collect questions here as I am writing them down. Then if people would like, a little bit later we will let Bob and Jas answer all of them at once.

MR. LOCKHART: Next point, since apparently most of the comments are coming back to the need to establish safety and reliability of the weapons systems and since Greg has been asked to furnish written comment, I would suggest that any comment on safety and reliability be submitted written rather than verbally --

MS. WEBB: I will --

MR. LOCKHART: -- now.

MS. WEBB: I will accept comments either way, and if after we have a few other people talk, then I will be glad, after we have -- everybody has had a chance to speak, to reopen the floor to Greg so he can finish reading his statement if he would like to do it that way. But thank you, Melvin, for your point of order.

MS. CHANDLER: Milton.

MS. WEBB: Milton?

MS. CHANDLER: Milton, yes.

MS. WEBB: Sorry.

MR. LOCKHART: Mervin --

MS. CHANDLER: Melvin, Martin --

MS. WEBB: And I called you "Greg," Jay. All right. First then we will let Chris say something. Then we will let Susan say something. And then we'll let Christine say something. Then if you have more to say, we will do it in that order. Chris?

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MR. MECHELS: I'll stand up so people can hear me. I'm Chris Mechels, retiree of Los Alamos. What I noted about the DARHT was I thought that the -- two of the alternatives that I thought was a better alternative were not considered, and they had to do with the FXR facility out in Livermore. One of the alternatives which is on Page 34 was the preferred alternative, a single site.

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There's some quotes in there which I think are pretty disingenuous and there's no supporting documentation or data provided. One of the, you know, the reasons for not considering the single site when you consider the alternatives was, quote, "The number of shots that could be scheduled to support both programs could be a problem -- could be a problem." "This could be detrimental to both sites -- could be detrimental." There is no supporting data as to what kind of test schedules they have or shots or anything like that. It's just a conjectural statement, and that's a pretty weak reason to dismiss that alternative.

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The other comments under the same alternative is that DOD would have to continue to operate PHERMEX to support smaller tests for dynamic experimentation which would not be cost effective to transport to other sites. There is nothing else to

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support that. It's just another convenient statement, in my opinion, to justify not considering the alternative.

A third statement in that same alternative is that this would not meet the need to replace PHERMEX. Well, I suggest that FXR, from my understanding, is quite capable of being used in place of PHERMEX. The issue is where it's located.

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On Page 338, the other alternative concerning FXR is dismissed, as the dual axis upgraded FXR in Livermore was not considered, as DOE does not conduct dynamic experiments with plutonium in Livermore. Well, we know they don't conduct dynamic experiments in Livermore; they conduct them in Los Alamos. That doesn't mean they couldn't conduct them in Livermore. If you are doing a fully contained experiment, they specifically ought to conduct them in Livermore. Again, this is just a statement that's made, they dismiss them because they don't conduct them in Livermore. Well, of course, they conduct them at Los Alamos. That is a very weak reason for dismissing an otherwise interesting alternative. So I think that the alternatives, both of those alternatives were incorrectly dismissed on very weak reasons, no supporting numbers.

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Another comment concerning FXR, there is a paper in the reading room, unfortunately I don't have it

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with me tonight, which is analysis -- I'm sure Bob has it -- analysis by an outside panel looking at some problems with DARHT. Some of their conclusions were that for right now, that DARHT is currently envisioned as having some problems running it under full voltage, and they are talking about hoping to raise that up to their design voltage. Right now they can't run it full voltage. They are operating at 300 KV. That's very clear from that report.

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It's also very clear from that report that the spot size that's offered is one of the big reasons to build DARHT. It's a big improvement, a hope -- they hope they can achieve that spot size. When DARHT comes on line, it won't have that spot size. They may be surprised. It's very clear in that paper. They hope some day after operating it 50 years, they'll gather enough data finally in the process to finally achieve the design spot size. That's very unclear.

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None of this -- I mean, it's all presented that we're going to turn this sucker around when it's built, when in fact you won't get a sucker on there built. You're going to sucker us running reduced voltage for a spot size that's optimal. That's very clear in the report. The other thing that's quite clear in the report is their analysis of the FXR, when upgraded, is at least

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as capable as DARHT. Again that's no reason not to dismiss FXR alternatives. I suggest that FXR, that the whole complex needs to be looked at in total. What you have is an excellent prospect to upgrade DARHT. Then you can upgrade FXR. Then Sandia can upgrade their stuff and basically you have a testing race going on between three laboratories.

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Mary has spoken to the fact that they should do sitewide or stockpile stewardship evaluation before they do all of this craziness. I totally agree, because what you have here is an arms race going on between the weapons labs. Thank you.

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MS. WEBB: Thank you, Chris. All right. Susan, I believe you had your arm up. Susan, and if you wouldn't mind, if you would come a little closer to our stenographer.

MS. HIRSHBERG: I do have a quiet voice and for that reason I will also stand. I'm Susan Hirshberg. I'm the nuclear waste and contamination director for concerned citizens for nuclear safety, and my comments at this point are quite brief, but I probably will have some more at some point and be submitting written comments as well.

I do not in any way want to undermine what has been said by my colleagues, Jay, Mary, Dan and

various other folks here, but I will be concentrating particularly on what I do believe are the environmental effects of the PEIS as mentioned here, and -- I'm sorry -- the EIS as mentioned here, although I do also 64 believe that programmatic planning should take place first.

One of the things that concerns me is that I don't believe PHERMEX is as good a facility as it was perhaps intended to be, not in the sense of not being able to carry out programmatic requirements but in the sense of environmental contamination. There -- there is considerable amounts, I believe, I am hoping I'm not wrong, of this much depleted uranium around the PHERMEX site.

Also recently at PHERMEX there was a fire, 65 which released both high explosive residues which are -- do contain several toxic components and lithium hydride into the air, and this fire caused seven firemen to be -- to end up going to the hospital for possibility of serious injuries. That fire burned for nine hours. And since this was an accidental fire, that was not included as a kind of thing that would be considered part of normal operations of PHERMEX. And my fear is that you could have a similar kind of accident occur at DARHT, 65 which would cause considerable amounts of environmental

contamination that are not being considered here. I don't believe you have sufficient worse-case scenarios for the facility as it stands.

Some other environmental concerns that have been raised to you right now is that you have a situation where both DARHT and PHERMEX are located near the edge of the mesa top, so that in high-rain 66 conditions, I would imagine that it would be quite simple for there to be fairly contaminated runoff into the canyons. And I think, in general, that that's a not great place to put these kind of things, and obviously you have a problem at Los Alamos because Los Alamos is mostly mesa tops, but I do think that has to be kept in mind and made a little more clear of what exactly the 66 effects of being on top of the mesa would have.

That brings me to my next point which is that there -- presently at Los Alamos there is a problem which is that the extent to which the laboratory has contaminated the deep aquifer is unknown, and that's why 67 I have the situation where you have the State of New Mexico engaging with the laboratory to try to find out really what has been the effect on the deep aquifer.

There is some evidence that suggests that the deep aquifer has been recharged more recently than has been previously associated -- assumed by LANL

scientists and that in fact you may very well have some contamination from facilities that are ongoing. I don't believe it's appropriate to say that facilities such as PHERMEX or DARHT have not contaminated -- have not caused 68 significant environmental problems before you know whether the laboratory in general has affected the deep aquifer. Now obviously it would be difficult to say it was PHERMEX as opposed to something else, but I think it is a very important issue that needs to be brought up.

Also, we are facing, through the administration and Congress, some considerable cuts in environmental restoration and waste management, and I 69 think that it's extraordinarily important that those cuts be included as a scenario for what we're really facing with DARHT if you're going to, for instance, affect the ability of DARHT to -- or would it increase contamination from the DARHT facility if those cuts were to go through? And I think it's a very real possibility. People may know that our organization is fighting hard against some of those cuts, but we are -- there's a limit to what we can do.

The other thing that I think is important and it's somewhat of a different tack, is the fact that 70 the Pajarito Plateau is such a very rich archeological reserve, and that you have some -- an incredibly huge

number of archeological sites within 200 kilometers -- I can't offhand recall, but it's well over a couple of hundred -- within --

MS. RISELEY: A thousand.

MS. HIRSHBERG: It's a thousand?

MS. RISELEY: A thousand.

MS. HIRSHBERG: I know that's within the 4,000 meter range, so -- now, a large majority of these 70 archeological sites are eligible for the national register for historical places. Partially because of the protection they have received from the laboratory, so far they are in quite good condition. This is something that needs to be considered if archeologists are ever to get to those archeological resources. It needs to be very 71 clear that the ground will or will not be contaminated, so that they can dig in the future.

So I have been told by the national registry of historic places that it must be considered an effect of the facility if the facility was making it so that archeologist cannot get to those resources in the future through fear of contamination or whatever.

At this point, that's the end of my comments, and as I said, I may have some more later.

MS. WEBB: I appreciate that and I expect to receive your comments later. Christine, I told you

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some time ago you could speak next.

MS. CHANDLER: In starting, I would like to thank you for noting our right to speak as private citizens at these functions and again, thank you. I want to revert back to some comments that Mary made. She questioned me, and then I wasn't given to the opportunity to respond to the question, so if I can do so now I would like to do that.

Yes, I am aware that LASG does cite some of John Immele's remarks. However, my experience with those sorts of quotations is, they are generally taken out of context and it is my practice to discount them and look at the original source. I appreciate Jay Coghlan's -- I don't know if I pronounced your name correctly --

MR. COGHLAN: It doesn't matter.

MS. CHANDLER: -- accurate quoting of Dr. Immele's specific statements that were made at the December meeting. That is my response to Mary's questions to me.

With regard to Mary's reference to the World Court, I have to confess, I find that an incredibly bogus argument. I say that with some expertise. I have a law degree in international law from Georgetown University, so I think I can speak with some expertise on

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the point. The World Court decision will have no bearing on our ability to test or not to test. International -- first of all, it would not constitute international law.

Second of all, under our system of government, domestic law takes precedence over international law. It's the domestic policy of this country, as it was articulated by the president of the United States, that we will have a nuclear stockpile; that it will be safe and reliable. That is the law. That is the domestic policy that governs, and if there is some problem with that, there is a political means to address it; we can vote. We have a Congress and we have an elected body of officials who dictate that policy.

With regard to international oversight -- and this is my last comment, I would object to any imposition of international oversight. I regard that as an infringement on our own sovereignty. I will reiterate again; it's the American people and the American political leaders that dictate how we operate American facilities, and I would object to any move that would impose foreign control over our nuclear stockpile.

Thank you.

MS. WEBB: Thank you. Mr. Lockhart, did you want to say anything else?

MR. LOCKHART: No, thank you, I got mine

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in a few minutes ago.

MS. WEBB: Thank you. Greg, before we return to you, or Jay before we return to you, I think there are some other people that want to speak and have not yet done so. Did you want to speak, ma'am? And if you wouldn't mind identifying yourself for our reporter.

MS. WEST: To answer your first question, I think I want to speak. I'm not sure, so, yes; I will say, yes, I want to speak. My name is Elizabeth West and I live in Santa Fe. And I heard kind of by word of mouth about this and I have absolutely none of the expertise that evidently you-all have.

When I came out here, I didn't know exactly what this meeting was going to be like, and so I suddenly realized, I'm not at all nervous, because I -- I don't know how to talk on the level that you-all do. It feels like, to me, it's just kind of a regular person who, on the fringe, is just interested and wants to know more about this. This feels like a very weird -- a very weird meeting.

But I suppose I would like to say also kind of in a funny footnote that I appreciate the fact that we were able to do it -- I assume it, as a United States citizen. And I don't know this woman's name

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(indicating). I have forgotten and I'm sorry, and I may not get everything accurate but I think she said something that is germane to what I'm feeling here. Pardon me if I talk too long. It will be a couple of more minutes.

MS. WEBB: That's fine. You just go ahead and talk.

MS. WEST: What I see up on the wall there, if we can call these things walls; I mean, you can hear everything going on in the next room and I don't know what they're doing over there. The process, which is an important thing that we all need to take into consideration, of course, whether we're scientists or people like me wondering what to do next, it begins with the notice of intent.

And my -- my bias or personal opinions on how we all work together has to do with this business of intent in this chaotic and crazy world that we're in because we're more aware of how chaos works supposedly on a scientific level. It's pretty much known by scientists and little people like me alike that where there is shared intent, there does not have to be a complicity in result. We don't all have to have the same results happen, as long as there is a shared intent. And just because we have decided to try to work together, that's

very good, as far as it's going.

I -- I hope that it's somehow based in some kind of truth in that -- in other words, this shared intent of trying to work things out, and come to more understanding and maybe even effect a change, no matter what side of this issue one is on, won't be dropped after these meetings. And that's what I would like to say, when this woman, young woman -- she's probably about my age, but I'm in my next half of the century, so -- said NATO or whatever that world organization was has nothing much to do with this, of course we know legally that domestic rules and laws dictate certain behaviors and outcomes, but we also know that we are part of a global effort, whether we agree or not; it just is happening.

And so I hope -- and I would like to put it down in writing or something -- that this notice of intent is carried forward and so that we do continue to keep open ideas coming and going. And I will tell you what it smells like to me. It smells like DARHT is going to happen. It's probably already happening. I don't know anything about it, but that's my guess, based on rough estimations of history, based on need, based on scientific and emotional needs, monetary, also, and based on the fact that we really don't know how to make change until somebody helps us see it.

So since I can't give you an idea of what to see and how I wish we didn't have to do it, I certainly don't think a no action alternative is good, but I don't have the alternative. I think, since it's probably going to happen in some form, continue to have meetings, continue to have things be open because there is a history in this area and in our country and internationally for behavior that causes lack of trust.

Now we all know we don't really care about that, as long as we can get what we want done, and supposedly for the safety of our country and world, we don't really care if people trust us or not, but actually I think that is an important component. And so that I would disagree with the heat behind what this woman was saying and that, no, we must consider global interaction.

And I believe -- I believe this is my last statement here. Too bad to end it kind of naively -- but I actually believe we have a pretty nifty country. And I'm a little bit of a Pollyanna, but I would like to see us take a means that is more creative, more interactive and more cognizant of the importance of shared intent. So thank you.

MS. WEBB: Thank you very much. All right. George, you haven't spoken yet tonight and your hand is up. Again this meeting was advertised to go to

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9:00, but obviously we are going to be running over, and I just want to let everybody know that we will entertain all of the comments of all the people that want to speak tonight. George?

MR. CHANDLER: Thank you, Diana. I would like to make a couple of comments and then address a couple of points that have been raised. My comment is on the -- on the -- as exemplified by Mr. Coghlan's objection, the process here has been dominated by the desire of the LASG CCNS group to have no opposition, to have the floor to themselves, and you saw an example there.

And when a Los Alamos person with expertise who has studied this issue using public sources -- by the way, as I have -- has studied this issue who is making important points that have been raised by people who oppose the DARHT, suddenly there's an effort to shut him up, and this has -- this has been characteristic of this process from the beginning.

We have had an instance where pressure has been brought to bear on people from Los Alamos employees, through the DOE and through their jobs, to stop them from public participation in this process. And the laboratory and University of California, to their credit, have defended the rights of the laboratory workers to speak at

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these meetings on their own as private citizens.

You see in this room a lot of people from Los Alamos who work in this area, and I think the reason that you see these people here is that we have become tired of reading in the papers and seeing the laboratory and the city of Los Alamos trashed by activists accusing us unjustly and irrationally of contaminating the environment, contaminating Northern New Mexico with no credible evidence that that's ever happened or has in any way happened. We've become tired of these accusations unrefuted, and so you see people here without expertise who can address these misrepresentations and try to bring knowledge to the public about what their real practice on them about Los Alamos and the operation there.

Last night I failed to compliment you, as everyone else has, on this very thorough document, which you supervised. I did criticize it, and I will try to use what's happened here tonight as a way of trying to make the point again that I tried to make last night; that there needs to be in this document a succinct statement of the problems that have arisen in the stockpile. The way that aging takes place, the misrepresentation that Dr. Kerlinsky has perpetrated here on the aging process is -- I hope more than any -- I hate to tell you, it's malice.

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But of course any system, most reliability -- any reliable engineer knows the -- the feature -- there are criterion known as bathtub curves where a system that goes on-line, in its first few months or years, may have a high grade and so what's called 75 infant mortality takes place. And then there's a long period of reasonably steady reliability, and when aging of the components takes place, the system begins to become unreliable again.

The people who design such systems as this work with bombs, as well as any other engineering systems, try to estimate what that period of steady reliability is. It's a very difficult process, and then there is a huge effort in the engineering community to try to make these predictions more accurate. These predictions have been made in the weapons in the stockpile; however, on the people at Sandia who would like to toss off some of these things rather briefly would acknowledge, there is no way to predict when that bathtub curve starts to turn up again and all the components in it.

It's constantly cited by the LASG CCNS, the safety record of the stockpile. If it's been so safe, why do we need to worry about it? The fact of the matter is, the stockpile doesn't just sit there. It's

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75 kept safe, it's maintained safe by a constant surveillance and testing of those components, and problems are turned up in testing. And that testing has to continue. There's no way for that safety record for that 10 to the minus 6 -- that you like to quote -- to be maintained without an ongoing test program. You cannot. So I will stop there. Thank you.

MS. WEBB: Okay, thank you, George. Some other people want to talk and, Kip, I see your hand; however, I'm getting frantic notes from people that we have been sitting here for a couple of hours and we would like to take a break. If you have a very short thing, I will entertain it, otherwise we will take break. You have something short?

MR. CORNELI: I'm sorry; I don't know your definition of short, but it's one page.

MS. WEBB: That's short.

MR. CORNELI: And I will try to stick to the script as close as I can. My name is Kip Corneli. And I live here in town. I'm not associated with any particular group, but concerned about the old nuclear program starting back. Long ago when I was told as a vet of World War II that I could throw away my electric meter because the nuclear system was going to take care of everything instead, I have -- in fact I became a little

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skeptical about some of the things I read, and the EIS did not particularly settle my mind at ease regarding the skepticism.

I appreciate the opportunity to speak. I'm going to address just one particular item in the draft EIS, although there were quite a few things that puzzled me, the redundancy, the shallowness of it, but it was very nice that you spoke of my item because that's what I have on my page. I was a farmer for 30 years back in Wisconsin, and we maintained our own machinery or I supervised the people who maintained it. And I'm not impressed with analogies that have come down to me about comparing the maintenance of the stockpile or safety of the stockpile, the aging of the stockpile, to old cars that don't start after 25 years. If you saw what Woody Allen in Sleeper, you know that Volkswagens are very reliable.

I recognize that farm machinery is not nearly as complex by a long shot as the systems and the products that come from the weapons programs and from LANL, but I suggest, there are certain parallels. I feel 76 strongly that the EIS does not, in any way, prove that aging weapons need additional high-tech -- and I underline -- high-tech study.

I was also a private pilot for a number of

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years and when my airplane needed an overhaul, they were able to detect cracks in the engine block by various examinations, Magnaflux and some others that did not require an ADA million-dollar machine or I wouldn't be flying. Here are some of my reasons; some experts have said that thorough physical inspections will reveal most 76 problems, as I just mentioned, and would suffice stockpile stewardship. My own experience about machinery deterioration leads me to give way to this view, at the same time, even examining or testing every component regularly, let alone on a sampling basis, will not prevent all breakdowns or accidents.

Number two, the EIS provides no summary of 77 results from the several years of existing radiographic tests. I have read reports in a recent New Mexican paper that aging problems have not caused the removal of any nuclear weapons from the stockpile and only 257 defects relating to safety and reliability have been found out of I believe the entire 70,000 nuclear weapon stockpile. That's three-tenths of one percent.

We currently are able to have 8,000. To get down to 8,000 nuclear weapons, three-tenths of a percent of that, if my calculation is right, 24 weapons would have those -- might have those defects. Surely when we attack Bagdad, we're not going to go there with

just one weapon, anyway.

77 I would like to know, for example, how -- how many cracks have been found, where they were, whether we are talking metallic fatigue, cracks, or problems like in the Challenger episode, or what these cracks were. The EIS was very uninformative on that. I don't quite see what this kind of information should be classified as especially when we are talking about an 88 million-dollar facility where depleted uranium will be exploded, and we all know that depleted uranium does not mean it is not dangerous.

78 Number three, if the design life of an on atom bomb is 25 years, when is it considered to be aging? There's the bathtub curve. When does it kick in? You asked that question yourself. I would like to know. As I recall, bombs and nuclear growth around the world, it's really not many years apart from the SAC strategy where the bombs used at that time. At what ages were they discarded or reworked or were defects found before discarding?

What's happened to the information that's been derived from underground testing, from retesting the 79 SAC weapons, all the others that have come and gone through the testing. Can't we perhaps work on good -- haven't we been able to develop good computer models that

would tell us where these things are? I'm not sure if the EIS explained to me that every one of the weapons that's out there in the stockpile that's going to be dismantled and tested, I expect it will be on a 80 statistical sampling basis, and what happens with the other ones that are not checked?

In short, we need a great deal more 81 information where I'm convinced that the task of stockpile stewardship actually requires a facility like DARHT and unfortunately the EIS did not convince me of that, either. Thank you very much.

MS. WEBB: Thank you, Kip. What I would like to do at this time is, it's ten minutes until 9:00. I would like to take a 20-minute break to allow everyone time to disburse, reassemble, have a look at information in the other room. And as Bob Day said earlier, it's extremely good and, I think, interesting. After that, we will reconvene. Greg, you've been wanting to talk again. Jay --

MR. COGHLAN: I have one other response of a question.

MS. WEBB: And we'll readdress those when we reconvene, so until ten after.

(Break taken at 8:47 p.m.)

MS. WEBB: All right. Let's reconvene.

Thank you, we ran a little bit long on that break, but I think I needed it. And it's 20 after the hour. There's a few people I think that wanted to speak but haven't spoken. But before we took the break, what we said we would do next is let Bob and Jas answer a couple of questions they have been itching here to answer, and then we will let you speak. You haven't spoken yet, and Greg we had promised you that you could have the floor again tonight, also. So first of all -- where are my notes? Here are my notes. First of all, Bob was asked the direct question by Jay that he would like to answer.

MR. DAY: The -- I don't have a quote. The question related to hydronuclear experiments in front of DARHT, plans and expectations for that, I believe is the question. Is that correct, Jay?

MR. COGHLAN: Yes, and I was looking essentially for a categorical answer as to whether or not they may occur.

MR. DAY: I think a number of people may not know what a hydronuclear experiment is. There is a report; you have it obviously, and it may be in the public reading room by Vestervelt and Thorn, which talks and defines nuclear experiments. And the definition there is hydronuclear experiments are experiments where you have some nuclear yield. And it talks about yields

up to four pounds, four pounds of high-explosive equivalent.

There are no plans for such experiments in front of DARHT, no preparations, no plans for that kind of experimentation, and -- and no requirement on the part of DOE for such experiments. There would have -- DOE, in order to do such experiments, would have to have all the appropriate documentation that would be necessary to do that, involving all the plans necessary to do that, if that was a requirement. There are no plans, no expectation for that now or in the future.

DR. KERLINSKY: Could it be done? Could four pounds be contained within a vessel?

MR. MERCER-SMITH: Of course. The yield of the high explosives is significantly higher than four pounds and, yes, you could well contain that. However, the question is whether it is a good idea to conduct an experiment which, if it got out of hand, was in a double-walled container right next to a 100-million-dollar machine. It does not seem to me to be a particularly wise idea.

If you were going to do a hydronuclear experiment, the Nevada test site would be the obvious site to do it, where you have a variety of containment techniques. But again the issues of hydronuclears are

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national policy issues. I personally wouldn't do one next to a machine that sensitive.

MS. WEBB: Bob, do you want to say anything else about it?

MR. DAY: No.

MS. WEBB: Jay, does that answer your question?

MR. COGHLAN: Yes, thank you.

MS. WEBB: Thank you. All right, we also had a couple of direct questions here, I believe, from -- from Dan. Dan, you asked a couple of questions, and I was not clear if they were rhetorical questions or direct questions regarding static radiography at DARHT, 3-D codes, and what is meant by reliability in the context of what we're talking about here. And you made some statements regarding the Galvin Task Force. Although obviously the Galvin Task Force report is in the LANL Community Reading Room, I was wondering if you intended to have us -- were you asking us to include the Galvin Task Force Report as part of the record of this proceeding? Obviously you don't need to give me a copy, if you wanted to do that because I have a copy, but I'm asking you, and you are nodding your head, yes.

DR. KERLINSKY: Thank you for making that nice suggestion, and just the national security section

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would suffice where you could -- it would be easier to find the recommendations about stockpile stewardship and hydrodynamic testing in the context of the national security section of the Galvin Task Force Report.

MS. WEBB: All right. Then we will enter that section of the Galvin Task Report for the record for this meeting. Even though you didn't physically hand me one, I know what you mean. Thank you. And then you had some other questions of Bob or Jas. Would you like to respond in retrospect to some of the things Dan asked earlier or, Dan, did you want them to respond?

DR. KERLINSKY: Sure.

MR. DAY: The issue of static pictures. I think it was stated in a way where we may be confusing a statement asked as a question -- stated as a question, and we could be creating confusion between static pictures and dynamic pictures. I think that's true. There could be some confusion.

MR. MERCER-SMITH: And the question also was whether you would use DARHT to --

MR. DAY: Do static --

MR. MERCER-SMITH: -- do surveillance.

MR. DAY: The surveillance program, static radiography is done by different kinds of machines. It is not done by DARHT. The analogy with the dental X-ray

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is, quite frankly, one that I use because I understand it. It's the way, you know, you look for a cavity or hole or something in the tooth. You can take an X-ray picture and get a piece of film. And when we are looking for our data, we take an X-ray of sorts and get a piece of film.

One of the major points is that that picture has to be very short because things are moving very fast. So it's not a static radiograph in the sense that the dentist does, where the technician asks you to hold real still. It's a radiograph where you're trying to make the pulse real short so as the stuff is moving you can freeze it, freeze frame it, and get information about where things are in time. And that's one of the key points about DARHT. And it's actually one of the important points is, that high quality in that kind of situation is very hard to achieve. It requires very precise control down to the electrons; very short pulse, in this case, about 15 nanoseconds, 16 nanoseconds, very tight control of the energy to make sure all the source is real small.

And that's been when Scott talked about the technology. Those are some of the technology issues that we have been developing and which we've been able to control in order to improve this, in order to improve

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this source, and one of the reasons we will be able to get much better data.

DR. KERLINSKY: I just want to say thank you very much for that clarification because I think it's important to note that, going through this EIS process, we are actually clarifying statements. We were just reviewing the Notice of Intent, and the language of the Notice of Intent talked about the X-ray pictures telling us details about the 3-dimensional condition of internal components, and I think this is very helpful.

MR. MERCER-SMITH: Let me try to explain that. If all you are interested in is static radiography, there are much easier ways to get it.

DR. KERLINSKY: That's right.

MR. MERCER-SMITH: The issue that DARHT has is the dynamic response of materials to shockloading, and so how do materials behave after they've been subjected to the shockfront developed by high explosives. And that's the function where DARHT and the plan for that machine are unique.

DR. KERLINSKY: The second part of the question about surveillance being done at DARHT or not being done at DARHT, a similar kind of clarification?

MR. DAY: Let's go back, though, one step. Issues related to surveillance can and are

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addressed at DARHT.

DR. KERLINSKY: Issues related?

MR. DAY: Related to surveillance can and are addressed at DARHT, because frequently as a result of surveillance, you find it. We find the dents and cracks and holes and changes and those kinds of activities. And as part of fulfillment of the -- of that program, we investigate those kinds of issues in a dynamic sense.

DR. KERLINSKY: Right.

MR. DAY: Because it's not the fact that they are static that's the issue. The issue is what effect do they have dynamically.

DR. KERLINSKY: Right.

MR. DAY: So if -- so DARHT is related in a very tight way, in some cases, to issues related to the surveillance program. It is not the first thing you do in a surveillance program. The first thing you do is you look at the static radiographs, look and take things apart and -- but it is a piece of how you handle surveillance issues.

DR. KERLINSKY: Let me see if I've got it right. Do you expect to find flaws in an aging weapon by -- in DARHT, or once you find a defect, are you going to use DARHT to analyze?

MR. DAY: You actually do both. The

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baselining that we talk about is part of that where you actually look to see what you have, and then compare, in the future, dynamics, because it's the dynamic part of the process that's part of the key. Can they or can you see all such issues in static pictures? And the answer is, no, you can't see all such issues.

DR. KERLINSKY: You see, the major issue that I was asking for resolution is, how, using mock materials, you know, not the real plutonium, but a mock material to simulate the pit, you know, and compressing that with the explosion and taking a picture of that explosion really tells you about either the current status of the real pit, or tells you about an aging effect of an aging pit, because the material you are compressing is not the real material. That's where I have been stuck. If you guys could help me clarify what that is, really what was initially described as benchmark.

MR. DAY: Let's step back one step from that, because this is also the issue related to nuclear testing. In order to ensure that the devices work, we have one sure way of doing it, and that's to take them to Nevada and see that they perform as we expect.

That technique is not available to us. There is a moratorium on comprehensive test bans, and

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that's full of high fidelity. Highest fidelity experiment is not available, so we do -- our job is to do the highest fidelity experiment that we can do under the constraints that we have, so the surrogate materials are -- provide some of the highest fidelity information that we can get in a routine -- in a routine way. And that information can be key to understanding some problems. I don't think we propose that it will understand all problems in the stockpile, but there are pieces and parts that we may not be able to sample, and the answer to that is yes.

DR. KERLINSKY: There is a wonderful discussion in 3-3 where you talk about surrogate materials and describe the difference between tantalum and weapons with plutonium, higher strength, higher melting point; the difference between lead that's sometimes used that has lower strength and lower melting point, you know. Do you currently have a simulated material that is described that acts as current status of these various weapons, and do you currently have a simulated material to -- to simulate, you know, for an aging effect?

MR. DAY: We do many experiment to understand aging effects. We try to accelerate the aging process. Sometimes we heat something and that

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accelerates the aging process, and there are other things you can do that can help you understand how things might age. And we do those -- we do those kind of experiments, and we try to use materials which have as high a fidelity as we can achieve. And there are -- there are no -- there's no way of addressing all of the issues without a full scale test.

DR. KERLINSKY: So --

MR. TRAPP: Can I put an example in here?

MS. WEBB: Could you please identify yourself for the record?

MR. TRAPP: Yeah, T. J. Trapp, nuclear materials program manager from Los Alamos. Let me just give him a good example of the kinds of things we do. Plutonium is an alloy, and that alloy seems to me -- it does things all the time. It changes, and some of the things that can change are like the grain structure, things like microstructures; it might be cracks or something. Now doing things like DARHT gives you the capability to take one material with small grain structure, look at that, take another case with a larger grain structure, see the difference in behavior. Then even though it's not the same material, you can extrapolate that material to see how you would expect any issues of -- any safety issues, any reliability issues

and other operative issues from the basic material and have an understanding of knowing a change happened, and someone doing a test can be given material that relies on a surrogate, if you do stability tests because that's an aging effect, that's a real life aging effect.

DR. KERLINSKY: So let me ask, looking at the grain structure change, have people constructed a surrogate material for that and carried out a hydrodynamic test to see what the compressibility of that surrogate material was to be able to see if they could extrapolate that to the plutonium?

MR. TRAPP: There is no surrogate that behaves in every sense like plutonium. So what you have to do is take a material and mimic one particular piece, and sometimes another material can mimic another particular behavior pattern. And in between doing all of those, you can put together something that's somewhat of a representation of plutonium. And yes, people have done that. That's the kind of thing that people are doing. One of the things that people are trying to do in the surveillance area is moving from what I call a retrospective surveillance, looking at something to see if it's gone wrong, to something that's predictive. We can look and make sure nothing is going to happen in the future, and that's where the question becomes very

important, how do we know whether or not anything is going to happen in the future? This is predictive capability when you start looking forward.

DR. KERLINSKY: So if you want ballpark, how many shots were done in the last year for simulation of the current status of plutonium?

MR. TRAPP: I don't know the answer to that.

MS. WEBB: Dan, in the interest of not trying to cut this off, Mr. McCorkle had raised his hand quite some time ago, said he wanted to say something, and now I see him packing up his materials and looking to dart out, and I would like to give him the opportunity of saying something.

MR. McCORKLE: I have something that I wanted to say to Jay, and I think there's probably room to say it in private, and I don't want to make a public statement and I, yes, I was getting ready to leave.

MS. WEBB: Thank you, and we appreciate you coming here tonight.

DR. KERLINSKY: Let me wrap up. I didn't hear the answer on how imploding a surrogate material really tells you about the current status about aging, future status.

MR. DAY: They can tell you a lot about

the hydrodynamics. It can tell you a lot about the complexion. You can follow density. Because the nature of the materials are different and the nature of the materials in the devices, you then have to compare how well you can predict those with what you predict in the devices that we have in the stockpile. And there's a computational part which is always part of what we do. You've got to understand that -- that -- you have to understand, there's an issue here.

MR. MERCER-SMITH: There are a variety of computational issues. If you think of the simplest possible geometry and impose a hole in it, you know, I drill a hole in it and impose geometry, that gives rise to a shape change. That is something that is addressable by some types of calculations. And part of what we do is, by using surrogate materials, follow the hydrodynamics of that sort of process, computationally, and then see how well we have done. And then we can consider extrapolating to those materials.

DR. KERLINSKY: And are there currently any holes in pits, I mean, that you would be simulating the status of? I mean, that's -- or is this just a hypothetical exercise?

MR. DAY: I think there is another point that we need to go after here and that is the process is

not just data. A process is the relationship between the data and the calculations. And then taking that data and those calculations and extrapolating to conditions in a full up device. And so what you do is, you take a set of data -- and this is also true in the underground test program in terms of understanding. You can validate most of the military requirements with real experiments, but in the case of trying to understand how the device works, and the data tells you how well the code works. And so there is this -- there is this constant process, part of the scientific process of having data, comparing it with calculations, using those calculations to drive what you don't understand to go back to create additional data which better illuminates the code, and it's through that process of calculating and experimenting that you get a better understanding.

DR. KERLINSKY: One last one from a comment.

MS. WEBB: All right. Your last one was your last one. So is this one your last one?

DR. KERLINSKY: This will be my last one. There is one sure that way you knew weapons would work; that is underground testing. Isn't it true they stopped doing underground experiments over a decade ago because every time they set off an old one, it went off as

predicted. So this argument about the only sure way of knowing it's going to work is by blowing it up. It was a question that had been resolved within a laboratory community quite some time back.

MR. DAY: No, that's not true. Reliability tests have been done routinely, and of our systems that have been in the stockpile, and those -- those were being done throughout the -- throughout the program.

DR. KERLINSKY: And were there yield effects that were significantly different than were predicted on those older weapons?

MR. DAY: We have seen effects of systems that have been in the stockpile that gave us new information about how they work and that would cause us concern about how well they would work in the future.

DR. KERLINSKY: Is that a yes or no?

MR. DAY: Again, it's the issue of understanding. Also there's another point I think should be clarified. And it seems to be the point that gets made a number of times that somehow the only way you can address aging issues is by actually aging it for a long period of time, and a lot of aging issues are related to changes. When you test a new system, you are testing a system or looking at a system -- in a way you are testing

a system in a way where there are changes. Those changes are what you see as you age so that every experiment that we have done in Nevada and in our experiments have helped to give us information on aging because, again, it's experiment in comparison with the calculation that gives us the confidence in both the aging issues as well as the other issues that we had. So it's not -- the situation is not quite as straightforward as you would -- as we might believe from that kind of a statement.

MR. MECHELS: A clarification. I think when you talk about doing full up tests in Nevada, you must not be talking about testing 150 kiloton warhead because I don't think Nevada has announced any testing. So what are you testing? Are you taking testing -- testing primaries?

MR. MERCER-SMITH: He's referring to a time when we did test, in the past, in the past tense.

MR. MECHELS: He was in the past? But I thought Dan was saying you hadn't tested full up since ten years. I don't know. I don't see you testing big things in Nevada, so you could not be testing unless you are dropping in holes.

MS. WEBB: Suffice it to say that we are not conducting underground nuclear tests in Nevada.

MR. DAY: And have not in 1994.

MR. MECHELS: What I'm saying, I didn't see you dropping 150 kilotons. I saw you test the small stuff so that's the best guess. I'm wondering if you were talking about testing primaries. Are you really telling us, if you are talking about ICBM and throwing them in holes and shooting them.

MR. MERCER-SMITH: Those were called stockpile confidence tests.

MR. MECHELS: And those were --

MR. MERCER-SMITH: And they were systems that had been in the field.

MR. MECHELS: And they were taking real systems and dropping them in, because I am very unclear.

MR. MERCER-SMITH: Real systems under the constraints of 150 kiloton threshold test bans.

MR. MECHELS: So if you had a system any bigger than -- like if you had some 300, you just can't do that; right?

MR. MERCER-SMITH: You could not test it at full yield --

MS. WEBB: Not under the constraints.

MR. MERCER-SMITH: -- under the constraints.

MR. MECHELS: Since that wasn't a full yield, that means you had to modify if you were going to

test it.

MS. WEBB: Chris, you said you had a brief comment.

MR. MECHELS: I thought it was brief, but it's more complicated than I thought. I am still unclear.

MS. WEBB: I would like to note for the record, during the break, Kip informed me he would like to correct his testimony and he will be providing me with a written correction to that. So I just want to note for the record that we will be looking for that.

We have promised Greg a long time ago that he could talk. And Greg, it's been a long time, and we appreciate your patience.

MR. CUNNINGHAM: I just wanted to try and answer some of the questions in the two and a half hours since I last talked.

MS. WEBB: And we appreciate your patience.

MR. CUNNINGHAM: One of my questions that the gentlemen back here asked was the average age the weapons that were retired back when there were B-52s, and I think you are referring to maybe '50s, '60s, '70s, that time frame. And up until 1958, the average age of retiring a weapon was 4.5 years. During the 1960s, the

84 average age was approximately 11 years, and we now are going to have weapons in stockpile for much, much longer than that, just to answer that question.

MR. CORNELI: What was done with the weapons after 11 years?

MR. CUNNINGHAM: They were retired from stockpiles. They have been out of the stockpile for many years.

MR. CORNELI: Were they refabricated?

MR. CUNNINGHAM: I don't know how to answer that question.

MR. DAY: The components would be disassembled. Usually the special nuclear materials would be reprocessed and used again, but the device itself would be disassembled.

DR. KERLINSKY: And you use data from the '70s and '80s to compare with the '50s and '60s?

MR. CUNNINGHAM: I don't recall what was compared. This is out of an old report.

The next question that I wanted to answer was in terms of access to documents. Jay made a comment that since I work for the laboratory I have special access to documents, special access to knowledge. One document that I don't have is the Sandia Stockpile Lifetime Survey because it's not being made available to

the public is my understanding.

MS. WEBB: Thanks to you --

MR. CUNNINGHAM: That's one document that Dan, Jay, everybody else seems to have except the representatives from the laboratory.

MS. WEBB: Thanks to the fact that Greg Mello earlier this evening submitted it for the record, we will now have it in the public reading room along with the transcript of this as soon as we have it.

MR. CUNNINGHAM: I would like to ask Greg Mello about that a week ago when I was in the office gathering all of this information, but I guess I will research --

MS. WEBB: I don't think Greg Mello is here. I don't see him.

MR. CUNNINGHAM: I question the special access to information at any rate. The next question is relative to something that Elizabeth -- I think it is? -- she's not here. She talks about shared intent, and I think I volunteered that one of the things that came out of the meeting that citizens of Los Alamos have in

85 response to the forum last fall was that we didn't think there was very good justification for why containment vessels should not be used. It seems like containment vessels solved some of the problems in terms of

environmental impact.

And we think that if containment vessels

85 aren't going to be used, we need a stronger justification for why their use is not justifiable. It's too costly. I think the operating cost I saw indicated the operating cost would double by using containment vessels from 6 million to 10 million per year. And so I think that needs to be made clear that by using containment vessels, it's going to cost an extra $4 million a year. Is that

85 worth the advantage you gain in terms of not contaminating the environment any more than it already is?

My last -- or not last question, but fourth response, is with respect to the Galvin Commission. Dr. Dan Kerlinsky served on the Galvin Commission, which I hope allows everybody to realize that a lot of the commissions that I'm citing, review committees that I'm citing, were independent commissions. And Dan, obviously, is an independent thinker.

The Galvin Commission was headed up by Robert Young, a CEO at Motorola. And there was a variety of industrial, academic, and what I would call activists, for lack of a better term. That Galvin Commission came up -- the first recommendation in the list of recommendations was to implement DARHT. The first

86 recommendation of the Galvin Commission was to implement DARHT.

And another recommendation that the Galvin commission came out with was to eliminate the stockpile stewardship activity in Lawrence Livermore which presumably is enough justification to not consider alternatives that would locate a very central part of those science based stockpile stewardship activities at Livermore, which answers Chris Mechel's comments.

Jay made a comment about hydronuclears. He said that he wanted a categorical exclusion on hydronuclear and Bob and Jas tried to answer that question, and I would just like to add my view on that. I think that obviously it depends highly on the comprehensive test ban being negotiated and hopefully implemented. And that it depends on the threshold of the comprehensive test ban, and we should take advantage of whatever that threshold is, and it just depends on what that threshold ends up being. Jay also stated that --

MR. COGHLAN: Can I correct one thing, though?

MR. CUNNINGHAM: One more comment and you can comment. Jay also stated that it's the quote, unquote, weapons states that are pushing for higher thresholds on the comprehensive test bans, and I

would like documentation made available for that, if you have a document that supports that.

MR. COGHLAN: The correction -- I didn't ask for a categorical exclusion; I asked for a categorical answer to the question.

MR. CUNNINGHAM: Your words were categorical exclusion.

MR. COGHLAN: I did not say that. I asked for a response to the question of whether or not there will or will not be hydronuclear tests.

MR. CUNNINGHAM: Either you or Dan said categorical exclusion.

MS. WEBB: Perhaps we will have to wait for Irene to get her transcript typed up, and then we can see who said what because, to tell you the truth, I don't remember the verbatim quote. Please let Greg finish.

MR. CUNNINGHAM: Three more points.

87 Dr. Kerlinsky indicated that most of the safety problems have been solved in the 1960s. The one-point safety criterion was not even established until 1968, but the one-point safety criterion indicates that you have to have a one in a million, only a one in a million or less chance of getting nuclear yield out of a device, out of a device that's accidentally detonated. That criterion was not established until the 1960s and computer counts

87 didn't have the predictive capability to predict one-point safety until 1988, according to Dr. Kidder in one of his reports to Congress.

And I would argue that one-point safety is 87 a -- is a very vital mission that we serve, because one-point safety is not related necessarily primarily to aging. It's related to inherent design flaws that potentially take years and years of testing to decide whether or not that it is a design flaw that could cause a one-point safety failure. The reason is, the sensitivity to various points on the outerexplosive where the one point would be initiated is not well understood and needs to be multiple tested, multiple different points in a code that can reliably predict such performance. And we don't have a 3-D code that can 87 reliably predict such performance because we don't have the 3-D information that would be provided by DARHT to benchmark that kind of a code.

Last comment on Dr. Kerlinsky's statement. He said that the Sandia Report indicated that high maintenance is needed, and I have a very long statement here that I won't read, but to summarize, there are many 88 problems with just having an inspection, maintenance, replacement kind of strategy as your entire science based stockpile stewardship program. That's called

surveillance. That's not science based stockpile 88 stewardship.

One problem is that materials can become unavailable. A very explicit example of this is, the Rocky Flats Production Plant was the only plant producing the pits that formed the central core of a primary of a nuclear device. Rocky Flats stopped producing pits, and for that reason, two of the weapons that remain in our stockpile, according to the recent Nuclear Posture Review headed by the Secretary of Defense, two of our weapons do not have insensitive high explosives. They have the old style high explosive, which makes them more susceptible to one-point safety hazards.

That is to say, if they have a one-point safety problem, the fact that they have old high explosives makes them more susceptible to accidental detonation and potential nuclear disaster. Those devices were not upgraded to devices that could have IHE, insensitive high explosives, because there was no vendor to produce substitute pits that would not have required the experiments and testing that would be required to solve the problem otherwise.

And the other solution was to essentially take used pits from the stockpiles, and the weapons experts decided that it would be more testing and more

costly and there would be underground testing and they did not do it.

So for that reason there has not been a safety upgrade. So in effect, not having done this whole concept of inspection, maintenance, replacement is seriously affected. Vendors do go out of business. Materials do disappear. Furthermore processes include 88 undocumented capabilities and styles of individuals who retire or just leave. You can't fully specify every aspect of a production process. We don't fully understand the production process in enough detail to know whether or not there are certain missing documentation of production processes.

I think I -- I have two more areas that I would like to comment on and maybe I will comment on them if other people comment on them; that is, with respect to the Nuclear Posture Review, which is available in the community reading room, and that declares why we need to have nuclear weapons. What our objectives are in having nuclear weapons and gives very explicit figures on how 89 many weapons we have taken out of the stockpile, how much we have reduced the stockpile, what kind of capabilities we have eliminated to save money, how many personnel now have access to weapons. It's been reduced by 70 percent. 70 percent fewer people have access or control of nuclear

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weapons. There are 70 percent, or on that order, fewer storage locations. There are 79 percent -- by the year 2003, there will be 79 percent less weapons in the stockpile.

There is a very vigorous and two-phase operation to eliminate very large portions of our capability in nuclear weapons. We are leading the way and eliminating weapons in the stockpile. But at the same time we need to hedge our weapons, we need to hedge those bets with other reliable deterrence. That's been stated by the Secretary of Defense and President of the United States. I would be willing to comment if people have questions about this.

And the last item is related to DARHT specifications and how exactly quantitatively DARHT will improve our ability to do hydrodynamic tests and how explicit this information will be, and I have some figures related to that that I would like to discuss if anybody is interested and asks questions.

MS. WEBB: Greg, I would like to just clarify something you mentioned. You mentioned that the Nuclear Posture Review is available in the community reading room. I would presume that we are referring to the unclassified summary of the Nuclear Posture Review and not the classified report itself?

MR. CUNNINGHAM: It's actually imbedded -- I had to sort through 100 documents to find it. It's actually imbedded in a document that's entitled Background Information on DARHT EIS.

MS. WEBB: When we sent it over it was not imbedded and I cannot answer as to why it is now imbedded. Jas indicated to me here by hand gestures that he would like to clarify something.

MR. MERCER-SMITH: There is a technically incorrect statement in something that Greg just said. There is not a direct relationship between the use of insensitive high explosive and one-point safety. The weapons in the stockpile are in fact one-point safe. The use of insensitive high explosives is valuable because -- in case of an accidental detonation and the likelihood of dispersal of plutonium; it is not directly related to one-point safety.

MR. CUNNINGHAM: To restate what I said before, the fact that it does not have IHE makes it more prone to accidental detonation which makes the one-point safety more important.

MR. MERCER-SMITH: It is not related to one-point safety.

MS. WEBB: All right. Perhaps you guys can have a little explanation on this offline.

MR. MECHELS: Could I answer very quickly to one point that he made? I was speaking to FXR LLNL, and his statement was that because they were targeted by the Galvin Task Force to go out of business that FXR is properly excluded from the evaluation. I certainly question that because Mr. Tarter out of Livermore hasn't gotten the message. He has every intention to upgrade FXR and it will cost about $40 million. I haven't seen anybody shutting the funding off. They are fighting very hard it keep it.

My comment was, we seem to have a complex wide arms race within the complexes to see who can build the fanciest gear, and I suggest it implies to me that before we build DARHT and fancy gear in competition with

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each other, that we have a stockpile stewardship evaluation to see what the heck we're doing.

MR. CUNNINGHAM: I can respond to that briefly.

MS. WEBB: Can I respond to it? I would just like to point out for the record that the Galvin Task Force was an independent task force report. The Department of Energy has not come out with a formal position regarding the recommendations of the Galvin Task Force Report. The Department of Energy has not suggested at this time that anybody should shut down the FXR

facility at Lawrence Livermore, and that is so stated in the draft EIS somewhere. I forget which page. Greg, please.

MR. CUNNINGHAM: Just a brief response. Dr. Ray Kidder at Lawrence Livermore National Laboratories is a highly respected theoretical physicist, who Congress repeatedly has asked for objective reviews

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of the current state of our nuclear stockpile. He had an article in the Bulletin of the Atomic Scientists entitled, "Shopping Spree Stop and Started." He itemized $2 billion worth of proposed facilities, out of which I think he approved of two facilities, DARHT being one -- another one, and that substantiates the need for DARHT.

MS. WEBB: Okay. Thank you, Greg. Christine has kind of been indicating that she wants to talk, and Chris is making noises over here, but Christine indicated she wanted to talk first.

MS. CHANDLER: This is really a question on process and procedure about the EIS and DARHT as well as the future ones occurring, and that has to do with employees -- people who happen to be employees that participate. At the break you pointed out I should always be clear in what capacity I speak. I question that as an approach, frankly.

We have two designated officials here who

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speak for the lab. I frankly think that the preferred approach should be, people who are clearly designated to speak for the lab -- people who are not clearly designated, the presumption should be that they speak in their own capacity until such time that they identify themselves in the official capacity. I would request that that be the approach for all the PEIS that DOE is going to be conducting. I know you only have control over this one or some authority over that, but I would suggest that is a proper process.

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I think by calling out people, where they are an employee, is inappropriate and I would request that that process be stopped.

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MS. WEBB: Okay. I appreciate that comment. It is true that Bob and Jas, if they would care to comment on the Environmental Impact Statement, I would have suggested to them that probably they should be speaking as private individuals since they are here in their official capacity. We have several other folks here, such as the people who are staffing the information room. It's little bit less clear, if they wanted to speak tonight, if they would be speaking as an individual or in the capacity in which I asked them to come and help out in the information room.

MR. DAY: Let me clarify that. They are

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here as representatives of the laboratory, with materials presented and prepared by the laboratory, so people in the other room are here as representatives of the laboratory, not in their individual private citizen capacity.

MS. WEBB: And there's a lot of other people who work at the laboratory but they are here tonight because I presume they are interested in being here, either that or their spouse made them come, and they are here in their capacity as private citizens. I don't make a habit of asking people on the record where they work, and I hope I did not do that.

I, quite frankly, am not really interested, too much -- I mean, sometimes it's really interesting where people work, but for the most part, I'm sorry if I left the --

MS. CHANDLER: I didn't mean that as a criticism, Diane. I think it's inherent in some of the things going on in this meeting, as well as the others. I think we need to put it out on the table and address it.

MS. WEBB: All right. I appreciate that comment. Mary, you were raising your hand.

MS. RISELEY: I like to think it's completely irrelevant if the people work at the lab or if

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they are a member of the public; they have a right to speak. But I would like to say that tonight we lost track of the vector that is expected by NEPA. And the vector in a DARHT comment meeting, or in a scoping meeting, is comments from the public to DOE. And it

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seems like a lot of what happened this evening is that that was passed on to other people, and they prepared rebuttal testimony rather than commenting on the DARHT EIS itself. And I don't know if it's possible to do anything like that, but maybe a reminder every once in a while that the purpose of meeting is to evaluate publicly the DARHT EIS, and presenting your own personal opinion about the various alternatives rather than the ideas of some other members of the public.

MS. WEBB: About ten hands went up, and I do appreciate that comment, Mary. And I did say earlier on that the purpose of the meeting is to discuss the accuracy and adequacy of the EIS, specifically the environmental analysis contained therein. I did however say that we would entertain comments on other aspects of the project for this review project. However, you are absolutely correct the main focus of this meeting is to get your comments on the adequacy and accuracy of the environmental impact analysis in the document. A bunch of hands went up simultaneously, and Chris is one.

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Greg is one. Dan is one.

DR. KERLINSKY: We will go around this way.

MR. MECHELS: I like that.

MS. WEBB: All right, Chris. You may say something.

MR. MECHELS: Because of my earlier noted trouble with members of Los Alamos National Laboratory throwing off statements which the public cannot rebut, I mean, I would like to get a clarification on the statement he just made; that part of the reason we need DARHT is because, quote, that the -- "that you don't really understand the production process." Is that the official laboratory position from these two gentlemen?

MR. CUNNINGHAM: I'm not representing the laboratory's position.

MR. MECHELS: As a member of the a laboratory and making a comment like that, is that true? I'm just saying, is that true?

MR. CUNNINGHAM: Get it out of the Miller Report. They don't --

MR. MECHELS: Wait a minute. Is that true? Here are two people who work at the laboratory and are experts in that area.

MR. MECHELS: I don't care what the Miller

Report said.

MS. WEBB: Bob, would you care to address that?

MR. DAY: As I understand the question -- let me clarify. Are there details in the production process that are undocumented that give rise to -- undocumented, that had an effect on the stockpile?

MR. MECHELS: What he said, and of course I'm asking for his comment, was that part of reason you need an instrument like DARHT is because you don't fully understand the production process.

MR. CUNNINGHAM: That's not what I said. He's telling me what I said.

MR. MECHELS: What did you say?

MR. CUNNINGHAM: What I said was, there are flaws in the premise that you can ensure the stockpile through a surveillance program to consist of inspection, maintenance and replacement. That's what I said. I didn't say that DARHT resolved the problems. I didn't say that was what DARHT was for. That's what I said.

MR. MECHELS: I have a got, you say, part of the reason you need DARHT is you don't fully understand --

MS. WEBB: Once again, I would invite --

MR. MECHELS: I'm just questioning that. I'm just saying, is it true?

MS. WEBB: Okay. Chris and Helen indicated that they know what Greg said. I would suggest that we wait until we read Irene's transcript to find out what Greg said. And Mr. Trapp is trying to say something.

MR. TRAPP: The answer to that question is that our real life experience is that every time you do something on a different piece of equipment in a different way, things change. So no matter how well you characterize and understand the process, if you think you will duplicate the same thing again on a different piece of equipment with slightly different characteristics, there's something different.

So the truth is, always things change. And we have many, many examples of very well characterized processes. In one case if we pick the process, and they did this on uranium out of the 1960s, there Oak Ridge has developed, and they did a wonderful job, documented it very well, put it away. We tried to duplicate the same thing. It took them six weeks to do it. It took us two years. What it lead up to was cool-down cycles and different purities in the equipment you make between the 1960s and now.

So the real world is, every time you change equipment and do the same thing again, something is slightly different, and that's it.

MR. MECHELS: Thank you.

MS. WEBB: All right, and then Milton -- can I get your last name?

MR. LOCKHART: Milton Lockhart. I have a comment on the discussion as developed tonight over the need for safety and reliability. This flies in the face of strictly commenting on the environmental effects of DARHT. It really doesn't impact the environmental effects. Having DARHT does cause environmental effects. But if we restricted it to just the environmental impact -- we have spent over half of our time tonight talking about a topic which is not relevant

MS. WEBB: Or possibly more than half of our time. An Dan would you like to say something?

DR. KERLINSKY: Two things. One is, if there isn't a justification for a new facility that 94 stands up, then whatever environmental impact comes from, that facility isn't justified, so that's kind of part of the --

MR. LOCKHART: That's a give and take and I agree with that.

DR. KERLINSKY: So we would've thought

it's better to create another alternative to look at in the PEIS -- I know it's getting late but -- what another 95 no action alternative or another proposal would be, would be to really look at, when do we need to do hydrodynamic tests, period? regardless of whether or not we build the DARHT or PHERMEX or FXR, and really specify when those tests need to be done, and that should be in some ways a different alternative.

What I would like to propose, getting near to wrapping up -- what people were talking about in the break, we kind of like this debate format, you know. It's like, why can't we keep doing it? So the suggestion was maybe as part of the EIS process, we could actually set up a more formal discussion where the round-table 96 part is more like a format for going back and forth or on particular points and we ask Bob and Jas and maybe the Sandia guys and some other folks to actually sit around -- do more of like a debate on the kinds of points that come up, and that might be interesting and good for the process.

MS. WEBB: Well, no one is falling asleep, yet, so we assume it's an interesting exchange, and we will take it under advisement. Greg, you had raised your hand a while ago when all the hands went up.

MR. CUNNINGHAM: Just a response to Mary's

or somebody's comments. I can't remember whose comment, but basically on NEPA. To me what NEPA is, it's about public involvement. To me the public being involved and informed, and I feel very strongly because of the comments I presented today and being able to do that.

So I feel that the NEPA process is all about involvement, not about some kind of formal specification of how comments are solicited. 97

MS. WEBB: Thanks. And Christine, I think your hand went up when all the hands --

MS. CHANDLER: No.

MS. WEBB: It didn't go up? I'm sorry

MS. CHANDLER: The one time.

MS. WEBB: George, your hand went up.

MR. CHANDLER: I will make an environmental comment on the environmental section of this report, which I think is outstanding. There are more thorough documents produced by the laboratory on lab surveillance and I think it's clear from what's in this report and from other things, that the laboratory dedicates large amounts of resources to environmental surveillance, tests everything conceivable, looking for migration of radionuclides off the laboratory property into the general environment, and has found nothing credible that would pose any credible threat to any of

its neighbors. 98

Mostly the -- there's, for example, when you look at the numbers you see a lot of plutonium numbers along the Rio Grande, and you find out that's all from atmospheric testing. There's a hint in a couple of places that there may have been some migration of plutonium down from the Bayo Canyon or the Pueblo Canyon but the amount that's there is minuscule compared to what's in the atmosphere from atmospheric testing.

The uranium content in northern New Mexico is very hot, and a lot of uranium -- there is a lot of uranium radioactivity. There is essentially no contribution from the laboratory of uranium into the environment that is made. There is a large amount of uranium on the mesa where these tests take place, 144,000 kilograms -- that's a number; that's a big number -- that's been expended out there carefully continuously monitored for any sign of migration, and there are in fact cleanup activities on the way. 98

So I think one of the things that's very important about this report is it documents the care that the laboratory takes to protect its neighbors from any kind of threat from activity out there, and those activities -- my personal observations are, they're increasing.

MS. WEBB: Thanks. Something else regarding EIS analyses, which I just wanted to say again; we talked a little bit about safety and reliability, which was part in the EIS of the purpose and need. An EIS specifies and identifies the purpose and need, but the purpose of an EIS is not precisely to debate or analyze the purpose and need. The purpose of an Environmental Impact Statement is to analyze the environmental impact of a proposal, in this case, the preferred alternative and the various alternatives to. The Environmental Impact Statement is one facet but not the only facet that will lead to the ultimate decision. Other things that are not analyzed in EIS, such as cost benefit analysis, programmatic studies, and other things of that type, will enter into the decision process, but are not part of the environmental analysis that's included in the Environmental Impact Statement. Does anybody else -- well, we are having a round of applause from next door.

MR. LYLES: John Lyles and I have heard a lot of ideology and statistics about weapons and production rates and various reasons or not reasons to finish building DARHT. I was wondering, since you've been bringing up the environmental part in the last few minutes towards the end here, the archeological part,

has -- in the last two days of these meetings, have any representatives of the pueblos been coming to these and actually having input because they are the most affected. It's their ruins and sites there. 99

MS. WEBB: Representatives of the pueblos have certainly been invited to these meetings. As with other types of other government entities, we make special provisions to make sure their comments are heard, as I have made the offer to other government entities, I have made the offer to go to the pueblos and speak to the tribal governments directly. They have accepted those invitations and these types of interchanges will continue. We do, under law, regulation and good-neighbor practices, take into account the input and give special deference to the input of the tribal governments as well as the state and local governments.

MR. CUNNINGHAM: Can I comment real briefly? I know Bev Larson, who is the archeologist, I believe, that did some the work on the archeological -- the cultural impact, if you will, Nake'muu, which is one of the sites that might be impacted and she has had several discussions. She had a very active discussion with the pueblo. One example I think is kind of interesting, I think; you guys correct me if this is wrong, but I believe the pueblos were interested in

taking earth and putting it over some of the ruins and they felt that that was the appropriate mechanism to ensure that resource, and they were much more willing to do that, for instance, than having it torn apart, and the pueblos were consulted to make sure that resources were being handled in an appropriate way.

MS. WEBB: What you're referring to was there was an archeological site that was covered by this earthen berm. The laboratory did consult with the local pueblos and at the request of the local pueblos, the archeological site was covered and is banked under that big mound of earth. That was not the preferred approach that had been suggested by the State of New Mexico State Historical Preservation Officer, but they did again -- again the state deferred to the wishes of the pueblo. Beverly was here earlier. I don't know if she's still with us. Beverly did contribute to this Environmental Impact Statement. I might just mention that the analysis was done by members of the Pacific Northwest Laboratories. The gentleman from Pacific Northwest Laboratories who did this analysis is also here tonight, somewhere. I don't see him at the moment, but he is here tonight, so if somebody wants to specifically ask about that.

MR. WATSON: I would like to make an

observation. My name is Scott Watson, speaking on my own behalf. About the Indian ruins, I think you pointed out earlier that the Indians ruins around the site which have been doing open-air hydrotesting for some 30 years now is excellent. I would like to add to that observation. As a citizen of Los Alamos I'm well aware of the number of ruins around the mesa tops, for example, White Rock Canyon, Bandelier, other areas, and we have observed those, as someone who likes ruin areas, and observed the damage done to them by hikers, bikers, motorcycle riders and people of the general public, and I have had the

100 opportunity to observe the condition of the ruins at the laboratory site and comparatively say, those ruins at the laboratory sites are in much better condition, which indicates to me that the laboratory, as a responsible steward of the archeological site and laboratory, actually maintain archeologists on-site and require reviews of these sites before such construction can take

100 place. So I think it's important that the public be aware that these sites are being well preserved and the fact that this ruin is in such good condition is testimony of that.

MS. WEBB: Thank you, Scott. We seem to be winding down. Who else would like to speak? There are some people who haven't said anything tonight. I

wasn't one of them. Ken?

MR. BAUER: Diane, I'm going to push the envelope a little. My name is Ken Bauer. I work at the lab as well, even in the stakeholder office, but I wish to speak as a private citizen. So in that sense, it is a little late, and I'm off the clock; I guess I can do that.

With respect to the format of individuals rebutting each other over time, I would like to suggest

101 that that is an adversarial situation where -- where we're pitting each other's rhetorical skills against one another, and perhaps it's not as constructive as speaking to -- to the goal of the meeting and working toward certain decision points that may be enhanced by that discussion.

The reason I wanted to break my silence was to say that -- that with respect to the adequacy of the of the draft, I was surprised that the air quality

102 was significantly worse with the containment option. And since this hasn't come up, I would like to suggest that in the final draft, the final EIS, a fuller explanation is made of how an identical set of calculations for an open air explosion versus an explosion that takes place inside containment and is properly vented, and so you on can come out significantly worse in that case where it's

contained. The socioeconomic consequences of using containment, of course, have been stated many times. It costs more money to that do that. As a chemist, I -- I learn to accept the -- to reject the notion that it was -- that the solution to pollution was dilution. And often the statement is made, 500 feet out from the site, you won't find any soil, any soil contamination in that background. The air quality 3-, 400 feet away is at background again, this is -- this is because of the incredible dilution effect that takes place over this

103 distance, and I think that as -- as citizens and scientists, we should reject the notion that by diluting 20 pounds of lead over the course of a year or 30 pounds of beryllium and large amounts of uranium, that just because it gets diluted over that large space, that it's acceptable because we can't measure any more out at this certain point.

So in that respect, I would like to argue

104 that containment has merits that should be embraced by the community members and by the scientific participants. Thank you.

MS. WEBB: Thank you, Ken. All right. Anybody else want to say anything to us tonight?

MR. MECHELS: One last comment is that I personally think that this is a bit adversarial in this

format. I came here specifically to speak to the DARHT EIS. I did, so my main objections were specifically
105 against that I think that we don't do very well when we have people saying, "So and so said so. I said so," and so I wish to refute them. I don't think it's useful.

MS. WEBB: If anybody else has comments on the format, I would be glad to hear then them now or there's evaluation forms out at the front desk and you can write those types of comments down.

Who else would like to speak? Jay is looking.

MR. COGHLAN: I propose to adjourn.

MS. WEBB: Jay is entertaining a proposal to adjourn, and I think it sounds like a good idea. So again, thank you all very much for coming. I know that you're all busy. I appreciate your taking the time to be here tonight.

(Hearing adjourned at 10:20 p.m.)

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, IRENE DELGADO, New Mexico CCR 253, DO HEREBY CERTIFY that I did report in stenographic shorthand the foregoing proceeding as set forth herein; that the foregoing pages are a true and correct transcript of my stenographic notes and were reduced to typewritten transcript through Computer-Aided Transcription.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case, and that I have no interest in the final disposition of this case in any court; that on the date I reported these proceedings, I was a New Mexico Certified Court Reporter.

IRENE DELGADO, NM CCR 253
Notary Public Expires: 5-1-96

Transcript Attachment
Comment Code 54

DARHT EIS COMMENTS FOR PUBLIC FORUM

1. Are the activist groups really interested in ensuring a safe and healthy environment in the context of ongoing work, or is their true agenda to eliminate all work on or related to nuclear weapons? Does the lab expend energy on meeting environmental requirements? Are these requirements too lax?
   a. Quotes from Mary Risely and Jackie Cabasso
   b. Galvin commission's findings on over-regulation by DOE (page 10 bottom).
2. Why does the US need to retain its nuclear weapons?
   a. Deterrence: In July of 1994, President Clinton said "We wil retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile" (slide 2 of Background Information for DARHT).
   b. Deterrence: In September of 1994, the Nuclear Posture Review concluded that we should "lead" in the area of reducing the nuclear danger and stemming proliferation. As part of these goals, the active stockpile has been reduced by 59% since 1988 and will be reduced by 79% in by 2003; storage locations have been reduced by over 75%, and personnel access to weapons or control has been cut by 70%. Furthermore, the US has and will presumably continue to support treaties that reduce the potential for non-nuclear states to gain a nuclear capability. However, the Nuclear Posture Review also emphasized that we must "preserve options in the case that reform fails in Russia" and "maintain good stewardship" of the weapons that remain in our stockpile.
   c. Non-proliferation: The DARHT EIS references the Presidential Decision Directive when it says that a safe and reliable US nuclear stockpile supports non-proliferation insofar as it provides and umbrella for our non-nuclear allies. As an example, what would happen if North Korea pursued a path toward nuclear armament, threatening non-nuclear states like South Korea and Japan. Would not a unilateral disarmament by the US increase the chances of those countries attempting to arm themselves?
3. Why does the US need national labs to continue to have nuclear weapons programs, in particular the SBSS program?
   a. To ensure the continued safety and reliability of the stockpile, in support of our deterrence hedge against Russia's probable success in reform and also in support of non-proliferation. The independent Galvin commission, headed by Robert Galvin, the CEO of Motorola, strongly supported the role of the

laboratories in administering the SBSS, particularly LANL, in saying (in Section VIIIA) that
   i. "the primary mission of the weapons laboratories MUST be a safe, secure AND RELIABLE nuclear stockpile in the absence of nuclear testing..."
      "It requires the following rank-order priorities"
      (1) Attracting and retaining skilled scientists, ...
      (2) Enhancing surveillance of weapons in stockpile...
      (3) Continued hydrodynamic testing to cope with problems
      (4) Assessing problems, reanalyzing previous data through numerical simulations, ...
      (5) Sustaining the scientific process of inquiry through experimentation.
      The Galvin commission also recommends that LLNL relinquish its peer review role in SBSS and that DARHT get continued funding. The JASON report, which was chaired by Dr. Sid Drell of Stanford University, said in its conclusions that
      (6) A strong SBSS program, such as we recommend in this report, is an essential component for the US to maintain confidence in the performance of a safe and reliable nuclear deterrent under a CTB. The technical skill base it will help maintain and renew in the defense program and weapons labs will also be important for assessing emerging threats from proliferant nations and developing possible technical response thereto.
      (7) ... it is CLEAR that IMPROVED hydrotesting is crucial to continued confidence in the safety and reliability of nuclear primaries ...
      (8) the first of 7 recommendations (and presumably the most important) is to continue building DARHT, as it (page 4) "would provide important information about the time development as well as the 3-dimensional structure of the implosion" and it "will provide GREATLY enhanced capabilities of importance in the absence of underground tests"
   b. A SBSS program is necessary to maintain confidence in the stockpile, which is a necessary ingredient for our political leaders to negotiate treaties that stem proliferation while still ensuring our interests, such as NPT or CTB. This concern is evident in the requests made by Congress in the late 80's and early 90's to

have Dr. Ray Kidder of LLNL provide a summary of the evidence surrounding the need for nuclear tests to ensure the safety and reliability of a static stockpile, made in the context of treaty negotiations. Dr. Kidder, and several other eminent scientists often quoted by anti-nuclear activists, re-assured the Congress that a CBT would not risk our losing confidence in the stockpile, AS LONG AS several actions were taken:

i. from Ray Kidder's report to Congress on July 26, 1991 (page 9, question 7), the Congressmen asked "What nonnuclear-explosive measures, if any, are currently used to assess the desired one-point safety characteristic of nuclear weapons?" Kidder's response "it has recently (1988) become possible to conduct moderately faithful computer simulations of 3D hydronuclear behavior... which permits a preliminary evlauation of one-point safety of a nuclear warhead without a nuclear test... Such computer simulations are still too rudimentary to be relied on to certify one-point safety..." but guide choices about what region of the device might be most sensitive to one-point safety to define nuclear tests (one-point safety requirements were initiated in 1968 and means that the device has a less than a one in a million chance of releasing a nuclear yield if detonated at ANY single point).

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The Congressmen next asked what methods could be used "to establish that thoroughly-tested nuclear warhead designs ... would CONTINUE to meet the one-point safety criterion", indicating their concern that new tests and simulations might reveal a previously undiscovered design flaw that might affect one-point safety. In a July 1994 article entitled "Shopping Spree Softens Test-Ban Sorrows," Kidder criticizes many planned or in-construction DOE complex facilities, including an AHF, but says "Given the importance of hydrodynamic testing, completion of DARHT may be justified." DARHT would give feedback on 3D features to improve the 3D codes' predictive ability, presumably enabling them to be sufficiently reliable to certify one-point safety.

c. Finally, maintaining competence about nuclear weapons was favored 2 to 1 over relinquishing competence in Sandia National Lab's public opinion poll. ← also Galvin + SAIC Ei + Ober ajr. Comm

4. Why does SBSS need to involve hydrodynamic testing? Aren't the weapons safe and reliable? Can't we just remanufacture them when they encounter the end of their design lives? Is reliability really that important? Is safety really affected all that much by small factors?

a. Weapons in the existing stockpile have been certified to be safe and reliable in the context of the missions they were designed to serve, the requirements they were forced to satisfy and the length of time they were anticipated to be in the stockpile, and through limited post-deployment nuclear testing, safety and reliability problems have been discovered and remedied in approximately 1/3 of the weapons in stockpile. From the Miller report to Congress in 1987 (page 7 bottom right): "One-third of all the weapon designs introduced into the stockpile since 1958 have required and received post-deployment nuclear tests to resolve problems related to deterioration or aging or to correct a design that is found not to work properly under various conditions." Nuclear testing has historically allowed us to place high confidence in the stockpile. Without nuclear testing, aging of the stockpile, potential changes in requirements, environment or components, and undiscovered design flaws will not allow us to continue this high level of confidence without a partial replacement for nuclear testing. Hydrodynamic testing, and dynamic radiography in particular, is seen as the only alternative to nuclear testing to certify re-manufactured or re-designed weapons, and to continue to look for design flaws that may affect one-point safety, for as Dr. Kidder says (page 6 bottom right of 91 report) "Safety problems with nuclear warheads are generally inherent in the design of the warhead itself, not the result of aging or other causes. Such problems may not be identified until LONG AFTER the warhead enters stockpile, but they were there to begin with." The JASON report also notes that "Several techniques are available to study the non-nuclear implosion of the primary," but "the properties of the pit at the late stages can be addressed only through dynamic radiography... It is this latter class of msmts that is the most difficult and requires the largest facilities."

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need for dynamic radiograph

b. Hydrodynamic testing will partially compensate for nuclear testing by comparing benchmark hydrodynamic tests against continuing post-deployment tests. These tests will help designers to detect changes in behavior due to

i. aging materials
ii. re-manufacture/re-design of components
iii. new environments/requirements
iv. ongoing evaluation and scrutiny of one-point safety

c. Re-manufacturing, in concert with tight surveillance,

would allow the US to maintain confidence in its stockpile (while losing design competence entirely) if not for several complications that make testing a necessity.

i. Historically, materials and components have become unavailable when vendors go out of business, and materials have been discovered to be hazardous to work with, requiring substitute materials or new work processes. Either of these scenarios can mean that new materials must be used in the weapon, and testing must be done to re-certify performance. The 1987 Miller report to Congress testified that, in fact, nuclear testing was desirable to certify even these types of changes due to the fact that "we simply cannot get the detailed information to tell what is really going on and to identify what might be wrong with our simulations." The 1991 Kidder report notes that nuclear tests would be needed to bring the Trident and Minuteman missiles up to current safety standards (they contain HE, not IHE, and are presumably more susceptible to accidental detonation, making one-point safety critical) because Rocky Flats was no longer producing substitute pits that would have made the additional nuclear tests unnecessary. To the best of my knowledge (as stated in the Nuclear Posture Review) the warheads used in the Trident and Minuteman remain in the stockpile today without IHE due to unavailability of a substitute component.

ii. Processes are not just a set of documents, but include important undocumented capabilities and styles of individuals who retire or leave without passing on their knowledge. Thus, processes can change even thought the material or component is presumed to be the same. Again, continuous testing against benchmark performance is required to detect changes in behavior due to a change in cthe weapon components (Miller et. al. report).

iii. Continued IMPROVEMENT in 3D codes and experiments are needed to continue the search for design defects that may affect one-point safety. The variety of circumstances and one-point detonation locations requires a vigorous hydrotest program. The need to exhaustively test these scenarios is illustrated by the set of 32 accidents that are documented in the 1984 DOD report "Narrative Summaries of Accidents Involving US Nuclear Weapons 1950-1980". The list includes aircraft

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crashes, accidental jettisons, missile fuel explosion, and fires. In 11 of those accidents, the HE was detonated, and in 10 there was radioactive contamination. The threat of accidental detonation is real, and if the weapons were not one-point safe, a major nuclear accident might have occurred. The necessity to exhaustively test weapons for one-point safety under many circumstances should thus be clearly seen as a real mission, and not as an excuse for some covert mission. Furthermore, the one-point safety mission for hydrotesting has been and is an ONGOING mission.

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The weapons currently in the stockpile were designed to meet a set of prioritized military characteristics that forced designers to create highly optimized weapons. The highest priority is nuclear safety, meaning that accidental or unauthorized detonation of the device should not produce a nuclear yield, and over 1/3 of all nuclear tests have bee performed to ensure nuclear safety. Several nuclear and non-nuclear tests showed that accidental detonation in some devices could have caused nuclear yield. All of the KNOWN safety problems with weapons in the stockpile have been resolved. As regards reliability, in many cases, the weapons' primaries were designed with very low weights so that the delivery missiles could travel long distances with high accuracy. The low weights necessitated "boosting" the primary, a process that is not well-characterized or predicted using current computer models and hydrodynamic test capabilities. There have been many problems with the reliability of primaries that have been due to aging or re-manufacture, and have been discovered through post-deployment nuclear and non-nuclear testing. Reliability of the primary is essential for ignition of the secondary, from which almost all of the destructive power of the weapon is derived. If the primary malfunctions, there is a good chance that the weapon will be a dud.

5. How and why is DARHT a major improvement in hydrodynamic testing? Wasn't DARHT designed to help in the effort to design new nuclear weapons? Why should we believe that DARHT won't be used for weapons design now?

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a. DARHT is a major improvement in current hydrodynamic test capability for several reasons

i. Dose - the two axes of DARHT will generate many

more x-rays than PHERMEX or FXR (>2x), and so will decrease the noise in radiographs and be able to penetrate thicker systems than both PHERMEX and FXR.

ii. Resolution - the smaller spot size afforded by DARHT (2x-3x better than PHERMEX) will mean a much improved ability to see the hydrodynamic contributors to the boosting process, which is the most important and least understood part of the operation of the primary. Current PHERMEX resolution and dose make it impossible to get enough detail to improve the calculational codes. Furthermore, better resolution allows an experimenter to use a more optimal geometry (object closer to x-ray source) to take better advantage of the dose that he has.

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iii. Lower energy - DARHT will have a lower energy than PHERMEX, and close to that of FXR. A lower energy means that there are more photons for a given dose level (so the penetrating ability is improved) and the attenuation to photons of the heavy metals that we radiograph is less so that a higher percentage of photons is able to penetrate.

iv. Shorter pulse - the pulse width of DARHT is 60 nanoseconds, compared to 200 nsec for PHERMEX, so that better "stop-action" data is taken, wherein material boundaries (which are dynamically evolving) are not allowed to "smear" the radiograph to as high a degree.

v. Multiple views or time snapshots - an analysis of the one-point safety of devices requires multiple views at one time of the device, which only multiple independent axes can provide with the needed dose and resolution. A benchmark hydrodynamic test which will be compared to future tests in order to detect performance changes will require more than one time snapshot of the device. This is due to the shot-to-shot variability in determining the absolute timing of the test. Determining relative timing between two snapshots in a single test can be done with higher precision and will thus allow a more predictable, as well as more informative, benchmark test.

vi. Of course, more axes, more dose, better resolution, and more time snapshots will make the benchmark test even more predictable and informative, but a facility such as the Advanced Hydrotest Facility will require much riskier technology and much more money than that required by DARHT. DARHT is a necessary first step toward

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providing the additional information needed to improve predictive computer codes, define and develop the testing components of a SBSS program, implement and improve moderate-risk components of a proposed AHF, and further define requirements for an AHF. This approach is endorsed by several independent panels, review committees, and commissions (HPAIC, DAIC, JASONs, e.g.). It is anticipated that even more capability than that offerred by DARHT will be needed to maintain the extremely high confidence in our country's stockpile that we have historically enjoyed due to a limited, but vitally important, nuclear testing program. The degree to which additional money should be spent on such a facility should be guided by our experience with DARHT and our nation's evolving nuclear policy.

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b. DARHT was indeed conceived in an era when new weapons designs were being developed, and would have been used in that capacity were it completed in an era when ongoing designs were needed. However, hydrodynamic testing has also played a vital historical role in discovering potential safety and reliability problems with deployed and developmental weapons. Remember that fully 1/3 of all nuclear tests were executed to ensure the nuclear safety of weapons, which was the highest priority for weapons' designers to observe. Finally, hydrodynamic testing has played a vital and historic role in helping designers to modify and improve their predictive calculational codes (whereas nuclear testing is imperative for certification). Thus, DARHT would have been used in the many of the same capacities it is being promoted for today even if new designs were being explored.

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c. DARHT will not be used to implement new designs because there is a presidential order that prohibits such activity. However, even if new designs were desired, DARHT (and even a more capable AHF) would simply not provide enough information for designers to certify a completely new design without a nuclear test. That this is so is stated many times in the Kidder and Miller reports. Nuclear testing is still essential for certifying that a new weapon design will be safe and reliable, and the need for nuclear testing will not be eliminated until a replacement program is validated by nuclear tests. Such a validation of a replacement program will be necessary before it is accepted by weapons' designers and responsible military and political leaders. This validation of a replacement to nuclear testing has not taken place and cannot take

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place as long as there is a moratorium on nuclear testing. Thus, there should be little concern that DARHT will be used to design new weapons. However, changes in behavior as a result of small changes in existing devices due to new materials, processes, components, and incremental re-designs due to any of the above, may be detectable by DARHT and perhaps diagnosable and correctable using DARHT or an AHF. This would be an essential component of a meaningful SBSS program.

Chapter 3

Responses to Public Comments

COMMENT CODE	LOCATION OF EIS REVISION(S)
1 - 1	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 1	None required

RESPONSE

The documents referred to in this comment have been superseded by the DARHT EIS, but are available for review in the LANL Community Reading Room. DOE prepared these DARHT environmental documents (Action Description Memoranda), during the 1980s under prior environmental review procedures then in effect. The general biological environment of LANL was discussed in the 1979 Sitewide EIS for LANL (DOE/EIS-0018) and served as a baseline for those reviews. DOE revised its NEPA documentation requirements in 1990. DOE/LAAO revised its NEPA review procedures in 1994 and now routinely makes all NEPA reviews available to the general public and other Federal agencies; however, prior to the policy changes in 1990 DOE did not generally make NEPA reviews (except for EISs) available except on request. Because the 1980s reviews did not identify the presence of federally-listed species, DOE was not required to initiate consultation with the USFWS under Section 7 of the ESA. DOE will provide copies of the Action Description Memorandum to the Albuquerque office of the USFWS for their files.

DOE has considered DOI's comment regarding reissuing of the draft EIS or allowing more than 30-days for review of the final EIS prior to reissuing a ROD. DOE believe that concerns raised by the DOI have been adequately considered in preparing the final EIS and that it is unnecessary to reissue the draft EIS or to provide more than 30 days review of the final EIS. DOE has closely coordinated with the Albuquerque office of the USFWS to ensure that issues raised by that office and DOI, in particular issues related to the Mexican spotted owl and implementing the associated mitigation measures identified in appendix K, have been adequately addressed.

In a telephone conversation on August 15, 1995, DOI agreed that proceeding with a final EIS with a 30-day review was appropriate, and DOE has agreed that it would continue to meet with the USFWS New Mexico Ecological Services State Office periodically.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 2	Section 2.3.1

RESPONSE

Baseline research will be conducted at many sites and facilities, not just at DARHT or PHERMEX at LANL, and is expected to take several years. Baselining to document the current physical status of the weapons systems will involve a broad range of observations, measurements, and tests. "Baselining" will involve many different types of calculations, tests and experiments performed at different DOE weapons facilities, primary LANL, LLNL, and SNL. Among these activities will be hydrodynamic testing conducted at LANL or LLNL as appropriate to research each type of information needed to answer a particular question. The extent and duration of these activities will depend in part on the nature of the results, but several years is the best early estimate. Text has been added to section 2.3.1 to clarify baselining.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 3	None required.

RESPONSE

Section 3.3.3 of the EIS states that DARHT would take advantage of the existing infrastructure established to support PHERMEX. This infrastructure is outlined in Table 3-1, which has been revised to indicate the existing facilities involved. The term "infrastructure" in this section of the DARHT EIS refers to the larger relationships among facilities at LANL; although the term "infrastructure" is sometimes used to mean improvements such as fence lines, roadways and utilities, these features are already in place for the facilities listed in table 3-1. Tables 3-3 and 3-4 contain an outline of the utilities required for each of the alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 4	None required.

RESPONSE

Potential impacts from construction and operation of the Radiographic Support Laboratory (RSL) were considered in a series of environmental reviews prior to initiating its construction in 1988. No significant impacts were found. Impacts from construction of the RSL (e.g., habitat reduction) have already occurred and now apply equally to all alternatives analyzed in the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 5	Appendix K.

RESPONSE

DOE completed its Biological Assessment of the DARHT site in July 1995, and has consulted with the USFWS. The assessment addresses potential impacts on all threatened and endangered species from activities at the proposed DARHT site, as well as mitigation measures. See appendix K for this assessment and USFWS letter to DOE dated August 3, 1995, concurring with DOE's determination that the operation of the DARHT facility is not likely to adversely affect the Mexican spotted owl. DOE appreciates the cooperation it has received from the USFWS' New Mexico Ecological Services State Office and will continue consultation, as appropriate, with the Service regarding implementing mitigation measures identified in appendix K.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 6	Section K.3.2

RESPONSE

The DOE has consulted with the USFWS regarding methods to minimize and mitigate adverse impacts to wildlife, and the Service has concurred with DOE's findings (see appendix K).

Modeling of fragment distribution has shown that there would be minimal amounts of test materials past an 800-ft (245-m) radius. Most of these materials would be sand size particles that have traveled in an upward trajectory and fall back to earth at a nonlethal velocity. DOE has calculated the potential for wildlife to be struck by a piece of flying debris to be less than 1 in 10 million at 1,200 ft (365 m) (see appendix K, section K.3.2). The DARHT EIS evaluates accidents on a "what if" basis, i.e., assume the accident occurs and describe the impacts of the event. DOE does not consider the possibility of beams "escaping" the DARHT as a credible event. The firing area would be cleared prior to a shot to prevent accidents to personnel; this clearing procedure would also prevent large wildlife from being present on the mesa top when the experiment takes place. Thus, accidents in the immediate vicinity of the firing point should not be a concern to wildlife.

The EIS identifies mitigation measures which will result in the avoidance and minimization of significant adverse impacts (see chapter 5 and specifically section 5.11). Further the Record of Decision for this EIS will document major mitigation measures, and a Mitigation Action Plan will be issued sometime following the ROD in which all mitigation measures will be identified.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 7	Tables S-1 and 3-3

RESPONSE

Section 4.1.1 of the DARHT EIS acknowledges that 8 ac (2.3 ha) of land has been disturbed by previous construction at the DARHT site. Any habitat reduction from this construction has already occurred. Because these impacts have already taken place, DOE cannot ignore them, but they apply equally to all alternatives analyzed in the DARHT EIS, and would not serve to help DOE select among the alternatives analyzed. Table 3.3 has been revised to indicate that no additional habitat reduction would occur as a result of implementing the DARHT Baseline Alternative.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 8	None required.

RESPONSE

DOE acknowledges that construction of the DARHT facility began before this EIS was started. For the purposes of the DARHT EIS, DOE considers that the impacts that have already occurred at the DARHT site due to construction prior to the decision to prepare this EIS to be part of the existing environment. An EIS is prepared to assist a federal agency in decision-making; the decisions facing DOE at this time do not include a decision whether or not to begin construction (that has already occurred) but instead include a decision whether or not to complete the DARHT facility to conduct enhanced radiographic hydrodynamic tests, or to complete the structure for some other use. Analysis of impacts from future construction activities is in chapter 5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 9	None required.

RESPONSE

The acreage and types of habitats that could be affected by direct or indirect impacts from construction and operation of DARHT are described in detail in chapter 4. Potential impacts are calculated across a broader area than for a localized habitat.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 10	Section 3.5.2

RESPONSE

The exclusion zones discussed in the DARHT EIS are safety features to provide protection to personnel and structures while testing takes place. During a test, the exclusion zone is the area which is cleared of any personnel before each shot. There are limitations on the types and designs of structures that can be built within exclusion zones. As mentioned in the DARHT EIS, section 3.3.6, the high explosives testing area at LANL comprises some 20 mi^2 (52 km^2), and includes several high explosive test facilities. Each test facility has a defined exclusion zone. The radius of each of these zones varies depending on the amounts of HE for which the facility is designed. The proposed DARHT facility would have an exclusion zone of 2,500 ft (750 m). This information will be included in EIS section 3.5.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 11	Section 5.11 and appendix K

RESPONSE

The final EIS has been revised to now list all candidate species, including information provided by the USFWS letter dated January 23, 1995. The biological assessment for the DARHT site, which was completed in July 1995, includes mitigation measures that the USFWS has concurred with.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 12	Appendix K

RESPONSE

The biological assessment for the DARHT site was completed in July 1995. It concluded that there was a low potential for the occurrence of the peregrine falcon at the DARHT site. Informal consultation with the USFWS has been completed (see appendix K).

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 13	Appendix K

RESPONSE

The draft EIS provided then-current information related to potential impacts to threatened and endangered species. The DARHT final EIS has been updated to reflect the habitat for the Mexican spotted owl in the vicinity of the DARHT site and includes mitigation measures to reduce potential adverse impacts to wildlife species.

DOE completed its biological assessment that discussed impacts on threatened and endangered species habitat, among other things. DOE and LANL consulted with the USFWS in accordance with Section 7 of the Endangered Species Act, and DOE has considered USFWS's concerns in its determination of no adverse affect (see appendix K, exhibit 1). While this process is separate and distinct from the NEPA review process, an agency may document the results of its consultation with the USFWS in a NEPA document. DOE has done this (see appendix K).

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 14	None required.

RESPONSE

Computer modeling was used to determine the potential air, surface water, and ground water contamination. Appendixes C and D describe the methods used to model impacts to air quality and water resources, respectively.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 15	Section K.3.2

RESPONSE

See response to comment 2-6.

Also, the surface waters on LANL do not support fish (see section 4.5.3). Potential contamination in surface waters at the Rio Grande resulting from the DARHT Baseline Alternative (the highest concentrations modeled for surface water) would be more than an order-of-magnitude below drinking water standards for uranium and several orders-of-magnitude below the drinking water standard for beryllium and lead (see section 5.2.4.1).

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 16	Sections 5.1.11.2, 5.2.11.2, and 5.4.11.2

RESPONSE

Under any alternative analyzed, when construction activities are complete the DARHT site will be revegetated. As agreed to with the USFWS, native species will be used whenever possible (see appendix K). Dust suppression is used during construction primarily to minimize any air quality impacts. There are no known effects from construction-related dust on wildlife. Construction noise associated with the completion of the facility would be mitigated to minimize noise impacts on the surrounding environment as much as possible.

See DARHT EIS sections 4.2.6 and 4.3.4 for a discussion of noise and vibratory ground motion. Impacts from airwaves are insignificant although they do cause a secondary peak in the vibratory ground motion.

See response to comment 2-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 17	None required.

RESPONSE

DOE recognizes that secondary impacts may adversely affect resources that are not in the immediate vicinity of a proposed project. DOE has completed computer modeling to help assess impacts to surface water sections (see appendix E3).

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 18	Section 3.3.3

RESPONSE

The likelihood of a transportation accident involving a test assembly bound for DARHT or PHERMEX is considered to be an extremely unlikely (annual probability of occurrence of 10^{-4} to 10^{-6}) to incredible (annual probability of occurrence of less than 10^{-6}) based on related LANL safety studies. For the EIS, impacts of accidents were evaluated without considering this very low probability of occurrence. Evaluation of potential impacts to humans from transportation accidents are considered bounding for blast effects and are also likely to be bounding for radiological and toxicological impacts since human dose receptors are assumed to be located nearby, likely closer to human activities than biotic resources, particularly wildlife. Potential impacts from soil contamination have been examined under normal operational releases from DARHT and PHERMEX operations, which would result in greater releases than a transportation accident.

COMMENT CODE	LOCATION OF EIS REVISION(S)
2 - 19	None required.

RESPONSE

Table 5-19 in the final EIS indicates the amounts of materials that are estimated to be released to the environment on an annual basis for all alternatives analyzed. It has been estimated that all of the high explosives would be consumed in the experiments. Ten percent of the solid material would be aerosolized, and a majority of the remaining material would be deposited within 460 ft (140 m) of the firing point.

DOE does not believe that any alternative analyzed would result in increased human activity in the area due to facility operations, or expansion of development into previously undeveloped areas. The construction and operation of DARHT will occur within LANL's High Explosives Research and Development and Testing Area in which land use has remained essentially unchanged for 50 years and the level of human activity expected under any alternative would be expected to remain essentially unchanged from the existing situation. The area in the vicinity of the DARHT site (although not the DARHT site itself) and the alternative locations for the vessel cleanout facility was previously disturbed by agricultural activities prior to the location being part of LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
3 - 1	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, and H.5.2

RESPONSE

DOE has prepared a revised Preferred Alternative, which is the Phased Containment Option of the Enhanced Containment Alternative, to address the concerns raised in this comment. See sections 3.7 and 5.4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
3 - 2	Section 4.9

RESPONSE

DOE agrees. See revised section 4.9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
3 - 3	Section H.3.2

RESPONSE

DOE agrees. The text has been revised to reflect the suggested change. See section H.3.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
3 - 4	None required.

RESPONSE

DOE appreciates this comment. The EPA has a statutory requirement, under 42 U.S.C.7609, to review proposals of other Federal agencies to determine whether the environmental impacts of the proposal would be unsatisfactory from the standpoint of public health or welfare or environmental quality. The EPA has four rating categories: environmentally unsatisfactory; environmental objections; environmental concerns; and lack of objections. DOE notes that the EPA reviewed the draft classified supplement along with the draft DARHT EIS, and appreciates the assistance of the EPA in this regard.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 1	Section 4.6 Tables 4-14 and 4-15

RESPONSE

Upon hearing of the concerns from San Ildefonso and other pueblos, DOE has removed the maps of cultural resources in the vicinity of the DARHT and PHERMEX sites. The tables in section 4.6 have been revised after consultation with Indian tribes.

The maps were included in the DARHT draft EIS because a Federal land managing agency can release maps of cultural sites if in doing so the best interest of the cultural resources would be served. DOE included the maps in the draft EIS because it was thought that the best interests to serve the environmental analysis was to show the location of sites in relation to the DARHT and PHERMEX Facilities. Access controls to TA-15 were considered sufficient to ensure that the sites would be protected.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 2	None required.

RESPONSE

DOE notes that all of the cultural resource sites listed in the DARHT EIS, including the four mentioned in this comment, are within a fenced exclusion zone that is not accessible to the general public. One reason that archeological and cultural sites on LANL grounds tend to be better preserved than those on surrounding lands is the fact that access to LANL has been controlled for over 50 years. The Nake'muu site has been described in the open literature many times over the past 90 years, as have several of the other cultural resource sites near TA-15. DOE takes seriously its responsibilities as a federal land management agency to preserve the cultural resource entrusted to its care. After conversation with San Ildefonso and other tribes, DOE has developed additional mitigation means to assist in protecting cultural resources in the vicinity of TA-15. See section 5.2.11.2 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 3	Sections 4.6.3 and 6.9

RESPONSE

DOE apologizes for any misunderstanding and has advised the Pueblo of San Ildefonso that there was no intent to violate the Tribe's privacy in regard to consultation under the American Indian Religious Freedom Act (AIRFA). Instead, DOE merely intended to note for the record in the DARHT EIS that it was pursuing its obligation to consult with the tribal governments under the AIRFA and other cultural resource laws, in accordance with its government–to–government relationship with San Ildefonso and other tribes. The text of the EIS has been revised in section 6.9 to indicate that consultation with the tribes is ongoing, and will be ongoing, for the life of the project.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 4	Section 4.6

RESPONSE

See response to comment 4-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 5	Section 4.6

RESPONSE

See response to comment 4-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
4 - 6	Section 4.6

RESPONSE

See response to comment 4-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 1	None required.

RESPONSE

The accelerator technology planned for DARHT is fundamentally different from that used at PHERMEX and FXR. These differences are necessary to move to the energy levels and pulse widths planned for DARHT. DARHT is considered to be a stepping stone to some of the technology for AHF when and if that facility is built. Thus, bypassing DARHT would not provide a shortcut to AHF. Schedule is another consideration; this proposed alternative would further delay the capabilities desired from DARHT. The AHF will be analyzed as part of the SS&M PEIS (see section 3.10.3).

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 2	None required.

RESPONSE

DOE agrees that more complete data are desirable, but the past environmental reports are the best available data for LANL. DOE continues to work with LANL to improve the quality of the environmental surveillance program and data and has also initiated a program with nearby pueblos to share in environmental surveillance data collection. Through means such as these DOE hopes to improves the representativeness and confidence of environmental surveillance data. DOE has not relied solely on the environmental surveillance data to draw conclusions but to present a picture of the potentially affected environment in the vicinity of DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 3	None required.

RESPONSE

See response to comment 5-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 4	None required.

RESPONSE

The EIS includes evaluation of potential impacts from releases of depleted uranium and other materials from DARHT (see section 5.1.2.1.2). DOE believes that the analyses presented in the EIS adequately represent the potential impacts of these releases on the environment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 5	None required.

RESPONSE

See response to comment 5-2 and response below.

Although the NEPA process includes a specific period for public comments on the draft EIS to ensure that they can be addressed in the final EIS, the process in no way inhibits the Pueblo's right to comment at any time. DOE notes that the LAAO office and LANL meet with San Ildefonso and other pueblos on a regular basis, and welcomes continuing dialogue with the Pueblo regarding these issues.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 6	Section 4.6

RESPONSE

See response to comment 4-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 7	None required.

RESPONSE

Section 5.1.6.1 indicates that measurements showed the air shock wave generated by a test event is of greater concern than vibrating ground motion in regard to the potential for damage to structures or cultural resource sites. In fact, ground motion caused by the air wave is stronger than seismically transmitted ground motion. DOE does not believe that further analysis of seismic ground motion is needed. The measured air wave is noted as being about one-tenth the value normally tabulated for window breakage. Based on these measurements, the 150-lb (68-kg) shots that would be fired at DARHT are calculated to be about one-half of the value normally tabulated for window breakage.

Standing walls, such as those at the Nake'muu ruins are slowly and continually weakened by natural processes, and they will eventually fall from natural forces. It should be noted that lightning strikes anywhere within a mile or two can produce an airwave at Nake'muu greater than that expected from DARHT testing. Damage at Nake'muu from DARHT air waves is not considered a reasonable expectation. In any event, to mitigate possible impacts, DOE has agreed to continue to work with San Ildefonso to protect Nake'muu and other cultural resource sites. See section 5.11 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 8	None required.

RESPONSE

PHERMEX, and firing sites very close to it, have been used at various times in the past for shots considerably larger than any design shots for DARHT. Thus, the fragment distribution in the vicinity of PHERMEX is not a good model.

Modeling of fragment distribution has shown that there would be minimal amounts of test materials past a 800-ft (245-m) radius. Most of these materials would be sand size particles that have traveled in an upward trajectory and fall back to earth at the velocity of gravity. Section 3.3.1 of the EIS has been revised to reflect this information.

As noted in the EIS, the probability that any shrapnel would reach Nake'muu is small and could be reduced further by placing an additional barrier on top of the DARHT building see section 5.11 of the FEIS. Shrapnel for any shots larger than the design shots would be mitigated by temporary blast shields.

COMMENT CODE	LOCATION OF EIS REVISION(S)
5 - 9	None required.

RESPONSE

The American Indian Religious Freedom Act, August 1978, sets U.S. policy to "protect and preserve for American Indians . . . access to sites. . ." LANL policy has been to consult with local Pueblos (in particular the governments of the four Accord Tribes) and coordinate access to areas within LANL. If pueblo members were visiting the Nake'muu site, there would be no shots at DARHT during the visit and pueblo members would not experience any shot effects. A possible exception to site access might be special arrangements to observe actual effects.

COMMENT CODE	LOCATION OF EIS REVISION(S)
6 - 1	None required.

RESPONSE

DOE appreciates the State's review.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 1	Section 4.4.2

RESPONSE

The statement in section 4.4.2 has been modified. Similarly, surface water and spring sustain perched ground water within Pajarito Canyon near the western portion of LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 2	Section 4.4.3

RESPONSE

This limitation is noted in the EIS text. See section 4.4.3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 3	None required.

RESPONSE

The DOE agrees that the screen lengths of the water supply wells limit their utility as water quality monitor wells. Data from these wells have been referenced in the draft EIS because there are no existing monitor wells in the area of TA-15. To eliminate this deficiency, DOE has suggested drilling a Laboratory-wide network of properly designed monitor wells under the Ground water Protection Management Program.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 4	None required.

RESPONSE

DOE has no intent to discharge DARHT-related materials to ground water. Analyses in section 5.2.4.2 indicate that, using conservative assumptions to maximize impact from infiltration of materials, there would be no impacts to ground water quality. Peak concentrations (which are well below applicable MCLs) calculated under these unfavorable conditions would be reached only after 20,000 to 40,000 years.

DOE has prepared the Ground Water Protection Management Program Plan and submitted it for review and comment to the New Mexico Environmental Department's Ground Water Remediation and Hazardous Waste Bureau. This document addresses ground water concerns LANL-wide and, in combination with the DARHT EIS, provides much more information than previous documents.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 5	None required.

RESPONSE

The DOE appreciates this assessment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 6	None required.

RESPONSE

In the event that DOE decides to implement an alternative involving the operation of DARHT, DOE and LANL will obtain all State permits necessary for operation of DARHT. Recognizing that appendix A values of AQCR 702 are screening values, DOE does not believe that these values provide a representative look at potential DARHT impacts because of the significant differences in operating parameters. Some of the unique DARHT parameters include periodic detonations rather than continuous stack or point-source releases, operation in an area closed to public access, and the fact that 90 percent or more of the depleted uranium that would be used in uncontained detonations remains on site as large and small metal fragments (section B.8), immediately reducing the amount of material available to 10 percent of the bounding amount of 1,543 lb (700 kg) annual usage. DOE is confident that calculation of impacts using EPA-approved methods would not exceed NMED permit requirements and in fact would be lower than impacts calculated in the draft EIS.

Hourly emission estimates for chemicals which react with heat to form varying chemical products should not be based entirely on yearly expenditure amounts. For instance, emissions of lithium hydride would be based on the aerosolized amount remaining after the combustion reaction with high explosives, not on the amount expended. Lithium hydride, in the presence of air, humidity, and heat will react immediately and completely to form lithium hydroxide, an unregulated form of lithium.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 7	None required.

RESPONSE

DOE does not believe that implementing the DARHT proposal to complete construction of the facility would meet the requirements for an AQCR 702 construction permit. DOE does not believe that the periodic emissions expected from DARHT, if implemented, would exceed appendix A levels, nor would any of the other criteria under AQCR 702 Part 3 C.2 apply.

See response to comment 7-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 8	None required.

RESPONSE

Amounts of metals and other materials assumed under all alternatives are the maximum amounts that have been projected for annual use at DARHT. Thus, the actual number of tests can vary from year to year and the amounts of materials released to the environment would remain within those levels discussed in the EIS. It is anticipated that actual usage will be significantly less. Use of hazardous materials is closely controlled at PHERMEX, and would be administratively limited at DARHT in a year when the maximum amounts of material were approached. One intent in this control is to prevent or strictly limit the potential for mixed-waste generation.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 9	None required.

RESPONSE

The solubility of uranium in LANL waters was assumed to be 300 mg/L (see appendix E2.2.1) and the proposed MCL value is 20 µg/L (see section 5.1.4.1). Thus, the solubility is 15,000 times the proposed MCL. One premise of the EIS calculations was that public access is limited by the present boundary of the LANL site which is approximately 0.75 mi (1 km) east of the DARHT site. A conservative modeling approach was adopted for runoff from the mesa top contributing water and sediment to the adjacent canyon bottoms. Using the curve number method, the volume of rainfall that becomes surface runoff was determined. This amount of water was assumed to carry contamination at the solubility limit to the canyon bottom. Thus, runoff from the firing site arrives in the canyon bottom and merges with water arriving from upstream in the watershed. The resulting solution concentration in the first segment or reach of the canyon was calculated to be above the proposed MCL, (i.e., 28 and 30 µg/L, see tables 5-3 and 5-7 of the DARHT final EIS); however, this location is within the boundary of LANL and not a point of public access. The quality of water discharging into the Rio Grande was shown to be well below the proposed MCL (see tables 5-2 and 5-6).

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 10	None required.

RESPONSE

The EIS evaluated potential radiological impacts from releases of uranium and tritium to the environment. See sections 5.1.8 and H.3. Tritium impacts were determined to be negligible because of the low quantity (3 Ci) and form (tritium gas) potentially released.

Analyses in the EIS conservatively assumed that 10 percent of all material released during uncontained detonations was respirable (see section 5.1.2.1.2 and figure B-1).

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 11	None required.

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
7 - 12	None required.

RESPONSE

The DOE appreciates this suggestion.

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 1	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, and H.5.2

RESPONSE

DOE appreciates this assessment. Mitigation will be addressed in the ROD according to the selected alternative.

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 2	None required.

RESPONSE

The 25 percent value is a hypothetical number used in this EIS to provide a bounding unit for analysis. The actual percentage under this alternative would be expected to be less. Some uncontained shots are necessary because the amount of high explosive needed would exceed containment capacity, special diagnostic equipment would not fit in the containment, or moving elements (such as a projectile) are involved. Other experiments might be done without containment because their small size would not justify the cost of containment or they would not include hazardous materials, where containment would mitigate adverse impacts from contamination by hazardous materials.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 3	None required.

RESPONSE

DOE recognizes that offsite discharge occasionally occur. Offsite surface water flow may occur seasonally in all of the drainages on the Pajarito Plateau depending upon the degree of snowmelt or intensity of summer thunderstorms. None of the drainages that cross DOE land, however, flow year long. Offsite flows typically are limited to a few days per year and flow may not be continuous from LANL contaminant source areas to the DOE boundary.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 4	None required.

RESPONSE

DOE agrees that more investigation is needed in the Cañon de Valle area. There is considerable debate between hydrogeologists as to the source of the springs and surface water. Please note that the DARHT draft EIS acknowledges the possibility that shallow perched ground water may exist in this area (section 4.4.3). DOE cannot verify the flow measurements cited in the comment but appreciates this information.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 5	Section 4.4.2

RESPONSE

Section 4.4.2 has been modified to include additional information on springs and drill holes in the canyons near DARHT and their implications concerning the presence of perched ground water.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 6	Section 4.4.2

RESPONSE

See response to comment 8-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 7	Section 4.4.2

RESPONSE

See response to comment 8-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 8	Section 4.4.2

RESPONSE

A comprehensive study has not been conducted in the Cañon de Valle area to determine the source of springs. Until such an investigation is performed, and the source is determined to be perched ground water, we cannot verify the NMED's interpretation.

See response to comment 8-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 9	Section 4.4.2

RESPONSE

See response to comment 8-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 10	None required.

RESPONSE

The hydrologic properties of the Discharge Sink in Potrillo Canyon located onsite at LANL have not been studied. Core from a borehole in the upstream portion of the Sink has been tested extensively for unsaturated hydraulic characteristics. From this data we are able to calculate hydraulic gradients within the Sink and make estimates of downward flux rates. Additional surface water flow characteristics were determined during a 5-year study.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 11	None required.

RESPONSE

DOE agrees that perched ground water in the alluvium is likely to exist in upper Cañon de Valle, sustained by spring flow and seasonal runoff. The dimensions of such a zone are unknown at present.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 12	Section 4.4.2

RESPONSE

It is possible a perched ground water body may exist in Water Canyon below Cañon de Valle. At present it is not known what the source of the water may be (e.g. effluent discharges, spring flow) nor is it known if this is a permanent water body. If a perched zone exists at this location, it cannot be very extensive, as wells WCO-1 and WCO-2 are dry just one-half mile below the WCM holes, which are located south of TA-15.

See response to comment 8-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 13	None required.

RESPONSE

Figure 4-12 shows contours on top of the main aquifer. Taking these contours as an approximation of the potentiometric surface, it appears that water in the aquifer moves eastward or southeastward across LANL. The only possible recharge area is in the Jemez Mountains immediately west of LANL, or areas further west. DOE asserts that these best available data support the statement cited in the comment regarding the aquifer recharge and flow locations.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 14	None required.

RESPONSE

The storm water monitoring stations near PHERMEX are recently installed and major storms are infrequent. As a result, the PHERMEX storm water quality data requested have not yet been obtained. DOE uses the best data available in its NEPA reviews but does not require that new data be collected in all cases. The runoff modeling described in appendix E computes the sediment load transported from LANL in the Rio Grande but currently doesn't provide details of sediment transport within LANL.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

8 - 15 None required.

RESPONSE

The calculations presented emphasize dissolved concentrations. Both the New Mexico General Stream Standards and the New Mexico Ground Water Standards are based on dissolved concentration limits. Nonetheless, sediment loading and associated concentrations are calculated at the Rio Grande.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

8 - 16 None required.

RESPONSE

The Ancho Canyon surface water station is located near the Rio Grande, a distance greater than one-half mile from Ancho Spring. While flow at the station is largely derived from Ancho Spring, it is considered to be a surface water station because it may be additionally affected by other surface features. Please note that the Laboratory Environmental Surveillance Reports (LANL 1993c and LANL 1994a) recognize that water collected directly from Ancho Spring is considered to be ground water.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

8 - 17 None required.

RESPONSE

DOE believes that the isotopic analyses are reliable. The question raised is whether the samples obtained from the wells are truly representative of the ground water horizons implied or contaminated by water from other horizons on the surface. The question of annular leakage and subsequent contamination of the main aquifer samples with water from the surface on shallow horizons probably cannot be answered without specially designed sampling techniques or entering the wells in question.

However, it should be noted that the effect of such contaminations, if it exists, is to produce conservative errors in the interpretation of results. The tritium and carbon-14 analyses are done to infer the presence of contaminations, if any, of the main aquifer by contaminants in shallow waters, and the rate at which surface water infiltrates through the unsaturated zone. In both cases, if the main aquifer samples are diluted by shallow water, the potential impacts on the main aquifer would be overestimated.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 18	Sections 4.4.2 and 4.4.3

RESPONSE

DOE agrees that additional monitoring wells in the alluvial material in the canyons opposite the PHERMEX and DARHT facilities would help identify and characterize any alluvial aquifer that may exist in the canyon alluvium. See the discussion in EIS section 4.4.2. Additional surface water monitoring stations would help isolate the impacts of PHERMEX or DARHT facilities operations on the water quality and sediment contamination.

LANL (i.e., DOE, LANL, and Foley Company, a facilities contractor for the DARHT construction) provided a Storm Water Pollution Prevention Plan (Foley Company, 1994) as required for construction of the DARHT Facility and has received a subsequent from U.S. Environmental Protection Agency permit for construction activities. If a storm water pollution prevention plan were needed for operation of the facility, it would likely become part of LANL's general storm water permit.

Environmental surveillance data, the Potrillo Canyon study, and computer simulations of uranium, beryllium, and lead migration have not revealed significant impacts due to storm water runoff from the PHERMEX or DARHT firing sites. Therefore, measures such as catchment basins to trap contaminated sediment from the firing site(s) are not anticipated.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 19	Section 4.5.4

RESPONSE

Since the draft EIS, a further biological survey has been done, resulting in identification of a nesting pair of Mexican spotted owls and a characterization of that specific habitat. The final EIS has been revised to incorporate this information, potential impacts to that habitat, and mitigation measures. See section 4.5.4, appendix K.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 20	Sections 4.5.4, 5.1.5.4, and 5.2.5.4

RESPONSE

Extensive field surveys for Mexican spotted owls have been performed concurrently with and following publication of the DARHT draft EIS. As a result of these surveys, it has been determined that suitable nesting habitat exists for the Mexican spotted owl near DARHT. Informal consultation with the USFWS has been completed, and USFWS has concurred in DOE's determination that the Mexican spotted owl would not be adversely affected by this project. Appropriate mitigative measures or operating restrictions will be implemented to limit any impacts to the Mexican spotted owl or the habitat (see section 5.11 and appendix K).

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 21	Section 5.8.1

RESPONSE

See response to comment 8-20.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 22	None required.

RESPONSE

Additional studies are planned to monitor the potential impacts of the proposed action on the Mexican spotted owl. See section 5.11 and appendix K. The scope of these studies will be determined over time and will be coordinated with the USFWS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 23	None required.

RESPONSE

The environmental impact analysis modeling in appendix H and the environmental consequences in sections 5.18 and 5.4.8 were based on calculated concentrations of uranium and other metals on foodstuffs, and accepted parameter values from the referenced professional literature for foodstuff uptake, translocation, and dose.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 24	Sections 4.5.4, 5.2.5.1.2, 5.2.5.4, and appendix K.

RESPONSE

DOE recognizes this fact; discussions in the DARHT draft EIS were written before field surveys were completed for the Mexican spotted owl in the vicinity of the DARHT site. Several sections in the EIS have been revised to properly reflect the protection of this species. See sections 4.5.4 , 5.2.5.4, and appendix K.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 25	Section 5.2.5.4

RESPONSE

DOE completed its biological assessment for the vicinity of the DARHT site in July 1995, after the draft DARHT EIS was issued. Consultation with the USFWS is now complete and in the event DOE proceeds with the DARHT proposal, DOE will take appropriate mitigation measures to protect biological resources.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 26	None required.

RESPONSE

DOE agrees with the presumption that the limits established under the NESHAPS permit would not limit testing under the Enhanced Containment Alternative, particularly since the NESHAPS limit is dose-based at 10 mrem/year from the air pathway. The anticipated dose impact from DARHT would be a small fraction of this value.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 27	None required.

RESPONSE

Since the prototype vessel has not been used before and is basically still a concept it is anticipated that there will be engineering problems encountered during operation. The testing limitations described in section 3.7 are considered reasonable at this point. These types of considerations provide part of the basis for the formulation of the Preferred Alternative, Phased Containment. DOE also anticipates being able to develop the vessel technology and provide increasing levels of containment, even beyond the proposed 75 percent in Phased Containment, if successful.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 28	None required.

RESPONSE

Three air sampling stations, two of which are located in TA-15, were put in place during 1993. However, analysis of LANL environmental surveillance data for 1993 has not yet been completed and is not available. Results available for other air monitoring stations, particularly the LANL perimeter stations for years before 1993, indicate very low to nondetectable concentrations of materials (mainly uranium) which could have originated at PHERMEX. Also, usage of these materials has decreased at PHERMEX over the years, so any detected concentrations would be expected to be less. Since the two stations in questions are onsite, in the middle of TA-15, they would be of limited use in estimating potential impacts offsite.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 29	Section 4.2.5

RESPONSE

The EIS has been corrected to read "downwind."

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 30	None required.

RESPONSE

EPA-prescribed methods are required for demonstration of compliance with 40 CFR 61 Subpart H. However, DOE Order 5400.5 "Radiation Protection of the Public and the Environment" directs the use of realistic assumptions in dose calculation methods in demonstrating that requirements of the Order have been met. Estimates using both methodologies are presented in section 4.8.1.1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 31	None required.

RESPONSE

Comparison to the EPA limit is presented in the final EIS (see second paragraph of section 4.8.1.1.) DOE believes comparison to the 100 mrem DOE standard contained in DOE Order 5400.5 is appropriate because it shows the radiological dose contribution from all LANL exposure pathways, rather than just the airborne pathway as required by EPA NESHAPS regulations at 40 CFR Part 61 Subpart H. It also provides some indication of the effect of using site-specific, realistic dose calculation methods.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 32	None required.

RESPONSE

The relative values are based on the mechanism of release. The EIS analyzes a hypothetical situation in which the effective release for unconfined tests would occur about 328 ft (100 m) above ground, depending somewhat on the size of the shot. The expanding ball of blast products would mix with the air and would be subjected to the winds at the higher elevation. For contained tests, the emission would occur near ground level as blast products are vented, comparatively slowly, following a test.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 33	None required.

RESPONSE

At the current time, too little information exists, and estimates of costs associated with soil cleanup are too nebulous to provide a detailed estimate of cost savings. DOE believes that the range from 25 to 90 percent (a factor of less than 4) is all that can be justified with the current information available.

COMMENT CODE	LOCATION OF EIS REVISION(S)
8 - 34	None required.

RESPONSE

The EIS analysis considers ground-level release for all criteria pollutants (section C1.3). The exception stated there is an area source rather than a point source; not an exception to gound-level release. Elevated release is used to analyze the effect for blast products, such as depleted uranium, beryllium, and lead (section 5.4.2.1 and H2.2). The height of release would depend somewhat on the size of the shot. Larger amounts of explosive would cause effective release at higher levels. As the release height increases, the FENII and MEPAS computer codes incorporate more dispersion and lesser resultant doses.

COMMENT CODE	LOCATION OF EIS REVISION(S)
9 - 1	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
9 - 2	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 1	None required.

RESPONSE

The DARHT EIS analyzes the environmental impacts that would be expected if five alternative ways to achieve enhanced radiographic capability were implemented, and compares these impacts with the current situation. DOE has stated, as part of the purpose and need for this proposal, that it needs to conduct dynamic experiments on plutonium. The EIS is prepared to aid in the DOE's decision-making process as to whether or not to provide enhance capability, but DOE is not facing a decision as to whether or not plutonium experiments are needed, and the DARHT EIS does not analyze whether or not these experiments are needed.

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly. The public is able to give input to this process through the election of public officials, involvement with public officials, and by participation in public hearings such as those held for the DARHT draft EIS. Plutonium is used in some stockpiled weapons. Although substitute materials are used whenever possible, some experiments to address stockpile issues cannot be done with a substitute material.

The Department prepared a classified supplement to the DARHT EIS that provides additional information and analysis. In general, the environmental impacts identified in the classified supplement have been incorporated into the unclassified portion of this EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 2	None required.

RESPONSE

Dynamic experiments involving plutonium would always be conducted inside double-walled steel containment vessels (sec. 3.3.2). Different designs could be used depending on the nature of the dynamic experiment and diagnostic tools used and would be developed in response to specific needs at the time such an experiment is designed.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 3	None required.

RESPONSE

The amount of material in any single dynamic experiment or set of experiments would vary according to test objectives. Different objectives could require different materials. In no case would the material be capable of providing a nuclear yield during the dynamic experiment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 4	None required.

RESPONSE

DOE conducts many types of tests and experiments on various isotopes, mixtures and alloys of plutonium. Dynamic experiments with plutonium, of the types proposed and discussed in the DARHT EIS, could involve various plutonium isotopes and alloys, which would be especially chosen for the purposes of the experiment. All experiments would be arranged and conducted in a manner such that a nuclear explosion could not result. In the past, DOE has conducted dynamic experiments at PHERMEX using weapons-grade and other forms of plutonium metal. See sections 2.3.3 and 3.3.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 5	None required.

RESPONSE

Any experiment involving a containment vessel would require that some parts of the experimental assembly be put together before placement inside the containment vessel. Other parts of the experimental assembly, such as some diagnostic devices, would be attached after placement of the assembly inside the containment vessel.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 6	Sections 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.4.9, 5.7.2.2, and J.6.1

RESPONSE

As noted in the EIS, any experiments that would incorporate plutonium would be conducted in double-walled containment vessels. Using this approach in the past, there have been no failures of the containment. Based on its engineering experience, DOE and LANL believe that vessel failure with a subsequent release to the environment is not a reasonable scenario.

DOE prepared a classified supplement to the DARHT EIS which describes, among other things, possible "accident scenarios regarding dynamic experiments using plutonium." The environmental impacts from the classified supplement, including accident scenarios, have been included in the appropriate sections of the DARHT EIS. See sections 5.1.9, 5.4.9, and 5.7.2. Based on the analyses presented in the classified supplement, conducting experiments with plutonium would be expected to have minimal potential for environmental impacts under any of the alternatives analyzed.

After completing the experiment, the vessel would be taken to the Plutonium Handling Facility at LANL, at TA-55, for cleanup procedures. This discussion in the EIS has been revised for clarity. See section 3.3.8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 7	Sections 3.3.8 and 5.4.10.3

RESPONSE

DOE would conduct any dynamic experiments using plutonium in a double-walled steel containment vessel. After completing the experiments the vessel would be taken to the Plutonium Handling Facility at LANL, at TA-55, for cleanup procedures. Discussion of waste volumes and composition of waste is contained in the EIS, sections 3.3.8 and 5.4.10.3.

Liquid plutonium waste streams would not be generated as a result of operations involving plutonium at DARHT or PHERMEX. Following completion of these operations the containment vessel would be moved to the LANL plutonium handling facility, TA-55, for cleanout and recovery. TA-55 waste streams will be addressed in the LANL Sitewide EIS. DOE has an excellent basis to estimate future waste streams, using past dynamic experiment, cleanout and recovery information.

COMMENT CODE	LOCATION OF EIS REVISION(S)
10 - 8	Section 3.8

RESPONSE

Part of DOE's purpose and need for enhanced radiographic capability specified in the DARHT EIS is to obtain information about plutonium through dynamic experiments (see section 2.3 of the DARHT EIS). Under the Plutonium Exclusion Alternative, DOE could not use the enhanced radiographic capability proposed for the DARHT Facility to obtain the needed information about plutonium, but instead would have to rely on its existing capability at PHERMEX or other facilities. This would have two immediate programmatic implications: first, DOE could not obtain the higher resolution information that is needed for dynamic experiments with plutonium; and second, DOE would have to continue to maintain and operate PHERMEX in addition to DARHT. Although the EIS is focused on environmental impacts, not programmatic impacts, DOE has summarized the programmatic consequences of the various alternatives in section 3.11. DOE expects to consider programmatic impacts when making its final decision on this project (see section 1.6).

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 1	None required.

RESPONSE

Section 106 of the National Historic Preservation Act (NHPA) requires that all properties (sites) that are determined eligible for the NRHP and which may be affected by a proposed Federal action be evaluated with respect to adverse effect. The NHPA requires that Federal agencies protect eligible resources through mitigation of adverse effects which can consist of protection data recovery or other actions. In the case of the Nake'muu site, mitigation of adverse effect would be accomplished by orienting the DARHT Facility such that the Nake'muu site would be in the "blast shadow," and other mitigation as addressed in section 5.11.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 2	None required.

RESPONSE

The draft EIS referenced past consultation with the SHPO and was prepared concurrently with additional field surveys and consultation with the New Mexico State Historic Preservation Officer. The archeological surveys were completed simultaneously with the draft EIS, and appropriate consultations have resulted. The DOE's actions in this area are consistent with the requirements of the CEQ 1502.25 (a).

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 3	None required.

RESPONSE

The NEPA regulations require consideration of impacts to cultural and historic resources among other aspects of the environment [40 CFR 1502.16]. The DARHT EIS identifies and assesses those impacts that might be expected from normal operations under any of the seven alternatives analyzed, and from various accident scenarios. DOE believes that the analyses in the DARHT EIS adequately disclose the environmental impacts expected and that the procedures established in correspondence between the New Mexico State Historic Preservation Officer and DOE would serve to minimize any potential impacts to important sites.

The EIS identifies and analyzes the impacts of each alternative on cultural resources in sections such as 5.1.6, 5.2.6, and 5.4.6.

See section 4.6.1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 4	None required.

RESPONSE

Following a NEPA review and completion of an environmental impact statement, an agency is required to document its decision in a formal document called a Record of Decision (ROD) (see inside back cover of EIS). By regulation, among other things a ROD must specify which alternative or alternatives were considered to be environmentally preferable [CEQ Regulation, 40 CFR 1505.2(b)]. An agency does not document this in the EIS (draft or final) because it is through the decision-making process (documented in the ROD) that the agency determines which alternatives were considered to be environmentally preferable. While an agency is required to identify and discuss in the ROD all factors that entered into its decision-making [40 CFR 1505.2(b)], an agency is not required to select the environmentally preferable alternative. As stated in section 1.6 of the EIS, DOE will identify in the DARHT ROD the environmentally preferable alternative, other decision factors, and how those considerations were balanced, in accordance with its regulatory responsibilities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 5	Section 2.5

RESPONSE

DOE has revised the discussion in the DARHT EIS of nonproliferation and counter proliferation applications for enhanced radiographic hydrodynamic test capability (see section 2.5).

The concepts and capabilities of hydrodynamic testing have been well known to negotiating parties for the Nonproliferation Treaty, as noted in the response to comment 17-4. Currently, it is not considered sufficient to certify a completely new design without nuclear test data. Activities proposed for DARHT or PHERMEX do not include nuclear tests. A few years ago, DOE briefly studied containment for very low-yield nuclear tests (CONVEX, see comment 53-53), but these tests could not be done at DARHT or PHERMEX because the containment would be too large and would be buried underground.

The Nation's commitment to nonproliferation follows. The parties agree to not transfer nuclear weapons, other devices, or control over them, and to not assist, encourage, or induce nonnuclear states to acquire them. However, the treaty does not invoke stockpile reductions by nuclear states, and it does not address actions of nuclear states in maintaining their stockpile. Article VI obligates each of the parties to negotiate in good faith on the "cessation of the nuclear arms race at an early date and to nuclear disarmament..." The concept of hydrodynamic testing is known to all the signatories, and the capability exists with several of the nuclear states. Such capability is said to have been an important factor for the nuclear states to have entered into the treaty and to agree to further negotiate for a Comprehensive Test Ban Treaty. On May 11, 1995, 178 nations agreed to permanently extend the expiring nuclear Nonproliferation Treaty and accept a set of "principles and objectives" that include specific steps to turn back the nuclear arms race. The five nuclear states also agreed to work toward a comprehensive test ban by 1996 and rapid negotiation of a treaty to end production of nuclear bomb material.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 6	None required.

RESPONSE

The EIS addresses cumulative impacts of past, present, and reasonably foreseeable future actions as required by 40 CFR 1508.7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 7	None required.

RESPONSE

As discussed in section 1.1 of the EIS, DOE initiated construction of the DARHT firing site facility based on environmental reviews conducted in the 1980s. In 1984, in response to public concern, DOE began this DARHT EIS. In July of 1994, the Secretary of Energy instituted a Department-wide NEPA Policy that, among other things, requires that DOE complete its NEPA reviews more expeditiously than was done in the past. The 10-month schedule for completing, the DARHT EIS is consistent with both the letter and spirit of the Secretary's Policy.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 8	Sections 4.5, 4.5.1, 4.5.4, 5.1.5.4, 5.2.5.4, and Appendix K Table 4-12

RESPONSE

See response to comment 2-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 9	Sections 4.5.4, 5.1.5.4, and 5.2.5.4

RESPONSE

See response to comment 2-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 10	None required.

RESPONSE

The term "mitigation" as used in the NEPA process is defined by regulation [40 CFR 1508.20]. Mitigation includes all of the following:

- Avoiding an adverse impact by not taking a certain action
- Minimizing an adverse impact by limiting or modifying certain actions
- Rectifying an adverse impact by rehabilitation or restoring the affected aspect of the environment after the action has taken place
- Reducing or eliminating an adverse impact over time by taking preventative measures or modifying operating conditions
- Compensating for an adverse impact by replacing or providing substitute resources.

Federal agencies work together and with state agencies, such as the State Historic Preservation Officer, to develop mitigation measures to protect cultural resource sites and habitat for wildlife including threatened and endangered species.

A NEPA analysis may include "up front" mitigation, which are those measures incorporated into a proposed action or its alternatives, to determine what the overall environmental effects of mitigation measures might be. On the other hand, a Federal agency may decide on mitigation measures after determining the potential for adverse environmental impacts through the NEPA review process, and identify these in the Record of Decision following the NEPA analysis. Although there is no provision in NEPA or its implementing regulations for "rating" mitigation measures for their anticipated "effectiveness of actually achieving these protective measures," the regulations do provide for monitoring the mitigation measures over time [CEQ regulation 40 CFR 1505.2(c)]. DOE accomplishes this through developing a Mitigation Action Plan [DOE NEPA regulation, 10 CFR 1021.331]. See section 1.6 of the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
11 - 11	None required.

RESPONSE

Mitigation and monitoring programs at LANL are discussed in full in the LANL annual Environmental Surveillance Reports. Only those operations connected with the proposed DARHT or PHERMEX facilities are discussed in this EIS. The EIS describes the potential impacts to soils and groundwater which would result from the alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
12 - 1	None required.

RESPONSE

A Federal agency is obligated to include within the scope of analysis of an environmental impact statement the impacts of "connected actions." "Connected actions" are closely related actions which: might automatically trigger other actions that may require an EIS; would not proceed unless other actions are taken previously or simultaneously; or are interdependent parts of a larger action and depend on the larger action for their justification [CEQ regulations, 40 CFR 1508.25 (a)(1)]. DOE did not identify any "connected actions" relative to its proposal to obtain enhanced radiographic hydrodynamic test capability analyzed in the DARHT EIS.

See discussion in section 2.6 and volume 2, section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
12 - 2	None required.

RESPONSE

The geologic setting and geology near the site are described in section 4.3.2. Because the local geology does not vary greatly laterally, the nearby data are deemed sufficiently representative, so long as analyses do not indicate marginally acceptable results. The potential for migration of contaminants with ground water is discussed in appendixes D and E.

With regard to the transport of fissile materials, currently there are approximately 25 to 50 shipments per year to and from LANL. DOE considers this to be an ongoing aspect of the nuclear weapons programs. Thus, decisions on enhanced hydrodynamic capability are unrelated to the shipments of fissile materials to and from LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
12 - 3	None required.

RESPONSE

DOE disagrees and knows of no evidence that a weapon system does not age. A weapon consists of electrical and mechanical parts that are made of metals and plastics; until a weapon is dismantled, it will age. The existing stockpile is considered to be safe and reliable, and has not yet experienced any post-design life aging problems since in the past, weapons have been retired soon enough that this has not occurred. The concern remains with the future stockpile since current U.S. policy requires that the existing stockpile remain active past its design life.

COMMENT CODE	LOCATION OF EIS REVISION(S)
12 - 4	None required.

RESPONSE

The purpose of NEPA is to bring about a complete examination of potential environmental impacts of proposed actions, such as DARHT, by Federal agencies.

COMMENT CODE	LOCATION OF EIS REVISION(S)
12 - 5	None required.

RESPONSE

Any known violation of permit standards or noncompliant situations are reported through the appropriate regulatory authority. Steps to bring LANL into compliance are negotiated with the regulatory authority. Citizen suits can be (and have been) brought against LANL or DOE if the public does not feel the spirit and intent of the laws are not being followed by LANL or DOE, or properly implemented by the regulatory authority. A violation at a single facility would not prevent other operations from being conducted at LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 1	None required.

RESPONSE

DOE agrees that existing dynamic nuclear weapons remain safe and reliable. DOE disagrees that confidence in a weapon system "actually increases with age;" DOE believes that it is essential to continue to study aging effects on nuclear weapons systems, and the condition of nuclear weapons primaries.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 2	Section 2.1

RESPONSE

DOE has revised the text in chapter 2 to clarify the discussion of need. The text points out that stockpile problems have arisen in the past; DOE relied heavily on underground nuclear testing as a diagnostic tool to assist in correcting these problems. DOE expects that stockpile problems will arise in the future - no one can predict with certainty when problems might occur, or what part of a nuclear weapon might be affected. Particularly in an era without nuclear testing, hydrodynamic testing increase in importance as an analysis tool or for confirming other analyses. DOE does not believe it is prudent to wait for problems to develop before acquiring the tools to deal with them. The recently completed study by the three nuclear weapons laboratories entitled "Stockpile Surveillance: Past and Future" (Johnson, K, et al. 1995) notes that certain types of components in primaries do in fact age. The average age of weapons in the enduring stockpile is increasing and in a few years will exceed for the first time the design lives of the individual weapons. The study describes hydrodynamic testing as the principal tool to help understand the effects of aging processes and verify any fixes for such problems. The comment confuses reliability with performance; while primaries are designed to provide ample energy to set off the secondary, the problem is whether the primary can be relied upon to achieve this performance. This engineering margin is unrelated to the need to compensate for the effects of aging or other influences.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 3	Section 2.3.2

RESPONSE

The comment references the "Sandia Stockpile Life Study" for which viewgraphs and an interim summary were prepared in 1993. DOE understands from Sandia that these viewgraphs were used as part of an internal status briefing. The data used to develop these viewgraphs arose from a database which was recognized to be incomplete and inadequate, in that much data, particularly that relating to problems found through methods outside the DOE's formal Stockpile Evaluation Program, was incompletely or inconsistently documented in this database. In particular, findings and "actionable" findings associated with the nuclear package (including the weapons primary) were not completely documented.

The three weapons laboratories (LLNL, LANL, and SNL) have now conducted a joint study [Stockpile Surveillance: Past and Future] (Johnson et al. 1995) which has updated this data to provide a more accurate record. The "defects database" now has more than 2,400 entries. More than 370 cases resulted in action due to safety or reliability concerns. Approximately 110 problems since 1958 required action to the nuclear components, in 39 of the 50 weapon types covered by the report. Of these, more than 90 were related to the weapons primary. While the rate of findings decreases after a weapon is initially deployed, the study concludes that it is reasonable to expect that problems would continue to arise in the stockpile at the rate of one or two defects per year, as the stockpile ages beyond the original design expectations. DOE notes that of the weapon types introduced since 1970, nearly one-half required nuclear testing to verify, resolve, or certify the resolution of problems relating to safety and reliability. This and other information have now been included in the final EIS in section 2.3.2.

The comment mentions metallurgical data and equation of state measurements. Such data are valuable, but do not relieve the need for enhanced radiographic hydrotesting.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 4	None required.

RESPONSE

Regarding the implosion process, DOE needs the enhanced capability that would be provided by DARHT to assure collection of adequate data in support of fundamental questions about physics of nuclear weapons regardless of aging considerations. See section 2.3.1.

As noted in the EIS, section 2.3.2, DOE believes that evaluation of aging weapons is needed. Actions should begin as soon as possible to benchmark the condition of weapons and their expected performance characteristics as a baseline for future surveillance observations and performance tests. DOE believes that, by itself, weapons surveillance is not adequate to evaluate, predict, and resolve performance or reliability problems.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 5	None required.

RESPONSE

DOE agrees that the existing stockpile is safe and reliable. The concern lies with the future evolution of the stockpile, the ability to address and resolve issues as they arise, and to maintain a high level of confidence in safety and reliability as the stockpile ages.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 6	Section 2.3.1

RESPONSE

DOE appreciates the concern expressed by this comment, but believes that the EIS adequately explains the safety issues associated with the proposed action.

The discussions in chapter 2 of the DARHT final EIS have been revised to include additional information related to safety and reliability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 7	Sections 2.1, 2.3.1 and 2.3.2

RESPONSE

See the responses to comments 13-2 and 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 8	None required.

RESPONSE

The purpose and need for enhanced radiography as proposed for DARHT is stewardship of the U.S. nuclear weapons stockpile pursuant to direction from the President and Congress. There is no requirement for new-design nuclear weapons at the present time.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 9	Section 2.3.2

RESPONSE

A discussion of the relevance of remanufacturing nuclear weapons to the DARHT proposal has been added to chapter 2. Chapter 2 has been revised in the final EIS to clarify the purpose and need. Additional information has been included in accordance with the SS&M Program Plan issued by the DOE in May 1995.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 10	Section 2.2.1

RESPONSE

While it is true that current national policy does not provide for the design of new nuclear weapons, the final EIS states that in the event that the U.S. decides it needs to design and manufacture new nuclear weapons it would use every tool necessary to accomplish this mission. This could include using enhanced radiographic hydrodynamic capability as proposed for DARHT (see section 2.3.4).

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 11	Section 2.5

RESPONSE

See response to comment 11-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 12	Section 2.5

RESPONSE

See response to comment 11-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 13	Sections 3.3.4 and 3.10.5

RESPONSE

The discussion in the EIS regarding the utility of FXR at LLNL compared to the proposed DARHT Facility has been revised. The DOE currently uses both FXR and PHERMEX to provide hydrodynamic test capability. However, DOE does not conduct dynamic experiments with plutonium at LLNL; DOE does not have the facility infrastructure at LLNL's site 300 to support these types of experiments, and it would be unreasonably expensive (several hundred million dollars) to provide the required plutonium handling capability at LLNL. Accordingly, the FXR facility, in current or upgraded mode, or with single- or dual- axis capability, would not provide the enhanced capability that the DOE needs to diagnose dynamic experiments with plutonium. As discussed in section 3.10.1.1, DOE believes it would be unreasonable to construct the requisite plutonium infrastructure at site 300 at LLNL, and this alternative is not analyzed in the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 14	None required.

RESPONSE

With regard to the transport of fissile materials, currently there are approximately 25 to 50 shipments per year to and from LANL. DOE considers this to be an ongoing aspect of the nuclear weapons programs. Thus, decisions on enhanced hydrodynamic capability are unrelated to the shipments of fissile materials to and from LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 15	Sections 3.3.2, 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.4.9, 5.7.2.2, and J.6.1

RESPONSE

For the DARHT EIS a breach of the double-walled containment vessel that would be used for dynamic experiments with plutonium was analyzed to determine potential health consequences from a hypothetical accidental release. DOE considers this to be an incredible event.

See response to comment 10-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 16	Section 5.4.10.3 Tables S-1 and 3-3

RESPONSE

Tables S-1 and 3.3 were revised to list the annual generation of various types wastes for each alternative. Table 3-1 reflects infrastructure needs for waste management and materials processing for single- and double-walled containment vessels. Section 3.3.8 and 5.4.10.3 were revised to address waste management issues raised in this comment.

Single-walled vessels would be used in support of hydrodynamic tests. Double-walled vessels would be used in containing plutonium.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 17	None required.

RESPONSE

This comment confuses the limited upgrades to PHERMEX which will occur in any case and are thus part of the No Action Alternative with the alternative of upgrading PHERMEX to provide the needed enhanced radiographic capability (Upgrade PHERMEX Alternative). As noted in the EIS (section 3.4), the No Action Alternative, which includes the continued operation of PHERMEX, is not static but includes the actions DOE might take to maintain or improve its current radiographic capability using its existing equipment. However, this limited upgrade to PHERMEX discussed in this comment would not provide the enhanced radiographic hydrodynamic testing capability that DOE now needs in the absence of nuclear testing. The addition of a double-pulsed capability to PHERMEX would not provide enhanced radiography. The second picture of the double-pulse would be of a noticeably reduced quality since the accelerator would not have time to generate the same power levels obtained for the first radiograph.

In contrast, the Upgrade PHERMEX Alternative would upgrade PHERMEX with the new high-resolution radiographic technology for DARHT. The intention for DARHT technology is not just to have two images late in the implosion process, as would be provided with the double-pulse capability, but to provide imaging through very thick, dense materials; take multiple, very brief, snapshots from two different lines of sight; and provide images of very high resolution. With completion and operation of both axes of DARHT, there would be a capability to obtain three-dimensional data as well as time-sequenced images.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 18	None required.

RESPONSE

On August 11, 1995, the President announced that the U.S. will no longer conduct the small-scale nuclear tests referred to by this commenter as hydronuclear tests. Accordingly, DOE will not conduct hydronuclear experiments at any existing or proposed facility at any site. DOE never intended to conduct hydronuclear tests at DARHT, and they were not proposed in the draft DARHT EIS. The DARHT facility was not designed to withstand the energy release that would be expected form this type of test, nor to protect workers or the general environment from the expected or potential accidental consequences from this type of test. The exact nuclear yield on hydronuclear experiments is difficult to predict and adds to the difficulty in designing facilities for hydronuclear tests. These possible effects mean that a facility such as DARHT would not be suitable for this type of test.

COMMENT CODE	LOCATION OF EIS REVISION(S)
13 - 19	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 1	None required.

RESPONSE

Up to 15 acres (6 ha) could have above-background concentrations of uranium under all of the alternatives developed in the DARHT EIS that would employ uncontained tests. This estimate was derived from the soil contamination analysis in appendix D. An estimate of measurable soil contamination, rather than a calculated estimate, would be 3 to 4 acres (1.2 to 1.6 ha) for the uncontained alternatives. This estimate was based on observed contamination at PHERMEX, which historically has used more depleted uranium and other materials than are planned for DARHT. Maximum use of material at the proposed DARHT facility is projected to be about 30 percent less than historical annual use at PHERMEX.

Appendix E used conservative modeling assumptions to estimate potential impacts to surface and ground water from DARHT operations. These evaluations showed there would be no impacts of DARHT operations.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 2	None required.

RESPONSE

Annual averages for the past several years have been the basis for materials that would be expended at the firing point. The number of detonations is not a good indicator because detonations may have different objectives (see table B-3) which can lead to great variability in characteristics among the detonations. To some extent, stockpile issues that arise will determine the shots required. However, there are also logistical constraints on how quickly the more sophisticated tests and experiments can be prepared and performed. Thus, the actual rates are not expected to be much different than past experience with PHERMEX.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 3	Sections 5.1.8, 5.1.8.1, 5.1.8.2, 5.1.8.3, 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.4.8, 5.4.9, 5.7.2.2, and J.6.1

RESPONSE

As noted in the DARHT draft EIS (see section 2.1), some aspects of the hydrodynamic testing and dynamic experiment program, and the related environmental assessment of alternatives, are classified as Secret Restricted Data under the provisions of the Atomic Energy Act of 1954, as amended, to protect national security. DOE prepared a classified supplement to the DARHT EIS that contains additional information and analysis. After review of this material, DOE determined in May 1995, that certain aspects of the impact analysis could be presented in an unclassified summary and made these available to the general public. DOE has revised the EIS in several places to incorporate this information. See chapters 3 and 5 and appendixes I and J.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 4	None required.

RESPONSE

Following a dynamic experiment using plutonium, the containment vessel would be moved to the LANL plutonium handling facility, TA-55, for cleanout and recovery. DOE expects that some small amount of total waste volume would become part of the TA-55 waste stream.

DOE does not expect WIPP to be either "problematic" or "without [sufficient] capacity" with regard to management of waste produced at DARHT or PHERMEX.

Characterization for WIPP would not be a problem because such characterization consists of certifying types, quantities, and forms of TRU in a waste package.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 5	None required.

RESPONSE

See response to comment 10-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 6	None required.

RESPONSE

See response to comment 13-14.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 7	None required.

RESPONSE

All alternatives analyzed in the DARHT final EIS are assumed to use the same maximum quantities of materials annually; for example, 1,540 lb (700 kg) of depleted uranium or 20 lb (9 kg) of beryllium. Table 3-3 shows releases to the environment, rather than use. Under all alternatives except the Enhanced Containment Alternative, 100 percent of the used material is assumed to be released to the environment so it is the same as usage. The amount of material released to the environment for the Enhanced Containment Alternative options varies by the particular pathway (e.g. water) examined. Water modeling assumes 460 lb (210 kg) of DU per year (30 percent of 1,540) is available for release. Seventy percent of the 1,540 lb (700 kg) DU used is deposited on or near the firing site as large and small fragments of metal, cleaned up during routine housekeeping activities, and disposed. Thus, there has not been an increase in usage of DU. The water modeling subtracts the 70 percent of DU that is cleaned up and disposed, i.e., 1,540 lb (700 kg) minus 70 percent equals 460 lb (210 kg).

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 8	None required.

RESPONSE

Waste material (mainly soil and detonation debris) removed from the PHERMEX firing site is low-level waste in most cases because of the presence of depleted uranium. Hazardous constituents potentially used at PHERMEX have not been detected in waste sampled; no mixed waste streams are generated from the PHERMEX firing site. DOE considers the evaluation of low-level waste disposal at LANL to be beyond the scope of the DARHT EIS or related actions. Waste management practices specifically associated with the alternatives analyzed are presented in Chapters 3 and 5 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 9	None required.

RESPONSE

Any modeling technique is based on hypothetical conditions. Justification for using Gaussian plume models is discussed extensively in appendix H.2. Use of Gaussian plume models provides a conservative estimate (tends to underestimate actual dispersion, and therefore overestimate potential consequences) of atmospheric dispersion when applied to complex terrain such as that found at Los Alamos. No mixing height data are available for Los Alamos, so the nearest available data were used. Again, mixing height data for Albuquerque would be conservative and would tend to overestimate potential consequences. Further, air quality modeling for purposes of the EIS does not require site specific air monitors.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 10	None required.

RESPONSE

DOE feels the estimate of the percent of materials that is aerosolized (10 percent) is well substantiated. Approximately 70 percent of the material on the ground is collected for disposal. For water resource impact evaluation, the remaining material on the ground was assumed to be very mobile to provide a conservation estimate of potential impacts. The portion of the material that is available to water resource contamination is discussed in various sections of chapter 5 and appendix E.

Neither lithium nor lithium hydride are regulated materials in soils or water. There are no Maximum Contaminate Levels or guidelines for either of these materials. Evaluation of lithium hydride was included principally because it can be an inhalation hazard from airborne emissions. Similarly, there are no constituents of high explosives residues that are known to be regulated materials in soils or water.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 11	None required.

RESPONSE

The dose that could result from resuspension and offsite transport of depleted uranium deposited in the firing site vicinity would be a very small fraction of the potential impacts calculated from the uncontained detonation releases. LANL's air monitoring stations are the most effective tool for monitoring and estimating any offsite radiation dose that could occur from this diffuse, nonpoint source release.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 12	None required.

RESPONSE

While the northeast drainage (runoff) channel at the PHERMEX site exhibits total uranium concentrations in soil 31 times background (105 ppm versus 3.4 ppm), runoff is not highly accessible to the water supply of the region, especially at contaminant concentration levels observed in the runoff channels in the immediate vicinity of the firing site. In this analysis, modeling of runoff to the canyon bottom and infiltration into the soil profile at the mesa top used solubility concentrations for total uranium of 300 ppm (i.e., 300 mg/L). This solubility value is higher than any observed solution concentration. Thus, model results presented in the EIS are conservative with respect to the observed concentrations of total uranium contamination in drainage channel waters. Furthermore, the analysis does not take credit for sorption and dispersion that would occur along the runoff pathway from the mesa top to the canyon bottom.

Before runoff waters or infiltration originating from a firing site, either PHERMEX or DARHT, could reach regional water supplies, it would infiltrate the canyon bottom or mesa top to the main aquifer, or flow via ephemeral streams to the Rio Grande. Analyses presented in the DARHT EIS show that water quality from either source would be well below MCLs for uranium, beryllium, and lead. See sections 5.1.4, 5.2.4, and 5.4.4.

Two independent methods were used to determine the area of soil contamination: a soil sampling survey and an aerial radiological survey. The former method resulted in an estimate of a 422-ft (129-m) radius circle exhibiting depleted uranium contamination above background. The latter method resulted in an estimate of a 450-ft (137-m) radius circle. To be conservative, a radius of 460-ft (140-m) was employed in the analysis and describes an area of approximately 15 acres (6 ha). This is an example where data did exist to produce a good estimate. Thus, examining model sensitivity to land area exhibiting uranium concentrations above background is not as meaningful as it would be if the area were not relatively well known.

The extent of surface contamination at the firing site selected for surface water modeling allows the entire annual expenditure of depleted uranium to be input to the surface water and vadose zone pathways. Thus, doubling the contaminated area would not increase simulated peak depleted uranium concentrations in the ground water or canyon bottom. The lower solubilities of beryllium and lead would not allow the entire annual expenditures of these contaminants to be input to the surface water and vadose zone pathways. Doubling the area of contamination would produce no more than a two-fold increase in simulated beryllium and lead concentrations. Even with such an increase, simulated peak beryllium and lead concentrations would remain well below drinking water standards.

The relationship of the DARHT EIS to the SS&M PEIS is discussed in section 1.5 of volume 2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 13	None required.

RESPONSE

The wall near the firing point could intercept blast debris of all sizes leading to the observations of higher levels of contamination. Only certain sized fragments (a small range) could reach Nake'muu on a ballistic path, and only then if planned shielding were not in place. Any vertical wall could provide some concentration of small particles at its base if the conditions were right, however, the quantity of small particles of material reaching Nake'muu at a distance of approximately 2000 ft from DARHT is considered to be insignificant.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 14	Section B.8

RESPONSE

Approximately 90 percent of the DU that is brought to the firing site is estimated to remain within 490 ft (150 m) of the firing point as described in section 4.3.3. In all likelihood, an even greater percentage remains in this vicinity because radiation that specifically indicates uranium contamination is not distinguishable from naturally occurring background levels at distances of about 460 ft (140 m) from the firing point. About 70 percent of the depleted uranium brought to the firing point is collected in cleanup. The soil contamination in the vicinity of the firing point is the starting point for analyses modeling the potential transport of uranium. The other metals distribute in ways similar to the depleted uranium. The high explosives convert during detonation to mostly water, NO_2, and CO_2; any residues are extremely minor.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 15	None required.

RESPONSE

The presence of fractures could cause a faster drainage rate. However, the units of the Bandelier tuff at TA-15 have few penetrating fractures in the lower units (fig 4-10).

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 16	None required.

RESPONSE

DOE agrees that protection of its workers and the general public remains of highest priority. Depleted uranium does not become more radioactive over time, although it is true that decay of the uranium isotopes, of which uranium-238 is particularly important, results in the production of a series of radioactive progeny. Dose calculations in the EIS for depleted uranium include all of the radioactive progeny that have half lives greater than approximately 10 minutes. The very short-lived radon progeny which are not included are typically of concern only in spaces with poor air turnover which allow the progeny to come into equilibrium with the radon-226 parent. These types of conditions are not of concern for DARHT operations. Radon progeny produced from DU at TA-15 would be a very minor contributor to overall radon progeny in ground water, compared to the contribution from naturally occurring uranium-238 and its radon progeny.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 17	None required.

RESPONSE

The models presented in appendix E3 on surface water modeling include a simple partitioning of precipitation into runoff to the canyon bottoms and infiltration into the mesa. The movement of water and contaminants in the canyons adjacent to Threemile Mesa was modeled using an updated version of the Lane et al. (1985) one-dimensional event-based model (see appendix E3). Climate records from the LANL site were used to drive the model, and flood events carrying water from the upper watersheds to the Rio Grande were simulated using this model.

The model described above, which includes consideration of runoff, infiltration, and precipitation event-driven flooding was used to model the migration of depleted uranium. In the model, depleted uranium was removed from the firing site by runoff and infiltration at a relatively high solubility of 300 mg/L–a value higher than observed solution concentrations. The annual depleted uranium inventory was applied to the firing site soils during each of the 30 years of firing site operation. Because of the relatively high solubility assigned to uranium, the annual inventory was, for all practical purposes, removed from the site each year by the combination of runoff and infiltration.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 18	None required.

RESPONSE

The use of 460 lb (210 kg) of depleted uranium as an initial annual source loading for the water resource system analysis reflects the application of 70 percent cleanup levels to the original annual inventory of 1,540 lb (700 kg).

Soil analyses were run to detect residues of high explosives, and none were found. Consequently, no analyses of potential impacts to water quality were conducted for high-explosive residues.

Lithium hydride does not appear in high quantities in the inventory, is primarily an inhalation hazard, and is not regulated to an MCL or MCLG in drinking water. Consequently, no analyses of potential impacts to water quality were conducted for lithium hydride.

See response to comment 14-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 19	None required.

RESPONSE

The DARHT EIS states "... well extraction of dissolved contaminant mass from the regional aquifer, if transported to the aquifer, is a possible consideration" and "... it may be unnecessary to model the flow and transport of contaminants in the main aquifer depending on the results of vadose zone modeling" (see appendix E4). Appendix E4 is largely devoted to a description of the vadose zone flow and contaminant transport modeling performed. Sections 5.1.4.2, 5.2.4.2, and 5.4.4.2 of the EIS contain results of vadose zone and ground water pathway analyses for the alternatives considered. In the analysis, well extraction of dissolved contaminant mass from the regional aquifer is described as occurring through a municipal/industrial well similar in all aspects to those currently operated by Los Alamos County in the Pajarito Field. Some wells from this field are located on the mesa immediately north of Threemile Mesa and Potrillo Canyon.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 20	None required.

RESPONSE

Because of research conducted on Potrillo Canyon and reported by Becker (1993) in her dissertation, more is known about this canyon and the discharge sink than other pathways from the firing site to accessible water supplies. Her estimates of dissolved and suspended uranium contamination entering the discharge sink are based on field observations and show relatively low migration rates. The model applied in this EIS to examine longer-term events also showed relatively low quantities of uranium moving into the discharge sink. Because the water quality entering the discharge sink over the long term was shown to remain below MCL and MCLG values for drinking water, further investigation of the discharge sink to better understand the potential hydrologic connection between the discharge sink and main aquifer would not alter the evaluation of alternatives analyzed in the DARHT EIS. However, it may well be important to other programs at LANL to better understand and characterize the hydrologic connection between the land surface and the main aquifer. Certainly, if under the proposed ground water protection program it is discovered that relatively young water is recharging the aquifer at this location, it will be important to develop a better understanding and a more mechanistic model of the discharge sink and its communication with the main aquifer.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 21	None required.

RESPONSE

Operations such as those planned for DARHT have been ongoing at LANL for decades and have not adversely affected tourism at local sites. Visitation at Bandelier has continued to increase. Part of the northern portion of Bandelier National Monument was part of the original Laboratory site and was added to the National Monument in the 1960s; this has not impacted recent use of the National Monument.

Nake'muu and other sites in the firing area would not be accessible to the general public for tourism or any other use in the foreseeable future.

See response to comment 4-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 22	None required.

RESPONSE

DOE does not believe that piecemeal destruction of cultural resource sites at LANL is occurring. The vast majority of proposed cultural resource sites in the vicinity of TA-15 are not threatened by LANL activities. The few that might be adversely affected by any alternative analyzed in the DARHT EIS, such as by construction at the firing point, are protected or excavated in coordination with the affected Pueblos and the State Historic Preservation Office.

See response to comment 4-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 23	None required.

RESPONSE

The discussion is under cultural resources. DOE guidelines for the assessment of environmental justice require identification of adverse environmental impacts (identified in other sections of the EIS) that would disproportionately affect low income or minority populations. See sections 5.1.7.4, 5.2.7.4, and 5.4.7.4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 24	None required.

RESPONSE

In appendix B, PHERMEX Baseline, existing LANL accident evaluations were used to estimate potential accident frequencies for PHERMEX. Appendix I, Facility Accidents, represents a newer examination of potential accidents and postulated accident frequency that might be expected at DARHT. However, since consequences of accidents at DARHT are examined in appendix I on a "what if" basis without consideration of the accident frequency, DOE believes that slight discrepancies between the methods and results for the two facilities are not a concern.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 25	None required.

RESPONSE

Provisions of the Federal Clean Air Act, as enacted in 40 CFR Part 61 Subpart H for DOE facilities, apply only to routine emissions from a facility. Potential releases from accidents are excluded.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 26	None required.

RESPONSE

Since consequences of bounding case accidents at DARHT are calculated in appendix I on a "what if" basis without consideration of the accident frequency (i.e., probability of occurrence = 1) , DOE believes further consideration of accident probability is unwarranted.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 27	Sections 5.1.8, 5.1.9, 5.4.8, 5.4.9, 5.7.2.2, and J.6.1

RESPONSE

See response to comment 10-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 28	None required.

RESPONSE

The analysis in the EIS was conducted in a manner to overestimate the amount of materials to be used and, thus, overestimate the potential impacts from the No Action Alternative. It is felt that by being conservative in this manner will allow a demonstration of insignificant impacts. This demonstration is based on high material usage levels that are not likely to be encountered. Thus, the impacts that are evaluated in the EIS are higher than those that are currently encountered from PHERMEX operations.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 29	None required.

RESPONSE

NEPA evaluation must be based on available information. The best available data and estimates are appropriate for the process.

COMMENT CODE	LOCATION OF EIS REVISION(S)
14 - 30	None required.

RESPONSE

All facilities administered by the DOE are regulated by the same set of environmental standards as any other industry or Federal agency. The majority of the materials released from PHERMEX are in such a form as to inhibit release to the environment, thus allowing an opportunity to provide a certain level of short-term cleaning to be followed by post-facility-operation remediation.

COMMENT CODE	LOCATION OF EIS REVISION(S)
15 - 1	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
15 - 2	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, and H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
16 - 1	None required.

RESPONSE

The DOE appreciates this assessment.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

17 - 1 Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 to provide for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

17 - 2 Sections 2.2.2, 2.4, 2.6, 3.3.4, 3.10.5, and volume 2, section 1.5.

RESPONSE

Chapter 2 of the EIS has been revised to more clearly show how the need for enhanced hydrodynamic testing is derived from directives made by the President and Congress.

DOE believes that DARHT, while a part of the SS&M program, is independently justified (see sections 2.6 and EIS volume 2, section 1.5). As stated in sections 2.4 and 3.10.5, FXR is not a reasonable alternative for conducting dynamic experiments with plutonium (see response 13-13). The ongoing upgrades of PHERMEX and FXR are discussed in section 2.4 and 3.3.4. Upgrade of PHERMEX with the capability proposed for DARHT is analyzed as a reasonable alternative to provide enhanced radiographic capability. Additional discussions of PHERMEX upgrades are presented in the response 13-17.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

17 - 3 Section 2.6 and EIS volume 2 section 1.5

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2, section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 4	None required.

RESPONSE

The *Treaty on the Non-Proliferation of Nuclear Weapons (1968)* went into effect in March, 1970. The treaty is aimed at the cessation of the nuclear arms race and limiting the proliferation of nuclear weapons to nonnuclear states. Under the treaty, the parties agreed to not transfer nuclear weapons, other devices, or control over them, and to not assist, encourage, or induce nonnuclear states to acquire them. However, the treaty does not invoke stockpile reductions by nuclear states, and it does not address actions of nuclear states in maintaining their stockpiles.

The concept of hydrodynamic testing is known to all the signatories, and the capability exists with several of the nuclear states. Such capability is said to have been an important factor for the nuclear states to have entered into the treaty and to agree to further negotiate for a CTBT treaty. Thus, by developing an enhanced radiographic hydrodynamic test capability, the DARHT project does not introduce any new elements for the treaty parties.

Past practice was to continually replace weapons in the stockpile at regular intervals as different mission requirements were established. Concurrently, the new weapons were designed with the best available technology of their time. Thus, much of the data collected in the past relates to designs no longer in the stockpile, is of insufficient quality (particularly in the case of hydrodynamic test data) to allow a predictive capability without underground nuclear testing, and sheds virtually no light on potential aging problems of those weapons which will remain in the stockpile well beyond their originally projected lifetime.

France has independently committed to construct the AIRIX (Accelerator Induction Radiographic a la Image X-Ray) facility which is similar in design to DARHT and will be completed sooner than DARHT. France plans to build other stewardship facilities as well. Both China and France are pursuing nuclear testing in advance of a Comprehensive Test Ban agreement. France and China have decided to perform nuclear tests before a Comprehensive Test Ban is concluded.

There is little evidence that a Comprehensive Test Ban would be seriously affected by DARHT or AIRIX. In May, 1995, 178 nations agreed to extend permanently the expiring Nuclear Non-Proliferation Treaty and accept a set of principles and objectives that include specific steps to turn back the nuclear arms race. On August 11, 1995 the President committed to pursue a Comprehensive Test Ban Treaty premised on a strong and continuing stockpile stewardship program.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 5	None required.

RESPONSE

DOE is aware of Dr. Katz's essay and his position. However, the DOE believe that stockpile stewardship as described in its Stockpile Stewardship and Management Plan (DOE 1995) responds to Presidential Decision Directive and Congressional mandates (see chapter 2 of EIS). More recently, the President established the conduct of a science-based Stockpile Stewardship Program, including a broad range of experimental programs, as a condition of U.S. entry into a zero-yield CTBT (August 11, 1995).

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 6	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 7	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2, section 1.5. DOE believes that the need for enhanced radiographic hydrotesting capability is justified independently of other Stockpile Stewardship and Management issues.

The analogy of obtaining a CAT-scan baseline prior to the development of heart disease (as discussed in comment letter number 17) was used simply to convey an example of obtaining a three-dimensional image in a way that was easily recognizable for the general public. DOE is proposing to use DARHT to provide a safety and reliability baseline of the enduring stockpile with the use of enhanced radiography to obtain a three dimensional image.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 8	None required.

RESPONSE

The two views of DARHT will provide three-dimensional information. This will be the first facility to give such information in the U.S. and obtain deeply penetrating high-resolution images. Additional views will give more refined information and also more detailed analysis. The Department is considering a conceptual facility, called the Advanced Hydrotest Facility (AHF) that would be used to provide up to eight radiographic views and 20 or more images. This would require a significant advance in technological capability. Information obtained from DARHT would be used to evaluate aspects of the design of a AHF and provide experience important in optimizing the operations of an advanced facility. Additional information is included section 3.10.3 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 9	None required.

RESPONSE

DOE acknowledges that there are some technical questions regarding the second axis of DARHT, as discussed in the HPAIC (as raised by this commenter). As noted in section 3.5, under the DARHT Baseline Alternative and any other alternative involving two axes, DOE would need to test and refine the accelerator technology proposed for the first axis before deciding on the technology to be used for the second axis.

Relative to current technology, the technology proposed for DARHT would provide higher-energy x-rays, which, in turn, could penetrate denser materials, and a shorter pulse time, which would provide a sharper image (better resolution) of materials moving at high speed.

PHERMEX and FXR accelerator technology is fundamentally different from that planned for DARHT and cannot be improved to match the same goals. The second axis proposed for DARHT would provide three-dimensional capability, which is in no way available for a single shot now. Several marginal improvements in technical specifications can result in important improvements in test data.

The EIS has discussed DOE's plans to upgrade its hydrodynamics facilities at PHERMEX and FXR (sections 2.4 and 3.3.4). However these upgrades would not provide the enhanced capability, as stated in the purpose and need, that would be provided by DARHT technology.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 10	None required.

RESPONSE

DOE does not agree that present radiographic hydrodynamic test capabilities are adequate for the type of stockpile stewardship directed by the President and Congress. The fact that certain levels of knowledge might be useful for design purposes does not preclude their usefulness in understanding stewardship issues.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 11	Section 2.6, 5.1.10 and volume 2, section 1.5.

RESPONSE

Please refer to the text in sections 2.6 and 5.1.10, and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs. Waste management impacts for DARHT were evaluated in chapter 5 of the draft EIS. These were inadvertently omitted from the summary table S-1 of the draft EIS and have been included in the final EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 12	None required.

RESPONSE

The DOE recognizes its responsibilities for waste management relative to the DARHT project. Under the Preferred Alternative the volume of LLW is projected to decrease significantly as the use of vessels increases.

Decisions regarding how to spend U.S. Treasury funds are made by the President and Congress. The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile and have appropriated funds accordingly. DOE recognizes that there are many demands for Federal dollars, but a portion of these dollars are needed for its mission assignment. Decisions on whether to request funds for DARHT construction are largely independent of decisions on funding provided for other activities, such as waste management or environmental restoration, within the overall envelope of DOE activities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 13	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 14	Chapter 2.1

RESPONSE

See response to comment 13-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 15	Sections 2.2.1 and 2.3.4

RESPONSE

The commenter is correct. Physical security of the stockpile is not part of the purpose and need for DARHT, but it remains a part of DOE's stockpile mission. The EIS text has been changed in those places where these two mission elements are discussed in relation to DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 16	Section 2.1 and 2.3.3.

RESPONSE

DOE agrees that routine surveillance of the nuclear weapons in the enduring stockpile is one essential tool for ensuring the safety and reliability of the stockpile and DOE intends to continue this program. In the event that routine surveillance uncovers a problem, or a problem is brought to light by some other method, DOE would develop some means to address the problem, through replacing parts, repairing parts, or retrofitting new parts. DOE needs to have the capability to ensure that these "fixes" would not adversely affect the safety and reliability of the weapon in some unforeseen manner. The capability proposed for DARHT is essential in this regard. Sections 2.1 and 2.3.3 of the final EIS have been revised to clarify this point.

There are instances in the past where hydrodynamic testing was or would have been useful in proving a "fix" to weapons system. These are discussed in "Stockpile Surveillance: Past and Future," prepared by SNL, LLNL, and LANL.

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 17	None required.

RESPONSE

The enhanced capability proposed for DARHT would provide a significant role in the stewardship of the nuclear arsenal by helping DOE acquire a better understanding of the physical processes that occur in nuclear weapons, or that are intended to occur, during the prenuclear portion of a device's performance. Experiments to obtain data on these physical processes use test assemblies that mock the conditions of an actual nuclear weapon and are detonated using high explosives. The increased x-ray dose expected from DARHT, relative to PHERMEX and FXR, would provide images at later times during the implosion process. In addition, other tests may deal only with the properties of a material under a given set of physical conditions. This knowledge can then be used to assess whether anomalies related to the material constitute a safety or reliability problem.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 18	None required.

RESPONSE

DOE disagrees with the comment that DARHT was proposed as a "magnet" facility to bring other new nuclear weapons design facilities to LANL. The hydrodynamic testing facilities at LANL are funded and operated by the DOE as part of the laboratory's ongoing stockpile stewardship mission, and DOE proposes to complete and operate the DARHT facility at LANL in furtherance of that mission. The DARHT facility is needed at LANL for this mission regardless of any other facilities which may eventually be located or operated there. Only one of the specific facilities mentioned in this comment, the Contained Explosives Test Complex, is related to DARHT. It is analyzed in this EIS as the Vessel Cleanout Facility of the Vessel Containment and Phased Containment Options of the Enhanced Containment Alternative. Of the other facilities mentioned in this comment, some are only in the early planning stages (such as the Tritium Laboratory), some are already completed (such as the Weapons Component Testing Facility and the Radiographic Support Laboratory (RSL)), and some are unrelated to the nuclear weapons complex (such as the Advanced Neutron Source). Specifically, the RSL will be used regardless of alternative. DOE believes that the proposal for enhanced radiographic hydrotesting capability is independently justified and thus need not follow the SS&M PEIS and the LANL SWEIS (see section 2.6, volume 1, and section 1.5, volume 2).

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 19	None required.

RESPONSE

DARHT is sited at LANL because of the existing infrastructure as noted in the section 3.10.1 discussion of why other sites were not analyzed as alternatives in this EIS. Hydrodynamic testing has been conducted at LANL for 0ver 30 years. Thus, DARHT is not part of the overall reconsolidation of the DOE complex. Reconfiguration of the DOE weapons complex to reduce costs and consolidate functions necessarily causes the remaining functions to be consolidated at the remaining facilities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 20	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, and H.5.2

RESPONSE

The final EIS contains an additional option, the Phased Containment Option (preferred alternative), within the Enhanced Containment Alternative. The selection of alternatives to be analyzed in the EIS from among a much broader range of possible alternatives is discussed in section 3.10. Each of the alternatives that were considered, but not analyzed in the EIS, were rejected for reasons such as failure to meet the purpose and need, infrastructure requirements, or cost. The DOE believes that their discussion in section 3.10 supports its choices for the range alternatives to be analyzed in the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 21	2.4

RESPONSE

See response to comment 13-17.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 22	Section 2.5

RESPONSE

DOE has revised the discussion in the DARHT EIS of nonproliferation and counter proliferation application for enhanced radiographic hydrodynamic test capability (section 2.5). The concerns raised by Congress for the National Ignition Facility are specific to that facility and not general to all new facilities in the DOE complex.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 23	None required.

RESPONSE

The objective of the science-based stockpile stewardship program is to preserve the safety, performance, and reliability of the Nation's nuclear weapons stockpile. However, the existence of this program is a key element in the U.S. decision to enter into the nonproliferation treaty, as described in the President's statement of August 11, 1995 (see the first box in chapter 2). See also the response to comment 17-4 for a discussion that signatories to the nonproliferation treaty were knowledgeable about hydrodynamic testing.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 24	None required.

RESPONSE

The cited sentence (draft EIS, section 2.5 paragraph 4, lines 7-10) does not reference DARHT and says only that lack of testing, "would not change the status of the United States in terms of proliferation." As noted, FXR would not be closed under any of the DARHT alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 25	Section I.3.2.

RESPONSE

The purpose of an EIS is to identify environmental impacts and compare them among the alternative courses of action analyzed. DOE has prepared a classified supplement to the DARHT EIS, and has incorporated the unclassified aspects of the classified impact analysis in the DARHT EIS. These include the impacts from routine operations regarding dynamic experiments with plutonium, and the consequences of accidents, in the event that they occurred, regarding dynamic experiments with plutonium. See section I.3.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 26	None required.

RESPONSE

DOE indicated in the Notice of Intent, the Implementation Plan, and the draft DARHT EIS that a classified supplement would be prepared that would provide additional information and analysis. DOE made an unclassified summary of the classified analysis available to the general public and incorporated the impacts in this final EIS. DOE also invited review of the classified supplement (by appropriately cleared individuals with a need to know the information) from the State of New Mexico, the Environmental Protection Agency, and certain Indian tribes. DOE has made all unclassified information and analysis relevant to the DARHT EIS available for public review.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 27	None required.

RESPONSE

The Record of Decision will document the DOE's decision on DARHT. None of the alternatives under consideration would involve any activities that would compromise nonproliferation policy or conflict with the President's decision that the United States will not design or build new nuclear weapons. DOE is strictly adhering to this policy. Under current policy, DARHT will be used only for assessing the safety, performance, and reliability of existing weapons; it will not be used to design new weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 28	Section I.3.1

RESPONSE

DOE agrees with this comment. Use of the 50th percentile meteorology is an assumption where it is equally likely that atmospheric conditions could be greater than or less than the conditions assumed. The final EIS text notes that this is a realistic, rather than conservative assumption.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 29	None required.

RESPONSE

As described in appendix H, potential release during routine operations must pass through multiple HEPA filters and are continuously monitored. No plutonium releases have ever been detected, therefore, it may be assumed that releases are zero. However, to provide a conservative estimate of potential impacts, it was assumed plutonium was released at the threshold of detection of the monitoring instrument. This would be the maximum quantity of plutonium that could conceivably be released.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 30	None required.

RESPONSE

The 50-year committed population dose described was actually the effective dose equivalent to the population. For purposes of this analysis there is no difference between the two dose terms. Evaluating the potential dose which could be received over 50 years is DOE's standard practice so that potential dose (and effects) will not be underestimated, for both populations and individuals. Maximally Exposed Individual (MEI) doses were also calculated for routine exposures and accidents, and estimates were made of the maximum probability of contracting a latent fatal cancer by these hypothetical individuals.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 31	None required.

RESPONSE

The resuspension pathway was included in these analyses.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 32	None required.

RESPONSE

The population of the La Tierra/Las Companos area was included in population dose calculations. The calculations used the latest available population data, from 1993, which are more up-to-date than those available from the 1990 U.S. Census. These data are shown in table H-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 33	None required.

RESPONSE

Because dynamic experiments with plutonium would be analyzed and conducted in such a way that a nuclear explosion physically could not occur, the accident scenario discussed in the EIS involves an accidental detonation of the high explosives and subsequent scattering of vaporized or particulate plutonium metal. The analysis indicates that at most, 12 additional latent cancer facilities might be projected to occur over a 50-year time frame. The dynamic experiments could not possibly result in an accidental detonation of a nuclear weapons primary since these components will not be tested in DARHT. The projected number of latent cancer fatalities (12) was arrived at using the modeling techniques and best available data described in appendix I. The approach in appendix I assumes a realistic scenario for public exposure.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 34	Sections 5.1.9.2 and I.3.2 Table I-7

RESPONSE

DOE agrees that the dose to an noninvolved worker from an uncontained detonation was inadvertently omitted from the unclassified discussion. This has been included in the final version of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 35	None required.

RESPONSE

The hypothetical plutonium accident analyzed in the DARHT EIS involved dispersal of plutonium metal. Impacts to human health have been analyzed. The DOE considered radiological and toxicological impacts to plants and animals and did not identify a measurable impact. See appendix H for a discussion of impacts within the food chain. During the 50 years that the Laboratory has been in northern New Mexico, the region has experienced one of the largest increases in the country in tourism, population growth, and real estate values, even though dynamic experiments with plutonium were performed at LANL during this time. The accident upon which the comment is predicated is incredible.

See response to comment 10-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 36	None required.

RESPONSE

The DARHT EIS analyzes accident scenarios on a "what if" basis, in other words, does not include a projection of the probability that any given accident might occur. The environmental impacts of an accident as identified and analyzed as if the event had occurred. The purpose of a safety study is to determine how safe something (facility, equipment, procedure) would be in order to determine the probability that an accident might occur. While the results of the safety study are instructive to put into perspective the likelihood of occurrence of a postulated accident, the results of the safety study would not change the environmental consequences that would be expected if the accident occur. The purpose of an EIS is to identify possible environmental impacts and then compare them across alternatives to see if there would be any difference in impact if another course of action were to be implemented. Because, as stated in chapter 3.3.2, dynamic experiments with plutonium would be conducted in the same manner (in double-containment vessels) regardless of the alternative, the environmental impacts would not be expected to vary among alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 37	None required.

RESPONSE

Decisions regarding whether or not to proceed with the DARHT Facility are unrelated to whether or not DOE would ever need to produce more plutonium. The text of section 3.3.3 has been revised to discuss facility requirements for dynamic experiments with plutonium.

Existing infrastructure at LANL would support any requirements for plutonium. Because this infrastructure exists independently of DARHT, its activities are not a "connected action" in the NEPA sense, and are not analyzed in this EIS. Waste handling and disposal are similarly part of the LANL infrastructure. As noted in the EIS decontamination and decommissioning (D&D) sections, such as section 5.1.12, most analysis of D&D activities must await determination of conditions when the facilities are designated for D&D.

See response to 18-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 38	Tables S-1 and 3-3, section 3.3.8.

RESPONSE

Waste management impacts for DARHT were evaluated in chapter 5 of the draft EIS. These were inadvertently omitted from the summary table S-1 and have been included in the final EIS. A discussion has also been added to chapter 3 regarding waste management.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 39	None required.

RESPONSE

The DARHT activities over the next 40 years would be known only in a general way. The details of D & D cannot be known until the time to close down DARHT. Appropriate NEPA reviews would be conducted at that time, as stated in the EIS section 3.3.9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 40	None required.

RESPONSE

Known available data is used wherever possible along with recognized, credible modeling codes to compute environmental impacts. When suitable data are not available, there calculations use conservative assumptions consistently for all alternatives. The NEPA process is to be followed using available data, rather than specifying a data acquisition program.

The allegations cited are primarily in the purpose and need chapter, and these are being clarified in text changes and other comment responses.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 41	None required.

RESPONSE

As noted in the EIS, any experiments that would incorporate plutonium would be conducted in double-walled containment vessels. Using this approach in the past, there have been no failures of the containment, not even of an inner wall. Based on this engineering experience, the LANL experimenters believe that vessel failure with a subsequent release to the environment is not a reasonable or credible (less than $1x10^{-6}$ probability of occurrence per year) scenario.

After a test, the vessel is moved to the LANL plutonium handling facility, TA-55, for cleanout and recovery. Most of the plutonium materials are recovered for recycling. The small amount not recovered becomes part of the TA-55 waste stream and loses its identity as DARHT waste.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 42	None required.

RESPONSE

The cited data in table 4-1 are all taken from a LANL publication in 1994. As such, these data are considered to be a complete inventory of emissions in significant amounts for materials likely to be used at a hydrodynamic testing facility. The source document has a more extensive list corresponding to other activities at LANL. These are the most recent data available. Within LANL, time is required to compile, check, and certify the data as well as conduct the review and approval process for publication.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 43	None required.

RESPONSE

DOE did not rely upon result of the LANL air monitoring program in evaluating potential environmental impacts from DARHT or PHERMEX. Rather, this information is presented in chapter 4 of the EIS to present a picture of the potentially affected environment at LANL and the nearby vicinity.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 44	Section 6.1.

RESPONSE

DOE has negotiated a Federal Facilities Compliance Agreement (FFCA) with the Environmental Protection Agency in order to come into compliance with the monitoring requirements of the Clean Air Act regulations governing hazardous air pollutants. This agreement provides for additional monitoring stations. Section 6.1 was revised to update the status of the FFCA.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 45	None required.

RESPONSE

See response to comment 8-28.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 46	None required.

RESPONSE

This table was reproduced from the 1992 Environmental Surveillance Report to provide general information regarding airborne releases from LANL as a whole. Since material usages and potential impacts of the dynamic experiments at PHERMEX and DARHT are dealt with extensively elsewhere in the EIS, both from past operations and for projected DARHT operations, DOE did not feel it was necessary to repeat impacts from dynamic experiments here.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 47	Section 4.8.1.1

RESPONSE

Text will be changed to indicate that LANL exceed the EPA annual standard for radionuclide emissions of 10 mrem in 1990 and was cited. This instance of noncompliance is discussed in greater detail in section 6.1. Operations at PHERMEX and those planned for DARHT are different from those which resulted in exceeding EPA standards.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 48	Table 4-22

RESPONSE

The term is left unchanged in the body of the table because the table is taken from published literature. However, the term is footnoted as follows: "This value includes a radon contribution on the order of 200 mrem, but such a value can vary considerably."

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 49	None required.

RESPONSE

Section 4.9 is descriptive of History of Accidents at LANL. Analysis of accidents is discussed in appendixes I and J.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 50	Section B.8

RESPONSE

Text in various places will be clarified to explain the fate of depleted uranium in the tests. The concept is illustrated in figure B-1, which has been modified to show 10 percent aerosolized (all assumed respirable).

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 51	None required.

RESPONSE

See response to comment 17-41.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 52	None required.

RESPONSE

The cited value is considered bounding and conservative, because transport of test assemblies in TA-15 and TA-16 occurs under much stricter regulations and with much better compliance with regulations than ordinary highway traffic.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 53	None required.

RESPONSE

The value, 10 percent, is derived from an empirically developed distribution of particle sizes produced in similar explosions. The analysis assumes that the empirical distribution accurately describes the particle distributions from tests that would be done at DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 54	None required.

RESPONSE

Rather than conducting analyses to determine if a transportation accident resulting in detonation of the high explosive might occur, the DARHT EIS calculates impacts if such a scenario were to occur. See section 5.7.2 and appendix I.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 55	Section 5.1.7.2

RESPONSE

The text in section 5.1.7.2 has been clarified. Under the No Action Alternative, the partially completed buildings at the DARHT site would be completed for some other purpose. No additional area would be disturbed. The capital costs in table 5-4 (formerly table 5-5) are for completing this construction.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 56	None required.

RESPONSE

The brief analysis for worker protection for noise impulses presented on page C-17 of the draft EIS shows that under no conditions could the threshold limit of 100 noise impulses per day at 140 dB be exceeded. The cycle time used here might apply to simple tests such as firing a series of projectiles against armor plate, but not to setting up hydrodynamic tests or dynamic experiments. The rate of 2 shots/month is used in analyzing the major activities that might occur and is based on previous experience at PHERMEX.

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 57	None required.

RESPONSE

Drilling the sites would provide a preferential path for water infiltration, a path that could be hard to seal. Because the local geology/stratigraphy does not vary much laterally, the nearby core data are deemed sufficiently representative so long as analyses do not indicate marginally acceptable results.

A Federal agency is not required to obtain field data for all conceivable environmental parameters for a given NEPA review; to do so would make the costs of NEPA reviews prohibitively expensive. The CEQ regulations provide for analysis with the best available information and acknowledges that there may be missing or incomplete information [40 CFR 1502.22.]

COMMENT CODE	LOCATION OF EIS REVISION(S)
17 - 58	None required.

RESPONSE

Since 1991, advanced laboratory techniques have been used to detect tritium at ultra-low levels and to determine that recent water (a few decades old) has recharged the main (i.e., deep) aquifer in several locations at LANL. In all instances, main aquifer contamination is located in the northern portion of the LANL site and is associated with a high tritium source concentration in a canyon bottom alluvial aquifer, and with older wells into the main aquifer (constructed with cable-tool drilling techniques and having questionable seals between well-bore and well-casing). In contrast, the Potrillo Canyon, Water Canyon, and Cañon de Valle locations in the southern portion of the LANL site do not exhibit alluvial aquifers and are not locations for wells that penetrate to the main or deep aquifer. Thus, the driving force provided by overlying saturated alluvial sediments, and the short-circuit pathway provided by imperfect seals in boreholes, are both absent in the canyons of interest to the DARHT EIS.

Water travel times from the surfaces of Threemile Mesa and Water Canyon (i.e., reach 12) to the main aquifer are reported in table E4-2 as 298 and 179 years, respectively. The comment that modeling for the EIS found "times for transport to the main aquifer to be in tens of thousands of years" refers to times reported as associated with the occurrence of peak concentrations of highly retarded metals (uranium, beryllium, and lead). Tritium, observed to have migrated into the main aquifer in the northern portion of the LANL site, is highly mobile and moves with the ground water. In the DARHT EIS, analysis has focused on highly retarded metals in an environmental setting that does not offer the same opportunity for rapid vertical migration.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 1	Section 2.1

RESPONSE

While an EIS specifies the purpose and need to which the agency is responding, the primary purpose of an EIS is to analyze the environmental impacts expected to occur if one of the alternatives were to be implemented. However, in response to this and other comments, the DARHT EIS has been revised to better explain the purpose and need. See section 2.1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 2	Sections 2.4 and 3.3.4

RESPONSE

PHERMEX accelerator technology is fundamentally different from that planned for DARHT, and cannot be improved to match the same goals. Neither PHERMEX, FXR, nor PHERMEX and FXR in cooperation (existing or upgraded) can achieve the enhanced radiographic hydrodynamic test capability specified in the EIS.

See response to comment 13-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 3	Section 2.1

RESPONSE

In the past, the DOE has discovered most problems in the stockpile through surveillance programs and has used nuclear testing to resolve them and/or certify the systems when fixed. Thus, there is no history of using hydrodynamic testing alone to either identify or resolve post-deployment problems. The current stockpile systems are certified safe and reliable based on this nuclear testing, among other things. However, new problems are likely to arise eventually as the systems age. For any such problems involving nuclear components, DOE would have to rely on hydrodynamic testing using test assemblies to address the problems and/or certify the fixes.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 4	None required.

RESPONSE

The references cited for chapter 2 are not intended to be an exhaustive list on the subject of the nuclear weapons stockpile. This section arises because the discussion in chapter 2 is meant to describe the purpose and need rather than present arguments for them. The purpose and need arise because the President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile. On August 11, 1995, the President committed to pursue a Comprehensive Test Ban Treaty provided a strong and continuing stockpile stewardship program is in place. Part of this mission is further defined by the NOI for the Stockpile Stewardship and Management PEIS which states that an enhanced radiographic hydrodynamic test capability will be part of that program.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 5	Section 2.1

RESPONSE

Enhanced hydrodynamic testing is clearly needed to improve the current testing capabilities and achieve DOE's mission goals for stockpile stewardship, as descried in chapter 2 of the EIS. However, sections 2.6 of the draft EIS called attention to the fact that DARHT is new technology and as such has uncertainties until the hardware is proven. Until testing is done, there is also some uncertainty in the amount of improvement in the testing results. Acknowledging such uncertainties is realistic engineering, but does not imply expected shortcomings.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 6	None required.

RESPONSE

In the absence of underground nuclear testing, it is not fully known whether enhanced radiographic hydrodynamic testing will fully satisfy the need for stockpile assurance. However, the President has determined that the United States will not design or build new nuclear weapons, and the DOE is strictly adhering to this policy. Under current policy, DARHT would be used only for assessing the safety, performance, and reliability of existing weapons, and would not be used to design new weapons. The possibility exists that, without nuclear testing, the Nation could not ensure the continued viability of a nuclear deterrent based on the existing weapons in the nuclear weapons stockpile. If stockpile viability could not be ensured, it would be incumbent upon the President to determine whether or not to change the policy to allow the design and building of new nuclear weapons, as well as to evaluate the potential ramifications for nonproliferation policy. On August 11, 1995, the President committed to pursue a Comprehensive Test Ban Treaty provided a strong and continuing stockpile stewardship program is in place.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 7	None required.

RESPONSE

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 8	None required.

RESPONSE

See response to comment 13-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 9	None required.

RESPONSE

This assessment may be based on the Miller report or other unclassified appraisals of problems in the nuclear weapons stockpile. Any such unclassified report is likely to have the same limitations as the Miller report.

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 10	Section 2.3.2

RESPONSE

See response to comment 13-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 11	Section 2.2.1

RESPONSE

The parenthetical phrase presented on page 2-2 of the draft EIS has been changed to read "(even to replace those removed when past their useful life)." Useful life is not a defined engineering term; but as a practical matter, an engineering decision is made on the cost benefits of retaining a system. Design life is an estimate (or an objective) during the design stage of what the useful life will be.

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 12	None required.

RESPONSE

Certainly, regular maintenance will allow a measure of confidence in the stockpile; DOE does not dispute this fact. However, there will be a programmatic need for hydrodynamic testing at any level of stockpile stewardship activity whether at a level greater than currently envisioned in the "Stockpile Stewardship and Management Program" document released as part of the PEIS process or at the less scientifically active and more limiting role of custodial responsibility as outlined in this comment. See section 2.6 and EIS volume 2 section 1.5.

Specifically, under the above proposal hydrodynamic testing would still be needed for:

- Surveillance of existing stockpiled weapons and systems
- Final proof testing of rebuilt weapons (in the absence of underground nuclear testing)
- To support non- and counter-proliferation activities
- To keep expertise of a nuclear weapons cadre as high as possible should the DOE be directed to return to previous levels of nuclear weapons program activity to include design and certification of new weapons and weapons systems.

Given the above, DARHT is a prudent investment to replace an aging 35-year old existing facility (PHERMEX) at LANL since the only other radiographic capability in the United States, FXR at LLNL, would not allow the required level of hydrodynamic testing activity for the weapons program should PHERMEX become non-operational.

Regular maintenance, already done routinely, does not forestall aging problems. Periodic nonnuclear component replacement is already contemplated in order to keep abreast with relevant technological advances.

The remanufacturing approach is likely to be more costly in terms of up-front dollars and environmental burden for the following reasons:

- The restart of old facilities, particularly Rocky Flats, is not feasible.
- New facilities, with increased capacity, will be required to replace warheads at a rate sufficient to forestall potential aging problems; the stockpile will have to be fully remanufactured on a 20 to 30- year time scale, rather than on a 40 to 50-year time scale.

Exact replication, especially of older systems, is impossible. A focus on remanufacturing alone will reduce the technical resources needed to solve future problems in the stockpile.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 13	None required.

RESPONSE

Maintaining "core intellectual and technical competencies" (see box in EIS section 2.1) in nuclear weapons has much more immediate need than the ability to resume weapons design, if such activity is ever needed in the future. A program of certification of the systems in the enduring stockpile requires intelligent assessment of the surveillance results using facilities such as DARHT to better characterize physical phenomena. Intelligent assessment of stockpile issues to plan, execute, and interpret needed tests and experiments is the immediate role for the core intellectual and technical competency.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 14	Sections 2.3.1, 2.3.2, and 2.5

RESPONSE

Although fundamental scientific knowledge about physical processes can be used in a variety of ways, the DARHT capabilities are to be directed at understanding and resolving safety and reliability problems in the weapons stockpile. As time passes the nature of these problems is not necessarily the same as those addressed during design verification.

Chapter 2 has been modified in the final EIS to clarify and better support the purpose and need. The additional information presented is attributable in part to the Stockpile Stewardship and Management Program Plan issued by the DOE in May 1995 and also to clarify some potentially sensitive issues.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 15	Section 2.3.2

RESPONSE

See response to comment 13-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 16	Section 2.3.3

RESPONSE

The existing body of information regarding the intrinsic properties of plutonium is inadequate. For example, DOE needs more information regarding changes in plutonium properties as impurities build up inside the material due to radioactive decay. These changes may affect the ductility of the metal or its reaction to shock heating. In turn, this may affect the behavior of a weapons pit, which may affect the safety or reliability of the weapon. Section 2.3 has been revised to include more information on this subject.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 17	Section 2.3.4

RESPONSE

Chapter 2 has been revised to include additional discussion on the NPT. Section 2.3.4 points out that the U.S. needs to continue to meet international agreements and assist other nations in evaluating nuclear weapons. DOE does not believe that activities allowed under these agreements violate the NPT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 18	Section 2.4

RESPONSE

See response to comment 13-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 19	None required.

RESPONSE

See response to comment 17-4 and response below.

The science-based stockpile stewardship program is much broader than just the program to build and operate DARHT. It is the entire program, not just DARHT, that is offered as one basis for other nations' confidence in the United States nuclear deterrence.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 20	None required.

RESPONSE

See response to comment 10-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 21	Sections 3.3.8 and 5.4.10.3.

RESPONSE

See response to comment 13-16.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 22	None required.

RESPONSE

In the unclassified summary of the classified supplement to the EIS potential environmental consequences of an accidental breech are discussed. The classified supplement examines potential environment impacts of the accident on a "what if" basis, that is, assuming that the accident would occur without consideration of the probability or frequency of occurrence. The summary notes that related DOE safety studies suggests the probability of this accident is less than one-in-one-million per year.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 23	None required.

RESPONSE

The Plutonium Exclusion Alternative was analyzed to allow DOE to compare the environmental impacts of conducting to the impacts of operating the DARHT Facility without dynamic experiments with plutonium at DARHT. DOE needs to conduct dynamic experiments with plutonium (see section 2.3.3). Because of infrastructure consideration LANL is the only site where these could be conducted. In the event DOE would choose to exclude plutonium experiments at DARHT, DOE would need to conduct these dynamic experiments which require radiography at PHERMEX (as has been done in the past). To exclude all dynamic experiments with plutonium from all facilities at LANL would not respond to the DOE's needs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 24	None required.

RESPONSE

As part of its mission to ensure the continued safety and reliability of the enduring stockpile, DOE needs to conduct dynamic experiments with plutonium. An integral part of DOE's need for the proposed enhanced radiographic capability is to diagnose the results of these dynamic experiments.

As noted by the commenter, DOE considered as unreasonable the alternative of upgrading the FXR facility to provide enhanced radiographic capability for conducting dynamic experiments with plutonium, because it would be too expensive to construct and operate the requisite plutonium handling infrastructure at site 300 at LANL (section 3.10.1.1). However, unless this were done, DOE could not meet its need for enhanced radiographic capability for plutonium experiments.

Although DOE analyzed the Plutonium Exclusion Alternative in order to identify and define the extent of environmental impacts that might be attributable to conducting dynamic experiments with plutonium at DARHT, the EIS points out that this alternative would not meet the DOE's need for enhanced capability to diagnose these experiments (section 3.8). DOE disagrees that including this alternative implies that a facility without plutonium capability would meet its purpose and need for enhanced radiography.

See response to comment 13-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 25	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1 and response below.

Uranium dissolution in surface water (rain) was assumed to be greater than any measured levels at or near the PHERMEX firing point (section E2.2.1). Subsequent modeling showed: uranium concentrations in waters released to nearly Water Canyon could be slightly above the proposed MCL; waters at the discharge sink in Potrillo Canyon an order of magnitude below the proposed MCL; and water at the nearest offsite access an order of magnitude below the drinking water standard (section 5.1.4.1).

Section 5.1.6.1 indicates that the expected air waves at Nake'muu would be a small fraction of the amount needed to cause window breakage (for comparison), and the site has continually stood up to similar airwaves. Nake'muu is considered by most recent scholarship to be an uncompleted structure of about the time of the Pueblo revolt, rather than associated with the Anasazi. The probability that any blast fragments would fall at Nake'muu is extremely small and can be reduced further with mitigation measures.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 26	None required.

RESPONSE

The internal size and configuration of the containment structure would require free-moving robotic devices to accomplish remote cleaning. A wide range of tasks would be required, such as inspection and removal of widely varying sizes and shapes of blast debris; and inspection, repair, and replacement of blast mats on the interior surfaces. A great deal of time and money would be needed to develop either a general purpose or a range of robotic devices, if indeed such is even possible with current and foreseeable technology.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 27	None required.

RESPONSE

A ball of hot gases and aerosolized blast products quickly rises because it is less dense than the surrounding air. As the gases rise, they cool by expansion and mix with surrounding air. In this manner, the effective height for dispersal by winds is about 330 ft (100 m) depending somewhat on the size of the shot.

An extensive discussion of this topic is provided in appendix H.2. The explosive dispersion of the uncontained detonations results in greater dispersion that allows these detonations to be modeled as elevated point-source Gaussian releases for atmospheric dispersion and airborne impact evaluation purposes.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 28	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, and H.5.2

RESPONSE

DOE believes that the revised Preferred Alternative, the Phased Containment Option of the Enhanced Containment Alternative, addresses the central issue of this comment.

DOE believes that it would be highly speculative to try to estimate costs associated with potential soil clean-up 30 years or more in the future. At the current time, too little information exists and estimates of are too nebulous to provide a detailed estimate of cost savings. DOE does believe that the Phased Containment Option of the Enhanced Containment Alternative would have lower associated clean-up costs (ranging from 25 to 90 percent less) than the uncontained alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
18 - 29	Sections 2.3.2 and 2.5

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly. Chapter 2 of the EIS has been revised to more clearly indicate that purpose and need for enhanced hydrodynamic testing capabilities arise from the directives from the President and Congress. It is currently against U.S. policy to design new nuclear weapons systems.

See responses to comments 13-9 and 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
19 - 1	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 1	Section 2.1

RESPONSE

See response to comment 13-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 2	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 3	Section 2.3.2

RESPONSE

See responses to comments 18-29 and 18-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 4	Section 2.3.2

RESPONSE

See response to comment 13-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 5	Section 2.5

RESPONSE

See response to comments 13-9, 17-4, and response below.

The EIS discussion of nonproliferation has been revised.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 6	None required.

RESPONSE

The DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 7	None required.

RESPONSE

The Phased Containment Option analyzed in the EIS would use vessels for most tests. Under this option, uncontained tests might be used for large tests, special diagnostics, or tests not involving hazardous materials such as depleted uranium, beryllium, or lead. DOE acknowledges that hydrodynamic tests are expensive and agrees that as much data as possible should be collected.

The cost of each shot, that is, hydrodynamic test or dynamic experiment, varies widely depending on the size of the experiment and its associated diagnostics. The cost may range from over a million dollars for a major hydrodynamic test representing a full system with simulated materials to a few thousand dollars for the simpler, smaller experiments that examine one specific physical property, such as high explosive detonation velocity. At PHERMEX, we conduct about 40 to 50 experiments yearly, 5 to 10 of which are considered major hydrodynamic tests.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 8	Section 4.2.6

RESPONSE

All of the relevant, available data on noise impacts are reported in the EIS (see section 4.2.6). The DOE agrees that additional tests would be of interest, but it does not appear that any additional data would change the analysis. The noise data available were acquired in March 1995 as part of air-wave tests for the Nake'muu site.

Normal conversation is often cited as an example of the 60-dBA sound level. This loudness example has been added to the EIS in section 4.2.6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 9	None required.

RESPONSE

For alternatives that produced identical results for criteria pollutants (DARHT Baseline, PHERMEX Upgrade, Plutonium Exclusion, and Single-Axis) results are discussed only once, under the DARHT Baseline Alternative. Tables S-1 and 3-3 present this information in summary form.

Depleted uranium emissions are the only type of uranium emissions from DARHT or PHERMEX.

Air Quality is less for the enhanced containment alternative than for other alternatives because of a combination of three major factors:

- Source Term. It is conservatively assumed that six percent of the material used annually in the containment is assumed to be released. These releases from containment would be ground-level < 328 ft (< 10 m high) releases occurring as part of normal operations (1 percent) or small failures (5 percent) of the containment structure (building or vessel), rather than elevated releases as for uncontained detonations (section 3.7)
- Atmospheric Dispersion. Less atmospheric dispersion results in greater contaminant concentrations in air. Dispersion of ground-level releases is considerably less than for elevated releases, particularly for nearby locations. In general, ground-level releases impact closer individuals much more than elevated releases, which have greater impact on distant individuals and populations because of the greater dispersion. Thus, even though less material is released via the enhanced containment alternative, the potential for exposure is greater because of the decreased dispersion of ground-level releases.
- Receptor Location. The point where a member of the public could receive the maximum offsite exposure is only 0.55 mi (0.9 km) from the firing point, southwest to State Road 4. This relatively short distance to the receptor and point of air quality determination tends to maximize the issues raised above.

It should be noted that conservative assumptions were made in these estimates of air quality. First, the released material was assumed to be wind-blown directly toward the point of maximum potential public exposure; second, an individual was assumed to be at this point for the full time of material passage, even though it is only a spot near State Road 4 and the LANL boundary and not a residence or business; finally, other parameters in the evaluation were selected to provide reasonable upper-limit (95 percent) estimates of potential impacts that could occur. In reality, it is expected that air quality values would be much smaller fractions of the applicable regulatory limits.

COMMENT CODE	LOCATION OF EIS REVISION(S)
20 - 10	Section 6.9

RESPONSE

Comments from neighboring pueblos have indicated their desire to have less discussion of Native American cultural resources in the DARHT EIS. In deference to these requests, discussion of these cultural resources has been decreased in the EIS. However, a list of consultations with outside agencies and Native American tribes has been added to the EIS. See section 6.9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
21 - 1	None required.

RESPONSE

The DOE recognizes that to acquire certain information additional tests may be required, relative to the Preferred Alternative. However the number of tests that would be conducted under any alternative are driven largely by scheduling and funding concerns; therefore, although to achieve the same amount of information more tests might be required under the Single Axis Alternative, in actual practice DOE would probably forego many additional tests. Note that most of the environmental impacts relevant to this alternative given on an annual basis. Because the time needed to set up a test is not strongly dependent on the use of one or two axes, the number of tests per year probably would be about the same.

COMMENT CODE	LOCATION OF EIS REVISION(S)
21 - 2	None required.

RESPONSE

DOE agrees that under the Upgrade PHERMEX Alternative, the facility would have to be shut down for a long time and there would be programmatic impacts due to such a delay. The shut-down period is noted in the EIS text.

COMMENT CODE	LOCATION OF EIS REVISION(S)
21 - 3	None required.

RESPONSE

The DOE appreciates this assessment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
21 - 4	None required.

RESPONSE

DOE has included in the EIS radiation exposure-to-risk conversion factors and made the conversions from radiation dose to risk of latent cancer fatalities for potentially exposed workers and members of the public. Of particular note is that no latent cancer fatalities are projected from radiation exposure under any of the DARHT activities under any of the proposed activities involving depleted uranium or tritium. DOE believes other sources are available that may serve as a radiation primer and provide information as to relative risk assessment and comparison.

COMMENT CODE	LOCATION OF EIS REVISION(S)
21 - 5	None required.

RESPONSE

See response to comment 20-7 and response below.

DOE appreciates this suggestion. Consideration can only be qualitative until specific tests and specific add-on experiments are identified.

COMMENT CODE	LOCATION OF EIS REVISION(S)
22 - 1	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
22 - 2	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 1	None required.

RESPONSE

The LANL sitewide EIS will address ultimate disposition of radioactive waste stored or disposed from all LANL activities, and the contributions from any alternatives analyzed in the DARHT EIS would be only a small percentage of that total; these contributions are discussed in the EIS. The DOE is preparing a PEIS on waste management at all of its sites [NOI 55 FR 42633] that will be used to help establish a Department-wide waste management policy. See section 3.3.3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 2	Section 5.1.10

RESPONSE

The typographical error has been corrected.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 3	None required.

RESPONSE

Fabrication of parts that would be used at DARHT is addressed in section 3.3.3 and table 3-1. DOE would conduct dynamic experiments with plutonium and hydrodynamic tests using hazardous or radioactive material under all alternatives analyzed in the DARHT EIS, including No Action. These activities would not bear on DOE's decisions regarding enhanced radiographic capability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 4	None required.

RESPONSE

The measurable cumulative impacts are discussed in section 5.9. DOE acknowledges that LANL is an alternative site for many actions under the SS&M PEIS as described in the NOI for that PEIS. However, these potential activities are too speculated to be assessed in detail at the time. DOE believes that DARHT is justified independently of any SS&M decisions. See also, section 2.6 and volume 2, section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 5	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 6	None required.

RESPONSE

Direction by the President and Congress for DOE to ensure the safety, security, and reliability of the nuclear weapons stockpile create current responsibilities, not ones that are activated for each of these elements when an issue for that element arises. Some safety and reliability issues can perhaps be addressed to some extent with current technology, but DARHT technology would better elucidate the physical processes involved. Competence to address a fuller spectrum of issues will require the temporal and spatial resolution provided by DARHT. Because such a facility requires years to construct, equip, and bring up to full operational capability, DOE concludes a need to proceed now. Relevance of the PEIS does not necessarily preclude or terminate activities that will be discovered in the PEIS. Since the action is urgent but not an emergency, 40 CFR 1506.11 does not apply.

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 7	Section 2.3

RESPONSE

Chapter 2 of the DARHT EIS has been revised to provide more information on why enhanced radiographic testing cap[ability is needed to assure stockpile safety and reliability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 8	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 9	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 10	None required.

RESPONSE

In February 1991, the DOE issued a Notice of Intent (NOI) to prepare the Reconfiguration PEIS to analyze its proposal to reconfigure the nuclear weapons complex to be smaller, less diverse, and more efficient [56 FR 5590]. In July 1993, the DOE revised the Notice to reflect the fact that the future nuclear weapons complex could be smaller and more integrated than previously envisioned [58 FR 39528]. The revised NOI included an alternative of upgrading existing facilities in place at existing sites rather than relocating them. In October 1994, the DOE separated the Reconfiguration PEIS into two separate reviews [59 FR 54175]: the "Tritium Supply and Recycling PEIS" (DOE/EIS-0161D) issued in draft in March 17, 1995, and the SS&M PEIS. Instead of pursuing the upgrade in-place alternative, as it was envisioned in July 1993, DOE has instead taken action to discontinue a weapons complex role at many of the sites formerly considered to be part of the nuclear weapons complex. The NOI for the SS&M PEIS, [59 FR 14433] lists eight nuclear weapons complex facilities, including facilities contained within larger sites with nondefense management (such as the tritium facilities at the Savannah River Site, which is considered overall to be an Environmental Management site rather than a weapons complex site). For comparison, in 1990, DOE listed 14 major sites that comprised the nuclear weapons complex.

DOE agrees that the SS&M PEIS is an evolution from the former Reconfiguration PEIS, but disagrees that the proposed scope of the SS&M PEIS falls within any one alternative discussed in the Notices for that PEIS. In any event, the scope of the DARHT EIS is different from the scope of the Reconfiguration PEIS or the SS&M PEIS.

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 11	None required.

RESPONSE

The No Action Alternative is a continuation of current activities and is not ruled out. DOE has continually worked to maintain and improve its hydrodynamic testing capability at LANL and LLNL. However, the need for enhance radiographic hydrodynamic capability cannot be met by continuing to use existing facilities at LANL and LLNL. Any discussions related to the SS&M mission and the LANL SWEIS will not alter the alternatives presented in the DARHT EIS. The No Action Alternative serves as a basis for comparison for the other alternatives analyzed in the DARHT EIS; if none of the other alternatives were pursued, that is, if no new course of action were taken, DOE would continue with its present program.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 12	None required.

RESPONSE

The DARHT Facility is intended to address issues arising from DOE's mission to ensure safety and reliability of the nuclear weapons stockpile. Although basic physics information could have some design significance, the information from DARHT would be quite inadequate to develop a new design in the absence of nuclear testing.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 13	None required.

RESPONSE

Enhanced radiographic capability proposed for DARHT would be limited to hydrodynamic tests and dynamic experiments. The scope and context of a CTBT, including any references to hydrodynamic testing will result from negotiations by the signatory parties. The U.S. supports a CTBT, and DOE believes that its hydrodynamic testing program planned for the next several years provides a strong foundation for that support by allowing the Nation to maintain a means (hydrodynamic tests) other than underground nuclear tests to assure the future safety, performance, and reliability of the weapons stockpile.

See also response to comment 17-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
23 - 14	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
24 - 1	Sections 2.4, 3.3.4 and 3.10.5.

RESPONSE

See response to comment 13-13 and section 3.10.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
24 - 2	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
24 - 3	None required.

RESPONSE

DOE agrees that any of the waste products from its operations should not be allowed to "ruin" Pajarito Plateau or any of the adjacent areas. LANL has numerous programs that prescribe how the waste products are handled and a monitoring network that provides information on the levels of contaminants found in the environment. These programs are described to some degree in the DARHT EIS and in more detail in the LANL annual Environmental Surveillance Reports (LANL 1993c and LANL 1994a).

COMMENT CODE	LOCATION OF EIS REVISION(S)
24 - 4	None required.

RESPONSE

DOE and LANL are working to improve communication with the general public in a variety of ways. Processes such as this NEPA review afford an opportunity for the DOE and LANL to provide information on specific projects and explain the rationale for recommending that a certain course of action be taken or not be taken. One of the underlying purposes of NEPA is to open the Federal decision-making process to public scrutiny, and to invite public participation in the decision-making process.

COMMENT CODE	LOCATION OF EIS REVISION(S)
24 - 5	None required.

RESPONSE

DOE disagrees that there have been no technological benefits from nuclear weapons spending over the past 50 years. Many advances in technology that are in common use today, from satellite communications to electronics to plastics, have benefited from research and development funded by the government in response to the need for improving nuclear weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
25 - 1	Table 5-19

RESPONSE

Table B-4 provides a definition of "other metals" for PHERMEX. The PHERMEX "other metals" are aluminum, boron, brass, iron, inconel, niobium, nickel, silver, tin, titanium, tantalum, tungsten, and vanadium. Plutonium is not listed in the "other metals" category. Table 5-19 (formerly table 5-20) will be revised to reflect the PHERMEX "other metals" list.

COMMENT CODE	LOCATION OF EIS REVISION(S)
25 - 2	Sections 5.1.8, 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.4.8, 5.4.9, and 5.7.2.2

RESPONSE

See response to comment 10-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
26 - 1	None required.

RESPONSE

A discussion of why additional alternatives that would end weapons research were not analyzed in the EIS is provided in section 3.10.

COMMENT CODE	LOCATION OF EIS REVISION(S)
26 - 2	Section 4.6 Tables 4-14 and 4-15

RESPONSE

DOE agrees that the Pajarito Plateau, including the lands comprising LANL, constitute a rich archeological heritage. The DARHT EIS, section 4.6, notes the archeological and historical sites in the vicinity of the DARHT and PHERMEX sites, and whether they are listed or would be eligible for the National Register of Historic Places under the provision of the National Historic Preservation Act. This section has been revised in response to public comments received and further consultation with the State and Indian tribes. DOE will continue to consult with the four Accord tribes on a government-to-government basis to ensure protection of traditional cultural properties.

COMMENT CODE	LOCATION OF EIS REVISION(S)
26 - 3	None required.

RESPONSE

As noted in section 5.9 paragraph 3, the value 239 person-rem is for the year 1993 and represents the total of all doses estimated for all 7,000 workers at LANL. The text also notes that the contributions from PHERMEX activities for 1993 was 0.3 person-rem, about a tenth of one percent of the total. For an individual basis, the average of all exposures would be about 0.34 rem (34 mrem). Clearly, different workers have different exposures; the cumulative dose is not a good way to consider individuals. Though not an impact from LANL operations, natural background, medical x-ray, etc., produce exposures estimated to be about 300 mrem/yr for persons living around LANL.

COMMENT CODE	LOCATION OF EIS REVISION(S)
26 - 4	None required.

RESPONSE

Over the past decade, the number of tests per year conducted at PHERMEX and DOE's other firing sites has varied from a few to a few dozen. Future testing could show as much variability. Sometimes one explosion is considered a test; other times a series of closely related explosions constitute a single test.

These tests are scientifically valid in that they are physical measurements of physical phenomena. The results are used to validate engineering and scientific predictions or analyses of the physical phenomena.

Because of the time and cost to set up each test, LANL staff try to minimize the number of tests and extract the maximum information from each test. Specific research objectives would depend on priorities among problems identified with stockpile items or other concerns.

COMMENT CODE	LOCATION OF EIS REVISION(S)
26 - 5	None required.

RESPONSE

The text states that the annual probability for earthquake occurrence is low. Section 4.3.4 indicates these probabilities are on the order of 10^{-4}. This means the average time between large earthquakes on nearby faults is about 10,000 years. The most recent large earthquakes on two of these faults are dated approximately at 4,000 to 6,000 and 8,000 to 9,000 years ago, respectively. Potential damage to facilities is mitigated by structural and equipment design. Damage that might occur is not deemed to result in environmental releases.

COMMENT CODE	LOCATION OF EIS REVISION(S)
27 - 1	None required.

RESPONSE

The DARHT EIS provides the level of information on the DARHT project and other alternatives analyzed sufficiently to support the "bounding analysis" of environmental impacts included in the EIS. The DOE's LAAO DARHT EIS Project Office and its parent AL EIS Program Office are responsible for providing information regarding the NEPA review and other aspects of the EIS process. However, those offices do not have the technical expertise for in-depth discussions of the hydrodynamic testing program or issues regarding nuclear weapons. The commenter was referred to LANL's Nuclear Weapons Technology Program Office; DOE apologizes for the confusion and miscommunication regarding the commenter's earlier request for information.

COMMENT CODE	LOCATION OF EIS REVISION(S)
28 - 1	None required.

RESPONSE

At each session of the public hearings on the draft EIS, DOE specifically noted that comments were invited on the adequacy and accuracy of the content of the entire EIS, as well as any other matter pertaining to the environmental review process (see public hearing transcripts). Comments on the purpose and need chapters are welcomed.

DOE recognizes that people who work at its offices or facilities have the same rights as other citizens to participate in the NEPA review process. DOE employees and contractors generally work and live in the communities affected by DOE proposals or alternatives. The DOE Los Alamos Area Office's "Policy Enhanced Opportunities for Stakeholder Involvement in the National Environmental Policy Act Review Process" dated August 3, 1994, specifically states that DOE and Los Alamos National Laboratory employees may participate in the public review process for NEPA, as long as they indicate whether they are speaking in an official capacity or as a private citizen. Public participation is invited in a NEPA review process to provide additional information or correct factual errors in a draft EIS. DOE weighs the content of each comment on its own merits, including those offered by its own employees and contractors.

COMMENT CODE	LOCATION OF EIS REVISION(S)
28 - 2	None required.

RESPONSE

The public hearings on the draft EIS were patterned after the public scoping meetings held in December on the DARHT EIS. At that time people with differing points of view indicated that the roundtable format was preferred over other formats for public meetings used in the past by DOE (see scoping meeting transcripts). As stated at the public hearings, DOE included three types of areas: a comment room, where people could provide formal comments in a private setting; an information area, where people could entertain informal discussions with knowledgeable laboratory and DOE personnel; and a roundtable discussion. DOE was amenable to providing a choice for the format of the roundtable to provide either an opportunity to present spoken or written material into the record without DOE or laboratory comment; an opportunity to ask questions of DOE and laboratory officials and receive answers; or an opportunity for a roundtable discussion among those of differing points of view. The format shifted several times during the sessions in response to requests from the people attending (see transcripts of scoping meetings and public hearings). Although some people stated that they were uncomfortable with the roundtable discussion, others indicated that they preferred it.

COMMENT CODE	LOCATION OF EIS REVISION(S)
28 - 3	None required.

RESPONSE

The DARHT EIS is a DOE document and represents the point of view of the DOE. It is prepared to provide DOE decision-makers with environmental information to assist them in making an informed decision. It is not intended as a document where either the DOE or its contractors employed at LANL "make a case" in support of a DOE proposal.

COMMENT CODE	LOCATION OF EIS REVISION(S)
29 - 1	None required.

RESPONSE

Although DOE does not develop U.S. policy it does believe the U.S. provides leadership for control, inspection, and reduction of nuclear materials/weapons, and is pleased to be a part of this effort.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
29 - 2	None required.

RESPONSE

The size of the nuclear weapon stockpile is decided by the President and Congress. While the exact size of the stockpile remains classified, the size has decreased dramatically over the past few years and is expected to increase further over the next few years. DOE agrees that reliability of the stockpile is a concern, and this is addressed in the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
29 - 3	None required.

RESPONSE

DOE agrees that all test ban treaties should be honored.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
29 - 4	None required.

RESPONSE

If the ROD to be issued following the DARHT EIS includes further construction for the DARHT facility, DOE will work to finish the facility as quickly as possible within the constraints of legal action, sound construction practices, and mitigation measures identified in the ROD.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 1	Tables S-1, 5-1, 5-5, 5-10, C1-8, and C1-16.

RESPONSE

Data describing NO_2, PM_{10}, and SO_2 for the No Action and DARHT Baseline Alternatives are presented in tables 5-1, 5-5, C1-8, and C1-16. For other alternatives, these pollutants are compared in the text to the two alternatives mentioned above. Additional tabulated data are provided as appropriate, such as for the Enhanced Containment Alternative (see table 5-10).

The Air Quality sections and appendix C1 have been revised to better explain contributions to the NO_2, SO_2, and PM_{10} emissions. Air quality values in table S-1 have been revised to reflect the contribution from all applicable emissions sources for each alternative. All of the chapter 5 tables mentioned in the comment have been revised, and several have been moved to appendix C1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 2	None required.

RESPONSE

Table 5-5 (formerly table 5-6) presents emissions in terms of concentrations and compares these concentrations to regulatory limits. Table C1-3 presents emissions in terms of quantities per unit time.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 3	None required.

RESPONSE

Table C1-8 (formerly table 5-7) presents emissions in terms of concentrations and compares those concentrations to regulatory limits. Table C1-7 (formerly table C1-6) presents emissions in terms of quantities per unit time.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 4	Sections 5.1.2.1.1, 5.2.2.1.1, 5.3.2.1, 5.4.2.1.1, 5.4.2.1.2, 5.5.2, 5.6.2.1, and 5.6.2.2 Tables S-1 and 3-3

RESPONSE

DOE agrees that errors were made in preparing some of the air quality tables. A number of these errors were in changing from fraction to percent of applicable limits. The text has been revised to correct these errors.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 5	None required.

RESPONSE

The Preferred Alternative (complete the DARHT Facility) in the draft EIS is now called the DARHT Baseline Alternative in the final EIS, and a new preferred alternative has been selected. The new preferred alternative is the Phased Containment Option of the Enhanced Containment Alternative. The DARHT Baseline Alternative was modeled as 100 percent uncontained, elevated releases due to the explosive, buoyant dispersion of the detonated material. The Enhanced Containment Alternative consists of three options. The Building Containment Option assumes 100 percent contained detonations, with 6 percent of the material released as part of normal operations as ground-level releases, <30 ft (< 10 m). The Vessel Containment Option assumes that 25 percent of the annual usage of material is as open air detonations; of the remainder, detonated in containment, 6 percent are released as part of normal operations and minor vessel failures. The Phased Containment Option (now the preferred alternative) is similar to the Vessel Containment Option except the proportion of shots that are contained starts lower and increases in steps as time passes (see section 3.7.2.3 and figure 3-10). However, the distinction between, and possible dose consequences of, elevated versus ground-level releases is very important for all the options.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 6	Table C1-11

RESPONSE

The material used under each alternative on an annual basis is the same (for example, 1540 lb (700 kg) per year of depleted uranium). Quantities of materials released to the environment for each alternative are provided in table 3-4. Values in the draft EIS table for the Enhanced Containment Alternative (vessels) were incorrect. These values should have been increased by about a factor of 5 to 29.5 percent of the No Action and DARHT Baseline Alternative (which was called the Preferred Alternative in the draft EIS), using the fractions that depend on effective release height. Differences in dispersion that occur at ground level and elevated levels are very important. Table C1-11 (formerly C1-8) has been changed.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 7	Table C1-11

RESPONSE

Table C1-11 (formerly table C1-8) and dependent results have been revised to reflect a new analysis which includes use of the {X-bar/Q'} atmospheric dispersion; use of the 1-hour X/Q has been discontinued. Use of the E/Q dispersion factor is not appropriate in this situation because impacts on air quality are compared to long-term (30-days, calendar quarter) regulatory standard periods which assume continuous or chronic emissions, where {X-bar/Q'} is the appropriate factor. Use of the E/Q atmospheric dispersion is appropriate for situations up to 8 to 24 hours.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 8	None required.

RESPONSE

Although the starting point of the uncontained detonations is a table at essentially ground level, the subsequent detonation results in the debris being moved as a buoyant cloud to a much higher effective release height. The debris cloud is generally characterized as a "stem and cap." Appendix H, section H.2.2 describes an evaluation done to determine if simpler, Gaussian plume modeling techniques could be used to approximate the stem and cap model. It was determined that an elevated Gaussian plume release could be used to conservatively simulate the "stem and cap" model.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 9	None required.

RESPONSE

Alternatives that include uncontained detonations have lower nearby impacts [i.e., 0.9 mi (1.45 km) southwest] because of the greater dispersion of the elevated release.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 10	Tables S-1, 3-3, 5-1, and C1-11

RESPONSE

Table 5-1, and subsequent summaries in tables S-1 and 3-3, were revised to reflect the revised evaluation documented in table C1-11.

See response to comment 30-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 11	Tables S-1, 3-3, 5-1, 5-10, and C1-11

RESPONSE

Differences between table 5-10 (formerly table 5-12) and tables S-1 and 3-3 were the result of errors computing and/or converting between fraction and percentage of the applicable regulatory limit. Values for table C1-11 (formerly table C1-8) were reevaluated, and the resultant tables 5-10 (formerly table 5-12), S-1, and 3-3 were revised. Consistency among tables has been maintained in the final EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 12	Sections 5.1.2.1.1, 5.2.2.1.1, 5.3.2.1, 5.4.2.1.1, 5.4.2.1.2, 5.5.2, and 5.6.2 Tables S-1, 3-3, 5-10, and C1-11

RESPONSE

See response to comment 30-11.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

30 - 13 None required.

RESPONSE

The numbers in question are for the the 30-year lifetime of the project. An average dose (0.02 rem annually) per worker would be an average of 0.6 rem over the 30-year project lifetime. Assuming 100 workers over the 30-year lifetime, the collective worker dose would be 60 person-rem. Both values should remain as stated in the tables.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

30 - 14 None required.

RESPONSE

As shown in table 3-3, it is estimated that worker doses under the Enhanced Containment Alternative would be about twice that of the uncontained alternatives. The estimated number of involved workers is the same as that for the uncontained alternatives.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

30 - 15 Section "Measurements and Conversions"

RESPONSE

The text of the EIS has been revised to incorporate this comment.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

30 - 16 None required.

RESPONSE

DOE appreciates this comment.

DOE has revised chapters 2 and 3 to better explain the purpose and need of DARHT and to provide additional clarification among the alternatives, as well as present the new Preferred Alternative, the Phased Containment Option of the Enhanced Containment Alternative. DOE believes that it has presented DARHT's unclassified unique capabilities, however, certain capabilities remain classified and are addressed in the classified supplement.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

30 - 17 None required.

RESPONSE

DOE has employed a professional technical editor to integrate the work of the many authors listed, and strives to prepare this NEPA review in plain (nontechnical) language to reduce the length of the document and increase public understanding. However, DOE is aware that hydrodynamic testing and the nuclear weapons program in general are highly technical, complicated topics.

The appendixes are necessarily more technical in nature and are intended to provide supporting information for specialists.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 18	None required.

RESPONSE

DOE has reviewed this suggestion and feels that the adding references to the sources of information in other parts of the EIS would make the table too congested. However, the comment is appreciated.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 19	Sections 5.1.2.1.1, 5.2.2.1.1, 5.3.2.1, 5.4.2.1.1, 5.4.2.1.2, 5.5.2, 5.6.2.1, and 5.6.2.2 Tables S-1, 3-3, 5-10, and C1-11

RESPONSE

The text and tables in the air quality sections have been revised to provide a more detailed explanation of assumptions used in modeling and description of impacts. All calculations and data presented in the tables have been reviewed for accuracy and consistency.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 20	None required.

RESPONSE

A NEPA review provides a comparative analysis of the environmental impacts of a proposal, and reasonable alternative ways of responding to the specified purpose and need [CEQ Regulations, 40 CFR 1502.13]. The "No Action Alternative" serves as a basis for comparison regarding the environmental impacts of the other alternatives, including the proposed action.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 21	None required.

RESPONSE

DOE does not believe that the action and alternatives analyzed in the DARHT EIS are connected to actions proposed for other parts of the weapons complex; therefore, the DARHT EIS does not predict impacts, including socioeconomic impacts, on other parts of the complex.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 22	Tables 5-4, 5-8, 5-9, 5-13, 5-14, 5-15, G-1, and G-2

RESPONSE

DOE agrees. The columns have been added.

COMMENT CODE	LOCATION OF EIS REVISION(S)
30 - 23	Sections 3.3.2, 3.3.8, 5.1.9, 5.7.2.2, I.3.1, and J.6.1 Tables I-14 and I-15

RESPONSE

As noted in the DARHT draft EIS section 2.1, some aspects of the hydrodynamic testing and dynamic experiment program, and the related environmental assessment of alternatives, are classified as Secret Restricted Data under the provisions of the Atomic Energy Act of 1954 as amended to protect national security. DOE prepared a classified supplement to the DARHT EIS that contains additional information and analysis. After review of this material, DOE determined that certain aspects of the impact analysis could be presented in an unclassified summary and made the summary available to the general public in May 1995. DOE has revised the EIS in several places to incorporate this information. See chapters 3 and 5 and appendixes I and J.

COMMENT CODE	LOCATION OF EIS REVISION(S)
31 - 1	Sections 3.3.4 and 3.10.5

RESPONSE

See response to comment 13-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
31 - 2	Sections 3.3.3 and 3.10.1.2

RESPONSE

The DARHT draft EIS does discuss the required infrastructure that is necessary to support hydrodynamic testing operations; see section 3.3.3. Using multiple sites to perform the necessary testing would be highly inefficient with regard to time and costs as discussed in section 3.10.1.2. DOE has revised these sections of the EIS for clarity.

COMMENT CODE	LOCATION OF EIS REVISION(S)
31 - 3	None required.

RESPONSE

See EIS volume 2 section 1.5 and response below.

The Congress established the national laboratories, under DOE's predecessor agencies, as competitive organizations. The labs are charged with responsibility for solving technological problems encountered in the various areas of DOE's mission. Although the labs compete with each other to obtain work in various portions of a program, they generally work hand-in-hand in sharing data to solve pieces of the puzzle.

COMMENT CODE	LOCATION OF EIS REVISION(S)
32 - 1	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
32 - 2	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
33 - 1	Section 4.2.6 Table C2-4

RESPONSE

The test was focused on shock and noise effects at Nake'muu. Other data were acquired as possible, but the test was not set up specifically for noise measurements in communities. The data obtained in communities were consistent with expectations and an extended set of tests under various atmospheric conditions does not seem justified in terms of time and cost. The data in table C2-4 have been reviewed and corrected.

A sound level of 60 dBA is characteristic of normal conversation level.

COMMENT CODE	LOCATION OF EIS REVISION(S)
33 - 2	None required.

RESPONSE

The discussion of cumulative impacts in the EIS addresses the potential impacts that are insignificant when viewed separately but may become significant when viewed together. The contribution to overall LANL emissions of criteria pollutants under any of the alternatives analyzed in the DARHT EIS would be inconsequential in terms of cumulative impacts. DOE did not consider "heating" to be a potential environmental impact of concern; nor would DOE expect "heating" to vary among alternatives (that is, result in an environmental change or impact).

COMMENT CODE	LOCATION OF EIS REVISION(S)
33 - 3	None required.

RESPONSE

Table 4-4 was reproduced from the LANL 1992 Environmental Surveillance Report (LANL 1994a), which includes potential impacts from dynamic experiments separately from point source emissions. Since material usages and potential impacts of the dynamic experiments at PHERMEX and DARHT are dealt with extensively elsewhere in the EIS, both from past operations and for projected DARHT operations, DOE did not feel it was necessary to repeat impacts from dynamic experiments here.

Depleted uranium emissions are the only type of uranium emissions from DARHT or PHERMEX.

COMMENT CODE	LOCATION OF EIS REVISION(S)
33 - 4	Section 5.4.2.1.1, 5.4.2.1.2, and C1.3.3 Tables S-1 and 3-3

RESPONSE

The EIS has been revised to provide a clearer explanation of the modeling for the Enhanced Containment Alternative.

See response to comment 20-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
33 - 5	None required.

RESPONSE

See response to comment 18-27.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 1	None required.

RESPONSE

If the DOE were to select the PHERMEX Upgrade Alternative, it would not be necessary to prepare a separate EIS given that the PHERMEX Upgrade Alternative was fully evaluated in the DARHT EIS. DOE will provide the rationale for its final decision in the ROD, including the rationale to select the Upgrade PHERMEX Option if that was its final decision.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 2	None required.

RESPONSE

Enhanced containment could be implemented with vessels after DARHT becomes operational. The containment building also could be added later to the DARHT structure, but incremental costs would be higher and testing would be interrupted during its construction. The Plutonium Exclusion Alternative, as described in the EIS could be implemented later, but if implemented after closure of PHERMEX, would not meet the DOE's stated purpose and need to conduct dynamic experiments with plutonium.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 3	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 4	None required.

RESPONSE

During the major construction that would be needed to implement the upgrade, the PHERMEX Facility would not be available to conduct tests. If DOE decides to pursue this alternative, when the upgrade is complete, the use would be identical to that described for the DARHT Baseline Alternative.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 5	None required.

RESPONSE

A forest fire would impact surface water contaminant migration by increasing the amount of surface runoff available to mobilize and transport contaminants from the firing site to the canyon channels. The greater water volume in the channel system would increase flow rates, allow more contaminant mass in solution, and increase the erosion and transport of sediment-sorbed contaminants. As a result, the increased volume of water and contaminant mass would move through the channel system more rapidly. Recovery of grasses, forbs, and shrubs after a forest fire can be relatively rapid in comparison to the time required for conducting heavy metals away from a firing site.

However, the occurrence of forest fires and the recovery of the ecological system such that runoff returns to typical values can be problematical. The density of trees, the length of fire interval (and hence the density of fuel), and the type and porosity of soil all play a role in determining whether a burn is light or severe, and the depth to which roots are killed in the soil profile. The climatic conditions following a fire also play a significant role, especially precipitation and temperature. Drought conditions can delay recovery while daily thunderstorms, which provide a steady supply of soil moisture, can alleviate stress in trees and promote the germination of grasses, forbs, and shrubs. A study conducted in the wake of the La Mesa fire has shown that biomass production of grasses and forbs after two growing seasons was about 2.5 times that of a predominantly native grass cover of an open pine stand (Potter and Foxx 1992). This implies that runoff may return to typical values very quickly in response to regermination of grasses and forbs in impacted areas. Because release of heavy metals from firing sites is a long-term process, neglect of the potentially short-term impact of a forest fire seems reasonable.

Potter, L.D. and T. Foxx. 1981. *Postfire Recovery and Mortality of the Ponderosa Pine Forest after La Mesa Fire*, pages 39-55 in La Mesa Fire Symposium, held at Los Alamos, New Mexico, October 6-7, 1981. LA-9236-NERP. Los Alamos National Laboratory, Los Alamos, New Mexico.

COMMENT CODE	LOCATION OF EIS REVISION(S)
34 - 6	None required.

RESPONSE

There could be some limitations. The containment vessel planned would have optical ports as would the optional extension modules, so a test would have to be configured to use the optical access as it would be available.

COMMENT CODE	LOCATION OF EIS REVISION(S)
35 - 1	None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
35 - 2	None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
36 - 1	None required.

RESPONSE

The costs associated with decommissioning and cleanup are not considered to be discriminating factors among the alternatives. All of the alternatives, except building containment, including the Phased Containment Option of the Enhanced Containment Alternative (the Preferred Alternative), would conduct some level of open air testing continually through the life of the project.

The initial costs of the Phased Containment Option would be about $30 million higher than implementing the DARHT Baseline Alternative. However, the projected cost over the life of the project would not be substantially different.

Although the EIS does not provide a cost-benefit analysis or a detailed discussion of life-cycle costs, costs of the various alternatives are summarized in table 3-4. DOE believes that the revised Preferred Alternative, the Phased Containment Option of the Enhanced Containment Alternative, would be cost effective over the lifetime of the project.

COMMENT CODE	LOCATION OF EIS REVISION(S)
36 - 2	None required.

RESPONSE

The bulk of increased cost for the Enhanced Containment Alternative is due mainly to increased construction and operating costs of the vessels (Vessel Option) and the associated Recycling Facility, or containment building (Building Option). There would be some cost associated with small quantities of mixed waste; however, one of the purposes of the Recycling Facility would be to minimize the quantity of potential mixed waste generated.

COMMENT CODE	LOCATION OF EIS REVISION(S)
36 - 3	None required.

RESPONSE

The intent of the EIS is to examine potential environmental impacts from the proposed action. To this end, the EIS assumes that potential accidents occur on a "what if" basis, to provide a reasonable upper limit on environmental impacts without consideration of the reliability or probability of occurrence. Overall safety and reliability of hydrodynamic testing operations would be addressed as part of the overall LANL Industrial Safety and Explosive Safety Programs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
36 - 4	None required.

RESPONSE

Section 3.10.7 addresses an alternative not considered in the EIS, namely, relinquishing reliability of the nuclear stockpile. The only point made in the text is that the President and Congress have directed DOE to maintain a safe, secure, and reliable nuclear deterrent. The italicized reference to DARHT is part of the scoping comment from the public.

COMMENT CODE	LOCATION OF EIS REVISION(S)
36 - 5	None required.

RESPONSE

The uranium is not found on the hair, but incorporated in the hair. Thus the hair is being used as an indicator of possible uranium in the food supply for the elk. Regardless of how these levels and their standard deviations are interpreted, a hunter could not inhale this material as particulates, and is not likely to ingest very much hair, if any, while dressing out a carcass.

COMMENT CODE	LOCATION OF EIS REVISION(S)
37 - 1	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

The DARHT EIS, section 3.7, indicates that under enhanced containment, for the Building Containment Option all tests and experiments would be contained, and that under the Vessel Containment Option most tests and experiments would be contained.

DOE has prepared a revised Preferred Alternative, which is the Phased Containment Option of the Enhanced Containment Alternative, that addresses concerns raised in this comment. See section 3.7.2.3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
37 - 2	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

Both the Building Containment Option and Vessel Containment Option under the Enhanced Containment Alternative would require some limitations on size, type, and diagnostic techniques for tests and experiments. The Preferred Alternative, Phased Containment Option, would minimize such limitations but would still impose more limitations than the DARHT Baseline Alternative (formerly the preferred alternative in the draft EIS). It represents a commitment to continual improvement in environmental protection, and provides the practical basis for implementing full containment for succeeding generations of hydrodynamic test facilities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
37 - 3	None required.

RESPONSE

See response to comment 20-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
37 - 4	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
38 - 1	None required.

RESPONSE

DOE agrees that the levels of contamination from PHERMEX operations are insignificant; however, DOE will continue to monitor all potential impacts associated with PHERMEX and DARHT. The actions taken to mitigate potential impacts from the course of action selected in the ROD following the DARHT EIS will be presented in the Mitigation Action Plan.

COMMENT CODE	LOCATION OF EIS REVISION(S)
38 - 2	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
39 - 1	None required.

RESPONSE

Construction of DARHT has ceased pending resolution of a court injunction issued in January, 1995.

COMMENT CODE	LOCATION OF EIS REVISION(S)
39 - 2	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
39 - 3	None required.

RESPONSE

See response to comment 17-12.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 1	None required.

RESPONSE

See response to comment 10-1 and chapter 2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 2	None required.

RESPONSE

Because tests and their objectives can vary, there is no unique value for a source term per shot. The EIS discussions are based on average annual rates for the most part. If plutonium were used in a test, the assembly would be enclosed in a double-walled vessel and no release would be expected at the firing point, as the commenter suggests. However, there would be small impacts to the waste stream from the facility where the vessels are cleaned and materials are recovered.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 3	Sections 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, and I.3.1 Tables I-14 and I-15

RESPONSE

The DARHT EIS refers to two types of containment vessels: double-walled steel vessels which would be used for all dynamic experiments involving plutonium; and single-walled modular steel vessels used for hydrodynamic tests. For the single-walled modular containment vessels, DOE estimates that under normal operations there could be a release (a leak) along the joints of the vessels about 5 percent of the time. The 5-percent estimate was used as a "bounding analysis" to establish a very conservative estimate of the possibility of materials or contaminants being released to the outside environment and is not considered indicative of routine conditions. All accident scenarios in the DARHT EIS were done using a "what if" approach (see EIS appendix I.2). No attempt was made to ascribe probabilities to the likelihood of an accident, or to identify potential causes for an accident (e.g., fire, earthquake, or human error) or the probability for any given causal event to occur. Instead, the DARHT EIS looked at the environmental impacts that would be expected to occur if an accident occurred for any reason (regardless of probability or cause). The unclassified summary of the classified impact analysis indicates that the same "what if" approach was used for accident scenarios involving dynamic experiments with plutonium. Under one of the two accident scenarios analyzed, DOE looked at the environmental consequences expected to occur if the outer containment vessel were breached with a 1-in hole. The summary suggests that related DOE safety studies indicate that the probability of an accidental uncontained detonation of an experimental assembly containing plutonium would be less that 10^{-6} (less than one in a million) per year. The EIS has been revised to indicate the results of the classified impact analysis; see section 5.1.9 and appendix I. Also, there has not been a breach of a containment vessel (inner or outer wall) during the operating history of PHERMEX

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 4	None required.

RESPONSE

See response to comment 17-41 and response below.

The likelihood of an accident involving a test assembly containing plutonium at DARHT or PHERMEX is considered to be an extremely unlikely (annual probability of occurrence of 10^{-4} to 10^{-6}) to incredible (annual probability of occurrence of less than 10^{-6}) based on related LANL safety studies. For the EIS, impacts of accidents were evaluated without considering this very low probability of occurrence. DOE believes that an appropriate way to evaluate potential impacts of a hypothetical release of plutonium is to investigate postulated impacts to humans. It is very likely that any contamination from such a release would be subject of rigorous and immediate intervention and remediation activities to reduce potential impacts. The effect of these efforts would be difficult to quantify in a generic, prospective evaluation. Evaluation of impacts from postulated soil contamination from such a hypothetical release would have a great amount of uncertainty associated with it, would be extremely difficult to do in a credible manner, and would add little substantive information due to the low probability of occurrence.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 5	None required.

RESPONSE

DOE agrees that the cost of cleanup in the event of an accidental plutonium release could be expensive, however, the probability of occurrence of such a release is considered to be less than one in a million per year. However, the types of dynamic experiments that would be conducted in the future at DARHT or PHERMEX could not result in a nuclear explosion or nuclear yield; therefore, infrastructure damage or contamination in the event of an accident would be localized with the exception of airborne aerosolized particles.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 6	None required.

RESPONSE

Discussion of the recent fire is included in section 4.9 of the EIS. Procedures are being revised to prevent this kind of incident in the future. Potentially exposed response personnel, such as fire fighters, are trained and have appropriate equipment to respond to this type of incident in a safe manner. The change in procedures will mandate a more protective response mode.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 7	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 8	None required.

RESPONSE

See response to comment 20-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 9	None required.

RESPONSE

Each test at PHERMEX will result in one radiograph. Multiple pictures are possible with the use of a second axis as proposed with DARHT or with the use of double-pulse technology as with the FXR facility at LLNL, although at reduced power. PHERMEX cannot be used for multiple exposures through pulsed power. The x-ray film size is equal to or larger than the area to be imaged; the image is created by shadows of materials that partially or fully absorb the x-rays. Neither PHERMEX nor FXR can produce "dual-axis" results.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 10	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 11	Sections 2.2.2 and 2.6.

RESPONSE

See response to comment 13-19 and chapter 2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 12	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 13	None required.

RESPONSE

Under the No Action Alternative, DOE would continue to conduct hydrodynamic testing and dynamic experiments using the facilities at PHERMEX and FXR as appropriate to address stockpile issues. These capabilities fall short of those believed necessary by DOE and several review panels (see EIS section 2.1); therefore, the No Action Alternative could eventually impact national security. In turn, some as yet unidentified scenarios might cause socioeconomic impacts. Such a scenario is too speculative for this NEPA action. The decision to pursue DARHT technology comes not from analyses in this EIS but from the President and Congress.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 14	None required.

RESPONSE

DOE agrees. The current stockpile is approaching an age that has not been experienced before; thus, the risk of encountering problems is increased.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 15	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 16	None required.

RESPONSE

Aspects that would be affected by tests at the proposed DARHT Facility would be safety, performance, and reliability. "Security" refers to aspects of nuclear weapons such as mechanical or electronic means to thwart unauthorized use of the weapon, or aspects of physical security such as guards or secure storage facilities that are used to protect weapons from unauthorized access. Security of nuclear weapons is an issue that will not be evaluated by tests at the DARHT Facility.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 17	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 18	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 19	None required.

RESPONSE

DOE agrees with the comment. Although the need for DARHT is premised on the need for enhanced radiographic hydrodynamic testing capability, skilled personnel are necessary to utilize the DARHT equipment, conduct the tests, and interpret the results. Use of enhanced radiographic hydrodynamic testing is expected to play a key role in science-based stockpile stewardship; see section 2.2.2 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 20	None required.

RESPONSE

See response to comment 36-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 21	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 22	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
40 - 23	None required.

RESPONSE

Bounding accidents for DARHT and PHERMEX operations were identified and selected for analysis in a Preliminary Hazards Analysis (appendix I, section I.1). Accident consequences were examined on a "what if" basis, that is, assuming that the accident does occur (probability = 1) and examining the consequences. The parameters of the hypothetical detonated assembly (i.e., mass of high explosive and depleted uranium) were selected to maximize the potential consequences. These assumptions resulted in bounding cases that encompass possible impacts from detonations of different types of assemblies.

COMMENT CODE	LOCATION OF EIS REVISION(S)
41 - 1	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
41 - 2	None required.

RESPONSE

DOE believes that chapters 1, 2, 3, and 4 provide adequate background information, and chapter 5 provides adequate information on potential impacts of the alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
41 - 3	None required.

RESPONSE

An EIS provides a comparative analysis of environmental impacts that would be expected from the various alternatives. An EIS is not intended to analyze other types of impacts, such as mission or cost impacts. However, in table 3-4 DOE has provided a summary of these other types of considerations to assist the reader.

COMMENT CODE	LOCATION OF EIS REVISION(S)
41 - 4	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
41 - 5	None required.

RESPONSE

See response to comment 40-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
42 - 1	None required.

RESPONSE

DOE agrees. The current stockpile is approaching an age that has not been experienced before; thus, the risk of encountering problems is increased.

COMMENT CODE	LOCATION OF EIS REVISION(S)
42 - 2	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
42 - 3	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comments 13-9 and 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
43 - 1	None required.

RESPONSE

All comments received from the public are given equal consideration. DOE staff and management meet with members of interest groups, and meetings are encouraged if the stated concerns are credible.

COMMENT CODE	LOCATION OF EIS REVISION(S)
43 - 2	None required.

RESPONSE

DOE agrees that the operation of PHERMEX has provided a necessary component in the U.S. nuclear testing program. The level of environmental impact by 30 years of operation is considered to be negligible.

COMMENT CODE	LOCATION OF EIS REVISION(S)
43 - 3	None required.

RESPONSE

See response to comment 36-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 1	None required.

RESPONSE

The technology proposed for DARHT is still considered to be state of the art. As stated in the EIS, section 3.5.2, the DOE considers enhanced radiography to be the best currently available tool to obtain certain kinds of information regarding the effects of aging on the safety and reliability of weapon primaries.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 2	Section 2.3.2

RESPONSE

A problem similar to that of the W-68 system might be addressed using hydrodynamic testing in the absence of nuclear testing. The hydrodynamic tests would use replacement explosives and mock nuclear components to simulate the W-68 warhead. DARHT technology would be critical for this because of the performance issues concern the configurations of ultra-dense pit materials near the end of the implosion. See section 2.3.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 3	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 4	None required.

RESPONSE

As discussed in the DARHT EIS, the need for DARHT is based on national policy. Nuclear weapons are not considered obsolete and remain a vital part the U.S. policy on deterrence. The number and type of weapons in the national arsenal, particularly in the nuclear weapons stockpile, are established annually by the President and Congress; DOE is required to provide the support required to ensure the nuclear weapons stockpile remains safe, secure, and reliable.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 5	None required.

RESPONSE

See response to comment 17-12.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 6	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 7	None required.

RESPONSE

See response to comment 17-1 and EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 8	None required.

RESPONSE

As discussed in the DARHT EIS (section 2.3.1), computer modeling and hydrodynamic testing are the key tools currently used to gather data regarding nuclear weapon primaries. These two tools had been used in the past in conjunction with the Nevada Test Site underground nuclear testing program. It would not be possible to provide sufficient predictive data of the certainty needed to provide a high confidence level in the safety and reliability of the stockpile if computer modeling were the only means of gathering data.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 9	None required.

RESPONSE

As stated in the EIS, section 2.2.1, nuclear deterrence remains a cornerstone U.S. policy, and the U.S. will continue to rely on DOE to maintain a safe, secure, and reliable nuclear weapons stockpile. DOE recognizes that individual citizens may disagree with this policy, and that is their right.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 10	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

The EIS examines the potential toxicological and radiological impacts from routine and accidental releases of depleted uranium, beryllium, and other materials from DARHT and PHERMEX. Results of these evaluations for the No Action (current program) and other alternatives analyzed in the DARHT EIS are presented in chapter 5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 11	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile. Thus, the actions discussed in the DARHT EIS remain tied to U.S. weapons policy regarding the safety and reliability of nuclear weapons, rather than the design or development of new weapons. The level of detail in this EIS is considered adequate for a project-specific analysis.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 12	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, 5.5.7.2, 5.5.7.3, 5.5.7.4, D.5, E3.5, and H.5.2

RESPONSE

The comment correctly points out an error in the costs shown for the Plutonium Exclusion Alternative; the text of the EIS has been revised accordingly. See section 5.5.7.2.

Although the EIS does not provide a cost-benefit analysis or a detailed discussion of life-cycle costs, costs of the various alternatives are summarized in table 3-4. DOE believes that the revised Preferred Alternative, the Phased Containment Option of the Enhanced Containment Alternative, would be cost effective over the lifetime of the project. The comment correctly notes that the initial cost of the Phased Containment Option would be about $30 million higher than DARHT alone. However, the projected cost over the life of the project would not be substantially different among alternatives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 13	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 14	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 15	None required.

RESPONSE

The NEPA review process is conducted in set stages, each stage tending to supersede the previous stages. For example, a Notice of Intent published in the *Federal Register* (FR) indicates the preliminary thinking of what the scope of an EIS would be, but the scope may change in either the draft or final EIS: [See CEQ regs. 40 CFR 1502.9, 1508.22, 1508.22, and 1508.25]. Under the DOE NEPA process, an Implementation Plan is provided to the public to, among other things, indicate the results of the public scoping process [10 CFR 1021.312]. Appendix A of the DARHT EIS Implementation Plan contains the text of the DOE's Notice of Intent to prepare the DARHT EIS. In the Notice DOE stated that it did not intend to analyze issues or alternatives in the DARHT EIS beyond the construction and operation of DARHT. Therefore, issues such as the Nation's nuclear weapons policies, the DOE stockpile stewardship mission, or continued operation of other (unrelated) facilities at LANL were not considered. See sections 2.6 and 3.10 of the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 16	Section 3.6

RESPONSE

DOE agrees with this comment and, although this was mentioned in the draft EIS in table 3-5, DOE has revised the EIS to better explain the programmatic and cost implications of this alternative. See section 3.6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 17	Section 3.6

RESPONSE

DOE agrees; the text has been revised. See section 3.6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 18	Section 2.1

RESPONSE

See response to comment 11-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 19	None required.

RESPONSE

DOE agrees; these problems are currently being encountered at the PHERMEX Facility.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 20	None required.

RESPONSE

See response to comment 44-12.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 21	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 22	None required.

RESPONSE

DOE believes that the current stockpile is safe on the basis of surveillance and testing. The uncertainties of the stockpile do not pertain to the existing stockpile but rather center on the effects of aging on the stockpile and on the potential of new safety scenarios or issues. DOE needs to ensure that the stockpile remains safe in the future. The existing stockpile is still within its design life, but as time goes on the stockpile will have aged beyond a point that has not been proven to be safe or reliable.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 23	None required.

RESPONSE

The enhanced technology proposed for DARHT would use higher energies which would allow scientists to look more deeply into a surrogate weapons system. This approach would provide more information on the interactions that take place during at later times during a test and allows scientists to make better predictions regarding the effects of aging on actual weapons in the stockpile.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 24	Section 2.3.2

RESPONSE

The EIS has been revised to accommodate this comment. See section 2.3.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 25	None required.

RESPONSE

Previously, nuclear tests (underground and above ground) and hydrodynamic tests were used to verify the computational codes, then the computer codes were used to predict what would be expected. Without underground testing the level of detail and amount of information available from hydrodynamic testing becomes more important. Models, calculations, and computer simulations need empirical data in order to build accurate models.

The enhanced capability proposed for DARHT would provide significantly increased levels of information over PHERMEX and FXR, information needed in this environment of no underground testing.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 26 Section 2.3.2

RESPONSE

Seeresponse to comments 18-29 and 18-8.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 27 None required.

RESPONSE

The number of tests and experiments planned for any given year depends more on cost and programmatic considerations than the technology used. Although scientists expect to obtain more information per test event if the enhanced technology planned for DARHT were used, the number of tests and experiments is expected to remain generally constant under any alternative analyzed in the DARHT EIS.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 28 Section 2.2.1

RESPONSE

See response to comment 13-9.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 29 None required.

RESPONSE

See response to comment 44-12.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 30 None required.

RESPONSE

DOE agrees that for some projects a higher cost is offset by environmental benefits.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

44 - 31 None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
44 - 32	Section 2.5

RESPONSE

Seeresponse to comment 11-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 1	Section 2.1

RESPONSE

See response to comment 13-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 2	None required.

RESPONSE

DOE considers the statements in the EIS of purpose and need for DARHT to be accurate. Enhanced radiography capability is essential to ensure the safety and reliability of the existing stockpile. If the comment is suggesting that DOE plans to use DARHT as a design facility, it must be pointed out that this is against current national policy. However, if national policy were to dictate the design of nuclear weapons, then DARHT would be used to assist those efforts.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 3	None required.

RESPONSE

If the presence of such a sensor affected the geometry of the pit or the high explosive around it, hydrodynamic testing might be needed to evaluate the way in which the altered geometry might affect the hydrodynamic phase of the weapon's action.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 4	None required.

RESPONSE

Neither FXR nor PHERMEX is adequate to provide the experimental data needed to ensure the continued safety, performance, and reliability of the stockpile in the absence of nuclear testing. The enhanced capability proposed for DARHT would be expected to provide significantly better resolution which is needed to resolve detailed implosion features necessary to address issues related to nuclear weapon primaries that will arise in the enduring stockpile. In addition, DARHT capability would provide this high-resolution data from two different angles giving information about asymmetries that may be especially important in assessing the possible results of an accident, or about time evolution of an implosion.

FXR and PHERMEX have been adequate for the design of new weapons in the past because they were used in conjunction with nuclear testing, that is, results from FXR or PHERMEX were used in the process that was finally validated with a nuclear test at DOE's Nevada Test Site. In the absence of nuclear testing, much better experimental data (higher resolution, more images) are needed to provide the required information. The JASON report on Science Based Stockpile Stewardship (JSR-94-345, November, 1994) strongly supports the need for advanced radiographic capabilities.

In an absolute sense, FXR by itself is inadequate to provide the needed data because no experiments involving plutonium are conducted there, and the capability to obtain additional data on plutonium is important.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 5	None required.

RESPONSE

DOE agrees that the existing stockpile remains safe, secure, and reliable. The existing stockpile is not considered to be at risk because of a program of continuous surveillance, repair, and replacement of components and subsystems [see O'Leary quote in box in chapter 2 of the EIS]. The concern lies with the future stockpile since current U.S. policy dictates that the existing stockpile remain active past its design life.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 6	None required.

RESPONSE

See response to comments 18-8, 18-9 and 18-29.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 7	None required.

RESPONSE

See response to comment 18-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 8	None required.

RESPONSE

Both LANL and LLNL have been doing experiments to improve resolution of existing radiographic and accelerator equipment. One technique is called "spot collimation." In this technique, LLNL uses a gamma-ray camera, and the radiographic spot is collimated with a small tungsten hole thereby reducing the spot size; however, the loss in x-ray quantity is significant, and the field of view available for radiography is also substantially reduced. It is true that by using this technique FXR can obtain a spot size as small as that anticipated from the enhanced techniques developed for DARHT. The performance parameters for these shots were approximately: a spot size of 0.05 in (1.2 mm) and an x-ray quantity of 50R at a distance of 3.28 ft (1 m). DARHT's parameters are a spot size of 0.05 in (1.2 mm) and an x-ray quantity of 350R at a distance of 3.28 ft (1 m). Resolution depends on both the x-ray quantity and the spot size. Consequently, DOE does not agree that the recent tests at FXR gave resolution as good as that which would be expected from DARHT. The enhanced techniques proposed for DARHT could also employ gamma-ray camera technology. Consequently, the images that could be produced using the enhanced techniques developed for DARHT would be expected to be of higher resolution than at FXR. For example, the quantum noise level would be expected to be about 2.6 times lower at DARHT. The dual-axis capability proposed to be employed at DARHT would also have two or more such images with a much wider field of view than the single image obtained at FXR. See: Watson, S., et. al. *A Figure of Merit for Dense Object Flash Radiographic Systems*, LANL- M-4:GR-93-02., and, Mueller, K., *Limiting Performance of Flash Radiographic Systems,* LANL-M-4:GR-92-13, for more information.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 9	None required.

RESPONSE

Dr. Sack was a member of the Hydrotest Program Assessment Independent Consultants (HPAIC) team that reviewed the technology proposed for DARHT in 1992. In that report, Dr. Sack includes a dissenting point of view regarding the need for two axis over one axis for enhanced hydrodynamic testing capability.

DOE and its predecessor agencies have maintained two weapons physics laboratories since the 1950s to promote peer review and healthy discussion among its researchers. DOE encourages a full and open technical discussion among scientists at the laboratories and recognizes that this approach leads to reasoned dissent rather than informed consensus in some cases. DOE acknowledges that Dr. Sack has made important contributions and is highly regarded. DOE has determined that the technology proposed for DARHT via the Enhanced Containment Alternative--Phased Containment Option--is its preferred approach to meeting its need for enhanced radiographic hydrodynamic capability, and respects the right of individual professionals within its laboratory complex to hold differing points of view.

Dr. Sack participated on the recent JASON panel regarding the need for nuclear testing (JASON 1995). That panel concluded that in order to maintain high confidence in the safety, reliability, and performance of the enduring stockpile under a CTBT, the U.S. must maintain an active stockpile stewardship program including the type of capabilities proposed for DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 10	None required.

RESPONSE

The draft interagency stockpile stewardship document, dated February 1995, is the rough draft of the "Stockpile Stewardship Program Plan for Fiscal Years 1995 through 1997." When issued, this document satisfies a requirement for the DOE and DOD to issue an annual report on stockpile stewardship activities to the National Security Council (NSC). The stockpile stewardship activities to be documented are defined in the November 1993 *Presidential Decision Directive.* The preliminary draft referred to was prepared as an unclassified working paper for the weapons laboratories (LANL, LLNL, and SNL) and the DOD to comment on and eventually to finalize as a joint DOE/DOD report. This draft contains no input from these organizations but does contain extracts from previous reports and from the initial FY 1996 laboratory budget request submitted in April of 1994 only as a means of soliciting the correct input for the 1995 report. Initial drafts of this report are written to be unclassified to facilitate the early stages of writing and review. Later drafts and the final report will be classified at the Secret Restricted Data (SRD) level because of the specificity with which weapons activities are discussed.

The Stockpile Stewardship Program Plan as described above should not be confused with the DOE's Office of Defense Programs "Stockpile Stewardship and Management Program" report, which was issued in May of 1995.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 11	None required.

RESPONSE

Technical work for the Phase II Study of a radio frequency weapon was completed in March 1995; a final report is currently in preparation.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 12	None required.

RESPONSE

See response to comment 24-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 13	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly.

The NOI for the programmatic EIS on Stockpile Stewardship and Management [60 FR 31291] states that the capability for enhanced radiographic hydrodynamic testing will remain an integral part of the program under all alternatives analyzed. The purpose of the DARHT EIS is to examine the potential environmental impacts of the various alternatives for accomplishing the DOE proposal to acquire enhanced radiographic hydrodynamic capability.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 14 None required.

RESPONSE

See response to comment 30-17.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 15 None required.

RESPONSE

See response to comments 17-12 and 44-4.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 16 None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 17 None required.

RESPONSE

See response to comment 18-23.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 18 None required.

RESPONSE

See response to comment 17-12.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 19 None required.

RESPONSE

The weapons mission of the DOE is established by law, and DOE and its predecessor agencies established LANL as a weapons research laboratory.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

45 - 20 None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 21	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 22	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 23	None required.

RESPONSE

DOE agrees that the alternatives analyzed present a range of reasonable ways to address the purpose and need, and that there are various pros and cons, such as cost, beyond the environmental impacts.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 24	None required.

RESPONSE

See response to comment 36-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 25	Sections 5.2.1 and 2.3.1

RESPONSE

Further clarification of the DARHT mission, purpose, and use are reflected in the revised chapter 2 of the final EIS.

An EIS is prepared to provide and analyze environmental information, not to justify the stated purpose and need for a proposal.

See responses to comments 3-1 and 30-17.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 26	None required.

RESPONSE

See response to comment 30-17.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 27	None required.

RESPONSE

The DOE believes that these quoted statements accurately indicate the positions of the President and Congress.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 28	None required.

RESPONSE

DOE believes that the EIS adequately evaluates potential environmental impacts from uses of depleted uranium at DARHT. Should any dynamic experiments be conducted at DARHT using plutonium, they would be done in containment; there would be no releases of plutonium to the environment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 29	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly. LANL is not in a position to dictate national policy.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 30	None required.

RESPONSE

Under the direction of Secretary O'Leary, DOE has initiated numerous activities to make information on DOE sites more available to the public and to provide for more public involvement in the DOE decision-making process. DOE plans to continue its efforts for more public involvement.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 31	None required.

RESPONSE

DOE recognizes that exposure to high levels of uranium, radon, or radon progeny may result in a significant increase in the risk of cancer. DOE is committed to a thorough evaluation of potential environmental impacts from the use of depleted uranium at DARHT and the investigation and consideration of necessary mitigating measures to minimize such impacts.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 32	None required.

RESPONSE

Radon and its radioactive progeny generated in the outdoor environment would not be a concern because they would be subject to immediate atmospheric dispersion that would reduce potential environmental concentrations to insignificant levels. Naturally-occurring radon and radon progeny in indoor environments, such as unventilated basements, are of potentially far greater concern.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 33	None required.

RESPONSE

DOE is committed to keeping radiation exposure to members of the public and workers from DOE activities to As Low As Reasonably Achievable (ALARA) level, which is a standard radiation protection practice. Based on findings and recommendations of the International Commission for Radiological Protection (ICRP), and the National Council on Radiation Protection and Measurements (NCRP), DOE believes that there is an acceptable low level of risk for exposure to radiation. While improving technical capabilities and meeting operational goals are important, the potential environmental impacts must be carefully examined, and DOE is committed to identifying and examining potential impacts.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 34	None required.

RESPONSE

DOE's proposal for enhanced radiographic capability responds to the direction of the President to ensure the safety, security, and reliability of the nuclear weapons stockpile. DOE is committed to environmental remediation of past DOE activities at LANL and all other DOE sites that may have resulted in unacceptable risks to the population and environment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 35	None required.

RESPONSE

Depleted or "spent" uranium is a mixture of isotopes of uranium that is depleted in the U-235 isoptope to some level less than the nominal 0.7 percent (by mass) occurring in natural uranium. The terms "depleted" or "spent" have been in common use for decades and have no implication regarding to the hazard evaluation of uranium except to describe the change in the relative mixture of isotopes (see Glossary in the EIS).

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 36	None required.

RESPONSE

The wording of the Comprehensive Test Ban Treaty (CTBT) remains to be negotiated and ratified by the treaty parties. DOE believes that means to ensure the safety and reliability of its enduring stockpile, such as its proposal to acquire enhanced radiographic hydrodynamic capability analyzed in the DARHT final EIS, will enable this Nation to pursue its goals of maintaining a comprehensive ban on nuclear testing, whether through a formal treaty such as the CTBT, or through a self-imposed moratorium as is now the case. As long as the United States retains nuclear weapons, it will be concerned with their safety and reliability. Without nuclear testing hydrodynamic tests and dynamic experiments are a vital means for assessing safety and reliability.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 37	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 38	None required.

RESPONSE

See response to comment 12-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 39	None required.

RESPONSE

In a judgment filed in U.S. District Court, Albuquerque, New Mexico, on May 5, 1995, Judge Mechem ordered DOE to "prepare a comprehensive environmental impact statement of the [DARHT] facility at Los Alamos National Laboratories [sic], as announced in their Notice of Intent ..." The NOI stated, "DOE does not intend, in [the DARHT] EIS, to analyze alternatives or issues beyond the construction and operation of DARHT that relate to the Nation's nuclear weapons policies, the DOE mission of stockpile stewardship and management, the mission of LANL, or continued operation of other facilities at LANL [59 FR 60134]."

"Bomb production," whether at LANL or elsewhere, is not a "connected action" to providing enhanced hydrodynamic test capability, or the construction and operation of DARHT, as that term is defined by regulations [40 CFR 1508.25 (a)(1)]. Accordingly, the DARHT EIS does not consider the production of nuclear weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 40	None required.

RESPONSE

Although the DOE issued its Notice of Intent to prepare the DARHT EIS on November 22, 1994, a Federal court on May 5, 1995, ordered the DOE to prepare an EIS on the DARHT proposal. The purpose of an EIS is to provide full and open discussion of significant environmental impacts, and to inform Federal decision-makers and the public of reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment while responding to the underlying purpose and need for agency action [CEQ regulations, 40 CFR 1502.1 and 1502.13]. An EIS may serve as a useful tool in a policy discussion, but it is not itself a forum for policy debate.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 41	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 42	None required.

RESPONSE

By regulation, DOE is required to state the underlying purpose and need to which the proposed action and other alternatives respond [CEQ Regulations 40 CFR 1502.13]. DOE believes that enhanced radiographic hydrodynamic testing is needed immediately, as stated in the EIS. The DOE appeared before the U.S. Court in December 1994 regarding whether or not construction of the DARHT facility should be stopped (enjoined) pending completion of this EIS. Although DOE stated that it felt that because DARHT's capability is urgently needed to help ensure the safety and reliability of the stockpile, construction should continue, the Court issued an injunction, and DOE stopped construction in January 1995. The court did not consider the purpose and need for the proposed activities as stated in the draft EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 43	None required.

RESPONSE

The comments in the LANL Institutional Plan are not directed at DARHT, but rather, are intended to be in support of the Advanced Hydrotest Facility. The ability for x-rays to penetrate a material depends approximately on the energy of the x-rays, the amount of x-rays available (dose), and the density of the material. Higher energies and higher doses are able to penetrate denser materials. DARHT would provide higher energy and greater dose in the brief flash of x-rays. However, pit materials can become extremely dense in the final moments of the implosion. So, although DARHT technology would provide a needed improvement in higher energies and doses, there may be some instances in which the pit materials are still too dense to be penetrated by the x-rays.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 44	None required.

RESPONSE

DOE acknowledges that the JASON Report is consistent with DOE's proposal. The JASON Report is an independent review and is not at issue; reasons for the development of the enhanced radiographic capability are discussed in the DARHT final EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 45	Section 3.10.3

RESPONSE

The Advanced Hydrotest Facility (AHF), discussed in the DARHT EIS in section 3.10.3, is a conceptual facility that would provide up to eight radiographic views and 20 or more images. It would be based on new and developing accelerator technology which is not yet ripe for implementation and is not yet a firm DOE proposal. The AHF could not provide enhanced radiographic capabilities in the near-term, and so is not considered to be a reasonable alternative to DARHT. In addition to the discussion in the DARHT EIS, the AHF is discussed on p. 15 of "The Stockpile Stewardship and Management Program: Maintaining Confidence in the Safety and Reliability of the Enduring U.S. Nuclear Weapon Stockpile," DOE 5/95. The Notice of Intent for the Stockpile Stewardship and Management Program Environmental Impact Statement [60 FR 25697] indicates that AHF, while under consideration, is not yet proposed but may be analyzed in that PEIS; LANL is listed as a preliminary alternative site to receive the facility. The draft PEIS is scheduled to be issued for public review in early 1996. The discussion in the DARHT EIS has been revised to include updated information regarding AHF planning.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 46	None required.

RESPONSE

See response to comment 30-17.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 47	Sections B.8 and C1.3.3 Figure B-1

RESPONSE

DOE recognizes that various descriptions of the respirable fraction was confusing. Figure B-1 shows the partitioning of depleted uranium into various fractions. The final EIS revises text in various places to represent the respirable fraction more clearly and accurately.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 48	None required.

RESPONSE

Two air sampling stations, onsite in TA-15, were put in place during 1993. See section 4.2.5. However, analysis of LANL environmental surveillance data for 1993 has not yet been completed by LANL and is not available. Results available for other air monitoring stations, particularly the LANL perimeter stations for years before 1993 indicate very low to nondetectable concentrations of materials (mainly uranium), which could have originated at PHERMEX. Also, usage of these materials has decreased at PHERMEX over the years, so any detected concentrations would be expected to be less. Since the two stations in question are onsite in the middle of TA-15 they would be of limited use in estimating potential impacts offsite.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 49	None required.

RESPONSE

Should DOE be restructured or merged with another Federal agency, both of which have happened in the past, DOE would not expect such an administrative change to affect this proposed action. Regardless of what agency administers the stewardship of the nuclear weapons stockpile, the Nation needs to ensure that the weapons in the stockpile remain safe, secure, and reliable. The DOE's proposal to obtain enhanced capability for radiographic hydrodynamic testing responds to a national need to ensure the safety, performance, and reliability of nuclear weapons; that need will persist regardless of administrative details.

The Department of Defense (DOD) has endorsed the need for the proposed DARHT facility in response to this EIS, as well as on numerous other occasions. See letter 1 from the Assistant to the Secretary of Defense for Atomic Energy, Dr. Harold P. Smith. Dr. Smith has testified several times before Congressional hearings regarding the need for enhanced hydrodynamic test capability as characterized by the DARHT proposal, the need and timing for the facility, and potential uses for the capability that DARHT would provide. In December 1994, then Deputy Secretary of Defense, John Deutch, formally declared that the Nation needs the high-resolution, three-dimensional radiographic capability that DARHT would provide. DOD has been consulted throughout the design and development of the DARHT facility and throughout this NEPA review. DOE has no reason to doubt that DOD would accept the proposal described in this EIS, and would endorse the DOE's decisions regarding whether or not to proceed with DARHT or one of the other alternatives analyzed in this EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 50	None required.

RESPONSE

See response to comment 44-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 51	None required.

RESPONSE

DOE recognizes that not all individual citizens agree with the course of action directed by the President and Congress, particularly in matters related to nuclear deterrence and stewardship of the enduring nuclear weapons stockpile. The design and certification of new weapons is not part of the current U.S. policy; however, if the President and Congress directed DOE to design weapons, then all available resources (including enhanced radiographic hydrodynamic capability, if implemented) would be used to meet that goal.

The use of hydrodynamic testing has gained importance in the United States because underground nuclear testing is no longer used and the nuclear weapons stockpile systems are not retired at any earlier ages than in the past.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 52	None required.

RESPONSE

See response to comment 44-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 53	None required.

RESPONSE

One mission of the DOE's nuclear weapons complex is to disassemble nuclear weapons being retired from the Nation's nuclear weapons stockpile. In this era of a rapidly shrinking stockpile, DOE is disassembling retired nuclear weapons at an unprecedented rate. This work is currently done at the Department's Pantex Plant in Amarillo, Texas. Nuclear weapons, on the average, have about 6,000 separate parts; less than 200 of these contain nuclear materials. After a weapon is disassembled, some parts are discarded, some are recycled, and others are stored for future use or for future disposal.

In addition, DOE is preparing a separate EIS on the disposition of surplus highly enriched uranium [60 FR 17344].

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 54	None required.

RESPONSE

See response to comment 13-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 55	None required.

RESPONSE

See response to comment 45-42.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 56	None required.

RESPONSE

An equally experienced group of nuclear weapons engineers feel that there can be important uncertainties in trying to replicate sophisticated manufacturing processes that have been shut down. Of these two viewpoints, the more conservative approach is to test (non-nuclear tests) the products of the replicated manufacturing processes to reduce uncertainties that the resulting products are sufficiently similar.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 57	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly. It follows that the groups that have been associated with the development of the weapons would be the same groups to assist in ensuring the safety, security, and reliability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 58	None required.

RESPONSE

Certain organizations within the DOD raised a proposal in June 1995 to conduct a series of underground low-yield tests at the DOE's Nevada Test Site. The administration has decided not to pursue that course of action at this time. Hydronuclear tests are those experiments involving high explosives and fissile materials which can achieve criticality and which can produce nuclear yields comparable to the energy release of the high explosive components. Hydronuclear experiments will not be done at DARHT nor are they analyzed in the DARHT EIS. Our ability to predict the exact nuclear yield from such experiments is inadequate to guarantee that the energy release could be sufficiently controlled to perform the experiments above ground.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 59	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 60	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
45 - 61	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
46 - 1	None required.

RESPONSE

In response to public and DOE concern regarding timeliness of its environmental reviews, in July 1994 the Secretary of Energy instituted a NEPA policy which directed the agency to reduce the median time for preparing an EIS from 33 months to 15 months. This means that half of all DOE EISs will be completed in less than 15 months. DOE felt that the DARHT EIS could be completed in less than 15 months and established a working schedule of 10 months, from Notice of Intent to Record of Decision. DOE is not in a position to speak to issues that may drive the schedules of NEPA reviews of other Federal agencies.

COMMENT CODE	LOCATION OF EIS REVISION(S)
46 - 2	None required.

RESPONSE

See response to comment 45-39.

COMMENT CODE	LOCATION OF EIS REVISION(S)
46 - 3	None required.

RESPONSE

Chapter 5 of the EIS addresses environmental impacts of DARHT operations. These evaluations reveal that no cancer deaths are expected from any action at DARHT involving depleted uranium or other materials. As noted in the unclassified supplement, there is a very small possibility of up to 12 latent cancer fatalities in the event of any accident breach of a double-walled containment vessel involving a dynamic experiment with plutonium.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 1	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 2	Index

RESPONSE

An index has been included in the final EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 3	Volume 2 section 1.5

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 4	None required.

RESPONSE

See response to comment 45-42.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 5	None required.

RESPONSE

See response to comment 45-39.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 6	None required.

RESPONSE

DOE notes that the DARHT EIS is of typical length for a single-subject EIS prepared by DOE.

See response to comment 30-17.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 7	None required.

RESPONSE

DOE believes that the need for DARHT's capabilities have become even more acute in recent years (since the moratorium on underground testing at the Nevada Test Site). In the past, both hydrodynamic and nuclear tests were used to assess nuclear weapon safety. Now, improved hydrodynamic tests are needed to verify computational models and to assess weapon safety, performance, and reliability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 8	None required.

RESPONSE

As the nuclear weapons stockpile decreases to the lower levels established by the President and Congress, DOE is tasked with dismantling the weapons returning from the stockpile. Some of the components removed from returned weapons are discarded, some are destroyed, some are recycled, and some are stored. Some series of weapons had aged beyond their design life at the time they were retired and some had not. The hydrodynamic testing and dynamic experiment programs, and the resultant number of "shots" described in the DARHT EIS are considered to provide a "bounding analysis" for forecasting environmental impacts; the actual impacts from testing and experiment programs in any given year would be expected to fall within this boundary of impacts. However, these programs are not correlated to the number of weapons being retired from the stockpile.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 9	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 10	Section 2.5

RESPONSE

See response to comment 11-5 and response below.

DARHT technology is the potential issue to treaty participants, rather than the amount of money invested. As discussed in the response to comment 47-9, the treaty signatories are well aware of the technology and its implementation.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 11	None required.

RESPONSE

The core competencies are the essential knowledge and expertise, such as computing, scientific, engineering, and material property expertise required to design, engineer, test, and produce nuclear weapons. Such expertise is also essential to conduct safe dismantlement in the United States and elsewhere, to assess nuclear weapon proliferation activities, and to respond to nuclear incidents and devise counter-proliferation measures. See also the DOE's "*The Stockpile Stewardship and Management Program: Maintaining Confidence in the Safety and Reliability of the Enduring U.S. Nuclear Weapon Stockpile.*"

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 12	Section 2.1

RESPONSE

See response to comment 11-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 13	None required.

RESPONSE

The use of hydrodynamic testing by declared nuclear weapons states has no bearing on the ability to detect proliferation by other nations. Thresholds of detection by seismic means are a greater than the energy release of high explosives in a hydrodynamic test. Mining activities also routinely produce explosives at and considerably beyond the explosive energy of a hydrodynamic test. Nations acting outside the Non-Proliferation Treaty could conduct such experiments provided they were not detectable by other means, independent of the use of hydrodynamic testing by the declared nuclear weapons states.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 14	None required.

RESPONSE

DOE agrees, as stated in the EIS, that in the 1980s DARHT (as then proposed) was intended to assist in designing new nuclear weapons and replacement parts. Since then, the U.S. has determined that in an era of a reduced nuclear weapons stockpile there is no need in the foreseeable future for new-design nuclear weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 15	None required.

RESPONSE

Typical examples of industrial uses might be explosive forming of complicated shapes or explosive welding. However, such details are not now known because such applications of DARHT are somewhat speculative and because much industrial research is proprietary. Industry might want to use DARHT capability to better understand how a metal flows under extreme conditions produced by explosives.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 16	None required.

RESPONSE

Before the nuclear testing moratorium imposed by the President in 1993, DOE used nuclear testing in conjunction with hydrodynamic testing to evaluate the safety, performance, and reliability of the nuclear weapons stockpile. Computational models were verified by observing the results of both hydrodynamic tests and nuclear tests. Since the testing moratorium, increased capabilities for hydrodynamic testing are even more important in verifying the stockpile characteristics and capabilities. DOE believes that increased hydrodynamic testing capabilities can go far in replacing the nuclear testing capabilities no longer available.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

47 - 17 None required.

RESPONSE

The stated 18 percent funding increase (actually 16.9 percent) referred to in the question is correct for the overall level of funding for the weapons program at Los Alamos but does not represent the level of support for the activities which include hydrodynamic testing at facilities like DARHT. These activities are referred to as the "Core" in the table below, including the Los Alamos Meson Physics Facility (LAMPF)/Los Alamos Neutron Scattering Center (LANSCE) funding and about half of the Advanced Strategic Computing Initiative (ASCI) funding represent the operating expense at Los Alamos devoted to stockpile stewardship activities. Based on the President's budget submission for FY 1996, Core funding, unadjusted for inflation, is actually scheduled to decrease in FY 1996 by about 3 percent relative to FY 1995 and by almost 11 percent relative to FY 1994. Including the relevant parts of ASCI and LAMPF/LANSCE (see notes below) within the definition of "Core" activities shows only a modest increase over FY 1995 and will result in an inflation-adjusted decrease in the level of activity. The hydrodynamic testing portion of the Core is undergoing a similar contraction, but not as severe because of the recognized utility of such testing to stockpile stewardship.

The DOE funding in research, development, and testing (RD&T) budget line (currently referred to as "Weapons Stockpile Stewardship" (WSS) for LANL are given below for FY 1994-1996 in thousands of dollars.

Category	FY 1994	FY 1995	FY 1996
Construction	35.5	21.9	39.9
Capital Equipment	25.4	19.9	19.2
Technology Transfer	34.1	35.5	43.6
Education	4.1	6.3	6.3
Inertial Confinement Fusion (ICF)	20.2	21.0	21.8
ASCI	0.0	0.0	15.0
LAMPF/LANSCE	3.5	7.0	24.8
Subtotal	122.8	111.6	170.6
Core	217.7	200.2	193.9
Total WSS	340.5	311.8	364.4

Notes: 1) A construction increase in FY 1996 is due to a commitment to fund Advanced Testing Line for Actinide Separation (ATLAS) construction: 2) about one-half of ASCI funding supports commercial hardware vendors; 3) an increase in LAMPF/LANSCE funding between FY 1995 and FY 1996 is due to DOE Defense Programs assuming responsibility for the operation of the LAMPF accelerator from DOE's Office of Energy Research.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

47 - 18 Section 3.3.4

RESPONSE

See response to comments 13-13 and 31-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
47 - 19	None required.

RESPONSE

The President and Congress have directed the DOE to maintain the nuclear weapons complex and to ensure the safety, security, and reliability of the nuclear weapons stockpile, and have appropriated funds accordingly. It is not the policy of the U.S. to just "limp along" because confidence in the nuclear weapons stockpile would be reduced. DOE believes it has clearly stated the need for the project.

See response to comment 13-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
48 - 1	None required.

RESPONSE

DOE agrees that the confidence in the U.S. nuclear weapons stockpile would be reduced if hydrodynamic testing proposed for DARHT were not performed.

COMMENT CODE	LOCATION OF EIS REVISION(S)
48 - 2	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
48 - 3	Sections 2.1 and 2.3.1

RESPONSE

Chapter 2 has been revised to provide additional information and clarity.

See response to comment 45-14.

COMMENT CODE	LOCATION OF EIS REVISION(S)
48 - 4	None required.

RESPONSE

See response to comment 44-12.

COMMENT CODE	LOCATION OF EIS REVISION(S)
49 - 1	None required.

RESPONSE

Based on findings and recommendations of the International Commission for Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP), DOE believes that there is an acceptable level of risk for exposure to radiation. DOE is committed to keeping radiation exposure to members of the public and workers from DOE activities to As Low As Reasonably Achievable (ALARA) levels.

COMMENT CODE	LOCATION OF EIS REVISION(S)
49 - 2	None required.

RESPONSE

The United States has decided, as a Nation, to maintain a nuclear deterrent as a cornerstone of its national defense. While DOE respects the right of individual citizens to hold a different point of view, DOE agrees with the President and the Congress that nuclear weapons have proven to be an effective deterrent over the past several decades.

COMMENT CODE	LOCATION OF EIS REVISION(S)
49 - 3	None required.

RESPONSE

DOE agrees that potential impacts from depleted uranium, which is simply uranium that is diminished in the U-235 isotope to levels below those of naturally-occurring uranium, need to be examined. The EIS includes a comprehensive examination of the potential impacts from use of depleted uranium at DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
49 - 4	None required.

RESPONSE

See response to comment 44-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
50 - 1	None required.

RESPONSE

DOE does not agree that a weapon system would become more reliable with age. In addition, nuclear deterrence remains a cornerstone of U.S. policy and has not lost any importance.

COMMENT CODE	LOCATION OF EIS REVISION(S)
50 - 2	Section 2.3.2

RESPONSE

The impediments are not so much in remanufacturing per se, but in reestablishing the manufacturing capability for processes that have been shut down, and in assuring that the products from replicated processes are sufficiently similar to the original products. Some processes, such as fabrication that occurred at Rocky Flats (now closed), would be quite expensive to replicate. For some remanufactured nuclear components, the only way to reduce uncertainty in their performance--short of nuclear testing--would be hydrodynamic testing.

COMMENT CODE	LOCATION OF EIS REVISION(S)
50 - 3	None required.

RESPONSE

The need to ensure the safety and reliability of the nuclear weapons stockpile deals with the future stockpile as it ages past its design life. The current stockpile is considered to be safe and reliable. See statements by Secretary O'Leary quoted in section 2.3.2 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
50 - 4	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 1	None required.

RESPONSE

See response to comment 45-44.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 2	None required.

RESPONSE

Today, development of new-design nuclear weapons for introduction into the stockpile is counter to U.S. policy. However, it is also U.S. policy (see the DOD Nuclear Posture Review, EIS section 2.2.2) to maintain that capability. Because information on almost any aspect of weapons can be applied to design, it would be difficult to only study weapon safety and reliability without other possible uses for such data. DARHT is intended to aid in evaluating and certifying weapon safety, performance, and reliability, not to develop new weapons. Such development would be beyond the scope of current U.S. policy.

The function of the surveillance program is to maintain the status of systems and to identify any problems. If a problem is found in the future with nuclear components, hydrodynamic testing would be needed to address its performance. Enhanced hydrodynamic testing is judged to be a much more effective tool in the long run.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 3	None required.

RESPONSE

The Department does not consider the JASON Report to have a conflict of interest and respects the integrity of the report. The loss of underground testing certainly does leave a void that is necessary to fill. This is one of the objectives of the DARHT Facility.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 4	None required.

RESPONSE

The President has determined that the United States will not test or deploy new nuclear weapons, and the DOE is strictly adhering to this policy. Under current policy, DARHT will be used only for addressing the safety, performance, and reliability of existing weapons and will not be used to design new weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 5	None required.

RESPONSE

DOE strongly disagrees. This is the very core of the justification for the DARHT Facility. The improved diagnostics are essential to obtaining data, especially with a moratorium on underground testing. Computational resources are used in conjunction with the hydrodynamic testing to continually provide a refinement of the computer modeling.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 6	None required.

RESPONSE

Even rebuilt weapons would have to be certified with respect to their safety and performance. In the absence of nuclear testing, an improved understanding for the physical processes during the late stages of an implosion would necessitate the use of hydrodynamic testing to certify systems.

COMMENT CODE	LOCATION OF EIS REVISION(S)
51 - 7	Section 2.3.2

RESPONSE

Chapter 2 is modified in the final EIS to clarify and better support the purpose and need. The additional information presented is attributable in part to the Stockpile Stewardship and Management Program Plan issued by the DOE in May 1995 and also to clarify some potentially sensitive issues.

See responses to comments 18-8, 18-9 and 18-29.

COMMENT CODE	LOCATION OF EIS REVISION(S)
52 - 1	None required.

RESPONSE

"Safe," in any practical use of the word, always carries with it a stated or implied level of acceptable risk. Safety of nuclear weapons implies a very low, but not unobtainably low, probability of accidental detonations.

COMMENT CODE	LOCATION OF EIS REVISION(S)
52 - 2	Section 2.3.2

RESPONSE

See response to comment 51-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
52 - 3	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
52 - 4	None required.

RESPONSE

DOE has examined the potential environmental impacts of all of the aspects noted in this comment; results of these evaluations for all alternatives are presented in chapter 5. DOE believes that construction and operations of DARHT will not degrade nuclear safety but, in fact, will result in improved nuclear weapons safety with no unacceptable impacts to the environment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 1	None required.

RESPONSE

The example given in section 2.3.2. of the DARHT EIS regarding weapons safety, the W68 high explosive aging, and the need to replace certain materials upon remanufacture, is drawn from the Miller Report.

See response to comments 18-29 and 18-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 2	Sections 3.3.2, 3.3.8, 5.1.8, 5.1.9, 5.4.8, 5.4.9, 5.4.10.3, 5.7.2.2, I.3.1, and J.6.1 Tables I-14 and I-5

RESPONSE

See response to comment 14-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 3	None required.

RESPONSE

See response to comment 13-5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 4	None required.

RESPONSE

See response to comment 44-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 5	None required.

RESPONSE

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 6	None required.

RESPONSE

The World Court, formally named the International Court of Justice, was established by charter of the United Nations and is the UN's principal judicial body. Jurisdiction of its 15 judges is limited to legal disputes among the UN parties, but the Court may choose to consider cases involving political questions. In 1993, the Court agreed to give an advisory opinion on the question: "In view of the health and environmental effects, would the use of nuclear weapons by a State in time of war or other armed conflict be a breach of its obligations under international law including the [World Health Organization] Constitution?" The Court invited written statements from appropriate entities and extended the deadline for submitting these until June 20, 1995. The Court has not yet released copies of any statements received and has not indicated when, if at all, it intends to issue its opinion. The opinion is expected to be limited to the actual use of nuclear weapons, not the threat of nuclear weapons or other policy issues regarding nuclear weapons, nuclear deterrence, or nonproliferation. Any opinion issued would be advisory only, and not binding on any member of the UN. DOE does not expect that such an advisory opinion, in and of itself, would result in a reversal of the U.S. policy that nuclear deterrence will remain a cornerstone of this Nation's defense.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 7	None required.

RESPONSE

It is against current U.S. policy to design and develop new nuclear weapons, thus, DARHT is not now intended for that role. Previously, when this country was designing new nuclear weapons, a combination of hydrodynamic testing, nuclear testing, and other tools were necessary. The nuclear weapons role for DARHT now is to address issues concerning stockpile safety and reliability.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 8	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 9	None required.

RESPONSE

See response to comment 17-18.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 10	None required.

RESPONSE

DOE does not agree that the completion and operation of the DARHT facility at LANL "would influence" any decisions regarding locating nuclear weapons manufacturing facilities at LANL. First, DOE and its predecessor agencies have maintained hydrodynamic testing capability at LANL for over 50 years. While DARHT, and most of the other alternatives analyzed in this EIS, would provide enhanced diagnostic capability, the proposal would not involve changing the existing mission assignments at LANL. Second, because this Nation does not anticipate the need for new-design nuclear weapons in the foreseeable future, DOE has no need to redevelop a large-capacity nuclear weapons production complex at any site, let alone LANL. Third, while DOE recognizes the need to maintain and repair existing nuclear weapons and is directed by DOD to maintain the capability to manufacture some number of new nuclear weapons (see Notice of Intent, Stockpile Stewardship and Management PEIS, 59 FR 54175), DOE does not consider the capability to fabricate weapons components, whether this capability resides at LANL or elsewhere, as a connected action to provide enhanced hydrodynamic testing capability or to the construction and operation of DARHT, as that term is defined by regulation [40 CFR 1508.25(a)(1)].

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 11	Section 2.6 and volume 2, section 1.5.

RESPONSE

Please refer to the text in section 2.6 and EIS volume 2 section 1.5 for information on the relationship of the DARHT EIS to other DOE EISs.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 12	None required.

RESPONSE

While the proposed facilities would be sited at an area (TA-15) without a deep borehole in the immediate proximity, to claim there is no information on the geology at the DARHT site is incorrect. The geology of the Los Alamos area is not random. It is entirely reasonable and appropriate to infer, based on continuity principles, that the layered, trending geologic structure that appears in the surrounding wells (e.g., DT-5A, DT-10, PM-2, and PM-4) will appear at the DARHT and PHERMEX locations also. Geologic inference based on interpolation of stratigraphies at various locations, coupled with an understanding of the formation processes of the geologic structures, provides a great deal of information. Furthermore, the modeling results for flow and transport in the vadose (unsaturated) zone are relatively insensitive to our uncertainty in the exact thickness of the various units, as the hydrologic properties of these units are not dramatically different.

The potential migration of heavy metals and radioactive materials into the ground water is presented in sections 5.1.4.2, 5.2.4.2, and 5.4.4.2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 13	None required.

RESPONSE

The DOE has issued the "Interim Management of Nuclear Materials draft EIS" [DOE EIS-0220D, March 1995], which looks at alternatives for the stabilization of various isotopes of nuclear materials at its Savannah River Site (SRS). Currently, the materials are temporarily stored in solution form in tanks at SRS. Due to safety concerns, DOE proposes to process the materials into different forms that would be more suitable for long-term storage. One of the many isotopes analyzed in the Interim Management draft EIS is plutonium-242. The Interim Management EIS discusses various options for processing solutions containing plutonium-242 and analyzes the environmental impacts of the various options. DOE decisions on how to meet its need for enhanced radiographic hydrodynamic testing, including construction and operation of DARHT, do not depend on the decisions it will make regarding its need to stabilize plutonium solutions at SRS. Accordingly, reprocessing SRS plutonium-242 material, and its transport, are not "connected actions" within the meaning of NEPA [40 CFR 1508.25(a)(1)] to the DOE hydrodynamic test proposal and are not discussed in the DARHT EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 14	Sections 3.3.2, 3.3.8, 5.1.9, 5.1.9.1, 5.1.9.2, 5.1.9.3, 5.4.9, 5.7.2.2, and I.3.1 Tables I-14 and I-15

RESPONSE

See response to comment 10-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 15	Section 3.4

RESPONSE

As stated in section 3.4, the DARHT EIS does include a consideration of simply upgrading PHERMEX in the No Action Alternative. The No Action Alternative is not static; under this alternative DOE would continue to use PHERMEX well into the next century to provide hydrodynamic test capability (but would not achieve the enhanced capability discussed in the DARHT EIS). This would include occasional maintenance and operating upgrades but would not include a major overhaul of the type of technology used at PHERMEX. The EIS has been revised to clarify this point. See section 3.4. The Upgrade PHERMEX Alternative, in contrast analyzes the environmental impacts that would be expected if DOE were to upgrade PHERMEX with the enhanced dual-axis radiographic capability proposed for DARHT (see Section 3.6), which could be characterized as "move DARHT to PHERMEX".

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 16	None required.

RESPONSE

See response to comment 45-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 17	Section 3.10.3

RESPONSE

See response to comment 45-45.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 18	None required.

RESPONSE

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 19	None required.

RESPONSE

The purpose of the EIS is to examine the potential environmental impacts for the various alternatives for accomplishing the proposed action.

There are no agreements at this time for international oversight of DARHT or other aspects of U.S. stockpile stewardship, other than existing verification agreements on nuclear testing and certain agreements related to the phased dismantlement for START I and II levels. Such measures would only be applied to DARHT pursuant to hypothetical international agreements, which would be carefully reviewed to assure consistency with U.S. national security.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 20	Section 3.3

RESPONSE

The EIS examines the environmental impacts from various alternative operating modes to conduct the needed hydrodynamic tests and dynamic experiments. Some of these alternatives could constrain certain types of experiments that might be needed; these programmatic constraints are noted in the EIS in table 3-4, section 3.11. The Plutonium Exclusion Alternative examined the expected environmental impacts if DOE imposed a programmatic constraint to not use the DARHT facility for dynamic experiments involving plutonium; the EIS provides a "bounding analysis" of environmental impacts expected from the largest testing and experiment program that DOE believed could be needed. DOE recognizes - and the text of the EIS has been revised to clarify - that the actual testing program may have programmatic constraints due to a variety of reasons, such as annual testing needs, funding considerations, or amelioration of potential environmental impacts.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 21	None required.

RESPONSE

See response to comment 53-7.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 22	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 23	None required.

RESPONSE

DOE policy is to comply with all applicable environmental laws and regulations, both in current practice and in correcting problems arising from past practice. Some compliance problems necessarily take time and funds to remediate; these should not be a barrier to the current DOE mission. Under current U.S. policy, the DARHT Facility would not be used to design and develop new weapons.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 24	None required.

RESPONSE

The DOE supports U.S. policy to enter a comprehensive test ban along with alternate means to provide assurance of stockpile safety, reliability, and performance. Enhanced radiographic hydrodynamic testing and the ability to understand and analyze the stockpile are essential to its stewardship.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 25	None required.

RESPONSE

The United States has decided, as a Nation, to maintain a nuclear deterrent as a cornerstone of its national defense. While DOE respects the right of individual citizens to hold a different point of view, DOE agrees with the President and the Congress that nuclear weapons have proven to be an effective deterrent over the past several decades.

See response to comment 17-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 26	None required.

RESPONSE

As stated in the EIS, section 2.2.1, nuclear deterrence remains a cornerstone of U.S. policy, and the U.S. will continue to rely on DOE to maintain a safe, secure, and reliable nuclear weapons stockpile. Reliability of the stockpile is a key component of effective nuclear deterrence. DOE recognizes that individual citizens may disagree with this policy, as is their right.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 27	None required.

RESPONSE

DOE believes that its facilities, including LANL, should be operated in accordance with all applicable laws and in a way that protects the environment. Like essentially all Federal agencies, DOE has compiled a set of rules, regulations, orders, and procedures in an attempt to ensure all relevant laws and other requirements are met. DOE is now reviewing its orders and other requirements, as part of the administration's initiatives to reinvent government, to eliminate unnecessary paperwork and oversight.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 28	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 29	None required.

RESPONSE

DOE agrees.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 30	None required.

RESPONSE

We do not foresee "undiscovered" problems with one-point safety. However, there is a continuing need to evaluate safety in a variety of accident scenarios that previously may not have been considered or were unable to be analyzed.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 31	None required.

RESPONSE

The DOE is aware of the value of the Miller report. See section 2.3.2 in the final EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 32	None required.

RESPONSE

Safety problems could also result from changes introduced in remanufacturing, or even aging, such as degradation of fire-resistant features. This aging example might not require enhanced radiographic hydrodynamic test capability to evaluate, but would need the enhanced capability to certify the reliability and performance of a remanufactured component.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 33	None required.

RESPONSE

DOE agrees that safety is a key concern regarding the future nuclear weapons stockpile. One-point safety is the assurance that if a weapon's high explosive is detonated at any one point, as could occur in an accident, there would be less than one-chance-in-a-million that more than four pounds (TNT equivalent) of nuclear yield could result. This is a key criterion for current U.S. weapons design. Four pounds of nuclear yield would be expected to cause localized dispersion of plutonium or other material, but would not release intense radiation. In the past, not all U.S. weapons were designed to be one-point safe.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 34	None required.

RESPONSE

DOE appreciates this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 35	None required.

RESPONSE

See response to comment 28-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 36	None required.

RESPONSE

See response to comment 28-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 37	Section 3.3

RESPONSE

Static radiographs in the parlance used in the nuclear weapons program are radiographs taken when the weapon or mock weapon is in its initial condition before an experiment or a test, i.e. before the high explosive charge is detonated. Static radiographs, for instance, were routinely taken at the Nevada Test Site of devices to be tested underground and are routinely taken of the test assemblies in the above-ground hydrodynamic testing program. Dynamic radiographs, on the other hand, are defined as radiographs taken of test assemblies shortly after the high explosive has been set off and are often taken at the time of simulated maximum criticality.

The purpose of a static radiograph prior to a hydrodynamic test is to assure the experimenter that the test assembly has been constructed properly and/or has not suffered an unacceptable or unknown change since assembly or that the test assembly is properly aligned. Thus a static radiograph provides a picture of the initial condition of the test assembly and, hence, defines the initial condition of an experiment. Dynamic radiographs are compared to the static radiograph to evaluate the degree of change during experiment.

Static radiographs can also be part of a surveillance program, but these radiographs can be done without using DARHT facilities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 38	None required.

RESPONSE

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 39	None required.

RESPONSE

There have been numerous issues related to weapon primary design or engineering that required evaluation to assure continued weapon safety and reliability. Without nuclear testing, such problems would often require hydrodynamic testing along with computations and other data or experiments as a principal means for evaluation and resolution. Of the weapon systems that have entered the stockpile since 1970, almost half required post-deployment nuclear testing to address, verify, or resolve issues associated with the safety or reliability of the weapon primary design. See discussion in section 2.3.2 of the EIS. "The seven weapons that will be in the enduring START II stockpile have already been retrofitted to varying degrees and some have had major components of the nuclear system replaced" (Secretary of Energy O'Leary, April 1995).

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 40	Section 2.3.2

RESPONSE

See response to comment 13-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 41	None required.

RESPONSE

See response to comment 51-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 42	None required.

RESPONSE

As discussed in the EIS section 2.3, hydrodynamic testing is used to assess weapons safety, performance, and reliability; evaluate aging weapons; and increase understanding of weapons physics as well as other uses noted in section 2.3.4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 43	None required.

RESPONSE

It is against current U.S. policy to use DARHT or PHERMEX to design new nuclear weapons. The descriptions of average annual expenditures of materials, such as depleted uranium, beryllium, lead, etc., as given in tables 3-4 and B-4, provide a better basis for estimating impacts to the environment because of the variability among individual tests as shown in table B-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 44	None required.

RESPONSE

The environmental impact analysis in the DARHT EIS is based on a "bounding analysis," that is, an analysis of the greatest number of test shots that would be anticipated under the foreseeable testing program. This analysis identifies the resulting environmental impacts and represents the upper boundary of impacts; essentially all actual impacts would be expected to be less, or within the boundary of impacts analyzed. DOE points out in several places in the DARHT EIS that the Nation does not intend to pursue new-weapon designs in the foreseeable future, and that DOE does not intend to use DARHT for this purpose. In chapter 5, DOE indicates that the actual impacts of hydrodynamic testing would vary depending on the number and size of tests, materials, and facility design; not by the intended application of test results.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 45 None required.

RESPONSE

DOE recognizes that not all individual citizens agree with the course of action directed by the President and Congress, particularly in matters related to nuclear deterrence and stewardship of the enduring nuclear weapons stockpile. The DARHT EIS presents a course of action that would meet the needs of the nuclear weapons stockpile. The suggested approach is not considered viable.

See response to comment 13-3.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 46 None required.

RESPONSE

While DOE agrees that the likelihood of all the weapons in the stockpile experiencing problems at the same time is extremely low, DOE would like to point out that this is not at issue. What is at issue is the safety and reliability that the nuclear weapons stockpile will be facing in the form of post-design life aging problems not previously encountered. This does not mean, however, that all weapons will fail at once.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 47 None required.

RESPONSE

See response to comment 13-3.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 48 None required.

RESPONSE

Although fundamental scientific knowledge about physical processes can be used for a variety of purposes, the DARHT capabilities are to be directed at understanding and resolving safety and reliability problems in the weapons stockpile. Hydrodynamic test capabilities were a known factor for parties to the nonproliferation treaty.

See response to comment 17-4.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 49 None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 50	None required.

RESPONSE

U.S. policy affirms that while reducing nuclear stockpiles, nuclear weapons remain a vital element of national security strategy. It is also U.S. policy (Nuclear Posture Review) to reduce the stockpile while maintaining a capability to develop and produce nuclear weapons if necessary.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 51	None required.

RESPONSE

DOE agrees with this comment. PHERMEX was not designed to perform at the level expected from the enhanced capability proposed for DARHT. Although over the last 30 years, LANL personnel have been able to operate PHERMEX to provide images that have exceeded the original design specifications, it is not possible to simultaneously obtain the small spot, fast frame rate, or optimum energy proposed for DARHT at PHERMEX. This is, in fact, the reason that induction linear accelerator technology was chosen over the RF linear accelerator technology now used at PHERMEX.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 52	None required.

RESPONSE

Relative to the No Action Alternative this comment is correct. DOE knows of no data from FXR that would be considered superior to that which would be obtained from DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 53	None required.

RESPONSE

Hydronuclear tests are those experiments involving high explosives and fissile materials which can achieve criticality and which can produce nuclear yields comparable to the energy release of the high explosive components. Such tests will not be done at DARHT nor are they analyzed in the DARHT EIS. Our ability to predict the exact nuclear yield from such experiments is inadequate to guarantee that the energy release could be sufficiently controlled to perform the experiments above ground.

The DOE conducted a study with participation of several organizations, including LANL, to determine the feasibility of conducting very low yield nuclear explosions contained in large vessels. It was always intended to encase the CONVEX vessels in concrete and bury them underground. There has been no further work on the program, and it was never related to plans for DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 54	None required.

RESPONSE

See response to comment 13-18.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 55	None required.

RESPONSE

See response to comment 18-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 56	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 57	None required.

RESPONSE

DOE agrees that the existing stockpile is not considered to be at risk and it is certainly not experiencing any post-design life aging problems since the weapons are retired prior to this occurrence. The concern remains with the future stockpile since current U.S. policy dictates that the existing stockpile will remain active past its design life.

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 58	Section 2.3.2

RESPONSE

See response to comment 13-3.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 59	None required.

RESPONSE

DOE believes that decisions regarding the DARHT proposal may proceed independently of the programmatic review to be provided in the Stockpile Stewardship and Management PEIS (see section 2.6). As stated in the NOI for the PEIS, under any alternative analyzed in that PEIS DOE would need to obtain enhanced hydrodynamic testing capability; therefore, decisions from the DARHT ROD would not prejudice the outcome of the SS&M PEIS.

DOE's agrees that there is no current crisis in safety and reliability, but believes that problems could arise within the stockpile as time passes. DOE is responsible for the stewardship of the enduring nuclear weapons stockpile and believes that it is prudent to deal with stockpile issues using adequate technology and tools before any crises develop.

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 60	None required.

RESPONSE

DOE believes that the DARHT EIS adequately identifies and analyzes the reasonably foreseeable connected actions as defined in 40 CFR 1508.25 (a) (1).

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 61	Sections 3.3.4 and 3.10.5

RESPONSE

See response to comment 13-13.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 62	None required.

RESPONSE

DARHT is expected to require some re-engineering as the accelerator is brought on line. Considerable refinement is expected to occur, and the achievement of the design goals would be a phased process. This process is one reason the second axis is planned on a delayed schedule.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 63	None required.

RESPONSE

Under all alternatives and options, LANL would be able to use significantly larger shots than FXR, if needed. In addition, FXR is currently subjected to more restrictive environmental limits because of its proximity to developed areas, including other LLNL facilities. These restrictions are expected to tighten in the future. Sandia does not have a significant hydrodynamic radiographic capability. Because LLNL and LANL are both DOE laboratories, they are unlikely to sustain a race for the same objective under expected DOE budgets.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 64	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 65	None required.

RESPONSE

See response to comment 40-6.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 66 None required.

RESPONSE

A climate model simulates both clear and rainy days. Contaminants at the firing site are presumed to dissolve in rain water at their solubility limit (maximum possible). The amount of rain water that becomes runoff is determined by a technique called the curve-number method. This runoff enters Potrillo canyon in reach 1 and water canyon in reach 12 (see EIS figure E3-1). With this method, larger rain storms would mobilize more contaminant, generate more surface runoff, and course more contaminant loading in the canyon channels.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 67 None required.

RESPONSE

Since 1991, advanced laboratory techniques have been used to detect tritium at ultra-low levels and to determine that recent water (a few decades old) has recharged the main (i.e., deep) aquifer in several locations at LANL. In all instances, main aquifer contamination is associated with a high tritium source concentration in a canyon bottom alluvial aquifer and with older wells into the main aquifer constructed with cable-tool drilling techniques and having questionable seals between well-bore and well-casing. In contrast, mesa top migration is relatively slow, and all indicators are that mesa-top facility locations offer significant, if not complete, isolation from the main aquifer.

LANL and the State of New Mexico are currently engaged in development of a ground water protection plan for the laboratory. As part of this plan, it is proposed that site-wide monitoring of the main aquifer be expanded and improved with the development of 23 new main aquifer wells and with the initiation of process-related research focused on developing a greater understanding of the existing examples of main aquifer contamination.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 68 None required.

RESPONSE

The DARHT EIS does not assert that the PHERMEX facility has not contaminated the environment. Existing soils contamination in the vicinity of the PHERMEX facility is described in appendix D of the DARHT EIS. A site-specific study of depleted-uranium transport in Potrillo Canyon (Becker 1993) coupled with the earlier study by Lane et al. (1985) forms the basis for the conceptual model of heavy- metal migration in canyon bottoms applied in the EIS. All available information has been used to characterize the environmental impact of the existing PHERMEX and proposed DARHT facilities. Environmental surveillance data and long-term consequence modeling have shown that no significant soil contamination or water resource problem should arise from the development of any of the proposed options.

See response to comment 53-67.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 69 None required.

RESPONSE

See response to comment 17-12.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 70	Section 4.6 Tables 4-14 and 4-15

RESPONSE

See response to comment 26-2 and response below.

The environmental impacts to cultural and historic sites that could happen from any of the alternatives analyzed are discussed in chapter 5. DOE believes that one reason that archeological and cultural sites in LANL tend to be better preserved than those in surrounding lands is the fact that access to LANL has been controlled for over 50 years.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 71	None required.

RESPONSE

Archeologists do not always excavate cultural resource sites to extract research information. The preferred approach is to leave cultural resource sites undisturbed unless there is a need, such as new construction or because of the research value of a given site. The impact analysis indicates that surface contamination from DU or other expended material, while measurable, would not be sufficient to cause a hazard to people or wildlife that may be in the vicinity for any reason (including archeological field studies).

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 72	None required.

RESPONSE

See response to comment 53-6.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 73	None required.

RESPONSE

See response to comment 28-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 74	Section 2.3.2

RESPONSE

See response to comment 13-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 75	Section 2.3.2

RESPONSE

See response to comment 13-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 76	None required.

RESPONSE

See response to comment 13-4.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 77	None required.

RESPONSE

Past results are important mainly as a basis for specifying the design and objectives of new tests. The requirements to be satisfied by new tests will depend on the particular stockpile issues to be addressed. For this reason, the details of past results are not needed to evaluate the potential environmental impacts from the various alternatives.

See response to comment 18-8.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 78	None required.

RESPONSE

A weapon system is considered to begin aging once it is assembled. A weapon that is designed to be available in the nuclear weapons stockpile for 25 years will reach the end of its design life after the 25-year period. If the weapon is to remain in the stockpile after the 25-year period, then confidence in the factors of safety built into each of the hundreds of components is reduced. At some unknown point, various systems will fail.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 79	None required.

RESPONSE

The DOE is currently pursuing an archiving program to capture and store all relevant data from underground nuclear testing, including engineering drawings, relevant computer simulation files, actual test data and procedures, and anecdotal data. This program is ongoing at all three weapons laboratories and at the Nevada Test Site. Due to the immense amount of data from almost 50 years of nuclear testing and programmatic constraints, it is uncertain when this task will be finished.

Regarding the second half of the comment, as a matter of policy, the United States has generally chosen to incorporate the most current technology when designing the nuclear and nonnuclear components of a new weapon system. This has resulted in a stockpile that currently is judged to be highly reliable, safe, and efficient, as well as a stockpile that allows the Nation to minimize the cost of the very expensive delivery systems and platforms, such as Trident submarines. Heretofore, our computer simulations were not adequate to predict the complex physical phenomena that take place during a nuclear explosion because of limitations in the computers, software, and understanding of the underlying physical science of such complex phenomena. Underground nuclear testing was used empirically to fix certain parameters and approximations. Analyzing the effects of aging within the stockpile or new changes due to remanufacturing requires analysis beyond empirical analysis.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 80	None required.

RESPONSE

Nothing happens to the unchecked items unless some unacceptable statistic is determined. Statistical sampling is based on the premise that the sample is representative of the total group, within a stated level of uncertainty.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 81	Sections 2.2.2 and 2.3.1

RESPONSE

The DARHT EIS has been revised to better explain the purpose and need for DOE's proposal for enhanced hydrodynamic test capability and the DARHT facility.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 82	None required.

RESPONSE

As a weapon ages, changes take place in a number of materials, including the high explosives, various stress cushions and plastics, as well as the plutonium in the pit. Hydrodynamic tests would be used to assess the effects of aging of materials such as the high explosives and stress cushions, and their effects on the hydrodynamics when the high explosives compress the mock pit. Aged weapons' plutonium cannot be used in these experiments because it would result in a nuclear explosion. We are exploring techniques to take aged systems from the stockpile and replace the fissile pit with a mock material so that aging experiments can be done. Next year, DOE is planning to conduct a hydrodynamic test using aged high explosives removed from a stockpiled unit. Another method to test aging effects is to accelerate the aging of test assemblies to determine the effects of aged nonfissile components on the pit implosion.

The effects of aging plutonium will be done in separate but complementary experiments that will focus on changes in plutonium's material strength, spall, equation-of-state, breakup, and other properties that can change with aging. These data will then be combined with information from full hydrodynamic tests using simulated materials to assess the effect of aging plutonium on weapon performance.

In the past year, no high explosives experiments were done to study the aging characteristics of plutonium. However, other laboratory experiments were conducted to look at how the properties of plutonium change with aging.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 83	None required.

RESPONSE

DOE conducted underground nuclear tests at its Nevada Test Site until September, 1992. In general, about one test per year was done on stockpiled systems. Sometimes, these tests were done to verify production techniques for a new warhead; sometimes the tests were done on aged weapons taken from the stockpile. Nuclear tests not specifically connected to a specific system also gave general, important information that could be applied to the behavior of stockpiled systems.

Nearly one-half of weapon types introduced into the stockpile since 1970 have required post-development nuclear testing to verify and fix problems or resolve questions of the weapon's safety, reliability, or nuclear performance. Nuclear weapons contain materials that are chemically reactive (e.g., chemical high explosives) and radioactive. Over time, these materials will interact with one another producing changes that can affect nuclear performance.

Although in DOE's routine surveillance program nuclear warheads are withdrawn from the stockpile, disassembled and the components examined for changes that may affect nuclear performance, it has not been possible to quantify through computer modeling and non-nuclear testing how these changes would affect nuclear performance. In the past, nuclear testing has been essential to make such determinations. Reliability concerns can be expected to increase in significance as the average age of the weapons in our stockpile increases. Ten years from now, many of our weapon systems in the enduring stockpile will have exceeded their design lives. We have almost no data on the performance of weapons that have exceeded their design lives. In the past, such weapons were routinely replaced with newer ones.

Although DARHT was originally proposed as an important adjunct to underground nuclear testing, now a key purpose of DARHT - and other advanced capabilities - is to try to make up for the loss of nuclear testing in evaluating issues that will arise in the weapons and to evaluate fixes that may needed. Current facilities are not adequate to do this demanding job in the absence of nuclear testing.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 84	None required.

RESPONSE

DOE agrees that the weapons stockpile is aging and that continued evaluations to ensure safety, performance, and reliability will become increasingly more important.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 85	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 86	None required.

RESPONSE

DOE is aware of the Galvin Commission recommendations.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 87	None required.

RESPONSE

DOE notes that this comment presents an example of evolving capabilities and need for the nuclear weapons stockpile.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 88	Section 2.3.2

RESPONSE

DOE appreciates this assessment. The problems of materials availability or partially documented processes have been noted in the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 89	Section 2.2.2

RESPONSE

DOE is aware of the Nuclear Posture Review and has included a brief summary of pertinent points in section 2.2.2 of the EIS.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 90	None required.

RESPONSE

See EIS volume 2 section 1.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 91	None required.

RESPONSE

DOE acknowledges this article and its conclusions.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 92	None required.

RESPONSE

See response to comment 28-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 93	None required.

RESPONSE

See response to comment 28-1.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 94	None required.

RESPONSE

See response to comment 45-42.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 95	None required.

RESPONSE

See response to comment 18-23.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 96	None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 97	None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 98	None required.

RESPONSE

DOE agrees that a great deal of effort is expended at LANL for environmental surveillance and believes that emissions from its operations at LANL do not pose a threat to the health and safety of workers or surrounding communities.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 99	Section 6.9

RESPONSE

DOE's Assistant Secretary for Environment, Safety and Health sent letters to Cochiti, Jemez, Santa Clara and San Ildefonso Pueblos inviting them to participate in this process, and sent copies of the EIS to these and many other tribal governments in the general region. In addition, DOE and LANL have held a series of meetings and tours with representatives from various tribal organizations. These are listed in the DARHT EIS in section 6.9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 100	Section 4.6 Tables 4-14 and 4-15

RESPONSE

See response to comments 26-2 and 53-70.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 101	None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 102	None required.

RESPONSE

See response to comment 20-9.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 103	None required.

RESPONSE

Sampling of uranium, beryllium, and lead in the soil around the PHERMEX firing site is described in appendix D, section D.2. Concentrations of beryllium and lead drop to background at about 200 ft (60 m) from the firing point; uranium does not. Using regression analysis, it was estimated that above-background concentrations of uranium would extend to about 280 ft (85 m); the 95-percent upper confidence level of this estimate was about 430 ft (130 m). It is estimated that about 70 percent of the depleted uranium and other materials within 200 ft (60 m) of the firing site are removed and disposed of during routine housekeeping. See section D.5.

COMMENT CODE	LOCATION OF EIS REVISION(S)
53 - 104	Sections Executive Summary, 1.3, 3.7, 5 Intro, 5.4.1.1, 5.4.1.3, 5.4.2.1.2, 5.4.3.3, 5.4.4.1, 5.4.4.2, 5.4.3.3, 5.4.5.1.1, 5.4.6.1.1, 5.4.7.2, 5.4.8.2, 5.4.9.2, 5.4.10, 5.4.10.3, 5.4.11.2, D.5, E3.5, H.5.2

RESPONSE

See response to comment 3-1.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

53 - 105 None required.

RESPONSE

See response to comment 28-2.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 1 None required.

RESPONSE

DOE agrees.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 2 None required.

RESPONSE

DOE agrees.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 3 None required.

RESPONSE

The DOE is aware of Dr. Kidder's testimony.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 4 None required.

RESPONSE

The DOE is aware of the Miller report.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 5 None required.

RESPONSE

The DOE is aware of the JASON report's assessments.

COMMENT CODE **LOCATION OF EIS REVISION(S)**

54 - 6 None required.

RESPONSE

DOE agrees with this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
54 - 7	None required.

RESPONSE

DOE agrees with this comment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
54 - 8	None required.

RESPONSE

These assertions are factually accurate regarding the expected performance of the capability proposed for DARHT.

COMMENT CODE	LOCATION OF EIS REVISION(S)
54 - 9	None required.

RESPONSE

The DOE appreciates this assessment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
54 - 10	None required.

RESPONSE

The DOE appreciates this assessment.

COMMENT CODE	LOCATION OF EIS REVISION(S)
54 - 11	None required.

RESPONSE

The comment is essentially correct. Enhanced capability proposed for DARHT would be extremely important to diagnosing the effects of changes in stockpile nuclear weapons and certifying the components. Currently, it is not considered sufficient to certify a new design without nuclear test data.

COMMENT CODE	LOCATION OF EIS REVISION(S)
55 - 1	None required.

RESPONSE

See response to comment 17-12

About NEPA

The National Environmental Policy Act (NEPA) was enacted to ensure that Federal decision-makers consider the effects of proposed actions on the human environment and to lay their decision-making process open for public scrutiny. NEPA also created the President's Council on Environmental Quality (CEQ) to establish a NEPA review process. DOE's NEPA regulations (10 CFR 1021) augment the CEQ regulations (40 CFR 1500).

An environmental impact statement (EIS) documents a Federal agency's analysis of the environmental consequences that might be caused by major Federal actions, defined as those proposed actions that might result in a significant impact to the environment. An EIS:

- Explains the purpose and need for the agency to take action
- Describes the proposed action and the reasonable alternative courses of action that the agency could take to meet the need
- Describes what would happen if the proposed action were not implemented – the "No Action" (or Status Quo) Alternative
- Describes what aspects of the human environment would be affected if the proposed action or any alternative were done
- Analyzes the changes, or impacts, to the environment that would be expected to take place if the proposed action or an alternative were implemented, compared to the expected condition of the environment if no action were taken

The DOE EIS process follows these steps:

- Notice of Intent, published in the *Federal Register*, identifies potential EIS issues and alternatives and asks for public comment on the scope of the analysis
- Public scoping period, with at least one public meeting
- Implementation Plan, which gives the results of public scoping and provides a "roadmap" of how the EIS will be prepared
- Draft EIS, issued for public review and comment, with at least one public hearing
- Final EIS, which incorporates the results of the public comment period on the draft EIS
- Record of Decision, which states:
  - The decision
  - The alternatives that were considered in the EIS and the environmentally preferable alternative
  - All decision factors, such as cost and technical considerations, that were considered by the agency along with environmental consequences
  - Mitigation measures designed to alleviate adverse environmental impacts
- Mitigation Action Plan, which explains how the mitigation measures will be implemented and monitored.

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