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DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND (AFMC)
NUCLEAR WEAPONS INTEGRATION DIVISION

4 January 1995

MEMORANDUM FOR DISTRIBUTION

FROM: SA-ALC/NWIW
1651 First Street SE
Kirtland AFB NM 87117-5617

SUBJECT: High Power Radio Frequency Phase 2 Study General Meeting 94-4 (#11) Minutes

1. Attached is a copy of the Minutes from the High Power Radio Frequency (HPRF) Phase 2 Study General Meeting 94-4 (#11) held 17 November 1994 at Lawrence Livermore National Laboratory, Livermore CA. If you have any questions or comments please call me at commercial (505) 846-6767 or my direct number of 846-4001, ext 208. DSN is 246-6767 or 246-4001, ext 208.

2. This letter is **UNCLASSIFIED**.

Keith M Baird
KEITH M. BAIRD
HPRF Study Director
Weapons Management Branch

Attachment:
HPRF Phase 2 Study General Meeting 94-4 (#11)
Minutes, Including Distribution List ~~[illegible]~~

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NAME: Jim Greeny	2. CLASSIFICATION CHANGED TO:
	3. CONTAINS NO DOE CLASSIFIED INFO
2ND REVIEW-DATE: 11/9/99	4. ~~COORDINATE WITH: DoD~~
AUTHORITY: DD	5. CLASSIFICATION CANCELED
NAME: ML Rolbay	6. CLASSIFIED INFO BRACKETED
	7. OTHER (SPECIFY):

QC Review Compl 11/9/99

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MINUTES

HIGH POWER RADIO FREQUENCY (HPRF)
PHASE 2 STUDY GENERAL MEETING 94-4 (# 11)
17 NOVEMBER 1994

Keith M. Baird
HPRF Study Director

NUCLEAR WEAPONS MANAGEMENT BRANCH
NUCLEAR WEAPONS INTEGRATION DIVISION
SA-ALC NWIW (AFMC)
1651 FIRST STREET SE
KIRTLAND AIR FORCE BASE NEW MEXICO 87117-5617

DOE b(3) & USAF

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MINUTES

HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING 94-4 (#11)

17 NOVEMBER 1994

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MINUTES

HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING 94-4 (#11)

17 NOVEMBER 1994

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MINUTES

HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING 94-4 (#11)

17 NOVEMBER 1994

I. (U) **INTRODUCTION.** The High Power Radio Frequency (HPRF) Phase 2 Study General Meeting 94-4 (#11) was hosted by Lawrence Livermore National Laboratory (LLNL), Livermore, California on 17 November 1994. Mr Keith Baird, HPRF Study Director, Nuclear Weapons Directorate, Nuclear Weapons Integration Division (NWI), chaired the meeting.

A. (U) **Administration.** Mr Baird welcomed the attendees and Dr Joe Sefcik, LLNL, provided administrative information. A special thanks to Dr Sefcik and LLNL for hosting the meeting. The meeting agenda and list of attendees are attached as Appendices A and B, respectively.

B. (U) **Executive Working Group Membership.** All members and observers or their representatives, except for the Det 10 Space and Missile Center, Ogden Air Logistics Center, SAF/AQQS (N), and Phillips Laboratory were present. Mr Karl Rueb, Department of Energy Albuquerque Operations Office (DOE AL) has retired and Mr Dennis Umshler is the new DOE/AL representative. Mr Al Baker has replaced Mr Joe Gazda, Headquarters Department of Energy, as an observer. Current members and observers, and their organizations are identified in Appendix C.

C. (U) **Meeting Objectives.** Mr Baird explained there were six objectives the study group needed to reach a consensus on during the meeting which are listed below.

1. (U) Warhead output parameters for required effectiveness.
2. (U) Target system vulnerability test data conclusions.

3. (U) Mission effectiveness analysis sufficient to demonstrate HPRF feasibility in all four mission areas.
4. (U) Time required to complete study based on above consensus.
5. (U) Working Group draft input dates for final report.
6. (U) Agency support to complete study.

II. (U) DISCUSSION TOPICS.

A. (U) Program Update. Mr Baird addressed administrative program issues (Appendix D).

1. (U) Schedule/Milestones. The optimism of the HPRF Phase 2 Study Schedule/Milestones (Appendix D) is based on the Vulnerability/Mission Analysis Working Groups (VWG/MAWG) ability to finalize the warhead output parameters, the target system vulnerabilities, and the mission effectiveness analysis. A meeting will be held on 31 January 1995 at DOE AL to reach agreement between the VWG/MAWG on the effectiveness results and to allow each working group chairman to brief his input to the final report. On 1 February 1995 at DOE AL the HPRF Executive Working Group (EWG) will address overall study conclusions and recommendations. All draft working group final report inputs are due on 17 January 1995, except the Requirements Working Group (RWG) HPRF unique issues white paper and Warhead Design Working Group (WDWG) input due on 15 December 1994. The MAWG final report inputs may slip a week or two to the end of January 1995. The goal is to have the HPRF EWG members review the final report comments in March 1995, and to publish and distribute the report in April 1995. Briefings to various organizations will follow the final report distribution.

2. (U) Final Report Format. The final report format is shown in Appendix D. The working groups final report inputs will include: stand alone reports, overall evaluation of candidates, working group summaries, final report executive summary inputs, and

references and appendices. An action item was assigned to all working group chairmen to identify all documentation that supports working group inputs. The final report will be signed-off by each primary agency representative.

B. **Security Classification**. Mr Bill Barry, NWI, provided information associated with the HPRF security classification. A subgroup [Bill Plummer/Sandia National Laboratories (SNL), Phil Lange/Los Alamos National Laboratory (LANL), Dave Brown/LLNL, Bill Barry/NWI, and John Bilski/Headquarters Defense Nuclear Agency] has been established to address the HPRF classification issue. Recommendations of the subgroup will be provided in December 1994. When classifying inputs to the final report working group chairman should be on the conservative side when in doubt.

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USAF

C. **VWG to MAWG Input.**

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USA

The vulnerability data files take a system composed of various elements each of which has a fault tree comprised of a functional arrangement of initiators. The failure of each initiator is determined by the truth of the inequality stress to be greater than strength. The stress and strength models are based on the FAAT expert judgement data base.

DOE
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USA

DOE b(3) & USAF

This is different than the FAAT methodology which estimates a nominal (50%) with upper (95%) and lower (5%) confidence bounds on the probability of failure CDF.

D. [redacted] VWG Input Limitations. USAF b(1)

presented the probabilistic nature of the decision making process and the uncertainties in relation to the HPRF Phase 2 Study (Appendix F). DOE b(3) & DTRA & USAF

USAF b(1)

DOE b(3) & DTRA & USAF

E. (U) Warhead Candidate Optimization. presented a methodology for evaluating HPRF warhead candidate optimization based on test data (Appendix G). A responsibility of the VWG is to provide vulnerability data on each of the modeled systems in each of the MAWG mission areas. The number of systems in the first mission area that are operative is quite large; furthermore, for most of the systems USAF b(1)

(U) As presented by a selection criterion based on characteristic points of entry was used to derive the basis set for which low-level test data would be required. The actual data sets incorporated into the basis set can be obtained from the agencies that conducted various vulnerability testing. The waveforms to be used correspond to the existing candidate, the various alternative candidates proposed by LANL and LLNL, as well as hypothetical candidates selected to take advantage of identified vulnerabilities determined during the course of the analysis. The analysis can also account for a variety of candidate orientations. Three action items were assigned in support of the warhead candidate optimization effort.

F. (U) **Requirements Working Group Report.** presented a summary of the topics addressed at the RWG meeting held 15 November 1994. The HPRF Study Director requested the RWG provide comments in the Military Characteristics (MCs) addressing specific issues that were pertinent to the HPRF program during development of the MCs. The MC comments and draft Stockpile-to-Target Sequence will be addressed at a meeting on 7-8 December 1994 at ORION International Technologies, Inc. in Albuquerque, NM. The HPRF unique issues have been finalized and will be documented in the HPRF Phase 2 Study finally report. The final list of unique issues is provided in Appendix H.

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DOE b(3); USAF

G. (U) **Surety Working Group Report.** presented a summary of the activities addressed at the 16 November 1994 SWG meeting which included operational safety, use control, dispersal of materials, and nuclear detonation safety (Appendix I). The operational and dispersal safety analyses are essentially complete.

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DOE b(3) USAF

Preliminary analyses have been completed for use control and nuclear detonation safety evaluations. Most, if not all of the required inputs from the Systems Engineering Working Group (SEWG) have been received. The remaining input to be received is from the California team designating use control implementations for their

warhead candidates from a large matrix of alternatives. The SWG format for the final report, and the schedule for completing evaluations and writing and reviewing the final report were discussed and finalized. Completion of SWG evaluations and draft SWG final report inputs are due to the SWG Chairman by 15 December 1994. An SWG meeting will occur on 11 January 1995 to review and finalize draft inputs to the final report.

USAF b(1)

H. (U) Warhead Design Working Group Report. [redacted] presented a summary of the topics addressed at the 15 November 1994 WDWG meeting. [redacted] It was suggested that the SEWG coordinate a naming convention for the warhead design candidates to be used in the final report inputs.

DOE b(3) & USAF

I. (U) Systems Engineering Working Group Report. [redacted] presented a summary of the topics addressed at the 16 November 1994 SEWG meeting (Appendix K). Topics discussed at the meeting included New Mexico and California design updates, and MK5 platform considerations. The design teams continue to wrap up the details of their respective candidates. At this time there are no identifiable obstacles that would preclude meeting the working group deadline of producing a draft systems engineering report by mid-January 1995. The benefits of including a "candidate attributes chart" which summaries the key features of each of the designs was discussed and approved. The list of key features was developed and a draft prepared. In addition to the chart a one page narrative for each of the candidates was recommended and approved. The individual design teams are responsible for their candidate narratives and were reminded that paragraph classification markings are required. The SEWG peer review process is underway. Design information has been exchanged. Once the critiques and rebuttals have been submitted, a presentation to the SEWG and SWG Chairmen will be arranged. The results and design information will be included in the SEWG report.

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1. (U) **New Mexico Design Update.** The engineering effort is proceeding on schedule. The status of the NM-3 design was presented with details of the mounting and support features described.

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3. [redacted] **MK5 Platform Considerations.** The details of incorporating HPRF warhead designs into a MK5 aeroshell are documented in Appendix K.

DOE b(3) & DTRA & USAF

J. (U) **Vulnerability Working Group Report.**

USAF b(1)

presented a summary of the activities addressed at the 15 November 1994 VWG meeting (Appendix L).

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The VWG input limitations and warhead candidate optimization write-ups were presented in paragraphs II.D and II.E respectively.

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& USAF

The HPRF Study Director requires inputs by 15 January 1995, but the work yet to be done by Drs Bernardin and Kaufman will still be in process. It was agreed that portions of the initial report input will be incomplete pending the results of work which is still underway.

USAF

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4. (U) Warhead Output Characteristics. Mr Baird, HPRF Study Director, stressed the importance of obtaining VWG consensus on the warhead output characteristics required to achieve the desired HPRF effectiveness. It was also emphasized to obtain VWG

nsensus on the conclusions that can be drawn from the test data base for target systems.

K. (U) Mission Analysis Working Group Report. [redacted] presented a summary of topics addressed at the 16 November 1994 MAWG meeting (Appendix M). [redacted] The VWG to MAWG input write-up was presented in paragraph II.C. [redacted]

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USAF

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III. (U) ACTION ITEMS. Four action items were closed from previous meetings and two remain open. Five new action items were assigned as a result of this meeting.

A. (U) Old Action Items.

1. (U) 7-5. Assigned to the WDWG

DOE & USAF b(3)

LLNL has performed the calculations. Layouts of designs are consistent with system engineering designs. LLNL will provide the data at the 18-19 October 1994 meeting at FCDNA. The data was provided at the meeting. This action item is **closed.**

2. (U) 94-1-1. Assigned to the VWG and WDWG.

DOE & USAF b(3)

This action item is still being worked. **Suspense: 17 January 1995.**

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USAF

3. (U) **94-4-3. Assigned to LANL, Dr Calahan.** Visit study test agencies to obtain appropriate sets of transfer functions for each test item for use in candidate optimization evaluation. **Suspense: 6 January 1995.**

4. (U) **94-4-4. Assigned to LANL, Dr Bernardin.** Prepare quantitative results of candidate performance using each candidates output and transfer functions from action item 94-4-3 to determine candidate performance. **Suspense: 13 January 1995.**

DOE
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Suspense: 15 December 1994 to RWG Chairman.

IV. (U) **NEXT MEETING.** The last scheduled HPRF Phase 2 Study General Meeting will be on 31 January 1995 at DOE AL. Each working group chairman will be given one hour to brief his final report input. There will be an HPRF EWG meeting on 1 February 1995 at DOE AL to address overall study conclusions and recommendations.

APPENDIX A
AGENDA

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AGENDA

HPRF PHASE 2 STUDY GROUP GENERAL MEETING 94-4
Lawrence Livermore National Laboratory
17 November 1994

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APPENDIX B
LIST OF ATTENDEES

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HPRF Mtg 94-4 Attendance 17 Nov 94 @ LLNL

Agency	Rank	First Nar	Last Name	DSN	Phone #	FAX #	City or Base	ST	ZIP Code
Dept of Defense									
USSTRATCOM/J533	Mr	Stan	Gooch	271-[illegible]	294-5254	294-6148	Offutt AFB	NE	68113-6500
FCDNA/FCPRA	Capt	Skip	Langbehn	246-[illegible]	846-8584	846-8611	Kirtland AFB	NM	87117-5616
FCDNA/FCPRA	Capt	John	Warzinski	246-[illegible]	846-8575	846-8611	Kirtland AFB	NM	87117-5616
US AIR FORCE									
HQ AFSPC/DOXN	Capt	Kirk	Dickenson	692-[illegible]	554-3776	554-5079	Peterson AFB	CO	80914-4120
HQ AFSPC/DOXN	Maj	John T.	Valverde	692-[illegible]	554-5079	554-5354	Peterson AFB	CO	80914-4120
SA-ALC/NWIW	Mr	Keith	Baird	246-[illegible]	846-6767	846-4618	Kirtland AFB	NM	87117-5617
SA-ALC/NWIO	Mr	William R.	Barry	246-[illegible]	846-5535	846-4618	Kirtland AFB	NM	87117-5617
SA-ALC/NWIW	Mr	Frank	Carrillo	246-[illegible]	846-6767	846-2038	Kirtland AFB	NM	87117-5617
SA-ALC/NWIW	Mr	Daniel	Granados	246-[illegible]	846-6767	846-2038	Kirtland AFB	NM	87117-5617
SA-ALC/NWIE	LtCol	Roger	Kropf	246-[illegible]	846-9575	846-4618	Kirtland AFB	NM	87117-5617
US ARMY									
US ARMY ARDEC	Mr	Philip	Angelotti	880-[illegible]	724-5451	724-2375	Picatinny Arsnl	NJ	07806-5000
US Army ARDEC	Mr	Donald	Huie	880-[illegible]	724-5472	724-5461	Picatinny Arsnl	NJ	07806-5000
ARL/AMSRL-WT-ND	Dr	Christophe	Kenyon	356-[illegible]	394-3060	394-2525	Adelphi	MD	20783-2800
Dept of Energy									
DOE/HQ, DP-12	Mr	Alvin	Baker		903-8455	903-5658	Germantown	MD	20874-5000
DOE/AL-WPD	MS	Cheryl	Stivers		845-6386	845-5188	Albuquerque	NM	87185-5400
Los Alamos Nat Labs									
LANL/X-5	Dr	Michael	Bernardin		667-1439	665-7725	Los Alamos	NM	87545-2345
LANL	Mr	Troy	Eddleman		667-6811		Los Alamos	NM	87544
LANL	Mr	John	Hutchinson		665-3665	665-2017	Los Alamos	NM	87545-2345
LANL	Dr	Ronald	McFee		667-1682	665-2227	Los Alamos	NM	87545-2345
LANL/NWT	Mr	Thomas	Scheber		665-0045	665-2213	Los Alamos	NM	87545-2345
LANL	Mr	Ed	Whitted		665-0038	665-2017	Los Alamos	NM	87545-5000

HPRF Mtg 94-4 Attendance 17 Nov 94 @ LLNL

Agency	Rank	First Nar	Last Name	DSN	Phone #	FAX #	City or Base	ST	ZIP Code
Livermore Nat Labs									
LLNL/L-125	Dr	Charles	Chow		422-4639	423-4097	Livermore	CA	94550-0808
LLNL/L-81	Dr	Al	Kaufman		422-1599	423-0708	Livermore	CA	94550-0808
LLNL/L-153	Dr	Mike	Ong		422-0206	423-5080	Livermore	CA	94550-0808
LLNL/L-13	Dr	Joe	Sefcik		423-0671	423-0925	Livermore	CA	94550-0808
Sandia National Labs									
SNL(NM)	Mr	Jerrry	Adams		844-3668	844-2189	Albuquerque	NM	87185-0482
SNL(NM)	Dr	Roger	Breeding		844-1532	844-8867	Albuquerque	NM	87185-0405
SNL(N	Dr	Jerry	Cuderman	244-	844-8063	844-8745	Albuquerque	NM	87185-0482
SNL(NM	Mr	Kazuo	Oishi	24	844-0159	844-8745	Albuquerque	NM	87185-0482
SNL(NM)		William J.	Tedeschi		845-9851	844-8745	Albuquerque	NM	87185-0482
SNL(CA)									
SNL(CA)	Dr	Jim	Hogan		294-2853	294-1015	Livermore	CA	94550-0969
CONTRACTORS									
Logicon/RDA	Dr	Phil	Castillo		842-8156	242-4121	Albuquerque	NM	87119-5000
Logicon/RDA	Mr	William	Kehrer		842-8156	242-4121	Albuquerque	NM	87119-5000
TRW, 953/1140	Dr	Mike	Papay		382-8492	382-2000	San Bernardino	CA	92402-1310
Orion International Te	Mr	Mike	Rafferty		881-2500	881-5060	Albuquerque	NM	87110-6501
Kaman Sciences	Mr	Dick	Wallner		599-1958	599-1420	Colorado Springs	CO	80933-7463

APPENDIX C
EXECUTIVE WORKING GROUP MEMBERSHIP

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HPRF Phase 2 Study
Executive Working Group Membership

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APPENDIX D
PROGRAM UPDATE

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SCHEDULE/MILESTONES

FINAL REPORT FORMAT

HPRF Phase 2 Study Report Format

Executive Summary

1. Introduction
   - 1.1 Background
   - 1.2 Tasking
   - 1.3 Navy participation
   - 1.4 Study Organization
   - 1.5 Scope of Study

2. Related Issues
   - 2.1 START Implications
   - 2.2 Warhead Certification
   - 2.3 DODD C3150.7 "Controling the Use of Nuclear Weapons" 6/20/94
   - 2.4 Maintaining the Nuclear Technological Base
   - 2.5 Excercising the DOE Production Facilities

3. Mission Effectiveness Analysis & Assessment
   - 3.1 Mission 1
   - 3.2 Mission 2
   - 3.3 Mission 3
   - 3.4 Mission 4
   - 3.5 Mission 5

4. Vulnerability Testing, Analysis & Assessment
   - 4.1 High Level Tests
   - 4.2 Low Level Tests & Data Extrapolation
   - 4.3 FAAT Analysis

5. Warhead Candidates
   - 5.1 California Designs Descriptions
   - 5.2 New Mexico Designs Descriptions
   - 5.3 Joint CA/NM Design Description
   - 5.4 DOE Engineering Trade Studies
   - 5.5 Peer Review

6. System Engineering
   - 6.1 MMIII Delivery System Interface
   - 6.2 RV/Warhead design options
   - 6.3 IAF&F
   - 6.4 Packaging
   - 6.5 Use Control

7.0 (U) Nuclear Surety
- 7.1 (U) Introduction
  - 7.1.1 (U) Requirements
  - 7.1.2 (U) Special Concerns and Unique Issues
  - 7.1.3 (U) Approach
- 7.2 (U) Nuclear Detonation Safety
  - 7.2.1 (U) Introduction- Approach
  - 7.2.2 (U) Warhead Candidate Evaluation
- 7.3 (U) Operational Safety
  - 7.3.1 (U) Introduction- QFD Approach, Evaluation Criteria & Definitions
  - 7.3.2 (U) Warhead Candidate Evaluation
- 7.4 (U) Nuclear Material Dispersal
  - 7.4.1 (U) Introduction- Approach, Evaluation Criteria
  - 7.4.2 (U) Warhead Candidate Evaluation
- 7.5 Use Control
  - 7.5.1 (U) Introduction- Approach, Evaluation Criteria
  - 7.5.2 (U) Warhead Candidate Evaluation
- 7.6 (U) Conclusions and Overall Evaluation of Candidates

8. Requirements
- 8.1 Tentative Mission Needs Statement
- 8.2 Military Characteristics
- 8.3 Stockpile-to-Target Sequence
- 8.4 Unique Issues

9 Conclusions and Recommendations
- 9.1 Conclusions/Discussion
- 9.2 Weapon Output
- 9.3 Vulnerability Analysis
- 9.4 Mission Analysis
- 9.5 Recommendations

References
- FAAT Report
- Vulnerability Report
- Mission Analysis Report

APPENDIX E
VWG TO MAWG INPUT

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APPENDIX G
WARHEAD CANDIDATE OPTIMIZATION

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On HPRF Candidate Optimization (U)

M. Bernardin, K. Calahan, et al

Los Alamos National Laboratory, et al

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APPENDIX H
HPRF UNIQUE ISSUES

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8.4 (U) UNIQUE ISSUES

(U) The Joint HPRF Phase 2 Study has shown that there are issues unique to the HPRF WXX warhead when compared with other typical warheads. In writing the Military Characteristics and Stockpile-To-Target Sequence documents, it became very apparent to the Requirements Working Group that these issues needed to be documented during Phase 2 and reviewed during Phase 2A of the program.

8.4.1 (U) STOCKPILE SAMPLING

8.4.1.1 (U) SYSTEMS EVALUATION. For any typical weapon system, the Department of Energy (DOE) and its Laboratories plan for and develop a Systems Evaluation Program (SEP). The SEP consists of testing newly built weapons (New Material Testing) and weapons withdrawn from the stockpile (Stockpile Testing). Both flight and laboratory tests are normally conducted.

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(U) The current stockpile sampling program removes 1/2 of a 90/90 sample every year. The 90/90 sample quantity is determined by the size of the population using a hypergeometric distribution.

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Of course over 20 years, weapon

8.4.1.2 [redacted] RELIABILITY.

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[redacted] In light of the issues associated with the stockpile program discussed above, the DoD will have to determine what the lowest acceptable reliability will be for this system. This may require a Trade Study to determine what is the acceptable reliability based on costs in Phase 2A.

8.4.2 (U) OPSEC REQUIREMENTS

[redacted] OPSEC requires the reentry system (RS) for the HPRF to appear visually indistinguishable from current RSs during START inspections. This requirement has been documented in the draft MCs, but may have to be further defined in Phase 2A. Currently, this requirement severely limits the design options available.

8.4.3 (U) USE CONTROL.

[redacted] Use control will be an area of significant importance during Phase IIA. A new DoD Directive S-3150.7 "Controlling the Use of Nuclear Weapons," has just been approved by the DoD.

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8.4.7 (U) TRITIUM

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APPENDIX I

SURETY WORKING GROUP REPORT

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Surety Working Group Report for HPRF Meeting 94-4 (11)

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The Surety Working Group met on November 16. The agenda is attached. The status of evaluation of Operational Safety, Use Control, Dispersal of Materials, and Nuclear Detonation Safety was reviewed. Most, if not all of the required inputs from the Systems Engineering Group has been received. The main remaining required input is for the CA team to designate Use Control implementations for their warhead candidates from a large matrix of alternatives.

The Operational Safety and Dispersal Safety analyses are essentially complete. Preliminary analyses have been completed for Use Control and Nuclear Safety.

The format for the final SWG report and the schedule for completing evaluations and writing and reviewing the final report were discussed and finalized. The schedule agreed upon is as follows:

(1) Completion of both evaluation and SWG final report inputs (hardcopies and discs to be delivered to SWG Chairman--- **No Later than December 15,**

(2) Compile Draft and Distribute to SWG Members: **No Later than December 23, and**

(3) SWG Meeting to Review and Finalize Draft --- **January 11.**

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Surety Working Group Mtg.
HPRF Meeting 94-4 (11)

- **Time, Date, Location**
  - 1:00 PM, November 16, 1994
  - LLNL, Livermore, CA-- Bldg 121/Rm 1048 (Ibex Room)
- **Agenda**
  - Introduction — Cuderman
    - Status of SWG Efforts
    - Final Report Format and Schedule
  - Use Control Analyses — Moore
  - Dispersal Analyses — Breeding
  - Nuclear Safety Evaluation — Pedersen
  - Intermediate Meeting — All

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FORMAT FOR HPRF PHASE 2 SURETY FINAL REPORT INPUTS

7 Nuclear Surety

7.1 Introduction **(Cuderman)**

7.1.1 Requirements

7.1.2 Special Concerns and Unique Issues

7.1.3 Approach

7.2 Nuclear Detonation Safety **(Pedersen)**

7.2.1 Introduction-- Approach; Evaluation Criteria

7.2.2 Safety Themes(Complete version)

7.2.2 Warhead candidate Evaluation

7.3 Operational Safety(**Cuderman)**

7.3.1 Introduction--QFD Approach, Evaluation Criteria & Definitions

7.3.2 Warhead Candidate Evaluation

7.4 Nuclear Material Dispersal **(Breeding)**

7.4.1 Introduction- Approach, Evaluation Criteria

7.4.2 Warhead Candidate Evaluation

7.5 Use Control **(Moore)**

7.5.1 Introduction-- Approach, Evaluation Criteria

7.5.2 Use Control Themes (SRD)

7.5.3 Warhead Candidate Evaluation

7.6 Conclusions and Overall Evaluation of Candidates **(All)**

APPENDIX J

WARHEAD DESIGN WORKING GROUP REPORT

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APPENDIX K
SYSTEMS ENGINEERING WORKING GROUP REPORT

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Sandia National Laboratories
Livermore, California 94551-0969

date: 18 November 1994

to: Mr. Keith Baird
HPRF Study Director
Weapons Management Branch
SA-ALC NWIW
Kirtland AFB, NM 87117-5617

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subject: SEWG Meeting Minutes for 16 November 1994 (U)

The eleventh general SEWG meeting was held at Lawrence Livermore National Laboratory. The minutes of the meeting follow.

Agenda

- New Mexico design team update:
- California design team update:
- Review candidate attributes chart
- Review drafts of introduction and summary
- Review other chapter detailed outlines
- Review schedule

General Issues -- J.R. Hogan

The design team continue to wrap up the details of their respective candidates. At this time there are no identifiable obstacles that would preclude meeting the working group deadline of producing a draft systems engineering report by mid January 1995. The proposed schedule for the report writing and editorial responsibilities are attached.

The benefits of including a "candidate attributes chart" which summaries the key features of each of the designs was discussed and approved. The list of key features was developed and a draft prepared. In addition to the chart a one page narrative for each of the candidates was recommended and approved. The individual design teams are responsible for their candidate narratives, The SEWG will coordinate the naming convention for the candidates.

The editors were reminded that paragraph marking is required. Additional guidance/primer on classification for HPRF topics is being prepared and will be distributed as soon as available.

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NM design team -- J. L.Adams

The engineering effort is proceeding on schedule. The status of the NM-3 design status was presented. Details of the mounting and support features were described.

SEWG Peer Review – J.R. Hogan

The peer review process is underway. Design information has been exchanged. Once the critiques and rebuttals have been submitted, a presentation to the SEWG and SWG chairs will be arranged. The results and design information will be included in the SEWG report.

Mk5 Platform Considerations

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Integration issues – C. DeJong

- Assessment of HPRF in Mk5 reentry body has not been coordinated with the Navy.
- Mk5 shell is similar in size and dimensions to Mk21. By similarity, HPRF candidates for Mk21 may have potential to fit in Mk5 volume.
- Selected ground rules from SLBM Phase 2:
  - No changes to missile/RBA physical and functional interfaces
  - No new, unique electrical signals from missile to RBA
  - Existing RB flight data cannot be invalidated (weight, cg limits, potential to relax for HPRF)
  - Mk5 AF&F shall be retained
- Some issues for Mk5 packaging:
  - Extent of weight and cg relaxation from Phase 2 limits (will be limited by missile or RBA structure and control issues)
  - Missile impacts due to limited HPRF loadouts
  - Compatibility with release assembly and deployment mechanisms
  - Unique Mk5 STS normal environments

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Interdepartmental letterhead

Mail Station L-22

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Document Number: COPD-94- 80
This document consists of 1 page.

MEMORANDUM

November 22, 1994

TO: Keith Baird

FROM: Joe Sefcik

SUBJECT: Paragraph for Navy response (u)

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Distribution:
Keith Baird ; LANL
Joe Sefcik
Master Copy

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Derivative Classifer:
Joseph A. Sefcik
Program Manager
A Division

Lawrence Livermore National Laboratory

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APPENDIX L
VULNERABILITY WORKING GROUP REPORT

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[redacted] Capt John Warzinski discussed the probabilistic nature of the decision making process and uncertainties in relation to the HPRF Phase 2 study.

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[redacted] Dr. Mike Bernardin of LANL proposed a methodology for evaluating the candidate warheads based on test data.

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This led to a discussion of the overall schedule. The HPRF study director requires inputs by 15 January 1995 but the work yet to be done by Bernardin and Kaufman will still be in process. It was agreed that portions of the initial report input will be incomplete pending the results of work which is still underway.

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APPENDIX M

MISSION ANALYSIS WORKING GROUP REPORT

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The other action item was to convene a teleconference of the MAWG around 15 January 1995 to review progress. The next study group meeting will be in mid-February 1995.

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