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DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND (AFMC)

REPLY TO Nuclear Weapons Integration Division (NWI)
ATTN OF: 1651 First Street, SE; Kirtland Air Force Base, New Mexico 87117-5617

SUBJECT: High Power Radio Frequency (HPRF) Phase 2 Study General Meeting # 7 Minutes

TO: DISTRIBUTION

1. Attached is a copy of the Minutes from the HPRF Phase 2 Study General Meeting # 7 held 9 December 1993 at Sandia National Laboratories, Albuquerque, New Mexico. If you have any questions or comments please give me a call at (505) 846-4001, extension 208 or DSN 246-4001, extension 208.

2. This letter is UNCLASSIFIED.

Keith M. Baird
HPRF Study Director
Nuclear Advanced Concepts Branch

1 Atch
HPRF Phase 2 Study General Meeting # 7
Minutes including Distribution List (S-RD)

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NAME: C. Kenney
2ND REVIEW-DATE: 11/18/99
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MINUTES

HIGH POWER RADIO FREQUENCY PHASE 2 STUDY GENERAL MEETING # 7

9 DECEMBER 1993

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MINUTES

HIGH POWER RADIO FREQUENCY PHASE 2 STUDY GENERAL MEETING # 7

9 DECEMBER 1993

I. (U) INTRODUCTION. The High Power Radio Frequency (HPRF) Phase 2 Study General Meeting # 7 was hosted by Sandia National Laboratories (SNL), Albuquerque, New Mexico, on 9 December 1993. Mr Keith Baird, HPRF Study Director, Nuclear Advanced Concepts Branch (NWIC), Nuclear Weapons Integration Division (NWI), chaired the meeting.

A. (U) Administration. Mr Baird welcomed the attendees and Dr Jerry Cuderman, SNL, provided administrative information. Eighteen Government agencies and contractors were represented at the meeting. A special thanks to Dr Cuderman and SNL for hosting the meeting. The meeting agenda and list of attendees are attached as Appendices A and B, respectively.

B. (U) Review of Executive Working Group Membership. All members and observers or their representatives, except for the Ballistic Missile Office, were present. Mr George Baker, Headquarters Defense Nuclear Agency, was added as a member and Mr Stanford Gooch, United States Strategic Command, was added as an observer. Current members and observers, and their organizations are identified in Appendix C.

II. (U) DISCUSSION TOPICS.

A. (U) Program Update. Mr Baird, HPRF Study Director, addressed program issues and schedule that were discussed at the Executive Working Group Meeting on 8 December 1993 (Appendix D). With the Department of Defense (DoD) downsizing the nuclear stockpile, the Secretary of Defense directed a Nuclear Posture Review which addressed United States security strategy, force structure, force operations, safety and security, counterproliferation policy, and threat reduction policy. Based upon the changing political environment, since the Cold War ended, the latitude of the HPRF Phase 2 Study tasking was addressed at this meeting. It was agreed to continue addressing the primary option Minuteman III/Single Reentry Vehicle (MK 12A or MK 21), and also investigate other options within the resources allowed by the Department of Energy (DOE), if beneficial to enhancing weapon effectiveness.

b(3)

DOE, UCNI

An action item to investigate this was assigned to the Mission Analysis and Vulnerability Working Groups (MAWG and VWG). It was further agreed to remove limitations based upon targeting in order to address all targets and not be limited due to chosen scenarios. Although the tasking on this study has not changed, areas needing further consideration include reentry vehicle shell limitations, warhead parameters, warhead reliability and certification, arming and fuzing, use control, safety technology. Additionally, the need to document study results while expertise is still

around was emphasized. The minutes from all meetings will be the audit trail for the study group. Overall, communications need to be improved between working groups to ensure action items assigned are completed and properly documented. The study's midterm report will be published in January 1994 with a presentation planned for the Nuclear Weapons Council Standing Committee in February 1994. The study ends in March 1995 with the final report due in April 1995.

B. [redacted] Surety Working Group Report.

USAF b(1)

The SWG effort is divided into three areas; operational safety, nuclear detonation safety, and use control.

The

DOE, USAF, DTRA b(3)

Quality Function Deployment process is continuing with evaluation criteria being reviewed.

DOE, USAF, DTRA b(3)

In the nuclear detonation safety area, the process for reviewing candidate designs is essentially complete. The first cut at an evaluation was addressed in September 1993, but still waiting for final warhead candidate designs. Use control is also new for land-based missile systems. The draft DoD Directive "Controlling the Use of Nuclear Weapons", has a new policy requiring use

control on all new systems including land-based missile systems.

DOE, USAF, DTRA b(3)

The use control requirements/policy review is complete and the overall approach is defined. Also, preliminary review of missile systems/warhead interfaces is complete.

USAF b(1)

C. **Requirements Working Group Report.**

The RWG met on 7 December 1993 to review HPRF MC action items from a Technical Interchange Meeting (TIM) held on 3-4 November 1993. The TIM was held to review comments on the initial draft of the HPRF MCs. Draft 2 has since been published and distributed to working group members. Comments on the MCs Draft 2 are due to NWIW by 21 January 1994 to support the RWG TIM in February 1994 with results to be discussed at the next HPRF General Meeting. Additionally, the Stockpile-to-Target Sequence (STS) Draft 2 document has been distributed to working group members with comments also due by 21 January 1994 to support the next RWG TIM in February 1994.

DOE, USAF, DTRA b(3)

The RWG is working two action items on use control and STS radiation environments assigned by the Systems Engineering Work Group (SEWG).

USAF b(1)

D. (U) Systems Engineering Working Group Report.

presented a status of the issues from the 7 December 1993 SEWG meeting which included Minuteman III weapon system information, New Mexico and California design candidates information, surety concept issues, and responses to action items (Appendix G).

1. (U) The MMIII SRV Program and GRP. The Minuteman III (MMIII) Single Reentry Vehicle (SRV) Program and Guidance Replacement Program (GRP) were discussed with a tentative schedule on these programs presented. The goals for both programs are to provide the capability for de-MIRVing the Minuteman III missiles to single MK 12 or MK 12As. The ability to place the MK 21 on the Minuteman III missile will not be precluded by either of these two changes. The placement of MK 21s on Minuteman III missiles remains a goal of the United States Air Force (USAF).

2. (U) New Mexico Design Candidates Information.

DOE, USAF, DTRA b(3)

DOE, USAF, DTRA b(3)

DOE, USAF, DTRA b(3)

3. (U) California Design Candidates Information.

a. [redacted] The preliminary use control concepts being considered for the California warhead candidates were summarized and will evolve over the next few months.

DOE, USAF, DTRA b(3)

DOE, USAF, DTRA b(3)

DOE, DTRA b(3)

DOE, DTRA b(3)

DOE, DTRA b(3) USAF b(i

USAF b(1)

Currently, the major emphasis is on the modeling effort for all mission areas.

DOE, USAF, DTRA b(3)

Three action items were addressed including the mission need statement, mission modeling work, and the funding shortfall.

DOE, USAF, DTRA b(3)

Finally tasked all MAWG analysis leaders to provide a timeline-to-completion chart to help the group keep better track of analysis work and for incorporation into future meeting minutes.

USAF b(1)

F. (U) Warhead Design Working Group Report.

DOE, USAF, DTRA b(3)

1. [redacted] Primary Candidates Certification. Certification of the primary candidates was discussed.

DOE, USAF, DTRA b(3)

It is clear the present testing moratorium will impact the current certification process for WR warheads.

DOE, USAF, DTRA b(3)

DOE, USAF, DTRA b(3)

3. [redacted] Action Items Responses.

DOE, USAF, DTRA b(3)

There are no anticipated measures to reduce INRAD in the warhead design at this time.

[redacted]

USA
b(1)

DOE
DTRA
b(3)

1. [redacted] USAF Phillips Laboratory Testing.

DOE, USAF
DTRA
b(3)

2. [redacted] SNL Testing.

DOE,
USAF
DTRA
b(3)

3. [redacted] LLNL Testing.

DOE,
USAF,
DTRA
b(3)

DOE, USAF, DTRA b(3)

4. [redacted] **LANL Testing.** LANL has zeroed out all funds for HPRF testing support.

DOE, USAF, DTRA b(3)

Because of the test approach used, the data from these tests must be reviewed to determine its applicability to the MAWG analysis.

DOE, USAF, DTRA b(3)

6. (U) MAWG Analysis Support.

Two data entry methods will be provided. One will facilitate the entry of FAAT-like data and the other will allow the entry of cross-sections or transfer functions from the test programs.

DOE, USAF DTRA b(3)

III. (U) ACTION ITEMS. Fifty-two action items have been closed from previous meetings and eighteen action items remain open. Eight new action items were assigned as a result of this meeting and the various working groups.

A. (U) Old Action Items.

1. (U) Assigned to Capt Lamb, Office of Aerospace Studies (OAS): Contact OL-NS regarding the chair of the Surety Working Group (SWG). *OL-NS did not have enough personnel to chair the SWG. Traditionally, OL-NS was the organization responsible for this position. Therefore, OL-NS was queried and stated that they did not mind if the chair of the working group was from one of the National Laboratories.* This action item is closed.

2. (U) Assigned to Sandia National Laboratories (SNL): Determine the chair of the System Engineering Working Group (SEWG). *SNL was the usual chair to the SEWG. The decision to chair this working group was left to SNL because either New Mexico*

(NM) or California (CA) would be the chair. As a result of the decision to let SNL NM chair the SWG, SNL CA was chosen to chair the SEWG. This action item is **closed.**

3. (U) Assigned to Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL): Determine the chair of the Warhead Design Working Group (WDWG). *The WDWG chair would be decided between the two laboratories that had the expertise. At the time of the first meeting, it was decided between LLNL and LANL that the chair for the WDWG would be Dr. Mercer-Smith, LANL.* This action item is **closed.**

4. (U) Assigned to Defense Nuclear Agency (DNA) and the National Laboratories: Produce an agreement on effects testing - SEE ACTION ITEM 50. *The Secretary of the Air Force for Acquisition (SAF/AQQS) requested a testing plan be coordinated among the organizations involved in the High Power Radio Frequency (HPRF) Phase 2 Study that would be conducting vulnerability testing during the study. Therefore, the chair of the Vulnerability Working Group (VWG), along with the organizational representatives, produced a master plan of the testing activities proposed throughout the HPRF Phase 2 Study. This plan was produced in January 1993 and distributed to the participants involved with testing.* This action item is **closed.**

5. (U) Assigned to Capt Lamb, OAS: Contact the United States Navy (USN) about participation in the HPRF Phase 2 Study. *The tasking letter from the Nuclear Weapons*

Group (WDWG) will investigate. *Mr Gazda was tasked to investigate the requirements for certification of a warhead if the testing moratorium on underground tests was continued. His response was the WDWG would propose methods for the certification issued. Therefore, the WDWG is continuing to investigate this issue and will provide input during the HPRF Phase 2 Study.* This action item is **closed.**

9. (U) Assigned to Mr Walton, Phillips Laboratory/WST (PL/WST): Relook at the funding levels for HPRF Phase 2 Study testing at PL. *Mr Walton investigated the funding levels at PL for the testing program of their organization. PL was able to procure the required amount of funding that will meet their obligation during the HPRF Phase 2 Study.* This action item is **closed.**

10. (U) Assigned to Each Working Group Chair: Produce draft charters for kickoff meeting. *Each working group chair was to provide a draft charter of their working group for use during the kick-off meeting. The draft charters were provided and included in the HPRF Phase 2 Study General Meeting #1 Minutes.* This action item is **closed.**

DOE, USAF, DTRA
b(3)

12. (U) Assigned to Each Working Group Chair: Provide charters, milestone schedules, and member listings to the HPRF Phase 2 Study Director by 12 October 1993. *Updated charters, schedules and member listings were provided to the HPRF Phase 2 Study Director.* This action item is **closed.**

13. (U) Assigned to LtCol Atchison, Field Command Defense Nuclear Agency (FCDNA): Hold a meeting to finalize the testing plan - SEE ACTION ITEM 50. *The testing plan meeting was held at FCDNA and a coordinated test plan was produced.* This action item is **closed.**

14. (U) Assigned to Capt Lamb, OAS: Contact the USAF BMO and OO-ALC for participation in the SEWG. *BMO and OO-ALC were contacted by Capt Lamb. They provided names of individuals to participate in the SEWG.* This action item is **closed.**

15. (U) Assigned to Capt Lamb, OAS: Contact the USN about study participation (Mr Clifton DeJong, Kaman Sciences Incorporated). *Capt Lamb contacted Mr Ben Wosoogh, USN, about participation in the HPRF Phase 2 Study. The USN is only participating as an observer. Mr DeJong, Kaman Sciences Incorporated, will attend the meetings and provide information to the USN about the HPRF Phase 2 Study's progress.* This action item is **closed.**

16. (U) Assigned to Capt Powell, HQ ACC: Provide the HPRF Phase 2 Study Director with a listing of the efforts of organizations contacted to support the functions

parameters of the MMIII delivery vehicle for use with the HPRF device to the SEWG and RWG. This action item is **closed.**

21. (U) Assigned to Capt Powell, HQ ACC: Provide a status of the draft mission need statement for the HPRF device. *Capt Powell provided an update on the development of a mission need statement which could be applicable to the HPRF. The draft mission need statement was regenerated with the reorganization of the USAF and the change of commands from Headquarters Strategic Air Command (HQ SAC) to HQ ACC.* This action item is **closed.**

22. (U) Assigned to Capt Lamb, OAS: Request a white paper on the assessments of the effects from an HPRF device. DOE b(3)

The assessment was done by PL/WSA and a report was filed in the case file for inclusion in the HPRF Phase 1 Study Final Report. This action item is **closed.**

23. (U) Assigned to Ms Fattor, OL-NS/ENN:

The final decision would be made in an HPRF Phase 2A Study. This action item is **closed.** DOE, DTRA b(3)

29. (U) Assigned to the SWG: Provide the Deputy Assistant Secretary for Military Applications (DASMA) HPRF Phase 2 Study draft surety theme to the SEWG. *This action item is a requirement for a working group during the course of the HPRF Phase 2 Study, therefore, it will remain open.* This action item is **ongoing**.

30. (U) Assigned to the WDWG: Provide information to support the development of HPRF surety themes to the SWG. *This action item is a requirement for a working group during the course of the HPRF Phase 2 Study, therefore, it will remain open.* This action item is **ongoing**.

31. (U) Assigned to the WDWG: Provide the warhead design characteristics to the SEWG. *This action item is a requirement for a working group during the course of the HPRF Phase 2 Study, therefore, it will remain open.* This action item is **ongoing**.

32. (U) Assigned to the WDWG: Provide the warhead output levels to the RWG and MAWG. *This action item is a requirement for a working group during the course of the HPRF Phase 2 Study, therefore, it will remain open.* This action item is **ongoing**.

33. (U) Assigned to Dr Cuderman, SNL NM: Provide inputs to the Executive Working Group (EWG) on the 90 day program briefings. *Dr Cuderman (SWG Chair) provided the schedule and timeline information to the EWG for the 90 day briefing to the NWCSC.* This action item is **closed**.

48. (U) Assigned to Capt Lamb, OAS: Determine the OAS/XRS environments for the HPRF device STS. *The nuclear environments involving the HPRF device were calculated by PL/WSM and presented at the VWG meeting and enclosed in the HPRF Phase 2 Study General Meeting #4 Minutes.* This action item is **closed.**

49. (U) Assigned to Each Working Group Chair: Provide Capt Lamb, OAS, with the funding shortfall statements (i.e., dollars versus impacts). *The funding shortfalls and their impacts were provided to the HPRF Phase 2 Study Director as they were identified. The current shortfalls have been addressed and will continue to be addressed as they become evident.* This action item is **closed.**

50. (U) Assigned to LtCol Atchison, FCDNA: Produce a test plan for the VWG to provide input for the NWCSC brief. *LtCol Atchison produced the draft test plan for the HPRF program and provided the information for inclusion in the NWCSC brief.* This action item is **closed.**

51. (U) Assigned to the MAWG:

This action item is **closed.**

DOE, USAF, DTRA b(3)

52. (U) Assigned to Capt Lamb, OAS: Provide the validation methodology to LtCol Martin, SAF/AQQS, for the NWCSC brief. *The validation methodology for the*

HPRF Phase 2 Study was provided in the NWCSC briefing package. This action item is **closed**.

53. (U) Assigned to the EWG: Address the fifth mission area in the tasking letter. *The fifth mission area in the tasking letter is being addressed as resources become available during the remainder of the HPRF Phase 2 Study. Original discussions placed other mission areas at a higher priority because it was felt that the study could generate more worthwhile information by focusing the efforts on the first four mission areas.* This action item is **ongoing**.

54. (U) Assigned to the SAF/AQQS(N): Determine whether an earthquake is considered an abnormal environment. *An earthquake could be an abnormal or normal environment depending upon the severity and the location of HPRF basing. The information for this action item will be provided when the final design and basing decisions are made. It is premature at this time to provide a definition.* This action item is **closed**.

55. (U) Assigned to LtCol Atchison and Mr Gutierrez, FCDNA:

This action item is **closed**.

DOE, USAF, DTRA b(3)

56. (U) Assigned to Each Working Group Chair: Provide timelines of the information required from the other working groups. *The working group chairs are to continue providing timelines to the EWG to insure that the proper information flow will occur and not cause a delay in the final results from the HPRF Phase 2 Study.* This action item is **ongoing.**

57. (U) Assigned to All Identified: Responses to the SEWG questions. *The responses to the questions from the SEWG posed at the HPRF Phase 2 General Meeting #4 have been answered to the satisfaction of the SEWG at this time. More definition of the warhead is required before further questions will be asked.* This action item is **closed.**

58. (U) Assigned to SAF/AQQS(N): What is the impact of the Fail-Safe and Risk Reduction (FARR) requirements on the HPRF Phase 2 Study? *The FARR requirements will impact this study by providing possible guidance of requirements for the designed warhead and delivery vehicle. At this time, the HPRF Phase 2 Study will proceed with options and try to address all of the FARR requirements, but will not delay design decisions waiting for implementation of FARR requirements.* This action item is **closed.**

59. (U) Assigned to the WDWG and SEWG: Provide working group inputs to the SWG. *This action item is a requirement for working groups during the course of the HPRF Phase 2 Study, therefore, it will remain open.* This action item is **ongoing.**

7-6. (U) Assigned to the RWG. What STS radiation environment levels must the HPRF warhead survive during launch, mid-flight and reentry? Provide information to the SEWG. **Suspense: March 1994.**

7-7. (U) Assigned to the RWG. Provide HPRF MCs' Use Control requirements to the SEWG. *Use control is being worked based upon a new draft DoD Directive C-3150.aa., but is currently TBD for the HPRF program.* **Suspense: June 1994.**

7-8. (U) Assigned to Each Working Group Chair. Provide plan of action, along with timelines, to include major activities between December 1993 and end of study. Also, need working group schedules with milestones to incorporate into overall study schedule. Provide information to the HPRF Phase 2 Study Director. **Suspense: March 1994.**

IV. (U) **NEXT MEETING.** The HPRF Phase 2 Study General Meeting # 8 will be held in conjunction with the various working group meetings on 8-10 March 1994 at the USAF Phillips Laboratory in Albuquerque, New Mexico.

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APPENDIX A
MEETING AGENDA

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APPENDIX B
LIST OF ATTENDEES

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HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING # 7
ATTENDANCE LIST
9 DECEMBER 1993

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PHASE 2 STUDY GENERAL MEETING # 7
ATTENDANCE LIST
9 DECEMBER 1993

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HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING # 7
ATTENDANCE LIST
9 DECEMBER 1993

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HIGH POWER RADIO FREQUENCY
PHASE 2 STUDY GENERAL MEETING # 7
ATTENDANCE LIST
9 DECEMBER 1993

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APPENDIX C
HPRF EWG MEMBERSHIP

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APPENDIX D
PROGRAM UPDATE

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OE, USAF, DTRA b(3)

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APPENDIX E
SURETY WORKING GROUP REPORT

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Surety Working Group Report
HPRF Meeting # 7

- The main business of SWG was conducted at an interim meeting on November 15-16 at SNL/NM
- The SWG met on Dec. 7 to review results of interim meeting
- Further Work on evaluating candidates for Nuclear Detonation Safety and Operational Safety is on hold pending more mature definition of warhead candidates
- Current efforts focus on development and evaluation of use control themes

USAF b(1)

The work of the Surety Working group is divided into three areas: Operational Safety, Nuclear Detonation Safety, and Use Control.

The addressing of Use Control is also new for land based missile systems. Because of the FARR study, it has become a timely issue for both DOD and DOE.

DOE, USAF, DTRA b(3)

DOE, USAF, DTRA b(3)

The Surety Working Group met on November 15-16 at SNL/NM. The primary activity at that meeting was continued work on developing the assessment process for Operational Safety for the different warhead candidates. A first cut was also made at evaluation. Nuclear Detonation Safety and Use Control were addressed in sub-groups headed by Paul Rexroth, SNL 324, and Larry Moore SNL 5122, respectively. John Berry, SNL 324, will assume the Nuclear Detonation Safety sub-group chairmanship for future meetings.

At the December 8 meeting of the SWG, the results of the November meeting were reviewed in presentations by J. F. Cuderman, John Berry, and Larry Moore.

Copies are attached of viewgraphs presented at the HPRF general meeting on December 10.

SURETY WORKING GROUP REPORT

SUMMARY NOV. 15-16 MEETING, SNL/NM

USAF b(1)

- OPERATIONAL SAFETY
  - QFD PROCESS WAS CONTINUED
  - EVALUATION CRITERIA WERE REVIEWED

DOE b(3)

- NUCLEAR DETONATION SAFETY
  - PROCESS FOR REVIEWING CANDIDATE DESIGNS ESSENTIALLY COMPLETE
  - FIRST CUT AT EVALUATION (SEPT. GEN. MTG)
  - AWAITING FINAL WH CANDIDATE DESIGNS
- USE CONTROL
  - REQUIREMENTS/POLICY REVIEW COMPLETE
  - OVERALL APPROACH DEFINED
  - PRELIMINARY REVIEW OF MISSILE SYSTEMS/WARHEAD INTERFACES COMPLETED

DOE b(3)

[redacted]

SWG RESPONSE TO RWG ACTION ITEMS

USAF b(1)

ITEM 1-- LLCE interval determined by individual candidate design features. This information should come from the WDWG. The costing tradeoffs are a SEWG responsibility.

ITEM 2--Safety system status verification appears to be an item which requires further discussion in the RWG. (1) DOE delivers WH in a safe state; Status is verified in two independent tests. (2) A status monitor can potentially be an unintended energy point of entry in adverse environments. It is my understanding that DOE does not concur that such verification is needed. (3) Current design proposals do not include enough detail to determine whether such verification is WH or missile issue.

ITEM 3-- It would not appear that the designs proposed would require any additional functional testing

ITEM 4--The determination of intrinsic radiation levels of should be determined by the WDWG.

Item 5--

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APPENDIX F
REQUIREMENTS WORKING GROUP REPORT

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APPENDIX G
SYSTEMS ENGINEERING WORKING GROUP REPORT

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THIS DOCUMENT CONTAINS 73 PAGES

HPRF Phase 2 Study

Systems Engineering Working Group Status Reports (U)

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Classified by: ALANDERSEN Code: 5161

Title: GRP DW SYS DEV Date: 12/22/93

7 December 1993
HPRF Meeting #7
Sandia National Labs, NM

[redacted]

Minutes of the Systems Engineering Working Group Meeting
December 7, 1993, Sandia/NM

• Minuteman III Weapon System Information

[redacted]

The status of the single RV (SRV) program, the guidance replacement program and the Peacekeeper program were discussed; a tentative schedule was presented. The SRV and GRP are still planned. The goals for both programs are to provide the capability for the de-MIRVing of the Minuteman III missiles to single Mk12 or Mk12As. The ability to place on Mk21 on the Minuteman III missile will not be precluded by either of these two changes. The placement of Mk21s on Minuteman III missiles remains a goal of the Air Force.

USAF b(1)

• New Mexico Design Candidates:

[redacted]

DOE, USAF, DTRA b(3)

Kaz Oishi (SNL/NM) summarized the issues that the SEWG must consider as we develop our surety concepts for the warhead candidates. Kaz also reviewed the discussions we have initiated with the Air Force (TRW/BMD and OOALC). He emphasized the need for continued cooperation as the SEWG works the problem of developing solutions to issues raised in the FARR study.

[redacted]

California Design Candidates:

DOE, USAF, DTRA b(3)

[redacted]

Charles Chow (LLNL) summarized the use control concepts being considered for the California warhead candidates. The concepts selection are very preliminary and will evolve over the next few months.

DOE, USAF, DTRA b(3)

The work on this concept is very preliminary

DOE, USAF, DTRA b(3)

All other designations (either carry over from the Phase I study or developed by other working groups) should be discontinued.

DOE, USAF, DTRA b(3)

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DOE, USAF, DTRA b(3)

• Response of Past Action Items

Frank Carrillo (SA-ALC) presented the Requirements Working Group responses to the action items requested by the SEWG at the last HPRF general meeting. Following some discussion, we revised our question regarding the radiation levels. The question was stated to request information specifically to the missile flight environments. What radiation levels must the HPRF warhead survive during launch, mid-flight and reentry. The information is primarily needed to establish the hardening level for the warhead electronics.

Agenda
System Engineering Working Group
7 December 1993

- *MM III Review*
  - -- J. Hogan
- *NM Design Candidates*
  - -- M. Haertling
  - -- K. Oishi
  - -- W. Tedeschi
- *CA Design Candidates*
  - -- C. Chow
  - -- G. Strandin
  - -- J. Chan
  - -- M. Kniskern
- *Action Item Review*
  - -- F. Carrillo
  - -- J. Cuderman

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New Mexico Design Candidates (U)

M. Haertling

Los Alamos National Laboratory

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Action Items(U)

SEWG Responses to RWG

SEWG Action Items for WDWG

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HPRF Warhead Phase 2 SEWG Meeting
8 December 1993
Sandia National Laboratory, Albuquerque NM

AI 93-3-1 from SEWG to RWG

Provide status at next Systems Engineering Working Group on MCs' Use Control and STS' Radiation Environments requirements.

Suspense: October-November 1993 timeframe

HPRF Warhead Phase 2 SEWG Meeting
8 December 1993
Sandia National Laboratory, Albuquerque NM

AI 93-3-1 from SEWG to RWG (cont)

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HPRF Warhead Phase 2 RWG Meeting
7 December 1993
Sandia National Laboratory, Albuquerque NM

Action Item to Warhead Design Working Group

Military Characteristic Paragraph 2.7.12 states, "The Intrinsic Radiation output from the Warhead shall be as low as reasonably achievable to minimize hazards to personnel during all phases of the STS. A desired goal is no more than TBD mrem/hr total with no more than TBD mrem/hr resulting from neutrons when measured at a distance of TBD meters from the centerline of the warhead. The DOE shall provide the DoD with details of the Intrinsic Radiation output of the Warhead."

Request the WDWG provide its recommendations to answer the TBDs.

S

DOE, USAF, DTRA b(3)

California Design Candidates (U)

C. Chow

Lawrence Livermore National Laboratory

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DEC 06 1993

HPRF ϕ -2 Study Meeting #7

SEWG/SWG Meetings

Dec. 8, 1993

Charles T. S. Chow

LLNL

~~(Confidential RD)~~

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Issues relative to use control enhancement- ~~(Confidential~~

1. Incorporation of the imbedded use control (UC) features will require reworking: California baseline package is not certified with use control system in place.

2. It pays to take a look at the alternatives that can be more accommodating to modern or advanced UC features:

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~~(Confidential RD)~~

Work in progress - to be reported to the next session:

1. **UC concepts to be spelled out in more details: packaging layouts and block diagrams, etc.**

~~(Confidential RD)~~

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HPRF System Engineering/Surety Working Groups Meeting

December 8, 1993

Gerald E. Strandin, Org. 5371

Sandia National Laboratories/California

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PRESENTATION OUTLINE AND OBJECTIVE

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HPRF Design Configurations

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HPRF Design Variations

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APPENDIX H
MISSION ANALYSIS WORKING GROUP REPORT

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APPENDIX I
WARHEAD DESIGN WORKING GROUP REPORT

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Warhead Design Working Group: LLNL Activities Status Report

Deborah Wojtowicz

Shawn Cantlin

High Power Radio Frequency Phase Two

Meeting # 7

Sandia National Laboratory

December 6-9, 1993

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Derivative Classifier:
Gene Burke Date: 11/10/93
F Group Leader, A Division

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NEDPC-HPRF-11-10-93-2

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Future plans

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APPENDIX J
VULNERABILITY WORKING GROUP REPORT

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MINUTES

HIGH POWER RADIO FREQUENCY
VULNERABILITY ANALYSIS WORKING GROUP MEETING #7

7 DECEMBER 1993

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DRAFT

DOE b(3) [redacted] A single point failure was experience during a single event, however, this failure is believed to be a MTBF and not significant.

[redacted] DOE, USAF, DTRA b(3

B. [redacted] Technical Presentation The only technical presentation was presented by Dr. Lynn Shaefer from LLNL.

[redacted] DOE, USAF DTRA b(3

Dr. Shaefer was asked to perform calculations using the specific yields of interest to our study.

C. (U)VAWG/MAWG Interface

[redacted] Two methods for data entry will be provided. The first will facilitate the entry of FAAT like data. The second will allow the entry of cross-sections or transfer functions from the test programs. DOE, USAF DTRA b(3

III. Action Items

A. (U)Old Action Items. NONE

B. (U)New Action Items.

[redacted] DOE, USAF DTRA b(3

IV. (U)Next Meeting. The next meeting of the VAWG will be in conjunction with the HPRF general meeting.

LIST OF ATTENDEES

VWG MEETING 7 DEC 93

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MINUTES

HIGH POWER RADIO FREQUENCY PHASE 2 GENERAL MEETING # 7

9 DECEMBER 1993

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