~~SECRET~~
UNCLASSIFIED

High Power Radio Frequency (HPRF) Phase 2 Study

Meeting #3 Minutes (U)

11 December 1992

RESTRICTED DATA	WARNING NOTICE
This material contains Restricted Data as defined in the Atomic Energy Act of 1954. Unauthorized disclosure subject to administrative and criminal sanctions.	Intelligence Sources & Methods Involved

CRITICAL NUCLEAR WEAPON DESIGN INFORMATION. DOD DIRECTIVE 5210.2 APPLIES	Not Releasable to Foreign Nationals

~~SECRET~~
(This title page is unclassified)
UNCLASSIFIED

(This page intentionally left blank)

NOTICE TO ACCOMPANY THE DISSEMINATION OF EXPORT CONTROLLED TECHNICAL DATA

(This notice is unclassified)

1. Export of information contained herein, which includes, in some circumstances, release to foreign nationals within the United States, without first obtaining approval or license from the Department of State for items controlled by the International Traffic in Arms Regulations (ITAR), or the Department of Commerce for items controlled by the Export Administration Regulations (EAR), may constitute a violation of law.

2. Under 22 U.S.C. 2778 the penalty for unlawful export of items or information controlled under the ITAR is up to 2 years imprisonment, or a fine of $100,000, or both. Under 50 U.S.C., Appendix 2410, the penalty for unlawful export of items or information controlled under the EAR is a fine of up to $1,000,000, or five times the value of the exports, whichever is greater; or for an individual, imprisonment of up to 10 years, or a fine of up to $250,000, or both.

3. In accordance with your certification that establishes you as a "qualified U.S. contractor," unauthorized dissemination of this information is prohibited and may result in disqualification as a qualified U.S. contractor, and may be considered in determining your eligibility for future contracts with the Department of Defense.

4. The U.S. Government assumes no liability for direct patent infringement, or contributory patent infringement or misuse of technical data.

5. The U.S. Government does not warrant the adequacy, accuracy, currency, or completeness of the technical data.

6. The U.S. Government assumes no liability for loss, damage, or injury resulting from manufacture or use for any purpose of any product, article, system, or material involving reliance upon any or all technical data furnished in response to the request for technical data.

7. If the technical data furnished by the Government will be used for commercial manufacturing or other profit potential, a license for such use may be necessary. Any payments made in support of the request for data do not include or involve any license rights.

8. A copy of this notice shall be provided with any partial or complete reproduction of these data that are provided to qualified U.S. contractors.

(This page is intentionally left blank)

TABLE OF CONTENTS

(U) Introduction 1

(U) Classification and Security 1

(U) Surety Working Group 2

(U) System Engineering Working Group 2

(U) Requirements Working Group 2

(U) Warhead Working Group 3

(U) Mission Analysis Working Group 3

(U) Vulnerability Working Groups 4

(U) Additional Presentations 4

(U) Action Items 5

Appendicies

A: (U) Meeting #3 Agenda 11

B: (U) Meeting #3 Attendance List 13

C: (U) Surety Working Group 19

D: (U) System Engineering Working Group 41

E: (U) Requirements Working Group 67

F: (U) Warhead Working Group 73

G: (U) Mission Analysis Working Group 75

H: (U) Vulnerability Working Group 83

(U) Distribution List 121

FIGURES

Figure 1. (U) HPRF Phase 2 schedule 9

TABLES

Table 1. (U) ACTION ITEMS FROM MEETING #3 5

Table 2. (U) PREVIOUS ACTION ITEMS 6

(U) ACKNOWLEDGMENTS

(U) I would like to take this opportunity to thank Dr. Jerry Cuderman of Sandia National Laboratories, New Mexico, who hosted the third meeting of the HPRF phase 2 Study. His efforts prior to and during the meeting helped immensely and were greatly appreciated.

(This page intentionally left blank)

an individual's need to know. In regards to unclassified material associated with this program, please handle the information with care. Proper operation security (OPSEC) requires that the unclassified material not be released that can give uncleared individuals the required information to piece together classified information.

(U) SURETY WORKING GROUP

USAF b(3)

[redacted] described how the Quality Function Deployment (QFD) process will be used within the SWG and emphasized the need to have participants attend a QFD orientation class. USAF, DOE, DTRA

[redacted] The presentation slides are included as appendix C. Further information will be provided as it becomes available within the SWG. The SWG met with the Warhead Design Working Group (WDWG) and the System Engineering Working Group (SEWG) during the working group meetings. Information from both working groups is important to the SWG as the information will be used to direct the surety themes. The external action items from the SWG are included in the action item section of this report.

(U) SYSTEM ENGINEERING WORKING GROUP

USAF b(3)

[redacted] These inputs are provided as appendix D. As stated in the previous paragraph, the SEWG met with the SWG during the working group session. During the SEWG meeting, working group members reviewed the nuclear safety theme and discussed SEWG requirements including the major issues for their group and interactions with other working groups. Some important engineering constraints need to be identified as soon as possible. DOE, USAF, DTRA

[redacted] The SEWG will investigate the engineering options until the engineering constraints are defined. Once decisions are made concerning the engineering constraints, work in these areas will become more defined. The goal of the SEWG is to provide transparency to the Air Force with whatever design is chosen. The external SEWG action items are included in the action item section of this report.

(U) REQUIREMENTS WORKING GROUP

(S) The Requirements Working Group (RWG) met during the first day of the working group meetings.

USAF b(1)

[redacted] His presentation slides are included as appendix E. The working group reviewed the action items from their previous meeting and reviewed a draft Stockpile to Target Sequence

b(3)

DOE, USAF, DTRA

(U) Action items external to the MAWG are provided in the action item section this report.

(U) VULNERABILITY WORKING GROUP

b(3)

(U)

USAF

A major discussion of the VWG centered around the responsibilities of the test director for each test object. The test director has the responsibility for the testing and analysis of the data from the test. The information for that test object then must be provided to the MAWG in a format that is compatible or useful for MAWG analysis of mission effectiveness. To insure that the information flow to the MAWG is proper, a representative from the MAWG will attend the VWG meetings.

USAF

USAF
b(1)

The plan was to be completed by the following Wednesday, December 16, 1992, and faxed to the test directors from each participating organization. They would have a chance to review it prior to meeting on December 18, 1992,. The completed test plan would show each organization's level of effort and level of participation during the study period. The plan would give the community an overview of the work levels each organization expects to perform.

(U) Action items external to the VWG are provided in the action item section this report.

b(3)

(U) ADDITIONAL PRESENTATIONS

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

(U) ACTION ITEMS

(U) Table 1 provides the list of action items assigned during meeting #3. The action items assigned during previous meeting are listed in table 2. Figure 1 shows a timeline for the study.

b(3)

→ USAF

→ DOE

→USAF

→DOE, DTRA b(3)

DOE, DTRA b(3)

USAF

DOE
b(3)

High Power Radio Frequency
Phase II Study Schedule

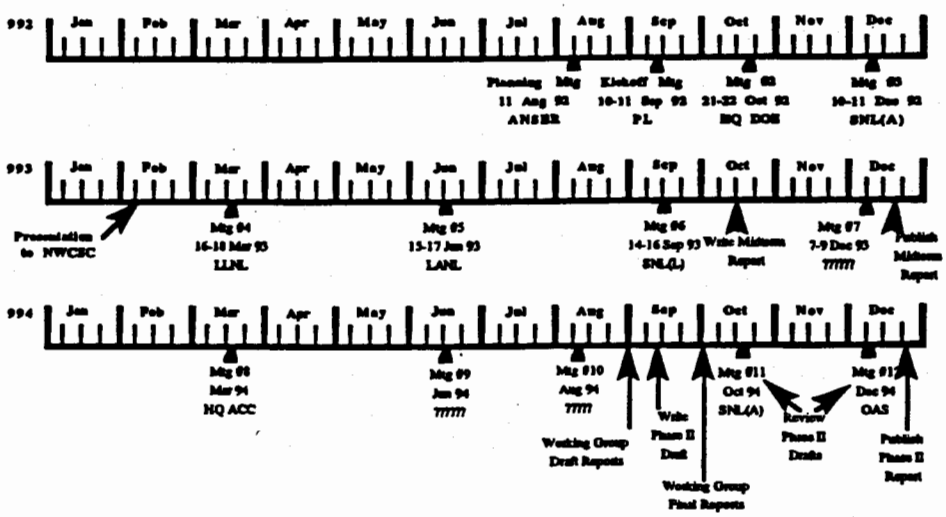


Figure 1. (U) HPRF phase 2 study schedule.

(This page intentionally left blank)

APPENDIX A

(U) MEETING AGENDA

USAF
b(1)

APPENDIX B

(U) MEETING ATTENDANCE LIST

	Ericksen, David	OO-ALC/LMAA Attn: May Wilcox Hill AFB UT 84056	Com: (801) 777-1752 DSN: 458-1752 FAX: (801) 777-
	Fattor, Todd	OL-NS/ENM 1651 First St SE Kirtland AFB NM 87117-5617	Com: (505) 846-6767 DSN: 246-6767 FAX: (505) 846-4620
	Fordham, Dave	Sandia National Laboratories, Albuquerque Division 4113, PO Box 588 Albuquerque NM 87185-5800	Com: (505) 844-8968 DSN: 244-8968 FAX: (505) 844-9293
	Gazda, Joe	DOE/HQ, DP-251 PO Box A Germantown MD 20874	Com: (301) 903-2984 DSN: FAX: (301) 903-5658
	Gooch, Stan	USSTRATCOM/J541 901 SAC Blvd Offutt AFB NE 68113-6500	Com: (402) 294-2580 DSN: 271-2580 FAX: (402)
	Grayson, Rodney	FCDNA/FCPRW 1680 Texas St SE Kirtland AFB NM 87117-5617	Com: (505) 846-8584 DSN: 246-8584 FAX: (505) 846-
	Gutierrez, Sam	PL/WSM Bldg 909 Kirtland AFB NM 87117-6008	Com: (505) 846-4823 DSN: 246-4823 FAX: (505) 846-7836
	Guzik, Joyce	Los Alamos National Laboratory X-2, Mail Stop B220, PO Box 1663 Los Alamos NM 87545-2345	Com: (505) 667-8927 DSN: FAX: (505)
	Haertling, Mike	Los Alamos National Laboratory WX-1, PO Box 5000, MS C936 Los Alamos NM 87545-2345	Com: (505) 667-0592 DSN: FAX: (505) 667-1878
	Hogan, Jim	Sandia National Laboratories, Livermore Division 5371, PO Box 969 Livermore CA 94550	Com: (510) 294-2853 DSN: FAX: (510) 294-1015
	Howard, Joseph	Los Alamos National Laboratory Mail Station 5000, Attn: A-5, MS-F602 Los Alamos NM 87545	Com: (505) 667-6451 DSN: FAX: (505) 667-2017
	Kaufman, Al	Lawrence Livermore National Laboratory L-85, PO Box 808 Livermore CA 94550	Com: (510) 422-1599 DSN: FAX: (510) 423-0708
	Keyser, Richard	Los Alamos National Laboratory Mail Station 5000, MS-G780, PO Box 1663 Los Alamos NM 87545	Com: (505) 667-9582 DSN: FAX: (505) 667-7809

	Walton, William	PL/WSM Kirtland AFB NM 87117-6008	Com: (505) 846-4823 DSN: 246-4823 FAX: (505) 846-7836
	Weitekamp, Mark	HQDNA/RAEE 6801 Telegraph Rd Washington DC 22310	Com: (703) 325-6622 DSN: 221-6622 FAX: (703) 325-2959
	Wojtowicz, Deborah	Lawrence Livermore National Laboratory L-13, PO Box 808 Livermore CA 94550	Com: (510) 423-9000 DSN: FAX: (510) 423-0925

SURETY/SYSTEMS ENGINEERING WORKING GROUP MEETING
HPRF Meeting #3
December 10, 1992

Name	Organization	Phone #	Fax #	WG*
CDR T. T. WALKER	FCDNA/FCFA	(505) 846-8883/4/5	(505) 846-4244	OBS
DAVID K. ERICKSEN	OO-ALC/LMEW	(801) 777-1762 DSN 458-1762		SEWG
LCDR ED ADE	FCDNA/FCPRW	(505) 846-8575	(505) 846 8611	OBS
CAPT M.J. MORGAN	HQ ACC/DONM	(804) 746-6411		SEWG
CHARLES T. S. CHOW	LLNL	(510) 422-4639	(510) 422-8185	SEWG/ SWG-
DON SHOVER	TRW	714-381-6461	~~714-372-~~	
MICHAEL HAERTLING	LANL/WX-1	505-667-0592	505-667-1878	OBS
JERRY CUDERMAN	SNL 5161	505-844-8063	505-844-8745	SWG.
MANUEL MARTINEZ	LANL/WX-1	505-667-2019	505-667-1878	SEWG/ SWG
ROBERT K. OLAGAUNA	LANL/WX-1	505-667-3545	505-667-9582	SWG
Linn Derickson	Sandia-Liv.	510-294-2117	510-294-2117	SEWG
RICHARD C. KEYSER	LANL/WX-5	505-667-7801	505-667-9582	OBS
JAMES MERCER-SMITH	LANL/X-2	505-667-9635	505-665-4086	OBS
JAMES R. HOGAN	SANDIA	510-294-2853	510-294-1015	SEWG
KAZUO OISHI	SNL/5161	(505) 844-0159	(505) 844-8745	SEWG
Joseph J. GAZDA	DOE/HQ/DP-251	(301) 903-2984	(301) 903-5658	OBS
Deborah Wojtowicz	LLNL/A-DIV	(510) 423-9000	—	OBS
Frank Dean	SANDIA	(505) 844-5202		
DAVE SANDERS	BMO/CYRR	(714) 382-2231	(714) 382-5425	SEWG
ELLSWORTH ROLFS	OL-NS/ENN	505-846-6767	505-846-4620	EWG
Todd FATTOR	OL-NS/ENG	505-846-4611	505-846-4620	SWG
Donald Hure	US Army ARDEC	201-724-2720	201-724-5461	SWG
LTC ROGER KROPF	OAS	505-846-7996	505-846-5558	OBS
KARL B. RUEB	DOE/AL/NPD	(505) 845-5189	(505) 845-5188	SWG
Carolyn Mangeng	LANL/NWP	(505) 667-3460	(505) 665-4833	EWG

WG* PLEASE INDICATE SWG, SEWG, OR OBS.

QFD PROCESS FOR PHASE 1 STUDIES

RECENT QFD EXPERIENCES

FRANK F. DEAN, 5161

QFD PROCESS FOR PHASE 1 STUDIES

OVERVIEW

- QFD DEFINITION
- QFD BENEFITS
- CUSTOMER REQUIREMENTS
- HOW THE QFD PROCESS WORKS
- ADAPTATION TO SYSTEM STUDIES
- EXAMPLE OF A QFD
- MISCONCEPTIONS AND RECOMMENDATIONS
- ADVANTAGES
- CONCLUSIONS

QFD PROCESS FOR PHASE 1 STUDIES

WHAT IS QFD?

- A TOOL TO HELP DEFINE AND RANK THE CUSTOMER'S NEEDS
- A TOOL TO MEASURE HOW WELL WE SATISFY THE CUSTOMER'S NEEDS

QFD PROCESS FOR PHASE 1 STUDIES

QUALITY FUNCTION DEPLOYMENT

QFD PROCESS FOR PHASE 1 STUDIES

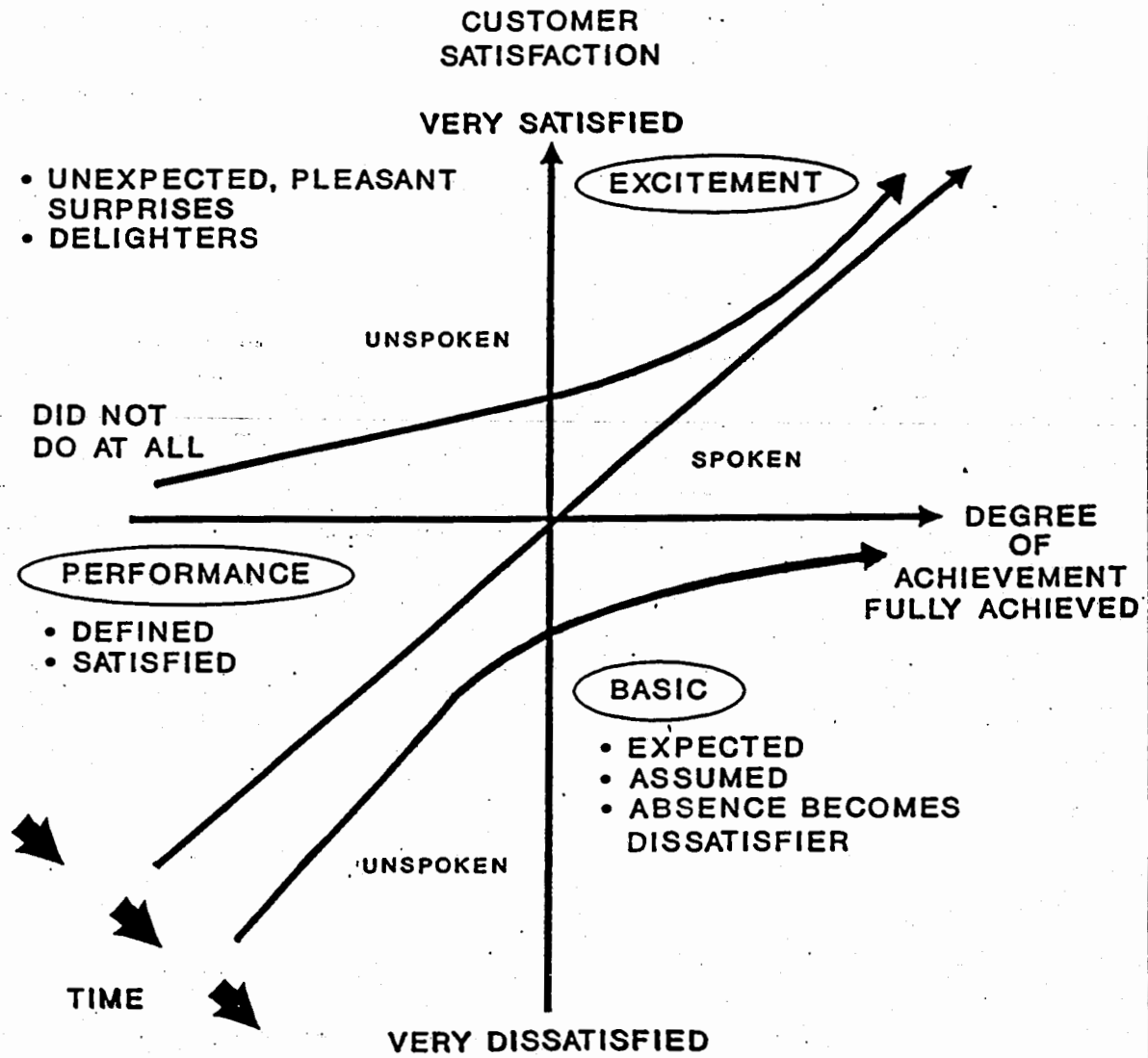
ARE WE MEETING OUR CUSTOMERS REQUIREMENTS?

QFD PROCESS FOR PHASE 1 STUDIES

BENEFITS OF THE QFD PROCESS

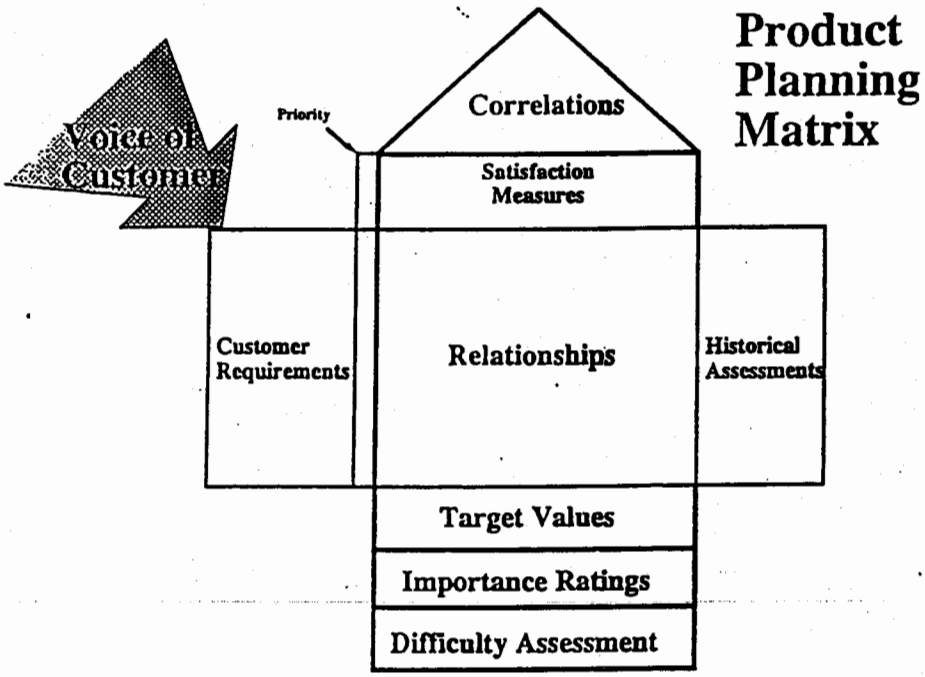
- CUSTOMER FEEDBACK UP FRONT
  - What's important
  - Relative ranking of the issues
- CUSTOMER PERCEPTION OF CURRENT PERFORMANCE
- FORMAL PROCESS FOR WHAT WE'VE DONE "HIT OR MISS" IN THE PAST
- CORRELATION MATRIX

KANO MODEL OF CUSTOMER SATISFACTION



QFD5.TAR

How QFD Works



Advantages

- Provides a Method for Structured Requirements Planning
- Increases Responsiveness to Customer Needs
- Reduces Cycle Time and Cost of New Designs
- Documents Product Planning Process
- Provides for a Common Understanding & Common Language throughout Organization

QFD Process (Phase I)

Step 1	Planning	•Identify customers & their representatives •Identify suppliers & their representatives •Identify QFD core team •Define the methods to be used to gather customer requirements
Step 2	Gather Customer Requirements	•Gather customer requirements along with source •List common definitions for customer requirements •Have customer prioritize requirements •Perform historical/competitive assessment (optional)
Step 3	Determine Satisfaction Measures	•Determine satisfaction measures •List common definitions for satisfaction measures
Step 4	Determine Target Values	•Determine target values for satisfaction measures •Assess feasibility of obtaining each target value
Step 5	Determine Relationships & Correlations	•Determine relationships between customers requirements & satisfaction measures •Determine correlations among satisfaction measures (optional)
Step 6	Calculate Importance Ratings	•Calculate importance ratings for satisfaction measures •Calculate importance ratings for satisfaction measures weighted by feasibility assessment •Based on these ratings determine what satisfaction measures to carry on to next phase of QFD

DOE
b(3)

DOE
b(3)

~~UNCLASSIFIED~~
UNCLASSIFIED

DOE
b(3)

UNCLASSIFIED
~~UNCLASSIFIED~~

~~UNCLASSIFIED~~
UNCLASSIFIED

DOE
b(3)

UNCLASSIFIED
~~UNCLASSIFIED~~

~~UNCLASSIFIED~~
UNCLASSIFIED

DOE
6(3)

UNCLASSIFIED
~~UNCLASSIFIED~~

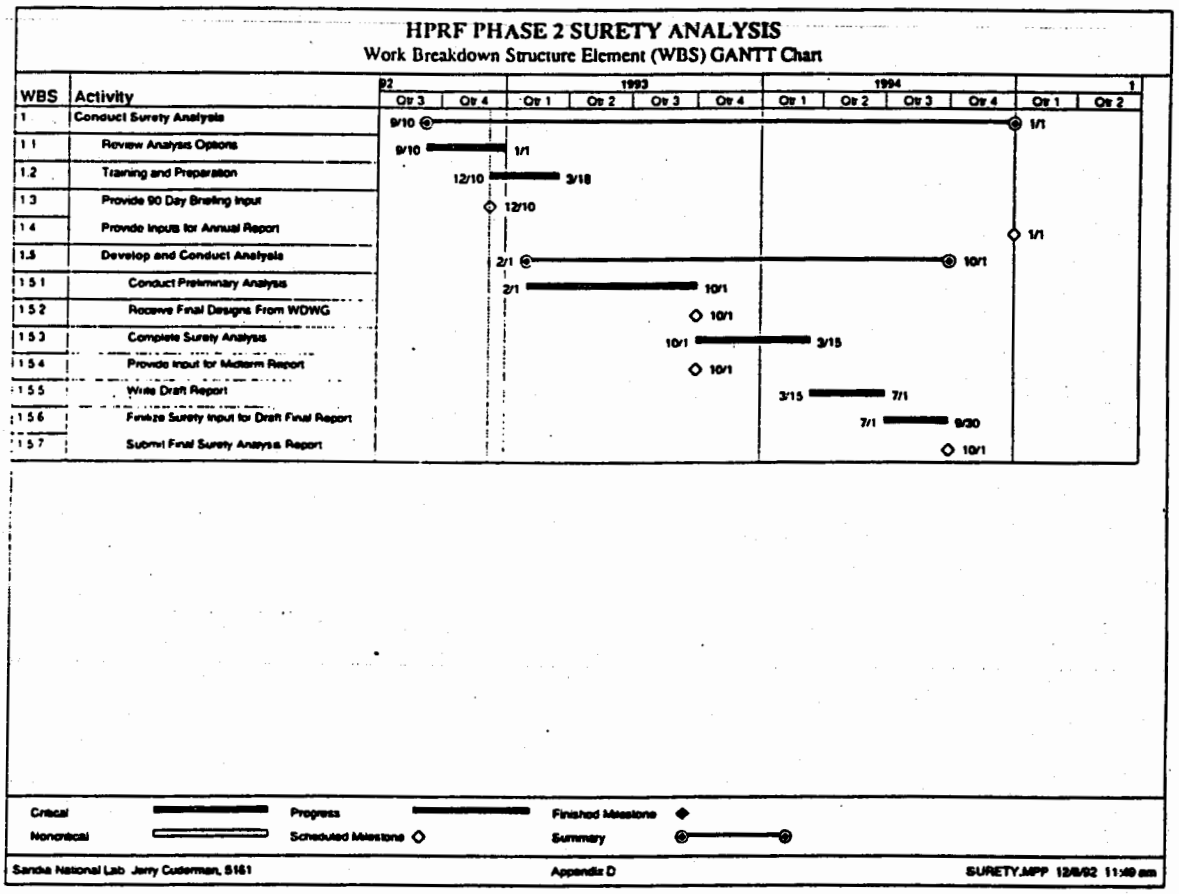
b(3)

DOE, USN
DTRA

DISCUSSION

PROPOSED KEY TASKS FOR SWG

- Evaluate WH Candidates using QFD
  - Limit Participation to SWG Members
  - All Part icipants be QFD Trained
  - Limited Scope of Study
- Evaluate Final WH Candidates using Fault Tree Analysis (Limited PRA)
- Conventional Surety Evaluation



~~UNCLASSIFIED~~
UNCLASSIFIED

ACTION ITEMS for SWG Members

- Return Comments on Gantt Chart
- Return Comments on Proposed Tasks
- Provide Name(s) for QFD Course
-
- Deadline for Action Items : 12-18-92

USAF
b(.)

UNCLASSIFIED
~~UNCLASSIFIED~~

(This page intentionally left blank)

APPENDIX D

(U) SYSTEM ENGINEERING WORKING GROUP

USAF
b(1)

(This page is unclassified)

[redacted] UNCLASSIFIED

SEWG Status Report

High Power Radio Frequency Weapon Phase 2 Study

USAF
b(1)

9-11 December 1992
Sandia National Labs
Albuquerque, NM

b(3)

DOE, USAF, DTRA

UNCLASSIFIED

[redacted]

b(3)

SEWG Briefing

AF Action Items

Don Shover
TRW
San Bernadino CA

9-11 December 1992
Sandia National Labs
Albuquerque, NM

BMO RESPONSE TO ACTION ITEMS

10 DEC 1992 DON SHOVER TRW

RWG A.I. 92-1-2

THE BALLISTIC MISSILE OFFICE NEEDS TO DETERMINE THE MAXIMUM ALLOWABLE WEIGHT FOR THE HPRF WARHEAD BASED ON THE LIMITS OF THE MM III PLATFORM

USAF
b(1)

HPRF PHASE 2
A.I. #20

PROVIDE PARAMETERS OF THE MM III AS A DELIVERY VEHICLE USING AN HPRF DEVICE TO THE SEWG/RWG.

USAF
b(1)

b(3)

b(1)
b(3)

DOE, USAF
DTRA

[redacted] UNCLASSIFIED

SEWG Briefing

Phase 1 Warhead Layouts

Charles T. S. Chow
Lawerence Livermore
National Lab

9-11 December 1992
Sandia National Labs
Albuquerque, NM

b(3)

UNCLASSIFIED

[redacted]

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

SEWG Briefing

Paste Extrudable Explosive Booster Technology

Linn Derickson
Sandia National Labs
Livermore, CA

9-11 December 1992
Sandia National Labs
Albuquerque, NM

b(3)

DTRA

b(3)

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

Attendance List
Joint Surety/Systems Engineering Working Group Meeting -- December 10, 1992

CDR Walker	FCDNA
D. Ericksen	OO-ALC
LCDR Ade	FCDNA
Capt Morgan	HQACC
C. Chow	LLNL
D. Shover	TRW
M. Haertling	LANL
J. Cuderman	SNL
M. Martinez	LANL
R. Okagawa	LANL
L. Derickson	SNL
R. Keyser	LANL
J. Mercer-Smith	LANL
J. Hogan	SNL
K. Oishi	SNL
J. Gazda	HQDOE
D. Wojotowicz	LLNL
F. Dean	SNL
D. Sanders	BMO
E. Rolfs	OL-NS
T. Fattor	OL-NS
D. Huie	ARDEC
LTC Kropf	OAS
K. Rueb	DOE/AL
C. Mangeng	LANL

b(3)

DOE, USAF

b(3)

DOE, USAF, DTRA

(This page intentionally left blank)

b(3)

USAF

DOE, DTRA

b(3)

DOE, USAF, DTRA

b(3)

b(3)

(This page intentionally left blank)

APPENDIX F

(U) WARHEAD DESIGN WORKING GROUP

[redacted]

USAF
b(1)

(This page is unclassified)

APPENDIX G

(U) MISSION ANALYSIS WORKING GROUP

(This page is unclassified) USAF b(1)

[redacted]
~~UNCLASSIFIED~~
UNCLASSIFIED

MISSION ANALYSIS WORKING GROUP

USAF
b(1)

OVERVIEW

- Activities Since Last Meeting
- Mission Need Statement
- Modeling Efforts
- Action Items

UNCLASSIFIED
[redacted]
~~UNCLASSIFIED~~

Activities Since Last Meeting

- CMT Workshop
- MNS Progress
- Modeling Progress

Mission Need Statement

- Validate Need
- Threat Analysis
- Mission Area Analysis
- Write MNS

Modeling Efforts

- Progress (Lt VanVeldhuizen Briefing)
- Funding

b(3)

DOE, USAF
DTRA

~~UNCLASSIFIED~~

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

~~UNCLASSIFIED~~

DOE, USAF, DTRA

b(3)

UNCLASSIFIED

HPRF PHASE II MAWG

MAWG MILESTONES

- 11 DEC 92 - APPROVE MODELING PRIORITIES
- 11 DEC 92 - APPROVE SPECIFIC SIMULATION FOR PENETRATION MISSION
- 1 FEB 93 - IDENTIFY FUNDING SOURCES
- 1 MAR 93 - IDENTIFY AGENCY(IES) TO PERFORM PENETRATION MODELING
- 1 APR 93 - BEGIN PENETRATION MODELING
- 1 APR 93 - IDENTIFY AND APPROVE SIMULATIONS FOR OTHER MISSIONS
- 1 MAY 93 - IDENTIFY AGENCY(IES) TO PERFORM OTHER MISSION MODELING
- 1 JUN 93 - BEGIN OTHER MISSION MODELING

Action Items

- Deconfliction Issue
- Design Preference
- Working Group Representatives
- MNS
- Test Objects Alignment With Modeling
- Modeling Function Efforts
- Notify Test Subgroup When Modeling Subgroup Meets

(This page intentionally left blank)

APPENDIX H

(U) VULNERABILITY WORKING GROUP

[ ]

(This page is unclassified)

USAF
b(1)

b(3

DOE, USAF, DTRA

[redacted]

UNCLASSIFIED

UNCLASSIFIED

[redacted]

DOE, USAF
b(3)

DOE, USAF, DTRA
b(3)

b(3)

DOE, USAF

List of workshop participants

Philip Angelotti	ARDEC/SMCAR-FSS-E
LTC Walter L. Atchison	DNAFC/FCPRA
Captain Roy M. Bohnert	FASTC/TATD
Thomas M. Boyd	FASTC/TABS
Hriar S. Cabayan	LLNL/L-81
J. Philip Castillo	Logicon – RDA, Albuquerque
Elizabeth L. (Betsy) Doherty	FASTC/TABS
David M. Fordham	SNL, Albuquerque/Dept. 4113
James M. Hoffman	SNL, Albuquerque/Dept. 1208
James R. Hogan	SNL, Livermore/Dept. 5371
Lt. William D. Hopkins	FASTC/TABB
Lt.Col. Wayne M. Johnson	USSTRATCOM/J5232
Captain Christopher M. Kalivoda	FASTC/TABS
Major Charles C. Kinkead	HQ, ACC/DONB
Captain William A. Lamb	OAS/XRN
Captain Brian A. Larkin	FASTC/TABG
Clifton H. McAuley	FASTC/TABB
Lt. William L. McGraw	FASTC/TABS
Captain John C. (Chris) Powell	HQ, ACC/DONM
Major Kevin T. Reilly	HQ, ACC/DONB
Joseph A. Sefcik	LLNL/L-22
Fred A. Swanson	FASTC/TABG
Thomas F. Tingley	FASTC/TACS

b(3)

DOE, USAF

Review procedure

- Report faxed/mailed to
  - FASTC
  - USSTRATCOM
  - HQ ACC
  - Air Staff
  - PL
- Review meeting held at PL on December 9, 1992

b(3)
b(1)

DOE, USAF, DTRA

, USAF
b(1)

b(3)
b(1)

DOE, USAF,
DTRA

b(3)

DOE, USAF, DTRA

[redacted]

UNCLASSIFIED

b(3)

UNCLASSIFIED

[redacted]

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

DVE

b(3)

DOE, USAF

b(3)

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

DOE, USAF, DTRA

b(3)

b(3)

DJE, USA
DTRA

b(3)

DTRA

DOE, USAF

b(3)

DUSAF

→ DOE, DTRA

b(3)

DOE, USAF
DTRA

b(3)

DOE,
USAF
DTRA

b(3)

→USAF

→DOE

b(3)

→ USAF

b(3)

→ DOE, DTRA

USAF

b(3)

USAF

b(3)

DOE, DTRA

→USAP

b(3)

→DOE, DTRA

b(3)

DOE, USAF
DTRA

b(3)

USAF

DOE
DTRA

(This page intentionally left blank)

Distribution List

1 AFISA/INAW
Attn: Capt Matt Baker
The Pentagon
Washington DC 20305-1000

2 Army
Attn: Mr Philip Angelotti
ARDEC SMCAR-FSS-E
Picatinny Arsenal NJ 07806-5000

3 ATSD(AE)
Attn: Lt Col Mike Crawford
The Pentagon Room 3C124
Washington DC 20301-5000

4 BMO/MYSC
Attn: Capt Dave Sanders

Norton AFB CA 92409-6468

5 DOE/AL-WPD
Attn: Mr Karl Rueb
PO Box 5400
Albuquerque NM 87185-5400

6 DOE/AL-NESD
Attn: Mr John Tribon
PO Box 5400
Albuquerque NM 87185-5400

7 DOE/HQ, DP-251
Attn: Mr Joe Gazda
PO Box A
Germantown MD 20874

8 FASTC/TASC
Attn: Lt Tom Tingley
4115 Hebble Creek Rd Suite 25
Wright-Patterson AFB OH 45433-5629

9 FCDNA/FCFA
Attn: LCDR Tom Walker
1650 Texas St SE
Kirtland AFB NM 87115-5616

10 FCDNA/FCPRA
Attn: Lt Col Walt Atchison
1650 Texas St SE
Kirtland AFB NM 87115-5616

11 FCDNA/FCSAC
Attn: LCDR Ed Ade
1650 Texas St SE
Kirtland AFB NM 87115-5616

12 HQ ACC/DONM
Attn: Maj Chris Powell
205 Dodd Blvd, Suite 101
Langley AFB VA 23665

13 HQ ACC/DRNB
Attn: Capt Mike Macagnone
204 Dodd Blvd, Suite 226
Langley AFB VA 23665

14 HQDNA/NOSA
Attn: Maj Art Wendel
6801 Telegraph Rd
Washington DC 22310

15 HQDNA/RAEE
Attn: Dr George Baker
6801 Telegraph Rd
Washington DC 22310

16 HQDNA/RAEE
Attn: CPT Mark Weitekamp
6801 Telegraph Rd
Washington DC 22310

17 Kaman Sciences
Attn: Mr Cliff De Jong
PO Box 7463
Colorado Springs CO 80933-7463

18 Lawrence Livermore National Laboratory
Attn: Mr Mike Bland
L-13 PO Box 808
Livermore CA 94550

19 Lawrence Livermore National Laboratory
Attn: Dr Hriar Cabayan
L-13 PO Box 808
Livermore CA 94550

20 Lawrence Livermore National Laboratory
Attn: Dr Al Kaufman
L-85 PO Box 808
Livermore CA 94550

21 Lawrence Livermore National Laboratory
Attn: Dr Mike Ong
L-153 PO Box 808
Livermore CA 94550

22 Lawrence Livermore National Laboratory
Attn: Dr Joe Sefcik
L-13 PO Box 808
Livermore CA 94550

23 Lawrence Livermore National Laboratory
Attn: Ms Deborah Wojtowicz
L-13 PO Box 808
Livermore CA 94550

24 Logicon/RDA
Attn: Mr Phil Castillo
PO Box 9377
Albuquerque NM 87119

25 Logicon/RDA
Attn: Dr Charles Mo
6053 W Century Blvd PO Box 92500
Los Angeles CA 90009

26 Los Alamos National Laboratory
Attn: Dr Michael Bernardin
X-5, MS B259 PO Box 1663
Los Alamos NM 87545

27 Los Alamos National Laboratory
Attn: Dr Ken Calahan
Mail Station 5000, AT-9, MS H818 PO Box 1663
Los Alamos NM 87545

28 Los Alamos National Laboratory
Attn: Mr Michael Heartling
Mail Station 5000, WX-1, MS C936 PO Box 1663
Los Alamos NM 87545

29 Los Alamos National Laboratory
Attn: Ms Carolyn Mangeng
Mail Station 5000, MS-F633 PO Box 1663
Los Alamos NM 87545

30 Los Alamos National Laboratory
Attn: Dr Manny Martinez
Mail Station 5000, MS C936 PO Box 1663
Los Alamos NM 87545

31 Los Alamos National Laboratory
Attn: Mr Ronald McFee
Mail Station 5000, MS-B220 PO Box 1663
Los Alamos NM 87545

32 Los Alamos National Laboratory
Attn: Dr J.A. Mercer-Smith
Mail Station 5000, MS-F634 PO Box 1663
Los Alamos NM 87545

33 Los Alamos National Laboratory
Attn: Mr Ed Whitted
Mail Station 5000, MS-F602 PO Box 1663
Los Alamos NM 87545

34 Navy
Attn: Mr Ben Wosoogh
SSP-27221
Washington DC 20376-5002

35 OL-NS/EN
Attn: Dr Kellerher
1651 First St SE
Kirtland AFB NM 87117-5617

36 OL-NS/ENN
Attn: Mr Elsworth Rolfs
1651 First St SE
Kirtland AFB NM 87117-5617

37 OO-ALC/LMAA
Attn: Mr Jim Oldham
6014 Dogwood Ave
Hill AFB UT 84056-5816

38 PL/WSA
Attn: Capt Luke Lorang
3550 Aberdeen St SE
Kirtland AFB NM 87117-5776

39 PL/WSM
Attn: Mr Sam Gutierrez
3550 Aberdeen St SE
Kirtland AFB NM 87117-5776

40 PL/WSM
Attn: Mr William Walton
3550 Aberdeen St SE
Kirtland AFB NM 87117-5776

41 PL/WSR
Attn: Mr Bill Prather
3550 Aberdeen St SE
Kirtland AFB NM 87117-5776

42 PL/WST
Attn: Lt Dave VanVeldhuizen
3550 Aberdeen St SE
Kirtland AFB NM 87117-5776

43 SAIC
Attn: Dr Cordelia White
10260 Campus Point Drive
San Diego CA 92121

44 SAF/AQQS(N)
Attn: Lt Col Armen Mardiguian
The Pentagon Room 4C258
Washington DC 20330-5040

45 SAF/AQQS(N)
Attn: Lt Col Charles Martin
The Pentagon Room 4C258
Washington DC 20330-5040

46 Sandia National Laboratories, NM
Attn: Mr John Andersen
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

47 Sandia National Laboratories, NM
Attn: Dr Jerry Cuderman
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

48 Sandia National Laboratories, NM
Attn: Dr Dave Fordham
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

49 Sandia National Laboratories, NM
Attn: Dr Kazuo Oishi
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

50 Sandia National Laboratories, NM
Attn: Dr Jim Solberg
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

51 Sandia National Laboratories, NM
Attn: Dr William Tedeshi
Org 5161 PO Box 5800
Albuquerque NM 87185-5800

52 Sandia National Laboratories, CA
Attn: Mr Doug Henson
Org 5371 PO Box 969
Livermore CA 94550

53 Sandia National Laboratories, CA
Attn: Dr Jim Hogan
Org 5371 PO Box 969
Livermore CA 94550

54 TRW Defense System Group
Attn: Mr Don Shover
PO Box 1310
San Bernadino CA 92402-5000

55 USCENTCOM/CCSA
Attn: Dr Earl Rubright

MacDill AFB FL 33608-7001

56 USSTRATCOM/J5243
Attn: Maj Tim Lampe
901 SAC Blvd Suite L-118
Offutt AFB NE 68113-6500

57 USSTRATCOM/J541
Attn: Mr Stan Gooch
901 SAC Blvd
Offutt AFB NE 68113-6500

58- OAS/XRN
65 Attn:
2350 Maxwell St
Kirtland AFB NM 87117-6008

(This page intentionally left blank)