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A-5:91-79(S) (SRD/CNWDI)  
December 16, 1991

# Potential NSNF Weapons Concepts for the 21st Century (U)

## Perspectives, Warhead Technologies, and Delivery System Concepts

Briefing to Joint Defense Policy Board/Defense Science Board Task Force on  
Non-Strategic Nuclear Forces  
December 17-18, 1991

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- 2A - J. S. Howard, A-5, MS F602
- 3A - T. P. Seitz, NWT-WP, MS F633
- 4A - CRM-4, MS A150
- 5A - A-5 File

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~~CRITICAL NUCLEAR WEAPON  
DESIGN INFORMATION - DCD  
DIRECTIVE 5210.2 APPLIES~~

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Title & Organization

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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
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## NSNF Briefing Overview

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### ***Perspectives-***

- Commitments to NATO
- Future 3d World Nuclear-Armed Adversaries
- Instability & Spillovers from Soviet Union Dissolution
- Deterrence & Insurance over Far-Term of 50+ Years

### ***Warhead Technologies-***

- Safety Enhancements
- Flexible and Modular Designs:
  - Fieldable Prototypes
- Low Yield Designs

### ***Delivery System Concepts -***

- Stealthy Stand Off Bomb
- Tactical Earth Penetrating Weapon
- Convertible Torpedo
- ASRAM
- Air-Launched Precision Strike Weapon

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## Perspectives on NSNF - I

### **WHY: *Forward-Deployed Commitments to NATO***

- Preclude Proliferation via Extended Deterrence Guarantees and Programs of Cooperation
- Ensure Deterrence as Weapons of Last Resort
- Promote Stability with US Presence in Post-Cold War Europe

### **HOW:**

100s of Air-Delivered Systems in Europe

### **TECHNOLOGIES:**

B61 Stockpile Improvement Programs  
New Delivery Concepts

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## Perspectives on NSNF - II

### **WHY: *Deterrence of Future 3d World Nuclear States***

- Provide Credible Regional Deterrence with Appropriate Options
- Preclude Sanctuary to Nuclear-Armed Leadership
- Protect Deployed US Forces

### **HOW:**

**CONUS Contingency Force of Low Yield Systems**

### **TECHNOLOGIES:**

**Very Low Yield Earth Penetrator Weapon  
Low Yield Anti-Theater Ballistic Missile  
Low Yield Air-Delivered Stand-off Missile**

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## Perspectives on NSNF - III

### **WHY: *Insurance to Counter Post-USSR NSNF***

- Counter Russian Civil War Spillovers and Loss of Central Nuclear Control
- Deter Resurgent Russian Imperialism Armed with Nuclear Weapons

### **HOW:**

**Air-Delivered Weapons in Europe**

**CONUS Air- & Sea-Launched Forces**

### **TECHNOLOGIES**

**Common Strategic & Non-Strategic  
Stand-off Air Munition**

**Maritime Bomb & ASW Options**

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## Perspectives on NSNF - IV

### **WHY: *Stability, Insurance, Deterrence over the Far Term***

- Proliferation Control through Extended Non-Strategic Deterrence
- Balance "Pre-Strategic", "Sub-Strategic", and Tactical Weapons Possessed by Other Industrial Nations
- Guard against Technological Surprise in Unpredictable Future

### **HOW:**

Limited Builds and Prototyping  
Maintenance of Core Competence

**TECHNOLOGIES**  
Supersafe Designs  
Advanced Designs & Materials

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*Perspectives:*

**The President's Initiatives will Change the Deterrent,  
Challenge the Complex, and Demand a New Role  
and Impact from RD&T**

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- Stand-down of many alert forces
- Environmentally sound, low-cost destruction of many weapons, with few new builds
- Dramatic reductions in deployed US and Soviet weapons, plus increased concern for weapons and SNM in post-USSR and other countries
- Deterrence, role of nuclear weapons will evolve
  - Some current weapons will be adequate for the near-term, others will not, BUT

*Nuclear Deterrence Remains a Cornerstone of  
National Security Policy*

**Nuclear Warhead Technologies will Remain an Important  
Component of Evolving National Strategies**

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

**Enhanced Surety in a Graded Approach:  
a Guiding Principle will be  
Stockpile Stability for 50+ Years**

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**We Will Emphasize:**

- A "Common Pit" for the B61 and W80 families providing IHE, fire resistance, pit reuse, and other features such as laser initiation
- Small Builds and Fieldable Prototypes
- Supersafe primary designs, e.g., a Pu-free primary for the ALCM/ACM, B61
- A new IHE (LAX-112) with energy density nearly equal to conventional high explosive
- Predictive capability for nuclear safety in abnormal environments

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**Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes**

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)  
EXAMPLE: CONVERSION OF W91 TECHNOLOGY FOR MULTIUSE**

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**\* Goal: Sandia, Los Alamos, and the production agencies develop and prototype a warhead system and modern primary with enhanced surety features and ES&H compliant safing, arming and firing technologies for future SIPs and warhead development programs**

- B61-3/4/10
- Stand-off Bomb
- Dual Capable Bomb
- Tactical Air-to-Surface Missile
- Minuteman III Missile
- HPRF

**\* Major Tasks**

- Integrate System Requirements
- UGT Demonstration
- Establish Environmental Capability
- Produce Functional Proof-of-Concept Hardware
- Establish Production Processes

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)  
APPLICATIONS**

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)  
FEATURES**

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

## **Deterrence by Capability: Fieldable Prototypes and Small Builds – A new concept for consideration**

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### **Why?**

- **Flexible response in a changing world**
  - Future builds will not be as large as before
  - Broader military requirements
- **DoD thinking provides the technological imperative**
  - How to maintain the defense industrial base
  - Change the culture from "big program" = success
  - R&D has big role in "deterrence by capability" and in reconstitution
- **Linkage with future of DOE Infrastructure**
  - Smaller, more flexible complex
  - Small builds and fieldable prototypes help maintain capability between larger production runs

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*Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes*

## Pu-Free Design Concept -- A Supersafe Initiative (U)

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*Warhead Technologies: Low Yield Designs*

**Very-Low-Yield Nuclear Weapons could be very effective  
and credible counters against future third world nuclear threats**

- 10-ton EPW
  - Hold buried C3 at risk
  - Neutralize MOBs by cratering runways
  - Collateral damage very localized
  
- 100-ton ATBM warhead
  - Destroy nuclear, biological, or chemical warheads in flight
  
- 1000-ton battlefield weapon
  - Deter use of mass destruction weapons by third world nations
  - Destroy company-sized units in overrun scenarios

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*Warhead Technologies: Low Yield Designs*

# W86 PERSHING II EARTH PENETRATOR

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*Warhead Technologies: Low Yield Designs*

## W33 AFAP Modified into a Tactical Low Yield Earth Penetrating Weapon

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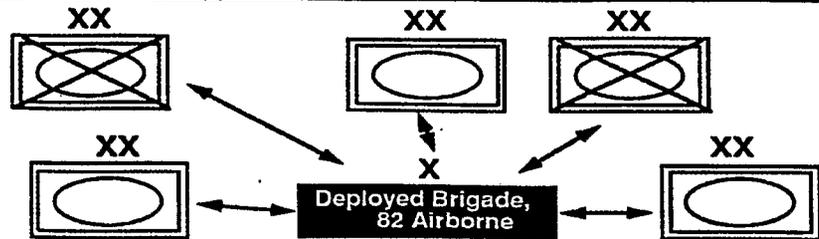
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*Warhead Technologies: Low-Yield Designs*

**A Low Yield Air-Launched Weapon Could Provide  
Capability to Prevent Overrun of Our Early Entry Forces**

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## **Hundreds of NSNFs Should Be Maintained and Modernized Within New US National Strategies**

**As the US Downsizes its Military and Nuclear Warhead Stockpiles, a Nuclear Force Other Than Strategic Weapons Is Needed –**

- For NATO forward-deployment
- To deter future nuclear-armed third world adversaries
- To guard against Russian instabilities, and post-USSR relapses and regional spillovers
- For far-term deterrence & insurance

**The Nuclear Weapons Laboratories Must Maintain a Broad Level of Competence to Support Future NSNF Needs**

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# Laboratory/DOE Briefing on December 17, 1991, to Joint DPB/DSB Task Force on Non-Strategic Nuclear Forces

## Attending Members of Task Force

- GEN John W. Vessey, USA, Ret (Former CJCS)
- Dr. Joseph V. Braddock (BDM Intl)
- GEN Andrew J. Goodpaster, USA, Ret (Former USAREUR CDR)
- ADM Huntington Hardisty, USN, Ret
- Dr. Charles A. McDonald
- GEN Donn Starry, USA, Ret
- Ambassador Seymour Weiss

Other Task Force Members: Dr Harold Agnew, Prof Graham Allison, GEN James Dalton USAF Ret, GEN Russel Dougherty USAF Ret, Dr Albert Narath, Dr James Roche

## Government Task Force Representatives

- Dr. Robert Barker (OATSD-AE)
- Dr. Everett Beckner (DOE)
- Mr. William Kahn (OSD/TNF)
- MGEN Gerald G. Watson (CDR DNA)

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*B. J. Hinkle* DO, DATE: *7/2/09*  
 23 pp.

**PURPOSE:** To brief DOE Laboratories Warhead & Delivery System Technologies for Task Force consideration and use to Secretary Cheney. Expanded to include Perspectives on NSNF Roles.

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## Laboratories Personnel at Briefing

Los Alamos: Tom Seitz, Frank Smith, Joe Howard

Sandia Albuquerque: Jack Werth, John Anderson

Lawrence Livermore: Kent Johnson

DOE Headquarters: Ev Beckner

Two Hour Briefing:

1. Los Alamos: Introduction, NSNF Roles, Nuclear Warhead Technologies (Common Pit, Multiple-Application Surety Technology, Fieldable Prototypes, Supersafe Designs, Low Yield Designs-- EPW, Battlefield Deterrence)
2. Livermore: NSNF Nuclear Warhead Applications & Effects (EMP, TBMD, Low Yield EPW)
3. Sandia: NSNF Delivery System Concepts (Stealthy Stand-off Bomb, Tactical EPW, Convertible Torpedo, ASRAM, Air-Launched Precision Strike Weapon), Summary
4. DOE: Future Production Complex

## Back-Channel Responses

### December 17 Laboratories Briefing:

- Excellent, Superb
- Viewgraphs wanted by Task Force

### December 19 Task Force with SecDef Cheney<sup>e</sup>:

- Unusual two-hour session, very well-received
- Used Laboratory VGs
- SecDef remains committed to an NSNF capability
- Task Force to prepare report and remain as body for further work



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