Mr. Gerard Smith

Briefing for Secretary Dulles (14:30 - 1 Apr. 57)

NUCLEAR WEAPONS (45 minutes) Dry Run - (14:00 - 29 Mar. 57)

I. Basic Nuclear Types

A. Fission

1. Gun-Assembly

2. Implosion

B. Thermonuclear

(Brief description of principles of operation and components of nuclear systems)

II. Non-Nuclear Characteristics

A. Fuzing

1. Varying Requirements

2. Types - Baro, Radar, Timer, Contact

B. Power Supply

C. Warhead Mounting Hardware

(Brief description of these components and why needed)

III. Presently Stockpiled Weapons

A. Implosion

B. Gun-Assembly

C. Thermonuclear

(Above described as to nomenclature, size, weight, yield and applications)

IV. Future Weapons

A. Weapons Under Development

B. Weapons Under Study

(Same as in III above for known factors)

V. Comparison of Certain Weapon Parameters

Illustrations of relationships between nuclear cost, yield, weight and diameter by discussion of appropriate graphs

- Fireball - thermal radiation

27 March 1957

WEAPONS EFFECTS BRIEFING FOR
UNDERSECRETARY OF STATE

OUTLINE

I. INTRODUCTION -- 5 minutes

A. Connect to previous briefing on Weapons Development.

B. Give scope of briefing

1. What happens when a nuclear weapon explodes - nuclear radiation, thermal radiation, blast, fall-out.

2. The different types of bursts - air, surface, subsurface, and underwater.

3. Vulnerability of persons and inanimate targets to the effects of the weapon.

4. Dependence of the effectiveness of blast, nuclear radiation, thermal radiation, and fall-out on the yield.

5. A brief word about protective measures.

6. Areas to be investigated in future tests.

II. EXPLOSION OF A NUCLEAR WEAPON -- 10 minutes.

A. Description of explosion.

B. Partition of energy.

C. Definition of physical effects.

1. Fireball - thermal radiation.

2. Nuclear radiation.

3. Blast wave.

4. The cloud (fallout.)

OUTLINE (Contd.)

D. Types of burst and their relation to these effects

1. Air burst.

a. No fall-out.

b. Optimize blast effects by formation of Mach wave.

c. More direct thermal and nuclear radiation.

2. Surface burst.

a. Cratering effect.

b. Maximizes fall-out.

c. Obtains higher ground pressures.

d. Decreases initial nuclear and thermal.

III. VULNERABILITY OF INANIMATE TARGETS -- 10 minutes

A. Blast

1. Primary destruction agent.

2. Explanation of effect of blast wave on target.

3. Examples - (20 KT vs 20 MT).

a. Overpressure sensitive target, brick apartment building.

b. Drag sensitive target - bridge.

B. Thermal radiation

1. Damage caused by fires.

2. Examples of ignition energies for typical fuels, wood, paper.

C. Nuclear radiation - Little effect on mast inanimate targets.

1. Special case - warhead vulnerability

D. Fall-out - Little effect on inanimate objects except to deny their use because of contamination problem.

E. Crater - Very hard targets - Compare 20 KT & 20 MT

OUTLINE (Contd.)

IV. Vulnerability of Humans - 10 minutes

A. Initial nuclear radiation

1. Immediate casualty effects "Combat Ineffective."

2. Long range effects.

3. Comparison of radii of effect for 450 Rem 20 KT and 20 MT weapons.

B. Fall-out

1. Local fall-out.

a. Description of mechanism

b. Biological hazard, short range and long range.

c. Comparison of fall-out patterns for 1 KT and 1 MT weapon.

2. World-wide fall-out.

a. Explanation.

b. Biological effect.

C. Thermal radiation.

1. Biological effect - "Combat Ineffective."

2. Comparison of radii of effect of 20 KT and 20 MT air burst.

D. Blast

1. Least significant casualty producer for shielded personnel.

2. Dynamic pressure effect.

3. Missile effect.

V. PROTECTIVE MEASURES - 5 minutes

A. Nuclear radiation - prompt and residual.

1. Shielding factors.

2. Decay rate.

B. Thermal - cover.

C. Blast - shielding from dynamic effects.

OUTLINE (Contd.)

VI. SUMMARY -- 5 minutes

A. Review effects.

1. Blast - primarily inanimate targets.

2. Thermal - both inanimate and humans.

3. Nuclear - prompt and residual.

a. Primarily personnel hazard.

b. Can deny use of inanimate objects.

B. Chart of radii of effects on Washington and vicinity.

C. Areas to be investigated in future tests.

1. High altitude effects.

2. Very high pressure.

3. Attenuation of thermal radiation.

4. Fall-out.

Summary - Gen. Lapsley - (15 minutes)

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