

Nuclear Weapons – Antithesis of International Law?

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“Nuclear weapons, the ultimate evil, destabilize humanitarian law which is the law of the lesser evil. The existence of nuclear weapons is therefore a challenge to the very existence of humanitarian law...Nuclear war and humanitarian law seem by consequence to be two antitheses which exclude each other radically, the existence of the one necessarily supposes the inexistence of the other.”

Declaration of Mohammed Bedjaoui, President, International Court of Justice, 1996
(emphasis in original)

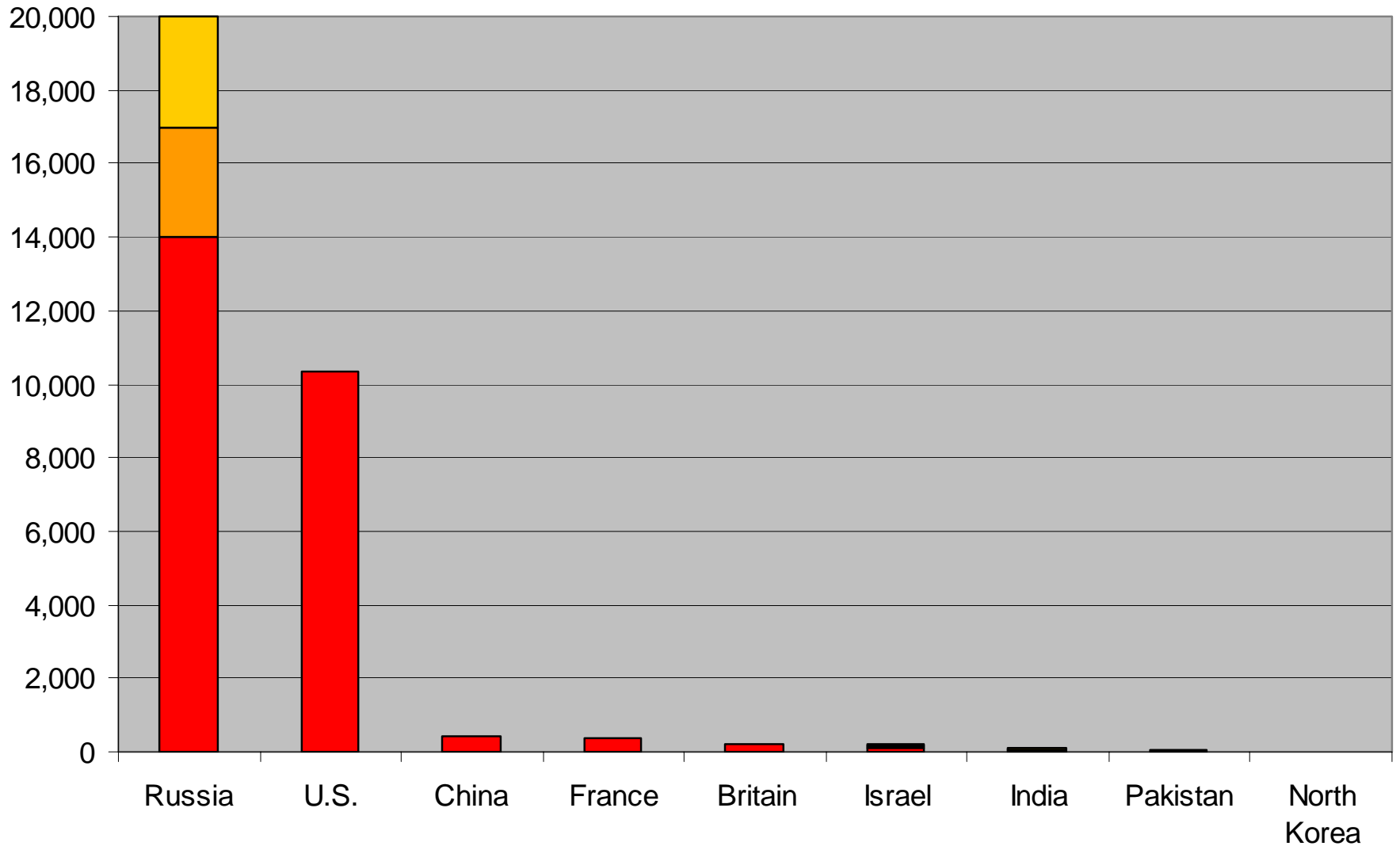


Greg Mello
Los Alamos Study Group
February 28, 2005

Nuclear weapon stockpiles, latent capabilities & aspirations

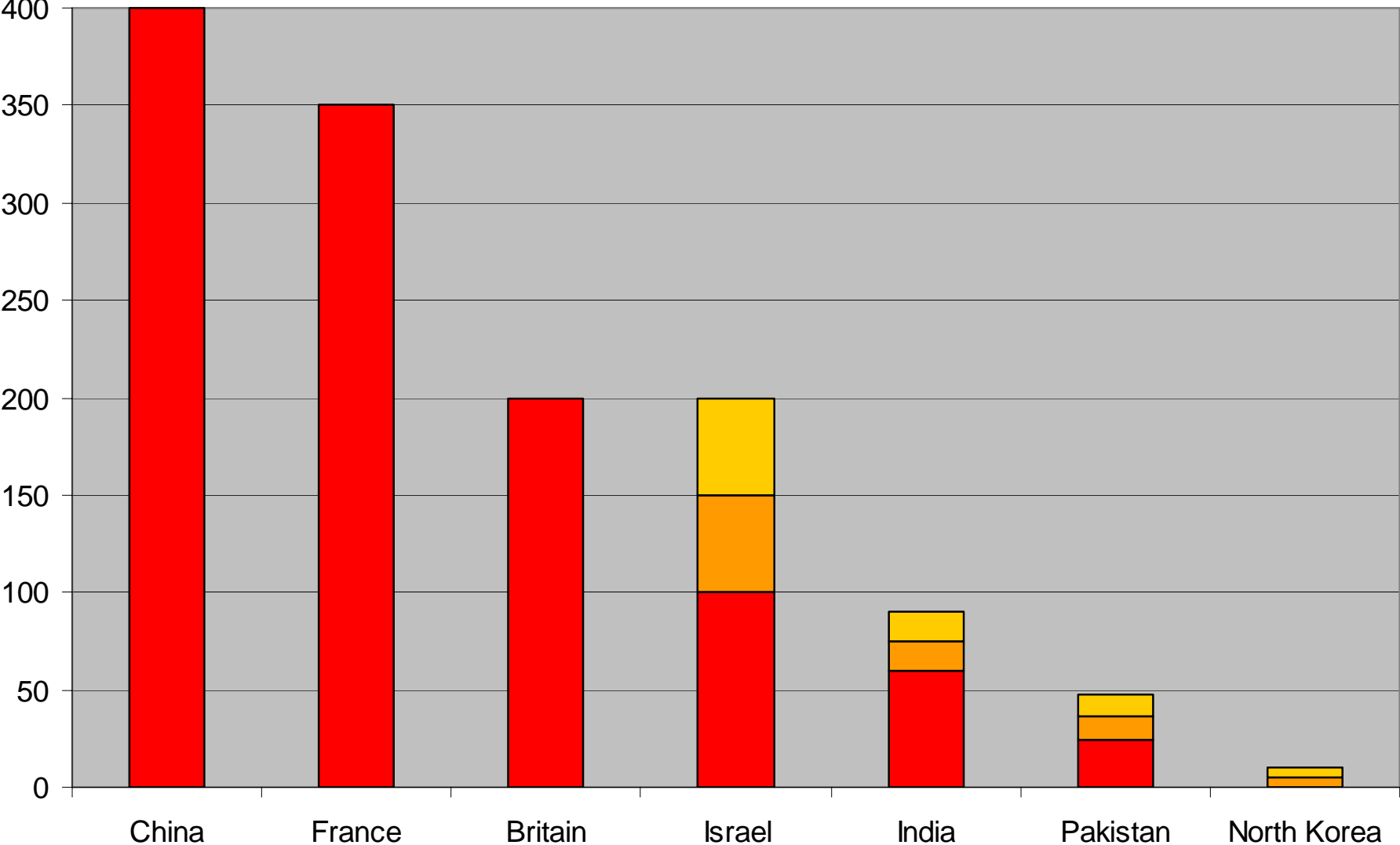
- *Weaponized stockpiles: 9 countries, ~25,000 to ~32,000 weapons*
 - *5 countries in NPT (“P5”): ~28,300 ± ~3,000 weapons (99%)*
 - *4 countries not in NPT: ~266 ± ~82 weapons (1%)*
 - *Weapons vary much more greatly in capability than devices*
 - *.*
- *Latent capabilities (a few dozen countries, some more than others):*
 - *Many countries own or control more than ~4 kg Pu (reactor-grade or weapons-grade; min. needed ~ 1 kg) or ~20 kg HEU. (Also: Np.)*
 - *Other countries could produce these materials if they chose.*
- *Aspirations: Some countries may have active nuclear weapon aspirations or seek latent capability; some non-state criminal organizations seek weapons, materials, know-how, and radiotoxins.*

World Nuclear Arsenals, 2004



Sources: NRDC, FAS, GlobalSecurity.org, others

World Nuclear Arsenals (Other Than U.S. and Russia), 2004



Sources: NRDC, FAS, GlobalSecurity.org, others

U.S. Nuclear Arsenal, 2004

| Type | Name | Launchers | Year deployed | Warheads x yield (kilotons) | Warheads active/spares | Reserve/Inactive | Possible Yield (kilotons) |
|----------------------------------|----------------------|---------------|---------------|----------------------------------|------------------------|------------------|---------------------------|
| ICBMs | | | | | | | |
| | Minuteman III | | | | | | |
| | Mk-12 | 150 | 1970 | 1 W62 x 170 | 150 | | 25,500 |
| | Mk-12 | 50 | 1970 | 3 W62 x 170 (MIRV) | 150/15 | 285 | 76,500 |
| | Mk-12A | 300 | 1979 | 3 W78 x 335 (MIRV) | 900/20 | 60 | 328,300 |
| | MX/Peacekeeper | 29 | 1986 | 10 W87 x 300 (MIRV) | 290/50 | 160 | 150,000 |
| | <i>Subtotals</i> | <i>529</i> | | | <i>1,490/85</i> | | <i>580,300</i> |
| SLBMs | | | | | | | |
| | Trident I C4 | 72/3 | 1979 | 6 W76 x 100 (MIRV) | 432 | | 43,200 |
| | Trident II D5 | 288/12 | | | | | |
| | Mk-4 | | 1992 | 8 W76 x 100 (MIRV) | 1,920/156 | 550 | 262,600 |
| | Mk-5 | | 1990 | 8 W88 x 475 (MIRV) | 384/16 | | 190,000 |
| | <i>Subtotals</i> | <i>360/15</i> | | | <i>2,736/172</i> | | |
| Bombers | | | | | | | |
| B-52 | Stratofortress | 94/56* | 1961 | ALCM/W80-1 x 5–150 | 430/20 | 880 | 199,500 |
| | | | | ACM/W80-1 x 5–150 | 430/20 | | 67,500 |
| B-2 | Spirit | 21/16 | 1994 | B61-7, -11, B83-1 bombs | 800/45 | 455 | 982,000 |
| | <i>Subtotals</i> | <i>115/72</i> | | <i>(350 and 1,200 kt, resp.)</i> | <i>1,660/85</i> | | |
| Non-strategic forces | | | | | | | |
| | Tomahawk SLCM | 325 | 1984 | 1 W80-0 x 5–150 | 320 | | 48,000 |
| | B61-3, -4, -10 bombs | n/a | 1979 | 0.3–170 | 800/40 | 210 | 178,500 |
| | <i>Subtotals</i> | <i>325</i> | | | <i>1,120/40</i> | | |
| Grand total** | | | | | ~7,000/382 | | |
| | | | | W84 (150kt) | | 400 | 60,000 |
| Total reserve/inactive | | | | | | 3,000 | |
| Grant total with reserves | | | | | | 10,382 | 3,191,900 |

Total explosive yield ~ 1,064 World War II's (@ ~ 3 MT)

Sources: NRDC, variously

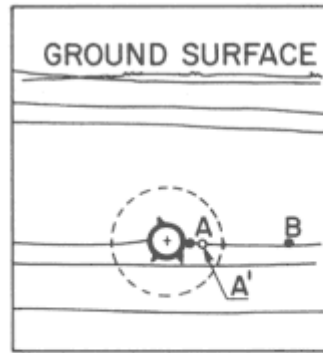
Projected U.S. Nuclear Stockpile, 2012 (NRDC)

| Warhead | | Number | Yield (kt) | Total Yield (kt) |
|--------------|------|--------------|------------|------------------|
| W78 | ICBM | 400 | 335 | 134,000 |
| W87 | ICBM | 545 | 300 | 163,500 |
| W76 | SLBM | 1,840 | 100 | 184,000 |
| W88 | SLBM | 400 | 475 | 190,000 |
| B61-3 | Bomb | 200 | 170 | 34,000 |
| B61-4 | Bomb | 200 | 170 | 34,000 |
| B61-7 | Bomb | 430 | 350 | 150,500 |
| B61-10 | Bomb | 180 | 170 | 30,600 |
| B61-11 | Bomb | 35 | 350 | 12,250 |
| B83-0/1 | Bomb | 625 | 1,200 | 750,000 |
| W80-1 | CM | 825 | 150 | 123,750 |
| W80-0 | CM | 265 | 150 | 39,750 |
| Total | | 5,945 | | 1,846,350 |

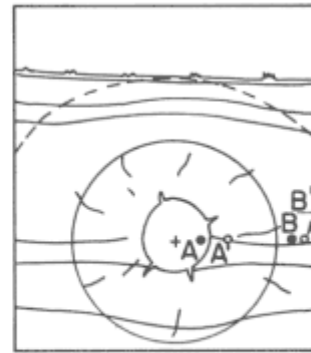
The (classified) stockpile plan is not bound by treaty or congressional act.
It includes major qualitative “upgrades.”

Case Study: Earth-Penetrating Nuclear Weapons ("Bunker Busters")

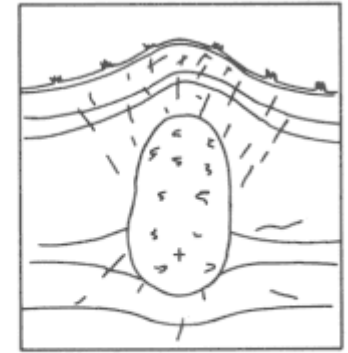
Despite unlearned claims that these weapons destroy mostly by underground shock, they in fact primarily destroy by cratering – by lifting and breaking.



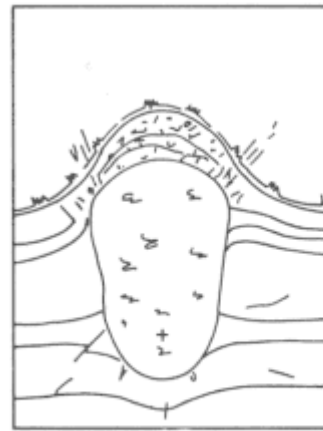
(a)



(b)



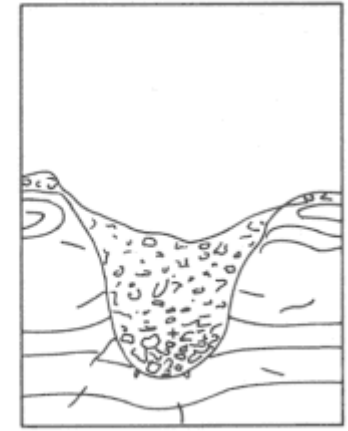
(c)



(d)



(e)



(f)

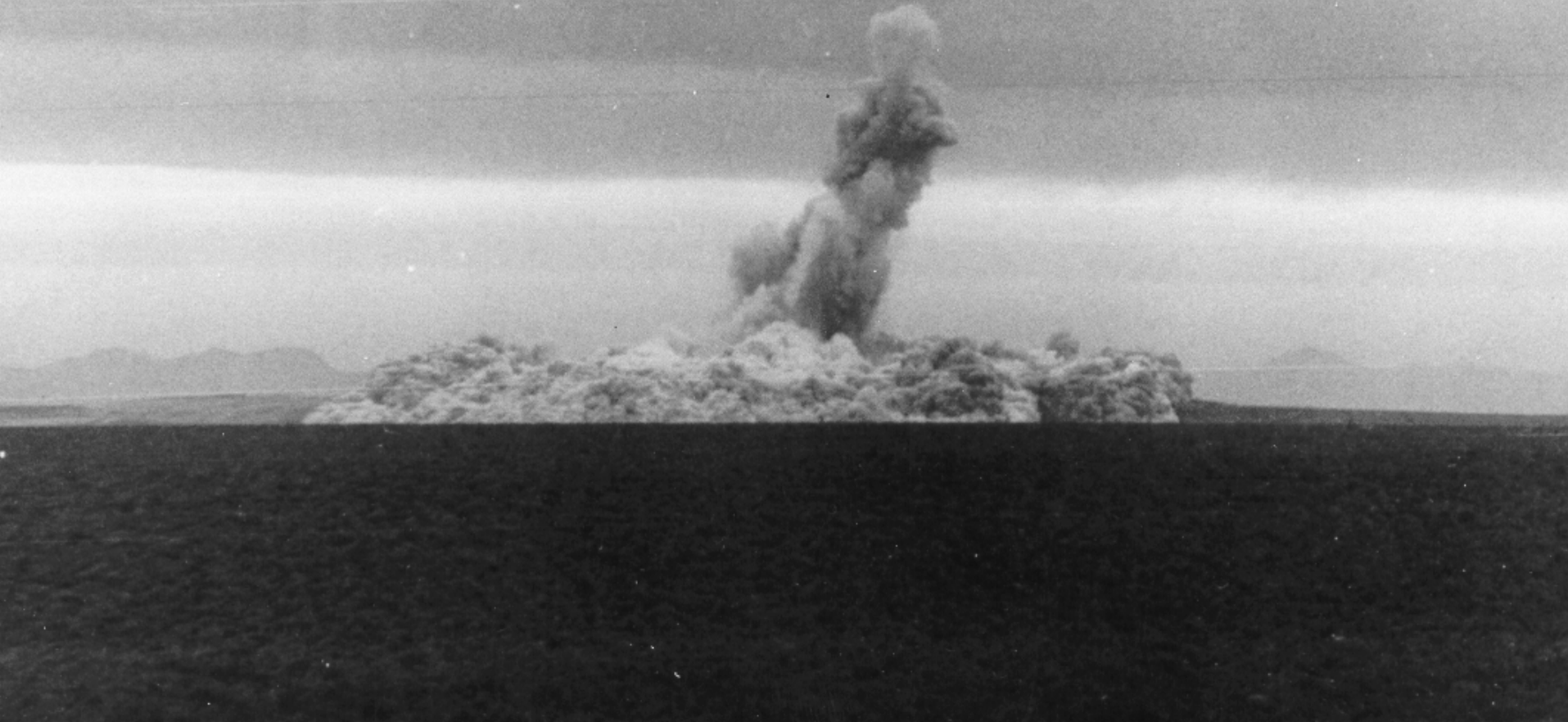
Radioactive Base Surge
Formation from Low-Yield,
Shallowly-Buried, Nuclear
Explosion



Sedan Shot:
High-Yield
(104 Kilotons),
Deeply-Buried
(635 ft;
alluvium)



Cabriolet – Base Surge
(2.3 kilotons; 170 ft deep; rhyolite)



[Sedan movie]



Hypothetical
Iraqi Nuclear
Targets –
Mix of Urban,
“Remote”





0 5 Kilometers
0 5 Miles

Tigris

Nahr Di

BAGHDAD

AL KAZIMIYAH

AL A'ZAMIYAH

SHAYKH HAMID

Muthanna Airport
(military)

Central
Railroad
Station

International Communications Center

Palestine Hotel
Sheraton Hotel

Presidential Palace

AL KARKH

AR RASAFAH

Target 2

US Embassy
(closed)

Baghdad
Univ.

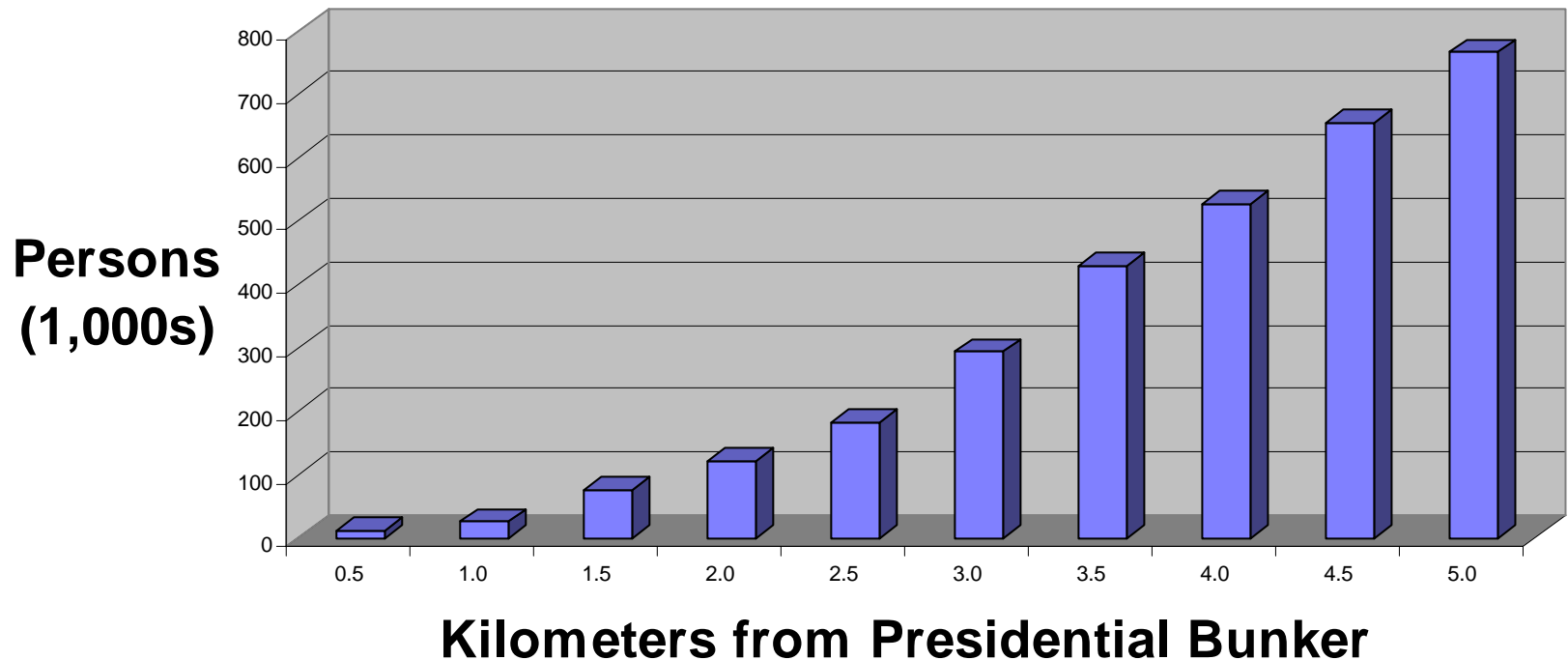
oil
refinery

Rasheed
Airport
(military)

Saddam International
Airport

AD DAWRAH

**Estimated Population Within Given Radius of Iraqi
Presidential Bunker 36.14.30 N by 43.57.40 E
(STRATCOM population model)**

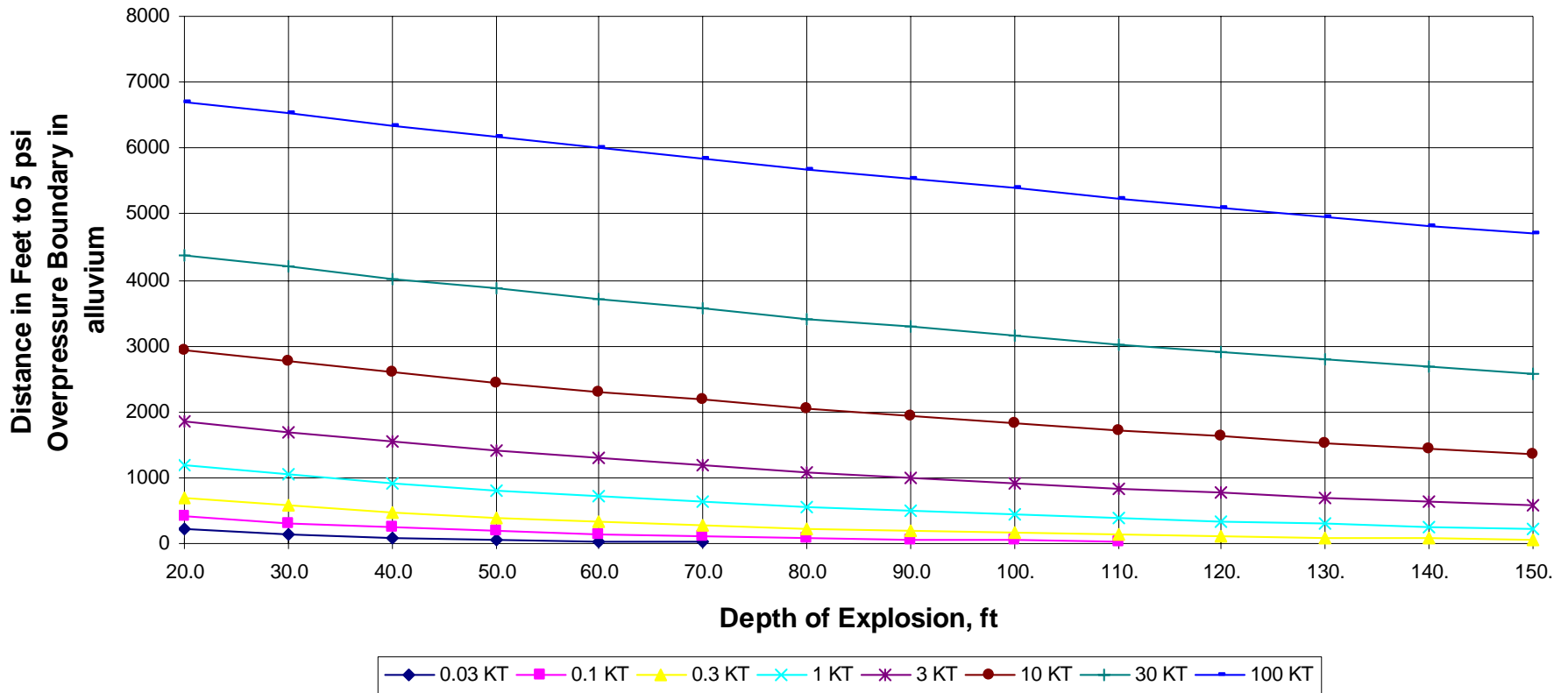


Nuclear strike on Presidential Bunker, Baghdad

- 0.3 kiloton (300 ton) earth-penetrating “mininuke” detonated at 50’ depth;
- fissile material: WgPu (17 g consumed by fission);
- depth of assured destruction: at most 135 ft;
- must hit within about 100 ft. of supposed target to destroy it.
- “collateral damage:”
 - ground shock induced airblast: 5 psi overpressure to 1,480 ft; 8,562 dead
 - airblast overpressure of 2 psi to 3,352 ft; 15,400 “injured”
 - radioactive base surge to ??? (fission products @ 1 minute: 8.1 billion curies)
 - main cloud to ??? height and ??? distance downwind; fallout
 - surface water contamination, loss of urban real estate, downwind agricultural contamination, long-term economic and social effects

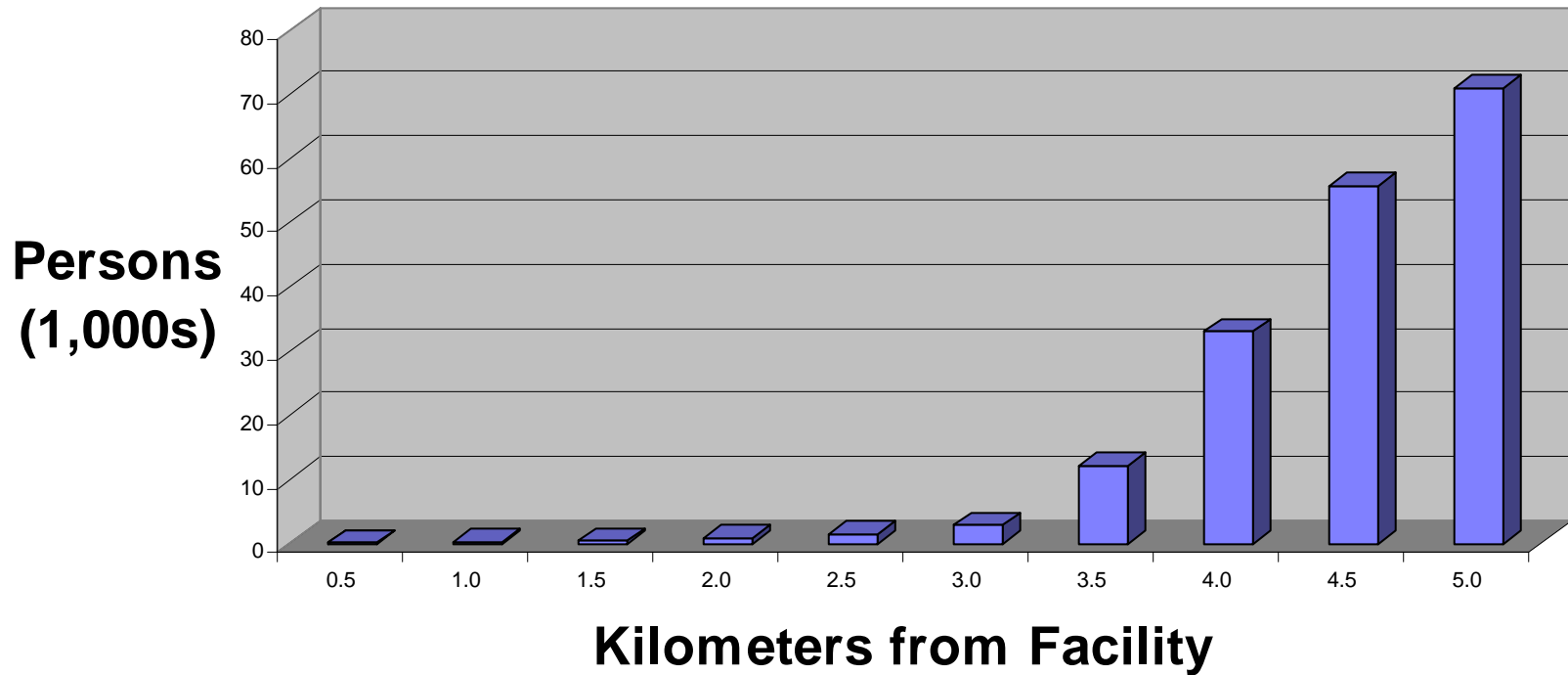
Earth-Penetrating Nuclear Weapons Cause Extensive Airblast

Yields in kilotons (KT); Glasstone and Dolan, 1977; analysis by Los Alamos Study Group)





Population Within a Given Radius of (Former) Irbil Underground Nuclear Facility (STRATCOM population estimates)



Nuclear Deterrence & “Compellence” (1)

“U.S. nuclear forces contribute uniquely and fundamentally to strategic deterrence – through their ability to impose costs and deny benefits to an adversary in an exceedingly rapid and devastating manner no adversary can counter...”

Nuclear weapons threaten destruction of an adversary’s most highly-valued assets, including WMD/E capabilities, critical industries, key resources, and means of political organization and control (including the adversary leadership itself...)

Nuclear weapons reduce an adversary’s confidence in their ability to control wartime escalation....

The use (or threatened use) of nuclear weapons can also reestablish deterrence of further adversary weapons of mass destruction employment...

Nuclear weapons provide the U.S. with proportionate and disproportionate response options that an adversary cannot counter....

Although advances in conventional kinetic and non-kinetic means (e.g. computer network attack, High Energy Radio Frequency, directed energy, etc.) by 2015 will undoubtedly supplement U.S. nuclear capabilities to achieve these effects, nuclear weapons that are reliable, accurate, and flexible will retain a qualitative advantage in their ability to demonstrate U.S. resolve on the world stage. These capabilities should be further enhanced by improving our capability to integrate nuclear and non-nuclear strike operations....

Additionally, nuclear weapons allow the U.S. to rapidly accomplish the wholesale disruption of an adversary nation-state with limited U.S. national resources.

*U.S. Air Force, U.S. Air Force Transformation Flight Plan 2004, Appendix D,
http://www.af.mil/library/posture/AF_TRANS_FLIGHT_PLAN-2004.pdf (emphasis added)*

Nuclear Deterrence & “Compellence” (2)

“To have maximum deterrence, we need to challenge an adversary’s weapons, leadership, military forces, and war-supporting infrastructure and industry....

“Rather than challenging these four categories with nuclear weapons alone, military strategy is evolving to systematically consider combinations of conventional and/or nuclear attacks for preemption or retaliation.”

(Paul Robinson, President, Sandia National Laboratories, Albuquerque Tribune, July 16, 2003)

“That’s the theory of deterrence: don’t try anything stupid because we’ll get you. Doesn’t matter how much destruction you cause in the United States – your country is gonna go away if you try something dumb.

“Now, they’re [nuclear weapons are] intended to prevent other countries, other states, other national entities from doing something that really isn’t in our national interest. You get people’s attention when you threaten the existence of their nation.”

(Steven Younger, Director, Associate Laboratory Director for Nuclear Weapons, Los Alamos National Laboratory, June 21, 1999)

Nuclear weapons are now openly said to offer “something more” than deterrence. The Congressional Research Service calls this “coercion.” The Defense Science Board calls it “compellence.” None of these concepts have any legal basis or provide any color of legal defense for violation of international law.

*(CRS 10/28/03, RL32130, p. 28, <http://www.fas.org/spp/starwars/crs/RL32130.pdf>;
Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, DSB
7/03, p. 1 at <http://www.acq.osd.mil/dsb/duf.pdf>.)*