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by

(10) Vincent L. Bristow, Major, USAF

(9) A RESEARCH STUDY SUBMITTED TO THE AIR FORCE FACULTY

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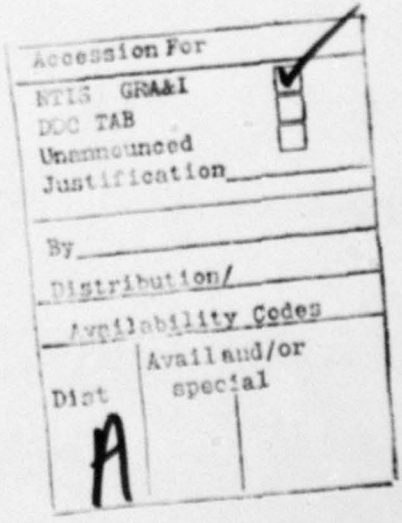

THE NEUTRON BOMB
A CREDIBLE DETERRENT

For the past several months a controversy has been raging over whether the United States should continue to develop the neutron bomb or enhanced radiation (ER) warhead as it is sometimes called. The Washington Post first brought this issue to the surface with a headline that read, "NEUTRON KILLER WARHEAD BURIED IN ERDA [Energy Research and Development Administration] BUDGET." The New York Times soon followed with their own version, "A WEAPON TO THINK (AND WORRY) ABOUT." Both emotion packed articles implied that the Pentagon generals had conspired to go behind the backs of the American people and develop a new and terrible weapon, a weapon so awesome it could alter the course of future conflicts and would advance our country even closer to the brink of all-out nuclear war. In this paper the author will deal with some of these issues by describing the neutron bomb and comparing it to some of the more conventional nuclear weapons the United States has deployed today. This will be followed

by a brief discussion of the Soviet threat in Western Europe. An analysis of these factors will show that the neutron bomb should be developed and deployed to NATO forces providing them with a credible deterrent against aggression by the Warsaw Pact.

The neutron bomb is not a new terror weapon as some critics claim but is simply and improved nuclear warhead. Unlike conventional weapons and other nuclear devices which achieve their kill capability by producing large amounts of blast and heat damage, the neutron warhead achieves its lethality by releasing the major part of its energy in the form of an instantaneous neutron emission with a great radius of antipersonnel effectiveness. (9;3) Blast and heat damage as well as residual radiation are minimized with the enhanced radiation warhead. Figures 1 and 2 below compare the effects of an airburst of a one kiloton (KT) neutron warhead to the airburst of a 10 KT conventional nuclear warhead. This particular comparison was chosen because both weapons have nearly the same radiation levels at ground zero and they are also representative of the size weapons that are generally considered tactical nuclear weapons.

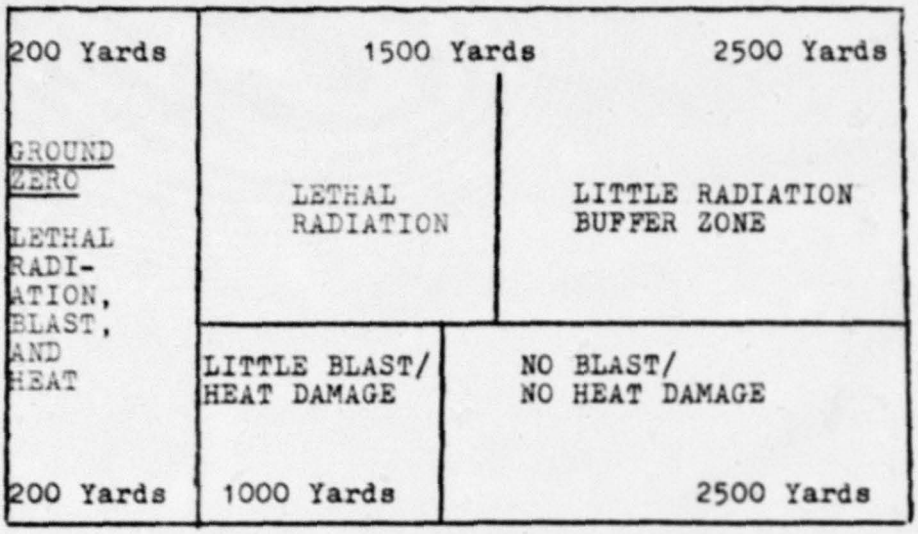

FIGURE1. Effects of a 1 KT Neutron Airburst (12:31)

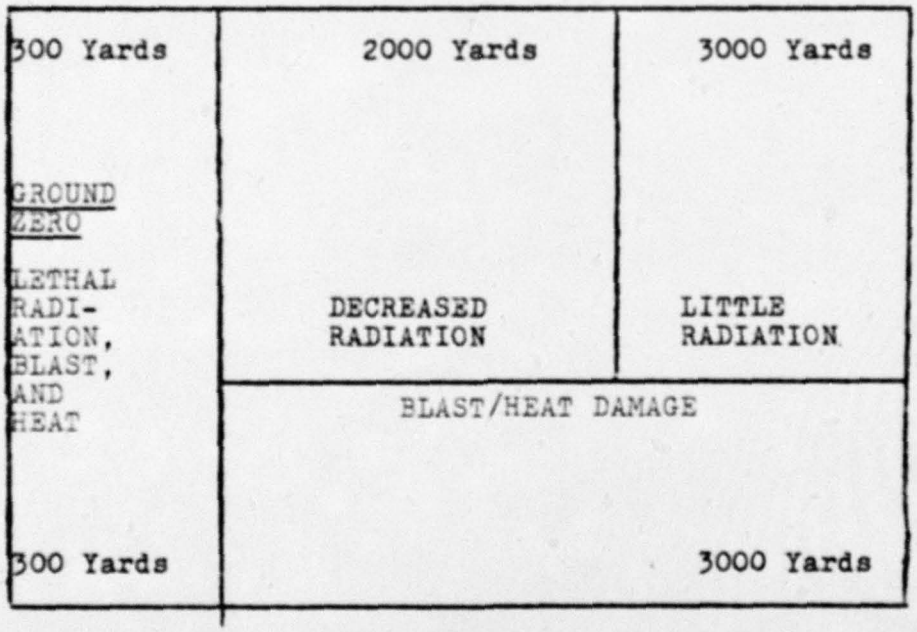

FIGURE 2. Effects of a 10KT Conventional Nuclear Airburst

Comparison of these figures show there is little difference between the two weapons at ground zero where both produce lethal radiation and tremendous heat and blast damage. There is a significant difference in the amount of damage caused by blast and heat beyond the first 200-300 yards. The neutron warhead causes little or no damage beyond approximately one half mile from ground zero whereas the conventional weapon continues to produce blast and heat destruction out to about a mile and one half. The major difference between the two weapons is the kill radius. The neutron bomb will produce casualties* throughout a three quarters of a mile radius, whereas the larger conventional tactical warhead kills out to one and one half miles. The 1 August 1977 issue of The New Yorker characterized these differences as the neutron bomb being, "... more like a sharpshooter's rifle than like a shotgun ..." (14:37)

There are other advantages that are accrued by using the rifle rather than the shotgun. The effects

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*The protection afforded by current shielding or buildings is slight. In built up areas, only those sheltered in cellars or bomb shelters would be effectively protected. (9:3)

of residual surface radiation and fallout are easier to control or are eliminated altogether with the lower yield neutron bomb. (5:36) The neutron warhead also limits damage to areas that friendly troops may have to traverse by greatly reducing blast and thermal effects. (5:36) These characteristics are extremely important when we consider Western Europe, a very likely arena for future conflict.

The balance of power in Western Europe has gradually shifted from the NATO Alliance to currently favoring the Warsaw Pact. The Pact nations have traditionally held a numerical edge in troops, tanks, guns, and aircraft while the NATO allies have relied on superior training, tactics, and more sophisticated equipment to offset those advantages. In recent years the Soviet Union/Warsaw Pact have greatly improved their forces. They now hold at least a two to one advantage with 3000 tactical combat aircraft in the forward area. (11:33) The outdated MIG-17s and earlier model MIG-21s are being replaced with modern, multi-role, sophisticated aircraft. They have succeeded in upgrading their conventional assets into a formidable all weather force that will be very difficult to deal

with. The following paragraphs quoted from a September 1977 report filed with the Strtegic Studies Center of the Stanford Research Institute summarizes the major modernization efforts.

> In the past five years the Soviet Union has produced and deployed to Eastern Europe some 4,000 new T-62 tanks (and some T-72s) while retaining the older T-55s and T-54s in place. The tank strength of the motorized-rifle division has increased by 41 percent. There has been a 100 percent increase in artillery support for forward deployed forces. In excess of 5,000 additional armored personnel carriers have been added. Since 1965 the overall strength of the Soviet army has increased from 1.8 to 2.5 million men, the tank inventory from 30,500 to 40,000, the tactical aircraft from 3,250 to 5,350.
>
> The Soviet and Pact armies have three antitank missile systems in their inventories: the RPG-7 shoulder weapon, the Swatter which is radio guided, and the wire guided Sagger. Both the Sagger and the Swatter are first generation missiles. The Swatter has been mounted on the HIND attack helicopter which, with the aircraft's attack personnel transport capability, provides an airborn infantry anti-tank capability. The Swatter (the best of the Soviet AT missiles) has also been mounted on the BRDM reconnaissance vehicle and the Sagger is on the BMP. Research and developmental programs can be expected to improve the lethality of these systems and their immunity from countermeasures, and to produce protective-defensive equipment and tactics.
>
> Soviet air units in forward Pact areas have been equipped with the new tactical fighter, the MIG-23 Flogger (the lightest aircraft with the variable sweep wing),

> the swing wing Su-17 Fitter C, and the Su-19 Fencer, all of which have ranges, speed, altitude and armament capabilities competitive with U.S./NATO aircraft. Soviet aircraft are being upgraded in penetration capablilities, missile armament, ECM and avionics. An all-weather close air support, interdiction capability is being significantly improved. There is a continuing improvement in tactical and strategic airlift and the helicopter development program is active.
>
> It has been reported the 50 MIG-35R (reconnaissance model) aircraft have been deployed to Soviet units in Poland and East Germany. These Foxbats are alleged to be conducting reconnaissance flights over Denmark, Norway and the FRG at altitudes and speeds which exceed the capabilities of the U.S./NATO Phantoms and Starfighters but not the F-111s or U-2s.
>
> The ground air-defense units opposite the Central Region are being reinforced with the combat proven, highly effective SA-4, SA-6 and SA-9 missiles augmenting the already considerable capabilities of the ZSU-23 mobile antiaircraft gun. (5:28)

The preceeding information must be fully understood to appreciate the impact of the Soviet air defence systems. Each of the five Soviet ground armies in East Germany alone are equipped with about 1000 mobile surface-to-air missiles and another 1000 anti-aircraft gun systems. (7:38) These systems are extremely agile which allows them to move rapidly along with their armored and mechanized units.

This mobility also complicates our ability to locate and target them. In addition, the mixture of anti-aircraft gun and missile systems the Soviets employ gives them air defence coverage from very high altitude down to just above tree top level. During the October 1973 Mideast War, the Israeli Air Force nearly suffered devastating losses in the early stages of the war when they faced such a system. This fact is even more chilling when one realizes that the Israelis were very experienced, proficient, well trained crews equipped with modern Western aircraft and electronic warfare systems.

While analyzing this threat we must try to determine the Soviet's intentions. Most military men would agree that the Warsaw Pact forces now in place far exceed those required for border defence. The trend is towards a continual force buildup as Soviet aircraft factories are turning out more fighters per month than our own. One must conclude that these developments are carefully planned to erode the NATO qualitative edge. Air superiority in the battle area, a luxury we have depended on in the past and planned on for the future, may not be obtained by NATO forces in the early stages of

a conflict. Without air support to deal with the Soviet second echelon forces, we can expect our heavily outnumbered ground forces to either be defeated or forced back during a mass armored/mechanized attack. At some point our leaders may be forced to either stop the attack through escalation or accept defeat.

By escalating the war with tactical nuclear weapons, we would hope to halt the enemy attack and make further attempted gains too costly for him. However the use of our tactical nuclear weapons currently deployed, would be very costly to our own side in terms of damaged property and the loss of civilian lives.

Western Europe today is much more urbanized than it was in World War II. Village boundaries meet village boundaries and it is very difficult to find open spaces. Battles in these areas whether conventional or otherwise are bound to involve civilian casualities and a heavy property loss. In short, the economic growth and the urbanization of Europe has made the use of conventional tactical nuclear warheads a nonviable option. Mr. John F. Scott, an economist with the Strategic Studies Institute, said

it best when he wrote:

> "The Soviets see no point in the effort to make their nuclear weapons smaller and cleaner, but that is no reason NATO should not make the effort. The killing of West Europeans by the Soviets would not confer on NATO the right to do so too." (16:2)

The enhanced radiation weapon gives us a viable option if NATO conventional forces were unable to withstand a Soviet attack. NATO would no longer be faced with the decision of destroying itself to save it. (12:30) The neutron bomb would help restrict casualties to the battlefield and would greatly reduce collateral damage to property.

The decision to modernize our tactical nuclear weapons with the neutron bomb will not be an easy o one. There are, to be sure, critics of this weapon and they rely on very strong emotional appeals to sway public opinion. For example, some say it is an immoral weapon to deploy. They cannot accept the fact that the neutron bomb kills humans while leaving property relatively intact. They also feel that this very characteristic will cause the Soviets to view this weapon as an offensive one. Why else, they argue, would we deploy it if we didn't intend to occupy enemy territory?

To counter these arguments we must look at our past record. We have never been an aggressive nation and even when we held a nuclear monopoly we didn't use it to solve political differences. Our ideology does not preach a continual conflict between communism and capitalism. We have always followed a policy of restraint and attempted to meet all conflicts at the lowest possible level. This policy would continue in Europe. If a Warsaw Pact attack could be blunted with conventional weapons we would do so.

The morality issue appeals mainly to those who favor unilateral disarmament. If it is immoral to kill a man while leaving his property intact it does not follow that it is moral to kill an enemy and destroy his property in the process.

A final criticism which has more factual basis than the previous issues is that the neutron warhead would lower the nuclear threshold. This idea does have merit as it would be much easier for a commander to choose to choose a weapon that would restrict damage over one that would cause a great deal of destruction. Thus the decision to employ nuclear weapons could come much earlier in a conflict.

However, this fact can also be viewed as stabilizing. If the Russians know we probably wouldn't use our current tactical nuclear weapons they probably would not be deterred from a conventional attack. On the other hand, if they know that we are more likely to use the neutron bomb to counter a conventional attack it in fact would be a deterrent to war.

Deterrence in the final analysis is still our overall goal. No one wants to see another war in Europe, conventional or otherwise. We must maintain a force that will convince and agressor that "the prospects of victory are out of proportion to the risks he incurs. (3:58) The neutron bomb would lend credibility to our theatre nuclear forces and would give our leaders more options than just defeat or destruction whether at our own hands or by the enemy. Enhanced radiation warheads were not designed as terror weapons. They are simply improved tactical nuclear weapons that can be tailored to suit particular targets and situations. (3:58) As such, they give us a definsive edge and are a credible deterrent to aggression by the Warsaw Pact.

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