The ‘Massive Ordnance Penetrator’ (MOP) Bunker Buster

In response to concerns about Iran and North Korea’s underground weapons facilities, the US government has accelerated development of the giant Massive Ordnance Penetrator (MOP), a conventional bunker buster. The Pentagon announced in early October 2009 that the MOP will be “deployable” within a few months,¹ and the United States may even be contemplating developing a small inventory of the new weapon.²

The Development of the Bunker Buster

The ancestor of the “bunker buster” was used during World War II to collapse walls.³ As governments began protecting their military facilities by placing them in fortified bunkers underground, “bunker busters” were developed to penetrate into soil, rock, or concrete in order to destroy hard and deeply buried facilities (HDBTs).⁴ The DOD, estimating that there are “10,000 known or suspected HDBTs worldwide [identified] by the Defense Intelligence Agency,” some of which are “buried in rock at depths greater than 300 meters” and some of which “hardened to withstand overpressure of about 1 kilobar” has sought both nuclear and conventional weapons to hold these targets “at risk.”⁵ While many conventional bunker busters have been developed, the B6 family of weapons includes nuclear weapons with an earth-penetrating capacity.⁶ For example the nuclear B61-11 bomb, deployed in 1997, was developed to destroy targets below the Soviet Union’s hard or frozen soil.⁷

Though the B6-11 bombs were considered to be more effective than conventional bombs, some critics argued that they would not able to penetrate certain types of terrain in which hardened underground facilities might be located, and proposed that new nuclear “bunker busters” be developed.⁸ In 2004 Sandia National Laboratory Director Paul Robinson argued that the B61-11 while “very good in soil” was “not very good in rock” and that “North Korea targets of high value to the United States are “very hardened, below deep cliffs, in very high-strength rock.”⁹ The Robust Nuclear Earth Penetrator (RNEP), under consideration between 2001 and 2005, was presented by the Air Force and the National Nuclear Security Administration (NNSA) as a more effective penetrator.¹⁰

However, the development of a new nuclear bunker buster aroused considerable controversy. Critics were concerned it could produce a “huge amounts of nuclear fallout.”  

In 2003 Sen. Dianne Feinstein, in bipartisan campaign to defund RNEP, held up cautionary photos from Hiroshima. Other experts argued that the weapons might not even be able to penetrate to the depth required to totally destroy their targets. There was also concern that if RNEP was used on targets containing chemical or biological weapons, the material would not be fully destroyed but could either leak or be retrieved for further use. There was also a debate about its impact on the non-proliferation regime. Critics argued that RNEP would not effectively deter non-state actors, yet pursuing its development would undercut global nonproliferation efforts with states. For example, Sen. Launtberg asked “How can we credibly ask North Korea and Iran to stop their own nuclear programs while at the same time we develop mini nukes and bunker busters?”

At first, Congress compromised by authorizing funding for research only, requiring further congressional approval for actual weapons development. However, in 2004 and again in 2005 Congress rejected administration requests for funding, in favor of research for more effective conventional bunker busters.

**Development of MOP**

Interest in conventional bunker busters had paralleled efforts to develop a new nuclear version; the Pentagon had worked on the GBU-57A/B MOP alongside studies for RNEP. The MOP was first recommended in the 2003 Defense Science Board Task Force as a new conventional bunker Buster that would be heavier, safer, and more effective than either the former conventional model, the Guided Bomb Unit (GBU-28), or the nuclear model, the RNEP. Congress approved the development of MOP in 2004.

The GPS-guided MOP is a 200 feet long conventional bomb that weighs 30,000 pounds, carries 6,000 pounds of high explosives. It is expected to penetrate as deep as 200 feet through reinforced concrete that is able to withstand pressure of 5,000 pounds per square inch, which is deeper than any existing nuclear weapon.

In summer 2009 the Pentagon accelerated plans by three years to deploy the first MOP bomb as soon as the middle of 2010. In a July 2009 request to Congress to reprogram funding in order to accelerate development of the MOP, the Department of Defense wrote that “the MOP is the weapon of choice” for an “urgent operational need” to “strike hard and deeply buried targets in high threat environments.” Despite the lack of DOD specificity regarding potential targets, the acceleration of MOP development is widely believed to be in response to concerns about Iran and North Korea’s nuclear programs. The U.S. Pacific Command (with responsibility for North Korea) and the Central Command (with
responsibility for Iran), were named as endorsing the “Urgent Operational Need” in the July request.\(^{28}\)

In mid-July 2009, the Boeing Corporation was awarded a contract to provide MOPs for B-2 bomb bays; it received a second contract in mid-August to provide three MOP separation test vehicles, associated aircraft and handling equipment for release separation and de-conflict tests on the B-52 aircraft.\(^{29}\) In October, 2009, after winning congressional approval, Pentagon awarded Boeing’s McDonnell Douglas a $51.9 million contract to “enable B-2 aircraft” to carry the bomb.\(^{30}\)

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“Pentagon Officials refused to clarify whether the bomb’s development was in response to Iran’s controversial nuclear arms program” op cited and “Iran threatened by U.S. buster bomb” op cited.


“Iran threatened by U.S. buster bomb,” op. cited.