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Response to Research Proposal from Engineering Perspective

**Technical Challenges with Dismantling Nuclear Weapons**

The United States has a nuclear arsenal of 6,600 weapons. This is a much larger collection than South Africa’s largest arsenal of 6 nuclear weapons and 1 under construction. Having such a large nuclear arsenal presents a significant technical challenge. The National Nuclear Security Administration (NNSA) is responsible for the lengthy process of disarming a nuclear weapon. Since each missile must have high explosives, nuclear material, and all other non-nuclear material removed and sent to various facilities for safe disposal, money and time is needed for complete disarmament.

Furthermore, the United States does not have a disposal site for nuclear waste. Most nuclear waste is currently stored at the location it was generated. Dismantling the nuclear arsenal of the United States would present significant challenges as to where to store the excess nuclear waste.

**Defense Against Nuclear Threats**

Another technical challenge presented by the disarmament of the United States is that of national defense. One of the primary functions of the current nuclear arsenal is to act as deterrence from other nuclear states. You cite an article, *The Future Role of United States’ Nuclear Weapons,* which concludes that a modern approach to deterrence is needed and the Reliable-Replacement Warhead (RRW) was a key path to modernizing deterrence (Walsh 51). Creating a new generation of smaller nuclear weapons could reduce the number of nuclear weapons needed and reduce maintenance costs. However, RRW was denied funding in 2009 and work on the project has ceased. For complete disarmament to take place, a new deterrence or defense would have to be functional. This presents another technical challenge in that missile defense technology is still developing. Without a viable alternative to nuclear deterrence, larger states than South Africa may not be able to let go of nuclear weapons to ensure national security.

**Technical Complications Outweighing Policy Pushes**

The technical complications of dismantling nuclear arsenals would not outweigh policy pushes in the long term. While there are significant challenges to overcome, with the right policy decisions disarmament is a possibility. However, it would take much more time than the 3 years it took for South Africa to dismantle its nuclear weapons. Construction of a nuclear waste facility alone has been in progress since 1987, and has since been defunded. In addition, a viable alternative to nuclear deterrence would have to be found. If this ends up being missile defense, the technology would have to be improved to be usable as a proper deterrence mechanism.

The same humanitarian reasons that South Africa based their disarmament on could be applied to the United States without technical complications impossible to surmount. However, the technical challenges are significant and would require strong policy pushes toward developing technology and creating waste disposal sites.

**References**

Walsh, Jim. 1994. *The Future Role of United States’ Nuclear Weapons.* MIT NRDC and DACS sponsored conference.