John and Janet
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U.S. Nuclear Deterrence: Policy Perspective and Scientific Needs

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In many regards, the United States has a "love/hate" relationship with all things nuclear. We love the security against nuclear attack that a nuclear deterrent provides, but we hate the terrible devastation that nuclear weapons can create. We love a reliable source of carbon-free energy that nuclear energy can provide, but hate nuclear waste and the bad consequences of nuclear plants that go wrong. We love the diagnostic precision of nuclear medicine, but hate not knowing whether or not there is a zero-threshold for damage due to radiation exposure. In each case, lack of detailed knowledge of nuclear processes or a certain ability to control these processes causes skepticism of benefit or fear of damage. Although it is not often easily seen, there is frequently an important connection between policy choices and the scientific progress needed to achieve the intended benefits of those choices. This is especially the case at the national and international levels.

In his April 2009 Prague speech, President Barack Obama said he envisioned a world without nuclear weapons, but to get to that point would require a transformation in societies around the world. He said that this objective may not be achieved in his lifetime, so as long as nuclear weapons exist, the US deterrent would be kept safe, secure, and effective. The 2010 Nuclear Posture Review, released a year later in April 2010, reflected this duality of objectives: (1) a strong push in the area of arms control (New Start Treaty) and nonproliferation (4-year objective to secure nuclear materials around the globe), while also (2) maintaining deterrent warhead safety and security through a series of Life Extension Programs (LEPs). In the ensuing five years, the approach taken and decisions made with specific LEPs has, in fact, furthered both areas -- a reduction of the numbers and types of nuclear weapons through appropriate modernization steps to ensure a smaller and younger nuclear deterrent arsenal. The background policy and steps taken to manage a weapons program in a non-proliferation world will be described in this presentation. In order to achieve the benefits intended by these national policies, advances in social and physical sciences must be made and the connections among the two areas must be refined, understood, and appreciated.

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