Attachment 2

OPENING STATEMENT

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COMMISSION TO ASSESS THE THREAT TO THE U.S. FROM ELECTROMAGNETIC PULSE ATTACK

BEFORE THE

UNITED STATES SENATE

COMMITTEE ON THE JUDICIARY

SUBCOMMITTEE ON TERRORISM, TECHNOLOGY AND HOMELAND SECURITY

HON. JON KYL, CHAIRMAN

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Chairman Kyl, Members of the Subcommittee, ladies and gentlemen, my fellow Commissioners and I thank you for the opportunity to testify today on the findings and recommendations of the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack, created by the Congress in Title XIV of P.L. 106-398. At the direction of the Congress, this Commission worked for two years on its statutory mandate. These efforts have included conducting actual experiments to test the potential vulnerability of modern electronics systems to EMP, and were informed by a global survey of foreign scientific and foreign military literatures to assess the knowledge, and if possible the intentions, of rogue states and other nations with respect to EMP attack. The Commission enjoyed access to all information in the possession of the Government in the course of its work, and was supported by top-quality studies and analyses on the part of many cognizant Government and contractor organizations.

The "bottom line" is that several classes of potential adversaries – including terrorist groupings – have or can acquire the capability to attack the United States with a high-altitude nuclear weapon-generated electromagnetic pulse. A determined adversary can achieve an EMP attack capability without having a high level of either military or nuclear sophistication. For example, a Scud missile launched from a freighter off the Atlantic coast of the United States could constitute a platform that would enable a terrorist group to mount an EMP attack against roughly half of the United States in population terms. Scud missiles can be purchased inexpensively (of the order of $100,000) by anyone, including private collectors, in the world's arms markets. Terrorists might buy, steal, or be given a 'no fingerprints' nuclear weapon. For example, North Korea has demonstrated willingness to sell both missiles and nuclear materials remarkably promiscuously. Iran, the world's leading sponsor of international terrorism, is widely reported to have a nuclear weapons program that is more advanced than previously suspected – and is known to have successfully test-launched a Scud missile from a vessel in the Caspian Sea, a launch mode that could be

adapted, as already noted, to support an EMP attack against the United States "from the sea".

A nuclear weapon detonated at altitudes above a few dozen kilometers above the Earth's surface will generate a set of electromagnetic pulses of different types as its various outputs interact with the Earth's atmosphere. These EMPs propagate from the burst-point of the nuclear weapon to the line-of-sight on the Earth's horizon, potentially covering a vast geographic region. For example, a nuclear weapon detonated at an altitude of 400 kilometers over the central United States would cover with its primary EMP the entire continental United States, and parts of Canada and Mexico.

The immediate effects of EMP are disruption of, and damage to, electronic systems and electrical infrastructures. EMP is not reported in the scientific literature to have direct effects on people.

EMP and its effects were observed extensively during the U.S. and Soviet atmospheric test programs in 1962. During the United States STARFISH nuclear detonation – not designed or intended as a generator of EMP – at an altitude of about 400 kilometers above Johnston Island in the Pacific Ocean, some electrical systems in the Hawaiian Islands, 1,400 kilometers distant, were affected. This comparatively weak-&-distant EMP caused the failure of street-lighting systems, tripping of circuit breakers, triggering of burglar alarms, and damage to a telecommunications relay system – among other reported effects.

The Russians, in their testing that year, executed a series of high-altitude nuclear detonations above their test site in South Central Asia. They report they observed damage to both overhead and underground buried cables, some at distances of 600 kilometers. They also observed surge arrestor burnout, spark-gap breakdown, blown fuses, and failures of power supplies of various types.

What is particularly significant about EMP is that a single high-altitude nuclear detonation can produce EMP effects that can potentially disrupt or damage electronic and electrical systems over much of the United States, virtually simultaneously, at a time determined by an adversary. Thus, EMP is one of a small number of threat-types that has the potential to hold American society seriously at risk and that might result in the defeat of our military forces.

The electromagnetic field pulses produced by weapons designed and deployed with the intent to produce EMP have a high likelihood of damaging electrical power systems, electronics, and information systems upon which any reasonably advanced society – including our own – depends vitally. Their effects on systems and infrastructures dependent on electricity and electronics could be sufficiently ruinous as to qualify as catastrophic to the Nation.

Depending on the specific characteristics of the EMP attack, unprecedented cascading failures of our major infrastructures could result, in which failure of one infrastructure could 'pull down' others dependent on its functioning, and the failure of these, in turn, could seriously impede recovery of the first infrastructure-to-fail. In such events, a regional or national recovery would be long and difficult, and would seriously degrade the overall viability of our Nation and the safety, even the lives, of very large numbers of U.S.

citizens.

The primary avenues for EMP imposition of catastrophic damage to the Nation are through our electric power infrastructure and thence into our telecommunications, energy, and other key infrastructures. These, in turn, can seriously impact other vital aspects of our Nation's life, including the financial system; means of getting food, water, and health care to the citizenry; trade; and production of goods and services.

The recovery of any one of these key National infrastructures is dependent on others working. The longer the basic outage, the more problematic and uncertain the recovery of any of them will be. It is possible – indeed, seemingly likely -- for sufficiently-severe functional outages to become mutually reinforcing, until a point at which the degradation of the set of infrastructures could have irreversible effects on the country's ability to support any large fraction of its present human population.

EMP effects from high-altitude nuclear explosions are not new threats to our nation. The Soviet Union in the past and Russia and other nations today are capable of creating these effects. Historically, this application of nuclear weaponry was mixed with a much larger population of nuclear explosives that was the primary source of destruction, and thus EMP as a weapons effect was not the primary focus of U.S. defensive preparations. Throughout the Cold War, the United States did not try to protect its civilian infrastructure against either the physical or EMP impact of nuclear weapons, and instead depended on deterrence for whatever safety might be attained.

What is different now is that some potential sources of EMP threats are difficult to deter – they can be terrorist groups that have no state identity, have only one or a few weapons, and are motivated to attack the United States without regard for their own safety or in the belief that they are effectively undeterrable. Rogue states, such as North Korea and Iran, may also be developing the capability to pose an EMP threat to the United States, and may also be unpredictable and difficult to deter.

Single detonations of certain types of relatively low-yield nuclear weapons can be employed to generate potentially catastrophic EMP effects over wide geographic areas, and designs for variants of such weapons may have been illicitly trafficked for a quarter-century.

China and Russia have considered limited nuclear attack options that, unlike their Cold War plans, employ EMP as the primary or sole means of attack. Indeed, as recently as May 1999, during the NATO bombing of the former Yugoslavia, high-ranking members of the Russian Duma, meeting with a U.S. Congressional delegation to discuss the ongoing Balkans Conflict, raised the specter of a Russian EMP attack that would paralyze the United States. Open-source Chinese military writings have described, in the event of a conflict over Taiwan, using EMP as a means of defeating the U.S.

Another key difference from the past is that the U.S. has developed more than most other nations as a modern society heavily dependent on electronics, telecommunications, energy, information networks, and a rich set of financial and transportation systems that critically leverage modern technology. This asymmetry is a source of

substantial economic, industrial, and societal advantages, but it creates vulnerabilities and critical interdependencies that are potentially catastrophic to the United States.

Therefore, terrorists or state actors that possess relatively unsophisticated missiles armed with nuclear weapons may well calculate that, instead of destroying a city or military base, they may obtain the greatest political-military utility from one or a few such weapons by using them – or by threatening their use – in an EMP attack. The current vulnerability of U.S. critical infrastructures can both invite and reward such attacks, if not corrected.

However, correction is feasible and well within the Nation's technical means and material resources to accomplish. Most critical infrastructure system vulnerabilities can be reduced below those levels that potentially invite attempts to create a national catastrophe. By protecting key elements in each critical infrastructure and by preparing to recover essential services, the prospects for a terrorist or rogue state being able to impose large-scale, long-term damage can be minimized. This can be accomplished reasonably and expeditiously.

Such preparation and protection can be achieved over the next several years, given a well-focused commitment by the Federal Government and a readily-affordable level of resources. We need to take actions and allocate resources to decrease the likelihood that catastrophic consequences from an EMP attack will occur, to reduce our current serious levels of vulnerability to acceptable levels and thereby reduce incentives to attack, and to remain a viable modern society, even if an EMP attack occurs. Since this is a matter of national security, the Federal Government must shoulder the responsibility of managing the most serious infrastructure vulnerabilities, including resourcing their timely obviation.

Homeland Security Presidential Directives 7 and 8 lay the authoritative basis for the Federal Government to act vigorously and coherently to mitigate many of the risks to the Nation from terrorist attack. The effects of EMP on our major civilian infrastructures lie within these directives, and the directives specify adequate responsibilities and provide sufficient authorities to deal with the civilian sector consequences of an EMP attack.

In particular, the Department of Homeland Security has been established, led by a Secretary with authority, responsibility, and the obligation to request needed resources for the mission of protecting the U.S. and recovering from the impacts of the most serious threats. This official must assure that plans, resources, and implementing structures are in place to accomplish these objectives, specifically with respect to the EMP threat. In doing so, DHS must work in conjunction with the other governmental institutions and with experts in the private sector to efficiently accomplish this mission. It is important that metrics for assessing improvements in prevention, protection, and recovery be put in place and then evaluated -- and that progress be reported regularly and independently reviewed.

Specific recommendations are provided in the EMP Commission's report with respect to both the particulars for securing each of the most critical National infrastructures against EMP threats and the governing principles

for addressing these issues of national survival and recovery in the aftermath of an EMP attack. Much of the problem can be addressed very economically, without major capital investments, but by developing effective plans to meet the challenges posed by EMP threats. For example, one major Commission finding is that the electric power grid is the "keystone" infrastructure, upon which all other infrastructures depend. Yet today, there is no plan for "black-starting" the power grid in the event of a Nation-wide collapse of the system. If the electric power grid can be quickly recovered, the other infrastructures can also be recovered adequately in the aftermath of an EMP attack. Making the key aspects of the Nation's infrastructures more robust against EMP attack will also pay dividends in protecting against other types of large-scale problems with them, such as natural disasters.

This concludes my statement. Again, my colleagues and I thank you for the opportunity to report the findings and recommendations of the EMP Commission to the United States Senate.