Statement for the Record

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to the

Senate Committee on Energy and Natural resources

Good morning Chairman Wyden, Ranking Member Murkowski and distinguished members of the Committee. I am honored to be able to testify to this Committee on a subject of great importance and about which I have written and spoken frequently.

My name is Robert H. Latiff. I am currently a private consultant, providing technology and management advice to FFRDCs, universities, and private industry. I am a retired Air Force Major General, having served 32 years of active duty, largely in research and development and weapons system acquisition. I am also an academic, with appointments at George Mason University, where I teach systems acquisition and intelligence technologies, and at the University of Notre Dame where I am an adjunct professor in the Department of Philosophy. I hold a doctorate in metallurgical engineering and materials science.

Pertinent to the interests of this Committee, I am the former Chairman of the National Materials and Manufacturing Board and am a member of the Air Force Studies Board of the National Academies. I am also a member of The Minerals, Metals, and Materials Society (TMS), a major professional society of metals, minerals, and materials engineers and scientists, and of the Strategic Materials

Advisory Council, a group of former senior U.S. government defense and materials officials and industry experts concerned about critical minerals and metals.

I am here to speak in strong support of S1600. For several years I have followed the attempts in both the House and Senate to pass legislation on this exceptionally important topic. For reasons I will discuss, it remains critical to national security, in my opinion, that this bi-partisan bill be enacted into law. While the rare earth crisis of the last few years appears to have somewhat abated, we should not become complacent. The fundamental risks that result from not having a secure supply of critical materials have not gone away.

S1600 would require the U.S. government to define criticality as it relates to materials, identify those materials it deems critical and establish policies to enhance the their domestic availability. It would authorize funding for research and development on those materials and would advance education and workforce development in areas important to materials. All of these actions will, I believe, have positive effects on national security and national defense. To the first point I note that the European Union published a report in 2010 that identified fourteen materials they deemed critical and recommended to the member nations broad policies for their development, recycling, conservation, and potential substitution. The U.S. has no such policy document. Nor do we have a single definition of what constitutes critical materials. S.1600 is an important step in correcting this issue and establishing a coherent national policy.

I have been following these issues since 2007 when, as a member of the National Materials Advisory Board, I chaired a committee concerned with Defense Logistics

Agency's National Defense Stockpile. Our committee was very concerned over what we felt to be Department of Defense's continued inaction on the topic. Subsequently, in a report to Congress, DOD reported that there had, in fact, been cases in which materials issues had impacted weapons acquisition programs in some way. However, even in the face of these materials impacts and the by then well-known issues surrounding rare earth materials, DOD policy continued to be silent on the topic and insisted that market forces would be sufficient to satisfy DOD needs. It has only been in the last year that DOD has finally publicly agreed that the market might not be sufficiently robust to supply needs for several materials deemed extremely important to current weapon systems. That recognition was a positive result. However, while they may now choose to stockpile materials like Yttrium and Dysprosium, there still is not a domestic supply of some key rare earth metals or oxides; thus it essentially becomes a fix to the supply-chain. What is needed is not just a near-term fix, but also a long-term solution to the underlying and systemic problems. My hope would be that a national policy, such as that engendered by S1600 might better inform DOD policy, which could in turn lead to better materials security, and availability of key weapon systems. The end result of the activities required by this legislation will likely mean that the DOD would not have to depend on extraordinary measures to insure access to important materials for its weapon systems

On the subject of materials research, I highlight a June 2013 report by the USAF Chief Scientist entitled "Global Horizons". In that report, the Chief Scientist lists materials science as the first of five enabling technologies of importance to the USAF

from FY13 to FY 27. A subsequent chart lists declining domestic availability of raw materials as an important key trend. Policy makers should take note of this. Clearly, the services, in executing their Title 10 "train and equip" responsibilities, recognize the criticality of these issues as they are forced to deal with availability issues and materials scarcity.

Turning again to the work of the National Academies, as early as 2005 The National Materials Advisory Board impaneled a Committee on the "Globalization of Materials Research and Development" which, it is important to note, was funded by the Department of Defense. The report of that committee quite accurately predicted an increase in importance of materials research in other countries, along with a decreasing dominance by the United States in the materials research field. More recently, a 2011 report by Thomson Reuters, verified this result and concluded that while materials research publications have been on the rise world-wide, the U.S. has in fact been in decline in regard to materials R&D. I would point out that many past DOD weapon systems, from satellites to submarines, from missiles to manned aircraft, have pushed the state of the art in materials science and that DOD historically was a significant funding source and beneficiary of advanced materials research.

On the topic of education and workforce development, I note with some dismay the decline in the number of university materials science departments in the U.S. and the steep decline in the number of materials science and engineering degrees conferred. While some of this decline can be attributed to and explained by the

concomitant increase in degrees in associated fields, it remains true that knowledge of basic materials science, materials design, mining, extractive technologies, materials processing, etc. has been on the decline. While admittedly dated, a 2004 American Association for the Advancement of Science article advised graduates not to seek a job in the metals industry unless they intended to work overseas. At that time, in the previous 30 years the number of jobs for scientists working in metals had declined from more than 13,000 to fewer than 2000. This is consistent with the more recently expressed views of Dr. Karl Gschneidner of Ames Laboratory, considered to be the leading U.S. expert in rare earth materials. Policies and the requirements of S1600 to enhance education and workforce development in theses areas will have important national security as well as economic implications. A reinvigoration of materials education writ-large will also benefit DOD and its industrial base as they seek to retain or regain technical superiority in weapon systems performance.

In summary, I feel this is an extremely important piece of legislation in placing a long needed emphasis on domestic security of critical minerals. The national defense implications are, in my opinion, profound. I reiterate my support for S1600 and my hope that this bi-partisan legislation will be successful.