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## The U.S. Antarctic Program: Achieving Fiscal and Logistical Efficiency While Supporting Sound Science

*Witnesses:*

**Norm Augustine**

Chair, U.S. Antarctic Program Blue Ribbon Panel

**Subra Suresh**

Director, National Science Foundation

**Duncan McNabb**

General (Retired), U.S. Air Force

Member, U.S. Antarctic Program Blue Ribbon Panel

**Warren Zapol**

Chair, Committee on Future Science Opportunities in Antarctica and the Southern Ocean, National Research Council

*Committee Members Present:*

Ralph Hall, Chairman (R-TX)

Eddie Bernice Johnson, Ranking Member (D-TX)

James Sensenbrenner (R-WI)

Lamar Smith (R-TX)

Steven Palazzo (R-MS)

Randy Hultgren (R-IL)

Mo Brooks (R-AL)

Hansen Clarke (D-MI)

Jerry McNerney (D-CA)

Terri Sewell (D-AL)

Paul Tonko, (D-NY)

Suzanne Bonamici (D-OR)

On November 15, 2012, the House Committee on Science, Space and Technology held a hearing on the U.S. Antarctic Program (USAP) entitled “Achieving Fiscal and Logistical Efficiency While Supporting Sound Science.” This hearing was held to review the future options and logistical recommendations of the U.S. Antarctic Program Blue Ribbon Panel report, “[More and Better Science in Antarctica through Increased Logistical Effectiveness](#),” which was released in July 2012, and to examine the work and goals of the U.S. Antarctic Program.

In his opening statement, Chairman Ralph Hall (R-TX) stated that, “Our support of explorers and scientists on that continent (Antarctica) has yielded and continues to yield valuable research that not only affects our daily lives, but cannot be done in any other place on Earth.” Hall added that, “I also recognize the important geopolitical reasons to maintain a U.S. presence there and appreciate the cooperation that must take place not only between relevant U.S. agencies, but also between our international friends and partners.” On logistics and funding, Hall stated that, “Unfortunately, the magnitude of the logistics to support these activities is enormous and overwhelmingly dominates the budget for Antarctic activities. Therefore, the Blue Ribbon Panel’s report recommendations are welcome.”

In his concluding remarks, Hall summarized the Blue Ribbon Panel’s report by saying, “The Blue Ribbon Panel report provides ten broad overarching recommendations for logistical effectiveness, and also provides a number of specific implementing actions categorized.” Hall concluded that he looked forward to discussing the feasibility of implementing these recommendations with the witnesses.

In her opening remarks, Ranking Member Eddie Bernice Johnson (D-TX) noted that, the presence of the U.S. in the Antarctica “is

critically important both strategically and scientifically.” However the ability to address the challenges and opportunities that lie ahead will “inevitably depend on what decisions we make about the larger federal budget in the coming months.” Johnson added that, “I hope that we will also keep Antarctica on our agenda in the next Congress as the budget picture comes into better focus.” Johnson praised the National Science Foundation (NSF) and their partner agencies for an “extraordinary job” in maintaining the USAP and for the “cutting edge science” that is going on in the Antarctic. Johnson affirmed that, “The more efficient and safer we are in our logistical support of those activities, the more opportunity we will have to expand and strengthen the science we do.”

In his testimony, Norm Augustine, Chair of the U.S. Antarctic Program Blue Ribbon Panel, acknowledged the report released by the National Research Council (NRC) in September 2011, “[Future Science Opportunities in Antarctica and the Southern Ocean](#),” which provided the basis for the Blue Ribbon Panel report. Augustine stated that while the USAP has been “extremely well managed,” there are “a number of opportunities for enhanced efficiency.” Augustine stated that the logistics of operating in the harsh Antarctic environment is the “dominant activity of the U.S. Antarctic program,” and “eighty cents of every dollar invested in the U.S. Antarctic program is devoted to logistics.” He pointed out that because of the intense logistical support needed to conduct science in the Antarctic, the science is particularly vulnerable to budget cuts. Augustine stated, “If logistics costs under a fixed overall budget were to rise by thirteen percent, the science program would have to be cut in half.” Augustine noted in addition to finding “opportunities to reduce logistical demands,” the panel observed a “few instances where current logistical activities were, in the judgment of the committee, unacceptable from the standpoint of the safety of both people and equipment,” in addition to “several single-point failure modes that warrant early attention.” Augustine acknowledged that NSF is already in the process of addressing these safety issues, but “further work is required.”

Augustine pointed the Committee to the ten recommendations made by the Blue Ribbon panel, including the need for a capital budget. Augustine noted that, “If one were to seek to identify a single root cause for the inefficiencies that we noted it would be that the Antarctic program does not have a capital budget.” Other recommendations include, continuing to use McMurdo, South Pole, and Palmer Stations as the main U.S. science and logistic centers, restoring the U.S. polar ocean fleet including icebreakers, implementing state-of-the-art logistics and transportation support, understanding science support costs, modernizing communications, increasing energy efficiency, pursuing additional opportunities for international cooperation and reviewing and updating Antarctic policy. In order to implement these recommendations in a budget-constrained environment, Augustine recommended increasing the USAP’s appropriations by six percent for each of the next four years relative to fiscal year (FY) 2012 levels, and “diverting six percent of the planned science expenditures over the next four years to upgrades of the science support system.” Augustine stated that these investments “would be repaid in approximately seven years.” However, this plan does not address icebreaker issue, Augustine said.

In his testimony, Subra Suresh, Director of NSF stated that, “The polar environment serves as an extraordinary laboratory and important bellwether for virtually all areas of science.” Suresh highlighted three major discoveries demonstrating this breadth including the discovery of the Ozone Hole, which led to the worldwide ban of chlorofluorocarbons, the discovery of antifreeze proteins in Antarctic fish, which has important implications for industry, and the recent discovery of the Phoenix Galaxy Cluster, which produces stars at “rates never before observed.” Suresh described the operations in and partnerships with sister agencies in Antarctica and pointed out that, “our commanding scientific presence ensures the U.S. a governing role in the Antarctic Treaty System.” Suresh referred to the Blue Ribbon Panel’s Report as “a detailed and realistic blueprint for securing and improving world-class research in Antarctica.”

As to NSF’s response to the Blue Ribbon Panel’s report, NSF “chartered a Tiger Team of senior NSF managers to respond to and guide development of a rolling five-year Long-Range Investment Plan and Integrated Master Schedule to implement recommendations contained in the report.” Suresh stated that, “NSF agrees with the majority of the recommendations, although not all of the recommendations can be implemented by NSF alone.” Suresh continued, “For example, recommendations concerning icebreaker capabilities for the United States necessarily require action on the part of the other components of the Federal government.” Suresh added that, “we fully expect Lockheed Martin, our current Antarctic Support Contractor, to implement some of the cost-saving ideas they included in their proposal.”

In his testimony, Duncan McNabb, a retired general of the U.S. Air Force and member of the U.S. Antarctic Program Blue Ribbon Panel referred to logistically supporting the USAP to be “one of our most demanding missions” in the U.S. Air force. McNabb said, “We take tremendous pride in the mission.” McNabb endorsed the findings of the Blue Ribbon Panel and highlighted the importance of McMurdo as a major base, optimizing transportation through an enterprise approach, establishing a capital budget and the importance of “multiyear funding for long term logistics infrastructure support.”

Warren Zapol, Chair of the Committee on Future Science Opportunities in Antarctica and the Southern Ocean of the National Research Council, began his testimony by explaining how his research as an anesthesiologist in the Antarctic benefits society. Zapol explained that out of an interest for medical applications, he studied Weddell seals, which can hold their breath for 90 minutes. As a result of his study, Zapol “developed a treatment for hypoxic human newborn babies by breathing nitric oxide.” As a result, “this technique is now used to save the lives of around 15,000 U.S. babies each year.” Zapol stated that his story illustrates

an example of how “allowing scientists to explore in Antarctica can lead to unanticipated discoveries.” Zapol continued, “As a geologist colleague of mine likes to say, this is a place where you can pick up a rock and be confident that you are the first person to ever pick up that rock.”

Zapol discussed the themes of scientific research in the Antarctic, which include discovery-driven science as well as science for the sake of understanding global change. Zapol outlined the six recommendations made by the NRC report. In regards to the Blue Ribbon Panel's report, Zapol offered his personal views saying, “The one area that I feel they could have paid more attention to was the need for more clearly defined and better communication channels and interaction between NSF leadership, the logistical support contractor, and working scientists in Antarctica.” Zapol continued, “I can also tell you that I have heard that many in the science community are worried about the potential impacts of the Blue Ribbon Panel's recommendations on the conduct of science.” He explained that, “With limited resources, we need to assure a balance between improving our capability to support our future presence in Antarctica and the actual conduct of research today.” Zapol stated, “Despite the challenges of working in the harsh environment of Antarctica and the Southern Ocean, this region offers great insights into our changing planet and is an invaluable platform for scientists to make new discoveries.” Zapol concluded, “What is more, Antarctica is an important part of our changing world, and we need to be watching it as it changes.”

Chairman Hall began the question and answer session by asking Suresh if there were any recommendations from the Blue Ribbon Panel's report that NSF disagrees with. Suresh answered that the Tiger team is not finished addressing all the recommendations of the report and not all of the recommendations could be implemented within NSF's prerogative, but require working with other agencies. For these reasons, Suresh stated that he cannot conclusively say yet that NSF agrees with all recommendations.

Ranking Member Johnson expressed her concern for the insufficient number of young scientists and engineers trained in the U.S. and asked how the short and long-term research can best be provided for. In response, Augustine agreed that the U.S. is not succeeding at attracting enough young people to science and engineering. Out of 93 nations, the U.S. ranks 79 for the number of bachelor's degrees awarded in science and engineering, Augustine said. Since advancements in science account for up to 85 percent of economic growth in the U.S., it is crucial to provide for both the short and long-term in a balanced way, Augustine said. In business, there are times you have to cut your overall budget, however, there are still some areas you increase the budget, he pointed out. Augustine urged that science is one of those areas where the budget should increase.

Suresh said the short-term funding priority is safety. As to the long-term, he is concerned with America's ability to compete with countries around the world. McNabb emphasized the importance of logistics in competing for young people, maintaining leadership in science, and increasing scientific productivity, saying if you provide scientists with world-class equipment and support, “they'll give you world-class results.” McNabb urged that the Blue Ribbon panel is “trying to increase science and reduce costs” and that investing in infrastructure is vital to this goal. Zapol assured that the adventurous appeal of the Antarctic makes the region tremendously attractive to young people, so the Antarctic does not suffer from want of American scientists and engineers. Zapol cautioned that the science community is worried about logistics receiving a larger portion of the funding at the expense of the science during times of overall budget cuts.

Representative Lamar Smith (R-TX) asked if the research conducted in the Antarctic could be done elsewhere for a reduced cost. Zapol answered that it is unlikely his research with the Weddell seals could have been done elsewhere because fast ice created a unique platform, which was vital to their study. Smith asked if the private sector would be funding the research that goes on in the Antarctic if the government did not. Augustine answered that the private sector would not fund basic research, such as Zapol's study, because of the nature of this research. Augustine explained that the outcomes are more uncertain in basic research and often the research is more long-term, which is not appealing to the private sector. Suresh said that the three notable discoveries he mentioned in his testimony could not have happened anywhere else. Every branch of science and engineering that NSF supports benefits from research in the uniquely pristine Antarctic, Suresh emphasized.

Representative Jerry McNerney (D-CA) asked if the dilapidation of facilities and multiple single points of failure are risking lives in the Antarctic. Suresh responded, saying NSF has a “phenomenal record of safety” and these threats represent potential future issues and for “severe loss of investments for the future.” McNerney asked if logistics were improved, could more money be devoted to science? Augustine responded, yes—improving logistics offers a huge opportunity to devote more funding to science.

McNerney asked what the disadvantages would be of relinquishing U.S. leadership in the Antarctic. Augustine replied saying that the U.S. presence is key for maintaining a peaceful Antarctic in a time where increasing exploration interests increases the challenge of peacekeeping. Augustine pointed out that the U.S. has already ceded leadership in particle physics and it would be “a shame” to lose another area of scientific leadership. The U.S. is not leading in keeping an icebreaking fleet and relies on Russian icebreakers, Augustine said.

Representative Mo Brooks (R-AL) asked the panel if anything is being done to share the logistical burden with international partners. To which, Augustine replied that New Zealand has built wind power facilities at McMurdo, which supplies power to the

base. Augustine pointed out that New Zealand and Australia are key international partners. Suresh said South Korea is building a new station near McMurdo and has built a new icebreaker, and NSF is working on increasing collaborating with them. McNabb said the U.S. Air Force has unrivaled transportation capabilities, but other countries provide smaller aircraft.

Brooks asked what the roles of Congress, the White House and NSF are to facilitate international cooperation. Augustine replied that it is the responsibility of NSF and the State Department to facilitate international cooperation with the support of Congress and the White House, to which Suresh agreed. Zapol said scientists are far ahead in collaborating internationally in their work.

Representative Suzanne Bonamici (D-OR) asked for comments on the impact of the sequester in light of the logistic-heavy budget for the Antarctic. Suresh said thousands of scientists would be affected, young people would be discouraged from going into science and engineering, and our future economic leadership would be in jeopardy. Augustine responded saying the cuts would disproportionately affect science in the Antarctic because the logistics that make the science possible cannot be cut.

Testimony from the witnesses and an archived webcast is available from the committee web site.

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