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NATIONAL VOLCANO EARLY WARNING AND MONITORING SYSTEM ACT

MARCH 2, 2010.—Ordered to be printed

Mr. BINGAMAN, from the Committee on Energy and Natural
Resources, submitted the following

R E P O R T

[To accompany S. 782]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 782) to provide for the establishment of the National Volcano Early Warning and Monitoring System, having considered the same, reports favorably thereon with an amendment and recommends that the bill, as amended, do pass.

The amendment is as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the “National Volcano Early Warning and Monitoring Program Act”.

SEC. 2. DEFINITIONS.

In this Act:

- (1) PROGRAM.—The term “program” means the National Volcano Early Warning and Monitoring Program established under section 3(a).
- (2) SECRETARY.—The term “Secretary” means the Secretary of the Interior.

SEC. 3. NATIONAL VOLCANO EARLY WARNING AND MONITORING PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall establish within the United States Geological Survey a program to be known as the “National Volcano Early Warning and Monitoring Program”.

(b) COMPONENTS.—The program shall consist of a national volcano watch office and data center, which shall oversee and coordinate the activities of United States Geological Survey regional volcano watch and data centers.

(c) PURPOSES.—The purposes of the program are—

- (1) to monitor and study volcanoes and volcanic activity throughout the United States at a level commensurate with the threat posed by each volcano; and
- (2) to warn and protect people and property from undue and avoidable harm from volcanic activity.

SEC. 4. MANAGEMENT.

- (a) **MANAGEMENT PLAN.**—
- (1) **IN GENERAL.**—Not later than 1 year after the date of enactment of this Act, the Secretary shall prepare a management plan for establishing and operating the program.
- (2) **INCLUSIONS.**—The management plan shall include—
- (A) annual cost estimates of—
- (i) operating the program; and
- (ii) updating the data collection, monitoring, and analysis systems;
- (B) annual standards and performance goals; and
- (C) recommendations for establishing new, or enhancing existing, partnerships with State agencies or universities.
- (b) **PARTNERSHIPS.**—The Secretary may enter into cooperative agreements or partnerships with State agencies and universities, under which the Secretary may designate the agency or university as volcano observatory partners for the program.
- (c) **COORDINATION WITH OTHER FEDERAL AGENCIES.**—The Secretary shall coordinate activities authorized under this Act with the heads of relevant Federal agencies including—
- (1) the Secretary of Transportation;
- (2) the Secretary of Commerce;
- (3) the Administrator of the Federal Aviation Administration; and
- (4) the Director of the Federal Emergency Management Administration.
- (d) **GRANT PROGRAM.**—
- (1) **IN GENERAL.**—The Secretary may establish a competitive grant program to support research and monitoring of volcanic activities in furtherance of this Act.
- (2) **COST-SHARING REQUIREMENT.**—The non-Federal share of the total cost of an activity provided assistance under this subsection shall be 25 percent.
- (e) **ANNUAL REPORT.**—The Secretary shall annually submit to Congress a report that describes the activities undertaken during the previous year to carry out this Act.

SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to carry out this Act \$15,000,000 for each of fiscal years 2009 through 2019.

PURPOSE

The purpose of S. 782, as ordered reported, is to establish within the United States Geological Survey a National Volcano Early Warning and Monitoring Program to coordinate research of volcanic activity in the United States.

BACKGROUND AND NEED

There are over 160 hazardous volcanoes located in the United States and its territories. The risks to life and property from volcanic activity are escalating as more people live, work, play, and travel in volcanic regions. The United States has experienced six major volcanic eruptions since 1900: Novarupta, AK (1912); Mt. Lassen, CA (1917); Mount St. Helens, WA (1980); Mauna Loa, HI (1984); Mt. Augustine, AK (1986); and Mt. Redoubt, AK (1989).

In addition, there have been many examples of ongoing volcanic activity, including the Spring 2009 eruption of Alaska's Redoubt Volcano near Anchorage; a series of earthquakes late in 2008 in Yellowstone National Park; a number of earthquakes and minor eruptions at Mount St. Helens in 2007 and 2008; and the ongoing eruption of Hawaii's Kilauea Volcano, which is now in its 26th year of continuous eruption.

Such incidents require ongoing monitoring, tracking, and response from the United States Geological Survey (USGS) and other authorities. The USGS works closely with the Secretary of Transportation, the Federal Aviation Administration, the Federal Emergency Management Administration, the National Oceanic and At-

mospheric Administration, the Forest Service, the National Park Service, and other local authorities to develop disaster plans and early warning systems in order to prevent the unnecessary loss of life and property.

Currently, the USGS has a series of volcano observatories that coordinate these activities. The observatories include the Alaska Volcano Observatory, based in Anchorage and Fairbanks, Alaska, which monitors the Aleutian volcanic chain; the Cascades Volcano Observatory, based in Vancouver, Washington, which monitors the Cascade Range volcanoes, including Mount St. Helens, Mount Rainier, and Mount Hood; the Hawaii Volcano Observatory, which is located in Hawaii Volcanoes National Park at the edge of the Kilauea Volcano; the Yellowstone Volcano Observatory, which monitors the caldera that occupies much of Yellowstone National Park; and the Long Valley Observatory, which monitors the Long Valley Caldera on the eastern front of the Sierras, California.

Beginning in fiscal year 1996, through fiscal year 2008, Congress provided supplemental funding for volcano monitoring through the Federal Aviation Administration. These funds, \$2.7 million per year, have been primarily used to expand monitoring networks beyond the Cook Inlet region of Alaska to a total of 33 volcanoes, all of which pose an ash hazard to heavily traveled North Pacific air traffic routes. This funding ended in FY 2008, however, leaving the long-term maintenance of these networks in jeopardy and some high threat volcanoes not adequately monitored.

As ordered reported, S. 782 would establish a new program within the U.S.G.S. including a national volcano watch office and data center, to oversee and coordinate the activities of the regional volcano observatories.

LEGISLATIVE HISTORY

S. 782 was introduced by Senators Murkowski and Begich on April 2, 2009. The Subcommittee on Public Lands and Forests held a hearing on the bill on June 17, 2009. (S. Hrg. 111-65). At its business meeting on December 16, 2009, the Committee on Energy and Natural Resources ordered S. 782 favorably reported with an amendment in the nature of a substitute.

COMMITTEE RECOMMENDATION

The Committee on Energy and Natural Resources, in open business session on December 16, 2009, by a voice vote of a quorum present, recommends that the Senate pass S. 782, if amended as described herein.

COMMITTEE AMENDMENT

During its consideration of S. 782, the Committee adopted an amendment in the nature of a substitute. As introduced, S. 782 would have established a national volcano early warning and monitoring system. The committee substitute instead establishes a program within the U.S.G.S. to coordinate and oversee volcano monitoring activities. The amendment authorizes the Secretary of the Interior to establish a competitive grant program to support research and monitoring of volcanic activities in furtherance of this Act.

The amendment is explained in detail in the section-by-section analysis, below.

SECTION-BY-SECTION ANALYSIS

Section 1 contains the short title, the “National Volcano Early Warning and Monitoring Program Act.”

Section 2 defines key terms used in the bill.

Section 3(a) directs the Secretary of the Interior to establish the National Volcano Early Warning and Monitoring Program within the United States Geological Survey.

Subsection (b) provides that the program shall consist of a national volcano watch office and data center, which shall oversee and coordinate the activities of U.S.G.S. regional volcano watch and data centers.

Subsection (c) states that the purposes of the program are to monitor and study volcanoes and volcanic activity throughout the United States and to warn and protect people and property from undue and avoidable harm from volcanic activity.

Section 4(a) directs the Secretary to prepare a management plan for establishing and operating the program within one year after the date of enactment.

Subsection (b) authorizes the Secretary to enter into cooperative agreements or partnerships with State agencies and universities, under which the Secretary may designate the agency or university as volcano observatory partners for the program.

Subsection (c) directs the Secretary to coordinate activities authorized under this Act with the heads of relevant Federal agencies, including the Secretary of Transportation, the Secretary of Commerce, the Administrator of the Federal Aviation Commission, and the Director of the Federal Emergency Management Administration.

Subsection (d) provides that the Secretary may establish a competitive grant program to support research and monitoring of volcanic activities in furtherance of the Act, with a requirement that the non-Federal share of the total costs of an activity funded by the grant be at least 25 percent.

Subsection (e) directs the Secretary to annually submit a report to Congress that describes the program activities undertaken during the previous year.

Section 5 authorizes the appropriation of \$15 million for each of fiscal years 2009 through 2019 to carry out the Act.

COST AND BUDGETARY CONSIDERATIONS

The following estimate of costs of this measure has been provided by the Congressional Budget Office:

S. 782—National Volcano Early Warning and Monitoring Program Act

Summary: S. 782 would authorize the appropriation of \$75 million over the 2010–2014 period for a U.S. Geological Survey (USGS) program to monitor active volcanoes and to enhance the agency’s ability to warn the public of potentially harmful volcanic activity. Based on information from USGS and assuming appropriation of the authorized amounts, CBO estimates that implementing the legislation would cost \$69 million over the 2010–2014 period and \$6

million after 2014. Enacting the legislation would not affect direct spending or revenues.

S. 782 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of S. 782 is shown in the following table. The costs of this legislation fall within budget function 300 (natural resources and environment).

	By fiscal year, in millions of dollars—					
	2010	2011	2012	2013	2014	2010–2014
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Authorization Level	15	15	15	15	15	75
Estimated Outlays	10	14	15	15	15	69

Basis of estimate: For this estimate, CBO assumes that the legislation will be enacted early in calendar year 2010 and that the authorized amounts will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for similar USGS activities.

S. 782 would authorize the appropriation of \$15 million a year over the 2010–2014 period for the USGS to establish a program to monitor active volcanoes and to provide warnings to protect individuals and property from the harmful effects of volcanic activity. The bill would require USGS to designate a national volcano watch office and data collection center. The bill also would require the Secretary of the Interior to prepare a management plan for establishing and operating the program and to submit an annual report to the Congress describing program activities. Finally, the bill would establish a grant program to support research and monitoring of volcanic activity. Based on information from USGS and assuming appropriation of the authorized amounts, CBO estimates that implementing the legislation would cost \$69 million over the 2010–2014 period and \$6 million after 2014.

Intergovernmental and private-sector impact: S. 782 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. State agencies and universities would benefit from grants and cooperative agreements in the bill for research and monitoring of volcanic activity. Any costs to those entities would be incurred voluntarily as a condition of receiving federal assistance.

Estimate prepared by: Federal Costs: Jeff LaFave; Impact on State, Local, and Tribal Governments: Melissa Merrell; Impact on the Private Sector: Brian Prest.

Estimate approved by: Theresa Gullo, Deputy Assistant Director for Budget Analysis.

REGULATORY IMPACT EVALUATION

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 782.

The bill is not a regulatory measure in the sense of imposing Government-established standards or significant economic responsibilities on private individuals and businesses.

No personal information would be collected in administering the program. Therefore, there would be no impact on personal privacy.

Little, if any, additional paperwork would result from the enactment of S. 782, as ordered reported.

CONGRESSIONALLY DIRECTED SPENDING

S. 782, as reported, does not contain any congressionally directed spending items, limited tax benefits, or limited tariff benefits as defined in rule XLIV of the Standing Rules of the Senate.

EXECUTIVE COMMUNICATIONS

The testimony provided for the record by the U.S. Geological Survey at the June 17, 2009 Subcommittee hearing on S. 782 follows:

STATEMENT OF THE GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Mr. Chairman and Members of the Subcommittee, thank you for this opportunity to provide testimony on Senate Bill 782, which is “to provide for the establishment of the National Volcano Early Warning and Monitoring System”. The Department would like to thank the Committee for its work on the bill, which recognizes a number of activities that USGS currently conducts under existing authorizations. The USGS operates a system of five Volcano Observatories for the purpose of reducing losses of life and property and minimizing social and economic disruptions during volcanic eruptions and their often protracted precursory phases. The USGS does this under the Disaster Relief Act (P.L. 93–288, popularly known as the Stafford Act) as the lead Federal agency with responsibility to provide notification for earthquakes, volcanic eruptions, and landslides to enhance public safety and to reduce losses through effective forecasts and warnings based on the best possible scientific information.

U.S. VOLCANIC HAZARDS AND USGS CAPABILITIES

The United States ranks as one of the top countries in the world in the number of active and potentially active volcanoes. Over the past three decades, 30 U.S. volcanoes have erupted on nearly 100 occasions, and an additional dozen volcanoes have exhibited periods of anomalous activity, unrest, that initially were worrisome but ultimately did not culminate in eruptions.

Volcanoes produce many kinds of destructive phenomena. In a few recent cases within the United States, communities near Mount St. Helen’s in Washington have been exposed to powerful explosions and mud flows, and in Hawaii, Kilauea volcano has sent lava flows into communities and noxious gas emissions have caused widespread lung ailments. Most U.S. volcanoes are located on sparsely populated Federal lands, and it is the threat to commu-

nities and infrastructure downstream and downwind, including to military and commercial aviation, that drives the need to properly monitor volcanic activity and provide forecasts and notifications of expected hazards. The most recent example is the 2009 eruption of Mt. Redoubt, Alaska that threatened a nearby oil loading terminal and disrupted civilian and military aviation operations for more than a week.

Hazardous volcanic activity will continue to occur, and the ongoing exposure of human life and enterprise will continue to be a primary consideration driving USGS volcano monitoring efforts. Fortunately, volcanoes exhibit precursory unrest that if detected and analyzed in time allows eruptions to be anticipated and communities at risk to be forewarned with reliable information in sufficient time to implement response plans and mitigation measures.

Monitoring volcanic activity in the United States is the responsibility of the USGS Volcano Hazards Program and is accomplished by the Alaska Volcano Observatory, Cascades Volcano Observatory, Yellowstone Volcano Observatory, Long Valley Observatory, and Hawaiian Volcano Observatory. To make maximum use of the Nation's scientific resources, the USGS operates the observatories with the help of universities and other Federal and States agencies, through formal partnerships. With the exception of the Hawaiian Volcano Observatory, which was established in 1912, U.S. Volcano Observatories have been established in response to specific eruptions or sustained levels of unrest. For example, the Cascades Volcano Observatory in Washington State was established in 1981, following the catastrophic awakening of Mount St. Helens in 1980, and continues to assess and monitor volcanic hazards in the Pacific Northwest.

The Volcano Hazards Program also maintains an international rapid-response team under the Volcano Disaster Assistance Program (VDAP), co-funded by the U.S. Office of Foreign Disaster Assistance within the U.S. Agency for International Development (USAID). This team responds to emergencies worldwide when called upon by the U.S. Department of State and also works to build volcano observatory infrastructure in other countries that are subject to volcanic disasters. Through VDAP, the USGS and its partners gain experience with a broad spectrum of volcano behavior and participate in disaster response and mitigation activities in a variety of physical and cultural settings, all of which inform and improve our domestic volcano-response capabilities.

The USGS works closely with other Federal agencies that contribute to volcano monitoring. The National Science Foundation has funded installation of geophysical instruments to detect ground deformation at about a dozen volcanoes for research projects through its EarthScope Program. Operational environmental satellites operated by the National Oceanic and Atmospheric Administration (NOAA) provide important global remote-sensing data

used by the Volcano Observatories to complement ground-based networks, NOAA also operates two of eight Volcanic Ash Advisory Centers (VAAC)—in Washington DC and in Anchorage, Alaska—that track the dispersion of volcanic-ash clouds hazardous to aircraft and disseminates this information to the Federal Aviation Administration, and commercial and military aircraft to avoid areas that may contain hazardous volcanic ash particles. The Smithsonian Institution’s Global Volcanism Program supports volcano monitoring activities by maintaining a comprehensive database on the eruptive histories of volcanoes throughout the world, providing data that are critical input to forecasting the likely future activity of restless volcanoes

RATIONALE FOR A NATIONAL VOLCANO EARLY WARNING AND MONITORING SYSTEM

We have learned from hard experience that waiting to deploy a robust monitoring effort until a hazardous volcano awakens and an unrest crisis begins means that scientists, civil authorities, businesses, and citizens are caught in a reactive mode of “playing catch up” with the volcano, trying to get instruments and civil-defense measures in place before the unrest escalates and the situation worsens. Precious time and data are lost in the weeks it can take to deploy a response to a reawakening volcano time and data that the public needs and should have to prepare for the hazards they may be confronted with. At present, 74% of the Nation’s moderate or high threat volcanoes are monitored by the USGS at various levels. Of the most threatening U.S. volcanoes, approximately half are monitored with at least basic real-time sensors (primarily seismic arrays). Of those, the three most active volcanoes in the U.S. are well monitored in real-time, with a suite of modern instrument types and methods that provide the ability to track detailed changes and apply models of ongoing and expected activity.

Volcanoes do not need to erupt to cause problems. Changes in a volcano’s behavior that are noted by the local population—such as increased smell of sulfur gases, steaming at the summit, or felt earthquakes—may cause an over-reaction, especially if fueled by rumors of an imminent eruption. This over-reaction may extend beyond the average citizen to corporations, small businesses, and government agencies. Without proper instrumentation installed on a volcano, it is difficult to ascertain whether activity is within the range of normal background behavior and thus of little concern or precursory to a significant eruption. In contrast, a well-instrumented volcano monitored by a local observatory coupled with an active program of community outreach can quickly replace rumors and speculation with sound scientific interpretation of the activity, thereby minimizing social and economic disruption.

The recent eruption of Redoubt volcano, Alaska, demonstrates both the utility of monitoring equipment in place

before unrest begins and the usefulness of modern instrumentation. Redoubt gained notoriety in its 1989–1990 eruption when a fully loaded passenger jet nearly crashed after its engines were shut down in flight by ingestion of airborne volcanic particles. Using the basic seismic network largely unchanged since 1990, along with other observations of subtle changes in the volcano’s baseline behavior, the Alaska Volcano Observatory detected the onset of unrest and raised the alert level for Redoubt in November 2008. AVO began monitoring the unrest closely to determine if activity was likely to escalate, plateau, or die down, and undertook to improve its monitoring capability in anticipation of a possible eruption and need for more data by adding instruments such as GPS, remote cameras, additional seismometers, and telemetry links. AVO was able to improve the network over a period of a few months, although the burdens of weather, winter, and safety concerns prevented installation of key new instruments that would have provided information about the subsurface rise of magma into the volcanic edifice. When the major explosive phase of the eruption began March 22, 2009, AVO’s warnings provided the public—including air carriers now well aware of the need to avoid ash-contaminated airspace and an oil terminal in the path of mudflows produced by the eruption—with enough time to undertake preparation and mitigation measures. In hindsight, it was fortunate that Redoubt provided AVO with sufficient time to improve its monitoring network as much as it did. These improvements were vital to the successful response to this eruption.

In 2005 the USGS published “An Assessment of Volcanic Threat and Monitoring Capabilities in the United States: Framework for a National Volcano Early Warning System, NVEWS” (<http://pubs.usgs.gov/of/2005/1164/>). The report is a comprehensive survey of installed instrumentation on the Nation’s volcanoes together with a rigorous ranking of volcanoes by threats posed to people and assets. This made possible a “gap” analysis, defining the disparity between priority monitoring as defined by threat potential and existing monitoring. Aviation hazards carried substantial weight in the NVEWS assessment. As part of the report, the USGS developed a methodology for assessing aviation threat on a regional and local basis at each volcano and determined that about $\frac{1}{3}$ of U.S. volcanoes represent a high or very high threat to aviation. Worldwide, numerous instances of fast-moving aircraft that inadvertently flew into diffuse clouds of tiny volcanic particles undetected by onboard weather radar have demonstrated the potentially costly and life-threatening damages that can be sustained.

The 2005 assessment prioritized volcanic centers where monitoring improvements should be upgraded: 13 in Washington, Oregon, and California, 3 in Hawaii, 1 in Wyoming, 28 in Alaska (where many active volcanoes have no ground-based monitoring yet pose a significant threat to

aviation), and 8 in the Northern Mariana Islands (also an area with significant hazards to aviation from unmonitored volcanoes).

The 2005 report also recommended a number of other steps beyond instrumentation improvements, including easier access to monitoring data, improved hazard-information products for decision-makers and the public, enhanced collaboration between USGS and external researchers, and innovative outreach to help communities develop risk-wise practices.

Currently, the USGS is authorized to implement all of the recommendations contained in NVEWS Report under the Stafford Act. After publication of the initial report in 2005, USGS began taking steps to implement some of the Report's recommendations. In 2009, USGS plans to finalize a strategy to achieve the recommendations of the report. NVEWS-recommended upgrades planned for the upcoming year include upgrades to monitoring capabilities at Newberry and Crater Lake volcanoes in Oregon. Furthermore, \$15.2 million in funding under the American Recovery and Reinvestment Act will be used primarily to modernize existing monitoring equipment at Kilauea and Mauna Loa volcanoes in Hawaii, at Anatahan and Sarigan volcanoes in the Northern Mariana Islands, at Yellowstone Caldera in Wyoming, and at Spurr, Redoubt and Augustine volcanoes in the Cook Inlet of Alaska; the software and communication systems used to transmit data from that equipment also will be modernized. Additionally, ARRA funds will be used to produce high-resolution topographic maps of volcanic areas in the Pacific Northwest that will greatly aid in development of volcanic-hazard mitigation plans by local communities.

S. 782 would authorize \$15 million in additional funding to implement NVEWS, which has been adopted as USGS policy for volcano hazards in "Facing Tomorrow's Challenges—U.S. Geological Survey Science in the Decade 2007–2017" (USGS Circular 1309).

ELEMENTS OF THE NATIONAL VOLCANO EARLY WARNING AND MONITORING SYSTEM (NVEWMS)

1. Improved monitoring infrastructure—targeting the volcanoes that are significantly under-monitored for the threats posed. This will be done principally in Alaska, Hawaii, the Commonwealth of the Northern Mariana Islands, California, Washington, Oregon, and Wyoming. In addition to installation of new networks and telemetry, out-dated patchwork monitoring systems will be modernized.

2. Measures for reduced community vulnerability—supporting communities in developing plans for mitigating volcanic risk. As with earthquakes, a key to risk mitigation is preparation. This means identifying high-risk areas and community vulnerabilities, creating new hazard-information products, and continuing to build broad-based hazard awareness.

3. An external grants program—to engage the Nation’s broader scientific community in advancing volcano monitoring science and technology and the societal aspects of volcanic risk mitigation. Volcanology is advancing rapidly both through growing understanding of volcanic processes and through advances in technology that make possible new kinds of observations. Many of these advances have occurred through the National Science Foundation’s basic research programs and through the efforts of USGS scientists. The framework identifies a need, however, to provide support for engaging the Nation’s nonfederal scientists in applied volcanology, through a competitive, peer-reviewed grants process to support investigations complementary to but not duplicative of NSF-supported research.

4. Volcano Watch Office—for readily available situational awareness of current volcanic conditions. At present, Volcano Observatories mount 24/7 responses during eruption crises by drawing heavily from partners and other observatories, as well as regular daytime staff, for support. There is a danger of missing important precursors between such crises. A 24/7 Watch Office will provide backup to observatories and also serve as a single point of contact for other federal agencies such as FAA, NOAA, and the Department of Defense that require situational awareness around the globe and around the clock.

5. National Volcano Data Center—as a gateway for access to U.S. volcano data, both within the observatory system and for the external scientific community. The free exchange of data both within the observatory system and to the broader scientific community and public is fundamental to scientific advancement, risk mitigation, and government transparency.

The USGS will not carry out NVEWMS by itself, but will build on its long record of successfully partnering with diverse groups that have expertise and data to share in the mission of helping people co-exist with dangerous volcanoes. Our partners range from the international and national levels, such as with the U.S.A.I.D., the Air Force Weather Agency, NOAA, and the Federal Aviation Administration to the regional and local scale with neighboring universities and State agencies that are part of the structure of the Volcano Observatories. Using our strategic partnering approach, the USGS will continue to apply new efforts to implement a National Volcano Early Warning and Monitoring System.

KEY OUTCOMES OF NVEWMS IMPLEMENTATION

The key outcome of NVEWMS will be to strengthen the scientific contribution to risk mitigation. Comprehensive monitoring of the Nation’s most hazardous volcanoes, coupled with greater understanding of volcanic processes, will improve forecasts of the onset, intensity, duration, and effects of expected hazards. New hazard-information products and dissemination methods will be developed by close

collaboration between scientists and users. Timely and accurate warnings to en-route aircraft will help prevent dangerous encounters with volcanic ash while minimizing costly unnecessary rerouting of aircraft. Overall, civil authorities, businesses, and individuals at risk will have more time and better information to prepare, ensuring that their ability to respond will not lag behind the evolving behavior of a volcano. Volcanic unrest does not always culminate in eruption, and long-term volcano monitoring will provide sound, ongoing, scientific information throughout episodes of unrest so that problems related to over-reacting or under-reacting will be minimized.

More than a network of instruments, NVEWMS will connect the monitoring and research results of scientists to the needs of decision-makers at the national to local level so that the impact of volcanic activity on the Nation is minimized. The real needs of diverse types of users will be ascertained and addressed to ensure that scientific advances are effectively applied in the real world.

CONCLUSION

The USGS appreciates the Committee's support for NVEWS, which is of the utmost importance to our Nation's ability to respond successfully to future volcano hazards. We note that this funding would have to compete with existing priorities within the USGS. Additionally, we are concerned that the 5-year management plan required in Section 4 of the proposed legislation requires pre-decisional budget and planning information up to five years in advance.

As the Nation continues to face significant threats from volcanic hazards in the future, the USGS will work to address the recommendations of the 2005 NVEWS report. The Survey has an exceptional record, both nationally and internationally, of scientific accomplishment in applied volcanology and we will continue to move forward with our efforts to upgrade volcano monitoring capacity for those areas which have been judged to be the highest priority.

Mister Chairman, this concludes my remarks. I will be pleased to answer any questions you may have.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee notes that no changes in existing law are made by the bill S. 782 as ordered reported.

