ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2014

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

RODNEY P. FRELINGHUYSEN, New Jersey, *Chairman*

MICHAEL K. SIMPSON, Idaho
RODNEY ALEXANDER, Louisiana
ALAN NUNNELEE, Mississippi
KEN CALVERT, California
JOHN R. CARTER, Texas
CHARLES J. FLEISCHMANN, Tennessee

MARCY KAPTUR, Ohio
PETER J. VISCLOSKY, Indiana
ED PASTOR, Arizona
CHAKA FATTAH, Pennsylvania

NOTE: Under Committee Rules, Mr. Rogers, as Chairman of the Full Committee, and Mrs. Lowey, as Ranking Minority Member of the Full Committee, are authorized to sit as Members of all Subcommittees.

ROB BLAIR, ANGIE GIANCARLO, LORAINE HECKENBERG,
BEN HAMMOND, and PERRY YATES,
Staff Assistants

PART 6

DEPARTMENT OF ENERGY

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE

87–778 WASHINGTON : 2014

COMMITTEE ON APPROPRIATIONS

HAROLD ROGERS, Kentucky, *Chairman*

C. W. BILL YOUNG, Florida [1]
FRANK R. WOLF, Virginia
JACK KINGSTON, Georgia
RODNEY P. FRELINGHUYSEN, New Jersey
TOM LATHAM, Iowa
ROBERT B. ADERHOLT, Alabama
KAY GRANGER, Texas
MICHAEL K. SIMPSON, Idaho
JOHN ABNEY CULBERSON, Texas
ANDER CRENSHAW, Florida
JOHN R. CARTER, Texas
RODNEY ALEXANDER, Louisiana
KEN CALVERT, California
JO BONNER, Alabama
TOM COLE, Oklahoma
MARIO DIAZ-BALART, Florida
CHARLES W. DENT, Pennsylvania
TOM GRAVES, Georgia
KEVIN YODER, Kansas
STEVE WOMACK, Arkansas
ALAN NUNNELEE, Mississippi
JEFF FORTENBERRY, Nebraska
THOMAS J. ROONEY, Florida
CHARLES J. FLEISCHMANN, Tennessee
JAIME HERRERA BEUTLER, Washington
DAVID P. JOYCE, Ohio
DAVID G. VALADAO, California
ANDY HARRIS, Maryland

NITA M. LOWEY, New York
MARCY KAPTUR, Ohio
PETER J. VISCLOSKY, Indiana
JOSÉ E. SERRANO, New York
ROSA L. DELAURO, Connecticut
JAMES P. MORAN, Virginia
ED PASTOR, Arizona
DAVID E. PRICE, North Carolina
LUCILLE ROYBAL-ALLARD, California
SAM FARR, California
CHAKA FATTAH, Pennsylvania
SANFORD D. BISHOP, JR., Georgia
BARBARA LEE, California
ADAM B. SCHIFF, California
MICHAEL M. HONDA, California
BETTY MCCOLLUM, Minnesota
TIM RYAN, Ohio
DEBBIE WASSERMAN SCHULTZ, Florida
HENRY CUELLAR, Texas
CHELLIE PINGREE, Maine
MIKE QUIGLEY, Illinois
WILLIAM L. OWENS, New York

[1] Chairman Emeritus

WILLIAM E. SMITH, *Clerk and Staff Director*

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2014

TUESDAY, MARCH 19, 2013.

ENVIRONMENTAL MANAGEMENT FY 2014 BUDGET

WITNESS

DAVE HUIZENGA, SENIOR ADVISOR, ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF ENERGY

Mr. NUNNELEE. This was a last minute change of plans, and so, the witness is David Huizenga, Senior Advisor for Environmental Management to the Secretary of Energy.

Mr. Huizenga, we welcome you back to the Subcommittee. We appreciate the work you have done over the last two years, and we look forward to your testimony.

The reductions in the FY 2013 President's budget request for the Office of Environmental Management have not been compounded by sequestration. Many people are bracing for it, and I am particularly concerned about the impacts to jobs and small businesses. I hope you can give us some clarity on what to expect.

But we have worked hard to return to regular order, but it had a lot of difficulties in 2013. In addition, FY 2014, the President's budget request is already more than a month late, and I am told we are not going to see it until well into April.

This is going to make it exceedingly difficult to cope with and will require another continuing resolution. The legislation can provide solutions to the imbalances across site activities and will most likely be beyond our grasp for at least another six months.

While we could easily become absorbed in the funding challenges of the next six months, there are also a number of long-term challenges.

The announcement that six more tanks at Hanford could be leaking has everyone concerned—not just because of the continued risk produced by the millions of gallons of dangerous radioactive liquid waste being stored there in aging underground tanks.

The news is also disturbing because we recognize that the timeframe to deal with this waste promises to be too long. The options we have are limited, and the potential solutions are riddled with technical complications.

Hanford is not the only cleanup site where the Department is struggling to make progress. The Department of Energy has made too many cleanup commitments that it will be able to keep, and your ability to meet the milestones will be weighed down by further failures in the past to deliver projects on time and on budget.

We will investigate this problem in-depth tomorrow, during our hearing on the Department's major construction projects. Please ensure that the hearing record, responses to the questions for the record, any supporting information requested by this Subcommittee are delivered in final form to us, no later than four weeks from the time you receive them.

I also ask that if members have additional questions they would like to submit to the Subcommittee for the record, that they do so by 5:00 p.m. tomorrow.

So, with those opening comments, I would like to yield to our ranking member, Ms. Kaptur, for any opening comments that she would like to make.

[The information follows:]

OPENING STATEMENT
The Honorable Rodney Frelinghuysen
Chairman, Energy and Water Development Subcommittee
House Committee on Appropriations

Hearing on the Budget for the
Department of Energy's
Office of Environmental Management
March 19, 2013

Good morning, everyone. We have before us today David Huizenga, Senior Advisor for Environmental Management to the Secretary of Energy. We welcome you back to the Subcommittee. Leading a program that is fraught with such daunting technical, management and regulatory challenges is no easy task. We appreciate the work you've done over the last two years and we look forward to your testimony.

The reductions in the fiscal year 2013 President's Budget Request for the Office of Environmental Management are now being compounded by sequestration. Many people are bracing for news on what the actual site impacts will be, and I am particularly worried about the impacts to jobs and small businesses. I hope in this hearing, you can provide some clarity on what to expect.

This Committee has worked hard to return to regular order, but it looks like we are facing a full-year Continuing Resolution. In addition, the fiscal year 2014 budget request is more than a month late. I'm told we may not see it until well into April, and this will make it exceedingly difficult to

write our bills in time to avoid another Continuing Resolution for fiscal year 2014. That means that any relief that legislation can provide to alleviate some of the imbalances across site activities will most likely be beyond our grasp for at least another six months.

While we could easily become absorbed in the funding challenges of the next six months, there are also a number of long term challenges. The announcement that six more tanks at Hanford could be leaking has everyone concerned, not just because of the continued risk posed by the millions of gallons of dangerous radioactive liquid waste being stored there in aging underground tanks. This news is also disturbing because we recognize that the timeframe to deal with this waste promises to be long, the options we have are limited, and the potential solutions are riddled with technical complications.

Hanford is not the only cleanup site where the Department is struggling to make progress. The Department of Energy has made too many cleanup commitments that it will not be able to keep and your ability to meet milestones will be weighed down further by failures in the past to deliver projects on time and on budget. We will investigate this problem in depth tomorrow during our hearing on the Department's Major Construction Projects.

Please ensure that the hearing record, responses to the questions for the record, and any supporting information requested by the Subcommittee are delivered in final form to us no later than four weeks from time you receive them. I also ask that if Members have additional questions they

would like to submit to the Subcommittee for the record, that they please do so by 5:00 PM tomorrow.

With those opening comments, I would like to yield to our ranking member, Ms. Kaptur, for any opening comments that she would like to make.

Ms. KAPTUR. Thank you, Mr. Chairman.

Good morning, Mr. Huizenga. It is good to see you again this morning. Thank you for your service to our country. You have managed your responsibilities, and you will leave the nation in better shape than you found it.

Mr. HUIZENGA. I hope so.

Ms. KAPTUR. Thank you for taking the time to discuss the environmental program with us today. The Manhattan Project and the resulting nuclear weapons complex is an unparalleled scientific advancement, both in its size and legacy, made possible by the development of an unprecedented infrastructure and industry.

Today, we must address the cumulative environmental impacts of that monumental undertaking, to ensure the health and safety of those communities affected now and into the future.

The federal government's obligation to remediate these sites is without question. However, given the constrained fiscal environment, it will be paramount that our resources are used to their fullest potential.

Many of the promises made to local communities were premised on a $6 billion program, one which was likely unrealistic and, in view of today's budget constraints, next to impossible.

I understand that the Department is undergoing a review of the implications of flat funding to the cleanup efforts. So, I am interested today in understanding what that might mean for your program.

Further, sequestration is now a reality. I view it as a misguided approach that will cut economic growth, and holds the potential for real impacts on your program.

I expect today you will be able to discuss in some detail the impacts of these across-the-board cuts to the sites and jobs within your authority.

Given the austere budget environment, issues of project management and corporate governance are increasingly vital to the success of the Department's mission. If strong leadership and fundamental management reform are not forthcoming at the Department of Energy, it will significantly inhibit the execution of this mission, as well as the Department's credibility.

I hope that you will take some time today to update us on your actions in this regard, and we really appreciate your time today, and thank you, Mr. Chairman.

Mr. NUNNELEE. So, Mr. Huizenga, if you would like to make an opening statement——

Mr. HUIZENGA. Thank you, Mr. Chairman. Good morning, Mr. Chairman, ranking member Kaptur, and members of the Subcommittee.

I am pleased to be here today to represent the Department's Office of Environmental Management—or EM, as we call it.

I would like to provide you with an overview of their program, their key accomplishments to-date this fiscal year, and the projected impacts of sequestration.

As you know, EM is the world's largest radioactive cleanup program, responsible for safe disposition of 88 million gallons of radioactive waste, over 10,000 containers of excess plutonium and ura-

nium, and millions of cubic meters of contaminated soil and groundwater.

Since we started our efforts almost 25 years ago, we have completed work at 90 of our 107 sites. To execute this cleanup, we have developed and employed many first-of-a-kind technologies to enhance our efficiency, making EM and its contractors world leaders in radioactive waste management and remediation.

EM has a number of accomplishments already this fiscal year. First, we are making continuous improvement in integrated safety management.

During my tenure, EM has strengthened its safety and security culture. We have trained more than 800 senior federal and contractor managers. We are sharing lessons learned and best practices among our sites, and working to improve our security and quality assurance programs across all of EM. We are a learning organization, and will continue to improve our organizational culture.

I am pleased to report that EM has been making steady progress in improvements in project and contract management—areas that you know GAO has designated as a governmental high risk for many years.

On February 14 this year, GAO removed the majority of EM's projects from the high-risk list. Of our 15 ongoing capital projects, 11 of them have been removed, leaving only our four largest major capital projects.

Two of these projects are proceeding well, and involve cleanup efforts along the Columbia River at the Hanford site, and the decommissioning of the Oak Ridge gaseous diffusion plant.

The remaining two large construction projects, the waste treatment and mobilization plant at Hanford and the salt waste processing facility at Savannah River, involve processing and treatment of high-level radioactive waste.

These first-of-a-kind facilities have proven to be particularly challenging. That being said, steady progress continues on both. I will touch on those just briefly.

The WTP—or waste treatment and mobilization plant—is vital to the Department's efforts to treat and store the wastes in the underground storage tanks at Hanford, including the 149 single-shell tanks, several of which are, indeed, believed to have leaked almost a million gallons of waste into the soil in the past.

Recent analyses suggests six tanks are continuing to slowly leak. While these slow leaks present no immediate health risk, they do serve as a reminder that DOE must remove the waste from the tanks, and the WTP is the ultimate solution for the bulk of this waste.

Over the last several months, the Energy Secretary and a number of top scientists and engineers have been reviewing the remaining technical issues that impact the project. The Department will resolve these issues prior to resuming full construction activities in the high-level waste and pretreatment facilities.

Please keep in mind, however, that full construction continues on the several other WTP facilities that are not impacted by these technical issues.

EM's second largest construction project, the salt waste processing facility at Savannah River, is 69 percent complete. There are

no outstanding technical issues, as the pilot version of this plant has been operational since 2008, and has processed over 3 million gallons of tank waste to date.

Delays in the delivery of key facility components have resulted in some cost overruns and schedule delays, and we are working now closely with our contractor to identify the most economical and timely path forward for completion.

We continue to make significant progress across the complex in our cleanup activities—notably in Oakridge, Tennessee. The Environmental Management program has now demolished almost 90 percent of the K–25 gaseous diffusion plant, which, of course, was the largest building in the world under one roof at the time of construction and the Manhattan Project.

At the Idaho National Laboratory, EM has completed the construction of the eighth buried waste retrieval facility, on schedule and under cost; with a total area of just under two acres, it is the largest facility of its kind that has been built on the site.

To-date, this fiscal year, Savannah River has treated and stabilized nearly 600,000 gallons of high-level liquid waste.

And at Hanford, EM has made major progress this year in cleanout of one of the site's most complex and hazardous facilities, a Plutonium Finishing Plant.

And, finally, at the Los Alamos National Laboratory, the site completed nearly 250 shipments of transuranic waste to the Waste Isolation Pilot Plant in New Mexico, working closely with stakeholders and regulators to realign our priorities based on risk.

Unfortunately, some of this excellent work will, indeed, be slowed down by the upcoming budget reductions due to sequestration. Like other federal agencies, EM faces significant negative impacts from sequestration, which will result in across-the-board cuts for EM, totaling more than $420 million.

As a result of these cuts, the Department's contractors may be forced to furlough or lay off almost 7,000 workers, and funding reductions may put numerous enforceable environmental compliance milestones at risk.

In conclusion, Mr. Chairman, I am honored to be here today, representing the talent and skills of our federal and contractor workforce. EM is committed to achieving our mission, and will continue to apply innovative environmental cleanup strategies to complete our work safely, on schedule, and within cost, thereby demonstrating a solid value to the American taxpayers.

This concludes my opening remarks, and I would be happy to answer any questions you and your colleagues have at this time.

[The information follows:]

Written Statement of David Huizenga
Senior Advisor for Environmental Management
United States Department of Energy
Before the Subcommittee on Energy and Water Development
Committee on Appropriations
United States House of Representatives

March 19, 2013

Good morning, Mr. Chairman, Ranking Member Kaptur, and Members of the Subcommittee. I am pleased to be here today to represent the Department of Energy's (DOE) Office of Environmental Management (EM). I would like to provide the Members with an overview of the EM program, key accomplishments during the past year, 2013 planned accomplishments and progress to date, and the projected impacts of sequestration.

Overview of the EM Mission

EM's mission is to complete the safe cleanup of the environmental legacy resulting from five decades of nuclear weapons development and government-sponsored nuclear energy research. This environmental legacy includes 88 million gallons of the world's most dangerous radioactive wastes, thousands of tons of spent nuclear fuel (SNF), over ten thousand containers of excess plutonium and uranium, over five thousand contaminated facilities, millions of cubic meters of contaminated soil and billions of gallons of contaminated groundwater. As the largest environmental cleanup program in the world, EM was charged with the responsibility of cleaning up 107 sites across the country; an area equal to Rhode Island and Delaware combined. EM has made significant progress in this cleanup mission, completing work at 90 of the 107 cleanup sites through the end of 2012.

EM Cleanup Objectives

EM continues to pursue its cleanup objectives safely within a framework of nuclear safety orders, environmental regulatory compliance commitments and best business practices. The rationale for cleanup prioritization is based on achieving the highest risk reduction benefit per radioactive content (activities focused on materials and wastes that contain the highest concentrations of radionuclides and sites with the highest radionuclide contamination). Taking many variables into account, EM has generally prioritized its cleanup activities across the EM complex as follows:

- Safety and security
- Environmental Compliance

- Radioactive tank waste stabilization, treatment, and disposal
- Spent (used) nuclear fuel storage, receipt, and disposition
- Special nuclear material consolidation, stabilization, and disposition
- High-risk soil and groundwater remediation
- Transuranic and mixed/low-level waste disposition
- Soil and groundwater remediation
- Excess facilities deactivation and decommissioning.

In addition to these priorities, EM is committed to sound technology development and deployment as a way to reduce costs and fulfill our critical mission. EM develops and implements first-of-a-kind technologies to further enhance its ability and efficiency in cleaning up radioactive waste. Through these innovations, EM and the companies that perform its cleanup work have remained world leaders in this arena. Our work in EM enables other crucial DOE missions to continue across the United States. By reducing our cleanup footprint, EM is lowering the cost of security, surveillance, infrastructure, and overhead costs that would otherwise continue for years to come.

Additional strategies are integrated into cleanup activities that are important to the achievement of EM cleanup progress as well as the stakeholders and states where cleanup sites are located. Most importantly, EM will continue to discharge its responsibilities by conducting cleanup within a "Safety First" culture that integrates environmental, safety, and health requirements and controls into all work activities. This ensures protection to the workers, public, and the environment.

Key Accomplishments in the Past Year

I would like to take this opportunity to highlight a number of the Office of Environmental Management's most recent accomplishments.

Continuous Improvement in Integrated Safety Management

One of my highest areas of emphasis has been in leading improvements to the organizational, safety, and security culture of EM. An organization's culture directly impacts how the organization performs. For industrial organizations, and particularly for nuclear organizations, having a strong safety and security culture is imperative for ensuring the safe and secure performance of work. It must be a fundamental value shared by all members of the organization, at all levels within the organization.

In 2011, DOE accepted the Defense Nuclear Facilities Safety Board recommendation to strengthen the safety culture at the Waste Treatment and Immobilization Plant in Hanford. Recognizing the importance of this initiative we have expanded our scope to improve safety culture at all of our EM sites. Efforts in this area are ongoing, and we have trained more than 800 senior federal and contractor managers on Leadership for a Safety Conscious Work Environment. We are seeing a clear recognition by managers of the need to improve the flow down of expectations throughout our sites and headquarters. We have also continued to improve our safety and security culture through other ongoing initiatives, such as evaluating field site safety management, sharing safety lessons learned and best practices, and working to improve our security and quality assurance programs across all of EM.

Part of maintaining a strong organizational culture is embracing the concepts of continuous improvement and being a learning and questioning organization. While EM has already seen significant improvements in its culture, there is more work to be done, and this will continue to be a key area of focus for EM.

Project and Contract Management

A second area of emphasis has been improvement of project and contract management, considering EM's project and contract management has long been designated a governmental "high risk area" by the Government Accountability Office. Key EM reforms in this area include implementing policies requiring more front-end planning; ensuring federal project directors and contracting officers have access to relevant training to help enhance their project and contract management knowledge; improving cost estimating; conducting more frequent project reviews by peers and experts in project management to ensure issues are identified early and lessons learned are being applied in real-time; selecting proper contract types; tying fee strategies to final outcomes; and restructuring our portfolio into smaller, better defined capital asset projects and non-capital operations activities.

These reforms are already bearing fruit. GAO has recognized EM's progress in this area. On February 14, 2013, GAO issued its biennial update to the high risk list. In recognition of EM's improvements in contract and project management, GAO narrowed the scope of its high risk designation, focusing on EM capital asset projects with costs greater than $750 million. In the report, GAO recognized EM management for demonstrating "strong commitment and top leadership support for improving contract and project management." EM will continue the specific project and contract management reforms above.

The Office of Environmental Management is continuing to make progress on constructing EM's two largest projects -- the Waste Treatment and Immobilization Plant in Richland, Washington and the Salt Waste Processing Facility in Aiken, South Carolina.

The Waste Treatment and Immobilization Plant is vital to the Department of Energy's mission to treat and immobilize in glass the bulk of approximately 56 million gallons of radioactive waste stored in 177 underground storage tanks at the Hanford site. We have focused our attention on resolving the technical and management issues at the Pretreatment Facility and the High-Level Waste Facility. Full construction continues on the Low-Activity Waste Facility, Analytical Laboratory and the Balance of Facilities (support facilities). The Department has determined it may now start ramping-up construction activities in the High-Level Waste Facility in areas not impacted by technical issues. Over the last several months, the Energy Secretary and a number of top scientists and engineers have been reviewing many aspects of the project. Approaches are being evaluated to resolve the criticality, hydrogen generation, erosion/corrosion, and tank mixing issues. Technical teams developed as a result of this review draw upon expertise from academia, industry, and the Department's national laboratories. The Department is committed to resolve these issues in order to produce a high-confidence design and baseline for the Pretreatment and the High-Level Waste facilities of the WTP, prior to resuming full construction activities.

EM's second largest construction project is the Salt Waste Processing Facility, which will treat the salt portion of the liquid radioactive waste inventory at the Savannah River Site is 69 percent complete. A pilot version of the plant has been operational since 2008, and as a result we have high confidence in the technical capabilities of SWPF. To date, the pilot plant has processed over 3 million gallons of tank waste. Due to delays in the delivery of key facility components at acceptable quality levels for nuclear facilities, including mixing vessels, SWPF is experiencing cost over-runs and schedule delays. Since the delivery of the mixing vessels last year, we are working closely with our contractor to identify the most economical and timely path for completion.

Finally, I would like to provide an update on a third important EM construction project. The Integrated Waste Treatment Unit will treat 900,000 gallons of radioactive liquid waste stored in underground tanks at the Idaho National Laboratory. Following the completion of construction, the facility began startup testing. However, startup testing was suspended in June 2012 to allow detailed evaluation of a system pressure event that occurred during cold commissioning.

Each of these three construction projects involve the processing, treatment and immobilizing high level radioactive/hazardous waste into glass or solid carbonate. These projects have been especially challenging considering these are first-of-a-kind and one-of-a-kind facilities.

Cleanup Progress

Thanks, in part, to the improvements in integrated safety management, contract management, and project management, EM has achieved major cleanup successes.

- *Footprint Reduction.* In 2009, the total footprint of EM's cleanup sites was 931 square miles. Through January 2013, we have reduced that figure by 74 percent, primarily through the use of Recovery Act funding to complete the cleanup of large areas of the Hanford and Savannah River sites.
- *High Level Radioactive Waste.* We have also made significant progress in the treatment of high level radioactive waste, which represents the most hazardous and costly component of our cleanup mission. At the Savannah River Site, we achieved closure of two high level waste tanks—the first tanks closed at the site since 1997—and packaged a record high of 275 canisters of high level waste at the Defense Waste Processing Facility.
- *Transuranic Waste.* Finally, we continue to achieve major successes with our nation-wide program for the transportation and disposition of transuranic waste. To date, we have sent more than 11,000 shipments of this waste to the Waste Isolation Pilot Plant in Carlsbad, New Mexico for disposal. At this one-of-a-kind facility, EM emplaces solid radioactive waste in underground salt beds at a depth greater than the height of the Empire State Building.

EM has achieved significant progress. However, I would also like to provide you an update on an issue that has emerged this year. In 2005, DOE completed a tank stabilization effort designed to remove much of the liquid waste from Hanford's single shell tanks. Last month DOE found that one tank continues to leak and five other tanks are showing declining liquid level trends that may indicate leaking. Video examination of the interior of the tanks is planned in the coming months to confirm the leaks. Both the Department of Energy and the Washington State Department of Ecology agree that the leaks pose no immediate health threat. But safe storage of tank waste until it can be treated for permanent disposal is a top priority, and the Office of Environmental Management is working to further investigate and evaluate the steps needed to address the issue.

FY 2013 Planned Accomplishments and Progress to Date

In FY 2013, EM will continue to reduce environmental risks associated with radioactive and hazardous contamination across the EM complex. Under the President's FY 2013 budget request, specific planned accomplishments included the immobilization of over one million gallons of high level liquid radioactive waste, the closure of two high level waste tanks, the demolition of over 40 radioactive and nuclear facilities, and the disposal of nearly 10,000 cubic meters of legacy transuranic waste.

EM has already made significant progress this fiscal year. I would like to take this opportunity to highlight just a few of the year's notable cleanup accomplishments:

- In Oak Ridge, Tennessee, EM completed the demolition of the north wing of the radioactively contaminated K-25 facility. K-25 was the world's first gaseous diffusion plant for uranium enrichment, and it was the largest building in the world under one roof at the time of construction. The north wing alone was nearly as large as two football fields. EM has now demolished almost 90% of the overall K-25 facility.
- At the Idaho National Laboratory in Idaho Falls, EM has completed the construction of the eighth buried waste retrieval facility on schedule and under cost. Accelerated Retrieval Project VIII (ARP VIII) has been constructed over pits 1 and 2 at the Subsurface Disposal Area. With a total area of just under two acres, it is the largest facility of its kind that has been built on the site.
- To date this fiscal year, the Savannah River Site has treated nearly 600,000 gallons of high level liquid waste, stabilizing the highly radioactive constituents of this waste in 67 vitrified glass canisters.
- At the Hanford Site, EM has made major progress this year in the cleanout of one of the site's most complex and hazardous facilities, the Plutonium Finishing Plant. In October, EM removed a 10-ton, two-story contaminated glovebox from the plant. EM has now removed over 75 percent of the facility's 232 gloveboxes, marking major progress on the path of demolishing the facility.
- At the Paducah site, EM successfully demolished one of the site's most contaminated structures the seven-story Metals Plant. The project was completed ahead of schedule and within budget, and represents a major milestone in the cleanup of the Paducah Gaseous Diffusion Plant.
- At the Los Alamos National Laboratory, the site completed nearly 250 shipments of transuranic waste to the Waste Isolation Pilot Plant through December 2012. This surpassed the shipment target for the year by nearly a third, and also shattered the previous site record of 171 annual shipments. The site's waste shipment progress is a testament to the benefits of effective cooperation with stakeholders and regulators. After the 2011 Las Conchas Fire threatened the Laboratory's transuranic radioactive waste storage facility, EM worked with regulators and stakeholders to realign site priorities to support the accelerated disposal of this waste.

The Impact of Sequestration

Like other federal organizations, EM faces significant negative impacts from sequestration. Sequestration will result in across-the-board cuts totaling more than $420 million in states like Tennessee, New Mexico, Idaho, Washington and South Carolina. This constitutes an on average 7 percent reduction in annual funding, but since the entire reduction is being implemented in the second half of the fiscal year, it actually results in a 14 percent reduction in available funds for the balance of the fiscal year.

- As a result of sequestration, we understand that the Department's contractors may be forced to furlough or layoff about 6,900 employees who are responsible for cleaning up nuclear waste at our nation's two highest risk cleanup sites in Washington State and South Carolina. These employment actions may delay the environmental cleanup and remediation work these workers do to protect human health and the environment.
- In addition, the Department is in legally binding agreements with state and federal regulators to make progress in addressing environmental contamination, and funding reductions would put numerous enforceable environmental compliance milestones at risk.
- These cuts may also curtail our ability to continue our progress related to closing the aging -- and in some cases leaking -- single-shell tanks storing over 25 million gallons of liquid radioactive waste at the Hanford site in eastern Washington State.
- Additionally, funding reductions will impact the Waste Isolation Pilot Plant in Carlsbad, New Mexico, which serves as the permanent U.S. geologic repository for transuranic defense waste. The site's ability to support hundreds of radioactive waste shipments this year may be impaired, which could curtail progress on these cleanup activities in several states across the nation.

Conclusion

Mr. Chairman, Ranking Member Kaptur, and Members of the Subcommittee, I am honored to be here today representing the Office of Environmental Management. EM is committed to achieving our mission and will continue to apply innovative environmental cleanup strategies to complete work safely, on schedule, and within cost thereby demonstrating value to the American taxpayers. I am pleased to answer any questions you may have.

Mr. NUNNELEE. Sure. Thank you, Mr. Huizenga.

Seems like we are both interested in the impact of sequestration—in fact, you just reported that you are going to have a number of projections for furloughs or layoffs of thousands of contracted employees.

But I am not sure I understand how that impacts individual sites. We are concerned about the impact to jobs, but we need to have a clear understanding of the programmatic impacts, as well.

So, can you give us a site-by-site impact for the rest of the year, under sequestration?

Mr. HUIZENGA. I can give you a snapshot, Mr. Chairman, as we understand it now, but I do have to preface this by saying that, you know, we are continuing to work with the contracting community on a daily basis, to try to minimize the impacts to the extent that we can, recognizing that there will be some serious impacts. I can give you some ballpark figures.

For instance, at the Los Alamos site, we would have on the order of just shy of 200 contractor furloughs. At the Oak Ridge site, there would be on the order of 100, 150 layoffs. Richland, Washington, maybe up to 1,700 furloughs and just under 200 layoffs. At the Office of River Protection, which manages the vitrification facility we have been talking about, up to 2,700 furloughs and 125 layoffs. At the Paducah site, 120 layoffs. And Savannah River, over 2,000 furloughs.

Mr. NUNNELEE. All right. So, what do you consider your five most pressing concerns for carrying out your work for the remainder of this fiscal year?

Mr. HUIZENGA. We have to stay focused on solving the technical problems at the waste treatment facility that we have been talking about. It is important for us to continue to retrieve waste from the single-shell tanks at Hanford to address the potential for the leaking tanks.

We are going to continue to focus our efforts on sending transuranic waste from Los Alamos, and Savannah River, and Idaho to the Waste Isolation Pilot Plant in New Mexico. This is important to meet our commitments to get the transuranic waste off the mesa at Los Alamos to avoid the potential for the fires that we have recently experienced.

We are going to continue to solidify high-level waste at the Savannah River plant to turn the high-level radioactive waste into glass logs that can be stored safely.

We are going to continue our efforts at Oak Ridge to decommission the K–25 facility and start focusing on the K–27 facility to follow.

And, as I mentioned already, you know, we will continue our efforts to send the transuranic waste from Idaho to WIPP.

Mr. NUNNELEE. All right. So, what milestones or high-risk work will be jeopardized because of sequestration?

Mr. HUIZENGA. Well, many things will be slowed down. So, I said we are going to focus on these, but, for instance, at Idaho, I mentioned we built a large structure over one of the buried waste facilities. We won't actually be able to start digging up the waste under the structure as a result of the sequestration impacts: so we are

prepared and ready to go, but we will need some additional resources to be able to actually start the work.

At the Savannah River site, we will probably end up slowing down the solidification of the glass.

And at Oak Ridge, we know that the K–25 and K–27 work will continue, but we will probably lose a year or year and a half overall, in terms of schedule on those projects. And the maintenance costs that are ongoing, kind of hotel burden, just to watch the facilities, at several million dollars a year—we just basically push that cost out, and make the lifecycle increase.

Mr. NUNNELEE. All right. You said that Hanford is one of your highest priorities. We have had many reports this week of nearly 250 workers that have been laid off at Hanford. Sequestration is applied in equal percentages across all lines; however, you do have the ability to request a reprogramming, to move funding towards your highest priority areas.

If Hanford is one of your highest priorities, why haven't we seen a reprogramming, at least before you started to lay off workers?

Mr. HUIZENGA. We are working aggressively within the Department of Energy and with the Office of Management and Budget to formulate a reprogramming that we can send up here to you, to try to move some money from areas where we have some flexibility, to areas that are in more need.

Mr. NUNNELEE. All right. In your FY '13 budget request, you actually ramped up funding for Hanford by about 3.5 percent—or $75 million. Did the Department of Energy hire any workers in anticipation of this ramp-up?

Mr. HUIZENGA. I might have to take that for the record, whether we—if you are talking specifically about the WTP project, sir, or about the overall workforce on the cleanup activities at hand.

Mr. NUNNELEE. The overall workforce.

Mr. HUIZENGA. Okay. I will have to check and find out if, indeed, some people were hired.

Mr. NUNNELEE. All right.

And then, finally, is there any other reason, other than sequestration, that you may need to reduce workers in FY 2013? Does any work ramp down, or does this type of work change?

Mr. HUIZENGA. I don't think there is any need for us to ramp down, but for the fact that we are now living, of course, under the continuing resolution, and the constraints that are placed on that in terms of being able to move money from one place to another in our budget; that is the value of the reprogramming. We will try to position that money for maximum value for the program.

Mr. NUNNELEE. Okay. All right, thank you.

I now recognize the ranking member, Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman.

Mr. Huizenga, let me ask you—in your testimony, you state you have completed work at 90 of the 107 cleanup sites through the end of 2012.

Mr. HUIZENGA. Mm-hmm.

Ms. KAPTUR. Could you give us a general sense of what percent, then, does that represent of the work that was initially anticipated? How much has been completed? Did you clean up the smaller sites first? What percent of work is actually completed, as op-

posed to the sites, in terms of the scope? Can you give us a sense of that?

Mr. HUIZENGA. I can try. We baselined the Environmental Management program first, I think, in 1995, as the result of a request from Congress to present an overall picture. And we baselined the program someplace around $250 billion over 60 to 70 years. We are about $100 billion into that over the last 25 years; maybe a little more than that. So, there is still on the order of, probably now, a couple hundred billion dollars in to-go costs.

So, I don't know if you would say we are ⅓ of the way through, you know, moneywise, but, you know, we have done some large sites—the Rocky Flats site has been closed in your state—the Fernald and Mound sites have been closed.

So, we have done a combination of large sites and—large, medium, and small sites, in that number of sites—the 90 sites that we have, indeed, closed.

Ms. KAPTUR. My point is, if 90 sites are thimbles, but you have buckets that remain out there—it looks like a lot has been completed. One would assume 90 percent of the work is completed.

Mr. HUIZENGA. No, it isn't.

Ms. KAPTUR. So, I am trying to——

Mr. HUIZENGA. We did a number of thimbles. I mean, there were some small ones that we——

Ms. KAPTUR. My point is, you know, you said the environmental legacy includes 88 million gallons of radioactive waste, thousands of tons of spent nuclear fuel, over 10,000 containers of excess plutonium and uranium, 5,000 contaminated facilities—overall, millions of cubic meters of contaminated soil and billions of gallons of groundwater.

If that is your target, then for each of those, can you give us, either today or for the record, what percent have you actually cleaned up? Are you halfway finished? According to what I heard you say—you said maybe you are ⅓ of the way finished.

Mr. HUIZENGA. Well, in terms of overall budget, you know, I will——

Ms. KAPTUR. Not the budget, sir; the challenge.

Mr. HUIZENGA. Sure. I can take that, and get back to you with specifics, in terms of the overall challenge, relative to—it would break down in terms of high-level waste. So, of those 88 million gallons, we have stabilized, you know, several million gallons. That is at the Savannah River site. And——

Ms. KAPTUR. Right. We still have over half to be done?

Mr. HUIZENGA. More than half of the——

Ms. KAPTUR. See, this is the number I am looking for. Where we have come, and where we have to go, for each of those threshold challenges that we face as a nation. Are you comfortable with providing that for the record?

Mr. HUIZENGA. Sure. We can get back to you with information in that regard. We have a scorecard. I don't have it with me at the moment, in terms of how much of the transuranic waste, for instance, has been moved from around the complex, down to the Waste Isolation Pilot Plant.

Ms. KAPTUR. Right—like you have over 5,000 contaminated facilities. Can you give us a number of how many have actually been cleaned up and shut down, then?

Mr. HUIZENGA. Yes, I can provide that.

Ms. KAPTUR. All right. And the contaminated soil—do you have an estimate on that?

Mr. HUIZENGA. I don't know whether there is an actual quantification of how many cubic meters of contaminated soil there is, but I will look into that.

Ms. KAPTUR. Do you feel that you have to clean it up?

Mr. HUIZENGA. Well, it is—we work these issues with the local community and the regulators. There are specific criteria that are driven by RCRA and CERCLA, that drive us to certain cleanup levels. We have some ability to negotiate, if we think that there might be some additional or overly restrictive worker impacts that would preclude us from doing some of this work.

So, we can discuss this with the regulators, but there are, indeed, threshold limits that are targets for cleanup.

Ms. KAPTUR. I think it will be very helpful for members of the committee to know where we stand in American history, how far we have come, where we need to go. It helps us in our decision making. Maybe it helps focus the agency. It is like a United Way thermometer—you know, you have to know where you are, in order to reach the goal.

So, I think it would be very helpful if you could present that picture to us.

Mr. HUIZENGA. Sure. I can. We have—on a site-specific basis, we keep track of this. For instance, at the Hanford site, not only are we focused on trying to solidify the radioactive waste that is stored in the tanks, but we are working to clean up along the Columbia River.

So, our vision, for instance, is, by 2015 or 2016, we will have the majority of the reactors stabilized along the river, and the waste moved away from the river, up into the central area for permanent disposal.

So, I could get back to the committee with the clarification as to what kind of progress we are making on a site-specific basis.

Ms. KAPTUR. All right. If I were to ask you for a list for the committee of the largest contractors involved in the remediation in each of the categories that you have outlined, could you do it?

Mr. HUIZENGA. Absolutely.

Ms. KAPTUR. You could. Are they really controlling the timeline, or is the Department of Energy controlling the timeline for their performance?

Mr. HUIZENGA. Well, the Department is responsible for the cleanup activities. So, the contractors work for us. But I have to say, this is a partnership. I mean, they have the expertise. We need to rely on that. And it is also a partnership, and, you know, a regulatory relationship with the states themselves.

Ms. KAPTUR. Could I ask you, for each of the categories in the environmental legacy that you have identified, are different contractors involved in each of them, or would it be some of the same contractors across the board, for all of the remediation challenges that the Department faces?

Mr. HUIZENGA. Most of our large contractors have broad expertise in many of the areas of need.

Ms. KAPTUR. All right. I would be very grateful for you to submit that to us. I mean, it has been 25 years, right?

Mr. HUIZENGA. We know who our contractors are. We have got a long list.

Ms. KAPTUR. All right. Very good. I would be very grateful for that. If you could put them in rank order, in terms of the amount of funds that they have received over the years, that would be very interesting—or approximately.

Let me ask you—previously, the Department had been consulting with members of Congress on the optimum funding level for the environmental management programs. And we thought it would be closer to about $6 billion a year. It has become clear we cannot spend at this level.

As a result, the federal government never reached the pace of cleanup that had been anticipated under a $6 billion target. Now, with sequestration, the cleanup of our legacy defense wastes will be cut even more.

Do you have any estimate of how much we are extending the timeline for completing the cleanup commitments, and what kind of costs are we generating by extending the timeline?

Mr. HUIZENGA. We are in the process of determining that now. We have embarked on a re-baselining effort, because, as you pointed out, we did baseline our environmental management activities at $6 billion in 2008, and it is clear from the last few years that we are not going to be able to operate at that level.

So, we are now trying to look at the impacts of baselining the program closer to a $5.7 or so overall flat funding for the next few years. I don't have an exact number of how far that is going to push things out, but it obviously is going to increase costs and take longer.

Ms. KAPTUR. So, you are keeping the same sites on the list; it is just that you extend the timeline—nothing is being stopped.

Mr. HUIZENGA. Well, we can't really stop it. We created the radioactive, you know, sites and materials. So, they need to be addressed. We can discuss this with the regulators, but, of course, there are expectations at the $6 billion level, so this requires negotiations and a transparent, you know, explanation of what we are going to be able to do for a more limited budget.

Ms. KAPTUR. All right. Thank you very much on this first round, Mr. Chairman.

Mr. NUNNELEE. Thank you.

Now recognize Mr. Simpson.

Mr. SIMPSON. Thank you, Mr. Chairman, and I would invite Representative Kaptur to come out to Idaho, and I will show you what a contractor is doing on the cleanup out there. They are doing a great job, and it would be interesting for you to come out and see what exactly is happening out there, and the challenges that they face.

Ms. KAPTUR. Thank you.

Mr. SIMPSON. Anyway, when you mentioned you got 90 sites cleaned up—some of that is a little bit misleading. I am not blaming you for this. Rocky Flats is cleaned up, the site, but it was

moved to Idaho, and a lot of the material that was taken out of Rocky Flats still has to be disposed of on a permanent basis.

So, when we think of cleanup, we haven't necessarily disposed of all the material there; sometimes we have just moved it to get it ready for disposal at WIPP or some other place—would that be fairly accurate?

Mr. HUIZENGA. You are correct.

Mr. SIMPSON. $420 million reduction by sequestration—is that— I am still trying to figure out how sequestration works, frankly— is that an equal percentage reduction in every program? I mean, is it programmatic?

Mr. HUIZENGA. Mm-hmm.

Mr. SIMPSON. Like $420 million reduction in the end, but you can decide within that where the money is going to go that is left. You can make changes of what goes to, say, Hanford, versus the INL, versus Savannah River, or something like that—because I assume, when we are doing reductions—and all sites are going to be competing for limited dollars more and more—but when we are competing for these dollars, that you have high-risk sites versus lower-risk sites.

Can you focus dollars on the higher-risk sites versus the lower-risk sites? Do you have that flexibility within your department?

Mr. HUIZENGA. To some extent, but it goes back, in part, to what Congressman Kaptur was mentioning. You know, we are constrained. We made some projections relative to what type of budget we might have in the out years, and if it was closer to $6 billion, we would obviously be able to do more than we can——

Mr. SIMPSON. Right.

Mr. HUIZENG [continuing]. At $5.5, or $5.6, or $5.7, where we have been for the last few years.

So, we have to address the regulatory requirements and agreements that we have in place. You know, we haven't engaged in full-scale, whole-scale renegotiation of these agreements across all of the complex yet, but in last December, I had a meeting with all the major stakeholders, and regulators, and people from around the complex, and we started to talk about this.

The tool that we have—analytical tool—allows us to move money from one place within a site to another place, or from one site to another, and you can see what would happen.

So, for instance, if we moved money from some other place to Idaho, those other people would—we would have to square that with them, right?

Mr. SIMPSON. Sure.

Mr. HUIZENGA. So, we——

Mr. SIMPSON. Or vice versa.

Mr. HUIZENGA. The problem is, we have got high-risk work to be done at all of the sites at this point.

Mr. SIMPSON. Speaking of high-risk work—and you mentioned in your opening statement, and the Chairman did, also—I was sitting at home, and saw the news come on—big announcement—leaking tanks at Hanford, you know, like this was the first time they were discovered.

Is this a bigger risk, or was this just an announcement by Governor Inslee on what had happened? I mean, we have had leaking

tanks for quite some time. We have known about it, and we have tried to address that. Does this pose additional threat that we didn't know about—or additional risk that we didn't know about?

Mr. HUIZENGA. We have been tracking these tanks—67 tanks have been assumed to have leaked over the—in the past, over the last several decades. And we have engaged in a monitoring program with the State of Washington.

First of all, we pumped all of the liquids out of those tanks that we could possibly pump, and now we are watching them to make sure that liquids don't flow back into the tanks, and cause these problems.

So, in the course of monitoring the liquid level in the tanks, we recognize that some of these tanks—there are six that are now in the news—the liquid levels are being reduced.

So, sometimes the liquid levels are reduced because the tanks are warm, and they evaporate, and we catch that evaporation; it is not a problem. But sometimes, they are actually leaking.

We are going to put video cameras in—we did this is one tank; we put a video camera. We are going to put video camera in the other five tanks, to ensure that we understand that they really are leaking. But it looks like they are.

So, it is not new news, in a sense, because some of these tanks have been—have leaked before, but it is our—you know, it is our responsibility now to track them with the technology that we have.

Mr. SIMPSON. Governor Inslee suggested that we build new tanks to put stuff in while we are trying to figure out how to get WTP operational. Is that a worthwhile suggestion, or——

Mr. HUIZENGA. We are working with the state now to understand when we would need tanks to support the WTP project overall, and we are trying to actually—in the end, if we build tanks, we would like to build dual-purpose tanks that can serve as extra space, in case we have a problem that we would need to pump a tank into this reserve space. But we also want to be able to use those tanks to be able to mix waste to feed into the WTP project directly.

So, we are trying to find a way, if we do need to build tanks, to build them for a dual purpose.

Mr. SIMPSON. One last question on this round—Idaho is scheduled to be, essentially, cleaned up by 2035 under the governor's agreement. You have got facilities there that are substantial. Any plans on using those facilities to bring waste from other sites to be treated there, and then sent to WIPP or other places?

Mr. HUIZENGA. That is a—you know, I appreciate you raising this issue, because it is, indeed, something that we are looking at. The advanced mixed waste facility, you know, has been doing a very fine job now for several years.

Mr. SIMPSON. Yeah.

Mr. HUIZENGA. And we have actually used them to bring out-of-state waste in for characterization, to be able to send it to WIPP, from over a half a dozen states—California, and Nevada, even some from Los Alamos. And we have a desire to continue to maximize use of our resources. So, some of the waste in the leaking single-shell tanks at Hanford is actually transuranic waste, and we are proposing to dispose of that in the Waste Isolation Pilot Plant.

And we have—one of the scenarios would be, package it up, and not characterize it at Hanford, but just use the characterization capability that you have got in Idaho. It is on its way to WIPP anyway, so we could package it up, send it there, have its final characterization, and then move it down to New Mexico.

Mr. SIMPSON. Has New Mexico agreed to accept waste from the tanks yet?

Mr. HUIZENGA. We have to——

Mr. SIMPSON. As TRU waste?

Mr. HUIZENGA. We have to complete a permit modification process with the State of New Mexico. I think it is fair to say they have an open mind, and are willing to work with us, but this will have to be, you know, reviewed by the public; the public will have an opportunity to have their say, and we want to make sure we are clear—waste is not any different than any of the other transuranic waste that is already being put in WIPP.

So, our desire is to work with the State of Washington and the State of New Mexico, to do the right thing for the complex as a whole.

If I could go back just to your first question, because since I have collected my thoughts on this—how we do the sequestration—we have 32 control points in our budget, and it is very mechanical. The way we have to take the sequestration hit was, just take the percentage reduction, whether it is defense or nondefense, you know, multiply it by that percentage—so we don't initially have any flexibility in how we take the cuts.

Then we can work with you in a reprogramming activity to reposition money, if we can—but, you know, hopefully, that won't take too long, because each day we delay, we will be doing less.

Mr. NUNNELEE. All right. I now recognize Mr. Calvert.

Mr. CALVERT. Thank you, Mr. Chairman.

Has there been any process or new technologies that are aimed at lowering the costs and lowering the timeline of these storage facilities?

Mr. HUIZENGA. We are continuing to try to work smarter, not harder, all the time. So, we have got a number of activities in the past that have borne dividends, and we are, for instance, working now on a new solvent to be used in the facilities at Savannah River that will remove the radioactive materials from one waste stream, and can consolidate it in another waste stream, in a much more effective manner—could save us, actually, hundreds of millions of dollars and several years' worth of operation.

So, it is extremely important for us to work with the contractor community, and the academia, and industry, to try to continually find ways to improve the processes.

Mr. CALVERT. Right. Now, Mr. Simpson was asking that when you relocate some of this waste, and they put it in different tanks, do you do it differently than they did it 50 years ago? Do you——

Mr. HUIZENGA. Yes.

Mr. CALVERT. [continuing]. Just put it in steel tanks, and bury it, or do you put it in vaults, or how do you do it?

Mr. HUIZENGA. No, we don't do many of the things that we did before. We have learned many, many lessons. Now, when we sta-

bilize waste, we solidify it in glass logs that can be stored for, you know, hundreds of thousands or millions of years.

When Mr. Simpson was pointing out that the trains used to bring the radioactive waste from Rocky Flats, and it was dumped in open pits at one time—that—you know, we stopped doing that in the 1970s—put it on asphalt pads and still buried it, and we are still living with that.

But that is not the way we conduct ourselves these days.

Mr. CALVERT. Speaking of places to put waste, you have different cleanup sites through at the country, but the high-level wastes—obviously, since Yucca Mountain is on hold, Carlsbad, New Mexico—is that a long-term solution for long-time, high-level waste?

Mr. HUIZENGA. Well, Carlsbad, New Mexico—the WIPP site is a salt bed, and salt, as a medium, is one of the mediums that are being looked at overall by our nuclear energy program within the Department of Energy, as a possible medium for disposal.

Mr. CALVERT. Does it have the capacity to put a substantial amount of high-level waste, at that facility?

Mr. HUIZENGA. The WIPP facility itself has a certain radionuclide content and limitations on the amount of waste that can be put in the facilities, as part of the Land Withdrawal Act. There is a lot of salt in the area that, I imagine, could be used for, you know, another repository. That could be valuable.

Mr. CALVERT. Okay. Thank you, Mr. Chairman.

Mr. NUNNELEE. All right—I now recognize Mr. Visclosky.

Mr. VISCLOSKY. Thank you very much, Mr. Chairman.

Am I correct in understanding that the one-year campaign to extend USEC operation of the Paducah gaseous diffusion plant will come to an end in May?

Mr. HUIZENGA. That is correct.

Mr. VISCLOSKY. All right. And the transfer will go back to the Department of Energy in June? Am I correct on that?

Mr. HUIZENGA. June of——

Mr. VISCLOSKY. Or July, June——

Mr. HUIZENGA. I think it is not clear exactly when the facilities will come back. They have to delist themselves from the NRC license, and that is a process that takes some time. So, we are working with the USEC now, to understand when, is the optimal timing to return the facilities to DOE.

But it likely will not be in June or July of this year.

Mr. VISCLOSKY. I don't quite understand the answer. You need permission from who?

Mr. HUIZENGA. The USEC—as I understand it, USEC has obligations relative to the Nuclear Regulatory Commission to, in a sense, address licensing requirements. They have to do certain things before they can turn it back over to the Department of Energy.

Mr. VISCLOSKY. Okay.

Mr. HUIZENGA. So, they have certain obligations that must be met. They have to turn it back to us in a certain condition that we can negotiate somewhat with them on the timing of the return.

Mr. VISCLOSKY. Subsequent to the re-enrichment, they have certain obligations, physically, that they have to do at the plant?

Mr. HUIZENGA. Once they shut down——

Mr. VISCLOSKY. Right.

Mr. HUIZENGA [continuing]. They have certain things that they need to do.

Mr. VISCLOSKY. If that is true—and given all of the problems with USEC, I appreciate that you ought to have a reasonable discussion, but I would hope they are not going to tool you around, and delay that transfer back to the Department of Energy.

Mr. HUIZENGA. Well, I have to admit, sir, the longer they want to keep running it, the better off we are. I mean, once we inherit it back into the EM program, we have to find additional resources in the environmental management budget to address it.

So, I am happy to have them run the facility as long as they want to, and turn it over to me as late as they want to.

Mr. VISCLOSKY. But their current operation was to end in May, regardless of what your personal feelings are.

Mr. HUIZENGA. Yes, I know. I think that—you know, we are working with them, and they are working, as well, to look for some possible way to extend the operations to the extent that they can.

Mr. VISCLOSKY. Oh, I am sure they are, but they are supposed to be done in May, because—that is correct?

Mr. HUIZENGA. Currently, they are scheduled to be done in May.

Mr. VISCLOSKY. And is some of the money that they are using for that operation until May federal money?

Mr. HUIZENGA. No, no federal money. No.

Mr. VISCLOSKY. No federal money at all?

Mr. HUIZENGA. No.

Mr. VISCLOSKY. Okay. Assuming there is going to be a transfer back—and let me ask you this—what authority would they have to continue after May?

Mr. HUIZENGA. I presume they would use the same authority as—if they can, for instance, work out a similar deal to extend the current operations for another, you know, few months, to work with some of the high-assay—Department's high-assay tails—I know that is being discussed, but I don't know, actually, whether there is——

Mr. VISCLOSKY. And who is that being discussed by?

Mr. HUIZENGA. With the same partners, I believe, that are engaged in the current activities—Energy Northwest and others.

Mr. VISCLOSKY. Who is it being discussed with at the Department of Energy?

Mr. HUIZENGA. With my staff.

Mr. VISCLOSKY. With your staff.

Mr. HUIZENGA. Mm-hmm.

Mr. VISCLOSKY. And assuming, between now and the end of the fiscal year, you would take that responsibility back, do you have money in your budget to do that?

Mr. HUIZENGA. We have been working with the Office of Management and Budget to position ourselves and the '14 request to have adequate resources for that.

Mr. VISCLOSKY. If it is returned before October 1st, do you have the money?

Mr. HUIZENGA. I don't believe there is money in our '13 request for that. But I am not anticipating getting it back before the 1st of October.

Mr. VISCLOSKY. Well, 1st of October is different than June or July. So, how long is USEC going to be doing this?

Mr. HUIZENGA. For planning purposes, we had planned on them finishing in May, and doing what they needed to do under their obligations for the rest of the fiscal year, and then sometime in early—in fact, Fiscal Year '14, we would return.

And, you know, to the extent that it takes them longer to do what they need to do, it could drift further into Fiscal Year '14.

Mr. VISCLOSKY. Longer to make the transfer, which would be four months if they stopped the enrichment program in May? It would take them that long to finish?

Mr. HUIZENGA. They have certain activities that they—some that they want to do; some that they have to do.

For instance, they have got a number of storage cylinders that have thin walls, that are not transportable, and they want to move it into—they are thicker walled cylinders; this will take them some time. They have a significant amount of inventory that they actually want to be able to take advantage of, but it needs to be moved into the different cylinders. That will take them some time.

Mr. VISCLOSKY. Compared to what they want to do with the cylinders, and what you want, what the Department of Energy wants, what the government of the United States wants—what is the difference?

Mr. HUIZENGA. Well——

Mr. VISCLOSKY. I am not too concerned about what they want.

Mr. HUIZENGA. No, I——

Mr. VISCLOSKY. But there is a government—what do the taxpayers want done here?

Mr. HUIZENGA. I don't think that this bears on—this would not be the taxypayers' money. This is something they would do on their own nickel, for their own, you know, business interests.

Maybe I am not completely understanding, but we expect to have the facility be returned to the Department of Energy for decommissioning and deactivation at some point. But I am not trying to rush it, because I just have to jam that additional scope into, perhaps, a flat budget.

Mr. VISCLOSKY. Okay, thank you. Thank you, Mr. Chairman.

Mr. NUNNELEE. I recognize Judge Carter.

Mr. CARTER. Thank you, Mr. Chairman.

I am new to this Subcommittee. You used the term several times on this questioning session—"permanent disposal." I assume these leaking tanks were somebody's idea, at one time, of permanent disposal. But, obviously, if they are leaking, they are not permanent disposal.

What is, in today's scientific studies of how we dispose of this stuff, the definition of "permanent disposal?"

Mr. HUIZENGA. Well, I mean, if I could go first—I mean, the Manhattan Project, obviously, was under a lot of pressure, and so the waste that was put in those million-gallon storage tanks in the '40s was never really intended to be left there for as long as it has been there. So, they are beyond their design lives, and that is why they are slowly leaking.

Permanent disposal—we have talked about the Waste Isolation Pilot Plant. So, this is 2,100-feet, under the ground—in South-

eastern New Mexico, there is a salt bed, many, you know, thousands of feet thick, that has been there for many years—300 million years; no water has basically been in that area, so it is a very dry environment, conducive to disposing of waste permanently.

And that is where we are putting the transuranic waste, which is plutonium and uranium-contaminated waste from around the nuclear weapons and research and development complex.

There are other media that could be used as well: hard rock, or a granite, or clay—different countries are using different media.

Mr. CARTER. And when you put it down there, you put it in some kind of container?

Mr. HUIZENGA. We put it in—could be as simple as a 55-gallon drum. You know, it has got a 55-gallon drum with a little special vent in it, so that no radioactivity can leak out of it when you are moving it.

But it is put underground, and, over time, since the salt is plastic, it slowly will creep in, and squash the waste, and contain it there permanently.

Mr. CARTER. My colleague and I were discussing outside, and he asked a question. I didn't know the answer. This Manhattan Project trash that you are messing with—has there any been any concept of maybe enclosing that in concrete or anything, to make it a better situation than what you have got?

Mr. HUIZENGA. Well, some of the waste that—the waste, actually, that is going into WIPP—much of that is stabilized in grout or concrete before it is sent down there. And we regularly grout and solidify waste that is disposed of at our low-level waste disposal sites up at Hanford and at the Nevada test site—Nevada Nuclear Security Site—excuse me.

Mr. CARTER. In this time of flat budgets or sequestration your solution is laying off or furloughing people. Are there other programs you look to move some money around and make it a more efficient thing so maybe people don't have to lose their jobs or be furloughed. Have you looked into that before you decided to lay people off, or was it just that was the easiest way to do it?

Mr. HUIZENGA. No, I think this is a timing issue, in part. I mean, we didn't actually know we were going to really have a sequestration until not long ago. We have been planning on—you know, in anticipation of that happening, we have been working to organize a reprogramming. We now need to, you know, move it through the Department expeditiously, and get it up here, and have you guys——

Mr. CARTER. Is reprogramming a difficult process?

Mr. HUIZENGA. It shouldn't be, but it can be.

Mr. CARTER. Okay. Thank you, Mr. Chairman.

Mr. NUNNELEE. I recognize the gentleman that represents the home of the Manhattan Project, Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman. And, Mr. Huizenga, thank you and your entire team. It is a pleasure working with you all. The EM mission, I think, is something that all Americans need to embrace. It is my fervent position, and I think it is yours, that environmental cleanup of this nature is not a matter of "if," but of "when."

I wanted to ask you a couple of questions. Our situation in Oak Ridge is unique. There are none of these sites nationally where it is good to have this waste, and I know we are cleaning it up, but at Oak Ridge, we have very dense population, surrounding a very—relatively small site in comparison to a site like Hanford, which is, I think, 500 or 600 square miles. And I appreciate your all's sensitivity to that.

A few questions, please. In the past year and a half, great progress has been made cleaning up ETTP—the East Tennessee Technology Park—in particular, the massive K–25 building.

Mr. Huizenga, will you comment on your priorities for cleaning up ETTP, and the remaining environmental work in Oak Ridge? And I specifically mean the work at ORNL—and at Y–12, in addition.

Mr. HUIZENGA. Mm-hmm. Thank you, Congressman.

As you point out, it is a complicated situation in Tennessee, where we have got activities going on in three sites in parallel, essentially. The work at ETTP, at the former gaseous diffusion site, is our highest priority right now—activity—recognizing we all eventually will have to move to working at Y–12.

Before we get into the large-scale deactivation activities at Y–12, we are focused on the mercury releases there. We are trying to do what we can, working with the state, to minimize the impact to the creeks and rivers in the area.

So, we are looking, for instance, at putting in place an outfall treatment facility, to catch some of the mercury before it has a possibility to get into the creeks. And we would do that as, in a sense, an interim measure, so that we minimize the impacts until we get there to deactivate the facilities.

And the Oak Ridge National Laboratory—we are working to process materials from Building 3019, sending some of the material to Nevada for reuse—ultimately hoping to send some material to Nevada for permanent disposal.

We are making some progress in all three fronts.

Mr. FLEISCHMANN. Okay. A little bit of a followup—just so—but in terms of your order and your priorities, is ETTP—specifically K–25 and K–27—first on the list? Is that where the focus is?

Mr. HUIZENGA. Yes, that is correct.

Mr. FLEISCHMANN. Okay. For the benefit of the committee, we touched on the mercury situation at Y–12, and it is—I have seen figures—as much as 2 million pounds of mercury in the ground there. There are a lot of complex environmental risks posed here—dealing especially with the surrounding streams and with our population all over.

What are the Department's plans to address the continuing mercury releases, and the long-term mercury challenges, once we get to them?

Mr. HUIZENGA. Mm-hmm. Well, as I touched on, I think the best way to approach this would be for us to basically put a water treatment facility in place to catch the water from the Y–12 facility, and treat it before it goes back into the east fork of Poplar Creek.

And I think this would be important to set the stage for long-term activity there, because there, indeed, is probably mercury underneath the facilities, and when we go in, and start decontami-

nating, and decommissioning, and tear down the facilities, we are going to disturb that soil.

So, if that mercury were to get down into the groundwater, and try to work its way offsite or into the sewer system, we would be catching it in the outfall, and, actually, be precluding it from getting into the river.

Mr. FLEISCHMANN. Okay. Mr. Huizenga, we touched on the 3019 Building. This is the disposition of uranium-233——

Mr. HUIZENGA. Correct.

Mr. FLEISCHMANN [continuing]. Stored at ORNL? This is an EM operation. What is the status of this project? I know we talked about sending some of the stuff to Nevada, but are you satisfied personally with the current disposition plan for 3019?

Mr. HUIZENGA. Well, let me make clear—I am satisfied that the material is securely stored, which is important. We have done several reviews following the incident at Y–12, to make sure that the security meets our standards, and, indeed, we won't have any similar issues at the Building 3019. And I am convinced, based on the reviews that have been done, that we are in good shape there.

But the long-term mission to remove that—or treat that material, and remove it, ultimately, from the site for permanent disposal, is, indeed, an important priority for us.

We have laid out near-term opportunities to package material up, and send it to the Nevada site for disposal, and then we will have to actually work on site to treat about half of the remaining waste, to blend it down to a lower activity before it could ultimately be disposed of.

Mr. CALVERT. Will the gentleman yield for a second?

All right. When you mentioned moving to a Nevada site, which Nevada site are you talking about?

Mr. HUIZENGA. The Nevada—yeah, I am sorry; that is good to clarify that. We have a Department of Energy active in Nevada Nuclear Security Site, where we have a low-level waste disposal facility that has been active for several years. That is where I am——

Mr. CALVERT. Well, I wouldn't mind if you moved it to the other site, but I just thought Harry Reid might be joining us in this hearing.

Mr. HUIZENGA. Yeah. Harry Reid is well-aware of the low-level waste disposal site, and supports it. So, we are going to continue to work with the State of Nevada, to try to solve some of our complex-wide problems.

Mr. FLEISCHMANN. Thank you. Mr. Huizenga, there are three different federal offices and three different prime contractors at 3019. This is a complicated arrangement. Given the lessons learned within NNSA, as a result of the Y–12 security incident, are you satisfied that we have translated those lessons learned effectively at 3019 Building?

Mr. HUIZENGA. I mentioned that a minute ago, and, indeed, I am. We have had multiple reviews—over a half a dozen different reviews by different teams now, and each team has concluded that, while there are some improvements that do need to be made, the materials are securely stored.

So, we made some physical improvements at the Building 3019, in response to these reviews. We have also done some overall, you know, made some management and programmatic adjustments, to make sure that our contractors are working closely and cooperatively together.

Mr. FLEISCHMANN. I yield back, Mr. Chairman.

Mr. NUNNELEE. Mr. Huizenga, I want to thank you for your candor. I appreciate that. But I have to also admit that I am surprised at the attitude of your department, as reflected in that candor in your answer to Judge Carter's question. It is something that I have sensed that has been a problem throughout the administration; I just hadn't heard it put quite that way.

When you said, "We didn't think sequestration was going to happen," where have you been the last 15 months?

Mr. HUIZENGA. Maybe I should have said, "I had hoped it wouldn't happen."

Mr. NUNNELEE. So, I was not in the military, but an attitude that I have picked up from those men and women that serve in the military—they say their attitude is hope for the best, and prepare for the worst.

So, is it accurate to say in your department that you grasped the first part of that attitude; you just didn't grasp the second part?

Mr. HUIZENGA. No, we, indeed, were making plans to try to, you know, deal with sequestration should it occur, and that is why, for the last several months, we have been, you know, looking at our budgets, trying to understand where we would best reposition money through a reprogramming effort, should it be necessary.

Mr. NUNNELEE. Okay. Mr. Simpson and Mr. Carter asked questions about the leaks at Hanford. It is an issue that is very important to this Subcommittee. Even in his absence, I can tell you it is an issue that is very important to the Chairman of this Subcommittee.

Quite simply, when did your department first discover that these tanks were leaking?

Mr. HUIZENGA. Well, some of those tanks, we have known have been leaking for a very long time, but recently, we have been tracking the quarterly monitoring data, and as soon as we had a confirmation with a video camera in Tank T–111, that, indeed, it was leaking, we notified the state that we had an issue we needed to address.

Mr. NUNNELEE. So, you have actually confirmed that the tanks are leaking?

Mr. HUIZENGA. Tank T–111, we have put a video camera in. We know that there is no anomaly with the instrumentation. So, indeed, the only explanation for the slow reduction in the water liquid level in that tank is that it would be leaking.

There are five additional tanks that we need to put the video equipment in to confirm that that is why the leaks—why the levels are being reduced.

Mr. NUNNELEE. So, how can you determine the amount of material that is actually leaking, given the fact that there has already been contamination in the soil from past leaks?

Mr. HUIZENGA. Pardon? I am sorry; can you repeat the question?

Mr. NUNNELEE. How do you know how much the amount of material that has actually been leaking, given the fact there has been contamination in the soil from previous leaks?

Mr. HUIZENGA. We are tracking the liquid level in the tank.

Mr. NUNNELEE. In the tank?

Mr. HUIZENGA. So, to the extent that it goes down just, you know, a quarter of an inch or some small amount, and we can multiply it by the diameter of the tank, and we know how much volume would have to be leaked out of the tank.

Mr. NUNNELEE. So, have you been able to measure any increase in soil contamination?

Mr. HUIZENGA. No, the—and, indeed, we have got robust pump-and-treat facility in place at the Hanford site. There are actually five facilities in place, but one in particular surrounds this leaking tank farm.

So, there is—in wells that suck the contaminated water out, clean it up to drinking water standards, purify it, reinject it around the perimeter of the tank farm to drive the gradient of water back towards the contaminated area to contain, basically, the contaminants in this small area around the tank farm.

Mr. NUNNELEE. So, what does this mean for the environment in Hanford?

Mr. HUIZENGA. In the near term, it doesn't mean anything. I mean, there are no additional impacts from the slow leaks from these six tanks.

Mr. NUNNELEE. So, if the data we have right now is inconclusive on these six tanks, without visual confirmation—and you have done that—how do we know that there are not going to be anymore tanks that could be leaking?

Mr. HUIZENGA. We are monitoring all of the tanks, and we do this in response to an agreement we have with the State of Washington. So, we are tracking the liquid levels in all of the tanks.

Mr. NUNNELEE. Okay—recognize ranking member Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman.

Mr. Huizenga, on the first round, I went through the various categories of environmental legacy that you are attempting to remediate—the 88 million gallons of radioactive waste, for example. And in each category, I sort of asked the question, "What percent of that has been remediated?"

If I were to go back to that, and go to the category 10,000 containers of excess plutonium and uranium, that includes what percentage of that category has been contained and remediated?

Mr. HUIZENGA. That material is definitely contained. We packaged that up in double-walled, stainless steel cans over the last several years. Much of that material was at the Rocky Flats site, and at the Hanford site. And we have moved that material to a storage location in a former nuclear reactor, the K Reactor at the Savannah River site.

So, it is all hermetically sealed in the stainless steel cans. We track these cans, you know. We monitor the cans. We don't have any issues with those cans at the moment. So, it is stable, but it is not permanently disposed of. We now have to actually take action to over the, you know, next few years, to disposition that material.

Some of that material can actually be put in the Waste Isolation Pilot Plant in New Mexico, because it is transuranic waste.

Ms. KAPTUR. Well, what I am interested in, in each of those categories, to give the Subcommittee a sense of where we are, in terms of the whole.

So, you stated more exists in the testimony just now on that category, and sort of projecting down the road where we are headed with that.

If I look to the 5,000 contaminated facilities, of the 5,000, how many have been completely cleaned up, to your knowledge?

And so I know two of them are in the district that I represent. They have been cleaned up to a standard, and——

Mr. HUIZENGA. Two of the facilities?

Ms. KAPTUR. Yes.

Mr. HUIZENGA. Mm-hmm.

Ms. KAPTUR. But of the—so I know it is 4,998, based on the district that I represent, but looking at those 5,000——

Mr. HUIZENGA. I will take it for the record, but, if I recall, it is somewhere in the area of 2,000 facilities that we——

Ms. KAPTUR. That remain.

Mr. HUIZENGA. No, that we have stabilized, and——

Ms. KAPTUR. Stabilized.

Mr. HUIZENGA [continuing]. So there are probably on the order of 3,000 remaining. But I guess it is important to recognize that there are more facilities in the Department, that the Department of Energy manages, some of which we haven't actually—they haven't been turned over to us yet.

So, some of—the 5,000 could increase to a number larger than that, over time.

Ms. KAPTUR. Well, that is why I am interested in these numbers; they keep moving. And so if we want to solve a problem, we have to know the extent of it. And it would be very helpful to have the context in which we are working. The 88 million gallons of radioactive waste—is that all under your control?

Mr. HUIZENGA. That is in the Environmental Management program, correct.

Ms. KAPTUR. All right. And are you satisfied with the way in which that is being held—or, like the other material, is it being—is it on course to be transferred somewhere else?

Mr. HUIZENGA. Well, it is in different stages. At the West Valley facility in New York, the liquid high-level waste has been stabilized into glass logs, and it is, you know, ready to go, ultimately, into a repository. So, it is being stored safely on site.

And in Idaho, we have stabilized a number of the liquid wastes. We have got 900,000 gallons left to stabilize, and we are constructing—we finished constructing a facility; we are trying to start that facility in the next several months, and by the end of 2014, those 900,000 gallons will be gone.

So, we know where all of the gallons are, and we have specific activities, either that have already been completed or are underway, to actually stabilize those materials.

Ms. KAPTUR. Well, as I look at the amount of dollars expended and the road ahead, what I am hearing from you is, overall, in terms of the EM mission, that less than 1/3 of the work has actu-

ally been completed to a level that gives the Department satisfaction—and we may not even be at 1/3.

Mr. HUIZENGA. Well, we are way over 1/3 of the number of facilities, but if you would just look at our costs so far—and to-go costs were on the order of 1/3, and if you know the number of facilities, we might be on the order of 1/3. And, you know, I will get you the specific numbers relative to how much of the transuranic waste, and exactly how much of the high-level waste, is actually stabilized.

Ms. KAPTUR. That would be very helpful. And when I look at your testimony—and you talk about 90 of the 107 cleanup sites—of the 107 cleanup sites, are those separate from the afore-mentioned challenges, or are they the——

Mr. HUIZENGA. That was the total.

Ms. KAPTUR. That was the total? Because when one looks at that, one would think, "We are 90 percent finished."

Mr. HUIZENGA. Yes.

Ms. KAPTUR. When one—so it is a little bit——

Mr. HUIZENGA. It is just——

Ms. KAPTUR [continuing]. Undecipherable.

Mr. HUIZENGA. Well, it is just one measure, right? I mean, there were——

Ms. KAPTUR. Right.

Mr. HUIZENGA [continuing]. 107 sites, and 90 of them are completed, but we did some small sites——

Ms. KAPTUR. Yes.

Mr. HUIZENGA [continuing]. And some large sites, like Rocky Flats, and Fernald, and Mound, in the State of Ohio. So, it is a wide range of small sites and big sites.

And, of course, we have got some very big sites left, like the Hanford site, and Idaho activities, and the Savannah River, and Oakridge sites.

Ms. KAPTUR. Well, I think that—and that is why I came back to this line of questioning—it is important for members of the Subcommittee to understand exactly where we are, and to be helpful to you, and to get the job done for the country.

Mr. HUIZENGA. Mm-hmm. Yeah, I apologize; I am probably not doing a very good job of explaining how—we actually know where all the waste is, and we know how much of it we stabilized. I just don't, in my notes, have the scorecard with me that would be able to explain to you, you know, how much of—what percentage we are on each one of those. But I can provide that for the record.

Ms. KAPTUR. Thank you.

Mr. HUIZENGA. But we clearly know where the wastes are, and what we are doing.

Ms. KAPTUR. I wanted to go, if I could, to the Portsmouth, Ohio site.

Mr. HUIZENGA. Mm-hmm.

Ms. KAPTUR. There were significant concerns about the cut in the FY '13 budget request for Portsmouth, and the contractor has signaled a need to cut the workforce there by as much as 20 percent. There are a number of decisions that need to be made in this year, to define the cleanup path there—including what will be done with

the process buildings and equipment of the uranium enrichment cascade.

So, my questions are, what is the path forward, to your knowledge, for the cleanup at Portsmouth? Does the Department anticipate having to continue to ramp down cleanup operations there? The site is counting on an increase in uranium transfers to fund the cleanup activities there. And what is DOE's plan to release additional uranium to fund cleanup activities, if a plan exists?

Mr. HUIZENGA. Mm-hmm. We use a combination of appropriations requests and what we call uranium barter. We have uranium that we are able to sell into the uranium market. We do this in a way that doesn't negatively impact the market. So, we can't sell—we have limits on how much we can sell in any given period of time, so we won't impact the overall uranium market.

We have been working at a steady pace now for the last couple years, and our projections are to do for another three or four years, and then that uranium barter material will be gone, and we will have to—if there are additional resources needed, we will be requesting those through the appropriations process.

But we are learning lessons from Oak Ridge, Tennessee, at the gaseous diffusion plants there, because these are very similar facilities. So, we are moving certain equipment from the process buildings now at Portsmouth, and, ultimately, once that equipment is removed, we will tear those buildings down.

Ms. KAPTUR. With the contractor signaling a need to cut the workforce, do you know how the workforce will actually be impacted at that site, and what is being done for site adjustment?

Mr. HUIZENGA. I am—yeah, I am sorry; I am unfamiliar with this particular reduction, because my information suggests that there will not be a reduction as a result of the sequestration. So, I will have to look into that, and try to better understand——

Ms. KAPTUR. Thank you.

Mr. HUIZENGA [continuing]. The nature of that potential reduction.

Ms. KAPTUR. Thank you very much. Thank you, Mr. Chairman.

Mr. NUNNELEE. All right, Mr. Simpson.

Mr. SIMPSON. Thank you, Mr. Chairman. Everybody talks about furloughs and layoffs, and is concerned about those. Obviously, nobody likes furloughs. You don't like it, the contractors don't like it, and we personally don't like it.

But the reality is, we appropriate money to do things. And when we are going to do fewer things, we are going to hire less people to do those things, because we are not going to have as much money—hence, you are going to have furloughs, and layoffs, and that kind of stuff, because we are not going to do as much work.

It is not that the administration is going in and saying, "We are going to lay off these people to make it look really ugly," and stuff like that. Nobody wants to do that. I don't think the administration—and I don't think you want to do that, either.

Mr. HUIZENGA. Absolutely not.

Mr. SIMPSON. But it is just the reality. We don't have the money to do the work.

Along those same lines, we talked earlier about how long it would take to do the cleanup at a $6 billion level, and we have never got to that level.

I think our budget situation is unlikely to change in the near term—or maybe even the far term future. Have you done an analysis of what we can do, and what it would look like, and how it would extend the milestones and agreements that you have with the states if the permanent budget—or the budget going into the future—is around the $5 billion level? Right now, we are at, what, $5.6, $5.7, in that neighborhood—minus $420 million.

So, we are getting down towards the $5 billion level. As I said, I don't see it changing very much in the next few years. So, have we done an analysis of what it would take to clean these sites up—the length it would take, the time it would take, the extensions—as I said, the milestones—all of those things that would have to be renegotiated with the states and so forth, so that we have a picture of what we are doing when we appropriate the money?

Mr. HUIZENGA. Mm-hmm. We have created an analytical tool that I have mentioned we use now in a pilot version with stakeholders, to be able to dial up and down the budget. So, if you wanted to assume $5 billion, and spread it around in various ways, you can click on the icon, put this much at Oak Ridge, and Tennessee, and Idaho, and Hanford, and see the impacts. And they are, frankly, significant, as you can well imagine, the lower you go.

Mr. SIMPSON. Yeah.

Mr. HUIZENGA. So, when you get down to a $5 billion effort—and to the extent that you take that much longer to do the work—you push it out—we have significant maintenance—and surveillance, and maintenance costs, and just a general hotel load costs at our sites—each year you push that out, you increase the overall lifecycle of the facility.

Mr. SIMPSON. You have expanded responsibilities, also, because if you have DOD sites, NNSA sites, Office of Science sites, NE sites that are continually reassessing what they need, and when they don't need something, you are the cleanup and D&D experts.

Are you taking increased responsibility for those, when you assume that they want to tear down an old reactor?

Mr. HUIZENGA. Yes, periodically. You know, we have a process to try to prioritize, you know, taking new sites, new facilities into the EM program, and they, you know, have obligations, again, to turn them over in certain conditions for us.

And, sometimes, we actually transfer them back. You know, we are working with a nuclear energy program to, perhaps, transfer some facilities back to them that they want to use. So, it goes a little bit both ways, but, most of the time, we are taking them.

Mr. SIMPSON. Yeah. One other question that is—how long have you been Acting Secretary?

Mr. HUIZENGA. Closing on 20 months.

Mr. SIMPSON. Almost two years. Are your abilities limited in any way by the "acting" status, rather than as the appointed undersecretary for EM?

Mr. HUIZENGA. There are two statutory limitations. I can't eliminate the WTP office, which I don't have any intention of doing.

Mr. SIMPSON. Yeah.

Mr. HUIZENGA. And——

Mr. SIMPSON. But if you wanted to, you could.

Mr. HUIZENGA. And there is one other one that doesn't bear on me; I don't actually remember what it is at the moment. It has something to do with, perhaps, officially asking to move money around, but that is something that the Secretary, frankly, does, so——

Mr. SIMPSON. Well, it would be at least my recommendation—and, I think it would be safe to say, the recommendation of this Subcommittee that the Secretary take a quick look at permanent status for you, if you wanted to accept it, or someone else.

But this acting status that goes on, and on, and on, I think, is a disadvantage to the individual that we are placing in that position.

So, we will make those recommendations when we see a Secretary——

Mr. HUIZENGA. Okay.

Mr. SIMPSON [continuing]. Whenever that happens. Thank you.

Mr. HUIZENGA. I appreciate that.

Mr. NUNNELEE. Judge Carter.

Mr. CARTER. Thank you, Mr. Chairman.

There has been a lot of talk here since this sequester thing has come out about. There are some folks who are saying that there has been an active "Chicken Little" syndrome going on in the country. The sky is falling, and sequesters have caused all the major problems on the face of the earth.

I would be willing to argue that probably the thing that the average American is more scared of than cancer is what is leaking out of your tanks because they don't understand anything about it——

Mr. HUIZENGA. Mm-hmm.

Mr. CARTER [continuing]. And it scares the heck out of them.

Mr. HUIZENGA. Mm-hmm.

Mr. CARTER. Please don't take offense at this question, because there has been a fear factor in the last three or four weeks. When you have a leak from these tanks—because they have leaked before—do you always do a public notice and a press release on the leaks from tanks? Because these leaks from tanks fell amongst the "Chicken Little" syndrome——

Mr. HUIZENGA. Mm-hmm.

Mr. CARTER [continuing]. Period of this sequester discussion. I think it is an honest question, and I would like an answer.

Mr. HUIZENGA. I appreciate the question, and timing is everything, Mr. Congressman.

What—I can explain to you exactly what happened. We had a program in place to stabilize the leaking tanks. We pumped all the liquids out of those tanks that we could possibly pump. We worked this with the regulators. When you got down to where you couldn't pump any more than a half a gallon a minute, and you couldn't see any more than a certain amount of waste—or liquid on top of the sludge in the tank—you stopped. You were allowed to stop.

And then, as part of that stabilization program, we were required, on a quarterly basis, to monitor, to see if any liquids have gotten back in through the piping system, or somehow leaked into

the tanks. So, if water leaks in, rainwater leaks in, it can then leak out again.

So, we have not noticed that problem until recently. So, we have been tracking the tanks for some time, and, as it turns out, we had an instrument in there that had some error, small error, associated with—error bars associated with the measurement itself.

So, we were—over time, the measurement was bouncing around slightly within the error bars, and we thought it was stable. When we took a look at this, we realized it was slowly, slowly drifting down; the level of the tank was going down.

So, when we understood that to be true—well, we put the camera in to make sure that our measuring device wasn't doing something inaccurate, and when we found it to be actually accurate, we felt an obligation to notify the state.

And it just happened in about the same time all of this sequestration stuff was——

Mr. CARTER. You can see why I asked the question.

Mr. HUIZENGA. I don't blame you for asking the question; I am just giving you an honest answer.

Mr. CARTER. You know, the DOE has been under scrutiny for almost two decades about being on the high risk list of project management. There has been some question about this here.

And your office of Environmental Management has been one of the flagged things over that 20-year period, as not properly managing the significant cost increases.

I think part of what we have got to learn to do—even though I don't think there is anybody in this room, including myself, who likes sequester; it is a stupid way to do things, and stupidity is very frustrating—but the facts are, as we look down the road—and I agree with my colleague that said this could be a long term of flat budgets and reducing budgets—is recognize that where our weaknesses are is where we figure out our cost savings.

Have you done studies or anything to come up with new ideas or solutions? Because this might be the place where you could make the savings, and be more effective, and——

Mr. HUIZENGA. Mm-hmm.

Mr. CARTER [continuing]. You wouldn't have to lay as many people off. Do you see what I am trying to say?

Mr. HUIZENGA. I do, and thank goodness we are making some improvements and learning some lessons.

Part of what we had done in the past—and sometimes this was done in response to the pressure to actually try to get something done as fast as you can, because you do have a leaking tank or some other waste that you wanted to stabilize—we would start construction of the projects before we fully had completed or understood the design.

And that is part of the do-loop that we are in with the waste treatment facility at Hanford, is that we were charging along, and we hadn't completed the design.

So, we have instituted new rules and guidelines for ourselves, that we are not going to do that in the future, if—you know, despite our desire to actually move out more—as quickly as possible, we recognize that that is not a best practice one should follow.

So, we are doing that. We are actually working with our contractors, to try to incentivize them to reduce costs. In some ways, we can adjust their fees, so that if they are able to save a significant amount of money, maybe they can make some extra fee, and the government, you know, gets part of the fee, and the contractor does, so it is a win/win. And, on the other hand, if they go over costs, they are going to lose a fee.

And we are trying to have this be a fair balance for the contractor, but also keep in mind that the taxpayer is ultimately—needs to get a fair shake in this, as well.

Mr. CARTER. Design-build contractors have always been very shaky, if your design has to be altered halfway through the project. That is—I don't care if you are building a house, or——

Mr. HUIZENGA. Yeah.

Mr. CARTER [continuing]. Building something that is as important as what you are doing. That is where most of our lawsuits seem to come from, in contract law, so I can understand that.

Because that is the kind of thinking we are going to have to do if we are really going to start solving things around here and reducing costs. We need to be looking at where each of our operations are weakest and costing the most, and fixing it. And then we don't have to hurt the overall mission.

Mr. HUIZENGA. Absolutely.

Mr. CARTER. Thank you for your——

Mr. HUIZENGA. Absolutely.

Mr. CARTER [continuing]. Answer.

Mr. NUNNELEE. Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman.

Mr. Huizenga, the Subcommittee has criticized the Department in the past for how it has been transferring uranium to pay for cleanup activities; effectively going around the appropriations process.

Still, the Department has expanded its use of uranium transfers. It appears the Department is not telling industry it might purchase, exchange, and transfer depleted and off-specified uranium tails as part of a future plan for Paducah.

It appears the Subcommittee has received no information from the Department on how such a transfer might be conducted. Congress has set special rules up under the USEC Privatization Act for the use of legacy uranium, in order to privatize operation of DOE's gaseous diffusion enrichment plants. But these are limited authorities.

What authority do you have to release DOE's assets for commercial benefit to another entity?

Mr. HUIZENGA. I know we had an opportunity to talk about this last time I was up here, and I think our position remains the same; that we believe we have the legal authority to barter the asset.

Mr. VISCLOSKY. Okie-doke.

Mr. NUNNELEE. There is tremendous pressure on the Department to complete construction of the Waste Treatment Plant. There are also some legal implications. You have stopped work on the pretreatment and high-level waste facilities back in June, but then recently sent a letter to the governor of Washington, announcing you would restart work.

It is in the wake of the GAO report that made a clear recommendation that the Department of Energy not resume construction on these two facilities.

The Department has stated again and again that it would do concurrent design and construction on future projects, learning its lesson from the Waste Treatment Plant.

You started construction years ago. We seem to be at a point where the construction work could easily outpace the design work, as Judge Carter mentioned.

How much construction will you continue to do on the Waste Treatment Plant before you have an answer to the problems you have identified?

Mr. HUIZENGA. Thank you, Mr. Chairman.

We have learned a lesson in this regard, and that is why, indeed, even though it was painful, we halted construction in the pretreatment facility, and we ramped down construction significantly in the high-level waste facility.

So, what you are referring to in Secretary Chu's recent letter was that we well enough understand where in the high-level waste facility the technical issues remain; there are four particular cells where materials are going to be processed, and we are going to continue construction in areas around the cells. There are many things that we can continue to do in the high-level waste facility that will not be impacted by the ability to solve the technical problems in the four remaining hot cells.

So, we are not going to be doing construction work that would need to be redone. This would basically be able to go on independently of solving the technical problems.

Mr. NUNNELEE. All right. So, what work needs to be deferred, and what decisions need to be made before restarting all the work?

Mr. HUIZENGA. For these particular hot cells and for many similar hot cells in the pretreatment facility, there are sophisticated mixing mechanisms that mix the waste to make sure that it doesn't have a chance to build up hydrogen gas or to have some kind of nuclear criticality accident occur.

We need to make sure that we are not going to have those problems. So, the technical teams that we have focused on these issues now are to address those, to make sure the mixing is adequate, to make sure that if you increase the mixing velocity, you don't increase the potential for erosion or corrosion of the piping or the vessels—so they are related to each other.

So, we are very focused on solving those problems. We believe we can have a better understanding toward the end of this calendar year for the high-level waste facility; that is our goal. And it is probably going to take, you know, another year or two before we fully understand the technical issues in the pretreatment facility.

But our intention is to stay focused in the areas where we don't have problems—so for the low-activity waste facility, where there are essentially no technical problems, construction continues on schedule for the laboratory facility that would support the overall activities that the facility has almost completed construction, and there are a number of support facilities that are also in the late stages of construction.

All of this can continue independently of solving the mixing and erosion/corrosion problems that are specific to these particular cells.

Mr. NUNNELEE. So, who will actually make the decisions on what projects are restarted?

Mr. HUIZENGA. Well, we will do this in combination with the site manager, and the people back at headquarters on my staff, and myself. We will understand—when a technical issue has been solved, we will authorize them to continue construction in that particular area.

Mr. NUNNELEE. So, given the track record of the projects that are in the design-build phase, is continuing in that mode of construction wise?

Mr. HUIZENGA. I think it is only wise if you do it the way we are doing it, which was to actually recognize that you need to take a pause. So, we took a pause where we had technical issues, because we wanted to not get ahead of our headlights, frankly.

Mr. NUNNELEE. All right. We already know that some of the vessels already installed will need rework to resolve the erosion concerns.

How much rework have you already identified, and what do those cost?

Mr. HUIZENGA. I don't have a specific number, in terms of the amount of cost. We know we had some issues with welds on certain vessels that are—we need to correct. We are in the process of doing that.

We are still mapping out the extent of the need to address some of these concerns, so I don't have a final number for you, but we will give you that when we develop it.

Mr. NUNNELEE. All right. If you can get that to us, that would be helpful.

All right. Ms. Kaptur, do you have additional questions?

Ms. KAPTUR. I do, Mr. Chairman.

I wanted to ask Mr. Huizenga—your time in charge is almost two years, and you spent a lifetime in a very important field of inquiry.

As you look back on these two years, where do you feel you have really been able to get a hold of the responsibilities of environmental management in the Department? So, what do you feel some of your areas of progress have been?

And then I want to ask you, what about any vexing challenges—those things that really impede your efforts? I would be interested in your assessment of that now.

And, finally, to what extent do you believe that the Department of Defense can assist your efforts, if at all?

Mr. HUIZENGA. Okay, thank you.

I am actually quite pleased with the progress we have made, as I mentioned in my opening statement, on the safety and culture activities.

We need to make sure that our workers provide us a safe environment—and to the extent that they recognize that there will not be retribution if they raise a particular issue, or something doesn't seem right to them, and they feel like they can go to their man-

ager, and have their manager pay attention, and listen to their concerns.

When I came here 20 months ago, there were some significant issues that we were wrestling with, at the WTP project in particular, up at Hanford, and we have really turned the corner there, I believe.

I met personally with a number of the people that had concerns, to try to understand them, and to try to address them.

We have now driven the need to show leadership in this regard into the performance plans for our senior managers, so I get to grade them—and I, indeed, get graded myself on, you know, whether we are paying attention to these.

So, we are trying to actually really put our money where our mouth is, in a sense, by holding ourselves accountable throughout the leadership team, to making sure that we have a safe environment for our workers—one that they don't feel fear of retribution if they raise issues. And I think we made progress in that regard.

The overall, you know—obviously, the WTP project presents an enormous challenge. But, beyond that, going back to the flat budgets that Congressman Simpson, and you, and others have been talking about—this is probably the largest complex-wide challenge we are going to be faced with. We have set a number of expectations, and, you know, people have—generations have spent their lives—made sacrifices during the Cold War to help win the Cold War, frankly, but we have generated a lot of waste as a result of that.

And so the people in these communities have an expectation that the federal government is going to come in, and do the right thing, and clean up their neighborhoods so they can turn them over for reuse for other purposes.

We will have to sit down with people, and explain that this is what we can do with this amount of money, and, you know, we are going to try to maximize the use of our resources, find new technologies, and be as efficient as we can, but it is probably going to take longer to accomplish some of the goals than the current community's expectations.

Ms. KAPTUR. And what about DOD? Relationships——

Mr. HUIZENGA. We don't—we have——

Ms. KAPTUR [continuing].Cooperative agreements——

Mr. HUIZENGA. Yeah, we have had, you know, intersections, because the DOD has worked on some of the cleanup activities called the FUSRAP activities, many of which—in the State of Ohio.

Ms. KAPTUR. I am very familiar with them.

Mr. HUIZENGA. You know, we can share lessons learned amongst the—between the organizations. I don't know that there is a direct need right now for a major interaction with DOD. We periodically talk to our colleagues if they are stuck on a particular problem, and we think we can help them. We talk to each other.

Ms. KAPTUR. Well, I know the President has been very specific on partnerships between the agencies, trying to look across jurisdictions, trying to spend public dollars more wisely.

And seeing as how the Department of Energy and the Department of Defense have some similar activities in certain areas, one would think that one could explore ways of using resources more

wisely, particularly in a complex area like this one. So, I just wanted to ask, in general, whether you had done any thinking on that, or if the administration had been encouraging any joint working relationships.

Mr. HUIZENGA. I have had discussions with colleagues at the Defense Department about collaboration in certain sites. Some of them, actually, are classified activities.

Ms. KAPTUR. All right. Thank you very much. Thanks, Mr. Chairman.

Mr. NUNNELEE. Mr. Simpson.

Mr. SIMPSON. You are absolutely right; if we don't do what is right by these local communities, there will not be a nuclear future in this country—because if we don't clean up these sites, the public won't support it. So I appreciate what you are doing.

But no hearing with EM would be appropriate without a full and thorough venting of Yucca Mountain—but you are not going to hear it from me. Frankly, I am a little tired of the debate, and I think our inability to resolve this issue, and come to an agreement on what we are going to do for the future is hurting the future of nuclear energy, and EM, and everything else.

The GAO said that EM needs to do additional research to look at long-term storage of spent nuclear fuel at its sites. The administration put together the Blue Ribbon Commission.

From what I understand, there are no plans to introduce legislation to address what the Blue Ribbon Commission recommendations were; now they are just recommendations sitting out there.

Is the administration going to push forward with the recommendations? I mean, ultimately, we need a long-term solution to this, whether it is interim storage at a friendly site, or whether it is the court deciding that they can't withdraw the license from the NRC for Yucca Mountain.

But even if the court decides that, I don't know what exactly that means in terms of politics and trying to resolve it here in Congress, because I don't think the administration is going to, all of a sudden, change its mind and say did you request increased funding for research?

And, on the parochial aspect of this—which is not the reason I am asking the question, the Idaho settlement agreement commits the DOE to designate the Idaho National Lab as the lead lab for research and development related to treatment, shipment, and disposal of all DOE-spent fuel.

Is the DOE and EM keeping that commitment when we see Savannah River has been funded, developed, packaged for spent fuel, and your staff has a subcontract with a Swedish company working on spent nuclear fuel disposal?

Mr. HUIZENGA. Yeah, let me start with it—just go to the end; just cover the last part.

I know that Savannah River is working with the Swedish government, because the Swedes have made some advances in terms of transportation.

But I also know that the Idaho National Lab folks are working with the Canadians, and along the same lines. So, to try and understand how best to transport fuel.

I do recognize that they are short on resources, and the Idaho National Lab, for its spent fuel program, and it got my folks looking into what we can do about that, as we speak.

The broader question of, you know, what are we going to ultimately do with the material—we work closely with Assistant Secretary Lyons in the Nuclear Energy Office, who is responsible for the followup to the delivery and commission recommendations—because, in some respects, we are a stakeholder, as well, with——

Mr. SIMPSON. You are the biggest stakeholder.

Mr. HUIZENGA [continuing]. Several tons of material that, you know, we would ultimately like to be able to permanently dispose of.

So, we are working closely with Dr. Lyons, to, ultimately, position ourselves to be able to dispose of DOE's spent fuel and materials, as well.

Mr. SIMPSON. Did you ask for additional resources in this budget climate, to do the research that was recommended by GAO?

Mr. HUIZENGA. We have requested some money in the past for R&D associated with the salt medium, for instance, just to make sure, in general—not specific to WIPP, as the line of questioning was going earlier—but, you know, whether salt would be a potential medium for the repository in the long run, and that is clearly something that we are focused in, we are interested in.

Mr. SIMPSON. Okay.

Mr. NUNNELEE. Mr. Visclosky, you don't have any questions?

One final question—after many months, contract negotiations have broken down between the Departments on a new contract to complete construction at the salt waste processing facility.

Despite negotiations being pushed all the way up to the Deputy Secretary of Energy, it has become clear to everyone involved that, because of the delays in performance issues, the Department will not meet its regulatory requirements to begin operations by 2015, and the cost to complete the project will be much greater.

How will the project performance delays impact the timeline for accomplishing these milestones?

Mr. HUIZENGA. There will be delays, and I think it is important to note, though—and despite what has been reported in the media—we are working closely with the contractor to re-baseline the project, and we worked through the weekend, frankly, to make sure we put the final touches on what we hope is going to be an agreement in principle to move forward. So, we are making progress in that regard.

They had a delay in acquiring 10 large mixing vessels, and that is the reason for the cost overrun at this point.

Mr. NUNNELEE. So, have you begun talks with South Carolina about the need to extend the timeline for enforceable milestones?

Mr. HUIZENGA. We—the State of South Carolina is aware of the schedule delays. I am, frankly, not familiar with which enforceable milestone we are going to miss in this regard. So, I will have to check on that, and get back to you, for the record.

Mr. NUNNELEE. If you find additional funding to pay for these cost increases, what does that mean for the other cleanup work at the Savannah River?

Mr. HUIZENGA. Well, there is only so much money to go around, and so if we are putting more money into this construction project, then we will put less money into something else—and we will have to negotiate that with the state, too, if that has some bearing on a regulatory requirement.

Mr. NUNNELEE. So, do you anticipate what tradeoffs those will be?

Mr. HUIZENGA. We are reviewing that now, but all options are basically on the table.

Mr. NUNNELEE. Does any other member of the Subcommittee have any questions?

With that, Mr. Huizenga, thank you for your time this morning, and we will stand adjourned.

Mr. HUIZENGA. Thank you, Mr. Chairman.

QUESTIONS FOR THE RECORD

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
HOUSE COMMITTEE ON APPROPRIATIONS

ENVIRONMENTAL MANAGEMENT
FISCAL YEAR 2014 BUDGET HEARING

MARCH 21, 2013

Defense Environmental Cleanup

SEQUESTRATION IMPACTS

Subcommittee. We are now dealing with the reality of sequestration. You recently reported out a number of projections for furloughs or layoffs of thousands of contractor employees, but it is still not clear how individual sites will be impacted. We are all very concerned about the impact to jobs, but we need to have a clear understanding of the programmatic impacts as well.

Can you provide site by site impacts for the rest of the year under sequestration?

Mr. Huizenga. For EM, sequestration funding is approximately $420 million below the FY 12 enacted level. In addition to contractor layoffs and reduced work hours, sites may be forced to suspend or curtail cleanup activities. This will result in additional program and project delays and impact regulatory compliance commitments. At this time, we are still assessing the specific impacts across the complex.

Subcommittee. What do you consider your five most pressing concerns in carrying out work for the rest of this fiscal year?

Mr. Huizenga. Like other federal organizations, EM faces significant impacts from sequestration. Sequestration will result in across-the-board cuts totaling approximately $420 million in states like Tennessee, New Mexico, Idaho, Washington and South Carolina. This constitutes a 7.4 percent reduction from 2012 funding, but since the entire reduction is being implemented in the second half of the fiscal year, it further exacerbates impacts to EM's workforce and programs.

- As a result of sequestration, the Department's contractors may be forced to lay off or reduce work hours for about 6,700 employees who are responsible for cleaning up nuclear waste at our nation's two highest risk cleanup sites in Washington State and South Carolina. These employment actions may delay the environmental cleanup and remediation work at these sites.

- In addition, the Department is in legally binding agreements with state and federal regulators to make progress in addressing environmental contamination; funding reductions could put achieving enforceable environmental compliance milestones at further risk.

- Funding reductions may also impact our ability to timely close aging -- and in some cases leaking -- single-shell tanks storing over 25 million gallons of liquid radioactive waste at the Hanford Site.

- Additionally, funding reductions will impact the Waste Isolation Pilot Plant in Carlsbad, New Mexico, which serves as the permanent U.S. geologic repository for transuranic defense waste. The site's ability to support hundreds of radioactive waste shipments this year may be impaired, which could impact our progress to remove such wastes from several sites across the nation.

Subcommittee. Which milestones or high risk work will be jeopardized?

Mr. Huizenga. Sequestration may negatively impact EM's ability to meet regulatory milestones and its ability to carry out vital, environmental risk reduction activities. At this time, we are still assessing the specific impacts across the complex.

RAISING THE OVERALL COSTS OF CLEANUP

Subcommittee. Previously, the DOE's environmental cleanup program had been consulting with members of Congress that the optimum funding level for the EM program would be closer to $6 billion a year. This level has never been affordable and it has become clear we cannot spend at this level and reduce the deficit. As a result, the federal government never reached the pace of cleanup EM had planned for under a $6 billion target. Now under sequestration, the cleanup of our legacy defense waste will be cut even more.

Do you have any estimate of how much are we extending the timelines for completing our cleanup commitments?

Mr. Huizenga. Due to the size, complexity, and ongoing project management challenges of the EM cleanup program, impacts of the reduction in FY13 funding on our cleanup commitments are still being assessed. Specific impacts will depend in part on negotiations with stakeholders to realign compliance milestones and assess different cleanup approaches.

Subcommittee. What kind of costs are we generating by extending these timelines?

Mr. Huizenga. If the timelines for cleanup are extended, EM would have to pay safeguards and security costs for nuclear materials, surveillance and maintenance costs for contaminated facilities, and other site infrastructure support costs over a longer period of time, which could increase our life-cycle cost assuming the compliance agreements could successfully be renegotiated.

CONSENT AGREEMENTS AND MILESTONES

Subcommittee. We've known for a while that all the work tasked to DOE under the various consent agreements with the states was not going to be accomplished on time. The reasons vary by site to site – and many of these reasons are not funding dependent but have to deal more with the fact that these projects have turned out to be more technically complex than first anticipated. While perhaps earlier attention to problems might have had benefits, at this point shoveling in more and more funding does not mean we will meet these milestones. We are looking at a host of challenges at every one of these sites, and our strategy on what to do about this must be well thought out.

Can you discuss the work you've done over the past year to understand which consent milestones are in jeopardy? Can you discuss which of the major milestones you know, or perhaps are likely, that you will not achieve?

Mr. Huizenga. Meeting its regulatory commitments is one of the major drivers for the Department of Energy in planning and executing its cleanup mission. EM is evaluating the recently enacted continuing resolution to determine whether any milestones will be missed and, if so, will engage its regulators.

Subcommittee. What has been your engagement with the various stakeholders? Is there a way to set more realistic expectations for progress?

Mr. Huizenga. The EM sites are in continuous dialogue with their state and federal regulators and other stakeholders regarding the scope of cleanup work and the associated schedule. In addition, EM meets routinely with its counterparts at the Environmental Protection Agency's Federal Facilities Restoration and Reuse Office, the National Governors' Association Federal Facilities Task Force, and the Environmental Council of the States Federal Facilities Forum to discuss many programmatic issues including priority setting. EM similarly meets with other organizations such as its site-specific advisory boards, the State and Tribal Governments Working Group, the Energy Communities Alliance, National Association of Attorneys General, and the Nation Conference of State Legislatures to engage on expectations for scope and pace of cleanup.

Subcommittee. Will there be penalties, financial or otherwise, for not meeting agreements with states?

Mr. Huizenga. We will not know whether fines and penalties may be assessed until we have evaluated the impacts of the continuing resolution on the Department's ability to meet its milestones and, if impacted, engaged with our regulators.

SUPPORT FOR SMALL BUSINESSES

Subcommittee. Because of the nature of the work conducted by EM, funding reductions to the sites almost always results in jobs lost. As the major contractors brace to absorb the impact of reductions while retaining their key talent, the negative impact on our small business contractors is even more pronounced. I have been a strong proponent of our nation's small businesses.

Is EM monitoring this situation? Are you taking any actions to make sure the bulk of the cuts don't fall on our small businesses?

Mr. Huizenga. Environmental Management recognizes that small business serves a vital role in contributing to job growth and economic stability and has taken steps in light of the potential effects of funding reductions.

- We are evaluating the reductions in light of the mission critical work and our commitments to the states and communities with the overall goal of maintaining safe operations.

- We are tracking funding to prime small business and working to sustain our current goals for the fiscal year.
- We have maintained our prime small business goals and are holding prime, large business contracts to their small businesses commitments.

Subcommittee. What can EM do to bolster its small business contractor force in the face of sequestration?

Mr. Huizenga. While those small businesses that contract directly with the government are more accessible in our ability to mitigate impacts, the remaining small businesses that contracts with our prime contractors are subject to the prime contractor's priorities and therefore their funding reductions.

For new procurements, we are maximizing the inclusion of small businesses, including small business owned by the disadvantaged, women, service-disabled veterans, veteran owned, those located in historically under-utilized business zones, along with participants in the 8(a) business development program.

Our aim is to create a sustainable small business influx into the program that will benefit both Environmental Management and the nation.

HANFORD

LEAKING TANKS

Subcommittee. The Department has informed the public that up to 6 single shell tanks could be leaking high level radioactive waste to the environment at Hanford. This is disturbing news and highlights the urgency of the cleanup work being conducted there. There is clearly a lot of concern in Congress and from stakeholders but it is essential that we understand exactly what has happened, what the risks are, and what our options going forward are for addressing this issue.

When did the Department discover the tanks were leaking?

Mr. Huizenga. Four of these six tanks were identified years ago as known or "assumed" leaking tanks and have been part of a monitoring program since that time. Last year, as part of an effort to evaluate single shell tank integrity, an unexplained slow decrease in liquid level was identified in these six tanks. (Note that all the single shell tanks experience some liquid level fluctuation due to pressure and temperature changes from seasonal variation and level loss due to evaporation. However, the drop in these six tanks could not be fully explained due to these effects.) Based on a visual inspection performed in tank T-111 in February of this year the Department of Energy determined the tank was slowly leaking and notified the Washington Department of Ecology as such. Tank T-111 was one of the previously known assumed leaking tanks.

Subcommittee. Have you actually confirmed that the tanks are leaking? What else do you need to do?

Mr. Huizenga. The Department of Energy has declared that tank T-111 is slowly leaking. Visual inspections of the remaining 5 suspected leaking tanks are planned to be completed in May.

Subcommittee. How can you determine the amount of material that is leaking given that there is already contamination in the soil from past leaks? Do you know how many tanks at Hanford have leaked in the past or how much has leaked to the environment recently? Have you seen any rise in soil contamination?

Mr. Huizenga. The amount of leaking liquids is estimated based on the contents of the tanks, amount of material suspended by the salts and sludge, and the level drop of liquid inside the tank. This level drop is then converted into an estimate of leaked volume. Based on these data, we estimate that the cumulative rate of leakage of the 6 tanks is less than 3 gallons per day.

Based on a study of detailed records, 67 single shell tanks (SST) were assumed to have leaked over the years (4 of the 6 potentially leaking tanks were already on this assumed leaker list). The total entire tank farm estimated leak volume is approximately 1,000,000 gallons over several decades. No increase in ground water contamination has been detected as a result of these 6 tanks. The Department continually collects data from monitoring wells around these tanks.

Subcommittee. What does this mean for the environment at Hanford? Do these new leaks pose a heightened risk and how concerned are you given the fact that tanks have leaked before?

Mr. Huizenga. Both the Department of Energy and the Washington State Department of Ecology agree that the leaks pose no immediate health threat. The additional risk posed by these potential tank leaks is negligible compared with previous discharges to the soil. Hanford soils have a high cation exchange capacity. This means that most radioactive material adheres tightly to the soil. Given the half-life of the radioactive species in Hanford waste, much of the radioactivity in the leaked material will decay to very low levels before it can threaten the environment. The isotope posing the most concern is Technetium (Tc-99), which exists in very small amounts in these tanks.

The risks posed by past tank leaks have been analyzed in the Hanford EIS. Risks from past and current leaks are small; regardless, the Department is working diligently to drive that risk as low as possible given current technological advances. For example, a high capacity groundwater pump and treat system has been installed around the T tank farm that captures and removes the Tc-99 and other chemical and radiological constituents from the ground water.

Additionally, to address the issue of potential leaks, the Department initiated actions in the late 1970's to remove pumpable liquids from the single-shell

tanks, significantly reducing the amount of liquids that could leak to the environment. This interim stabilization effort was completed in 2005.

Subcommittee. If the data we have right now is not conclusive on these six tanks without a visual confirmation, how do we know there aren't any more tanks that could be leaking?

Mr. Huizenga. Finding a tank leak requires identification of liquid level decrease in the tank and a comprehensive analysis of many additional factors. If levels change beyond what is expected from normal variability, that triggers additional steps, such as performing a visual inspection with a temporarily installed camera to determine if that tank is leaking. Also, the interim stabilization program removed a significant portion of the pumpable liquids from the single-shell tanks and in total, less than one million gallons of liquid remains throughout the 149 single shell tanks. This significantly minimizes any residual risk from potential single-shell tank leaks.

WASTE TREATMENT PLANT CONSTRUCTION PLANS

Subcommittee. There is tremendous pressure on the Department to complete construction of the Waste Treatment Plant and there are also legal implications. You stopped work on the Pretreatment and High Level Waste Facilities back in June but then recently sent a letter to the Governor of Washington State announcing you would restart work. This is in the wake of a GAO report that made a clear recommendation that DOE not resume construction on these two facilities.

The Department has stated again and again that it would not do concurrent design and construction on future projects, learning its lesson from the Waste Treatment Plant. While you've started construction years ago, we seem to be at a point where the construction work could easily outpace the design work.

How much construction will you continue to do on WTP before you have an answer to the problems you've identified? What work will you move forward with now and what will remain stopped?

Mr. Huizenga. Construction (mostly civil work) is underway in areas not affected by the technical issues. Design and procurements are on hold in those areas impacted by the technical issues. Construction work continues unabated on the Low-Activity Waste Facility, Analytical Laboratory and Balance of Facilities, which are on schedule for completion by 2019.

Subcommittee. What work still needs to be deferred and what decisions need to be made before restarting all work? Who makes the decision on what work can be restarted?

Mr. Huizenga. See the answer above. Full construction work will resume after the technical issues have been resolved. DOE has engaged highly qualified technical expertise from the national laboratories to help lead the design, implementation and analysis of the full-scale vessel testing program, which is central to resolving many of the remaining technical issues. Initial planning indicates the key technical issues for High Level Waste (HLW) should be resolved by early 2014. DOE senior management will make all decisions based on the results of the technical issue resolution efforts.

Subcommittee. Given the track record of the project in the design build phase, is continuing in that mode wise?

Mr. Huizenga. Currently, decisions to resume or proceed with construction activities are based on our resolution of the technical issues. No Pretreatment Facility construction activities are expected to begin until after resolution of the technical issues. Only HLW Facility activities not affected by the unresolved technical issues are under consideration for resuming construction activity. Construction and commissioning activities for other site facilities (i.e., the Balance of Facilities, Low Activity Waste Facility and Analytical Laboratory) continue as these facilities pose very low risk of modifications/ rework after completion and startup.

Subcommittee. We already know that some of the vessels already installed will need rework to resolve the erosion concerns. How much rework have you already identified and what are those costs?

Mr. Huizenga. Re-work due to process vessel erosion is expected to be minimal. However, DOE has concluded that two vessels will require rework due to quality assurance issues and is currently developing an estimate of the impacts associated with this rework. DOE plans to use one of these vessels in the full-scale vessel testing program, thus receiving effective use of this tank.

INVESTIGATING SOLUTIONS FOR LEAKING TANKS

Subcommittee. Several stakeholders have started to speak out on ways to address the leaking tanks, advocating for constructing new tanks, completing another round of stabilization, or accelerating removal of tank waste that can be disposed of without construction of the Waste Treatment Plant.

Can you please inform the members what options are available and how quickly each of those options could be implemented? How might the costs compare?

Mr. Huizenga. The Department is currently evaluating several options; however this analysis is not yet complete.

DOE is evaluating broader use of existing facilities (e.g., Low Activity Waste and possibly High Level Waste) to begin treating some waste prior to the entire WTP coming on-line. Costs and schedules for these options are being developed. Additionally, DOE is examining the potential of retrieving some specific waste from certain Hanford tanks if such waste is properly and legally classified as mixed transuranic (TRU) waste, processing this waste, and shipping it to the Waste Isolation Pilot Plant (WIPP) for disposal. Finally, any action is contingent upon DOE obtaining the applicable and necessary permits, and that all other regulatory requirements have been met.

The ultimate solution to the issue of the leaking tanks is to retrieve and treat the waste. C-Farm retrievals (which includes 7 historically assumed leaking tanks continues on an aggressive pace that is expected to be completed by the end of fiscal year 2014.

Subcommittee. If new tanks were built, how many would be needed and how many years would that take? Other than the high cost, are there any other drawbacks to this approach?

Mr. Huizenga. DOE is still evaluating whether or not additional tank storage capacity is needed, and if so, in what configuration. As a result, high confidence cost estimates are not yet available. However, given the interim stabilization of the single-shell tanks and the relatively low additional risk posed by the remaining liquids in the single-shell tanks, additional storage capacity will not by itself greatly reduce risk of the legacy tanks.

Subcommittee. There are many more tanks at Hanford than the six that have been in the news, and it is not unreasonable to anticipate more leaks in the future. How is the Department managing this problem? How will you continue to monitor the tanks and protect the environment?

Mr. Huizenga. The primary method of leak detection is observation through detection equipment of tank liquid levels. The frequency of monitoring these liquid levels has been increased as appropriate. All liquid level drops are investigated to determine the cause. Since all SSTs have already gone through an interim stabilization process, additional risks posed by past and future leaks will continue to be very small. DOE has a pump and treat remediation system in place to remove contaminants in the groundwater. DOE's current objective is to complete C-Farm tank retrievals, begin retrievals in other tank farms, and complete the WTP in order to treat the waste as quickly as safely possible. Monitoring of the groundwater surrounding the tanks farms will also continue.

DISPOSING OF TANK WASTE AT WIPP

Subcommittee. When DOE came out with its record of decision this fall on how to dispose of Hanford's tank waste, some details were still unclear. DOE just announced an additional preferred alternative of removing TRU waste from the tanks and disposing of it at WIPP. This work would not require construction of the Waste Treatment Plant.

Has New Mexico and Washington signed off or taken a position on allowing TRU tank waste into WIPP? Won't this require modifications to the state agreements? How long could this approval process take?

Mr. Huizenga. On April 8, 2013, the Department of Energy submitted a request to the State of New Mexico Environment Department for a Class 2 permit modification to the Waste Isolation Pilot Plant Hazardous Waste Facility Permit that, if approved, would no longer prohibit the disposal of waste from certain Hanford tanks and waste that has been managed as high-level waste. The Class 2 permit modification request is currently under consideration by the State of New Mexico Environment Department. The State of Washington has expressed conditional support for disposal of certain Hanford tank waste at Waste Isolation Pilot Plant (WIPP) limited to wastes from 20 Hanford tanks under specified circumstances, including demonstration of a viable pathway for disposal. Currently, the Department has not classified any Hanford tank waste as mixed transuranic (TRU) waste, and such waste must be properly and legally classified as mixed transuranic (TRU) waste before disposal at WIPP. In order for such potential mixed TRU waste to be disposed of at the WIPP in New Mexico, the waste also would need to meet all applicable regulatory, packaging and shipping requirements, and the waste acceptance criteria for disposal at the facility. In addition to the WIPP permit modification, a modification of the Hanford Tank Farms **Resource Conservation and Recovery Act** permit would also be needed from the state of Washington, would allow for the retrieval, treatment, and packaging of the waste in the tank farms.

Please note this does not eliminate the need for the Waste Treatment Plant.

Subcommittee. How much of Hanford's tank waste could feasibly be disposed of safely at WIPP? Is there enough waste to justify exerting energy to get these agreements modified, or are there other benefits to consider?

Mr. Huizenga. The Hanford Tank Closure and Waste Management Environmental Impact Statement (TCWM EIS) evaluated wastes in 20 tanks as candidates for classification as mixed TRU waste, consisting of approximately 3.1 million gallons of waste. To make progress in the overall tank waste retrieval process, and in view of recent information about potential tank leaks, DOE recently announced that its preferred alternative for the TCWM EIS is to retrieve, treat, package, and characterize and certify such Hanford tank wastes that may, in the future, be properly and legally classified as mixed TRU waste for disposal at WIPP. However, DOE has not classified any of this waste as mixed TRU waste, and the volume of Hanford tank wastes that may ultimately be properly and legally classified as mixed TRU waste and designated for treatment and disposal at WIPP is subject to ongoing evaluations and analyses. The retrieval and disposal of these tanks has been included within the Office of River Protection (ORP) baseline documents as a possibility; the most recent ORP system plan base case did not assume these tank volumes would be processed through the Waste Treatment Plant.

DOE is continuing to assess whether there is sufficient waste volume and programmatic benefit to warrant the efforts to further pursue disposal of these wastes at WIPP and the associated permit modifications.

Subcommittee. Have you done a cost comparison of packing this waste and shipping it to WIPP versus sending it through WTP to a permanent repository?

Mr. Huizenga. Past DOE evaluations have indicated the unit cost for processing and disposal of transuranic waste are significantly lower than that for high-level waste.

Subcommittee. How confident is DOE that these wastes can be characterized as TRU waste? If it is not TRU and turns out to be low level waste, is there a disposition path?

Mr. Huizenga. The Department is currently carefully evaluating the characterization data for these potential contact-handled mixed TRU tank wastes. This evaluation will inform the Department's detailed planning for disposition of the tanks. The final characterization and certification of all transuranic wastes occurs after the wastes are processed and packaged for

disposal. If any portion of this waste inventory is subsequently determined to be low-level waste, rather than TRU waste, there are various disposition alternatives available, including disposition alternatives which do not involve near-surface disposal of the bulk of the waste in situ in the Hanford tanks.

WORKING THROUGH THE TECHNICAL SAFETY ISSUES

Subcommittee. After his visit this summer, the Secretary of Energy became more involved in the nuclear safety issues surrounding the design of the Waste Treatment Plant. He assembled a panel of experts and conducted a technical review. Now there are five design teams in place to focus on a few specific technical problems.

What were the results of the Secretary's review? What technical issues were considered the most serious and which issues will these teams work on?

Mr. Huizenga. The Secretary engaged a group of independent outside experts to assist him is reviewing the black cell design and operations at the Waste Treatment Plant and resulted in the identification of a number of unresolved technical issues. As a result of the Secretary's review, a WTP Design Completion Team, with five technical sub-teams was established to focus on resolving the remaining technical issues. The teams consist of site federal and contractor personnel working collaboratively while drawing on the expertise of the national laboratories, academia, and industry. The sub-teams have developed plans for resolving the following key technical issues: 1) Identification of waste pre-conditioning requirements/facilities; 2) Full-Scale testing; 3) In-service inspection/redundancy; 4) Black cell analysis; and 5) Erosion/ corrosion.

Subcommittee. Will anything actually be accomplished in FY13 under the CR to get to resolution on any of the technical problems?

Mr. Huizenga. In FY 2013, the WTP Design Completion Team will identify most of the activities necessary to address the remaining technical issues. Additionally, the Full-Scale Vessel Team has started developing a test strategy and is developing the detailed specifications, including the proposed simulants for full-scale testing of the first vessel, a HLW Facility vessel. Further, several safety-related technical issues are likely to be resolved or closed by the end of the year.

Subcommittee. Do you have an estimate of how long it will take you to work through these problems? Have you set hard dates for technical deliverables from the teams and will you provide these dates to the Committee?

Mr. Huizenga. While there is currently no fixed time established for resolving all the technical issues, budgets and schedules are being finalized for most of the activities and progress is being closely tracked by the WTP Design Completion Team to complete the work and issue the findings and recommendations as soon as possible. For example, for full scale vessel testing, the preliminary test strategy consists of testing six vessels at full scale: one vessel from HLW and five vessels from PT. Full scale testing is currently planned to start late in CY 2013. The test vessel for the High Level Waste facility will be tested first in order to resolve pulse jet mixing issues for High Level Waste and facilitate resuming full construction of the High Level Waste wet process cell (black cell) as early as practical. Testing of Pretreatment Facility vessels will follow completion of the High Level Waste vessel in alignment with technical priorities.

Subcommittee. What is DOE doing to keep the public and stakeholders informed about the work of Secretary Chu's expert review teams?

Mr. Huizenga. Information has been shared on the technical issues being addressed by Design Completion Teams with the State of Washington and other affected stakeholders. Information related to cost and schedule is being finalized.

DIRECT FEED

Subcommittee. One of the major process modifications that DOE is considering is direct feed, allowing some of the waste to avoid the Pretreatment Facility and speeding up the timeline for which you could begin processing tank waste. This has been under consideration for some time.

At what point do you intend to make a decision about direct feed and what additional information do you need to make that decision?

Mr. Huizenga. The Department is evaluating the possibility of directly feeding waste to either or both the Low Activity Waste and High-Level Waste Facilities. Direct feed considerations for these two facilities involve evaluating funding, support infrastructure at both tank farms and the WTP complex, and some technology development. A business case will need to be provided to senior DOE management and appropriate baseline change approvals will be required before a decision can be made. DOE will make the final decisions in consultation with all pertinent stakeholders, regulators, and safety organizations.

Subcommittee. How much would this cost and would the cost be included in the WTP total project cost?

Mr. Huizenga. A cost estimate is currently being developed. DOE will discuss the potential cost implications with Congress and other key stakeholders prior to making decisions to implement these options.

Subcommittee. Can a business case be made comparing the costs of direct feed to the current process design and will you provide this information to the Committee as part of any future budget requests to support this new processing path?

Mr. Huizenga. As part of its consideration of this option, a business case will be prepared. Such a business case would form the basis of a change to the current approach and baseline if the Department were to make such a decision.

PACE OF WORK AT THE PLUTONIUM FINISHING PLANT AND WORKER SAFETY

Subcommittee. Your budget request for FY13 proposed to nearly double the funding for cleanout of the Plutonium Finishing Plant at Hanford over the $68 million appropriated by the Committee in FY12. The latest project management reports from the Department indicate that progress on the Plutonium Finishing Plant is starting to fall behind again, only about a year after the Deputy Secretary adjusted the performance baseline on a portion of the overall project to bring down the building entirely by 2015.

In the FY13 House report, the Committee expressed some concerns about ramping up the work too fast, knowing the difficulty of this work and the fact that past mistakes have resulted in contamination incidents of our workers and work stoppages. This is a very dangerous building and it will take great care to take it apart safely.

Why does work continue to keep falling behind the targets you've set for this project? Do you expect the schedule to slip further?

Mr. Huizenga. Work progress has been affected by various issues associated with unforeseen building conditions. Deterioration of the aging equipment has required repairs and upgrades in order to safely support and continue work in contamination zones. Unforeseen conditions have also caused work stoppage. For example, in January a leaking nitric acid line caused work stoppage. Nevertheless, with lessons learned from recent work, the remaining scope can be efficiently and safely executed. The Department is taking every step possible to mitigate the schedule impact, including looking for efficiencies, and incorporating a more methodical and robust approach for glovebox removal.

Subcommittee. How many personnel contamination and safety incidents have there been and what have you done to improve safety for the workers?

Mr. Huizenga. The Department and its contractor continue to stress that safety of workers is the number one priority for the Plutonium Finishing Plant (PFP). Safety management systems are in place, continuously monitored, and lessons learned incorporated. Key safety performance

statistics are much better than established Department goals and industry performance; however, the project continues to strive for zero incidents.

Since the start of the current contract in October 2008, there have been 6 contamination incidents (individuals) that resulted in an intake of greater than 10 millirem. All such events have been taken seriously by the contractor and DOE. For each event, an investigation and causal analysis was performed and corrective actions taken. DOE oversaw the contractor's investigation of each event and is monitoring the implementation of the corrective actions.

Subcommittee. Do you continue to have more contamination incidents and work stoppages?

Mr. Huizenga. The Department and its contractor continue to stress that safety of workers is the number one priority for PFP. Safety management systems are in place, continuously monitored, and lessons learned incorporated. Key safety performance statistics are much better than established Department goals and industry performance; however, the project continues to strive for zero incidents.

No contamination incidents resulting in intakes have occurred since January 2013. There have been a number of work pauses at the PFP that were not the result of a contamination or safety incident.

Subcommittee. Given the continued problems with achieving your target productivity levels, is it realistic that you can execute the amount of funding that you requested? Is it even necessary to work at this pace of operations, particularly given the risk to workers? Are you worried you will not be able to achieve the 2015 date in the consent agreement?

Mr. Huizenga. The PFP is the highest hazard nuclear facility at the Hanford Site due to the significant quantities of residual plutonium in glove boxes and process equipment. Completing this project is a high priority. Until this cleanup project is complete, the Department will incur significant maintenance and operating costs of up to $50 million per year to safely manage the facility. We believe this work can be performed in a safe manner. Requested funding is necessary to ensure PFP is completed in a safe and predictable manner. The Department is taking every step possible to mitigate the schedule impact, including looking for efficiencies, and

incorporating a more methodical and robust approach for glovebox removal. The Department is working to transition PFP for decontamination and decommissioning by September 30, 2015 and to clean out the PFP to slab on grade by September 30, 2016.

SAVANNAH RIVER

SALT WASTE PROCESSING FACILITY (SWPF)

Subcommittee. After many months, contract negotiations have broken down between the Department and Parsons on a new contract to complete construction of the Salt Waste Processing Facility, despite negotiations being pushed all the way up to the Deputy Secretary of Energy. It has become clear to everyone involved that because of the delays and performance issues, the Department will not meet its regulatory requirements to begin operations by 2015 and the costs to complete the project will be much greater.

How will the project performance delays impact the timeline for accomplishing the milestones?

Mr. Huizenga. The SWPF is not expected to begin operations in 2015 as originally planned due to project delays. Once contract discussions on this project are completed, DOE will be able to establish revised cost and schedule baselines for the project to determine the impact on the Savannah River Site milestones.

Subcommittee. Have you begun talks with South Carolina on the need to extend the timeline for the enforceable milestone? What kind of extension is acceptable?

Mr. Huizenga. The State of South Carolina and the Environmental Protection Agency have been informed of the potential delays in enforceable milestones; however, specific milestones have not been discussed. The regulators have acknowledged the delay, but are awaiting DOE proposals.

Subcommittee. If we need to find additional funding to pay for these cost increases, what does this mean for the other cleanup work at Savannah River?

Mr. Huizenga. Delays to SWPF will require adjusting activities on the rest of Savannah River Site to support continued construction and startup activities, especially considering the interconnectedness of the liquid waste storage, processing, treatment and disposition system at the site. Specific

impacts will be identified once the new cost and schedule baselines for the project are finalized.

Subcommittee. How do project delays impact other work at the site and what tradeoffs will you have to make? Will other work need to be deferred?

Mr. Huizenga. Some activities in the liquid waste system will need to be deferred based on funding considerations and to more closely align with the re-baselined schedule for SWPF, such as completing tie-ins of SWPF to the tank farms and tank closures.

FUTURE OF H-CANYON

Subcommittee. Two years ago, the Department stated its intention to terminate operations H-canyon at Savannah River and the Deputy Secretary of Energy deferred signing a record of decision on future missions for the facility. Since then, the NNSA announced intentions to use H-canyon to support plutonium reprocessing to supply the MOX plant and the Department has resumed reprocessing dangerously corroded spent fuel.

Have you formed a future vision for this unique facility? Will EM continue to operate the facility?

Mr. Huizenga. The Department is currently utilizing the H-Canyon facilities to process certain aluminum-clad SNF that is vulnerable to continued wet storage and to process some surplus non-pit plutonium-239 to provide feed for the National Nuclear Security Administration's (NNSA's) Mixed Oxide Fuel Fabrication Facility. While operating the H-Canyon facilities, advanced safeguards instruments are being tested to validate their operations in a production environment. Additionally, following the recent completion of National Environmental Policy Act documentation, the Department signed an Amended Record of Decision that supports operating H-Canyon for several more years to process Canadian liquid highly enriched uranium being returned to the U.S., under the Global Threat Reduction Initiative.

Subcommittee. How will sequestration or other budget pressures at Savannah River, such as the large cost growth associated with the Salt Waste Processing Facility, impact your commitment to operate the H-canyon facility?

Mr. Huizenga. Current impacts include reduced operation of the H-Canyon facilities, delays in restarting portions of HB-Line to convert the surplus plutonium into oxide, and slowing the rate of processing the vulnerable SNF. These delays will preclude achieving the originally intended progress in FY 2013. DOE has developed a reprogramming request to better align funds with current site needs, thereby reducing these impacts.

Subcommittee. The GAO has reported that late completion of the safety and environmental analyses will delay H-Canyon operations. Much

of the analysis is complete. When does DOE plan on finally releasing a record of decision?

Mr. Huizenga. As stated above, the H-Canyon facilities are currently operating, supported by appropriate safety analyses, and additional environmental analyses have recently been completed. Subsequently, an Amended Record of Decision that supports processing Canadian liquid highly enriched uranium was signed on March 29, 2013.

LEAKING SPENT FUEL IN L-BASIN

Subcommittee. The Defense Nuclear Facilities Safety Board has warned that at least three of the 36 cans of spent fuel have ruptured and that uranium fuel in one can was so corroded that it had turned into an oxide sludge. In September, you began a year-long campaign to begin disposition of the most corroded fuel. However, the Defense Nuclear Facilities Safety Board has since wrote a letter to the Secretary of Energy in January expressing concerns about the leaking fuel and that the overall storage conditions for the bulk of the metal spent fuel is not robust.

Will this present campaign take care of all the spent fuels identified as corroded or leaking by the Defense Nuclear Facilities Safety Board? Or are there other fuels in storage at L-Basin that are degraded?

Mr. Huizenga. The Department is currently utilizing the H-Canyon facilities at the Savannah River Site (SRS) to process (treat) certain aluminum-clad spent nuclear fuel (SNF) because of potential health and safety vulnerabilities; however, this campaign will not take care of more recently identified concerns (January 2013) by the Defense Nuclear Facilities Safety Board (DNFSB) regarding metal fuel in the L-Basin. The Department agrees with the DNFSB (January 2013 Report) that further attention is warranted for metal fuel stored in L-Basin at the SRS and is working to address these issues in a timely manner.

DOE/SRS had conducted ultrasonic testing on 12 oversized cans that contain most of the SNF of concern to the Board, and did not find any indications of loss of fuel integrity. Additionally, the Department is working with the United Kingdom Nuclear Decommissioning Authority to learn from its experiences regarding management of SNF in wet storage.

Subcommittee. Have you identified the costs of treating the degraded fuels at Savannah River and a potential timeline?

Mr. Huizenga. DOE/SRS does not have the capability to process (treat) metal spent nuclear fuels other than aluminum-clad fuels. DOE has considered developing an L-Area Basin Isolation System, which would open up these cans and perform repackaging/examination without impacting the entire L-Basin water. The Department is working to address these issues in a timely manner.

The Office of Environmental Management manages L-Basin, but the majority of the spent fuel currently in storage there is from foreign and domestic research reactors transported there by NNSA as part of its material removal and reactor conversion programs.

Subcommittee. How does EM work with the NNSA to manage the costs of storing and disposing of this fuel?

Mr. Huizenga. EM is responsible for the cost of storing and disposing this fuel. However, as part of the Foreign Research Reactor Fuel Acceptance Program, foreign research reactor operators that reside in countries with a high-income economy pay a fee to EM based on the quantity of the fuel being returned to help offset some of the costs for storage and disposition.

Subcommittee. Is NNSA responsible for identifying the ultimate disposition path for this fuel?

Mr. Huizenga. No, DOE/EM is responsible for interim and long-term management of all material received under the U.S.-origin Nuclear Remove Program, domestic research reactor receipts, and DOE- owned material residing in L-Basin. However, DOE/EM coordinates with NNSA and other DOE Offices to resolve SNF receipt, storage, and disposition issues.

Subcommittee. How will this situation impact the NNSA's ability to keep L-Basin open for receipt of additional spent fuel?

Mr. Huizenga. NNSA relies almost exclusively on EM's ability to receive and store research reactor fuel in the L-Basin storage pool at SRS. The closure of L-Basin would require the termination of the receipt of all aluminum-clad fuel from foreign and domestic research reactors, which would impact DOE's non-proliferation goals. However, the current situation with degraded metal fuel in L-Basin should not have any impacts to the NNSA Fuel Acceptance Program (for receipt of aluminum-clad fuel).

OTHER DEFENSE CLEANUP SITES

PROGRESS ON CLEANING OUT U-233 FROM BUILDING 3019 (OAK RIDGE)

Subcommittee. In FY12, the Committee supported additional funding for a project to clean out uranium being stored at Building 3019 at Oak Ridge National Laboratory. There has been a great deal of interest in moving this material out of its current location faster than the Department had been planning because of security and safety concerns, not to mention the high costs of maintaining this legacy facility. A recent review by the Office of Health, Safety and Security highlights the continued security concerns this material poses at the site and should provide a greater sense of urgency to the Department.

What work are you doing in FY13 and how to do you intend to eventually disposition all the U-233 currently stored in Building 3019?

Mr. Huizenga. In FY 2013, the U-233 project will complete preparations of the Consolidated Edison Uranium Solidification Project (CEUSP) material and plans to begin shipping the material to the Nevada National Security Site (NNSS) for disposal. The disposition of the CEUSP material, which will require several years, will complete the Direct Disposition phase of the project. The remaining portion of the inventory (~560 canisters) is heterogeneous material that requires processing and down-blending at Oak Ridge National Laboratory (ORNL) prior to shipment to off-site disposal. DOE has initiated contractual actions to begin planning activities for the processing campaign.

Subcommittee. Have any of the recent events (the HSS review, Y-12 incident) increased your concerns about the adequacy of the security there or the urgency of moving this material out?

Mr. Huizenga. In response to the security incident at Y-12 incident, DOE conducted three reviews to improve the security at Building 3019 at ORNL: Office of Health, Safety and Security (HSS) Extent of Condition Review; Office of Science Security Posture Review; and the HSS Office of Independent Oversight Inspection. While the results of these reviews confirmed that the material stored in Building 3019 is adequately protected, there were several programmatic improvements identified that could

enhance the security of the facility and assist in the execution of the program. DOE has taken action to implement the recommendations made by the review teams. These reviews also indicated that efforts should be taken to accelerate the disposition of the stored inventory.

Subcommittee. Under your current planning, how long will it take to remove all the material from the building? How could additional funding be used to accelerate this schedule further?

Mr. Huizenga. Under current planning, the disposition of all of the material would be completed by FY 2024.

Subcommittee. How will EM ensure this material is secure while being stored and when you begin processing and shipments?

Mr. Huizenga. In addition to the enhancements made to the Building 3019 security programs recommended by the security reviews, DOE has revised and updated the Site Specific Security Plan for Building 3019, as well as the Vulnerability Assessment to support the direct disposition of the CEUSP materials. These security documents define the security programs in place and the security measures necessary to ensure the protection of the materials during storage and disposition. In addition, the Transportation Risk Assessment is used to define the security measures required during transport to Nevada National Security Site. The Vulnerability Assessment will be updated again to define the security requirements for the processing campaign. These documents are developed by security professionals, and are reviewed and approved by the DOE Officially Designated Federal Security Authority.

The U-233 is stored at ORNL in heavily shielded hot cells within Building 3019. DOE establishes and adheres to safety basis and facility design requirements related to analysis and design of nuclear facilities to ensure protection of workers and the public from the hazards associated with nuclear operations. Building 3019 operations and the associated potential for accidents are identified and evaluated in the facility safety basis. The safety basis also identifies engineering and administrative controls to protect facility workers and to mitigate the potential for a release of radioactive or hazardous materials. Building 3019 requires a Hazard Category 2 nuclear and a Category I security facility for safe and secure storage of special nuclear material.

SEPARATIONS PROCESS RESEARCH UNIT (NEW YORK)

Subcommittee. In the past, this Committee has expressed concern about the cleanup at the Naval Reactors site in New York – the Separations Process Research Unit (SPRU). Work was halted over two years ago after a set of contamination incidents occurred. Site conditions were made worse by subsequent storms. The first order of business is always to ensure that the site is stabilized so that we don't have further contamination, and the Committee provided funding for this in FY12. But work at the site has been exceedingly slow and we hear micro piles are still being installed to provide stabilization under the Continuing Resolution.

What is the status of work to stabilize the site? Is the site in a stable condition or is there more work to be accomplished?

Mr. Huizenga. The tent enclosures were completed on time to meet the U.S. Environmental Protection Agency (EPA) Compliance Order on Consent milestone (February 2013). The work site is in a sufficiently stable condition that will allow the planned project work efforts to continue.

The next step after stabilization is establishing a performance baseline and restarting the cleanup activities. Even though the contractor submitted their proposal months ago, we still have no baseline.

Subcommittee. Why have there been so many delays in setting a cost and schedule baseline?

Mr. Huizenga. DOE conducted its initial review of the site contractor's baseline last fall. Through this review, DOE identified several needed improvements. The contractor has since recommended a slower approach than initially presented in the baseline submitted last fall. DOE is now performing an Independent Cost Estimate, which will be completed this month. DOE intends to commission an External Independent Review of the baseline prior to requesting Acquisition Executive approval of the revised baseline.

Subcommittee. How much longer do you intend to keep 'reviewing' the baseline proposal before you actually make some decisions on a path forward?

Mr. Huizenga. The path forward for the SPRU project is to complete the project as planned using the existing contract. There are outstanding factors that may result in a subsequent baseline revision, including potential settlement of costs associated with recovery from storm impacts and an extension of the schedule by the contractor due to the negotiated cost cap on the contract related to the contamination incidents.

Subcommittee. Has the EPA determined whether any fines or penalties will be assessed? Are there any other potential costs?

Mr. Huizenga. The EPA Region 2 is in the process of determining the magnitude of a fine to impose for National Emission Standards for Hazardous Air Pollutants (NESHAPs) administrative violations.

Under the terms of the existing contract, as modified, there are other potential project costs associated with certified claims submitted by the contractor. DOE is in the process of evaluating several of these claims, and the final cost has not yet been determined.

Subcommittee. Mistakes in the cleanup have already spread contamination to the river once. What is the timeframe for finally accomplishing this work and removing the continued risks?

Mr. Huizenga. The current forecasted completion date is fall 2015, based on the baseline schedule submitted by the contractor in the fall of 2012. This date is contingent upon the settlement of claims and the anticipated schedule extension forecast by the contractor may result in a different completion date.

Subcommittee. DOE made a commitment to the state of Idaho to complete construction of the Sodium-Bearing Waste Project and complete treating all waste by December 2012. Last year, you found quality assurance and design issues that have delayed startup of operations. The milestone was not met and the facility has been in standby while it looks for more technical solutions.

What have you done so far to identify and correct the issues that caused you to halt operations? When do you expect the facility to be up and running and processing tank waste?

Mr. Huizenga. An unexpected pressurization event occurred on June 16, 2012 during startup testing at the Sodium-Bearing Waste Project, which caused shutdown of the facility and cessation of startup testing activities. The process was shut down and an Investigation / Recovery Team assembled the following week with members from the companies responsible for the technology, design, construction, and operation, as well as the Department of Energy (DOE). The Team issued its report on August 2, 2012 summarizing the event causes as 1) less than adequate technical direction, 2) design inefficiencies, and 3) less than adequate oversight and management. The Team also identified several facility modifications which would improve the overall reliability and performance of the facility.

The contractor developed a Corrective Action Plan (CAP) to address the Investigation / Recovery Team report. All identified actions are completed or nearing completion including:

- Anchor all filter bundles to prevent lifting at elevated pressure
- Redesign and install filter bundle gaskets for all filter assemblies
- Enhance control mechanisms and instrumentation for High Efficiency Particulate (HEPA) filters and pre-filter
- Redesign and install oxygen feed and control instruments for Carbon Reduction Reformer
- Redesign and install system blower seals in coordination with manufacturer
- Perform Collective Significance Review for all facility changes
- Update facility Safety Analysis Report for identified risks
- Revise startup testing procedure to provide better control and oversight

The DOE Idaho Office developed its own Corrective Action Plan to strengthen its management and oversight of the startup and testing activities. A revised Startup Oversight Plan issued in October 2012 documents the improved oversight activities.

Finally, the facility received a thorough evaluation to determine the extent of physical event impacts not immediately obvious, or other facility conditions that were unexpected per the design parameters. A significant finding from this evaluation effort was apparent plugging of equipment designed to provide reformer bed fluidization. In recognition of this, the contractor is pursuing a detailed, multi-phase test program to ensure operational parameters and fluidizing hardware function properly. This last major action is planned for completion in the fourth quarter of 2013. Completion of the fluidizing equipment installation would lead to resumption of startup testing in the first quarter of 2014 and start of tank waste processing in the second quarter of 2014.

Subcommittee. This facility was only supposed to run for less than a year, but now we must carry costs while the design issues are investigated. What is the total cost growth of the overall cleanup associated with the facility delays?

Mr. Huizenga. Cost growth associated with the delay to start processing the Sodium Bearing Waste (SBW) is primarily due to corrective actions associated with the June 2012 start-up over-pressurization event and operational improvements to the facility. This has resulted in approximately a 24 month delay to begin processing the remaining SBW. Projected cost growth due to the recovery activities are estimated to be in the $20-$30M range. Results of testing activities currently being conducted to address the main processing vessel corrective actions may allow recovery of some of this cost through improved performance following restart of the facility and SBW processing.

LOS ALAMOS NATIONAL LABORATORY CLEANUP

Subcommittee. There has been significant progress in completing the framework agreement with the state of New Mexico to accelerate the removal of TRU waste stored at Area G at Los Alamos National Laboratory to WIPP. Moving this waste off the mesa has been a major concern for the state.

Can you speak to the specific commitments you made in the framework agreement, and how far along are you in meeting those commitments? Can you still meet your goals under a full year Continuing Resolution and sequestration?

Mr. Huizenga. The 2012 Framework Agreement between the Department of Energy and the New Mexico Environment Department called for the removal of 3,706 cubic meters of potentially combustible and dispersible transuranic (TRU) waste stored above ground at Technical Area (TA)-54 Area G at the Los Alamos National Laboratory by June 30, 2014. Specific objectives include removal of 800 cubic meters of TRU waste in FY 2012, 1,800 cubic meters in FY 2013, and the remaining 1,106 cubic meters in FY 2014.

Through March 2013, all quarterly reports to the State of New Mexico have shown the project meeting or exceeding volume removed objectives. However, the funding constraints within the full year Continuing Resolution and sequestration may impact the June 30, 2014 objective.

To date in FY 2013, 30 percent of the 1,800 cubic meters fiscal year goal has been removed through the second quarter. Overall, 39 percent of the 3,706 cubic meters has been removed.

Subcommittee. Will this agreement move out all of the above-ground TRU waste from Los Alamos? NNSA is now constructing a new TRU Waste facility, so can you explain how much waste will remain at Los Alamos after the current removal effort is complete?

Mr. Huizenga. Once the 3706 cubic meters of above-ground TRU has been removed, approximately 85 percent of the transuranic (TRU) waste in Area G at the Los Alamos National Laboratory will have been disposed of at WIPP. Additional efforts will be undertaken to remove the lower risk

inventory stored above ground, as well as below grade transuranic wastes requiring retrieval, processing and shipment.

Ongoing national security mission activities at Los Alamos generate transuranic waste volumes, which also require disposition. Storage capacity at the NNSA's planned facility will be a small fraction of Area G storage capacity, and the facility is intended to store and process only newly generated waste. Until this facility is operational, some newly generated NNSA transuranic wastes will be staged at Area G until disposed of at WIPP

Subcommittee. This Committee has supported large increases for this particular cleanup effort, but future availability of funding for cleanup will be constrained. How does the vulnerability of this waste or the threat to the environment compare with other EM sites?

Mr. Huizenga. The principal vulnerability to the above ground stored waste relates to wildfires, which are viewed as anticipated events in the Los Alamos region (e.g., Cerro Grande wildfire in May 2000 and Las Conchas wildfires in June 2011). The potential impacts of such threats are carefully evaluated in the safety basis documentation underpinning waste operations at Area G. Since the 2000 wild fire event, which caused evacuation of the City of Los Alamos and Town of White Rock and burned many acres at the laboratory and encroached quite close to the stored waste, the Department took steps to increase protections from such threats by, for example, removing fuel and creating wildfire breaks. Such steps were successful in keeping the Las Conchas wildfire several miles away in 2011 and were such that the town of White Rock did not need to be evacuated. Risk factors differ among sites for numerous reasons such that simple comparisons among sites – even for similar activities and inventories – are generally avoided.

NON-DEFENSE AND URANIUM ENRICHMENT CLEANUP

PORTSMOUTH (OHIO)

Subcommittee. There were significant concerns about the cut in the FY13 budget request for Portsmouth. The contractor has signaled a need to cut the workforce there by as much as 20 percent. There are a number of decisions that need to be made in 2013 to define the cleanup path there, including what will be done with the process buildings and equipment of the uranium enrichment cascade.

What is the path forward for the cleanup at Portsmouth? Does DOE anticipate having to continue to ramp down cleanup operations there?

Mr. Huizenga. The President's FY13 request for the Portsmouth cleanup supports DOE's continued commitment to the cleanup at Portsmouth. DOE continues to work on the regulatory decision documents with the Ohio EPA and other stakeholders to define the cleanup path forward for the Portsmouth Site. DOE is anticipating the decision documents (Record of Decisions) for the Process Buildings and the potential Onsite Waste Disposal Facility to be finalized in early FY14. The near term focus is the cleanup and offsite disposal of the process gas equipment and preparation for demolition of the first of three large gaseous diffusion process buildings.

Subcommittee. How is the site adjusting and how will the workforce be impacted?

Mr. Huizenga. As the cleanup progresses, the workforce is transitioning from operational surveillance and maintenance activities to cleanup activities. The decontamination and decommissioning (D&D) contractor has completed a voluntary workforce skill mix adjustment to align some of the workforce with the D&D activities. As D&D cleanup activities continue to progress, additional skill mix adjustments will be required.

Subcommittee. It seems that the site is counting on an increase in uranium transfers to fund the cleanup activities there. Some reports state that DOE has agreed to increase its uranium sales to about $90 million a

year to offset the reduction in requested appropriations. What is the DOE's plan to release additional uranium to fund cleanup activities?

Mr. Huizenga. Based on the May 2012 Secretarial Determination, the Department may increase the amount of the uranium transfer from 1,600 MTU in calendar year 2013up to 2,400 MTU per year, with no more than 600 per quarter, as needed, for future cleanup activities through FY2021. The annual value of these transactions will vary based on market influences.

FUTURE OF PADUCAH

Subcommittee. The Department has issued an Expression of Interest (EOI) for the reuse of the gaseous diffusion plant facilities and uranium materials at Paducah.

What are your goals in developing a future DOE-sponsored mission at Paducah and what are the government's interests here? Is it feasible to reuse all or a portion of the facility?

Mr. Huizenga. DOE's near and long-term mission for the Paducah Gaseous Diffusion Plant (PGDP) site is focused on the safe environmental cleanup of the site. This mission includes the return of the Gaseous Diffusion Facilities from USEC after shutdown and USEC's compliance with turnover requirements in the GDP Lease, and the eventual decommissioning of the PGDP.

DOE believes it may be feasible to reuse all or a portion of the facilities and site and continues to explore those options. The potential reuse opportunities range from commercial reuse of a portion or all of the existing facilities to the possible construction of new facilities on the DOE-owned site. While the DOE is focused on environmental cleanup, we are fully committed to support commercial reuse options; however, no decisions have been made at this time.

Subcommittee. The one-year campaign to extend USEC operation of the Paducah Gasseous Diffusion Plant by re-enriching uranium tails will soon come to an end in May. The transfer back to Department of Energy control is expected to take place in June, but no funding was specifically requested in the fiscal year 2013 budget request.

What are the costs of taking over operations in 2013? Will you have enough funding under a full-year Continuing Resolution to fund base operations? What activities will you fund in 2013 specifically?

Mr. Huizenga. Although USEC enrichment operations are projected to cease around May 2013, DOE expects USEC shutdown and closeout activities, including compliance with the notice and turnover requirements in the GDP Lease, could continue through June of 2014. Consequently, DOE does not expect to take back the facilities to fund any current USEC base

operations in FY13, nor did DOE request any funding in FY13 to take over the USEC leased facilities. DOE's actions in FY13 are limited to planning for the future return of the leased facilities, pending formal notice from USEC of its intent to return the facilities.

TRANSFERRING URANIUM TAILS FOR RE-ENRICHMENT

Subcommittee. This subcommittee has criticized the Department again and again for how it has been transferring uranium to pay for cleanup activities, effectively skirting around the appropriations process. Still, DOE has expanded its use of uranium transfers. The Department is now telling industry it might include purchase, exchange, or transfer of depleted and off-specification uranium tails as part of a future deal for Paducah. We've received no information from the Department on how such a transfer might be conducted. Congress set up special rules under the USEC privatization act for the use of legacy uranium in order to privatize operation of the DOE's gaseous diffusion enrichment plants, but these are limited authorities.

What authority do you have to release the DOE's assets for commercial benefit to another entity entirely? Do you need additional legislative authority?

Mr. Huizenga. DOE would not need additional legislative authority to transfer or exchange depleted or off-specification uranium tails. Broadly speaking, the Atomic Energy Act authorizes the Department to possess, distribute, acquire, and dispose of source, special nuclear, and byproduct material. The USEC Privatization Act places certain conditions on the Department's covered transfers of natural and enriched uranium in its stockpile, including a requirement that the Department receive fair market value for the material transferred in those transactions and avoid an adverse material impact on the domestic mining, conversion, and enrichment industries. Accordingly, DOE may transfer or exchanges its excess uranium inventories consistent with existing authorities and in compliance with applicable legal requirements.

Subcommittee. How will you protect the government's interests, particularly since you've identified an ongoing need for unencumbered enriched uranium to support our national security needs for producing tritium?

Mr. Huizenga. Under any future arrangements, the Department will ensure protection of America's national security interests and taxpayers by properly managing its inventory of excess uranium in a manner that is consistent with current law and balancing Departmental mission needs. These mission needs include maintaining an adequate inventory of U.S.-

origin material for DOE national security needs, appropriately supporting cleanup activities, and supporting the maintenance of a strong domestic industry. The Department remains committed to the maintenance of a strong domestic uranium industry, and the future plans will reflect adherence to policies and legal requirements that protect the interests of the domestic uranium industry in an effective and reasonable manner while providing the Department with the necessary flexibility to meet its programmatic needs and responsibilities.

DISPOSITION OF REMAINING URANIUM TAILS

Subcommittee. The current program of record for thousands of metric tons of depleted uranium tails has been to convert and dispose of them. To support this program of record, the DOE has invested over $600 million since 2002 to design, construct and operate a conversion facility at Paducah. At the end of FY12, you were 7,750 metric tons short of your target for packaging uranium for disposition. You reduced funding in your FY2013 budget request and now you are looking at transferring additional tails.

Have you packaged any uranium yet and do you intend to actually use the facility this year? Is this no longer part of the DOE's plan for the site?

Mr. Huizenga. The Department of Energy (DOE) depleted uranium hexafluoride (DUF6) conversion facilities at Paducah, KY and Portsmouth, OH (DUF6 Conversion Facilities) are operational, and we plan to continue operations of both to convert lower assay DUF6 into uranium oxide for disposition. Through February 2013, the Department has converted and packaged over 11,200 metric tons of uranium oxide at the DUF6 Conversion Facilities. The DUF6 Conversion Facilities' production capacity is ramping up and DOE expects to reach and sustain full use of the facilities' design capacity for conversion in late 2013.

Subcommittee. What is the government's ultimate responsibility here? Are there any regulatory commitments to dispose of the tails?

Mr. Huizenga. The Government's ultimate responsibility is to disposition its inventory of depleted uranium in a safe and responsible manner. To that end, DOE's plan is to convert approximately 800,000 metric tons of DUF6 material stored at the Paducah and Portsmouth sites into a more stable chemical form suitable for beneficial reuse or disposal, as analyzed in the *DUF6 Conversion Facility Final Environmental Impact Statements* (DOE/EIS-0359, DOE/EIS-0360) and reflected in the associated DOE Records of Decision. There are no regulatory commitments to dispose of the tails and the state regulators have not raised concern with storing the converted oxide as the primary chemical hazard has been removed.

Subcommittee. Will you be including a cost-benefit analysis to the Committee if your decision to dispose of the uranium tails changes,

incorporating the fact that we have already invested $600 million towards disposition?

Mr. Huizenga. DOE conducts cost benefit and if applicable market impact analyses as a part of the decision process for determining the most appropriate disposition paths for its materials and waste. For example, in accordance with DOE Order 435.1, *Radioactive Waste Management*, DOE is required to determine what disposal path is in the best interest of the Government, considering cost, schedule, the need for transportation, packaging and certification, potential legal liability, and other pertinent factors. Additionally, as part of its *Finding of No Significant Impact and Mitigation Action Plan for the Disposition of DOE Excess Depleted Uranium, Natural Uranium, and Low-Enriched Uranium* (DOE/EA-1607), DOE indicated it would conduct a market impact analysis prior to the sale or transfer of its higher-assay depleted uranium to determine the potential impact of the proposed sale or transfer on the domestic uranium industry and structure any sale or transfer to mitigate any potentially significant impacts on the domestic uranium industry. DOE plans to continue operations of both of these conversion facilities to convert lower assay DUF6 into uranium oxide for disposal or reuse. If the plan for the lower-assay tails changes, the Department will inform the Committee.

WEST VALLEY CLEANUP – "VICTIM OF ITS OWN SUCCESS"

Subcommittee. Funding has been going down for nearly all EM sites, extending timelines and raising the costs to complete our cleanup goals. The West Valley Demonstration Project in New York is one of those sites and the community is understandably struggling with these decreases. It was characterized (by an EPA official) that West Valley is "a victim of its own success," successfully cleaning up the highest risk materials and subsequently falling to the bottom of EM's cleanup priorities.

Where does the West Valley cleanup rank against other DOE EM projects in terms of overall risk to the environment?

Mr. Huizenga. The most significant environmental risks at West Valley were mitigated through the successful vitrification of the liquid high-level wastes remaining from the commercial reprocessing activities conducted at the site, and through the construction of the permeable treatment wall to contain further spread of ground water contamination. The current cleanup work at the site is now focused on the safe decontamination of the significant facilities on site and the processing and storage or disposal of the radioactive wastes generated during these activities. As such, the West Valley activities are evaluated consistent with other solid waste disposition and facility decontamination and decommissioning activities within the EM program.

Subcommittee. Are there other considerations that led you to reduce funding for West Valley in your budget requests?

Mr. Huizenga. As the budget request is formulated each year, the EM program carefully considers the risk drivers for each activity or project, as well as related compliance requirements, project and contract management considerations, site-wide or complex-wide impacts, and other factors, including work force and stakeholder issues.

Subcommittee. Do you see the ranking of West Valley cleanup in your cleanup priorities changing in the near future?

Mr. Huizenga. As the budget request is formulated each year, the EM program carefully considers the risk drivers for each activity or project, as well as related compliance requirements, project and contract management

considerations, site-wide or complex-wide impacts, and other factors, including work force and stakeholder issues.

THURSDAY, MARCH 14, 2013.

APPLIED ENERGY FUNDING FY 2014 BUDGET

WITNESSES:

DAVID DANIELSON, ASSISTANT SECRETARY FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

PETE LYONS, ASSISTANT SECRETARY FOR NUCLEAR ENERGY, DEPARTMENT OF ENERGY

CHRISTOPHER SMITH, ACTING ASSISTANT SECRETARY FOR FOSSIL ENERGY, DEPARTMENT OF ENERGY

Mr. FRELINGHUYSEN. Good morning. The hearing will come to order. I would like to welcome our witnesses, Dr. David Danielson, Assistant Secretary for Energy Efficiency and Renewable Energy. Dr. Pete Lyons, welcome back, of course, Assistant Secretary for Nuclear Energy. And Christopher Smith, Assistant Secretary for Fossil Energy. Welcome to all.

The three accounts that you oversee total more than $3 billion per year, more than half of which is for energy efficiency and renewable energy. While this is an impressive investment, it is dwarfed by the more than $20 billion your programs received in the Stimulus Act of 2009. It should not go without noting that EERE alone received more than eight times its regular annual allocation from that one law. That period of time where money flowed freely, oftentimes without proper oversight and planning for its use, is gone. In fact, the reverse is true, and substantially less money is available. But we still need oversight, and we still need planning, and I am sure that we can count on you for that.

Each of your programs is critical to the competitiveness of our country. We have asked you to appear this morning as a single panel to give us all a better sense of the Department's planning across all potential energy sources for this country. The Department's justification for your programs have been historically separate, but such a traditional approach obscures the fact that applied energy programs should be seen as a portfolio of investments, not just stove piped. Generally, we look at the Department's budget request to get a sense of the strategy you are taking across all energy sectors but the President's budget submission is now more than a month late, so we do not have the benefit of that submission.

I must say, gentlemen, that fact will make it exceedingly difficult to write our bills in time to avoid another continuing resolution for 2014, but we will do our best.

I know the panel will have many questions we would like to ask, so I will keep my opening comments brief and turn to Ms. Kaptur for any comments she may have.

Ms. KAPTUR. Thank you, Mr. Chairman. And we welcome our panel, Dr. Danielson, Dr. Lyons, Secretary Smith. Thank you so very much for all the work that you are doing for our country.

Today we consider the applied research and development portfolios at the Department of Energy—energy efficiency and renewable energy, nuclear energy, and fossil energy—all critical areas of our nation's energy portfolio. And nothing could be more important to this member of Congress than energy independence for our nation. All you have to do is look at U.S. trade accounts, the top two categories, and just think about their relationship to understand how important is the work that you do.

The U.S. energy sector faces myriad challenges that pose a persistent threat to our economy, our national security, and our environment. According to the EIA, the proportional makeup of annual electric energy sources in terms of fossil, nuclear, and renewable has not changed significantly in the last decade. However, there are significant changes within fossil and renewable with natural gas, wind, and solar gaining ground. Nuclear is not left out of the equation as we face an aging inventory of plants, but also the new push for additional capacity coming online in the coming years, largely in the form of small modular reactors.

I represent a part of the country that has worked very hard to develop all types of energy, all of the above, from the PV solar manufacturing sector in Toledo, to oil refining in Oregon, nuclear energy in Oak Harbor, offshore wind in Lake Eerie, and advanced batteries in Cleveland. And we are now seeing a boom of natural gas all along the eastern half of Ohio.

But by and large we have had to compete in the harshest of free markets. We lack the advantages of a national lab driving development or investment. We lack power authorities providing generations of subsidized power to our homes and businesses. For my district and state and others like us in the industrial heartland, energy supply is a significant financial strain on the citizens and businesses striving to make it through each day. In fact, people are looking to us for better answers for the future. So I am particularly interested in work that drives down costs and supports regional energy equity.

I expect today that you will address how each of your programs is meeting the nation's challenges related to our energy sector, but in an era of budget austerity, I am focused on understanding the technological challenges that face each of these industries so that collectively we can make informed and wise decisions to shepherd our limited resources toward those areas with the largest return.

At the same time I am very concerned about indications that America is losing her competitive advantage in energy technologies. While China is pouring $10 billion into solar development and production, we are struggling to maintain level funding. The downturn in the housing sector and the crash of the euro has really impacted our export markets in solar as one example, all at the expense of our domestic manufacturing capabilities. I am interested to hear about opportunities to not only remain competitive but to restore our position as the global leader in new technology for tomorrow. Similarly, I would like to hear your plans to ensure that we are not wasting critical research and development dollars by allowing other countries to step in at the critical transition to large scale manufacturing, reaping the rewards of our own investments in intellectual capital.

Dr. Danielson, gas prices continue to be an issue for most Americans, putting pressure on their family budgets as we move slowly toward an economic recovery. While there is no magic bullet available to the government to immediately drop the price of gasoline, ongoing federal research in vehicle technologies is starting to yield dividends with the market introduction of automobiles utilizing technologies that will displace some portion of gasoline for power. Efficiency standards have played an important role in driving this trend, but we recognize the Department of Energy's work in advanced engines. Vehicle systems and advanced metals have made these gains possible. I hope to hear today what the Department is doing to advance the nation's knowledge in these areas and to increase the domestic manufacturing sectors that utilize these technologies.

And lastly, with the Senate considering the CR this week, it is clear that sequestration is a reality despite estimates it will cut economic growth by one third. The CBO also estimates that up to 1.4 million jobs are at stake as sequestration is fully implemented and a George Mason University study predicts it could be as many as 2,140,000 jobs lost. I expect that each of you will address the impacts of sequestration to your programs today and thank you, Mr. Chairman, for this time.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur.

Dr. Danielson, welcome. Good morning. Thank you for being with us. You are first on the firing line.

Mr. DANIELSON. Mr. Chairman, Ranking Member Kaptur, and distinguished Members of the Subcommittee, thank you for the opportunity to testify today.

The Office of Energy Efficiency and Renewable Energy, known as EERE, seeks to ensure American leadership in the transition to a global clean energy economy. Our goals are to dramatically reduce U.S. reliance on foreign oil, reduce energy costs for American families and businesses, create American jobs, and reduce pollution. At EERE, we focus on three distinct energy sectors: (1) sustainable transportation; (2) renewable electricity; and (3) energy efficient buildings and manufacturing. We support research development and demonstration at some of America's most innovative businesses and research institutions with the explicit goal of making clean energy technologies directly cost competitive without subsidies with the energy technologies we use today.

Our nation stands at a critical point in time when it comes to the opportunity in clean energy. Americans are paying more than $3.70 a gallon at the pump. We continue to send $1 billion a day overseas for foreign oil, and we are wasting hundreds of billions of dollars every year in energy costs through inefficient buildings and factories, but this does not have to be the case. After decades of targeted investments by EERE toward American clean energy innovation, we have made tremendous progress and are now in the unique position where a wide array of technologies from solar power, wind power, and plug-in electric vehicles, to solid state lighting and cellulosic biofuels are within 5 to 10 years of being cost competitive without subsidies. This presents us not only with the opportunity to address America's strategic energy challenges,

but also with what will likely be one of the most significant economic opportunities of the 21st century.

In 2012 alone, $268 billion was invested globally in clean energy, and trillions more will be invested in the years ahead. At this critical point in our nation's energy history, I believe we face a very stark choice. We can either make the necessary and appropriate investments to ensure that the clean energy technologies of today and tomorrow are invested and manufactured in America, or we can surrender global leadership and import these technologies from other nations like China, India, South Korea, and Japan.

In spite of the tremendous and urgent strategic and economic opportunity for America in clean energy, the energy industry is systematically underinvested in innovation, adjusting just 0.3 percent of its sales in R&D, as compared to pharmaceuticals which is at 20 percent and the aerospace defense industry at 12 percent. Therefore, there continues to be an important and appropriate role for government investment and innovation in the clean energy sector.

For all of these reasons, the importance of stable, targeted government investments in clean energy RD&D are more important now than they have ever been before. With the limited time I have before you today, I would like to share with you just a few examples of the many successes we have already had at EERE and as a nation in the area of clean energy.

In the transportation sector, the investments EERE made in cutting-edge combustion efficiency R&D over 20 years from 1986 to 2007 resulted in $70.2 billion in total economic benefit in the heavy duty diesel truck sector, representing more than 70 to one return on the taxpayer investment. In addition, virtually every hybrid vehicle on the road today has EERE-developed technology inside the nickel-metal hydride NiMH) batteries, providing for up to a 50 percent increase in fuel economy. The U.S. no has more than 2.5 million of these vehicles on the road today.

In biofuels, last year we successfully accomplished an aggressive 10-year goal to technically demonstrate the production of cost-competitive cellulosic ethanol at $2.15 a gallon at the pilot scale. In addition, through EERE support, the very first cellulosic ethanol plant to sell product into the commercial marketplace will be up and running this year with four more coming online over the next two years, representing a total production capacity of more than 80 million gallons a year.

We have achieved similar progress in renewable electricity technologies as just one example through committed EERE investments in RD&D. The cost of solar PV modules has been reduced by 95 percent over the last 30 years and by 75 percent over just the last four years. Today, typical installed utility scale solar PV prices range from about $2.00 to $2.50 per watt without subsidies. Going forward, EERE has set the aggressive sun shot goal of bringing the cost of solar down to $1.00 a watt or less by 2020, at which point solar will be directly cost competitive without subsidies. I have many other EERE success stories to tell and I look forward to the opportunity to share them during the rest of this hearing.

In the current time of fiscal and budget austerity, I know that it is more important now than ever before that EERE uses the precious funds that are made available to it by the Congress as effi-

ciently and carefully as possible. For this reason, and at the direction of this Committee, starting in fiscal year 2014, EERE will be fully and uniformly implementing ARPA–E active project management under which every single competitive project we award going forward will be a cooperative agreement, not a grant, and will be subject to aggressive annual go/no go milestones, rigorous quarterly reviews, and early termination in the event of insufficient technical performance.

I look forward to continuing to work with this Committee to ensure that every taxpayer dollar spent at EERE is spent to the highest impact possible to ensure the United States wins the global race for the clean energy manufacturing industries and jobs of the future.

Thank you, and I look forward to your questions.

[The information follows:]

STATEMENT OF

DR. DAVID DANIELSON

ASSISTANT SECRETARY FOR
ENERGY EFFICIENCY AND RENEWABLE ENERGY

U.S. DEPARTMENT OF ENERGY

BEFORE THE
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
COMMITTEE ON HOUSE APPROPRIATIONS
UNITED STATES HOUSE OF REPRESENTATIVES

MARCH 14, 2013

INTRODUCTION

Mr. Chairman, Ranking Member Kaptur, and Members of the Subcommittee, thank you for the opportunity to testify on our recent accomplishments and on the opportunities and challenges that lie ahead for the Energy Department's Office of Energy Efficiency and Renewable Energy (EERE).

The U.S. Department of Energy (DOE) is pursuing an all-of-the-above approach to developing every source of American energy. EERE leads DOE efforts to help build a strong clean energy economy, a strategy that is aimed at reducing our reliance on foreign oil, saving families and businesses money, creating jobs, and reducing pollution. We support some of America's best innovators and businesses to research, develop, and demonstrate cutting-edge technologies, and work to break down market barriers in our portfolio's three sectors: 1) sustainable transportation (vehicles, biofuels, hydrogen and fuel cells); 2) energy efficiency (energy-saving homes, buildings, and manufacturing); and 3) renewable electricity generation (solar, geothermal, hydrogen and fuel cells, wind and water).

Our nation stands at a critical point in time in terms of the competitive opportunity in clean energy. In 2012, $268 billion was invested globally in clean energy, a 500% increase since 2004; trillions more will be invested in the years ahead. Last year, China pulled ahead of the U.S. in clean energy investment after we gained the investment lead in 2011. We are essentially trading pole position with China as the world begins to accelerate into a decades-long transition to clean energy. In that transition, the United States faces a stark choice: the clean energy technologies of today and tomorrow can be invented and manufactured in America, or we can surrender global leadership and import these technologies from other countries. We can continue wasting hundreds of billions of dollars in unnecessary energy costs – money that we could be reinvesting into our economy – or we can strengthen our productivity and competitiveness by investing in more efficient homes, buildings, and factories and a more flexible and integrated electrical grid that supports greater use of cost-effective clean energy technologies.

The United States has world-class innovation capacity, a unique culture of entrepreneurship, well-developed capital markets, and the finest scientists, engineers, and workers in the world. We have everything it takes to outpace our competitors in clean energy. However, despite this tremendous opportunity, the U.S. energy industry is systematically underinvesting in R&D (0.3% of sales versus 12% in aerospace/defense and 20% in pharmaceuticals, according to one

estimate).[1] The significant underinvestment in energy R&D by the private sector – in spite of the highly strategic importance of energy to American economic growth, energy security, and the environment – makes government support for applied clean energy RD&D critical for our national success.

Today, the technological improvements that EERE, with Congress's support, has helped develop through investments in American innovation over the last four decades, show a clear path to cost competitiveness with conventional forms of energy for a widening array of renewable energy and energy efficiency products both in terms of price and performance, bringing these technologies to the brink of widespread market adoption. Now is the time to stay the course on our recent progress in these areas. Clean energy technologies are real, they are working, and with smart, targeted investments and effective public-private partnerships, they provide us an opportunity to win one of the most important economic races of the 21st century.

EERE'S RETURN ON INVESTMENT

In order to make a significant impact in transforming large existing global energy markets and to maximize the value it delivers to the taxpayer, EERE must invest only in the highest-impact activities in order to achieve our clean energy goals. Evaluations using best-practice, peer-reviewed methods are key to both understanding the returns on past investments and making continuous improvements in EERE's investment strategy. Using well-established methodologies, we have evaluated key elements of our portfolio of EERE activities in energy efficiency, solar, and vehicles investments to date; these activities have clearly produced a significant positive return on investment in the form of economic and environmental benefits. EERE is proud of this record of driving and accelerating innovative clean energy technologies to commercial success. In the near term, EERE is expanding this effort to perform return on investment analyses for all applicable program areas. These studies have, and will, document the value of EERE investments to the taxpayer and provide important feedback to EERE leadership to help identify the most effective investment approaches and allow continual improvement going forward.

Examples of our analyses to date are included below:

- EERE generated $70.2 billion (2008 dollars) in total benefits from vehicles combustion engine R&D due to fuel savings for users of heavy-duty diesel trucks and associated, monetized health benefits, based on $931 million invested from 1986 to 2007.[2]

---

[1] American Energy Innovation Council, *Business Plan for America's Energy Future*, 2010.

[2] Valued in inflation adjusted 2008 dollars; "Retrospective Benefit-Cost Evaluation of U.S. DOE Vehicle Combustion Engine R&D Investments: Impacts of a Cluster of Energy Technologies," U.S. DOE, May 2010. The investment of $931M includes some funds from the Office of Science.

- EERE generated $18.7 billion (2008 dollars) in total benefits from solar photovoltaic R&D due to module efficiency and reliability improvements, based on $3.7 billion invested from 1975 to 2008.[3]

- A 2001 National Academy of Sciences analysis found that in its first two decades of existence DOE generated approximately $40.4 billion (2008 dollars) in total benefits from energy efficiency R&D, based on $2.1 billion invested from 1978 to 2000.[4]

EERE'S SECTOR-LEVEL PROGRAMS AND ACCOMPLISHMENTS

EERE's strategic investments in clean energy technologies complement those of the private sector. The EERE portfolio consists primarily of competitively selected projects with the largest potential to help achieve national economic, strategic, environmental, and energy goals. It balances investments in higher-risk, early-stage research and development with public-private partnerships that accelerate the transfer of innovations into the marketplace.

Sustainable Transportation

Through our Vehicle, Bioenergy, and Fuel Cell Technologies Offices, EERE advances the development of next-generation technologies to improve plug-in electric and other alternative-fuel vehicles, advanced combustion engine and vehicle efficiency, and the production of low-carbon domestic transportation fuels.

- **Vehicles:** Develops and accelerates deployment of efficient and environmentally friendly highway transportation technologies that will enable America to use less petroleum and lower greenhouse gas emissions from the transportation sector without sacrificing vehicle performance. Activities focus on a mix of near- and long-term technologies for a broad range of vehicle technologies including advanced batteries, power electronics and electric motors, next generation lightweight materials and propulsion materials, advanced combustion engines, advanced fuels and lubricants, and vehicle systems and enabling technologies. The Workplace Charging Challenge – part of DOE's EV Everywhere Grand Challenge – is one of the newest activities in this portfolio, and aims to expand access to charging stations in many U.S. communities.

---

[3] Valued in inflation adjusted 2008 dollars; "Retrospective Benefit-Cost Evaluation of DOE Investment in Photovoltaic Energy Systems," U.S. DOE, August 2010. Economic benefits were quantified by comparing actual technological progress to counterfactual scenarios under which DOE technical expertise, technology infrastructure, and financial support were not available and PV module companies pursued their technology R&D strategies without DOE support. These counterfactual scenarios were primarily informed by interviews with academic and industry experts.

[4] Valued originally in inflation adjusted 1999 dollars, further inflation-adjusted to 2008 dollars; "Energy Research at DOE: Was It Worth It? Energy Efficiency and Fossil Energy Research 1978 to 2000," National Research Council, 2001

- **Fuel Cells:** Aims to improve the durability of fuel cells, reduce costs, and improve the performance of hydrogen production (from renewable resources), delivery, and storage technologies to enable the widespread commercialization of an alternative energy system to power cars, trucks, and provide for stationary power.
- **Bioenergy:** Enables activities that overcome challenges across the bioenergy supply chain, from the development of sustainable and economically-viable biomass feedstock logistics systems to the conversion of biomass into end uses such as cellulosic ethanol, drop-in hydrocarbon fuels, and bio-products to replace "the whole barrel" of petroleum.

Sustainable Transportation Accomplishments

EERE-supported technological achievements are helping to transform the U.S. transportation sector, saving U.S. families and businesses money by reducing fuel costs and providing them with a range of fuel choices. Our accomplishments in sustainable transportation include the following:

- **Most hybrid electric vehicles sold in the United States today use EERE-developed battery technology.**[5] EERE's efforts to improve nickel-metal hydride (NiMH) batteries resulted in fuel efficiency improvements of up to 50 percent compared to similar non-hybrid vehicles. Additionally, EERE-supported R&D helped discover and optimize new technologies for lithium-ion batteries that reduce battery size and weight compared to NiMH technology by 25-35 percent.
- **Improved cost-competitive battery technologies for electric vehicles.** EERE research efforts contributed to the achievement of a greater than 50 percent cost reduction for automotive lithium-ion batteries between 2008 and 2012.[6] EERE has helped reduce the modeled high volume production cost of high-energy, high-power batteries from $1,200/kWh in 2008 to $500/kWh in 2012, with a goal of reaching $300/kWh by 2014 and $125/kWh by 2022—which if achieved will make a wide range of plug-in hybrid and all-electric vehicles directly cost-competitive with conventional vehicles over the next 5-10 years. Let me provide one example of a recent success that is significantly contributing toward these goals:
    - A battery startup based in Newark, CA, has become a world leader in the race to commercialize new high energy lithium-ion batteries that promise better performing electric vehicles that cost much less. This company's innovative battery cells use a breakthrough mixed-metal cathode material invented at DOE's Argonne National

[5] "Linkages of DOE's Energy Storage R&D to Batteries and Ultracapacitors for Hybrid, Plug-in Hybrid and Electric Vehicles." U.S. DOE, February 2008

[6] Based on projection to high volume manufacturing of battery prototypes that meet or exceed performance requirements using a peer reviewed cost model, and on proprietary data submitted by battery companies participating in the U.S. Advanced Battery Consortium

Laboratory and developed through a decade of sustained EERE support.[7] A major U.S. vehicle manufacturer subsequently has found this battery technology using the cathode so promising that it has invested $7 million in the company. With the help of a 2009 ARPA-e award, the Newark startup is also developing and incorporating a silicon-based anode designed to further boost driving range, lower production costs, and improve safety. Through the U.S. Advanced Battery Consortium—a cooperative agreement between DOE and automakers—and an individual cost-share partnership with EERE, this company continues to optimize this cathode technology. In February 2012, the company announced it had achieved a breakthrough that would enable twice the battery energy density of current lithium-ion batteries and, as a result, has the potential to reduce their cost by more than half.

- **Reduced fuel costs for heavy-duty trucks to help U.S. businesses save money.** EERE's SuperTruck initiative aims to develop technologies to improve the fuel economy (freight hauling efficiency) of heavy-duty, class 8 vehicles by 50 percent by 2015 with respect to a comparable 2009 vehicle. The SuperTruck Initiative has made significant progress in the areas of engine efficiency and emission control, advanced transmissions and hybridization, aerodynamic drag of the tractor and trailer, tire rolling resistance, light-weight materials, and Auxiliary Power Units to reduce engine idling and has already achieved a 20 percent engine efficiency improvement in the laboratory. The SuperTruck Initiative is on track and expects to exceed its 50% freight efficiency improvement goal.
- **Decreased the dependence on oil for transportation in many local communities.** Since 1993, the EERE-supported Clean Cities Program has grown to a national network of nearly one hundred local coalitions, which have collectively displaced more than 4.5 billion gallons of gasoline.[8] These coalitions have helped deploy thousands of alternative fuel vehicles and the fueling stations needed to serve them, aided in the elimination of millions of hours of vehicle idling, and helped accelerate the entry of electric-drive vehicles into the marketplace.
- **Achieved significant reductions in the cost of fuel cells and hydrogen technologies.** EERE has achieved a more than five-fold reduction in the platinum content in fuel cells since 2005,[9] which has led to substantial cost reductions—enabling a more than 35% reduction in modeled high-volume automotive fuel cell cost since 2008, and a more than 80% reduction since 2002.[10] Additional reductions of about 35%, in addition to the achievement of scaled up manufacturing volumes, will be required to achieve cost-parity with internal combustion engines. EERE has

[7] Argonne National Laboratory http://www.anl.gov/articles/argonne-envia-strike-deal-license-advanced-battery-technology
[8] As reported by program partners and based on measured and estimated impacts. http://www1.eere.energy.gov/cleancities/accomplishments.html
[9] DOE Hydrogen and Fuel Cells Program Record # 9018, http://hydrogen.energy.gov/pdfs/9018_platinum_group.pdf
[10] Based on projections to high-volume manufacturing; DOE Hydrogen and Fuel Cells Program Record #12020, http://hydrogen.energy.gov/pdfs/12020_fuel_cell_system_cost_2012.pdf.

also dramatically reduced the costs of technologies for producing and delivering hydrogen—including a >80% reduction in the cost of electrolyzer stacks. Currently, hydrogen production from natural gas is projected at high volume to be cost-competitive with gasoline, and the costs of producing hydrogen from several renewable pathways range from approximately $4 to $10 per gallon gasoline equivalent (gge).[11] EERE will explore pathways to reduce the cost of renewable hydrogen production, delivery, and storage, which will need to come down to $2-4/gge to achieve cost parity with gasoline in other advanced vehicles.

- **Spurred commercialization of fuel cells in key early markets.** EERE-funded R&D in fuel cells and hydrogen has led to the development of more than 360 patents, 35 commercial technologies, and more than 65 technologies that are projected to be commercialized within 3 years. In addition, strategic cost-shared deployments of 700 fuel cell forklifts and about 700 fuel cell backup power units have successfully catalyzed the growth of these early markets, leading to additional purchases of more than 5,000 additional fuel cells, with no additional DOE funding.[12] By accelerating early adoption, we are enabling the growth of a domestic manufacturing base, prompting additional private-sector investment, and helping drive down costs through economies of scale.
- **Supported first-of-a kind integrated biorefineries across the United States.** Through public-private partnerships, EERE has also established, with our industry partners, a network of pioneering biorefineries making cellulosic ethanol, drop in biofuels, and other products at different production demonstration scales. These facilities are validating the costs and significantly reducing the technical and financial risks associated with developing and producing advanced biofuels. After decades of pioneering technological achievements and support from EERE, we expect the first commercial cellulosic ethanol biorefinery in U.S. history to fully come online this year. It will transform municipal solid waste and yard waste into renewable biofuels and clean energy, while commercial cellulosic biorefineries built by two other companies are expected to be online shortly thereafter in 2014. Together, these three facilities will have the capacity to produce more than 50 million gallons of renewable fuels annually.[13]
- **Reached cellulosic ethanol production cost-competitiveness and continuing RD&D portfolio shift to "drop in" hydrocarbon biofuels.** In 2001, our modeling efforts determined that the production cost of a single gallon of cellulosic ethanol would be more than $9.00, if technologies actually existed to do so. After 10 years of dedicated EERE investment, breakthroughs across the biomass supply chain have helped reduce the cost of cellulosic ethanol by more than 75%, and in

---

[11] DOE Hydrogen and Fuel Cells Program Record # 12002, http://hydrogen.energy.gov/pdfs/12002_h2_prod_status_cost_plots.pdf.
[12] DOE Hydrogen and Fuel Cells Program Records #12013 and #11017, http://hydrogen.energy.gov/program_records.html.
[13] Planned production at each company: 8 million gallons/year, 20 million gallons/year, and 25 million gallons/year

2012, EERE-supported research reached a major milestone – achieving a modeled production cost of $2.15 per gallon of cellulosic ethanol. In addition, improved processing and conversion technologies of biomass resources have reduced the delivered cost in certain biomass feedstock scenarios from $60 per dry ton in 2005 to $35 per dry ton.[14] This year, we continue to further shift our RD&D focus to the next major opportunity in biofuels – non-food cellulosic "drop-in" hydrocarbon biofuels that can directly power our vehicles and aircraft and are compatible with our existing petroleum-based infrastructure.

Renewable Electricity Generation

Through our Solar, Wind and Water Power, and Geothermal Technologies Offices, EERE plays a key role in developing innovative technologies that will make clean, renewable electricity generation cost-competitive with traditional sources of energy, enabling the U.S. to diversify its energy portfolio and better protect our environment and respond to the threat of climate change. In early 2012, through recent U.S. government efforts using EERE-supported technologies, the U.S. met a key national goal when renewable energy generation from wind, solar, and geothermal doubled since late 2008; the cost of these technologies is declining rapidly.

- **Solar:** Drives research and manufacturing innovation, and breaks down market barriers, through DOE's SunShot Initiative to help make solar energy cost-competitive with other forms of electricity by the end of the decade.
- **Wind and Water Power:** Leads and partners on the development of technologies that improve the reliability and affordability of land-based and offshore wind energy systems; and accelerates technology development for cost-effective and environmentally responsible renewable power generation from water.
- **Geothermal:** Supports research, development, and demonstration projects to improve the discovery of new geothermal resources and develop innovative methods of accessing those resources for cost-effective base-load (24-hour) renewable electricity production.

Renewable Electricity Accomplishments

By investing in renewable electricity technologies, EERE is driving lower costs and introducing better performing technologies to provide clean, renewable electricity for homes and businesses across the country. Our accomplishments in the renewable electricity generation sector include the following:

[14] "Feedstock Supply R&D". 2011. Biomass Multi-Year Program Plan. Available at: http://www1.eere.energy.gov/biomass/pdfs/mypp_april_2011.pdf

- **Accelerated the solar industry's technological progress by an estimated 12 years.** EERE's research and development efforts are helping to drive down the costs of solar power. Without EERE involvement, the average solar photovoltaic (PV) module production cost per watt would have been $5.27 in 2008, rather than $1.92, based on a retrospective benefit-cost evaluation that included a counterfactual assessment.[15] Today, PV modules are sold for less than $1/W.

- **Enabled a multitude of innovative solar start-ups.** In addition, since 2007, our SunShot Initiative's Incubator program has successfully leveraged $92 million in EERE funding to enable innovative start-up companies to subsequently secure more than $1.7 billion in follow-on private capital.

- **Enables US leadership in solar R&D innovations.** EERE-supported solar PV research has resulted in more than half of the solar cell world records over the past 35 years. A recent study found that 30% of the solar patents around the world are linked to foundational DOE-attributed patents.[16]

- **Accelerated the wind industry's technological progress by an estimated 6 years.** Without EERE involvement, the overall the reliability, commercial risk, and cost of wind energy would be 6 years behind where it is now, at a loss of over two-thirds of cumulative wind power deployed through 2008, based on a retrospective benefit-cost evaluation that included a counterfactual assessment.[17] In 2012, wind energy added nearly half of all new power capacity in America – even more than new natural gas power capacity.[18]

- **Drove improvements in wind components, and continues to showcase technology innovation to increase viability and reliability of wind.** Through research, development, and demonstration, EERE and its partners have achieved significant improvements in key wind turbine components, particularly composite-related structures. Through innovation, supporting policies, and a robust U.S. wind market, U.S. manufacturing captured more than 70 percent of the domestic wind energy market in 2012, up from around 35 percent in 2005. The U.S. is home to over 400 manufacturing companies, across more than 40 states, in the wind energy supply chain.

---

[15] "Retrospective Benefit -Cost Evaluation of DOE Investment in Photovoltaic Energy Systems," U.S. DOE, August 2010
[16] "Linkages from DOE's Solar PV R&D to Commercial Power from Solar Energy," U.S. DOE, April 2011.
[17] "Retrospective Benefit-Cost Evaluation of U.S. DOE Wind Energy R&D Program," U.S. DOE, June 2010
[18] Federal Energy Regulatory Commission's December 2012 report. Available at: http://www.ferc.gov/legal/staff-reports/dec-2012-energy-infrastructure.pdf

- **Demonstrated successful co-production of strategic minerals from geothermal brines.** To improve the cost-effectiveness of geothermal development, EERE is advancing mineral extraction technologies to remove valuable minerals from geothermal brines during the power production process – an additional revenue source that lowers the cost of development. Based on extraction technology originally developed at Lawrence Livermore National Laboratory, EERE funded the first demonstration facility to co-produce lithium, manganese, and zinc from geothermal brines, in the Salton Sea area of California. The estimated lithium production alone from their plants could be enough for batteries to power 300,000 to 600,000 electric vehicles per year and make the U.S. a major lithium producer.
- **Demonstrated recent progress in Enhanced Geothermal Systems (EGS).** Enhanced Geothermal Systems are manmade geothermal systems, created where there is hot rock but little to no natural permeability or fluid saturation; hydrothermal systems, by contrast, are naturally occurring geothermal systems. EGS signifies a significant long-term opportunity for widespread geothermal power production beyond just hydrothermal-rich regions of the United States, and successful development and deployment could facilitate access to a resource estimated to be on the order of 100-500+ GWe (USGS, 2008)[19]. Recent successes in three EGS projects include a project in Northern CA – demonstrating potential to produce 5 MW; a project in Bend, OR, demonstrating reservoir stimulation and preliminary results of further reservoir creation from a single well where none existed before – a first-of-its-kind achievement; and a project in Western NV, demonstrating fluid injection and stimulation to within the magnitude of a commercial well, as well as dramatically increased flow rate. These achievements represent steady progress in our efforts to optimize and validate EGS development in the United States, and ultimately establish the parameters under which EGS can be commercially successful.
- **Supported the development and deployment of the first U.S. commercial tidal energy system.** Tidal energy is a resource that can be harnessed wherever changing tides move a significant volume of water – including off the coasts of many U.S. cities where there is high electricity demand. To illustrate one recent success that garnered national media coverage:
  - The first ever grid-connected tidal power project in the United States is now delivering electricity to the utility grid from an underwater power system in Cobscook Bay, Maine. The device is designed to operate in shallow tidal or deep river sites at depths of 50 to 100 feet, and has a peak output of 180 kilowatts – enough electricity to power 25 to 30 homes annually. Two additional devices will be installed at the Cobscook Bay Project site in the fall of 2013, and together, the three-device power system will generate enough energy to power

---

[19] A Technology Roadmap for Strategic Development of Enhanced Geothermal Systems, February 2013 Available at: https://pangea.stanford.edu/ERE/db/GeoConf/papers/SGW/2013/Ziagos.pdf

75 to 100 homes. The devices connect directly to an onshore substation through a single underwater transmission line.

- **Upgraded and expanded U.S. clean hydropower capacity.** Through American Recovery and Reinvestment Act investments, EERE has supported capacity and efficiency upgrades of 7 U.S. hydropower facilities by funding low-cost, high-impact upgrades to existing clean energy infrastructure and by applying modern energy generating technologies to sustainably harness water for clean, renewable power generation. As of 2012, three of these projects have been completed and the remaining four will be placed in service by 2014. In total, these retrofits are expected to add more than 131,000 MWh of sustainable annual generation of electricity – enough to power about 11,400 homes.

Energy-Saving Homes, Buildings, and Manufacturing

Through its Building Technologies, Advanced Manufacturing, Weatherization and Intergovernmental Programs, and Federal Energy Management Program Offices, EERE is continually developing innovative, cost-effective energy-saving solutions to improve the energy efficiency of U.S. plants, manufacturing processes, products, homes, and buildings in which we reside, work, and shop.

- **Advanced Manufacturing:** EERE invests in high-impact cross-cutting manufacturing innovation and efficient energy-intensive process technologies to reduce energy costs for U.S. manufacturing and improve U.S. competitiveness.
- **Buildings:** EERE supports research, development, and demonstration of advanced building efficiency technologies and practices to make U.S. homes and buildings more efficient, affordable, and comfortable.
- **Weatherization and Intergovernmental:** EERE works with State, local, U.S. territory, and tribal governments to advance energy-efficient home retrofits through State-managed networks of local weatherization providers; provides States technical and financial resources to help them achieve their own energy efficiency and renewable energy goals; and supports feasibility assessments and the development of implementation plans for clean energy projects on Tribal lands.
- **Federal Energy Management:** EERE assists the Federal government in leading by example through its Federal Energy Management Program, which provides interagency coordination, technical expertise, training, financing resources, and performance contracting support for Federal agencies to help the Federal Government meet its own goals for cutting energy use.

Energy Efficiency Accomplishments

By investing in technology innovation that increases energy productivity, EERE helps U.S. consumers and businesses save money and improve their global competitiveness. Accomplishments in the energy efficiency sector include the following:

- **EERE-enacted new standards to improve the energy efficiency of household appliances.** EERE appliance standards save households money on their utility bills, as these households replace their existing appliances with newer models that use less energy. As a result of the standards implemented from 1987 through 2011, energy users were estimated to have saved approximately $40 billion dollars on their utility bills in 2010.[20] Since 2009, 16 new or updated standards covering more than 30 products have been issued, which will help increase annual savings even further over the coming years. Cumulative consumer utility bill savings associated with these recently enacted standards are projected to be $180 billion (undiscounted) through 2030.[21] Federal energy efficiency standards reduce the regulatory burden on appliance and equipment manufacturers by pre-empting a potential patchwork of state standards with a single Federal standard; this regulatory streamlining enhances industry competitiveness. EERE actively encourages manufacturer and other stakeholder participation and interaction at all stages energy conservation standards development and implementation.
- **Reduced costs for high performance windows.** EERE investment in low emission (low-e) coatings for windows has played an important role in developing cost-effective windows that are three times more efficient than those from the 1970s. First introduced to the market in 1983, windows with low-e coatings now account for nearly 75 percent of home windows sold.
- **Cut costs for U.S. homes and businesses to power, heat, and cool their buildings.** EERE investments have resulted in energy savings in both residential and commercial buildings. In collaboration with EPA through the Home Performance with ENERGY STAR Program EERE has partnered with state governments, local governments, utilities, and non-profit organizations since 2002 to encourage homeowners to perform building science-based energy upgrades to their homes resulting in average energy savings of 20-30%. To date, more than 300,000 retrofits have been completed – saving owners 15% to 30% annually on their energy bills.
- **Increased U.S. manufacturing competitiveness.** Since 1979 EERE and its partners have successfully developed 220 new, energy-efficient manufacturing technologies, received 78

[20] Savings generated from the analysis for each rule promulgated through 2011. For further information see: http://ees.ead.lbl.gov/bibliography/energy_and_economic_impacts_of_u_s_federal_energy_and_water_conservation_standards_adopted_from_1987_through_2011.

[21] Savings generated from the analysis for each rule promulgated since January 20, 2009. For a complete list of products with standards, please see: http://www1.eere.energy.gov/buildings/appliance_standards/standards_test_procedures.html.

R&D 100 Awards, and delivered technical assistance to more than 33,000 industrial plants. Collectively, these activities have saved billions of dollars and cut carbon emissions by millions of tons, which will continue to grow. Regarding energy-efficient manufacturing technology development, recent EERE successes include the following:

- A steelmaker partnered with EERE to reduce four energy-intensive iron plant process steps— coke making, sintering, power plants, and blast furnaces—into a one-step breakthrough iron manufacturing process that saves time, eliminates the need for carbon-intensive coke, and consumes 30% less energy than a conventional blast furnace.
- A company used EERE support to take previously fragile and expensive super-insulation based upon extremely porous materials called aerogels and pioneered the commercial-scale production of flexible industrial insulation for piping, tanks, and other equipment that is twice as thin as and up to five times more thermally efficient than the current standard. The company has sold millions of square feet of this insulation, saving U.S. manufacturers money on energy costs while improving competitiveness.

- **Scaling up combined heat and power** by supporting manufacturers' R&D investments in reciprocating engines in combined heat and power (CHP) facilities. Since 1970, as CHP use has increased by nearly a factor of six, EERE has also helped manufacturing facilities owners to nearly double the collective combined efficiency of their heat production and electricity generation through the installation of CHP. For example, EERE's network of Clean Energy Application Centers has supported more than 225 energy assessments, and provided over 700 technical support activities on CHP projects, supporting over 1.5 GW of CHP capacity installed or under development in the United States.
- **Provided funds to states to weatherize more than 1,000,000 homes.** Since 2009, the Weatherization Assistance Program has improved the energy performance and comfort in the homes of over 1,000,000 American low-income families across the nation, saving these families hundreds of dollars on their heating and cooling bills each year.
- **Saved taxpayers money by cutting the Federal Government's energy use.** From FY 2005 to FY 2011 EERE has facilitated $3.1 billion of efficiency investments in federal government facilities from performance-based contracts, which will result in energy cost savings of approximately $8.5 billion over the life of the energy-saving measures. The savings on utility bills and operation and maintenance created through the facility upgrades will be used to pay the private contractor for the project over the term of the contract, and in most cases, the agencies continue to save money and energy after the contract term ends.

MANUFACTURING COMPETITIVENESS

I'm constrained by time and the focus of this hearing from discussing in detail with you today some of the key cross cutting thrusts that EERE is pursuing which leverage and align the efforts of our individual technology offices.

But I do want to note one such thrust – an EERE-wide effort we are undertaking to increase American competitiveness in clean energy manufacturing.

Through this effort, we are beginning an in-depth analysis of the international supply chain for all of the clean energy technologies EERE invests in to inform the development of more comprehensive competitiveness strategies and technology development roadmaps. This analysis will ensure that EERE's innovation investment strategy aligns well with U.S. competitive advantages to increase the probability that EERE technology investments will result in U.S. manufacturing activity.

Furthermore, the President has proposed to create a network of up to 15 Manufacturing Innovation Institutes across the country through the National Network for Manufacturing Innovation (NNMI). This network would serve to create an effective manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. As sustainable, manufacturing innovation hubs, Institutes will create, showcase, and deploy new capabilities, new products, and new processes that can impact large-scale commercial production. To make progress right away, the President announced in his State of the Union address a plan to launch three new Institutes using existing resources. Under this plan, EERE expects to launch a Clean Energy Manufacturing Innovation Institute as part of a multi-agency effort that includes the Departments of Defense and Commerce, the National Science Foundation, and the National Aeronautics and Space Administration. This Institute will focus on manufacturing technologies that address critical energy needs and will be selected through an open and competitive process.

These, and all other manufacturing related activities, are being coordinated across EERE to ensure operational efficiency, and to leverage and replicate best practices and successful models. We recognize, as does this Committee, the many benefits of U.S. based manufacturing, including job creation and other economic multiplier effects, high-tech intellectual property generation, and private sector support of research and development. We want to ensure that our efforts at EERE are laser-focused on supporting and scaling up this critical sector.

EFFECTS OF SEQUESTRATION

I have been asked to address the impacts of the sequestration on EERE program activities. The negative impacts of the sequestration, if combined with another Continuing Resolution based on FY 2012 levels, will be acutely felt by EERE's Weatherization Assistance Program (WAP) in the Weatherization and Intergovernmental Programs Office. States, the District of Columbia, U.S. territories, and Native American tribes will suffer from receiving less Weatherization assistance funds that enable low-income families in need to reduce their energy bills by making their homes more energy efficient. We estimate this reduction in funding, when compared to the Administration's FY 2013 Budget Request, will mean the following:

- Thousands fewer homes will be weatherized, with eligible low-income families losing potential energy savings.
- A potential loss of full-time employment for a large number of skilled weatherization retrofit professionals, which could also lead to the deterioration of States' abilities to deliver these upgrades.
- The potentially complete elimination by grantees of some of their sub-grantee network members.
- The potential closing of a number of training programs with concurrent loss of professional retrofit certification capability.

This Program was appropriated a low FY 2012 funding level, as we had residual American Recovery and Reinvestment Act (ARRA) funding still available to supplement new appropriations. Now, however, the remaining ARRA funds that were previously available in many states in FY 2012 have been expended – leaving limited ability to absorb reductions without cutting into core programmatic goals.

Furthermore, sequestration will not allow us to ramp up funding for important clean energy manufacturing activities as planned. Our advanced manufacturing activities with industry partners aim to accelerate technologies and practices that best enable U.S. manufacturers to succeed in global markets; a reduction in funding will delay DOE's efforts to bring together industry, small businesses, and universities to invest in emerging technologies that will create manufacturing jobs and boost our global competitiveness at a juncture when other countries, such as China, are investing at an greatly increased pace.

ORGANIZATIONAL REFORMS

Winning the clean energy race requires smart investments and smart policies. It also requires smart organizations.

In order to be the most effective, transparent organization we can be, and one that maximizes impact on the energy landscape and provides the highest possible return on investment to the American taxpayer, EERE is implementing some small, but important, organizational reforms. Fundamentally, these reforms are intended to ensure that EERE consistently practices good government by being flat, organizationally uniform, transparent, and effective in order to serve our mission of creating American leadership in the transition to a global clean energy economy. These reforms take what we consider to be the best of organizational innovations made by other organizations that are widely respected and considered best practices. The essence of what we are doing can be summarized as two thrusts:

- First, we are better organizing ourselves around energy sectors, while maintaining our focus on individual technologies, to improve our coordination and impact. We will do this by adding a new Deputy Assistant Secretary for Transportation, in addition to the existing Deputy Assistant Secretaries for Energy Efficiency and for Renewable Power Technologies. This approach elevates and responds directly to the urgency of reducing our oil dependence in the transportation sector, while building on our current executive expertise and maintaining our current budget structure.

- Second, in order to perform best practice active project management, including creation and enforcement of rigorous "Go-No Go" milestones in our agreements, performance of regular in-depth project site visits/reviews, and termination of under-performing projects, we are simplifying our organizational structure to better achieve program success by creating more uniform roles and responsibilities with clear accountability for active project management within our programs.

I want to be clear about this. I believe we have a fundamental commitment to you and to American taxpayers – particularly in these tough fiscal times – to invest the funds you appropriate to us in the most efficient and impactful way possible. Our organizational changes will allow us to better fulfill that commitment.

I should also emphasize that, based on this Committee's request, EERE has been shifting to forward funding of multi-year commitments wherever possible so that we are minimizing the exposure of taxpayers to future mortgages in situations where the funding has yet to be appropriated and

allowing EERE to be highly responsive to any changing conditions or opportunities that emerge in the clean energy landscape.

CLOSING

In conclusion, let me reiterate the key points that I want to leave you with today. At EERE, we recognize the enormous opportunity that clean energy represents for the United States. Working in partnership with the private sector, we are optimistic that we can create and sustain American leadership in the global transition to clean energy, and in so doing grow high paying jobs and strong market share for our workers and businesses. We stand behind EERE's track record of accomplishments and our efforts to make our organization even more effective and accountable to you and to the American taxpayer as we pursue our mission. We are privileged to play this role and to work with this Committee to help ensure that the United States wins the global clean energy race.

Mr. FRELINGHUYSEN. Thank you, Dr. Danielson.

Dr. Peter Lyons, welcome back.

Mr. LYONS. Thank you.

Mr. FRELINGHUYSEN. Much time and grade. Thank you.

Mr. LYONS. Chairman Frelinghuysen, Ranking Member Kaptur, and Members of the Subcommittee, it is again an honor to meet with you today.

President Obama set a goal of reducing carbon emissions by 80 percent by 2050. Nuclear power can play an important role in achieving this goal. As the president noted last spring, "in the United States, we have restarted our nuclear industry as part of a comprehensive strategy to develop every energy source."

Nuclear power has reliably contributed almost 20 percent of electrical generation in the United States over the past two decades. It remains our single largest contributor of clean electric power, and currently, for the first time in almost three decades, five U.S. nuclear reactors are under construction.

To ensure that nuclear energy remains a viable energy option for the nation, we support research and development to help resolve challenges of continued and increased use of nuclear energy, and we are well served by our federally chartered advisory committee which reviews all of our programs.

I would like to comment briefly on three achievements and provide a little information on the impact of sequestration in my office. A high priority of the Department is to accelerate the commercialization and deployment of small modular reactors or SMRs through our Licensing Technical Support Program. This program supports first of a kind costs associated with design certification and licensing through cost shared work with industry. SMRs may offer a new paradigm in nuclear plant construction and operation, and we want to assure U.S. leadership of this potential new industry. In November 2012, we selected Generation M Power and their team to support SMR deployment by 2022, and on March 11, we issued a second solicitation for proposals that emphasized innovations to further improve safety, operations, and economics.

I would next like to briefly discuss the nation's quest for a permanent solution to the nation's used nuclear fuel and high level defense wastes. The solution is essential to assure the future viability of U.S. nuclear power and further strengthen our standing as a global leader on issues of nuclear safety and nonproliferation.

In 2010, the Secretary of Energy established the Blue Ribbon Commission charged to conduct a comprehensive review of policies for managing the back-end of the nuclear fuel cycle and to provide advice, evaluate alternatives, and make recommendations for a new plan to address those issues. The Commission issued its final report in January of 2012. Two months ago, the Department released the administration's strategy in response to the Commission, endorsing key principles of their report, subject to authorization from Congress. This strategy lays out plans to implement a long-term program that begins operation of a pilot interim storage facility by 2021, advances toward the siting and licensing of a larger interim storage facility by 2025 and makes real progress on the siting and characterization of geologic repository sites. The strategy endorses consent-based siting and highlights the need for a new

waste management and disposal organization to provide the stability, focus, and credibility to build public trust and confidence. The administration is committed to working with Congress on new legislation, while working within existing authorizations to plan for transportation, storage, and disposal of used nuclear fuel.

On sequestration, its largest impact in my office involves the safeguards and security program that protects the Idaho National Laboratory. Under this reduced funding level there are insufficient funds to maintain the site's current safeguards and security program, which I understand may result in layoffs or furloughs of more than 80 contractor employees.

And finally, I want to note that this is a truly momentous week for U.S. nuclear power with pouring of the first nuclear safety grade concrete for new U.S. reactor construction in both South Carolina and Georgia, and both of those happened this week. The four Westinghouse AP1000s was being built at these sites represent a new class of reactors that incorporate passive safety features which for this design allow operators three full days to respond after an accident. The Department is proud to have supported the development of this world-leading, passively safe technology and anticipate still further improvements in this attribute with SMRs.

Passively safe designs, as I think many of you know, have greater reliance on natural phenomenon to minimize or eliminate the need for pumps in an emergency, and additional improvements that extend the time in which operators must act in any upset. Passive safety significantly improves the safety of nuclear power. But other research in my office advances so-called inherently safe designs for which the physics of the unit actually preclude a meltdown. Several of the Generation IV designs, like the high temperature gas cold reactor are inherently safe designs.

In closing, my office works to enable a strong, viable nuclear industry to ensure a clean, safe, secure, and affordable nuclear energy capability for our nation. Thank you, and I look forward to your questions.

[The information follows:]

Statement of Peter Lyons
Assistant Secretary for Nuclear Energy
U.S. Department of Energy
Before the
Subcommittee on Energy and Water Development, and Related Agencies
Committee on Appropriations
U.S. House of Representatives

March 14, 2013

The United States, like all countries, shares the challenges associated with ensuring its people have access to affordable, abundant, and environmentally friendly sources of energy. President Obama continues to make addressing climate change a priority and the Administration has set a goal of reducing carbon emissions by 80 percent by 2050. Nuclear power can play an important role in achieving this goal. As the President noted in Korea last Spring, "in the United States, we've restarted our nuclear industry as part of a comprehensive strategy to develop every energy source."

Nuclear power has reliably and economically contributed almost 20 percent of electrical generation in the U.S. over the past two decades. It remains the United States' single largest contributor (more than 60 percent) of non-greenhouse-gas-emitting electric power generation. Currently, we have five commercial nuclear reactors under construction, including four AP1000 reactors, which represent a new generation of passively safe nuclear plants.

The Office of Nuclear Energy (NE) has achieved several major milestones since I've last been in front of this Committee. In November of last year, the Department selected a small modular reactor (SMR) vendor and utility partnership to support development of the licensing documentation that would enable SMR deployment by 2022. Just this week, the Department issued a second solicitation that will support industry's development of additional innovative and competitive SMR technology options that improve safety profiles and further reduce regulatory risk for these reactors.

In January of this year, the Department released the Administration's Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste. The Strategy builds upon the final report and recommendations made by the Blue Ribbon Commission on America's Nuclear Future and serves as an initial basis for discussions among the Administration, Congress and other stakeholders on a sustainable path forward for disposal of nuclear waste.

To ensure that nuclear energy remains a viable energy option for the nation, NE supports research and development activities which are designed to help resolve the technical, cost, safety, waste management, proliferation resistance, and security challenges of continued use of nuclear energy. NE has been well served by the federally chartered Nuclear Energy Advisory Committee (NEAC), chaired by Richard Meserve and Susan Eisenhower, along with esteemed representatives from universities, industry, foreign nationals, and national laboratories. NEAC reviews the elements of the NE program and provides advice and recommendations on the program's long-range plans, priorities, and strategies to effectively address the scientific and engineering aspects of the R&D efforts.

A prerequisite for nuclear power continuing as a vital part of the nation's clean energy portfolio is public confidence in the safety of nuclear plants and commercial confidence that the plants can be operated safely, reliably and economically. Our R&D efforts are coordinated with reactor vendors, utilities, universities, regulators and the international community to ensure that lessons learned from the events at Fukushima, Japan are appropriately incorporated and that these efforts are integrated and efficient.

SMR Licensing and Technical Support

The development of clean, affordable nuclear power options is a key element of NE's *Nuclear Energy Research and Development Roadmap.* As a part of this strategy, a high priority of the Department has been to accelerate the timelines for the commercialization and deployment of small modular reactor (SMR) technologies through the SMR Licensing Technical Support program. The program will focus on first-of-a-kind engineering support for design certification and licensing activities for SMR designs through cost-shared arrangements with industry partners (industry contributions are a minimum of 50% of the cost) to promote accelerated commercialization of the nascent technology. If industry chooses to widely deploy these technologies in the U.S., they could help meet the nation's economic, energy security and climate change goals.

In November 2012, the Department selected the Generation mPower team, comprised of Babcock & Wilcox, Bechtel, and the Tennessee Valley Authority (TVA) to support the development of licensing documentation that could lead to SMR deployment by 2022. DOE determined that the mPower team would be the most capable applicant to achieve program goals as well as gain insights to help address generic issues that will face the SMR class of reactors.

On March 11, 2013, the Department issued a second solicitation for proposals that include innovations to improve SMR safety, operations and economics through lower core damage frequencies, longer coping periods in the event of an accident, enhanced resistance to hazards presented by natural phenomena, and potentially reduced emergency preparedness zones or workforce requirements. This follow-on solicitation will be funded within the $452 million envelope for the SMR Licensing Technical Support program.

Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste

Finding a long-term, consent-based solution to managing the nation's nuclear waste and used nuclear fuel is a long standing challenge. Such a solution, however, is necessary to assure the future viability of an important carbon-free energy supply and further strengthen America's standing as a global leader on issues of nuclear safety and nonproliferation.

In FY 2010, the Secretary of Energy established the Blue Ribbon Commission on America's Nuclear Future (the Commission) composed of experts from government, academia and industry. The charter charged the Commission to conduct a "comprehensive review of policies for managing the back end of the nuclear fuel cycle, including all alternatives for the storage, processing, and disposal of civilian and defense used nuclear fuel, high-level waste, and materials derived from nuclear activities... [and to] provide advice, evaluate alternatives, and make recommendations for a new plan to address these issues." The Commission issued its final report on January 26, 2012.

In January 2013, the Department released its *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, which endorses key principles of the Commission's

report. With the appropriate authorizations from Congress, the Administration's Strategy lays out plans to implement a long-term program that begins operation of a pilot interim storage facility by 2021, advances toward the siting and licensing of a larger interim storage facility by 2025, and makes demonstrable progress on the siting and characterization of geologic repository sites. The Strategy fully endorses the need for a consent-based process for siting facilities in which jurisdictions are treated like partners and consent is obtained at multiple levels. The strategy highlights the need for a new waste management and disposal organization to provide the stability, focus, and credibility to build public trust and confidence. The Administration believes that there are several viable organizational models that can possess critical attributes such as autonomy, leadership continuity, and oversight and accountability. The Administration also recognizes that providing adequate and timely funding is critical to the success of the nuclear waste mission. The Strategy proposes a funding program that contains three critical elements: discretionary appropriations within existing spending caps to pay for specific, ongoing activities; reclassification of fee income or spending to make dedicated funds available in sufficient amounts without competing with other government priorities; and access to the existing balance of the Nuclear Waste Fund in the Treasury.

Full implementation of this program will require legislation to enable the timely deployment of the system elements noted above and the Administration is committed to working with Congress on this important issue. In the meantime, the Administration, through NE, is undertaking activities within existing Congressional authorization to plan for the eventual transportation, storage, and disposal of used nuclear fuel.

Reactor Concepts - Research, Development and Demonstration

The Reactor Concepts Research, Development and Demonstration (RD&D) program is designed to develop new and advanced reactor designs and technologies that enable improved competitiveness and safety to help advance nuclear power as a resource capable of meeting the Nation's energy, environmental and national security needs. The R&D activities in this area include: advanced SMR approaches; other advanced reactor concepts such as sodium-cooled, fluoride salt-cooled, high temperature gas-cooled reactors; and advanced technologies to support life extensions of light water reactors (LWRs).

Small Modular Reactor Advanced Concepts R&D

The SMR Advanced Concepts R&D program is addressing instrumentation and controls, materials, safety and licensing issues that will offer more affordable and flexible nuclear technology options. In FY 13, NE has continued research on high temperature metals for SMR applications, commenced instrumentation and control research for multi-module systems, and initiated safety and licensing support R&D.

Advanced Reactor Concepts (ARC)

This program is designed to develop and refine future reactor concepts that could dramatically improve nuclear power performance including sustainability, economics, safety, and proliferation resistance. In support of our goal of seeking greater input from industry, NE established a Reactor Concepts Technical Review Panel (TRP) to inform the R&D prioritization process for the Advanced Reactor Concepts program. In response to a Request for Information issued in early 2012, NE received eight reactor concept submittals from vendors and just last month, NE issued a FOA to conduct cost-shared priority R&D identified through the TRP process. This year, ARC pursued testing of an ultra-sonic system for

under sodium viewing to support in-service inspection of sodium fast reactors, continued evaluation of liquid-metal engineering test capability, and commenced advanced power conversion system testing. The program has also continued to provide support for international collaborations on advanced reactor operations and safety.

Next Generation Nuclear Plant (NGNP)

The NGNP program is designed to investigate the technical viability of High Temperature Gas Reactor (HTGR) technology to provide more efficient carbon-free electricity and high-temperature process heat for a variety of industrial uses. After the October 2011 Secretarial Determination to not proceed with Phase 2 design activities, the NGNP program shifted to longer term R&D by focusing on materials and fuels testing. Through the NGNP program, we have continued irradiation testing of graphite materials and continued the qualification testing of TRISO fuel fabrication. The program also continued collaboration with the Nuclear Regulatory Commission (NRC) to develop a licensing framework. In January of this year, NE awarded a cost-shared contract to industry to understand industrial end-user requirements, and produce trade studies evaluating the integration of NGNP into various industrial applications.

Light Water Reactor Sustainability

Through NE's Light Water Reactor Sustainability program, which is closely coordinated with NRC and cost-shared with the Electric Power Research Institute, the Department is conducting R&D to explore extending the operating lifetime of current plants beyond 60 years and, where possible, enable further improvements in their safety and productivity. This research forms the technical basis for age-related material degradation management and informs major component refurbishment and replacement strategies related to instrumentation and control systems, improvement of fuels, and better safety margin characterization. The research also addresses post-Fukushima lessons learned focusing on research to enhance the accident tolerance and response of light water reactors. In FY 13, NE plans to publish a database on concrete performance in nuclear power plant environments and further improve component aging computer analysis tools.

DOE has utilized the Advanced Test Reactor (ATR) National Scientific User Facility (NSUF) to partner with the Electric Power Research Institute to investigate irradiation-assisted stress corrosion cracking in nuclear reactor core materials to ensure the sustainability of light water nuclear reactors well into the future. A series of experiments began last month which involve inserting the materials into the ATR core so they can be exposed to typical reactor conditions for a period of time. After irradiation in the ATR, the materials will then be sent to a specially designed testing apparatus at the Materials and Fuels Complex for post-irradiation examination.

Radiological Facilities Management

The Radiological Facilities Management (RFM) program maintains the nuclear facilities and infrastructure needed to support space mission requirements and research reactor programs.

NE works with NASA on the design and development of power systems. In August 2012, the nuclear-powered Curiosity Rover landed on Mars and is operating successfully for the Mars Science Laboratory mission. Curiosity, the largest and most capable rover ever sent to another planet, is powered by a Multi-Mission Radioisotope Thermoelectric Generator that was designed, built, and delivered by NE. NE

also made significant technical progress on the project to develop an Advanced Stirling Radioisotope Generator (ASRG) for future space exploration efforts. The ASRG will be the first radioisotope power system to use a dynamic power conversion system which will increase efficiency by four times, thereby extending availability of the limited supply of plutonium-238. NE is in the process of building hardware for the qualification unit as part of the process to demonstrate readiness for flight. In FY 2013, RFM's Plutonium-238 Supply Project designed, built, and irradiated its first test target in the High Flux Radioisotope Reactor at Oak Ridge National Laboratory. This represents a first significant step for the NE-managed, NASA-funded project to reestablish a reliable supply of plutonium-238 for powering future space exploration missions.

RFM's Research Reactor Infrastructure program provides fresh reactor fuel to, and removes used fuel from, 26 operating university reactors. FY 2013 efforts include delivering 29 fuel elements to the University of Missouri Research Reactor and to the Massachusetts Institute of Technology Nuclear Research Reactor, and completing five used fuel shipments to the Savannah River Site.

Fuel Cycle Technologies

The continued use of nuclear power will require a sustainable fuel cycle. R&D in fuel cycle technologies spans the range from finding more efficient methods of extracting uranium to techniques to improve waste management. NE has achieved several milestones in the area of Fuel Cycle Research and Development including: developing a catalog of fuel cycle options and proliferation and security evaluation criteria for the FY 2013 fuel cycle options screening; completing two independent relevancy reviews of major subprograms: Separations and Waste Forms and Advanced Fuels, with plans to complete the Material Protection, Accountability, and Control Technologies (MPACT) review this September; developing a roadmap for evaluating, developing, and deploying light water reactor fuels with enhanced accident tolerance; and completing initial testing of candidate adsorbent materials at marine facilities for extracting uranium from seawater.

Systems Integration and Analysis

Systems analysis and integration provides the capabilities needed to analyze complex fuel cycle system options, assess overall performance under various scenarios, and improve understanding of the interdependencies between subsystems and associated technologies. Hundreds of potential fuel cycle options exist within three broad fuel cycle strategies (once through, limited recycle, and full recycle). In FY 2013, NE is conducting an evaluation and screening of fuel cycle options to identify a relatively small number of those options that have the potential to offer significant performance benefits compared to the current fuel cycle. Improvements will be measured in terms of economic, environmental, safety, non-proliferation, security and sustainability requirements. These evaluations can be used to inform future research and development decisions.

Fuels with Enhanced Accident Tolerance

In the wake of the accident at Fukushima-Daiichi, NE is pursuing the development of fuel that could better tolerate the extreme conditions of severe accidents. NE's strategy starts with feasibility assessment and down-selection and moves into development and testing. In FY12 and FY13 the program is focused on evaluation studies of fuel and cladding concepts. In 2013 the program competitively selected over 25 concepts for evaluation and assessment. The program will develop high level screening criteria to evaluate which of the selected concepts are best positioned in terms of

technology maturity, economics, regulatory feasibility, and other factors in order to down-select to one or two designs for potential further development and testing, prior to commercial qualification. For NRC licensing of any new accident tolerant cladding or fuel, abnormal reactor transient tests must be performed to confirm fuel performance. Transient testing involves the irradiation of pre-commercial nuclear fuels under a rapid, high-energy pulse, and high power-level conditions. This testing is required to support a prototype lead test assembly for insertion into a commercial reactor. In FY2013, the Department is initiating an Environmental Assessment and finalizing alternatives to resume transient testing.

Seawater Extraction

Continuing and reliable supplies of uranium are critical to any future use of nuclear power. The oceans contain over 4,500 million tonnes of uranium which would provide an essentially unlimited supply. The office of Fuel Cycle Technologies manages an R&D program on fuel resources with a primary focus on making the technology more economically competitive by improving the selectivity, loading capacity, chemical stability, and biological and mechanical durability of the adsorbent materials. Significant technical progress has been made in the past two years. An advanced material prepared by a research team at the Oak Ridge National Laboratory (ORNL) vastly outperforms today's best adsorbents. The ORNL adsorbent material development was recognized in June 2012 by R&D Magazine as one of the year's most significant technological innovations, winning an R&D 100 Award.

<u>International Nuclear Energy Cooperation</u>

The International Nuclear Energy Cooperation program (INEC) provides the Department the ability to meet growing demands for engagement with international partners on civil nuclear policy, R&D, and related activities. INEC engages both bilaterally and multilaterally in support of U.S. policy goals related to nuclear energy globally and allow more effective integration of NE international R&D and policy interests. INEC has coordinated bilateral R&D Action Plans with China, France, and Russia; advanced DOE's bilateral nuclear safety activities with China; implemented bilateral cooperation programs with the Czech Republic, Kazakhstan, Mongolia, Russia, Ukraine and the Republic of Korea; performed analytical studies related to the Comprehensive Nuclear Fuel Services (CFS) approach to limit incentives for individual countries to acquire or develop capabilities involving sensitive nuclear technology; and established Civil Nuclear Energy Working Group with Japan.

Through INEC support, the U.S. continues to chair the International Framework for Nuclear Energy Cooperation (IFNEC) Steering Group. This year, NE is developing workshops with industry to further explore commercially-based comprehensive fuel services and participant countries are identifying infrastructure development needs and issues via this framework. INEC also supports U.S. Government efforts to increase U.S.-civil nuclear exports by coordinating with the Department of Commerce Advocacy Center and other agencies to ensure that our bilateral and multilateral engagements include advocacy for U.S. exports, as appropriate.

<u>Nuclear Energy Enabling Technologies</u>

The Nuclear Energy Enabling Technologies (NEET) program conducts R&D in crosscutting technologies that may lead to revolutionary improvements in safety, performance, reliability, economics, and proliferation risk reduction and promote creative solutions to the broad array of nuclear energy challenges related to reactor and fuel cycle development.

Nuclear Energy Advanced Modeling and Simulation

The Nuclear Energy Advanced Modeling and Simulation (NEAMS) program is advancing the leading edge computational methodologies for the analysis of advanced fuels, reactor systems and components. These new capabilities are expected to speed technology development by reducing the need for some experiments and better informing the design of others. In addition, more accurate calculation of the underlying physics will enable the establishment of realistic and defensible fuel and reactor operating margins, resulting in lower cost systems that maintain or exceed current levels of safety. This year, NEAMS successfully launched a new iteration of the state-of-the-art reactor systems analysis tool named RELAP7 and will demonstrate this capability to simulate boiling water reactor station blackout. NEAMS will complete a simulation to confirm the methodology for predicting complex behavior driven by competing physical phenomena in a fuel assembly, while also demonstrating that large fractions of an entire reactor core can be simulated with appropriate competing physics.

The Energy Innovation Hub for Modeling and Simulation

The Energy Innovation Hub for Modeling and Simulation (Hub) is an investment in leading-edge modeling and simulation to improve the performance of currently operating light water reactors. The Hub is integrating NEAMS-developed codes and other commercially available codes to run on DOE supercomputer platforms and to display the results in a user-friendly visual format. The development of a high resolution and high fidelity three-dimensional virtual pressurized water reactor (PWR) model has proven to be a feasible proposition. This year, the Hub is delivering a capability that will run independently on industry computers. The Virtual Environment for Reactor Applications (VERA) will be used to better understand and improve the performance of existing PWRs. The Hub approach is to develop modeling and simulation tools within the virtual reactor to address specific "challenge problems" that have been defined by industry. The initial deployment of these technologies will be to computer test stands located at industry partner's sites followed quickly by deployment to other industry users outside of the Hub partnership. This is being accomplished just three years from the start of the Hub and illustrates the importance NE places on getting energy technologies out of the laboratory and into the hands of industry users.

National Scientific User Facility

The National Scientific User Facility (NSUF) program represents a "prototype laboratory for the future" since it promotes the use of unique nuclear research facilities for science-based experiments and encourages active university, industry, and laboratory collaboration in relevant nuclear scientific research. The NSUF, through competitive solicitations, provides a mechanism for research organizations to collaborate and conduct experiments and post-experiment analysis at facilities not normally accessible to these organizations. In FY 2013, NE will issue a FOA for irradiation, post irradiation examination (PIE) and small rapid turnaround projects to provide students and faculty the means to cover the cost of facilities and associated staff support to execute the research projects.

Crosscutting R&D Solicitations

This year, NE has restructured our cross cutting R&D solicitations to increase the efficiency and effectiveness of our resources. NE previously issued separate solicitations for R&D opportunities through the Nuclear Energy University Programs (NEUP) and the Nuclear Energy Enabling Technologies

(NEET) Crosscutting Technology Development Program. In FY 2013, NE integrated these peer-reviewed, competitively-selected R&D opportunities into a single FOA that will allow universities and industry to focus and prioritize research proposals as well as facilitate university-industry-national laboratory teaming. As in previous years, the NEUP program supporting work scopes address the full range of NE R&D with specific emphasis on technical areas best suited for university-based R&D including important aspects of fuel cycle and reactor development, as well as mission supporting transformative research

Since FY 2011, NE has also utilized the Integrated Research Projects (IRPs) to provide R&D solutions that are the most directly relevant to the near-term, significant needs of the NE R&D programs. IRPs are significant, three-year awards for projects that address specific research issues and capability gaps identified and defined by the NE R&D programs. These projects are multidisciplinary and require multi-institutional partners and NE encourages these university-led teams to utilize industry, national laboratory, and international partners. This year, NE plans to award, through NEUP, an IRP in advanced reactor materials that will need to receive radiation doses higher than what can be obtained in a reasonable time in the test reactors currently available.

Impacts of Sequestration to Nuclear Energy Programs

The NE safeguards and security (S&S) program to protect the Idaho National Laboratory is, from a budgetary viewpoint, segregated from other NE programs as it is designated as a national security activity and is therefore funded within the Other Defense Activities account. As a result the S&S program is taking the larger percentage reduction assigned to Defense activities. The total reduction will be about $6.7 million below the FY 2012 appropriation and $8.3 million below our FY 2013 budget request.

Under reduced funding levels, there would be insufficient funds to maintain the site's current S&S Program, which the Department understands may result in layoffs or furloughs of more than 80 contractor employees.

Over the last few weeks, the Department has thoroughly reviewed impacts to our mission, the American public, and our employees, but the nature of the cuts – spread evenly across over 225 funding lines in the Department – has severely limited our flexibility to prioritize activities or lessen the impact of cuts. NE will continue to investigate options to manage these impacts.

The Department is making every effort possible to prevent severe impacts to the mission and layoffs for our workforce.

Closing

These efforts support a strong and viable nuclear industry in the United States and preserve the ability of the industry to participate in both domestic and international nuclear projects, and are intended to ensure a clean, safe, secure, and affordable nuclear energy capability to continue and expand within the U.S.

Mr. FRELINGHUYSEN. Thank you, Dr. Lyons.

Mr. Christopher Smith, thank you for being with us. May I say we have a very distinguished panel here this morning. I know that both Dr. Danielson and Dr. Lyons have authored many papers and have had interesting careers, but I also note Mr. Smith also has, and we also note you are a West Point graduate. Is that correct?

Mr. SMITH. Yes, it is.

Mr. FRELINGHUYSEN. Well, congratulations. That is a special honor and privilege.

The floor is yours. Thank you.

Mr. SMITH. Thank you. Mr. Chairman, Ranking Member Kaptur, and Members of the Committee, it is my pleasure to appear before you today to discuss the Department of Energy's Fossil Energy Programs.

If I may, Mr. Chairman, just a personal note before I begin. Having spent more than a decade in the oil and gas industry before coming to the Department of Energy, I saw firsthand the impact of the Department's Research and Development programs on energy development here in the United States, so I am especially honored to represent the Office of Fossil and Energy before this Committee.

As a key component of the president's all of the above energy strategy, the primary mission of the Office of Fossil Energy is to ensure that our nation continues to advance technologies that will allow traditional domestically-produced fuel sources to play a role in the clean energy economy of the future. In addition to research and development, the Office of Fossil Energy also manages the Nation's Strategic Petroleum Reserve, the Northeast Home Heating Oil Reserve, and the Naval Petroleum Reserve.

Beginning with the Fossil Energy Research and Development Program, I would like to provide a brief overview of the Office of Fossil Energy's activities. The bulk of our research and development is focused on carbon capture and storage to capture and stored CO2 from power points and industrial sources. We are currently pursuing demonstration CCS technologies focusing on a range of capture options. Through the Regional Carbon Sequestration Partnerships we are also pursuing storage in a variety of geologic formations, including enhanced oil recovery in oil bearing formations. At present, we have eight major CCS demonstration projects underway across the country. We are also exploring advanced systems to reduce the cost of carbon capture. At the same time, we are also engaged in cross-cutting research in innovative systems for improving the efficiency and environmental performance of new and existing fossil fueled power plants.

While coal remains an integral component of our domestic energy supply, unconventional resources—shale gas, for example—are also important elements of the nation's energy portfolio. The Office of Fossil Energy's natural gas technologies R&D program is centered on prudent and sustainable development of these resources. The Department of Energy is collaborating with the Environmental Protection Agency and the Department of the Interior to conduct research to minimize the potential impact of shale gas development. The three agencies have created a single steering team,

which I chair, which will bring our three research programs together.

Within the Department of Energy, we are focused on work that includes water quality and availability, air quality, induced seismicity mitigating the impacts of development. We are also studying the potential for the development of hydrates in the arctic. This month, the Department of Energy released data from an innovative arctic experiment that explored the feasibility of storing CO2 in hardite formations and releasing natural gas. Data from that test are under evaluation and are publicly available on the Office of Fossil Energy's National Energy Technology Laboratory website.

In addition to our research and development, the Office of Fossil Energy manages the Strategic Petroleum Reserve, which serves as the largest stockpile of government-owned emergency crude oil in the world. Recent SPR activities include the completion of the cavern replacement project at Bayou Choctaw site and transfer of oil to that new cavern is currently underway.

The Office of Fossil Energy also manages the Northeast Home Heating Oil Reserve which provides an emergency stockpile of home hitting oil for the northeast. In November of 2012, more than 121,000 barrels of the reserve's inventory was loaned to the Department of Defense in support of FEMA's response in the aftermath of Hurricane Sandy.

Finally, we continue to work on a clean-up and closure of our environmental remediation responsibilities at the Naval Petroleum Reserve No. 1 in California, which was sold by the Department in 1997. Additionally, a disposition plan is being developed for the National Petroleum Reserve No. 3, which will be provided to Congress and we will begin its implementation with the final disposition of that property estimated to occur in fiscal year 2015.

The Office of Fossil Energy is committed to developing the science and technology that balances the nation's fossil energy needs with environmental responsibility. We are also committed to protecting against disruptions in our domestic supplies. The Office of Fossil Energy Programs have made good movement towards these goals, and we believe that our continued progress will help ensure the nation's energy environmental security, while providing the maximum benefit to U.S. taxpayers.

Mr. Chairman and Members of the Committee, this completes my prepared statement. I would be happy to answer any questions that you may have.

[The information follows:]

STATEMENT OF

CHRISTOPHER SMITH

ASSISTANT SECRETARY FOR
FOSSIL ENERGY (ACTING)

U.S. DEPARTMENT OF ENERGY

BEFORE THE
SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
COMMITTEE ON APPROPRIATIONS
UNITED STATES HOUSE OF REPRESENTATIVES

MARCH 14, 2013

Mr. Chairman, Madam Ranking Member, and Members of the Committee, it is my pleasure to appear before you today to discuss the Department of Energy's (DOE) Office of Fossil Energy's (FE) programs.

Our fossil fuel resources are essential to the Nation's security and economic prosperity. The Office of Fossil Energy's primary mission is to ensure that the U.S. can continue to utilize those traditional fuel sources for clean, affordable, reliable energy. Technology development is critical to this mission. FE's Research and Development (FER&D) program advances technologies related to the reliable, efficient, affordable, and environmentally sound use of fossil fuels.

FE also manages the Nation's Strategic Petroleum Reserve (SPR). The SPR, with a capacity of 727 million barrels, serves as the largest stockpile of government-owned emergency crude oil in the world. The SPR helps ensure U.S. energy security by providing protection against disruptions in U.S. oil supplies. It also allows the United States to meet, in combination with commercial stocks, its International Energy Agency (IEA) obligation to maintain emergency oil stocks.

In addition to the SPR, FE oversees the Northeast Home Heating Oil Reserve, which provides a short-term supplement to private home heating oil supplies in the Northeast in the event of a supply interruption. The Office also manages the Naval Petroleum Reserves.

Beginning with the FER&D program, I would like to provide an overview of FE's activities over the past year.

Carbon Capture and Storage (CCS) and Power Systems R&D

FER&D has concentrated on programs and projects to enable the efficient and sustainable use of the Nation's abundant fossil resources. In support of President Obama's Interagency Task Force on Carbon Capture and Storage recommendations to develop the technical capability to dramatically reduce carbon emissions from power production, the bulk of FE's R&D program activities were focused on:

1) Carbon dioxide (CO_2) capture technology applicable to both new and existing fossil-fueled facilities;

2) CO_2 storage, CO_2 monitoring, verification, accounting, and assessment;

3) Advanced systems utilizing fossil energy resources for power and high-value chemicals that support carbon capture and storage (CCS) and CO_2 utilization , including integrated gasification combined cycle (IGCC) and oxy-combustion technologies; and

4) Cross-cutting research to bridge fundamental science and engineering development.

These initiatives are designed to achieve the reduction of fossil energy power plant emissions (including CO_2) and substantially improve efficiency to reduce carbon emissions, leading to a viable near-zero atmospheric emissions fossil energy system and supporting carbon capture,

utilization and storage. While initiated with a focus on coal plants, many are applicable to natural gas plants with some further development. The program currently includes large-scale demonstration of carbon capture technologies through the Clean Coal Power Initiative (CCPI), FutureGen 2.0, and Industrial Carbon Capture and Storage (ICCS) activity, as well as large-scale demonstration of injection and storage in geologic formations and beneficial utilization of CO_2 through the Regional Carbon Sequestration Partnerships.

Carbon Capture. This sub-program is focused on the development of post-combustion and pre-combustion CO_2 capture technologies for new and existing power plants. Post-combustion CO_2 capture technology is applicable to pulverized coal power plants, which is the current standard industry technology for coal-fueled electricity generation. Pre-combustion CO_2 capture is applicable to gasification-based systems such as IGCC.

FE's advanced carbon capture R&D activities have concentrated primarily on post-combustion technologies. This emphasis on post-combustion is due to the large installed base of pulverized coal combustion electricity generating plants. The successful development of advanced CO_2 capture technologies for post-combustion CO_2 capture is critical to reducing the carbon intensity of coal-based power generation in the U.S. and globally. The program has completed over 2,000 hours of post-combustion capture pilot-scale testing which has allowed novel and advanced technologies to be taken out of the laboratory and tested under real-world coal flue gas conditions. An example of the cutting edge technology being developed through FER&D is the Basic Immobilized Amine Sorbent (BIAS) process – a novel carbon capture technology developed by FE's National Energy Technology Laboratory (NETL) and an industry partner – which was recognized in 2012 by *R&D Magazine* as among the 100 most technologically significant products introduced into commercial marketplace within the past year.

Carbon Storage. The activities conducted under this sub-program are designed to benefit the existing and future fleet of fossil fuel power generating facilities by further refining the understanding of available storage opportunities that exist throughout the United States and by developing technologies/protocols that ensure the safe, permanent storage of CO_2 injected in geologic formations.

We have pursued projects designed to develop innovative, advanced technology and protocols for the monitoring, verification, accounting, and assessment (MVAA) of CO_2 storage in geologic formations as well as simulating the behavior of geologically-stored CO_2. MVAA of geologic storage sites is an important part of making geologic storage a safe, effective and reliable method of greenhouse gas control. These activities will culminate in a set of best practices for the deployment of carbon capture, utilization and storage technology.

The DOE's Regional Carbon Sequestration Partnerships (RCSPs) are an essential component of the carbon storage program. They unite more than 400 public and private entities in an effort to complete and evaluate CO_2 injection tests across the nation. In FY 2012, two RCSPs began large-scale projects that inject carbon dioxide for utilization and geologic storage. In addition, the RCSPs provided input for NETL's 2012 edition of the *Carbon Utilization and Storage Atlas (Atlas IV)*, which illustrates that the U.S. potentially has

at least 2,400 billion metric tons of possible CO_2 storage resource in saline formations, oil and gas reservoirs, and unmineable coal seams.

CCS Demonstrations. Through demonstrations, the technical risks associated with scale-up and plant integration of advanced technologies are reduced, thereby, accelerating the deployment of new technologies into the commercial sector. Fully funded through The American Recovery and Reinvestment Act as well as prior year appropriations, this sub-program focuses on demonstrating CCS technologies integrated with retrofits to existing coal-fired power plants and to new plant builds such as the construction of advanced power generation plants such as IGCC, and carbon dioxide emitting industrial facilities. As such, this sub-program is comprised of two activities focused on coal-based power generation with CCS (CCPI and FutureGen 2.0) and one activity focused on industrial applications of CCS technologies (the ICCS program).

There have been important advances in several demonstration projects. For instance, construction of the Kemper County Mississippi Power IGCC project under the CCPI program is over 50 percent complete, while the Archer Daniels Midland ICCS project in Illinois is under construction and approximately 45 percent complete. In Texas, The Air Products and Chemicals, Inc. ICCS project began capture and CO_2 enhanced oil recovery operations. The project began capturing CO_2 from the first of two steam methane reformer hydrogen production plants in December 2012. Capture from the second unit is expected in the next few months.

FutureGen 2.0 successfully completed Phase I, which included identification of a sequestration site, preliminary characterization and test drilling, and a commitment from the Illinois Commerce Commission to cover the project's output under its purchasing plans. Phase II commenced on February 1, 2013, and the project is now focused on preliminary design and engineering.

Current demonstrations are focused on storing CO_2 in a variety of geologic formations. There are currently six projects employing CO_2 EOR and two projects employing saline storage underway across the U.S. As with saline storage projects, CO_2 EOR projects will be subject to rigorous MVAA procedures and technologies to ensure their safety and effectiveness.

Advanced Energy Systems. This activity is focused on improving the reliability and efficiency of power plants and other coal conversion facilities and enabling affordable CO_2 capture, while increasing plant availability and efficiency, and maintaining the highest environmental standards. The program supports gasification-related R&D to convert coal into ultra-clean synthesis gas (syngas) that can, in turn, be converted into power, chemicals, hydrogen, and electricity. Many of these technologies will have positive spillover effects on the conversion of other carbon-based materials, such as biomass, petcoke or natural gas, into power and value-added products.

Advanced Energy Systems R&D is currently focused on technologies that have potential benefits to both existing and new fossil-fueled power plants. Key achievements include the conclusion of 100 hours of testing to assess second generation design concepts for oxy-fired

boilers, as well as the completed construction, commissioning, and testing of one 12 cell-module in a 30-kw oxy-boiler. In addition, construction on a 100 tons per day (TPD) Ion Transport Membrane oxygen system is approximately 75 percent complete.

Other advances include the testing of a hydrogen turbine under full load condition with commercial scale pre-production hardware, as well as the testing of a novel, high-pressure dry coal feed pump for gasification systems designed for 600TPD. Finally, the recent American Society of Mechanical Engineers Boiler & Pressure Vessel Code approval of Inconel 740 high nickel alloy represents a significant milestone in the development of ultra supercritical boiler applications in pulverized coal plants.

Cross-Cutting Research. Cross-Cutting Research is concentrating on technologies that have potential benefits to both existing and new fossil-fueled power plants and serves as a bridge between basic and applied research. It fosters the development and deployment of innovative systems for improving efficiency and environmental performance through the research and development of instrumentation, sensors and controls targeted at enhancing the availability of advanced power systems while improving the efficiency of Advanced CCS and Power Systems. The program focuses on the development of advanced materials that can withstand the higher temperatures and pressures demanded by future ultra-high efficiency energy systems. The program also develops computation, simulation and modeling tools focused on optimizing plant design and shortening developmental timelines. It addresses advanced and cross-cutting issues, including plant optimization technologies, environmental and technical/economic analyses, coal technology export, and integrated program support.

In addition, this sub-program supports university coal research and historically black colleges and universities education and training. It also supports international activities, including multilateral collaboration with organizations such as the International Energy Agency, the United Nations, the World Energy Council, and the Carbon Sequestration Leadership Forum, as well as bilateral activity with key countries such as China and India.

The Department has made noteworthy progress in Cross-Cutting Research. Highlights include the successful deployment and site acceptance testing of a new 3-D virtual immersive training system for IGCC power plants with carbon capture at the DOE's Advanced Virtual Energy Simulation Training and Research (AVESTAR) Center.

Researchers also completed initial prototype testing on fiber optic based sensors and piezoelectric sensors using NETL's thermal test rig. The sensor technologies were novel first-of-a-kind type sensors developed by universities. Initial designs and prototype were built to evaluate the sensors' initial performance and robustness in high temperature combustion conditions. Additional testing of ceramic-based micro sensors were completed using improved sensor designs that were developed by a small company in concert with NETL.

<u>**Natural Gas Technologies**</u>

The Natural Gas Technologies R&D program develops technological solutions for the prudent and sustainable development of our unconventional domestic resources. These resources, which include natural gas and oil contained in shale or other low permeability geological formations, are increasingly important components of our nation's energy portfolio.

The successful applications of horizontal drilling and hydraulic fracturing technologies have enabled production to be extended to vast volumes of unconventional natural gas and oil that was previously uneconomical to produce. In order to take full advantage of these natural gas resources, it is vital that development occur safely and responsibly, including addressing issues related to water quality and availability, air quality, greenhouse gas emissions, ecosystem integrity, human health, community well-being, and the prospects of inducing seismic events.

In 2012, the Department of Energy, Department of the Interior, and Environmental Protection Agency (EPA) signed a multiagency memorandum of agreement pledging to develop a focused, collaborative research effort to address high-priority challenges in safe and prudent development of these resources. The primary goal of this multiagency research effort is to provide timely science and tools that support sound policy, allow for informed unconventional resource development decisions at many levels -federal, state, tribal, and local; industry; and the public, and to advance technologies that will maximize benefits to the Nation. This collaborative multiagency approach will provide research efficiencies and utilize scarce resources effectively. DOE is implementing work in areas that include water quality and availability, air quality, induced seismicity, and mitigating the impacts of development.

The Natural Gas Technologies program is also focused on improving our understanding of methane hydrates. In 2012, the program – in partnership with ConocoPhillips and the Japan Oil, Gas and Metals National Corporation – successfully completed a long-term production test after drilling and testing a fully instrumented hydrate well in Alaska. The test demonstrated the ability to inject controlled gas mixes into natural gas hydrates and to sustain production during flowback for the available duration of the test site and provided large volumes of data available to the public for further evaluation.

These datasets include the rates and composition of gases both injected and produced, and information on changes in reservoir pressure and temperature during the test. The data are now fully available to all researchers and the public via the NETL website. (http://www.netl.doe.gov/technologies/oil-gas/FutureSupply/MethaneHydrates/rd-program/ANSWell/co2_ch4exchange.html)

Petroleum Reserves

The Office of Petroleum Reserves manages the Strategic Petroleum Reserve (SPR), which provides strategic and economic protection to the Nation from disruptions in foreign and domestic petroleum supplies; the Northeast Home Heating Oil Reserve, and the Naval Petroleum and Oil Shale Reserves, involving the Department's environmental legacy responsibilities from the sale of the Naval Petroleum Reserve No. 1 (NPR-1) in California and the operation of the NPR-3 stripper oil field and Rocky Mountain Oilfield Testing Center, both located near Casper, Wyoming.

Strategic Petroleum Reserve. SPR completed its cavern replacement project at the Bayou Choctaw site, providing a new cavern (BC 102) to replace an existing problem cavern (BC 20). Transfer of oil to the new cavern is in progress. Additionally, DOE recently awarded a contract to move the degasification plant to the West Hackberry site, where 70 million barrels of oil currently unavailable for drawdown can be processed to mitigate high vapor pressures.

Northeast Home Heating Oil Reserve. The Northeast Home Heating Oil Reserve (NEHHOR) was established in 2000 to provide an emergency stockpile of home heating oil to address the Northeast's vulnerability to winter weather shortages. The Reserve provides a buffer for the Northeast against a supply disruption for approximately 10 days, the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor.

In FY 2011, NEHHOR sold its 2 million barrels of high sulfur heating oil for conversion to ultra-low sulfur diesel (ULSD). The Heating Oil Reserve was concurrently reduced from 2 million to 1 million barrels. In November 2012, more than 121,000 barrels of the Reserve's ULSD inventory was loaned to the Department of Defense in support of the Federal Emergency Management Agency's response to Hurricane Sandy aftermath.

Naval Petroleum and Oil Shale Reserves. Three of the four original Naval Petroleum Reserves (NPR-1, NPR-2, and NPR-4) have been sold or transferred to the Department of the Interior. The NPR-1oil field was sold in 1997 with residual requirements for equity finalization and environmental remediation.

The Department continues to work on the cleanup and closure of its NPR-1 environmental remediation responsibilities, focusing on the closing of 131 environmental cleanup/remediation Areas of Concern (AOC) identified by the 2008 consent agreement between DOE and the California Department of Toxic Substance Control (DTSC).
In FY 2011, DOE established a technical baseline and schedule and has been conducting sampling and analysis resulting in DTSC certification for "no further action" on 9 AOCs. The plan for FY 2013 is to gain DTSC certification for "no further action" on an additional 30 AOCs based on sampling and laboratory analysis.

Naval Petroleum Reserve No.3 (NPR-3), the Teapot Dome oilfield near Casper, WY, is the only remaining oil reserve managed by the DOE. NPR-3 is now a stripper field that also serves as an oilfield technology testing center, the Rocky Mountain Oilfield Testing Center (RMOTC).

A disposition plan that was developed for NPR-3 during FY 2012 will be provided to Congress and DOE will begin implementing that plan, with final disposition of the property estimated to occur in FY 2015. NPR-3 will be utilized for production and testing operations in order to retain asset value during preparation to transfer to potential new ownership. Production facilities will remain operational as long as they remain economic. The program will continue RMOTC testing of 100 percent funds-in projects that do not conflict with the disposition plan. Environmental remediation of NPR-3 facilities will continue to facilitate the

disposition of the property in a manner consistent with an approved property disposition plan. The regulatory consultation process required by the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA) will be conducted in parallel beginning in FY 2013.

Conclusion

The Office of Fossil Energy is committed to developing the science and technology that will allow the Nation to use its abundant fossil energy resources in a way that meets the Nation's energy needs, including sustaining a robust economy and ensuring environmental responsibility. Through our management of the Nation's petroleum and oil reserves, we are also committed to ensuring the Nation's energy security against disruption in domestic supplies. Our programs have made good movement toward these goals over the past year. We believe that continued progress will help maintain DOE's leadership role in addressing issues of energy and environmental security, and ensure the maximum benefit to U.S. taxpayers.

Mr. Chairman, and members of the Committee, this completes my prepared statement. I would be happy to answer any questions you may have at this time.

Mr. FRELINGHUYSEN. Thank you for your testimony.

Last spring, gas prices were at record high and putting a strain on American families and businesses. In our fiscal year 2013 bill, this Committee focused funds within the Department of Energy's applied energy research accounts on programs that would in the long run lower what Americans pay at the pump and our reliance on imported oil. Now, a year later, we see reports of gas prices last month were at a record high for February. The prices may dip for a few months here and there. High gas and oil prices are clearly not going away. Our bill last year offered an all of the above approach that included efforts to address gas prices in both of your programs—Mr. Danielson's and Mr. Smith's.

I would like to take a few moments for each of you to discuss what you feel is behind these rising gas prices and ways that we can address prices not only for the short term but for the long term. I know Mr. Smith, you have had a pretty long career in oil and gas. Besides, obviously, Chinese demand and things of that nature, why did we see this spike in gasoline prices?

Mr. SMITH. Well, thank you, Mr. Chairman.

First of all——

Mr. FRELINGHUYSEN. And what are you doing specifically with the programs under Fossil Energy to address some of these issues?

Mr. SMITH. Well, thank you for the question, Mr. Chairman.

First of all, we are technology managers but we are also citizens and consumers, so we understand that the increase in gasoline price is having a real impact on American businesses and families. So at the core of what we are trying to do, you know, over time is make sure that American families have real options so that we are less reliant on oil over time.

As you are aware, oil is a globally fungible commodity. The vast majority of the miles in American travel are fueled by oil, so over time what we want to do is make sure that American businesses, American families have real options for different diverse fuel sources.

So one of the things that we are doing in the immediate term is making sure that we are working on natural gas. We are ensuring that we are taking this important domestically produced resource and we can demonstrate to the public that it can be developed safely. It can be developed in a way that is environmentally sustainable. As you know, these wells are being drilled close to where people live and work, and it is our job to make sure that we are quantifying the risks that the communities are concerned with. We are able to demonstrate that the rules being put in place, both at the federal and the local level, are effectively mitigating these risks, and we are bringing this gas to market in a way that is safe and that helps reduce price volatility.

So over time, if we are going to provide real options to American consumers, it is going to mean that we have to have a very diverse portfolio of energy solutions. In that vein, we are working together with the other two programs, Nuclear Energy and EERE to make sure that we do have a good diversity of energy supplies.

Mr. FRELINGHUYSEN. Thank you.

Dr. Danielson, I know you have covered some of this in your testimony, and may I say, and I am sure all my colleagues agree, I

think all of your testimonies today were excellent. Highly substantive.

Any additional comments? Obviously, it is a global marketplace, but there is a fair amount of anxiety about the high rising gas prices. Any particular other things that you are doing?

Mr. DANIELSON. I want to echo what my colleague said in terms of average Americans' businesses seeing $3.70, $4.00 or more in some places, it is tough. It is tough for families and businesses.

When I look at this issue it really does come down to what Chris is talking about where we do not have a choice. You go to the pump and that is pretty much your only choice, and events that happen halfway across the world can dictate that price. Having a number of cost-effective options is what we really want to drive toward.

Very briefly I wanted to point out a few of those on which we are working on and that we have worked on hybrid vehicles and more efficient combustion. I mentioned that you get about 50 percent more efficiency out of a hybrid vehicle. If you look at $3.70 a gallon, cut that by a third if you have a more efficient vehicle, getting you down around $2.50 you are really seeing at the pump in terms of your actual fuel costs.

And the natural gas opportunity is tremendous. We have an alternative fuels database that EERE manages where it posts the CNG prices all around the country. CNG is about $2.10 a gallon equivalent. We have a network of about 100 Clean Cities partners that covers about 75 percent of Americans where we help do technical assistance to deploy advanced vehicle technologies. About 50,000 CNG vehicles have been deployed there, which is almost half of the 112,000 that we have in the nation today.

There are some issues around fuel infrastructure. ARPA–E is actually taking on this challenge in an interesting way and we are tracking what they are doing. The goal of dramatically reducing compression costs so one can actually do home refueling and dramatically increasing the amount of gas that one can store so that the average American could fuel up their CNG vehicle at home would break down a big barrier.

And very briefly, the last thing I want to mention is last year 50,000 Americans bought plug-in electric vehicles, and they are paying $0.80 to $1.50 a gallon equivalent in those vehicles today. If we can drive the cost of batteries down to a point where any American family or business can afford those vehicles, that is going to give people access to $0.80 to $1.50 a gallon equivalent electricity that is domestically produced. I think we have made great progress and we have some more work to do. I think in the next 5 to 10 years we are going to see a lot of these technologies be affordable enough for every American family.

Mr. FRELINGHUYSEN. We are working on these technologies, but we also need to increase our domestic production. That is an issue. The papers speculate that we will overcome the Saudis within a couple of years in terms of using our own domestic supplies. What is the Office of Fossil Energy doing relative to taking advantage of what we have here at home?

Mr. SMITH. Tremendous opportunities there. As you know, we have a very specific goal of reducing our reliance on imports. And in fact, imports are decreasing as we get more efficient and we are

increasing our domestic production. So when we think about what is our role in moving this process along I will emphasize a couple things. First, I was the designated federal official for the commission that the president created after the Deepwater Horizon accident. And so that was a commission what had the task of figuring out what went wrong while things were still going wrong—the well was still blowing out when the commission was created. We learned a lot from that experience, and one of the things that we are following up after that accident is ensuring that we understand what the root causes are; that we are doing the right research to make sure that we are keeping up with industry as it goes into more difficult horizons in terms of Deepwater.

Mr. FRELINGHUYSEN. But in reality, and I want to go to Ms. Kaptur, a lot of the technologies that allowed our oil producers to do what they are doing today, let us say in the Gulf, besides obviously that was a huge safety issue, environmental disaster, but in reality the Department has been very key to giving technologies to those companies so they can actually do a better job, do more in the way of exploration. Is that not correct?

Mr. SMITH. Well, we have been primarily focused on onshore in terms of developing new technologies. I mean, the technologies that turned into the process for hydraulic fracturing for horizontal laterals, those were all technologies that originated early on.

Mr. FRELINGHUYSEN. With DOE.

Mr. SMITH. With DOE.

I would say that our mission offshore is to make sure that, as you know, corporations are spending billions of dollars on research and development offshore in these difficult environments because that is where the prize is. That is where the oil is. So there is a very strong profit motive to move out to deeper, bigger, more difficult prospects offshore. Our job is to make sure that we are doing the right research and development to quantify the risks of those operations. And so that we can demonstrate that we have quantified the risks that we are concerned about and that we can show that the rules in place are appropriate for mitigating those risks, if you do that well you create an environment in which you can maximize the value of your domestic resources. You increase our confidence in our ability to permit in a way that is judicious and safe, and we help ensure that we are getting the most out of our domestic resources, both onshore and offshore.

Mr. FRELINGHUYSEN. Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman.

I was thinking as I was listening to your questions and listening to the secretaries respond, I think you can all be very proud that at a time when America really needs you, you are devoting the substance of your work lives to helping her get stronger footing inside her borders on energy independence. And I do not think there could be any more important place for any American to be putting their lives at this point. So we are very fortunate you are serving all of us. And likely everyone in this room as well. So thank you for being here this morning.

Dr. Danielson, my first question goes to solar and our domestic manufacturing capabilities that flow from our research capabilities. In view of what the Chinese have done to dump panels on the mar-

ket and to overproduce, I would like to ask you how you think we can retain a top position as a global leader in solar and retain our intellectual property and move the technology at this very difficult time in the marketplace? And what might your department be able to do in this regard to help our companies so that they do not all crash?

Dr. DANIELSON. Thank you for that very important question. We have been the leading innovator in solar. EERE itself has funded more than 50 percent of all of the world records that have ever been recorded in solar energy technologies. We have been the leading reason why we have been able to reduce solar to something that was on satellites to something that has been reduced in cost by 95 percent over 30 years to where now it is actually very close to competitive in the market.

It is absolutely true, and we have to be very cognizant of the fact that the Chinese state banks have put in a ton of incredibly low-cost capital into the Chinese companies, which has created a very difficult environment for our companies. In spite of that, truly innovative American companies like First Solar, whose technology initially came from EERE-funded research at the National Renewable Energy Laboratory and has origins up in Ohio, in your region, they are still, even in that kind of environment, the second top producer of panels in the world. They are the only company in the top 10 that has a truly differentiated technology. So I think that really shows the strength of American innovation in the marketplace and there is a shakeout happening and First Solar is an example of a company that is looking very strong.

Meanwhile, I think we need to pull together and make sure that we are doing everything we can to make sure our companies are supported in the way they need to be. There are a couple of areas where I think there is great opportunity for us to make sure we pull things together. One is the Department of Defense has made a three gigawatt commitment to purchase solar power and other renewable power. And that has a Buy America requirement. I think that is a great opportunity to make sure we retain our manufacturing even in light of some of the overseas activities. In addition, we have become heighteningly aware of the opportunity with the Ex-Im Bank and Ex-Im loans for markets like India where our companies are incredibly competitive and are currently doing quite well. I think we should continue to be dialing up that effort with the Ex-Im.

I am the co-chair of the Renewable Energy and Energy Efficiency Subpanel of the President's National Export Initiative where I work with folks from Ex-Im and others, and so it is my plan to really engage that whole group to make sure that we are doing everything we can to support our industry.

Ms. KAPTUR. I would just like to say to the other members of the Committee, I happen to represent in the heart of the Midwest, right smack dab up against Canada, one of the leading solar platforms on the continent. And to see what the Chinese have done, and to know many of the scientists and the business people that have been involved in trying to give birth to this industry for our country, to see what the Chinese have done. Further, we have not fully locked in our trade laws and other mechanisms to help the

domestic industry survive this real dumping of panels on the market. It has been very painful to watch. So I thank you, Mr. Secretary, for those statements.

Secretary Smith, I wanted to ask you, the Solid Oxide Fuel Cells Program has supported research into an emerging technology that could change the way that we use natural gas, including highly efficiently distributed generation. I am interested in whether or not the Department will continue to fund the Solid Oxide Fuel Cells Program through fiscal year 2013 under the full-year continuing resolution which was required by law.

Mr. SMITH. So I guess two points. First of all, thanks for the question. Two points I will make on that.

First, the administration had not requested funding for this program. We had set a very specific goal for research on this Solid Oxide Fuel Cell Program in the sub-megawatt category working on 25 kilowatt blocks. So we achieved our goals there and that is a program that we had decided to focus our resources on in other areas, primarily carbon capture and sequestration. Going forward, however, if that is an area that is funded, we do have a plan for ensuring that we are moving forward on developing the technology primarily on the work that we have to do around optimizing and combining the 25 kilowatt blocks into modules of 250 kilowatt blocks. So it would be 10 module components. So we do have work that we could go forward with should we receive funding for that. So we have got a plan to continue working on that program if those funds are appropriated by Congress.

Ms. KAPTUR. I think Congress spoke loud and clear by restoring funding in fiscal year 2012. And then again in 2013 by once again providing funding in the Energy and Water Appropriations Bill. I know that you know that, but I wanted to make sure and place it on the record.

Mr. SMITH. Thank you.

Ms. KAPTUR. Finally, to Dr. Lyons, I wanted to just mention that I happen to represent a nuclear power plant in the heart of the Midwest that had the largest fine in American history placed on it. In over three incidents over three decades, the reason we had no major incident to the atmosphere was because of the personnel inside those plants—boilermakers, plumbers and pipefitters, electrical workers whose sheer grit and skill allowed us to avoid major incident. Over the years—had it not been so serious I would not bring this up, Mr. Chairman, but we found it extraordinarily difficult to get a relationship between the trades people who are doing the work inside the plant, the Department of Energy, and the Nuclear Regulatory Commission in terms of training programs to augment what is already being done. And I would just urge you to look at the manner in which the fine was distributed. We tried very hard to get a training program coordinated with the fine that was placed by the NRC on the company, and the company has really measured up. I mean, they are getting better, but to provide some additional nuclear training for the workers who work in that plant. I do not know whether you have done that around the country or not, but to link to the actual journeymen, the apprenticeship programs, these training sites that the boilermakers, the plumbers and pipefitters, and the electrical workers have in the region. Are

you aware of where this might have been done elsewhere in the country? They do not just work at that nuclear power plant. They go around the country and they work at others. But I would think when the fine was finally placed by the NRC, they put money into the Cuyahoga National Recreation area. They put money into renewable energy. Nothing was put into training programs for the actual people that work onsite. Is this something you could take a look at and reflect upon as you work on nuclear energy at the Department?

Mr. LYONS. Well, thank you for the question.

Let me respond to some extent from my previous service as commissioner at the NRC and now with the Department of Energy. The NRC, within their educational program, does have the opportunity to work with community colleges and trade schools. And at least at the time I left the NRC that was being done. And I would refer you to them for whatever is being done currently. Within my office I take 20 percent of all of our R&D funds and I apply that to funding of an educational nature. However, because it is programmatic funding, I am required to apply that to programs that are directly relevant to nuclear power of a R&D nature, which is what I am supporting. I have put about $230 million into U.S. universities over the last four years to directly support workforce development.

But in specific answer to your question, within my authorization I do not believe I have the ability to extend that to the trade schools. I am acutely aware, however, of the need for that, and I certainly agree with the points you are making.

Perhaps one point that would also be of perhaps interest in your comments on Davis-Besse, when I was at the NRC, something I found fascinating was that the TMI accident, Three Mile Island accident, there was a precursor at Davis-Besse a couple months before TMI, but they handled it correctly, and you do not hear of Davis-Besse in the same light as TMI. I fully agree the 2002 incident at Davis-Besse was very severe and I was involved in the lessons learned from that.

Ms. KAPTUR. I thank you very much. Thanks, Mr. Chairman.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur.

Mr. Simpson.

Mr. SIMPSON. Thank you, Mr. Chairman. And thank you all for being here today. I appreciate it very much.

Dr. Danielson, if you could e-mail me a list of the gas stations in my area where I could get gas for $3.70, I would appreciate that.

But you mentioned plug-in vehicles, which brings up the issue that most people think that the plug in my house creates the electricity that goes into my car. We seldom think about where that electricity comes from, which means it puts additional pressure on the electrical grid and the production of energy. It is all about production of energy. Does the Department consider nuclear energy renewable energy?

Mr. DANIELSON. Thank you for the question.

In terms of your question about nuclear, it might be best to direct that to my colleague.

Mr. FRELINGHUYSEN. I think he deliberately addressed it to you.

Mr. SIMPSON. What I was going to say is do you do any programs or activities in the nuclear arena?

Mr. DANIELSON. Within EERE's context?

Mr. SIMPSON. Yeah.

Mr. DANIELSON. No. We do not do any work within the nuclear context. That is really——

Mr. SIMPSON. Is that because nuclear energy is not considered renewable energy?

Mr. DANIELSON. When the president put out the clean energy standard proposal for 80 percent clean energy by 2035, nuclear is absolutely included in that. Under that definition, nuclear is definitely considered clean energy.

Mr. FRELINGHUYSEN. Would you yield for a minute?

Mr. SIMPSON. Sure.

Mr. FRELINGHUYSEN. This panel was by grand design. Normally each of you would appear for your programs to defend it separately, but deliberately we put you together. So right on, Mr. Simpson.

Mr. SIMPSON. Well, I was just curious because you talk to some people who think renewable energy is wind and solar and maybe geothermal and maybe some other things, but generally you do not consider it renewable energy which produces the most electricity that does not contribute to greenhouse gases of any energy production in this country. You, do not consider that a renewable energy I just found that curious as to why we have that definition or lack of definition. Would you like to answer that?

Mr. LYONS. Thank you for that question. It is an interesting question. I certainly concur with what Dr. Danielson said, but I think it might also be of interest to note that there have been concerted efforts between INL (Idaho National Lab) and NRL (National Renewable Laboratory), to look at programs where the two energy sources complement each other. And we look at so-called hybrid energy systems where the intermittent nature of renewables can be complemented by the steady baseline characteristics of nuclear. There have been at least two such workshops. There are some very interesting ideas there.

As to whether nuclear is considered renewable, I am not aware that there is an official definition of renewable. Certainly a clean energy. In my book it is certainly sustainable, and I am sure certain folks would have different views on the use of the renewable phrase.

Mr. SIMPSON. You mentioned during your testimony the impacts of sequestration. I do not think anybody in this Committee, in fact, I do not know anybody in Congress who thinks this is a smart idea. But nevertheless, this is where we are. You mentioned the impact that it is going to have on safeguards and securities at the INL, potentially 80 layoffs I think you said——

Mr. LYONS. Safeguards. Yes. Security and safeguards.

Mr. SIMPSON. What are the impacts of those potential layoffs? If there are no impacts, then we were employing obviously 80 people too many. So I assume there are some impacts with laying off 80 people.

Mr. LYONS. Of course, we are still working that through with the laboratory. However, yes, there are potentially very serious im-

pacts. The safeguards and security line covers the protective force. That protective force, as you are well aware, protects the site.

Mr. SIMPSON. Right.

Mr. LYONS. Idaho, with its large concentrations of category 1 facilities, very large quantities of special nuclear materials requires a robust guard force in order to operate many of the facilities. I am very concerned that if this continues, depending on how this is mitigated, we may find it very difficult to continue operations of all of those key facilities at Idaho.

And by the way, this funding is not in the direct NE account; it is in the Other Defense Activities account, which further complicates it from my perspective.

Mr. SIMPSON. What impact will sequestration have on the NE account?

Mr. LYONS. On the NE account, we had primarily been planning well ahead this year. There will be some reductions in some of the R&D, but because we forward fund virtually all of our work, I anticipate those will be very small.

Mr. SIMPSON. One of the things we have been concentrating on over the last several years with your dedication and your help on this is trying to upgrade the facilities and increase the capacities at the various labs that deal with nuclear energy. I want to tell you I think you have done a wonderful job at the Idaho National Lab in making sure that we have some of the modern facilities that are necessary if we are going to attract the best scientists in the world to come out and do research and so forth. Will there be an impact on the potential upgrades that are necessary at the ATR and long-term impacts on the proposed APIE facility? How is sequestration, and essentially the reduced funding level that you are going to see in future years, going to impact those things and impact the future of nuclear energy in this country?

Mr. LYONS. Well, at least in this fiscal year I do not anticipate any impacts on ATR TREAT or APIE. And certainly, ATR as an operating reactor, that will remain a top priority from a safety standpoint to assure that it has the funding needed to maintain safety. Well, perhaps for the rest of the Committee, TREAT is Transient Reactor Test Facility. APIE is Advanced Post Irradiation Examination Facility. I can go into lots of detail on that. But suffice it to say that both of those facilities—and TREAT is a restart. That is an existing facility. APIE is a new facility. Both of those facilities are absolutely essential if we are to move ahead with any new fuels in this country.

One of our strong programs is in accident-tolerant fuels where we believe it is possible with strong research programs to develop fuels that would be incapable of sustaining the type of accident that occurred at Fukushima. The largest impact at Fukushima was the hydrogen explosions. We believe it is possible through research to develop fuels that cannot generate hydrogen in an accident. That is the goal of our research. I have to have those facilities operational. And certainly, reduced funding over a period of years would greatly complicate our ability to bring those two facilities online.

Mr. SIMPSON. Thank you. We will get into some more.

Mr. FRELINGHUYSEN. Thank you, Mr. Simpson.

Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman. Thank you, gentlemen, very much.

I, first of all, Dr. Danielson, want to congratulate you on what I think is a very practical approach to administering your department, and I must say it calls to mind Dr. Ray Orbach, who ran the Office of Science some years ago. I thought Dr. Orbach just did a fabulous job and was a very good public servant.

I say that because I think you are looking at the problems we face and the developmental issues in a very practical sense. You supplied our office with a cost competitive analysis relative to silver, and I think again looked at it in terms of what are all of the impact costs, energy savings, and what are the subsidies to our industry. And what are the subsidies in this case to the Chinese industry because we do live in a very gray world. And I appreciate that practical approach. Somewhat along the lines of my colleague, Mr. Simpson, too, I appreciate the fact that there is more than simply verbiage in your testimony relative to industrial development and manufacturing and how we can do that as efficiently relative to the use of energy as possible.

God bless you. You thought ahead. You mentioned a steelmaker in your testimony. But I tell people that today the steel industry nationally uses 30 percent less energy than they did in 1990. That is a lot of trees. That is a lot of carbon, and that is a lot of energy savings. And I think again we have to have a broad look here at this problem.

You talk about industrial insulation. If we have proper insulation for all of our industrial processes in the United States, we would save a lot more trees and a lot more carbon. And I appreciate that very much. I appreciate the fact that you spoke and are doing research on tidal power. Our Subcommittee has tended to add money because I think administrations in both parties have underfunded that particular issue. But again, it is a possible source and you highlight that. I do appreciate it very much.

I would ask a question about the energy hubs, if you would. My understanding is that the first several are coming up for their fifth year of funding, and as originally proposed by the Department, fiscal year 2014 will be the last year of funding for each hub unless it is performing—to use the Department's words—exceptionally well. You mentioned the concept and the attitude that we are trying to enhance through ARPA–E. That is if it works we are going to help you; if it does not work we cannot dissipate our resources. Money is very finite in this climate.

Where do you see the hubs looking ahead to 2014, and will the Department take a very tough look at these to see if they are performing exceptionally well?

Mr. DANIELSON. Thank you very much for those comments. I appreciate it. And thank you for that great question.

There are two hubs under my purview at EERE. There is the Energy Efficient Buildings Hub, which is located in Philadelphia.

Mr. VISCLOSKY. Philadelphia.

Mr. DANIELSON. We just made an award and are currently in active negotiations with the Critical Materials Hub, which will be under my purview at EERE, and is being headed out of Ames Lab

in Ames, Iowa. We are almost at the midpoint for the buildings hub, and we are going to be giving it a very rigorous review in September where we are really going to dive in and see how things are going and bring a number of experts to the table to evaluate where we are with that.

I will tell you that in year five, we are going to do the same thing, and I absolutely agree with what you said. If it is truly providing exceptional value to the taxpayer, then we will strongly consider continuing to fund it. If it is not, then we will definitely strongly consider not funding that going forward.

We are currently in very active negotiations on a Critical Materials Hub. Reflective of what I was talking about in my oral testimony, it is really important for us to make sure we are laying out very well-defined, quantitative goals with these hubs. We are doing that. I am personally involved in reviewing the statement of work for the hub to make sure we all are on the same page in terms of what we are going to achieve this in five years, and each year we are going to make this progress. The idea of the hub is to really empower a leader, a great leader, a technical leader to really manage a team and move things around and shut things down if they are not working. We will be flexible with that leader but they need to know where the North Star is so we can hold them accountable.

Mr. VISCLOSKY. Chairman, if I could, one more question.

Mr. FRELINGHUYSEN. Go right ahead.

Mr. VISCLOSKY. Dr. Lyons, on the small reactor program, my understanding is in the original budget request it was $452 million. And the terms of the applications have changed as I understand it. And further, by funding two designs, are you stretching out their timelines considerably? And again, are we, if you would, splitting the baby as far as this budget? And was that the intent of the program?

Mr. LYONS. The original intent, sir, was to—the original funding opportunity announcement that went out was for up to two awards. After evaluating the applications that we received on the first funding opportunity announcement we elected to go with one. That is the mPower team. And that was—negotiations are in progress. For several reasons that we can discuss later if you wish, the Department viewed it as essential to modify the criteria slightly and go back out on another funding opportunity announcement which was released this week. The intent on that second FOA is to select one award, although we maintain at least the possibility and the funding opportunity announcement that more could be selected if there were outstanding applications.

I recognize the point you are making about splitting the pie too much. That will certainly be a consideration within the Department as we move ahead with evaluation on the second FOA.

Mr. VISCLOSKY. And I guess a better question is was that the implication of the administration's request when they asked the Subcommittee for the money in the first instance, that there were going to be two awards instead of one with that money?

Mr. LYONS. The initial plan was up to two.

Mr. VISCLOSKY. And was that made clear to the Subcommittee in the budget request?

Mr. LYONS. I believe so, Sir.

Mr. VISCLOSKY. Okay. Thank you very much. Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Thank you, Mr. Visclosky.

We have a key interest in that program.

Mr. Alexander.

Mr. ALEXANDER. Thank you, Mr. Chairman. I just have two questions.

Dr. Danielson, Louisiana has been one of many states that have benefitted from the Department's experimental program to stimulate competitive research. That is a federal and state program, of course, that provides partnership for competitive energy-related research. It fosters innovation, challenges young minds, and enables our country to work towards solutions to our energy needs. The question is will that revenue stream to fund that program continue, and will it be in the president's budget request?

Mr. DANIELSON. Thanks for that question. Can you be a little bit more specific about the program that you are talking about in terms of the EERE?

Mr. ALEXANDER. Well, the program allows universities at the state level to take state money along with federal grants to work on energy sources.

Mr. DANIELSON. I may need to take this question for the record to make sure I absolutely address your question with perfect detail. Under my purview is the State Energy Program, where we provide funds to state energy offices and then those state energy offices allocate those funds to other entities within the state. I am absolutely committed to that program if that is indeed the program we are talking about and plan to continue that support.

Mr. ALEXANDER. Okay. We will get back with you on it.

Mr. Smith, the second question is your department is responsible for liquefied natural gas exportation. Under the National Gas Act, LNG cannot be exported without your approval. The approval to countries that have free trade agreements is kind of a given thing, but out of 18 export applications, only one has been granted to a country that we do not have a free trade agreement with. When will you begin to resume consideration of those applications that are pending? And why is it so slow?

Mr. SMITH. All right. Thank you very much for the question.

As you state, the statute divides our considerations into two categories—free trade agreement countries which we approve without delay or modification, and those are defined by statute to be in the public interest. And non-free trade agreement countries, which the law essentially creates a rebuttable presumption that those exports are in the public interest mean that for each of those applications we need to consider them individually, and if we do not determine that approving it would not be in the public interest then we are compelled to approve those applications.

As you mentioned, we have approved one, which is in your state, in Louisiana, for the Sabine Pass Terminal in Louisiana. We are currently looking at a number of additional applications, a total of I think about 28.2 billion cubic feet per day of exports. It is hard to overstate the importance of these decisions in terms of energy policy. We have gone from being a net importer of LNG to potentially being a net exporter. It is a big shift for our country, but the

law sets out a very specific requirement for the Department of Energy to make sure that these applications are in the public interest. We are doing this in a way that is very open, very transparent. We have requested studies which we have received back to the Department of Energy, and currently, we are going through the process of working through this queue. Our goal is to make sure that we make this important public interest determination in a way that is sufficiently rigorous and transparent such that it is going to withstand the scrutiny that it is certainly going to attract. And so our goal is to make sure that we do all the right work up front, that we deal with all the stakeholders who have very, in some cases, conflicting views about LNG exports, and that we are able to make decisions upon which investors can act upon with confidence. So we are doing that work now. The comment periods are closed and we are now in the process of evaluating those applications.

Mr. SIMPSON. Thank you.

Mr. FRELINGHUYSEN. Thank you.

Mr. Fleischmann, you were here bright and early.

Mr. FLEISCHMANN. Yes, sir. Thank you, Mr. Chairman. And gentlemen, welcome. Thank you very much.

Secretary Lyons, your department made an award last November for the deployment of a small modular reactor to be located at the Clinch River site in Tennessee with B&W Design. Can you please tell us what progress has been made so far and what is DOE's plan for the near future in regard to that project, Sir?

Mr. LYONS. Well, thank you for that question.

In the immediate future, we are continuing the negotiations to finalize the contractual details with which that contract will move ahead. Those negotiations I think are very close to conclusion but they are still ongoing at this point.

Mr. FLEISCHMANN. Okay.

Mr. LYONS. I can talk about the overall goal of the program if you want, but I do not think that was your question.

Mr. FLEISCHMANN. Okay. So you expect to have that contract negotiation with B&W worked out relatively soon so they can get started?

Mr. LYONS. Certainly, from what I hear from the teams. Yes, they are close to the end of negotiations. But this is a substantial award and there has to be careful negotiations.

Mr. FLEISCHMANN. I understand.

Both the Department of Energy and private industry have made some remarkable technological breakthroughs in nuclear energy within the last few years. Unfortunately, despite these advances, the nuclear industry faces significant challenges. This was especially apparent to me just last week when a nuclear manufacturing firm in my district laid off 80 people. What can your office do to help our nuclear manufacturers more effectively compete both here and abroad?

Mr. LYONS. Well, from an R&D perspective, sir, we certainly have a number of programs that are involved in advanced manufacturing and attempting to work with such companies. You, however, raise a very important point that the low cost of natural gas currently makes it very difficult for clean energy sources in general to compete if the view of utility is very short term. In cases where

there are public utility commissions, companies, particularly in the Southeast that are taking a much longer term, I would say nuclear is doing very well. I mentioned the five plants under construction. But you raise an important issue and certainly to the extent that we can assist in advocacy for international contracts, we do that as well. That is more through the Commerce Department.

Mr. FLEISCHMANN. Very good.

My final question for now. There is a longstanding need to maintain the nuclear infrastructure at the Oak Ridge National Lab (ORNL) for the R&D work for your department. I understand the budget constraints and the very important work of INL in Chairman Simpson's district, I would like to work with you and my colleague, Mr. Simpson, and anybody else who is interested to keep ORNL's nuclear facilities in a safe and mission-ready state. How can we accomplish this?

Mr. LYONS. ORNL is currently an important contributor to the Nuclear Energy program. I would be correct in saying that they are second only to the Idaho National Laboratory in terms of funding from my program. And yes, sir, they have vital capabilities, especially in the area of advanced reprocessing, waste forums, such areas. Also, in advanced materials in general involving particularly corrosion of materials. So many, many programs at the Oak Ridge National Lab, and I would look forward to continuing to work with you and Representative Simpson to find ways where we can maintain those key capabilities.

Mr. FLEISCHMANN. Mr. Chairman, I believe my time is up.

Mr. FRELINGHUYSEN. If you want to give it up, that is great, because Mr. Nunnelee is ready to step forward.

Thank you, Mr. Fleischmann.

Mr. NUNNELEE. Thank you, Mr. Chairman.

I represent a district that is very heavily involved in manufacturing of all kinds, so I am interested in manufacturing in general. Specifically, as it relates to our meeting here today, I am interested in manufacturing as it relates to new energy recovery methods and new energy development methods. So I will start with Mr. Smith.

We have seen an unprecedented growth in natural gas recovery. And I am interested in the manufacturing of equipment related to natural gas, whether it is the manufacturing of turbines used for generation of electricity, or manufacturing of equipment for recovery. Is most of that being made in the United States or if not, where is all this equipment being manufactured?

Mr. SMITH. Well, thank you for the question, Congressman.

So in terms of I guess the point of origin of the majority of the equipment, there is a very wide range of equipment that goes from extraction to end use. So, I mean, there are a variety of sources and that is probably a question we could answer for the record so we can give you a more accurate breakdown of where things come from.

I will mention that our job in terms of manufacturing or the thing at least we are focused on in the near term is making sure that the feedstock, the natural gas that you use to put into these processes is available; that we are ensuring that they are prudently developing the resource. And one of the many things that we are compelled to consider when we look at policies such as LNG ex-

ports is impact on prices, impact on energy-intensive manufacturing. We do have some opportunities of moving manufacturing back to the United States based on lower natural gas prices. And so our policies are geared towards making sure this great deal of confidence around being able to prudently develop the resource, and thinking about the potential impact of various policies. So that is the focus that we have had in terms of natural gas manufacturing job creation.

Mr. NUNNELEE. You anticipated the root of my question. You may look at it even more for the record. I am very interested in what policies the government of the United States can pursue to encourage more manufacturing of natural gas recovery equipment in the United States?

Dr. Lyons, basically the same question on the nuclear side. The Nuclear Regulatory Commission approved a new nuclear power generation plant for the first time in 30 years. I am interested in these plants that manufacture the technology, also the small modular nuclear reactors, and in what we can do to encourage more manufacturing of those type of products in the United States?

Mr. LYONS. Thank you for the question, sir.

Starting first with the small modular reactors, one of our strong interests in the SMRs is that they offer the potential for manufacture in the U.S. They can be completely made in the USA. They do not require the very large components for which we do not have some of the handling capabilities in this country. But the SMRs and one of our small goals is to explore the possibility of building a new U.S. industry where all components can be made in the U.S.

From the standpoint of the large plants, there are serious limitations as to what can be made in the United States. The very large forgings that are required for the reactor pressure vessel and some of the large piping, there is no capability in the United States for that forging, and those forgings for the plants in South Carolina and Georgia are coming from either Japan or South Korea.

However, it is my understanding, and we can certainly get detailed information from the vendors, that of the order of 80 percent of the costs for those plants in Georgia and South Carolina is traceable to U.S. manufacture. That is not something that my office specifically follows but that is my understanding.

So small modulars, you have hit on one of my targets, one of my biggest goals. Large plants, the largest forging components are not capable within the United States now and as far as what could be done in the future to recover that, frankly, I think it depends on if we see a resurgence of orders for the gigawatt-class plants in this country, which gets back to a previous question involving competition with low-cost gas. If there is enough interest in this country in the large plants, then I am sure that will follow and a capability to build those large forgings in this country. Right now that would be very hard for a company to justify.

Mr. NUNNELEE. Okay. Thank you.

In general, and in closing, Mr. Smith, whether it is recovery, new ways of recovering old energy, or Mr. Lyons, new ways of developing new energy, I think they provide incredible opportunities for American jobs. And I am most interested in what the Congress can

to do make sure that we can take advantage of those growth opportunities.

Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Some excellent questions. And I know Ms. Kaptur raised the issue here. We are interested in domestic manufacturing. And obviously, we want to make sure that whatever research teams you have working, that all their good efforts do not find production jobs overseas. That is highly important.

Dr. Danielson, I think you were in the audience last year because you had been nominated and had not been confirmed, and so you may remember our particular—all of you—our particular emphasis on domestic manufacturing.

We did talk about the Bayh-Dole Act last year. What authorities and legal levers have you found that could help us on this front?

Mr. DANIELSON. Thank you for that question. I have been thinking about it for a year. Longer than that, but in earnest since I was nominated for this position.

Mr. FRELINGHUYSEN. This is what recipients can do or not do; is that correct?

Mr. DANIELSON. Exactly. The Bayh-Dole Act and other activities we take at DOE really relate to the government's right to require substantial manufacturing of any product embodying government-funded intellectual property. Bayh-Dole covers small businesses, universities, and nonprofits. It does not cover large companies. What it covers is any exclusive licensee of a small business, university, or nonprofit at which we fund research needs to substantially be manufactured in the United States. It does not cover large businesses, but DOE has title to the large business inventions, and then we waive our rights and provide the IP back to the large business, provided that they commit to substantial manufacturing in the United States.

We have been doing some work to identify a couple of potential gaps in Bayh-Dole where there may be an opportunity for us to work together to make sure to close some of these gaps. One very specific example of that is with Bayh-Dole, if we fund a start-up, a small business, and they take the IP and manufacture on their own, and they do not license it to someone else, they are not covered under this substantial manufacturing requirement. We are internally exploring options that exist in the statute that may allow us the opportunity to close that loophole.

Very soon I would like to sit down with membership individually to talk about what we might be able to do there. I think there is some work that we can do to close this.

Mr. FRELINGHUYSEN. We are going beyond—obviously, your thinking is going way beyond Bayh-Dole.

Mr. DANIELSON. Bayh-Dole is very strong, but we do want to make sure that it is airtight. And in addition to that, traditionally, under Bayh-Dole EERE has the right to require the submission of an annual report on how all the IP is being used. Traditionally, we have used that in cases where we know companies are going to be acquired or go bankrupt, but now going forward in fiscal year 2014, it is my intention to require every single entity that has EERE funded IP to submit that annual report to us every year.

Mr. FRELINGHUYSEN. I commend you for that. And Ms. Kaptur and I were briefed in addition to other members about your commitment, and obviously you have made it more public today. I like that. We like that vigorous scrutiny.

Mr. DANIELSON. Thank you.

Mr. FRELINGHUYSEN. I think that is excellent.

Mr. Smith, we hear a lot about the administration's approach to addressing our energy problems and to our reliance on imported oil. No one likes that situation. But there are areas with great potential the administration does not seem to be so keep in including in that approach. I think you know of what I talk about here. The U.S. Geological Survey released a report last month in which it found that the Green River Formation in Colorado, Utah, Wyoming, holds a staggering 4.2 trillion barrels of oil buried inside oil shale formations. To give some context, Saudi Arabia's entire proven oil reserves is less than 300 billion barrels. So we have 14 times Saudi Arabia's proven reserves sitting under our own land. If we want to get technical, the U.S. Geological Survey estimated that of that oil, up to 1.1 trillion barrels have "a high potential for development." That is almost four times the Saudis proven reserves.

I understand there are significant technical obstacles to extracting oil from these oil shale formations. Currently, technologies require vast quantities of water during extraction, and because deposits are actually a precursor of oil, we need to keep them to turn the substance into oil.

What are you doing in this area of research? I have met with people who have come up with apparently some pretty ingenious ways to minimize the whole issue of pollution by using limited amounts of water. I just wonder if you could tell us why are we not maybe focusing—I commend you for your safety focus but I am just wondering about R&D in this area.

Mr. SMITH. Thank you, Mr. Chairman, for the question.

So I will be careful about commenting on USGS's study or the Department of the Interior's oversight of public lands simply because we are the technical organization, so I do not have—

Mr. FRELINGHUYSEN. You do not have to be cautious. You can be whatever you want to be. We just want to be confident that you are going to be involved in this issue. This is important to us.

Mr. SMITH. And thank you for that clarification.

So, I mean, one thing I can be clear is that we do have a very active, an interactive collaboration with the Department of the Interior and the Environmental Protection Agency. One thing I mentioned in my opening remarks is that we have created a single steering team which I chair that oversees all of the research and development that occurs in three agencies that has to do with unconventional oil and gas research and development, and that is to make sure that the right agencies are working on the right work and we have got the right type of overlap, the right type of collaboration, and that the right agency is doing the right work.

Mr. FRELINGHUYSEN. You are not suggesting what we are talking about here is unconventional?

Mr. SMITH. Well, I mean, as we define unconventional resources——

Mr. FRELINGHUYSEN. This is not a new process. We have been doing fracking for 40 years in this country. I assume we have had our oar in the water here, have we not as a department?

Mr. SMITH. Indeed. But as one defines unconventional oil and gas resources, certainly we put hydraulic fracturing and shale gas development in that category, which is not to suggest that it is not something we cannot do safely and sustainably. In fact, we have the very specific mandate of making sure that we are doing it safely and sustainably. But in terms of categorization, we see that the role that shale gas and shale oil are playing in our economy, these type formations, has changed radically over the last few years. So we have been fracking formations for a long time, but certainly we have hit a phase change in terms of the impact that they are having on our economy.

Mr. FRELINGHUYSEN. Have we ever. I mean, who would have ever thought.

Mr. SMITH. It is a dramatic change.

Mr. FRELINGHUYSEN. A dramatic change. And I am just wondering whether you are doing more than just the safety side here.

Mr. SMITH. So if we look——

Mr. FRELINGHUYSEN. I know there is private—there is a lot of interest in this issue beyond, obviously, environmental concerns, which we all share. We do not want permanent damage to our environment anywhere, but my God, the job creation just on this issue, causes an incredible amount of excitement.

Mr. SMITH. Indeed.

Mr. FRELINGHUYSEN. It is almost like the Gold Rush. Whatever it is, you have got to be a player here. Are you involved in this in any way? I assume you do support the All-of-the-Above Strategy here. This must be part of the strategy.

Mr. SMITH. Indeed. It is an important part of the strategy. And it comes down to a question of what is the government's role in this case. We have got technologies in which the private sector is not playing a robust role in doing research and development and commercial development of particular technologies. I think we have talked about a few of those around this table. In terms of oil and gas, I think we do see the private sector playing a very robust role in developing the technologies to make sure that they are able to harvest oil and gas in a way that is profitable. And so we tend not to focus our resources on helping oil companies do those processes better. First of all, we do not see that as being a primary government role, and second, we probably—

Mr. FRELINGHUYSEN. We are investing in private vehicles. Private sector as well, too.

Mr. SMITH. Well, I mean, there are areas again in which we see that the private sector is stepping up to the plate and they are making those investments in those areas we do not invest. There are areas in which the private sector is not making significant investments that are in the public interest, and those are areas that we are focusing on.

So for oil and gas, the most important thing that we can do to make sure that these resources——

Mr. FRELINGHUYSEN. To get out of the way, is that what you are going to suggest?

Mr. SMITH. I would not say——

Mr. FRELINGHUYSEN. There are some who subscribe to that.

Mr. SMITH. I would say there is a very important role that the government has to play in demonstrating to the public that we understand the risk, that we have quantified them in the public interest, and that we can demonstrate that the rules in place are mitigating the risks that we have scientifically quantified. We think that is the most important thing we can do to make sure the Deepwater resources get into the market, shale gas resources get into the market, tight oil resources, which has been one of the other transformational plays here in the recent past get into market. So that has really been our focus, to make sure that—these are wells that are being drilled very close to where people live, where they work, where they go to school. We have to demonstrate that we understand that it can be done safely.

Mr. FRELINGHUYSEN. Well, you have some very bright and capable people across the board that work with you. I just think this is an area where I think you need to give some attention. I am not asking you to cast your lot with a bad group here. This is something we are dealing with. It has changed the whole energy equation here. I think it is incredibly remarkable.

Ms. Kaptur.

Ms. KAPTUR. Thank you very much, Mr. Chairman.

We are going to wear you out, Dr. Smith. I am going to start with you on this round.

In many places in our country, due to changes in the marketplace and technology, several coal-fired utilities are shutting down production facilities. Ohio is one of the states that has a number of these situations. I am wondering if within the Department or within your part of the Department there is any ability to help these communities, many of which exist in economically troubled regions to transition to a different energy future. Many of these places do not even have the technical assistance, if they are smaller towns, to know what is happening in the marketplace, who they might partner with to analyze the energy situation in their region. Many communities I can guarantee you are losing the tax base and do not have necessarily the business relationships to even understand what is happening to them. I am wondering if this is something you have given any thought to. Though the origin of this situation did not start with you, I am just concerned about quick adaptation to the marketplace in many of these places, rather than just letting this linger. So that is my question. Do you have any mechanism, administrative mechanism in place to deal with communities that need to readjust?

Mr. SMITH. Thank you, Ranking Member Kaptur for that question.

So this is hopefully roughly analogous to the question that you were asking. In terms of coal-fired power plants being shut down and figuring out new economic activities for the communities, we do not have direct programs in that area. There is one thing that we are doing I think that is analogous to that general concern.

As you have shale gas development that is moving from the Barnett Shale in Fort Worth, Texas, to the East Coast, now in the Marcellus in Pennsylvania and potentially into Ohio and other

places, one of the things that we are focusing on there is as this development moves into communities, the communities generally do not, in some cases, know how to deal with this new type of activity. From North Dakota down to South Texas you have seen as we have had these booms in production that often there are challenges that it brings to communities.

So there are a number of entities that we do fund that help communities adjust to new types of activities, new types of industrial activity, and they are within their borders. One is we fund an organization called STRONGER, which is State Review of Oil and Natural Gas Environmental Regulations. That is a group that is invited by the states. Because much of this activity is managed and regulated as you know by state entities. That is a group that we fund that can go in and review regulations to help bring best practices from the states that might have a track record, meaning they have had some successes and some failures at managing this new activity and help make sure it gets to new states who might be wrestling with some of the same issues and do not want to go through this process of reinventing the wheel of something that has been experienced in some other area. We also fund groups like the Groundwater Protection Council that looks at creating tools that will help the public understand things that are going on in their areas.

But I would certainly be interested and willing to take the question that you specifically had around coal and perhaps answer those questions.

Ms. KAPTUR. Yeah. Just to give you a perspective, I know one plant, for example, which has been mothballed by the company that has come to own it now. And the local community is not big enough. I mean, the mayor does not even have a travel budget to go to find this absentee owner and figure out what are they going to do with this because they are not completely shutting it down. These communities just do not have information that can help them make intelligent decisions. So I am just putting that on your radar. I think for Ohio, and I am sure other places, that discussion could be really helpful and perhaps bring information to communities so that they could make wiser decisions.

Mr. FRELINGHUYSEN. Will the gentlewoman yield?

If 52 percent of America's energy comes from coal, I think we need to maybe review your response for future testimony.

Ms. KAPTUR. Thank you. Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Ms. Kaptur.

Ms. KAPTUR. So I just wanted to put that on your radar.

The other thing is with the biorefineries and the research that DOE is investing in which I support, agriculture is enormously important to our country, obviously a leading exporting industry.

I wanted to ask whether you would give some thought to the Strategic Petroleum Reserve. I cannot make you do this, but to think about a strategic energy reserve for the country. And to think about the role of that reserve in procuring, let us say, biorefined product from some of the very plants that are being constructed. I think it could provide a useful role in giving us an all-of-the-above Strategy in terms of strategic reserve. So I just place the idea before you as you do your important work. So that is not in

the way of a question but merely a suggestion because I think as you think about it, there may be some appealing aspects to it. And we are at a different point technologically than we were 15 years ago.

Mr. SMITH. Thank you.

Ms. KAPTUR. Let me move quickly to advanced manufacturing partnerships. The president talked in his State of the Union about advanced manufacturing innovation hubs. There are several programs that are operating at the Department right now in this regard, and I am wondering if you could kind of perhaps, Dr. Danielson, talk a little bit about how you see the Department approaching the advanced manufacturing innovation hubs building off of some of the former programs that you had focusing on manufacturing. Clarify the administration's perspective for us.

Mr. DANIELSON. Thank you for that question.

The Advanced Manufacturing Office, which was called the Industrial Technologies Program prior to about two years ago, is where— I really want to be very clear about what we are doing with this program because it is a major priority of mine going forward. We are not abandoning the work that we have done over many years doing cutting-edge R&D and other work with highly energy-intensive industries in the United States to help them be more energy productive and more energy competitive. In addition to that we are funding what we are calling platform foundational manufacturing materials technologies that crosscut a number of the actual clean energy sectors in which we work. A couple of examples of that would be if we can achieve very low-cost carbon fiber, which is an advanced material we see used in a lot of DOD applications but is very expensive today. That could make vehicles much lower weight and much more efficient and while still being safe. It would help us get to the next generation of much larger wind turbine blades we are going to need; and help us with low-cost tanks for CNG so that CNG vehicles can provide the same range as other vehicles. That is one example of the kind of platform foundational technology that will have broad impacts on what we are doing.

The two elements of our Advanced Manufacturing Office: one is all about really cutting-edge research and development in those two areas I was just talking about, and other part is about what we call technical assistance to help industry become more efficient and more competitive. This Manufacturing Innovation Institute that you mentioned, I think many people on the committee and I think we have had too many acronyms in this Advanced Manufacturing Office. We are simplifying and collapsing that down so we can communicate very clearly with you. There were things called Manufacturing Demonstration Facilities that you remember, I am sure, and we are now talking about these Manufacturing Innovation Institutes. We will only be seeking to do Manufacturing Innovation Institutes going forward. We are simplifying the acronyms.

These are platform foundational research centers that are about $50 to $70 million over five to seven years, cost-shared with at least that amount by the private sector, where a number of different companies can come together and access these cutting-edge capabilities in manufacturing. We have already done one in the area of additive manufacturing in Youngstown, Ohio, with the De-

partment of Defense as a pilot. I think we are seeing a lot of exciting early indications that this is a good model, and we are continuing to learn. But going forward we will be looking to fund more of these Manufacturing Innovation Institutes in addition to individual investigator R&D awards in the Advanced Manufacturing Office.

Ms. KAPTUR. Thank you very much.

I wanted to ask a question about wind and your offshore wind demonstration projects. Can you give us a summary of where you are in the wind arena? And do you see that market growing globally as it has been for the last several years?

Mr. DANIELSON. Thank you for that question. Just for clarification, you are talking specifically about offshore wind?

Ms. KAPTUR. Yes.

Mr. DANIELSON. Or offshore wind?

Ms. KAPTUR. Well, you can talk about wind in general, globally, and then focus on offshore.

Mr. DANIELSON. We have seen tremendous progress in wind power. Over the last 30 years through DOE investments we have seen a reduction in the cost of wind by about 90 percent. We have seen tremendous progress. We are getting very close to cost competitiveness. Last year more wind power was put onto the grid in new capacity than any other form of new capacity. One thing that is really exciting from a manufacturing perspective is if you look at 2005 to 2011, we went from all the wind farms we were putting up in the United States only having about 35 percent domestic manufactured content to more than 70 percent now, which is a great thing. Wind is getting close to cost competitive, and our roadmap, we see it getting directly cost competitive, even dealing with any costs associated with the intermittency by the end of the decade. That is our aggressive roadmap.

Offshore wind is more immature, but it is a great opportunity. It is a huge resource. It is very close to load. If you look at one of the "light at night" maps of the United States, it is very bright around many of the coasts. There are a lot of people, a lot of energy users there. It is very easy to site the transmission relatively speaking to this offshore wind. But the cost is still significantly higher than onshore wind, obviously. The model cost we have is about 25 cents per kilowatt hour, which is still too high. I think we need to get about half that in order to reach direct cost competitiveness in that area, but I think it is a great opportunity for American leadership. Europe has taken the lead in this area but they have primarily focused on wind turbines that are fixed to the bottom of the ocean in very shallow depths. We are pioneering areas where it is deeper than that where we have a lot of resource there in the United States, where we actually have floating wind, offshore wind turbines that borrow a lot of expertise——

Ms. KAPTUR. Where is that Mr. Secretary?

Mr. DANIELSON. There are actually zero offshore wind demonstrations in the United States today, which is why we put out this funding opportunity recently to fund some pioneering demonstrations. We have funded a number of phase one awards, about $4 million each to do all the required engineering and planning to determine whether an offshore wind demonstration is going to

work, and then we are going to down-select to three or four projects that will actually get in the water in the next few years and will be the first demonstrations in offshore in the United States.

Ms. KAPTUR. My final question on this round is short, Mr. Chairman. And that is if we have manufacturers, industrial manufacturers that use enormous amounts of energy, is there any program at DOE that—and these are companies that face tremendous competition in the global marketplace—is there anything DOE has to help them think about how to reduce their energy costs as a percentage of production cost? Where does one send them?

Mr. DANIELSON. You send them to me and they will bring them to my Advanced Manufacturing Office. The technical assistance portion I spoke about, we have nine centers around the country that provide technical assistance for companies to adopt combined heat and power, which is a great way to save money. The technology is here. There are just some logistical barriers that we can help with, working with PUCs and others.

And to close, we fund an Industrial Assessment Center program where we fund students at about 25 universities to learn how to be an energy management engineer. Through this program we have done about 15,000 industrial assessments providing free advice and recommendations for how especially small and medium enterprises can lower their energy use and increase their energy competitiveness.

Ms. KAPTUR. Thank you.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur.

Mr. Simpson.

Mr. SIMPSON. Thanks, Mr. Chairman.

I am frankly shocked that we have gone an hour and 40 minutes, with somebody from the nuclear industry here and we have not mentioned the hole in the ground in Nevada. I am not going to be the first to do that by any stretch of the imagination.

Mr. FRELINGHUYSEN. Thank you, sir.

Mr. SIMPSON. But you mentioned in your testimony consent-based siting. Do we have any consent anywhere? And where are we with the recommendations of the Blue Ribbon Commission in terms of dealing with this issue?

Mr. LYONS. Well, thank you for that question. The administration released their so-called strategy for how they recommend dealing with the Blue Ribbon Commission recommendations. That was in January. That is available on our website. We certainly outlined the path, and I mentioned in my opening remarks the directions that we would suggest proceeding. It does require legislation. It is our understanding, at least on the other side, there are four senators working on a legislative package. I have not seen that package. Senator Wyden has said it would be available this month. Perhaps that will be a step forward.

So in terms of the——

Mr. SIMPSON. Will the administration recommend some legislation for this?

Mr. LYONS. The administration does not plan to recommend legislation. What we said in the strategy is that we look forward to working with Congress on a legislative package.

Mr. FRELINGHUYSEN. Will the gentleman yield?

Mr. SIMPSON. Sure.

Mr. FRELINGHUYSEN. We are going to have a specific hearing on this. You will not be disappointed. You may be disappointed by the responses but you will not be disappointed by the hearing.

Mr. Simpson.

Mr. SIMPSON. Okay. As long as we are going to have a separate hearing on this. Obviously this is important. I am getting tired of talking about a hole in the ground in Nevada versus something else. Ultimately, we have got to move on.

Mr. LYONS. I could not agree with you more, sir.

Mr. SIMPSON. Otherwise, it is going to be the bane of nuclear industry and we will not be able to move forward with advancing nuclear technology in this country if we do not solve this quandary. And I have gotten to the point where I really do not care what we do as long as we solve the problem.

Mr. LYONS. Sir, that is one of the reasons I am in this job is because I agree with you.

Mr. FRELINGHUYSEN. He is going to be on the job until we get a proper location.

Mr. SIMPSON. Along the same lines, you are going to be criticized no matter what you do. You have been in politics long enough to know. I do not think Mr. Visclosky was criticizing necessarily but he was questioning the decision on the SMRs with one funding opportunity and whether there were more funding opportunities originally proposed and so forth.

I happen to be one of those that believes you are going to get criticized for picking winners and losers if you have one. You are going to get criticized for diluting funding opportunities if you pick more than one. I am one of those that thinks government should not pick the winners and losers to start with. We ought to look at what is proposed. And if there are legitimate proposals that make sense and we need to do the research on them, then they ought to be available for funding opportunities also. So I am glad that you went out for a second round. Maybe something will come in that makes sense. Maybe it will not. Maybe you will look at all the proposals out there and say we just do not want to do that. But having that opportunity is the same thing. I have heard the same criticisms when it comes to Gen IV that we are picking winners and losers and that we are diluting our funding sources.

Where are we with Gen IV?

Mr. LYONS. The Generation IV International Forum has been ongoing for several years. That effort is an international arrangement in which we are with a number of international partners looking at, as I indicated in my testimony, advanced reactors, certainly not deployable. I mean, 2030 would be early for it to consider deployment of a Gen IV reactor, but with extremely exciting characteristics. And I mentioned the inherently safe reactor systems which would be represented by a number of the candidates within the Generation IV.

In terms of where we are, the research is continuing strongly. The two primary candidates with the most interest around the world and in which we have at least significant research in the United States would be high temperature gas reactor and sodium-cooled fast reactors. In both of those areas we are cooperating both

within Gen IV and in various bi-national arrangements with other countries. And both are very interesting future technologies. But these are research programs.

Mr. SIMPSON. Right. Okay.

One last question I need to ask you. Last year we talked about the Remote-Handled Low-Level Waste Disposal Project at the Idaho National Laboratory and the fact that IAM was going to be shutting down their facility, and now they have extended the life of it for two years. What does that mean for the urgency of getting on with building that project?

Mr. LYONS. We are keeping that funding on track with a target of operating, I believe, in 2017.

Mr. SIMPSON. Okay. That was originally the plan, that they were going to shut down in 2017, and I think they have said they are going to keep it open a couple of years later. But as most projects go, it might take a couple years beyond what we anticipate to get it done.

Mr. LYONS. We are still targeting 2017 to the best of my knowledge.

Mr. SIMPSON. I appreciate it. Thank you.

Mr. FRELINGHUYSEN. Thank you, Mr. Simpson.

Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman. Mr. Chairman, I also appreciate that the Subcommittee will hold a hearing on the issue raised by Mr. Simpson, and I am happy that he did. And Dr. Lyons, I will not hold you to the comment that the administration has a so-called strategy. I am sure it is a firm strategy. I respect the president but also think we need some leadership here.

Mr. SIMPSON. I simply meant that was the name.

Mr. VISCLOSKY. I understand.

Dr. Danielson, on wind. And it is in your testimony. You mentioned it just a minute ago to Ms. Kaptur that on wind, 70 percent of domestic wind energy market in 2012 is captured by U.S. manufacturing and that is up from 35 percent in 2005, and I am delighted. I would appreciate being updated because I am stuck in the past and become inflamed thinking about the 215 tons of steel in each one of those windmills. Three hundred sixty of them were constructed in the 1st Congressional District of Indiana by a number of companies but it was in 2009. When I asked the companies where they were manufactured, I never really got an answer back, which implies that they were not manufactured in the United States of America. I am assuming that impression from 2009–2010 is behind the curve now; that if I ask companies today if they put 360 turbines in the 1st District that those puppies would be manufactured in the United States more than half the time?

Mr. DANIELSON. Thank you for that question. It is an area we have been digging in a lot. I want to make sure to take that exact question for the record and make sure that I provide a detailed response to that.

The work that you mentioned around the Clean Energy Manufacturing Strategic Analysis on Solar, we are doing that same work in wind as well, so we should be able to have the cost structure, value-add, and location data to share with you in detail very soon.

Mr. VISCLOSKY. But that picture for U.S. manufacturing is much better than—again, I am kind of stuck, I think, probably in that 2009 timeframe.

Mr. DANIELSON. I would believe so. I want to make sure to get that right. This is an interesting example where the manufacturing was following demand. We had stable demand growth by virtue of reasonably stable policy over those seven years that I mentioned, and that resulted in a doubling of the domestic content. Something that has come out of our analysis, is that stable demand and domestic manufacturing are often correlated.

Mr. VISCLOSKY. Gotcha.

And Dr. Lyons, I would associate myself also with Mr. Simpson's questions about Gen IV. I also have a strong interest in that program. I appreciate your discussion.

Just one other question, Mr. Chairman, for Dr. Danielson. On vehicle technology, we had a lot of discussion about electric vehicles, but kind of like with the coal issue, there is a lot of internal combustion engines out there. What work is the Department doing to make those types of vehicles more efficient? You talk about compounds and other types of materials. What activities on a combustion engine are you undertaking?

Mr. DANIELSON. Thanks for that question. Sometimes I think folks think our Vehicle Technologies Office is all electric vehicles because that is something that we are excited about and we talk about, but a significant portion of our funding for fiscal year 2012 for greater than $50 million, I believe, is in advanced combustion technologies. We are doing work that includes new alloys of aluminum that can deal with much higher temperatures and much higher pressures so one can increase the efficiency of combustion. We are doing work in an area called a low-temperature combustion which is a much more efficient form of combustion; it is still relatively immature, but we are making great progress there.

In my initial remarks I mentioned this 70 to 1 payback of some of our combustion R&D over the last 20 years. There is this tremendous facility that we support at Sandia in Livermore, California, that is a great example I think of a very proper role of government, a facility that has very high-end diagnostics, laser diagnostics and other diagnostics, of how combustion occurs—and the auto industry uses that. They do not have that in their own labs—in order to optimize their results. Most of that 70 to 1 payback that I talked about was related to that facility. There are some other efforts but that facility continues to be very valuable.

Mr. VISCLOSKY. Thank you very much. Thank you, gentlemen. Thank you, Chairman.

Mr. FRELINGHUYSEN. Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman.

A quick comment. Secretary Danielson, thank you so much for commenting on the Advanced Manufacturing Office. I just wanted to commend you for the carbon fiber work at Oak Ridge, and I appreciate your commitment to that program long term, sir.

I have one further question for Dr. Lyons. Dr. Lyons, I wanted to get your views on CASL, the nuclear energy hub at ORNL. CASL has shown great success in developing new modeling and simulation technologies that are beyond the nuclear industry's cur-

rent capabilities. Will you also please discuss the possibility of expanding high performance computing to support any of these programs, sir.

Mr. LYONS. Thank you for that question.

CASL at Oak Ridge, the modeling and simulation hub for nuclear energy is doing extraordinarily well. We are very, very pleased with that. In fact, just yesterday I received a report from the current board of directors evaluating the performance up to this point. And certainly it was a glowing report. That current board of directors is headed by Dr. Dale Kline, the former NRC chairman, and he took over for Dr. Ernie Moniz, relatively recently. And Dr. Moniz had been the previous head of the board of directors. CASL headed by Doug Cote is an outstanding example of what the secretary's vision for a hub was envisioned. And they are indeed making substantial progress in advancing modeling and simulation into the nuclear energy industry.

As far as further extending certainly one of the areas that we will be looking at very carefully, that hub is coming up close to its five years. We will be evaluating that. We need to evaluate whether we can make the case of exceptional performance. Certainly based on what I have seen to this point I believe I could make that case readily. But we will be evaluating that over the next year, and that will be one very important mechanism to look at further end roads of modeling and simulation into the nuclear energy community.

We do have additional programs within my office. The so-called Nuclear Energy Advanced Modeling and Simulation, our NEAMS program that is also looking, in ways that are complementary to the hub. In a very austere budget certainly that is suffering from somewhat limited funding. We are doing the best we can. There are certainly areas where we could expand that modeling and simulation effort. But from the standpoint of the hub it is going superbly.

Mr. FLEISCHMANN. Thank you, Dr. Lyons.

Mr. Chairman, I yield back.

Mr. FRELINGHUYSEN. Mr. Nunnelee.

Mr. NUNNELEE. Thank you, Mr. Chairman.

All of your offices are involved in funding research grants that may very well cover multiple years, and some of those grants work out but some are underperforming. I think it is very important that we monitor projects, that we cancel and even recover money of underperforming projects. So just in general I would like to hear about what you do to monitor those underperforming projects and hear specifically about any project that you have canceled in the last year or two.

Mr. DANIELSON. I will be happy to take that question. Thank you for that question. I think it is a really important question.

I arrived a year ago, but if you look from 2005 to last year, by virtue of active project management that existed over those years at EERE, which includes regular site visits, statements of work that are detailed, 54 projects at EERE were terminated for technical reasons. They did not live up to the technical requirements. And $113 million were recovered that would have been spent if we had not had that active management. But going forward, as I mentioned in my initial comments, I am absolutely committed to dial-

ing up that active project management. And for me that is going to include the enforcement. We are only going to do cooperative agreements, which give us more flexibility in terms of termination early. We are having a template for what a statement of work needs to look like and what a quantitative observable metric is. Not activity-driven things but actually accomplishment-oriented metrics and milestones. And by the Q1 of fiscal year 2014, we will have a salesforce.com database where I will have visibility into every single project and what the status is—green, yellow, red. And I will be getting reports every quarter on which projects are—it is potential for them to be terminated and which projects are being terminated. And I would be more than happy, a question for the record, to deliver you a list of some of these projects that we have terminated early.

Mr. LYONS. Also, thank you for the question.

Within the Office of Nuclear Energy, we do predominately use cooperative agreements. We, in almost all cases, except for very large funding cases like the small modular reactor that we will be year-to-year funding, we do forward fund. The university programs are funded for their three years upfront so that we never incur a mortgage. We have quarterly reviews of all of our programs.

As for a list of what has been canceled, I will have to get back to you. I am certainly aware of ones that have been adjusted and modified. I will have to, for the record, let me respond on what has been canceled. But I believe we have a robust program of oversight and our forward funding I believe is very important certainly for universities for also for companies as well.

Mr. SMITH. So for the Office of Fossil Energy, certainly over the last several years we have had to make some hard choices as budgets have gotten smaller. We have a very important mission of ensuring that we can retrofit the coal-fired power generation fleet of today for the clean energy economy of tomorrow. There are lots of technological hurdles from capture all the way through monitoring verification of CCS. We have had to take a really close look at the projects that we fund. Certainly, that portfolio, that funnel of projects has gotten smaller over the last couple of years. Again, as with Dr. Lyons, I could not respond for the record with some specific examples of projects that we have eliminated as we have had to make those changes.

Mr. NUNNELEE. Thank you. Dr. Danielson, your response reminded me of a mentor I had in business early in my career and he taught me that the only thing you accomplish is what you measure. If you do not measure it, there is no way of knowing whether you accomplished it or not. So thank you for your attitude and responsibly monitoring and managing the dollars that the taxpayers entrusted to all of us.

Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Thank you, Mr. Nunnelee.

Dr. Lyons, would you give the Committee a brief tour of what is going on in terms of nuclear reactors around the world? Who is building? Who perhaps is focusing as we are? And do we need to expedite it on the small modular reactors? What does the nuclear plant landscape look like right now? Who is doing what? Obviously, many of those—are United States companies doing things, is there

international collaboration? Give the Committee a world tour as to who is doing what. And then I want to get you back home where your initial testimony focused.

Mr. LYONS. Thank you for that question, sir. And that could be a fairly long answer.

Mr. FRELINGHUYSEN. We do not want it to be too long. Put some numbers on the table because this is all about American competitiveness, and American competitiveness depends on diversity of energy supply, and nuclear is part of that equation. So what are other countries doing, particularly China?

Mr. LYONS. Small modular reactors.

Mr. FRELINGHUYSEN. Start with the more traditional reactors.

Mr. LYONS. I believe the number is 67 reactors of the gigawatt class are under construction around the world. I mentioned the five currently in the U.S. Those are U.S. manufactured. Of the 26 being built—I believe that is the correct number—in China, there are four Westinghouse AP1000s being constructed. There certainly are other competitors in China. China has an indigenous capability. There are Russian reactors being built in China. There are French reactors being built in China.

U.S. companies are in final throes of competition in a number of places around the world—Czech Republic, Poland, Finland, the U.K., and these would be both Westinghouse and GE designs. In terms of the largest manufacturers, I have already mentioned that China is certainly active, but only within China up to this point. South Korea is extremely active within South Korea. And going on to the international market, Russia is extremely active on both their domestic markets and around the world. And I am probably missing several others but that is a whirlwind tour.

In terms of SMRs, we definitely do not have this field to ourselves. There are very strong programs, particularly in Korea and Russia, and to some extent in Argentina. To my knowledge, the only SMRs that are actually under construction are in Russia. Korea has, I believe, completed the licensing of their small modular reactor.

Mr. FRELINGHUYSEN. So in the overall scheme of things, in terms of the small modular reactors, several nations are ahead of us? And that sort of places obviously an additional burden.

Mr. LYONS. Let me——

Mr. FRELINGHUYSEN. How would you characterize where we are versus them? This is something innately which our Committee supported, that has been excited about domestically. People are excited about it.

Mr. LYONS. I am hesitating on how to respond on exactly who is ahead here. If you ask who has a plant under construction, Russia does have a plant under construction. It is certainly not licensed within the United States, and part of the goal of our program is to achieve licensing to the gold standard of the United States, which also will be of interest to many other countries.

Mr. FRELINGHUYSEN. Are the technologies that they are employing similar to some of the ones you are taking a look at?

Mr. LYONS. No. In fact, they are very different.

Mr. FRELINGHUYSEN. Could you just very briefly say what is the difference?

Mr. LYONS. The technology being utilized in Russia to the best of my knowledge is a lead-bismuth coolant which I believe has been used in their submarine program. There is no lead-bismuth reactor to my knowledge commercially operating in the world. And in the United States we have focused on the light-water reactors on which we have extensive experience. The light-water reactor accounts for certainly the vast majority—I am sure it is greater than 90 percent—of the operating 437 reactors.

Now, there are challenges. Japan is still debating what to do after Fukushima. Germany is rethinking, retrenching. So there are 67 reactors under construction but I could point to countries that are certainly pausing, on a hiatus, and debating on their path forward.

Mr. FRELINGHUYSEN. Would you go back to the major milestone you mentioned in your opening remarks about what is occurring in terms of, should we say, laying down of the concrete?

Mr. LYONS. Yes, sir.

Mr. FRELINGHUYSEN. Would you comment further on that? I say it because, as you are aware, the Washington Post had quite a long article which put forward the rather challenging pictures. As good news as it is here domestically, this is still an article that casts a view that people might walk away from these type of investments. I come from the school, and certainly through I think the work on this Committee, is that this is for our long range. This is for our future. For this nation's future. And you cannot be dismissive of an article which obviously had some fairly good investigative reporting but in reality we need to continue to make the commitment. I would assume you would agree with what we are doing here.

Mr. LYONS. This Subcommittee was instrumental in the NP 2010 program. The NP 2010 program is the basis for the AP1000 reactor, which is licensed in the United States. It is in the closing actions of licensing within the U.K. It is being built in China. It is the first passively safe reactor to be built in the world. Passive safety in my mind is I would say essential. As we move ahead with nuclear power post-Fukushima, I think this Subcommittee should feel a tremendous source of pride with your role in NP 2010 and seeing now eight AP 1000s being built around the world. The ones in China were started earlier. They are about two years ahead of the ones here, but I could not be more pleased that we have four AP 1000s being built here. It does require states and PUCs that are willing to take a long-term view.

Mr. FRELINGHUYSEN. Yes.

Mr. LYONS. And I can only agree with you that in the long term the All-of-the-Above Inclusive Strategy that provides a diversity of energy sources is going to be vital to our nation.

Mr. FRELINGHUYSEN. Thank you for being so emphatic and putting that on the record.

Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman.

Secretary Danielson, I have been fascinated by the transmission efficiency of superconductor technology that I have seen used by the Navy. And I understand that some commercial applications have been installed in places like Long Island. I am just wondering what your view is of the costs of that technology or the scientific

or engineering hurdles we might have to overcome so we could more widely deploy that if possible, particularly in some of the poorest neighborhoods in America that are close to industrial plants. I am just wondering what is your take on that technology?

Mr. DANIELSON. Well, thanks for that question, Ranking Member Kaptur.

The hardware related to transmission and the kind of grid level hardware, that R&D is in the Office of Electricity under my colleague, Assistant Secretary Pat Hoffman. It is not under my purview, but one application that the area is seriously pursuing and supporting some leading companies in is in the area of superconducting generators for wind turbines. This is an advanced technology that potentially goes to the next level of reliability. That is one area where we are making investments in this area.

ARPA–E has been making some very significant investments in the area of superconductors and has made some exciting progress. I connect with them on a regular basis, but I think it would probably be important for me to take this question for the record to make sure we get you a good answer from our Office of Electricity.

Ms. KAPTUR. All right. I really appreciate that.

Let me move to the Clean Cities Program, which was not mentioned in your 2013 budget request. I have been pretty impressed with the results that I see on the ground in local municipal vehicles, public fleets. I am not sure about the Post Office. I see hundreds and hundreds of vehicles that are very energy inefficient, though the Post Office I am told has done the most in terms of energy efficiency of any federal agency. And I know they are trying to save money, so I am looking at all these public fleets.

Mr. FRELINGHUYSEN. They are almost bankrupt.

Ms. KAPTUR. I think we can save a lot on energy with them.

I am just wondering how do you see the Clean Cities Program evolving?

Mr. DANIELSON. Thank you for that question.

The Clean Cities Program is incredibly valuable to us, and there are slightly more than 100 of these communities, who come together and look to deploy next generation transportation technologies to reduce our dependence on foreign oil and lower their costs. I am absolutely committed to that program going forward. I think it is a very cost effective program. We make very limited investments in each of these communities as a way to collect data from them convene and have a communication channel. I actually think it is going quite well the way we are doing it today; I would just plan to continue to operate it the way we have over the last 20 years. I think it is a very cost-effective investment and it has had a real impact in terms of the ability of these communities to get these vehicles with much lower costs, like CNG vehicles, hybrid electric vehicles, and other vehicles that help them lower their costs.

Ms. KAPTUR. There are some amazing companies. I just witnessed a vehicle in our local public transit fleet that came out of California which was a hybrid where they cut their fuel costs in half just with those purchases. So there is a real change in psychology out there at the local level. I do not know if you work with our community colleges. A lot of them have fleets as well. And they

even had some of these charging stations that I have seen at some of our community colleges and the opportunity to move people from one community college to another as students are trying to learn. So I just really like that program and I am glad to hear you reaffirm it.

I wanted to move for a second to biorefineries. We have not talked about those as much today. And you have in your office invested in many large biorefinery demonstration projects. I know that there are difficulties in some cases with the cellulosic breakdown, but I am wondering if you can give us a little update on where you are on those and what your assessment of the state of the technology is.

Mr. DANIELSON. Thank you for that question.

That has been a significant part of the Bioenergy Technologies Office effort, which has been doing a lot of great R&D to make sure that the cost structure is going to be there. I mentioned achieving this 10-year goal. Ten years ago, we laid out this goal of cost competitive cellulosic ethanol demonstrated at the pilot scale, and the goal was $2.15 per gallon. Over two administrations with really steady work we went from an estimated cost of $9.00 10 years ago to $2.15. I think we have hit all our goals in terms of getting the technology there, and then with the biorefineries program, over the course of that program with 29 different integrated biorefineries only four were at the commercial scale. The rest were at the demonstration and pilot scale.

A number of them are working out. A limited number of them have been unable to get the private sector cost share and some of them have had technical difficulties so we shut them down, but what I am excited about is that this year the very first commercial cellulosic ethanol biorefinery is going to be up and running and selling commercial products in Florida. Over the next year, in 2014, we will have two more than we expect to get online. In 2015, two more. That will be five of the cellulosic ethanol plants selling commercial product. At that point we really think that it is time for the private sector to look at the data, look at what has been done, take some of the innovation that we have helped to support, and scale that industry because it is going to take the private sector to bring that industry to scale.

Ms. KAPTUR. I wanted to make a comment here, Mr. Chairman. I served on the Agriculture Appropriations Subcommittee for many, many years, and what I see lacking at USDA—and this is with all due respect to them because they are trying is that we really do not have a very formed set of objectives for each region of the country, including, because of climate changes, a clear understanding of a goal of setting a number of BTUs. We want the lowest BTU per ton input for the greatest BTU per ton output. The planting technologies differ, whether you are in the Garden State of New Jersey or the grain producing state of Ohio, and the science of that is still rather gooey. We have not really organized it in the best way.

And so to the extent that you could work with colleagues at USDA, Secretary Vilsack is phenomenal. I really would encourage you on so that we get a psychology at the local level depending on whatever is being produced. We do not want to displace food but we want to use our lesser productive soils, for example, with the

kinds of crops and the careful science that has to go into that. And I have seen a strategic problem with the marrying of scientists on the agricultural side and on the energy side over a number of years. I just wanted to share that with you. And I know you can make a difference.

What about work you are doing with EPA on sewage treatment and the production of power in local cities? Is there much progress in that regard? I wanted to ask you a question about that. And then algae. Both areas.

Mr. DANIELSON. Thank you for those questions.

The area you are talking about turning sewage into methane or SIM gas and then power is an area called anaerobic digestion. The technology is reasonably mature. We have considered efforts in that area but we currently do not have significant R&D effort in that area given that we consider that technology to be reasonably mature.

When it comes to algae, there is a tremendous opportunity there in that this can be put pretty much anywhere. You do not need to have fertile soil. You can use wastewater or potentially saltwater, so water will be less of an issue. But there is definitely going to be some work ahead to make algae work. The modeled cost that we see today with the current performance of all of the different parts of that technology, if you put them together in a model, is about $10 a gallon. We have identified many of the critical barriers and are addressing them through aggressive R&D but I would say that is a little bit of the longer term part of the portfolio in terms of algae to direct drop-in biofuels. We have other technologies we are working on that we believe will turn other forms of biomass into drop-in hydrocarbon fuels that are a little bit more near term.

Ms. KAPTUR. All right. I would think, Mr. Chairman, it would be very helpful if the Department could provide a chart to the record both in the case of the waste from cities and the anaerobic digestive process. And if, in fact, we are where we need to be with the technology, why is it not being used more widely? And number two, in terms of the algal research, summarize what you have said in terms of cost per ton, however you measure it. I think that would be very, very interesting to look at.

Mr. DANIELSON. We will absolutely take that question for the record.

One thing I wanted to reassert is that the very first commercial cellulosic ethanol biorefinery in Florida is actually taking municipal and other waste and converting it into ethanol. Waste is a great feedstock. It has a negative cost, and so it is actually a great first market for a number of these energy fuels and technologies that we are talking about.

Ms. KAPTUR. Thank you. Mr. Chairman, would you indulge me with one tiny 10-second question since we both serve on Defense together as well?

Mr. FRELINGHUYSEN. Absolutely. Go right ahead, Ms. Kaptur.

Ms. KAPTUR. Thank you.

This relates to the Navy's biofuels initiative. Last year's budget request included $40 million to support a Navy initiative that would attempt to jumpstart a bio-based jet in diesel fuel industry for military use. As of now it appears the Department does not

have authority to transfer those dollars. Could you tell us what has happened with that initiative, please?

Mr. DANIELSON. Yes. Thank you for that question.

Just to reiterate what you said, there was an MOU between Ag, Energy, and Defense to coordinate together and put funds into the Defense Production Act authority to invest in a number of commercial cellulosic biorefineries that would make jet fuel or diesel bio-derived available for the DOD to use. DOD's motivation, when I have spoken to them as the biggest fuel consumer in the world, was $11 billion in fuel costs, and also the fact that one of our greatest competitive advantages as a nation is our agricultural productivity. That is the source of our interest and our expertise in this area having invested in the number of biorefineries that I mentioned to you is why we all came together on this. But we have not received the authority to put any funds into the Defense Production Act for this purpose.

Mr. FRELINGHUYSEN. Still, I feel it is still under debate. I think this is an issue of whether this is the sort of thing that needs to be subsidized. I do not think anyone argues with the goal. I think in some areas in the military they have done some remarkable things. Particularly on solar panels at Nellis Air Force Base becoming totally independent in terms of their energy source. But certainly it is open for debate.

Anything further, Ms. Kaptur?

Ms. KAPTUR. No. Just thank you, Mr. Chairman, for an excellent hearing. The witnesses were just fantastic. Thank you for your service to our country.

Mr. FRELINGHUYSEN. Lastly, for the record, Mr. Smith, I know we talked about the joint research effort that relates to hydraulic fracturing. I would like to know exactly, if you could for the record, what the Department's role is on that Committee. I know we have got the EPA and U.S. Geological Survey. I just want to know what the Department's role is in that group, if you would for the record.

Mr. SMITH. I would be happy to.

Mr. FRELINGHUYSEN. Gentlemen, thank you for your testimony. I appreciate everybody being here. We stand adjourned.

QUESTIONS FOR THE RECORD

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
HOUSE COMMITTEE ON APPROPRIATIONS

**ENERGY EFFICIENCY AND RENEWABLE ENERGY,
ELECTRICITY DELIVERY AND ENERGY RELIABILITY,
NUCLEAR ENERGY, AND
FOSSIL ENERGY RESEARCH AND DEVELOPMENT
FISCAL YEAR 2014 BUDGET HEARING**

MARCH 14, 2013

MANUFACTURING AND OIL INDEPENDENCE

STRATEGY TO REDUCE OIL DEPENDENCE

Subcommittee. It's as import as ever for the United States to reduce its dependence on imported oil—becoming independent from oil imports is both a security and economic imperative. We have several ways to approach this, but the single largest problem is our transportation sector's use of imported oil.

Mr. Smith and Dr. Danielson, what is the Department's strategy to help reduce our reliance imported oil?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

Subcommittee. I'm not saying anything new when I say that the domestic supply of natural gas has skyrocketed in recent years and is here to stay. I'd like to ask our three witnesses to discuss the opportunities and implications for domestic manufacturing that come from this newfound domestic supply of low-cost natural gas.

Mr. Smith, let's start with you. It seems like every other power plant that's built in the United States burns natural gas. Who's making the turbines that power those plants, and the gas exploration and production equipment that extracted it from the ground? Are they being manufactured here?

Is there an opportunity to take back manufacturing in the natural gas industry because of our domestic production and demand? How can your program help that to happen?

Dr. Danielson, what about your programs? Are there opportunities for domestic manufacturing of natural gas vehicles or in other areas? What are your programs doing on that front?

Dr. Lyons, what about in your camp? In the last eight years or so, we've supported a program to develop a high-temperature nuclear reactor that could replace natural gas in industrial settings—and potentially be manufactured here, at least in part. How has the natural gas market affected those plans, or other plans in the nuclear industry?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

NUCLEAR ENERGY

NUCLEAR ENERGY FUNDING OPPORTUNITIES FOR UNIVERSITIES AND INDUSTRY

Dr. Lyons, there is some debate among interested parties around how your office should decide where grants go. Nuclear Energy research funding goes to national labs, universities, industry, and other research groups, and there has been some disagreement around how the Department should decide the allocation of funds to each of those types of institutions. For instance, your office has a Nuclear Energy University Program, which sets aside up to 20 percent from every program for university grant competitions.

Our Committee included language two years ago directing the Department to allow all types of organizations to compete for some portion of your office's funding. And while I understand there are many complexities you have to deal with on this topic, I'd like to note that we've heard some positive reviews from a number of parties who indicate that they've been able to compete for opportunities for which they weren't previously eligible.

Dr. Lyons, can you bring us up to speed on this issue? Have you been able to allow more types of organizations to compete, and let the best applicant prevail? What do you think is the right approach?

I understand your office had some concerns that there is a federal regulation that does not allow national laboratories to compete with industry—though in other program offices at the Department, they go head to head frequently. Have you resolved this issue, or is it still an obstacle?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

SMALL MODULAR REACTORS

CHANGES TO THE SMR PROGRAM THREATENING NEAR-TERM DEPLOYMENT

Secretary Lyons, I'm concerned the Department's sudden changes made in December to the SMR program may threaten its overall success. The Congress — and the Department's own budget request, I might add — were very clear: the program's goal is the expeditious deployment of small modular reactors through the support of two different designs. The Department's sudden changes worry me for two reasons, among others:

First, by shifting the focus towards innovative designs, you're pushing back the timeline for getting them out the door by a number of years, if not more. In fact, the funding announcement you made this week puts the timeframe for new applicants to, and I quote, "2025 plus or minus 2 years." This means you could select applicants who want to deploy reactors by 2027—that's quite a long time from now. Given how quickly other countries are moving forward on SMRs, aren't you putting our companies and manufacturers at risk of "missing the boat"?

Secretary Lyons, my second reason for concern is this: by supporting more than two designs within the original budget of $452 million, you're putting at risk the deployment of each design. First off, you're changing the terms on applicants after the fact, something that further damages the Department's credibility. Further, with less funding to support each design, their timelines could be stretched out considerably—or worse, they may back out altogether. By spreading your funding too thin, aren't you "splitting the baby" here?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

IMPACT OF CR AND SEQUESTER ON SMR LICENSING PROGRAM

Secretary Lyons, the small modular reactor licensing program is scheduled to provide $452 million over five years in support of reactor designs going through their licensing process. Anything that stretches funding beyond five years, or any delays along the way, may seriously hurt our chances to make the SMR industry and American industry.

How will the sequester effect the timeline for the SMR program this year? How might that translate into the ultimate timeline for the licensing and deployment of these reactors?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

SMALL MODULAR REACTOR ADVANCED RESEARCH AND DEVELOPMENT

Dr. Lyons, when the Administration first proposed its small modular reactor programs, it included an Advanced SMR research and development program, which the Congress then funded. Last year, you told us that this program is focusing on improving safety, extending the lifetime of fuels, increasing reactor efficiency, proliferation resistance, and one or two other areas.

How do these research areas differ from the "innovations" the Department has said it wants additional reactor designs chosen for the licensing program to focus on?

When should we expect to see results from the Advanced SMR research program? Is this focused on enabling deployment of advanced designs in the next decade or two?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

PROGRAM MANAGEMENT

ADMINISTRATION PRIORITIES FOR NUCLEAR ENERGY

Secretary Lyons, the Administration proposed a number of top priorities for the Nuclear Energy program in the last two years, many of which were in line with our Committee's priorities. The Small Modular Reactor program, for example, has been atop our list, along with experimental and safety infrastructure at our national laboratories, research into new reactors, and research into new fuels that are even safer than fuel in today's power plants.

Looking forward through the next year, can you lay out for us the Administration's top priorities for the Nuclear Energy program?

Secretary Lyons, what if you received additional funding? For example, if you received an additional $50 million or $100 million, what additional priorities would be next in line for funding beyond those you just listed?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

INTERNATIONAL NUCLEAR ENERGY COOPERATION

Dr. Lyons, last year's budget request proposed $3 million for the International Nuclear Energy Cooperation, which coordinates international activities across the Department.

That amount only accounts for the small office that coordinates international activities. How much is spent across the Nuclear Energy office on international work?

What countries is your office actively working with?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

MARKET AND WORKFORCE

NUCLEAR WORKFORCE AND THE INTEGRATED UNIVERSITY PROGRAM

Dr. Lyons, in the next 10 years or so, we expect a large number of retirements in the nuclear industry and related government programs, is that right?

The last time the government operated under a full-year continuing resolution, in fiscal year 2011, the Administration took the opportunity to eliminate funding for the Integrated University Program.

Terminating activities under a continuing resolutions—activities explicitly supported by the Congress—is not appropriate. Just as important, that termination in fiscal year 2011 hurt our nation's nuclear workforce, given the retirements that we're expecting to see coming up. It stopped a program that ensures our universities are filling the pipeline with nuclear engineers and scientists needed to support our energy sector and nuclear deterrent.

Will the Department continue to fund the Integrated University Program under a full-year continuing resolution?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

NUCLEAR ENERGY INFRASTRUCTURE AND SECURITY

REMOTE-HANDLED LOW-LEVEL WASTE DISPOSAL PROJECT AT INL

Dr. Lyons, last year when we spoke, there was an urgency to begin construction of the Remote-Handled Low-Level Waste Disposal Project at Idaho National Lab. The Office of Environmental Management (EM) had announced that it would be closing the existing waste disposal facility in 2017, and we needed to get going on construction so that this new facility would be ready to accept waste by the closure of the old site.

I understand that EM recently announced that it will keep the old facility open for an additional 2 years. Does this reduce the need to start this new disposal project as soon as possible?

By when do you believe we need to start this new project in order to meet EM's new timeline?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ADVANCED TEST REACTOR AT IDAHO NATIONAL LAB

Secretary Lyons, the Advanced Test Reactor serves an important role for the health of our nuclear navy, as well as for civilian nuclear energy research and development. The ATR is an old reactor, but it's still going strong day-in and day-out.

What is the general health of the reactor, and has it been adequately funded to provide maintenance and upgrades necessary for it to last?

What projects and upgrades to the ATR are still outstanding but were not proposed in your budget request?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

IDAHO SAFEGUARDS & SECURITY FUNDING

Dr. Lyons, the Idaho Sitewide Safeguards and Security appropriation provides for critical operations for the Idaho Laboratory. If sequestration takes full effect, how short will its funding fall below the minimum amount needed to keep the lab safe and secure?

If the full funding amount can't be restored, what savings can you realize in that account, and how?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

NEW MOLYBDENUM-99 PROGRAM AUTHORIZED

Secretary Lyons, the isotope molybdenum-99 plays a critical role in a broad array of medical applications, including important diagnostic procedures. A few years ago, we had a scare when the small handful of reactors that produce this isotope—in other countries—temporarily shut down. The supply has since been stable, but many members have had concerns that we do not have a sufficient domestic supply of the isotope.

The National Defense Authorization Act enacted late last year authorized a Department of Energy program to encourage the creation of domestic supplies of molybdenum-99 that use low-enriched uranium as a fuel.

Do you see a real need here, or is this program unnecessary?

Does the Department have plans to request funding for this program?

If so, would it be run within the Nuclear Energy program, or within the Office of Science's Isotope Production Office?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

REACTOR RESEARCH

NEXT GENERATION NUCLEAR PLANT PUBLIC/PRIVATE PARTNERSHIP

Dr. Lyons, last year's budget request did not propose to move forward with a Next Generation Nuclear Plant demonstration project. It did, however, recommend the development of a public/private partnership and a licensing framework.

How long and expensive of an endeavor is the licensing framework, and how much progress have you made?

In what state is the public/private partnership? Have talks been ongoing, or have they stalled?

Last year we asked you about this program, and you said that the program will continue as only research and development, "until conditions warrant a change in direction." What conditions would warrant a change? And when will you simply declare the project over?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

TRISO FUEL: USING NGNP RESEARCH IN OUR CURRENT REACTORS

Dr. Lyons, one of the accomplishments of the Next Generation Nuclear Plant program was to develop extremely reliable and accident-tolerant TRISO fuels.

There is apparently some potential to use TRISO fuel in today's reactors, because it would add an entire additional layer of protection from radiation releases, even in accident scenarios. How real is that potential? Is it feasible to use TRISO in light water reactors? Are there any problems with this approach?

Why was TRISO fuel necessary to develop for the NGNP's high temperature reactors in the first place?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

NEXT GENERATION NUCLEAR PLANT HIGH TEMPERATURE MATERIALS RESEARCH

In addition to TRISO fuel development and licensing frameworks, your budget request last year called for continued research into graphite and high temperature materials. If an NGNP demonstration project is not moving forward, how do you justify this high temperature materials research? How can it be applied to other designs or aspects of nuclear reactors?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ADVANCED REACTORS THAT DON'T REQUIRE REFUELING

Secretary Lyons, a number of American and other companies are pursuing advanced reactor designs that don't need to refuel for several decades. This cuts down on proliferation risks, and it could dramatically reduce the amount of waste produced in a reactor. I believe Bill Gates is behind one of these designs.

Are these reactors feasible? What are the challenges to developing one of them?

We understand that these innovators are now pursuing opportunities for research and development overseas. Why are they doing so? What recommendations would you make for keeping these cutting-edge ideas here in the U.S.?

In the United States, we ordinarily require testing of fuel so that it is rated as safe for its lifetime. And it turns out that it's difficult to do that for fuel that lasts 30 years—I believe it's actually impossible to do so with our nation's test capabilities. Other nations are pursuing these designs. Do they have such fuel testing capabilities, or do they simply not require this testing?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

EXTRACTION OF SEA WATER URANIUM

The Department is now well into its second year of research into extraction of uranium from seawater.

What progress has been made since you started? How close are we to economic extraction of uranium from seawater, and what are the technical barriers?

Do you expect the Department will need funding to sustain this program for many years, or is this research close to completion?

Does the low current price of uranium on the market—which isn't helped by the Department's sales and trades of its uranium—hurt the viability of uranium from seawater?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ENERGY EFFICIENCY AND RENEWABLE ENERGY

TRANSITION AWAY FROM MULTI-YEAR GRANTS

Up until a year ago, the Department's energy programs had engaged in the practice of awarding multi-year grants—that is, giving grants that promise or "mortgage" future-year appropriations. This practice promises future money the Department might never have. It also locks up much of your budget each year to pay for past awards, and so prevents your programs from being nimble each year to address the changing state of markets and technology. We therefore included in the fiscal year 2010 appropriations Act some incentives for you to transition away from this practice.

Dr. Danielson, your office was the "chief offender" in this respect. But after just a year of transition time, I am happy to recognize publicly that you and your team have all but stopped the practice of mortgaging future funds, except in appropriate circumstances.

Do you have an update on this issue and on the past year's transition?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ENERGY SYSTEMS INTEGRATION FACILITY AT NREL

Secretary Danielson, the Energy Systems Integration Facility (ESIF) was a considerable investment at the National Renewable Energy Laboratory, and now that it's completed and operational, we'd like to understand the opportunities for the facility.

Most user facilities are budgeted for on separate lines in the budget request and in our appropriations bills, but so far ESIF's operations have been funded by contributions from each of your office's related programs. Our Committee report for fiscal year 2013 directed the Department to start funding ESIF like every other user facility is, under separate operations lines. Has your office begun doing this, and will we see this in the upcoming budget request for fiscal year 2014?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ADVANCED MANUFACTURING PROGRAM

ADVANCED MANUFACTURING PROGRAM PROPOSED LAST YEAR

Secretary Danielson, last year's 2013 budget request proposed the new Advanced Manufacturing Office. The Office would be an evolution of the existing Industrial Technologies program and would focus on technology research and development that can help our manufacturers compete globally.

How has this program taken shape and evolved since your proposal last year?

Will you be asking for a reprogramming of funds within the Office of Energy Efficiency and Renewable Energy to fund this initiative? If so, why is this reprogramming needed?

Is this program still funding important research historically funded in the Industrial Technologies program that focuses on the manufacturing of steel, aluminum, paper, concrete, chemicals, and other materials?

How might sequestration impact this program?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

WHITE HOUSE MANUFACTURING INITIATIVES AND THE STATE OF THE UNION

Last year, the White House announced a number of initiatives to support and revitalize American manufacturing, including the National Network for Manufacturing Innovation and the Advanced Manufacturing Partnership.

Though the White House named the Department of Energy as a key agency in implementing the Advanced Manufacturing Partnership, it was only mentioned briefly once in the 2013 budget request and didn't have a dollar amount next to it. How is the Department of Energy involved in this partnership? Have you put any funding to it?

Around that same time, the White House also announced the National Network for Manufacturing Innovation, which to date has funded one institute focusing on additive printing. I understand that the Department of Energy partially funded this institute. Dr. Danielson, I do not oppose this institute, per se. But last year's budget request, being extremely thin on details, failed to mention these institutes at all. Will you commit to being more transparent with the public and the Congress in your budget requests moving forward?

In his State of the Union Address this year, the President called for three more of these institutes, and eventually a total of 15. We talked at length last year about our concern over the proliferation of "centers" within the Advanced Manufacturing program, so you can understand why we might be concerned about the details here. How, if at all, is the Department involved in this effort, and can we expect to see a detailed proposal in the 2014 budget request?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

UPDATE ON CENTERS WITHIN ADVANCED MANUFACTURING PROGRAM

Secretary Danielson, I have been very supportive of the Industrial Technologies program, which has now evolved into the Advanced Manufacturing program. Last year in this hearing, however, we discussed our concern with your predecessors that the Advanced Manufacturing Program was bogged down with far too many centers of various kinds. I don't think I need to remind you that last year we talked at length about all of these existing centers: the Industrial Assessment Centers, the proposed Manufacturing Demonstration Facilities, the Clean Energy Application Centers, the Advanced Manufacturing Clusters, and the Critical Materials Hub.

Now a year later, the President is proposing more centers—these called National Manufacturing Innovation Institutes. Now, those are not a bad idea at face value, but I am just as concerned about the proliferation of centers as I was last year—especially when the President announces yet more in this program.

Before we discuss the new institutes, what have you done since last year to address our concerns about the surplus of centers in this program?

And what about the new and proposed institutes? Are these just more heaped on top, or do you have a coherent, simplified program now into which these institutes fit?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

UPDATE ON CRITICAL MATERIALS STRATEGY

Critical materials became a pressing issue in the last several years, when China was apparently reducing its exports and these materials were becoming scarce worldwide. This is a long-term issue we need to solve, but the market conditions fluctuate from year to year. How has the global supply evolved since this became an issue several years ago?

What's the Administration's current strategy, and how is EERE collaborating and coordinating with other agencies, like ARPA-E and the Department of Defense?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

MECHANICAL INSULATION PROGRAM UPDATE

Dr, Danielson, the Industrial Technologies program—now the Advanced Manufacturing Office—has partnered with outside groups for several years to increase industrial efficiency by raising awareness of the impact of mechanical insulation and other methods in manufacturing and industrial settings. This is a way to highly leverage federal funds to make large improvements in U.S. industry.

What progress has been made to date on this initiative?

How much is the Department planning to spend on this effort under a year-long continuing resolution?

How does this effort fit into your larger advanced manufacturing program?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

BATTERIES

BATTERIES: UPDATE ON TECHNOLOGY LANDSCAPE AND RESEARCH

Secretary Danielson, many different offices at the Department are conducting research into batteries and their supporting technologies, ranging from the basic research at the Office of Science to more incremental research in your office. And of course, all of these are focused on cars, storage for energy on the power grid, and other energy-related applications.

How do you coordinate this all, with four different program offices all working on the same end product?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

BATTERIES: UPDATE ON MANUFACTURING AND GLOBAL COMPETITION

Significant sums of taxpayer funds have been used to support American manufacturing of batteries in the last four years. The 2009 stimulus supported batteries through both the loan programs and the Advanced Battery Manufacturing grant program. What have we gotten for those investments? Do we manufacture any more of the world's batteries than we did in 2008?

Do we have a shot at gaining market share in the battery industry, or was the 2009 stimulus just a poor assessment of that industry?

If we have a shot, how can we make it happen—and if government funding failed once, why should we keep doing it?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

A123 BANKRUPTCY

One conspicuous and unfortunate failure of the 2009 stimulus battery program was A123's bankruptcy. That company went under, and now it looks like it's being sold to a Chinese company.

Dr. Danielson, what went wrong? How did what people thought of at the time as a promising manufacturer and innovator fail?

Do you believe it's appropriate for A123's assets, which are partially the product of Department of Energy grants, to end up with a Chinese company?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

INSPECTOR GENERAL REPORT ON LG CHEM MICHIGAN BATTERY MAKER

Secretary Danielson, the DOE Inspector General just released a report finding improper use of taxpayer money by LG Chem Michigan, which was awarded about $150 million of 2009 stimulus funds. The reason for the report was about $800,000 of improper labor reimbursements, but that's not even chief among my concerns.

The worse problem is this: first, the IG found that, four years after the stimulus was passed, LG Chem has yet to sell a commercial battery. Second, more than 90 percent of the grant has been spent, and yet LG Chem has only built about 60 percent of the production capacity that it agreed to put in place when it took the federal grant.

First of all, how did this go so wrong? Is this plant ever going to sell a battery?

Are there grounds to reclaim the public funds that went to this recipient? Is that something DOE would pursue?

Is LG Chem typical of the other battery grants in the 2009 stimulus? Are any of the other projects manufacturing and selling batteries?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

BIOFUELS AND BIOMASS

ETHANOL BLENDS

Ethanol blending has been a very controversial topic this year. The EPA has found that gasoline using more ethanol than the 10 percent currently used at gas stations is safe for vehicles currently on the road. But another recent study claims these fuels blends with more than 10 percent ethanol could damage vehicles. Critics of the study, in turn, say it is flawed in a number of ways. Dr. Danielson, can you shed some light on this controversy?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

BUILDING TECHNOLOGIES

BUILDING EFFICIENCY ENERGY INNOVATION HUB

Dr. Danielson, the Building Efficiency Energy Innovation Hub was one of the first three Hubs to be funded back in fiscal year 2010. The Hub was awarded to Penn State University, and was the slowest Hub to get off the ground—in part, because the Hub chose to do a very large renovation project for its office space before moving in.

The Hub has also been slow to staff up—I understand that the other two Hubs started back in 2010 staffed up much more quickly.

The goal of the Hub is also somewhat of a cause for concern. The Hub's overarching mission, as stated on its website and in its mission statement papers filed with the Department of Energy, is to reduce energy consumption in commercial buildings in the Greater Philadelphia region by 20 percent.

That goal itself seems like a worth undertaking for a city to take. But this Hub is national asset, funded by federal dollars, and one could reasonably think it should center itself around a central mission with direct national benefits. For example, one of the other Hubs started in 2010 is aiming to develop a technology that can convert sunlight directly into transportation fuel—a technology which, if developed, would have nationwide benefits. The buildings hub seems to focus on regional benefits, but its national benefits are conspicuously missing.

Do you agree that the mission is not sufficiently national in focus?

What is your assessment of the Hub's performance overall?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

RESEARCH INTO CUTTING-EDGE TECHNOLOGIES, LIKE SOLID STATE LIGHTING

Dr. Danielson, the Building Technologies program puts some of its funding into research for new technologies for appliances and other household items that could greatly reduce power consumption and save consumers and businesses money through lower power bills. One example is solid state lighting, which this Committee has supported for several years and could dramatically reduce how much power we use to light our buildings.

Last year's budget request proposed to nearly double funding for Heating, Ventilation and Cooling systems research. Is that such a large opportunity that it should be the main focus of your technology research in that program?

How do you ensure that your research does not benefit one firm over another or inappropriately shape markets?

What are the other large opportunities for lowering Americans energy bills through new technology development?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

VACATED FURNACE EFFICIENCY RULE AND NEGOTIATED RULEMAKINGS

In its energy efficiency rulemaking program, the Department has recently begun using a Negotiated Rulemaking process, which can operate at an accelerated schedule while gaining better consensus between industry and government than the typical process. Somehow that process did not work when the Department made a motion to vacate its proposal for a furnace efficiency rule.

What happened during that process? What worked and what didn't?

What is your assessment of how well the negotiated rulemaking process is working in other instances?

What are the budget implications of using this process rather than the traditional rulemaking process?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

VEHICLE TECHNOLOGIES

NATURAL GAS VEHICLES POTENTIAL AND OBSTACLES

Dr. Danielson, given the new, vast supplies of natural gas here in the United States, many people are talking about the possibility of using it for transportation.

What's the potential for natural gas vehicles, and what are the obstacles?

Are we aiming only for trucks and fleets, or could we see natural gas make its ways into consumer vehicles?

Is there an opportunity here for American manufacturing?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ADVANCES IN NATURAL GAS VEHICLE FUEL STORAGE

Secretary Danielson, I understand that storage tanks are a difficult problem for consumer-sized natural gas vehicles. Is your office doing any research to advance the technology?

If not, why not? What offices in DOE are doing that work? It certainly seems high-impact enough for the Department to take on.

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

ELECTRIC VEHICLE "EV EVERYWHERE" AND 1 MILLION CAR INITIATIVES

Dr. Danielson, in March of last year, the President announced an "EV Everywhere" initiative, to be conducted by the Department of Energy's Office of Energy Efficiency and Renewable Energy, Office of Science, and ARPA-E. The program aims to lower the cost of American-made electric vehicles, and is related to the President's goal of having 1 million electric-drive vehicles on the roads by 2015.

We're somewhat in the dark here, because "EV Everywhere" is not mentioned a single time in last year's budget request for fiscal year 2013.

Can you lay out for us, Dr. Danielson, exactly what this initiative entails and how it relates to your programs?

There are a number of other factors that impact the Administration's goal of electric vehicle deployment — events in the private sector, and government policies like vehicle tax credits and gas mileage standards. How will your programs interact with these other federal activities?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

STATE OF ELECTRIC VEHICLE MARKET

In his 2011 State of the Union Address, the President called for America to put 1 million electric-drive vehicles (EV's) on the road by 2015. The sales for electric vehicles fell somewhat short in the last two years, so I'd like to check in with you, Dr. Danielson, on the state of the EV market.

How many EV's are on the road today, and how on track do you think we are for reaching the President's goal by 2015?

We hear conflicting reports about the health of the EV market. Some say the market has grown substantially, others say that the market has fallen short of projections, and we even have a public spat between a CEO and newspaper over charging an electric car. What's the "real deal", Dr. Danielson? How healthy is the market, and where is it heading?

If we did meet the President's goal, how much of a difference will this make? For instance, how much oil will we have avoided importing?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

CLEAN CITIES PROGRAM

Secretary Danielson, the Clean Cities program has been an important mechanism for spurring activity at the state and local level to use clean fuels, reduce our reliance on imported oil, and reduce Americans' dependence on fuels with soaring prices.

How do you see the Clean Cities program evolving as electric vehicles mature—and with the new supply of low-cost domestic natural gas?

Last year, the Department announced a new initiative, the National Clean Fleet Partnership. How does this fit into the Clean Cities program? Does this change the programs balance between fleets and consumer drivers?

This Partnership wasn't mentioned in your fiscal year 2013 budget request. Will it be in this year's request? How much of the Clean Cities program is the Department spending on this partnership in fiscal year 2013?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

SOLAR ENERGY

STATUS OF THE SOLAR INDUSTRY AND OVERSEAS MANUFACTURING

Secretary Danielson, the Administration had high hopes several years ago that we would capture a large portion of global manufacturing in the solar industry. The last year has painted a different story, which is unfortunate given the level of federal investment in that area.

What does the current global solar manufacturing market look like? How much of it do we or other nations manufacture, and how has that changed over the last several years?

What led manufacturing to shift overseas so dramatically?

What do you foresee happening in the next several years or decades?

Last year's budget request for fiscal year 2013 included $310 million for the Solar Energy research and development program. That is a large sum, given that most solar manufacturing has shifted overseas in the last several years. How can we make sure that funding goes towards bringing manufacturing back here, instead of just improving products that are manufactured overseas?

Is there a next generation technology on the horizon that might enable the US to excel in solar manufacturing once more?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

DEPARTMENT'S EMPHASIS ON SOLAR MANUFACTURING

Dr. Danielson, in addition to its emphasis on lowering product costs, the Solar Energy program in your office has shifted its emphasis in the last year or two towards research that improves manufacturing. This includes the Photovoltaic Manufacturing Initiative, programs focusing on the supply chain, and other activities.

Since these programs have now been rolling for a little while, what's your assessment? Are they making a difference?

If most manufacturing is happening overseas, how are you ensuring that these manufacturing-focused programs are going to our own companies and research groups here in the Unites States?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

PROGRAMS FOCUSING ON SOLAR "SOFT COSTS"

Last year's budget request proposed to increase research and other activities to lower the "soft costs" of solar, which includes local permitting and other non-technical activities.

Of the various soft costs, what does DOE really have the ability to reduce?

Last year's budget proposed to spend $42 million on soft costs. As far as we could tell, this meant funding cities to build websites to speed up their permitting processes. Is this a good use of federal funds—and is it something that can be leveraged to beyond just the handful of cities that would win the grants?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

WIND ENERGY

OFFSHORE WIND DEMONSTRATION PROJECTS

Dr. Danielson, your Wind Energy program has been very excited about an offshore wind demonstration project for several years, and this year you're announcing the selected applicants who are entering the first round of the program.

How does this fit into the marketplace? How are these projects different than what the private sector is already supporting? What offshore wind projects are moving forward without federal support?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

COMPETITIVE LANDSCAPE FOR WIND TURBINE TECHNOLOGIES

When talking about wind turbines and wind energy, we hear buzzwords these days like "direct drive" turbines.

What does the latest competitive landscape look like for wind turbines, and what are the next technologies on the horizon?

Is the U.S. making any of these, and could it be positioned to make the next-generation technologies?

The wind market has been around for quite some time. What technology research and development remains to be done?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

WATER POWER

WATER POWER PROGRAM REDUCTION

Dr. Danielson, the Water Power research and development program is one of the few research programs whose funding is reduced in the last several years in the Energy Efficiency and Renewable Energy budget request. And yet, the nation has vast inland water energy resources that have been documented by federal studies—gigawatts of untapped renewable power, in fact. And new turbines and other supporting technologies could help us to sustainably harness that energy.

Do you think it would be unwise to reduce this program while proposing increases for almost other programs?

What is the total potential for additional electricity production if we were to use all of our inland water resources?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

REDUCTION TO MARINE AND HYDROKINETIC WATER PROGRAMS

Dr. Danielson, proponents of Marine and hydrokinetic energy point to the fact that as much as 10 percent of the nation's energy could be generated from the motion of ocean water just off our coasts. This is essentially is a completely untapped natural resource. And yet, the budget request for the program that advances ocean energy and hydrokinetic technologies is consistent in the tens of millions—and order of magnitude lower than many of your other programs. We hear about other countries moving forward developing ocean-based energy technologies, and it looks like the Administration has ceded this market to others. Are we under-investing in this area in proportion to the other programs in your office?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

WEATHERIZATION AND STATE ENERGY PROGRAM

WEATHERIZATION NEEDS AND REPROGRAMMING

Dr. Danielson, for a number of years the Weatherization program has had ample carryover from the 2009 stimulus.

How much 2009 stimulus funding is left to support the state, territory, and tribe programs as they enter their 2013 program years?

What are your funding needs for this program in fiscal year 2013 under a continuing resolution?

Will you submit a reprogramming request to the Congress in order to get that funding?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

GEOTHERMAL

GEOTHERMAL FIELD SITES

Last year, the Department's fiscal year 2013 budget request proposed a new Enhanced Geothermal Field Sites proposal. Unfortunately, that proposal lacked the details we require to fund a new $30 million program.

Where are you with this? Have you developed more details that are ready to go in the fiscal year 2014 budget request?

What exactly are these field sites meant to accomplish that regular demonstration and test projects cannot?

After more investigation, have you determined that the field sites idea is still a good opportunity? What form are you thinking they'll take? A user facility, or a privately owned demonstration project, or another arrangement?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

FOSSIL ENERGY

SOLID OXIDE FUEL CELLS (SECA) PROGRAM

Mr. Smith, the Solid Oxide Fuel Cells program has supported research into an emerging technology that could change the way we use natural gas, including highly-efficient distributed generation. The program, if seen to completion, could create substantial benefits for American jobs, manufacturing, and our energy sector. Unfortunately, the last time we had a full-year continuing resolution in fiscal year 2011, the Department zeroed out funding for this important program.

Congress spoke loud and clear by restoring funding in fiscal year 2012, and we spoke once again in 2013 by once again providing funding in the Energy and Water appropriations bill.

Will the Department continue to fund the solid oxide fuel cells program in fiscal year 2013 under a full-year continuing resolution, as required by that law?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

HYDRAULIC FRACTURING RESEARCH

In last year's the budget request, the Administration proposed to fund a research effort involving the Department of Energy, the EPA, and the U.S. Geological Survey, aiming to "understand and minimize the potential environmental, health, and safety impacts of shale gas hydraulic fracturing. The Department of Energy proposed to put $12 million of its budget towards this effort.

While I think that ensuring public health and safety is important, efforts on that front should be matched by efforts to make sure we're effectively using the vast domestic resources in shale gas formations. This is still an infant technology, and we have to make sure we do not squander our newfound domestic resources.

What are the range of activities your office is funding on hydraulic fracturing?

Did the Department start work on this interagency effort using fiscal year 2012 funds?

Everyone is still awaiting a plan from the Department on its exact role in this interagency effort. When will you be releasing a draft of this plan?

How will you balance these competing priorities moving forward?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

FALLING BEHIND IN COMPETITIVENESS FOR FOSSIL ENERGY TECHNOLOGIES

Mr. Smith, China is actively building many coal plants, and is dominating the world stage of carbon capture and sequestration projects. By contrast, we have little to point to when it comes to new coal plants. Are we at serious risk of losing the manufacturing market in this large part of the energy sector?

What are you doing to prevent that?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

COAL PLANT EFFICIENCY AND INNOVATION RESEARCH

In the last several budget requests, we've found that the Administration has underinvested in technologies that increase the efficiency of coal power plants. Increasing the efficiency of our coal plants by just 1 percent would add a substantial amount of power generation to the grid.

Mr. Smith, what work is your office doing to increase coal utilization and the efficiency of our existing power plants?

Will you invest in these areas at a level that is more commensurate with the potential positive impact?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

METHANE HYDRATES – SUCCESSES AND FURTHER OPPORTUNITIES

In the last year or so, we seen some large successes reported on the Department of Energy's efforts to extract methane from methane hydrates in the arctic. The volume of methane in those deposits is staggering, and continued progress on the technology seems well worth the investment.

Following on the successes of last year, what is the program working on now?

Japan recently announced a new major success with underwater hydrates extraction. Can you elaborate on their success, and does this mean we're falling behind the competition—and underfunding our program?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

FOSSIL ENERGY — MAJORITY QUESTIONS

FUTUREGEN

Mr. Smith, the FutureGen project, to which $1 billion of stimulus funds were devoted in 2009, has been on a long path towards completion. But it appears to have cleared the main hurdles put before it so far, including approval at the state level and securing a power purchase agreement.

What do you see as the main obstacles ahead between now and the beginning of construction?

The project's funds will expire five years after funding was obligated, which is not too far in the future. How much of a risk do you believe there is that project delays will lead to the expiration of funds before the project is completed?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

KEYSTONE XL PIPELINE EXPANSION

Mr. Smith, this year, the Keystone XL pipeline is once again a topic of controversy. The Administration has still not approved the construction from Canada all the way through to the Gulf Coast. And given that it's still an issue, a number of questions on the topic still seem relevant.

How will an operational Keystone XL pipeline affect our imports of oil from overseas and the overall the availability of oil in the United States?

How will the pipeline project likely impact domestic oil prices?

How much more energy is used to extract oil sands oil compared with conventional oil?

If we don't build the pipeline, will Canada just simply close shop, or will it sell the oil to other countries using tankers?

If it sells the oil on tankers anyway, then what is anyone gaining by not taking the oil via a pipeline?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM CHAIRMAN FRELINGHUYSEN OF NEW JERSEY

CHANGES TO THE SMR PROGRAM AGAINST CONGRESSIONAL DIRECTION

Secretary Lyons, this subcommittee has been a staunch supporter of the Department of Energy's Small Modular Reactor licensing program. This program aims to support a new American industry that brings important benefits to our energy sector while also standing up an entire manufacturing supply chain here in the United States.

Unfortunately, in December, we saw some sudden, poorly explained changes in the Department of Energy's implementation of the program that are of great concern to me. After starting a grant competition nearly a year ago to support two designs, your program only funded one design in December and announced a new competition earlier this week to support an undetermined number of additional designs.

The fiscal year 2012 appropriations conference report provided initial funding for the program to be implemented as proposed in the budget request in support of designs that can be deployed expeditiously. As you know, that means the program would support two designs, each receiving \$226 million over five years. Secretary Lyons, until December, your program was on track to do just that. For the benefit of the subcommittee, please explain what led to this sudden change?

Just so we're completely clear, how many designs does the Department now plan to support under this program?

When organizations applied for these grants last year, your budget request, the congressional appropriations Act, and your funding opportunity announcement were all very clear: the Department would fund two designs. I'll quote from the funding announcement last March: "The total Government funding available to be divided among awards under this FOA is estimated to be \$452 million over five years." And further on in the announcement, it says: "DOE intends to make two awards." The math is pretty simple, and it seems reasonable for any applicant to conclude they were investing their resources in a competition for a \$226 million grant. Isn't

it misleading to now change how much is offered to each grant recipient? Doesn't this damage the Department's credibility?

If you fund more than two designs, is the administration expecting to request more funding from Congress, in order to provide grants at the original amounts—and to restore the Department's credibility?

The language in the 2012 conference report was very clear: the Department was to implement this program as proposed in its own budget request, and that means two designs. Isn't the Department going directly against congressional direction and its own budget request? What justification can you give?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM RANKING MEMBER KAPTUR OF OHIO

GLOBAL COMPETITIVENESS AND DOMESTIC MANUFACTURING – SOLAR

Energy development is really a must-win situation because of the great impact on our economy. Right now, energy represents the largest portion of our trade deficit, but with the right energy policy, we can reduce that figure, and as a global leader in energy technologies, we can regrow our nation's manufacturing base. This has been a central focus of this committee's efforts and I want to learn you are doing to advance these goals.

Secretary Danielson, we continue to hear concerns about the state of solar manufacturing and a large shift overseas. Briefly, what is the current state of the global solar manufacturing market?

What led manufacturing to shift overseas so dramatically, and do you think this trend can be reversed?

Can we actually take back the top position as global leader in solar or is our best hope to simply remain competitive? In which areas can we retain a competitive advantage?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

GLOBAL COMPETITIVENESS AND DOMESTIC MANUFACTURING – CONTINUED

Other than solar, how are we competing globally? In which technologies are we finding the most success? Where are we losing our competitive edge?

Again, focusing on manufacturing, which energy technologies offer the best prospects for encouraging domestic manufacturing? What challenges do we face?

America's strength lies in the skill and quality of our workforce, but too often cheap labor has won out. As energy technologies reach maturity, how do we incentivize companies to set up manufacturing floors on our shores?

Inevitably, some companies will not be convinced to stay in America, or will be bought by foreign operations. What are you doing to protect the intellectual property developed with the support of taxpayer-dollars?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

SOLID OXIDE FUEL CELLS (SECA) PROGRAM ADDITIONAL QUESTIONS

With the growing reserves of natural gas, and the move to natural gas as a fuel for electric power generation, how is natural gas utilization being addressed to ensure lowest cost and highest efficiency electric power generation?

Does the DOE see a relationship between near-term natural gas application of SECA technology for distributed generation and the long-term goal of central power generation with gasified coal?

Since one of the strategic focus areas of the administration is natural gas, what consideration has been given to accelerate the application of technology developed in the SECA program for highly efficient electric power generation directly from natural gas?

The SECA program is within three years of delivering technology that meets commercial requirements for private investment in manufacturing and entry of state of the art direct natural gas fueled products into the distributed generation market. What is the DOE doing to ensure that the SECA program is successful?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

INTERAGENCY INITIATIVES

Secretary Danielson, the most cutting-edge technology coming out of your program is often not economically feasible for widespread commercial use. However, in the long-term, these innovations are absolutely necessary for improving existing technology such as solar, batteries, and biofuels. However, other federal agencies often require these specialized technologies to advance their work—this is especially true of the Department of Defense. How is EERE working with federal agencies to further growth in cutting-edge energy technology? What opportunities exist for further partnerships?

In Youngstown, Ohio, the Department recently partnered with four federal agencies to invest in a pilot institute for additive manufacturing—3-D printing. How is this program advancing the goals of EERE?

Do you anticipate more interagency initiatives like this one in the near future? What technologies might be the focus?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. SIMPSON OF IDAHO

NUCLEAR ENERGY UNIVERSITY PROGRAM

Dr. Lyons, you commit up to twenty percent of your research and development program to university research. What is the process you use to assess how programs utilize the research conducted by the Nuclear Energy University Program?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. ALEXANDER OF LOUISIANA

EPSCOR PROGRAM

Louisiana has been one of many states that have benefitted from DOE's EPSCoR (Experimental Program to Stimulate Competitive Research) program. This federal-state partnership provides for competitive energy-related research. This program fosters innovation, challenges young minds, and enables our country to work toward solutions to our energy needs.

Will DOE continue to support the EPSCoR program and sufficient funding?

Will this funding be reflected in the FY14 budget request?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

LIQUEFIED NATURAL GAS

Mr. Smith, my question relates to DOE's responsibility related to the export of liquefied natural gas, LNG. Under the Natural Gas Act, LNG cannot be exported without DOE's approval. Approval to countries with which the U.S. has a free trade agreement is virtually automatic. However, to non-free trade agreement countries DOE must approve a request to export unless it finds that the request is not in the "public interest." There are currently 18 export applications filed at DOE. The last one approved – in fact the only one approved – was given the green light in May of 2011. I understand two studies on the matter were recently completed.

When will DOE begin to resume consideration of the applications that are now piling up?

Why is DOE working so slowly through this process?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

STATUS REPORT ON "BLUEPRINT FOR SECURE ENERGY FUTURE" RESEARCH PLAN

Mr. Smith, in March of 2011 the President released his "Blueprint for a Secure Energy Future" – a comprehensive plan to reduce America's oil dependence, save consumers money, enhance the nation's economy, and promote the development of the nation's oil and natural gas resources while recognizing the importance of safe practices and environmental protection. As a part of the blueprint, and via a formal Memorandum of Agreement signed on April 13, 2012, DOE, DOI, and EPA were specifically tasked with the development of a multi-agency program collaborating on the highest priority research challenges associated with the safe and prudent development of the unconventional shale gas and tight gas. A draft research plan was to be developed and made available to the public for comment during the fall of 2012.

Can you please provide us with a status report on the activities of this multi-agency program, the level of funding provided to the three agencies and where those funds are being targeted, and when the draft research plan will be made available to the public for comment?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. FLEISCHMANN OF TENNESSEE

BASE OPERATING FUNDS

Mr. Danielson, I understand you are looking at a new facility stewardship model, similar to the Office of Science, to provide base operating funds for your new technology user facility at NREL, the Energy Systems Integration Facility. The provision of base operating funds has been a practice that the Office of Science has learned over the years that is critical to success in conducting world-class science with these facilities.

Do you plan to expand that practice to include facilities sponsored by your organization that exist at other laboratories?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

NE SUPPORT OF NATIONAL LABS

Dr. Lyons, given the requirements within NE to support the Idaho National Laboratory, and the requirements of significant nuclear energy infrastructure at other Labs like ORNL, does NE have a more sustainable strategy to manage and maintain these programs?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. PASTOR OF ARIZONA

EERE RESEARCH, DEVELOPMENT, DEMONSTRATION, AND DEPLOYMENT

For several years, this Committee has supported DOE's Combined Heat and Power (CHP) funding and urged DOE to provide research and development funding for small scale CHP.

Will there be dedicated funding for small scale CHP research and development in the FY14 budget request?

Where will the funding responsibility lie- with Building Technologies or with Advanced Manufacturing?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. FATTAH OF PENNSYLVANIA

EERE

Do you agree that improving energy efficiency in commercial and residential buildings is a critical economic development and environmental concern, and that the Energy Efficiency Buildings Hub is an important asset that will help the nation in this regard? Given the Hub's importance, how will DOE's plan to implement sequestration impact the Hub?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

CHP

EERE's Advanced Manufacturing Office has recently announced Combined Heat and Power Technical Assistance Partnerships (CHP TAPs) that are intended to provide funding to accelerate deployment of 40 gigawatts of new, cost effective combined heat and power (CHP) by helping remove market and non-market barriers.

CHP has been an underutilized source of clean energy within the United States due to some of these barriers. Can you discuss in more detail what these barriers have been in the past?

What are the long term goals of this partnership? How do you hope to monitor and evaluate the success of these partnerships? Can you discuss in more detail which sectors are the most involved and most in need of implementing CHP technologies?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Offices of EERE, NE, OE, and FE received questions from the Subcommittee on March 19th, 2013, thirteen months prior to the printing of this volume.

TUESDAY, MARCH 5, 2013.

SCIENCE FY 2014 BUDGET

WITNESS

BILL BRINKMAN, ACTING UNDER SECRETARY FOR SCIENCE, DEPARTMENT OF ENERGY

Mr. FRELINGHUYSEN. The meeting will come to order. I would like to welcome our witness, Dr. Bill Brinkman, director of the Department of Energy's Office of Science. Welcome back.

Mr. BRINKMAN. Thank you.

Mr. FRELINGHUYSEN. This time of year we would normally call you before the subcommittee to explain the President's budget request. The press reports that we may finally see that budget sometime this month and we certainly hope it is not later than that. Every day it is delayed simply increases the chances of being forced into another continuing resolution for fiscal year 2014 as we anticipate voting on one for 2013 this week.

Mr. BRINKMAN. Right.

Mr. FRELINGHUYSEN. It is not a good state of affairs. No way to run a railroad.

Dr. Brinkman, your programs enjoy wide support here in Congress, you know that. Even so they are not immune to budget pressures and sequestration. Like other non-defense programs at the department last Friday, you lost approximately 5 percent of your budget. That amounts to a $244 million reduction. That would bring you down to just below fiscal year 2009 levels. With such budget uncertainty, advanced planning and prioritization are critically important. This subcommittee has been encouraging you over the years to develop clear plans and priorities under different budget scenarios and I hope you will be able to let us know today, this morning, how a flat or slightly decreased budget scenario will affect your program.

Fortunately, you have been working with the larger science community to develop priorities, especially for fusion energy science and nuclear physics. While we will not be able to explore your fiscal year 2014 budget request, we look forward to a substantive discussion about your plans and your priorities. We are all facing challenges in the coming months and years and I would encourage you to take this time to build a consensus for any significant changes you would like to make in order to strengthen your programs. These may be controversial and we will need some time to openly consider them during the fiscal year 2014 process.

Before I close I want to thank you on behalf of the committee for your work and ask that you take that message of thanks to your employees and contractors of the Office of Science.

And with that, I turn to my ranking member, Ms. Kaptur, for any remarks she may have.

Ms. KAPTUR. Thank you, Mr. Chairman, and welcome, Dr. Brinkman. Thank you for your service to our country and it is really good to have you here today.

Secretary of Energy Dr. Chu has said he regards two principal challenges for our country to be energy independence and climate change. In the long term, I believe that much of the inspiration to overcome both of these challenges will come from the Office of Science to which you are devoting so much of your life. I happen to share his concerns. In many areas of science and technology American researchers typically or arguably remain the best in the world. However, our margin of leadership neither is wide nor as clear-cut as it has been in the past and in certain areas we have clearly fallen behind. Given the constrained fiscal environment it is particularly important that we strategically plan each major program to ensure that we are proceeding in a deliberate and thoughtful manner, increasing or maintaining our lead in the areas where we can and limiting our investment where we cannot, while finding viable niches to maintain scientific knowledge.

U.S. leadership in many areas of science and technology depends in part on the continued availability of the most advanced scientific facilities for our researchers. However, I believe that many of the infrastructure plans of the Department of Energy were developed with a far more optimistic funding profile than the current reality will support. We need to maximize scientific and technological advances within tight fiscal restraints and I hope to hear from you about how the Office of Science has begun to reevaluate the strategic plans of major program areas.

Our national labs are rightly viewed as national assets. However, coming from an area without a national lab, as most members do, I would like to understand how the department interacts with organizations, whether it is industry or academia, outside the national lab structure. I am also very interested in how you link to other science-related laboratories that the Federal Government operates, whether it be Department of Defense or NASA.

I would like to understand a little more about how you function collaboratively in this area of—in this era of fiscal restraint. It is oftentimes difficult to articulate to our constituents the importance of our Nation's science laboratories, something that I hope you will help me with today.

Additionally, I will be interested in hearing your perspective on where we should be investing in science and how it fits into the administration's all-of-the-above strategy for the 21st century that develops every source of American-made energy. The numbers look better as I look at our trade accounts. And I am very hopeful today, hopefully in my lifetime, when I will be able to say America is energy independent again here at home.

Thank you so very much and we look forward to your testimony.

Mr. FRELINGHUYSEN. Dr. Brinkman.

Mr. BRINKMAN. Thank you.

Mr. FRELINGHUYSEN. The floor is yours.

Mr. BRINKMAN. Well, thank you, Chairman Frelinghuysen and Ranking Member Kaptur and distinguished members of the committee. Only one, but——

Mr. FRELINGHUYSEN. There may be more.

Mr. BRINKMAN [continuing]. He is very distinguished.

Mr. FRELINGHUYSEN. Very distinguished. Mr. Fleischmann is the new member of the committee, very distinguished.

Mr. BRINKMAN. I am pleased to come before you today, the Office of Science at the Department of Energy. We are the Nation's largest source of funding for basic research of the physical sciences. Our research investments and user facilities are vital to advancing U.S. leadership in science and strengthening our national competitiveness. We thank you and this committee for your ongoing support for our mission. It has been very essential.

We face a unique and challenging time during this period of budget uncertainty. We are operating under a continuing resolution that expires March 27th and we face sequestration reductions of $215 million for the Office of Science compared to the 2012 enacted level. The Office of Science is doing everything possible to mitigate the problems that are caused by the continuing resolution and impact of sequestration. To do this in the most effective manner we will need to have the opportunity to reprogram some lines of the budget. This is very important. However, there are unavoidable impacts to our programs, facilities, and construction projects that affect not just the progress of the science we steward, but also the everyday lives of researchers, institutions, and businesses we support.

Our facilities and research make great contributions to science. The 2012 Nobel Prize in chemistry was awarded based on research at the Advanced Photon Source at Argonne National Laboratory. The Linac Coherent Light Source at SLAC National Accelerator Laboratory, the world's first hard X-ray free electron laser, continues to enable ultrafast imaging that was previously impossible.

We have started the new battery hub, the Joint Center for Energy Storage Research. And I think we look forward to a lot of work there. In fact, it is at Argonne National Laboratory and Argonne has offered to help Boeing understand its problems with the batteries.

Mr. FRELINGHUYSEN. They better hurry.

Mr. BRINKMAN. They have tried.

Mr. FRELINGHUYSEN. Good.

Mr. BRINKMAN. They are very much involved with an industry-wide group of people that are working the issues.

We have made great improvements in our understanding of aerosols and ecological systems and climate modeling.

So, sequestration cuts occur at a time when the United States faces an increasingly competitive international landscape in physical science research. For example, the European Union now publishes more scientific papers than the U.S. Of the papers in Physical Review, a publication of the American Physical Society, only 22 percent are American. At the same time, our major facilities are being challenged by new construction throughout the world. Reductions in supercomputing—to our supercomputing budget will mean delaying power upgrades at our leadership computer facilities and

delaying our fast-forward proposals to accelerated superconductive research. This occurs while our leadership in computing is being challenged strongly by the EU, China, and Japan, all of which set goals to be the first to achieve exascale-level computing.

In fusion energy sciences sequestration will impact both the domestic research facilities and funding of U.S.-made hardware for the international ITER project. We are still assessing the proper balance of reductions in these two areas, but however the sequestration cuts are implemented it will damage our fusion program. Meanwhile, South Korea, China, and Japan are greatly increasing their fusion efforts and are already planning for the machine that will follow ITER while, at the same time, keeping their commitments to ITER itself.

The Linac Coherent Light Source II upgrade project at SLAC is in danger of reduced funding and significant delay that will lead to an increased total project cost. Elsewhere in the world four competitive X-ray free electron lasers are being constructed, threatening our leadership in this field. The National Synchotron Light Source II at Brookhaven may be forced to reduce early operations while new light sources in Sweden and Brazil will also be entering operation at comparable capabilities of NSLS II.

Over 25,000 scientists worldwide, nationwide, and across many fields rely on the Office of Science for facilities for their research. Many university researchers will be impacted by user facility budget reductions. The Office of Science has a proud history of delivering to the American taxpayer. Our research investments have positioned the U.S. as a global leader in the field crucial to our national environmental and energy security. With the budget uncertainties and likely reductions we face our leadership position is in jeopardy. The United States cannot back away from scientific research and maintain its enviable position in the world.

Thank you.

Mr. FRELINGHUYSEN. Thank you, Dr. Brinkman. The Office of Science is one of our bill's top priorities and has always been. It drives American innovation, keeping our science and engineering workforce competitive. It leads to tomorrow's jobs in manufacturing and other services. But science, like all programs, must live within flatter declining budgets and that will make the coming years a time of tough choices for your office. We understand that.

I would like to take a minute to talk about both the opportunities and the tradeoffs ahead. The Office of Science supports some remarkable research in everything from fusion science to the world's fastest computers, and you have talked about some of that. Can you briefly walk us through what you see as some of the greatest scientific opportunities at your office over the couple of years, where we are going in the future?

Mr. BRINKMAN. I think in the next few years the very important things will be—one is in the whole materials and chemistry where we have these light sources. I think the X-ray free electron laser is a very unique tool that will lead us to new science. It already is leading us to new science. I think it is a tremendously important activity on our part. To make sure that that is a successful program is really, to me, our top priority.

Of course, I think it is important for us to be a very strong participant in the ITER program. You know, if you look at fusion, fusion has built up over the years a series of machines that have gotten closer and closer, and it really does look that it is possible to get to a sustained plasma, burning plasma as they call it, with ITER. So it seems to me that last step is tremendously important.

I think clean energy is an issue that we desperately need to work on. We have, as many of you know, the thing we call Energy Frontier Research Centers that we created when this administration started. And these research centers have their five-year focus on a very specific project. They bring university people together to work on that project and work on that particular application. And I think it has been a highly successful program and we want to continue that program in the future.

In addition, in the energy world we have two hubs: One is the Fuels from Sunlight hub, which is out in California; and the other one is this new battery hub. And one of the things we are very proud about at the battery hub is that, you know, I think last year I came and talked to you about the fact that we were trying to create what we call tech teams, and these were teams on specific subjects that reached across the organization, the department as a whole, not just science. And, for instance, the team that was interested in batteries, it was the team that devised the FOA for the battery hub. The battery hub is in the Office of Science, but everybody from ARPA–E to the EERE organization, all those organizations contributed to the FOA so that we would cover the full spectrum of what we expected as a department. And I think that is a clear example of something that is very, very successful and is now a real live thing that Argonne National Laboratory is a primary funder of.

Beyond that there are things in the other areas of physics and the other areas of science. One of our issues is to keep a balance. We think clean energy is an extremely important part of our mission, but we also have the mission of worrying about high-energy physics, nuclear physics, and fusion physics. And so we have to try to balance these things and we work hard at that.

Mr. FRELINGHUYSEN. You talked about some of the opportunities and the excitement that accompanies those sort of prospects, but we are meeting a rather stark fiscal reality here and——

Mr. BRINKMAN. Yes, and we spend—we, my staff here and all of our associate directors—we spend a lot of time doing what we call budget scenarios, which we look at 10 years out. And we say, okay, suppose it is 2 percent per year, suppose it is flat, suppose it is more, less, and try to understand what we would do under those scenarios. So we have worked out—I think we probably did five or six of those in the past year to try to understand clearly what the impact would be.

Mr. FRELINGHUYSEN. But as you were doing that work and——

Mr. BRINKMAN. Some things go by the wayside.

Mr. FRELINGHUYSEN [continuing]. These people were dismissive of the fact that we would ever have a sequester. We have one. We are living with it. We are in it.

Mr. BRINKMAN. Right, we are in it.

Mr. FRELINGHUYSEN. I mean, a lot of people—a lot of talk about it not occurring, but in reality——

Mr. BRINKMAN. In reality it has happened.

Mr. FRELINGHUYSEN [continuing]. It has occurred.

Mr. BRINKMAN. It has occurred and we have——

Mr. FRELINGHUYSEN. And so the work that you have done and we commend you for doing it, it is something we charge you with each year, how are we going to——

Mr. BRINKMAN. We have gone through—we have been doing this exercise——

Mr. FRELINGHUYSEN. Well, let us just take the nuclear physics program.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. You know, got a lot of——

Mr. BRINKMAN. We have a lot of problems.

Mr. FRELINGHUYSEN [continuing]. Important projects there.

Mr. BRINKMAN. We have three important projects.

Mr. FRELINGHUYSEN. Yes. Let us talk about the RHIC and what is going on at Thomas Jefferson and——

Mr. BRINKMAN. In that particular case we have three——

Mr. FRELINGHUYSEN. And how you all are going to——

Mr. BRINKMAN. We were trying to pull that together. We believe that RHIC has a lot of good science left to be done. It is not that old a machine. It is 12 years old. You know, normally you run these machines for 20, 25 years, so RHIC is not that old. It is doing a lot of good science right now and so we would like to keep it going. We are certainly—we see that as something we want to do.

The 12 GeV Upgrade at Jefferson Lab is another issue which is just about finished and ready to go, and we are planning on running that. And then we are planning to try to find a way to include FRIB in the program, and we will do that. It is going to go through what is called our CD-2 process, which——

Mr. FRELINGHUYSEN. CD-2 stands for?

Mr. BRINKMAN. I forgot what it stands for.

Mr. FRELINGHUYSEN. Critical decisions.

Mr. BRINKMAN. Critical Decision 2.

Mr. FRELINGHUYSEN. I could have guessed, but for us——

Mr. BRINKMAN. Anyway, it will be.

Mr. FRELINGHUYSEN [continuing]. That stands for Congressional District, CD.

Mr. BRINKMAN. We hope to put that through that critical decision. We believe that Michigan State has done an excellent job of working the plans and the design of the facility. They have worked very hard at it. And Michigan is the state——

Mr. FRELINGHUYSEN. How are you going to do all these things?

Mr. BRINKMAN. We think we could——

Mr. FRELINGHUYSEN. You know, we are aware of what you want to do in Michigan. Obviously there is some keen interest in that state.

Mr. BRINKMAN. Yes. We think that the nuclear physics program, with a small increase, we could do it. Okay. And so we are hopeful——

Mr. FRELINGHUYSEN. So how are you actually going to keep all these programs up and running and then embrace a new one here?

Mr. BRINKMAN. We clearly are not going to keep all the projects up and running. For example, there are two major things that——

Mr. FRELINGHUYSEN. And I have not even gotten into fusion.

Mr. BRINKMAN. Yes, that is a different subject.

Mr. FRELINGHUYSEN. I have a keen interest there. I do not mean to throw them into——

Mr. BRINKMAN. No, but let us talk about some other things——

Mr. FRELINGHUYSEN. Yeah.

Mr. BRINKMAN [continuing]. That we have decided we will not do, and one of them is we have talked about doing what is called the Next-Generation Light Source at Berkeley. And we just pushed that out of the picture. It is not going to happen because we just do not see where we would get the money to do that.

Second, we wanted the Oak Ridge National Laboratory very much. We would like to build a second target station down——

Mr. FRELINGHUYSEN. Do not get him started. He will get his own time.

Mr. BRINKMAN. Okay, I will not.

Mr. FRELINGHUYSEN. What are you throwing red meat out here for?

Mr. BRINKMAN. Anyway, that one is also off of the table as far as we are concerned because we just do not have the money. Those are billion-dollar projects which we just will not be able to afford. So we have those kinds of things.

Mr. FRELINGHUYSEN. So you are working this through what we call a critical decision process here.

Mr. BRINKMAN. We continue all these processes. We work these things. We try to plan these things out in great detail.

Mr. FRELINGHUYSEN. Let me yield to Ms. Kaptur. Excuse me for taking so long. Ms. Kaptur.

Ms. KAPTUR. It is always interesting, Mr. Chairman. Thank you.

Doctor, I noted that the subcommittee in past years had placed a higher priority on American manufacturing. And I am interested in carrying forward those who came before me in this position in supporting that effort. You talked about batteries this morning already. So one of my questions relates to how do our major science facilities support American manufacturing? The President in his State of the Union talked about manufacturing innovation hubs. And I am wondering to what extent you and your Office of Science will be involved in any of that.

And so how do you use your power to help lift America where she is hurting?

Mr. BRINKMAN. Yes.

Ms. KAPTUR. And a related question is as I look at the location of the national labs and the standard of living of the communities around them, obviously the presence of those incredible minds and those resources make a difference. As one walks down the manufacturing path it takes you to places where the standard of living has actually dropped because the United States has lost such edge there. And I am wondering to what extent your research links to those places where there is a heritage of machine tool, of metals technologies when you do not have national labs located there.

So number one, what are you doing on the manufacturing science front? And number two, how are you connecting to places where

national labs may not exist in order to enliven the assets that are there in furtherance of research in manufacturing science?

Mr. BRINKMAN. Well, first of all, we have this whole set of national facilities that we have, our synchrotrons and our electron microscopy facilities, our computing facilities. And we really invite a lot——

Mr. FRELINGHUYSEN. Could you speak up a little louder?

Mr. BRINKMAN. I am sorry.

Mr. FRELINGHUYSEN. Move the mic up, thank you.

Mr. BRINKMAN. We invite a lot of industry to come and use these facilities to help them. General Electric uses our facilities at Brookhaven because they are trying to develop a sodium metal halide battery that would be a commercial battery that they would produce here in the United States. And so we do a lot of that kind of thing.

At the intellectual property level, that is a little more complicated situation. First of all, a lot of our money goes into university grants. Universities control their own intellectual property rights. So we do not have much to say about that. But in the national labs, the situation there is if somebody wants to get a license to some of our intellectual property they have to guarantee U.S. manufacturing. They have to show that some fraction of the manufacturing will be in the U.S. So there is a very definite thing that is important from a U.S. manufacturing point of view.

But we do a lot of things that we try to help industry in this country. And, of course, manufacturing, like the Boeing Dreamliner, is very, very important.

Ms. KAPTUR. But it is diffuse. There is no one sort of tasked with——

Mr. BRINKMAN. I am sorry, no, that is not true. We also have a technology transfer office that——

Ms. KAPTUR. And where is that located, sir?

Mr. BRINKMAN. In——

Ms. KAPTUR. Here.

Mr. BRINKMAN. Down the street.

Mr. FRELINGHUYSEN. A good person running it.

Mr. BRINKMAN. She is very good and she has done a lot of work. She has even created a new way of getting the labs to work with industry and due process, which was simplified. It also gives some advantages, too, in terms of how much money they have to put in. It is called HACT and it is a process whereby the M&O contractors that run the laboratory can actually fund the work at the lab, advance fund the work at the lab, for some companies, but then the company has to pay the M&O contractor back later. And so there is some interesting and complex ways of trying to advance our interaction with industry at our laboratories.

Ms. KAPTUR. Well, I just would urge you to look at the trade accounts of the United States——

Mr. BRINKMAN. Yes.

Ms. KAPTUR [continuing]. And to know how important the manufacturing and obviously energy sectors are to the future of this country domestically.

Could I ask you, Doctor, what specifically is the current status of the MIT fusion facility, which your budget request last year projected to terminate?

Mr. BRINKMAN. Well, we have put it into a static mode. It is not running, but it has not been—we are not taking it apart. We are not firing people. So until this issue is sort of resolved more clearly, we are putting it basically on hold.

Ms. KAPTUR. I would like to urge, Doctor, that the administration not do anything under a continuing resolution that could irreversibly impact any aspects of the fusion program.

Mr. BRINKMAN. We are well aware of that desire on your part and the committee. We hope you help us sort out the issues with the fusion program and get this straightened out because it is—I think, we are in a situation where fusion is getting a double hit. First of all, ITER is ramping up in terms of its costs and, at the same time, we are doing sequestration and things like that. And so we have a very difficult situation there that we need to sort out.

Mr. FRELINGHUYSEN. Absolutely.

Ms. KAPTUR. Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur. Judge Carter has a previous commitment, and we are trying to get him there. And Mr. Fleischmann has kindly agreed to forego his for a minute.

Mr. CARTER. Which I appreciate very much. Thank you, Mr. Chairman. I thank my colleague, Mr. Fleischmann. I have a conflict that I have to go to immediately after this question.

Dr. Brinkman, global competition for the fastest computers, you have mentioned that. It is a program that is important to all of us. America has been a leader—the leader, in fact—in the beginning of this industry. We have dominated the list of the world's fastest computing systems for decades. The Office of Science advanced scientific computing systems used cutting-edge research. Now, China, Europe, and others are competing with us. Can you sum up what the competitive landscape looks like for advanced computing and how the U.S. fits in?

Mr. BRINKMAN. Yes. We, of course, are working very hard to move forward in advanced computing. We have just this past year established the fastest computer in the world at Oak Ridge National Laboratory. And the one at Argonne is just behind it and Livermore was the champion the year before. The year before that, China actually stepped in. We are working with NNSA and even with NSA to try to get a program together that will ensure that we move forward in a cooperative fashion and see to it that the U.S. stays ahead. We are working with both of those organizations. It is very, very important for us to do that.

We think we have a good program and heading towards what is called exascale. There are lots of uncertainties, lots of questions, technological questions that have to be answered before you get there, but I point out to you we are at 20 petaflops as it is called where you are looking at machines that are going to go over 100, and we are trying to prepare for that. Sequestration is going to affect our ability to do that in the sense that we are going to have to delay our power upgrades to these facilities. The next machines are definitely going to take more power.

At the same time, we have to say that one of the issues here is programming machines as complicated as these are getting and so we have to do a lot of software development. And so we are concerned about two aspects: one of them is just staying ahead in terms of how fast you can calculate, but the other one is being able to calculate a broad spectrum of things. And so we want to be able to do both of those. That is very important as we go forward.

Mr. CARTER. Where are our competitors?

Mr. BRINKMAN. China has moved very much into this world by buying Intel chips and things from the United States, but they are now saying that they are going to build their own processor. They have every intention of trying to compete with us.

The EU has put a sizable budget together for them to try to get into the lead. So we have some really severe competition in this area, but that is kind of true of almost all my areas.

Mr. CARTER. You have answered that question pretty well. Not to be changing the subject, but back last year we asked you to send us some information about it. And you said you all are using your analytical tools to determine 10 years out what various bare-budget scenarios might be and we asked you to submit what would you think a flat budget effect would be, and I do not think we have had that submission yet.

Mr. BRINKMAN. On just——

Mr. CARTER. Have you all looked at that?

Mr. BRINKMAN. Well, of course we looked at it. The flat budget is one of those exercises that we do. And we have thought very carefully about what we can do and what we cannot do under a flat budget, let alone less than flat. It is a little trickier.

Mr. FRELINGHUYSEN. The report is still due, though.

Mr. BRINKMAN. The report that is due——

Mr. FRELINGHUYSEN. I think that is what the——

Mr. BRINKMAN [continuing]. Is in concurrence.

Mr. FRELINGHUYSEN. The gentleman from Texas, I think, is——

Mr. BRINKMAN. It is somewhere in concurrence.

Mr. CARTER. Yeah, it would be helpful if we could get that report because——

Mr. BRINKMAN. I understand.

Mr. CARTER [continuing]. We honestly are on your side and we want to try to do everything we can to——

Mr. BRINKMAN. Well, I appreciate it.

Mr. CARTER [continuing]. Look at the scenario and see——

Mr. BRINKMAN. Okay, we will try to get that.

Mr. CARTER [continuing]. What we agree and disagree——

Mr. BRINKMAN. We will try to get it out.

Mr. CARTER [continuing]. With so we can have more conversation.

Mr. BRINKMAN. Okay.

Mr. CARTER. Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. It would help with our critical decisions.

Mr. BRINKMAN. Okay.

Mr. CARTER. Yes.

Mr. BRINKMAN. Thank you.

Mr. FRELINGHUYSEN. Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman. Dr. Brinkman, last year the subcommittee asked yourself and a number of your colleagues about what the department is doing to ensure that research funded by DOE leads to manufacturing in the United States. The answer essentially was if a department lab grants an exclusive or partially exclusive license to a company, then any license patents must be substantially manufactured in the United States.

Mr. BRINKMAN. Right.

Mr. VISCLOSKY. Unless a waiver is granted. There are a number of qualifications in that basic answer that was submitted to this subcommittee.

Mr. BRINKMAN. Yes.

Mr. VISCLOSKY. The first question I would have is it seems as though protections as to encouraging manufacturing in the United States applies for licenses and patents when they are exclusive or partially exclusive. What percentage of all manufacturing that result from research at the science labs are covered by these protections?

Mr. BRINKMAN. I do not think I can answer that question. I really do not know the answer of what percentage, I am sorry. I have stumbled on that one because it is not one that I know the answer to off the top of my head.

Mr. VISCLOSKY. Let me ask you a follow-up question. For how many are covered, how many waivers were granted last year?

Mr. BRINKMAN. I will have to get these answers for you. I do not know the answer to that.

Mr. VISCLOSKY. I would appreciate in detail an answer for the subcommittee.

Mr. BRINKMAN. We will be happy to supply that.

Mr. VISCLOSKY. And the fact that in both instances you were not prepared to answer the question tells me there is not as much emphasis on this as I would like to see coming from this department.

Mr. BRINKMAN. Well, this kind of stuff has been covered by our organization that worries about tech transfer organizations, so I could get this information for you. I just do not have it at the tip of my fingers.

Mr. VISCLOSKY. The research your office supports, it is extremely important, and I do understand that over the last year the Office of Science has held workshops for materials for energy research, modeling and simulation, cybersecurity, and batteries in order to bring representatives from the department, labs, and industry together to collaborate, apparently to, again, ensure that this technology is transferred to the private sector in the United States. Can you provide us with any concrete examples of success of these four workshops? Concrete examples?

Mr. BRINKMAN. Well, that is an interesting word. I think what has happened there is one of the things that happened is in the computer area. Oak Ridge National Laboratory now has something like 15 different companies that it is working with.

Mr. VISCLOSKY. Can you speak up, Dr. Brinkman?

Mr. BRINKMAN. I am sorry. The Oak Ridge Lab has something like 15 different companies that are there using our high-performance computing. One of the workshops you are referring to was on

high-performance computing and we have very much increased the interaction with industry on that.

Mr. VISCLOSKY. Were they there before the workshop or after the workshop?

Mr. BRINKMAN. Probably half and half would be my guess. It is somewhere in that region, but it has increased in the last year or so.

Mr. VISCLOSKY. And so the other half that showed up after the workshops, you would imply that they would not have been participating and the technology would not have been transferred absent the workshops?

Mr. BRINKMAN. You know, you never know, right? You do not know because, they may have gone and may go right on and find out about this stuff on their own. And so I do not know the answer to that, how many of them would use that particular workshop. That is a hard question to answer.

Mr. VISCLOSKY. Could I just ask any specific actions you have taken, meetings to encourage—I do not get a sense of urgency here.

Mr. BRINKMAN. Well——

Mr. VISCLOSKY. It is taxpayers' dollars——

Mr. BRINKMAN. No, no, no, I——

Mr. VISCLOSKY [continuing]. That we are using here.

Mr. BRINKMAN. I think we have had a lot of meetings that have been directed towards tech transfer. I mean, those four meetings/workshops you are talking about all happened within the past year.

Mr. VISCLOSKY. For the record, I assume you all have concrete examples of transfers that have happened and jobs created.

Mr. BRINKMAN. The most famous one is the battery that goes into the Volt. The cathode material for that battery was explicitly invented at Argonne National Laboratory,

Mr. VISCLOSKY. Right.

Mr. BRINKMAN. And that is one of the examples. For example, one we——

Mr. VISCLOSKY. But that happened before the workshops——

Mr. BRINKMAN. That happened before the workshops.

Mr. VISCLOSKY. That happened before the workshops.

Mr. BRINKMAN. Absolutely.

Mr. VISCLOSKY. So that is not an example from the workshops.

Mr. BRINKMAN. Oh, no, and you cannot——

Mr. VISCLOSKY. I am looking for examples from the workshops.

Mr. BRINKMAN. You have to be a little careful here because some of these things take 10 years before they get into a product.

Mr. VISCLOSKY. That is why we need a sense of urgency.

Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. I share the gentleman's concern. I have some questions later about——

Mr. BRINKMAN. Okay.

Mr. FRELINGHUYSEN [continuing]. Unauthorized transfers of information.

Mr. BRINKMAN. Okay.

Mr. FRELINGHUYSEN. People stealing our intellectual property. That is another issue, but I just want you to know we need this——

Mr. BRINKMAN. Yeah, yeah.

Mr. FRELINGHUYSEN [continuing]. Both Ms. Kaptur and Mr. Visclosky's questions answered, I think, more thoroughly.

Mr. BRINKMAN. We can give you answers with more detail.

Mr. FRELINGHUYSEN. Please. Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman. Dr. Brinkman, good to see you this morning, sir.

Mr. BRINKMAN. Thank you.

Mr. FLEISCHMANN. I think probably my first conversation once I was elected to Congress with a DOE employee was with you, and I appreciate that, sir, very much and appreciate your work. Congratulations on making the Titan the number one supercomputer in the world.

Mr. BRINKMAN. Thank you.

Mr. FLEISCHMANN. I applaud those efforts and successes.

Judge had asked you some questions, Dr. Brinkman, and I just wanted to get a little bit more specific. I understand that we are number one and I understand that the rest of the world is moving forward. It is my understanding that China is currently building a 30- and 100-petaflop system. What is the status, the best that you can tell us, of our Nation's supercomputing plans not only to maintain cybersecurity and American competitiveness, but to reach exascale and beyond, sir?

Mr. BRINKMAN. Well, what we have is a plan which involves various stages. And right now we are at the stage in which we are looking at co-designs of—what that means is that we are looking at how it is that these future computers, how they will be used for specific applications. And so we have put together a team that has computer scientists and mathematicians and the people who are interested in a specific subject area, like fluid dynamics or materials. And we get those together and they look at how it is that you are going to make a machine, a kind of machine we are talking about, do that problem, their kinds of problems. So we have got that kind of thing going.

We have small grants to industry now that are designed to try to address some of the critical issues that industry has in moving this whole thing forward.

Mr. FLEISCHMANN. Okay. Thank you, Doctor. As you know, I am a strong advocate of environmental management to clean up our nuclear legacy and I think as are you. While the Office of Environmental Management is responsible for the disposal of these materials and cleanup, I would like to talk specifically about building 3019 at ORNL.

Mr. BRINKMAN. Who would have guessed?

Mr. FLEISCHMANN. Yes, sir. The security at that site, I believe, falls to your office. I have got a two-part question, sir. What steps has the Office of Science taken to better secure 3019? And then, even more specifically, this building will need to be secured as long as the U233 and other materials remain on site. How much is the Office of Science expecting to spend to secure Building 3019 until the sensitive material can be moved out?

Mr. BRINKMAN. Yes. Let me first say that over the past year and a half or so we had one of our people from Oak Ridge National Laboratory go on assignment to EM and to rethink through how we

would dispose of the uranium 233 that is in this building 3019. We came up with a totally new approach to that. And, in fact, what has happened is the most dangerous material that was there was metallic uranium

233. That we have moved out and moved over to the weapons program. In addition, there is uranium 233 in vitreous glass and we are going to be starting to ship that to Nevada to be buried, and we will get rid of that.

The first action is finished. The second action will be finished in the next year and a half. We will bring down the amount of uranium 233 in 3019 by 50 percent. So we are making a big step forward there.

The third part of this material in that building is uranium oxide powder. And what needs to be done there, it needs to be processed and diluted and then disposed of, and we would like to start that process. And we can do it in the building right next door without building a new facility. We absolutely do not have to spend a half a billion dollars on a facility for this. And we can then, if we can get enough money in the EM budget, they will do this process and in a few years we could be out of that building as far as uranium 233. That is what I would like to see happen. I hope that some way or another EM will find the money to do that.

Finally, I should say that we are responsible for the guards, the security of the building, and it costs us around $5 million a year to do that. After the incident at Y12 we did a thorough analysis. We had three or four different teams, some from HSS and some that we appointed, that have gone and looked at our security and, frankly, we found some defects in the way we do things.

We then found that the management structure was not as clean as it could be and that we needed to straighten that out. And we also found that we had some alarm problems that we should not have, namely the alarm on the roof was sensing birds and every time a bird landed on the roof, the alarm went off. So that kind of stuff we are fixing.

And we are also fixing the management and we will have a new contract for the security guards in force in the next few weeks. And so we have done a lot to see to it that the security is good and we also think we have done a lot to help mediate the problem in general, but we have got this last hurdle to get over.

Mr. FLEISCHMANN. Thank you. Mr. Chairman, how is my time, sir?

Mr. FRELINGHUYSEN. Your time is over, okay? For the time being. So much enthusiasm from Oak Ridge. It is difficult to control. As a matter of fact, one of your lab directors came in to see me the other day, along with somebody from Lawrence, Berkeley, and Argonne as well, of course talking about a lot of exciting things that are happening in science.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. Of course, we are excited that you are here. We are excited about a lot of the work that is being done, but the reality is——

Mr. BRINKMAN. You know, I am excited about those three directors. They are very good.

Mr. FRELINGHUYSEN. They are, but they are taking some steps relative to sequestration.

Mr. BRINKMAN. Oh, yes.

Mr. FRELINGHUYSEN. They were telling me about that and they have plans——

Mr. BRINKMAN. Sure.

Mr. FRELINGHUYSEN [continuing]. To shut down early, you know, facilities, so I want you talk about that——

Mr. BRINKMAN. Okay.

Mr. FRELINGHUYSEN [continuing]. What they are doing. What are you doing?

Mr. BRINKMAN. Yes. We have been working with all of the laboratories to understand the consequences of sequestration for each laboratory. We have a plan for each laboratory at this stage.

Mr. FRELINGHUYSEN. So you have been working obviously considering the impact of the continuing resolution and sequestration.

Mr. BRINKMAN. Right.

Mr. FRELINGHUYSEN. And how long have you been working on that?

Mr. BRINKMAN. For the last three weeks, maybe four weeks. For a long time we were told not to worry about this.

Mr. FRELINGHUYSEN. You need to worry.

Mr. BRINKMAN. We are definitely worried now.

Mr. FRELINGHUYSEN. Yes.

Mr. BRINKMAN. And so we have been working for the last several weeks on this and we think we have it pretty well itemized. A lot, I have to repeat, depends on us being able to get the anomalies through in reprogramming so that we can optimize the funding among the different activities. The simplest example of that is the situation where——

Mr. FRELINGHUYSEN. Yeah, we are going to wait to see your reprogramming.

Mr. BRINKMAN. Pardon?

Mr. FRELINGHUYSEN. We are going to wait to see your reprogramming. So do you agree with what they are doing? And would you be doing something different?

Mr. BRINKMAN. These are my people.

Mr. FRELINGHUYSEN. I know that.

Mr. BRINKMAN. I agree with what they are doing, yes.

Mr. FRELINGHUYSEN. So you do agree? Will any of the facilities be turned off for part of the year?

Mr. BRINKMAN. Yes, clearly some of them——

Mr. FRELINGHUYSEN. And will some be on standby or some potentially be shuttered, and which ones are at risk?

Mr. BRINKMAN. Well, you know one already. The Alcator C is going to be on standby.

Mr. FRELINGHUYSEN. So, what you have to say——

Mr. BRINKMAN. Alcator C will be on.

Mr. FRELINGHUYSEN. All right, MIT.

Mr. BRINKMAN. MIT. But the other one, the RHIC facility will not be run the full amount of time that it was to be run, so that is a reduction. Now, I do not know if I can cite many others. Am I missing one that I should cite?

Mr. FRELINGHUYSEN. She is transcribing something, so whatever it is, we will look at it after.

Mr. BRINKMAN. He will figure it out.

Mr. FRELINGHUYSEN. How about furloughs here? We are talking about jobs.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. And we are talking about people who are dedicated to work and we need to talk about the impact on them.

Mr. BRINKMAN. It appears that there will definitely be furloughs at a number of the laboratories. Well, in fact, Fermilab is even talking about having a furlough of the entire laboratory for a week or so.

Mr. FRELINGHUYSEN. So how many jobs are we talking about here that are at risk?

Mr. BRINKMAN. Well, that is huge. I mean, as far as furloughs are concerned that is a very large number. I mean, 1,700 people right there, one laboratory. But mostly, I think, at this stage, most of the discussion is around furloughs and not so much actually decreasing the number of people onsite, so we will see how that works out.

Mr. FRELINGHUYSEN. So you will provide the committee with some numbers?

Mr. BRINKMAN. Oh, absolutely. We have even got those numbers. They are coming.

Mr. FRELINGHUYSEN. I know you are good at numbers, so somebody must have those numbers.

Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman. In these tight budget times, Doctor, I am looking over the priority areas that you have identified: Basic energy sciences, advanced scientific computing, biological environmental research, fusion energy, high-energy physics, and nuclear physics is your top. Those priorities are provided to you by whom?

Mr. BRINKMAN. Those are not actually priorities in some sense. They are the different components of our organizational structure. We have these six in our programmatic side. The programs are divided up into those six buckets and so, in some sense, they do not represent our priorities, per se. They represent how we managed the science. The science of high-energy physics and the science of nuclear physics are very different. The science of material science and chemistry is very different from nuclear physics or particle physics. So we break it up into these categories and so they do not actually represent priorities.

Now, over that, of course, is something like energy priorities, right? And our energy research is primarily in basic energy sciences, biological and environmental sciences, and computing. So, from an energy point of view, I think of those three as being our primarily important organizations. But from a basic science point of view, of course, particle physics is the premier basic science type organization. And so we have this continuous debate about balancing between these things. And right now the Secretary—and I believe that we have been very enthusiastic by pushing the energy side of the house to the sacrifice of the other three. And we feel

that we may have gone a little too far in that direction and so we are trying to redress that some.

But there is no question in my mind that in the long run what we are interested in, you know, besides the basic science, we have to be focused on energy.

Ms. KAPTUR. Well, if you look at our trade accounts it is pretty clear that that is a well-placed priority.

Mr. BRINKMAN. Thank you.

Ms. KAPTUR. And you look at where our military is deployed, I think it is a pretty well-placed priority on the energy side.

But I wanted to ask you, on the energy piece, as hard as we have tried to develop new products—take solar for one. With what has happened to the marketplace because of the Chinese, we have many companies that are right at the edge or they folded. I am wondering, if your office could do anything to help save the intellectual property associated with these companies. As the market globally adjusts to the overproduction by the Chinese, thus creating an oversupply situation where many of these startup companies that are spread across our nation, some in Ohio as well——

Mr. BRINKMAN. Yes.

Ms. KAPTUR [continuing]. Are facing very difficult economic times, and my concern goes to the technology. Some of the technologies may not have been as ripe as others, yet they were on a path to helping us forward. And the per kilowatt cost of production kept going down, down, down, down until the oversupply situation occurred. For the sake of our country, is there anything you as an Office of Science are doing with these companies across the country, I do not know all of their names, but to help push the technology further, so we do not lose the intellectual property? Because the commercial marketplace has been severely impacted by what the Chinese have done.

Mr. BRINKMAN. We as a science organization are not in such a great position to actually do the kind of thing you are talking about. You are really talking about how to play in the market, and that sort of thing. The thing that we do is look for new things, new inventions that might impact the market.

For instance, in the past year, our EFRCs that I mentioned earlier—the Energy Frontier Research Centers—have invented totally new types of photocells, solar cells, that we think might have a chance. They are very, very different, but they use a lot less silicon than the normal photocell and so we think they could potentially be cheaper. Small companies have been started up because of those inventions, and so we are trying in that sense. And, you know, if you go over into EERE or someplace like that, that is a different story. They are interested in these markets.

But, you know, there was a total misjudgment of the size of this older market by the Chinese, is what happened here. And they have completely overbuilt and that really hurt.

Ms. KAPTUR. I hear what you are saying, Doctor, but my concern is that many of these startup companies have intellectual property. Is it the most efficient and the most advanced that it could be? I have no way of knowing. I just know that I have seen with my own eyes technologies that I think, oh, would that benefit from more science? Because when you are a smaller company, you do not have

all of this money to invest in research, but as a country we should not be losing all of that incredible effort that has been put forward. And so my question is, you are saying the answer would be for those places to go to EERE, but EERE does not do the research, so whether we have the technology——

Mr. BRINKMAN. No, but we do the research. I just gave you a couple examples of the kind of research we do. We invent new things.

Ms. KAPTUR. Right.

Mr. BRINKMAN. But, in the end, we cannot determine the market for these things.

Ms. KAPTUR. No, no, no, not the market, but what if you have a technology that could be pushed further to advance it even more? To ripen it even more? Are you involved with that?

Mr. BRINKMAN. We are. For example, I think it is in your state, there was First Solar and First Solar had a very different solar cell than the silicon solar cell.

Ms. KAPTUR. Yes.

Mr. BRINKMAN. And there was a fundamental problem that has made those solar cells not as efficient as they should be. We tried, but, you know, sometimes fundamental problems do not yield and we were never able to find a way around this specific problem. And I believe what is happening at First Solar is that they are basically becoming an installation company and not a solar cell manufacturer is what is happening at this stage because the silicon is just getting too cheap.

Ms. KAPTUR. And there are other companies. So the question there is, you know, are there scientific hurdles that could be met? And I will do follow-up questions on that.

Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. We have made substantial investments.

Mr. BRINKMAN. Oh, yeah, sure.

Mr. FRELINGHUYSEN. Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman. Dr. Brinkman, on the Energy Frontier Research Centers, we are in the fifth of five years of funding. What do you see as the future of the centers?

Mr. BRINKMAN. Well, first of all, you should understand the way those were funded. Fifteen or sixteen of those Energy Frontier Research Centers were funded with ARRA money and then the other 30 were funded out of——

Mr. VISCLOSKY. Stimulus.

Mr. BRINKMAN. Pardon?

Mr. VISCLOSKY. With the stimulus bill.

Mr. BRINKMAN. Yes, with the stimulus money and the other 30 were funded out of regular budgets. And so we have about $100 million a year going into this program, but it is not going to fund 46 of them going forward. And so we have already had one very in-depth review of all of them. Very, very strong review. We have bucketed the quality of each one of them, so we have a rating for each of the 46 EFRCs. And so when we get close to the five-year thing we will undoubtedly introduce an FOA and get new proposals, so that we cannot just look at the 46 we have, but look at possible new ones. But the total number will surely go down from 46.

Mr. VISCLOSKY. In talking about the review, is that the review that indicated that about 75 percent of them were excellent or very good?

Mr. BRINKMAN. Yes.

Mr. VISCLOSKY. And then, on the assumption of what you are saying that they will be renewed, but that you would also then have an open competition?

Mr. BRINKMAN. Yes, we have to have some kind of a competition since we are going to be down to 25 or 30 rather than 46, first of all. And then we also would like to make sure that if there is some really good new ideas, that we could put them into the pot. So we have to be able to, you know, make that judgment across the board.

Mr. VISCLOSKY. Would those that were not rated as highly be able to compete again?

Mr. BRINKMAN. Depends whether they have changed their ratings since the last review. I mean, if they do not rate that highly, they could presumably in the next review.

Mr. FRELINGHUYSEN. Could you move the microphone a little closer to your mouth.

Mr. BRINKMAN. I am sorry. It depends how they do in the review. I mean, they certainly, I would think, would be eligible to send in a proposal.

Mr. VISCLOSKY. Would the competition be based on subject areas of research that we need to have done? Or would they be competitions based on research currently taking place in the various centers? The world is different today than it was five years ago.

Mr. BRINKMAN. Pardon?

Mr. VISCLOSKY. The world is different today than it was five years ago.

Mr. BRINKMAN. They write new proposals. So there would be some new proposals, there will be some that want to say, hey, we have got these ideas and we have done this much and we would like to take it for another five years. So there is going to be all different kinds of proposals, I would presume.

Mr. VISCLOSKY. How does the center stack up generally against other research departments? Is it worth keeping any of them?

Mr. BRINKMAN. I think it stacks up well. And I think, based upon what my experience with the EFRCs is that when I talk to university people, they like the fact that they have these applied goals, that it gives them something to drive toward. It gives them more of a focus in their research than they have had in the past, so they have actually liked it. And so I have been impressed by that fact that they feel that way and so it has a positive impact, I hope.

Mr. VISCLOSKY. And you think they would still have independent value?

Mr. BRINKMAN. Value? I hope so. Why would they not.

Mr. VISCLOSKY. Vis-a-vis other laboratories, other research taking place. But what you are saying is, you are looking to continue the centers with a competition and a smaller number given the fact that we have got financial constraints?

Mr. BRINKMAN. Right.

Mr. VISCLOSKY. Thank you very much, Mr. Chairman.

Mr. FRELINGHUYSEN. Financial constraints, somewhat the theme of our hearing.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. And how you are going to operate in that environment?

Mr. BRINKMAN. Well, there is an example of where we are clearly not going to stay at the same level we were.

Mr. FRELINGHUYSEN. That is why we need to question you vigorously. Mr. Fleischmann.

Mr. FLEISCHMANN. Thank you, Mr. Chairman. Dr. Brinkman, I have a couple of questions. How would you assess the state of neutron facilities internationally and where do U.S. facilities, like HFIR and the SNS at ORNL, fit into the global picture, sir?

Mr. BRINKMAN. Well, let me see. SNS is the highest intensity pulse neutron source in the world, okay? The only competitor at this stage, I believe, is in England and it is not nearly as intense. However, there is a proposal to build and there is, I believe, starting construction on a Spallation Neutron Source in Sweden, which will be very comparable to the SNS.

Now, from the point of view of reactors, certainly HFIR is a high-flux reactor. It is very, very useful. It is compared to, say, the reactor in Grenoble—the reactor in Grenoble was specifically built to do neutron scattering, and so it is more accessible, more useful, from the neutron scattering point of view than HFIR. And so I would say it is a somewhat better machine for neutron scattering than HFIR. And HFIR was not really built for the purpose that we are using it today.

And the other spallation source that is used is at the Lujan Center out at Los Alamos. That is another spallation source, but it is not nearly as intense as it is at Oak Ridge.

Mr. FLEISCHMANN. Well, as a follow-up question to that then, Doctor, what do we need to do as a Nation in your view to ensure that our neutron facilities remain at the cutting edge and that U.S. remains at the forefront of neutron scattering research? And how will our Nation benefit from these facilities in that research, sir?

Mr. BRINKMAN. Well, my view on that is that eventually we will need to build those second target stations that I talked about earlier. We need to put that on SNS. And in the process we will undoubtedly want to close down those facilities that are not at the top of scale and that that is something that we will have to work out.

Reactors rather than spallation sources have very different characteristics. A reactor gives you a much higher total flux and you can, therefore, do exposures of isotopes. And so you can make isotopes, like Californium, which is made at the HFIR Oak Ridge lab. That isotope is a very tricky isotope to make because it requires lots of neutron bombardment, and so there are reasons why HFIR is a good reactor for that, but that does not nearly support the cost of that reactor.

Mr. FLEISCHMANN. Thank you, Doctor. Mr. Chairman, I yield back.

Mr. FRELINGHUYSEN. While Mr. Simpson is fortifying himself with a doughnut, I will proceed to focus on an area where I have traditionally done: Fusion.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. And you know as well as anyone that we have sought to strike a balance between ITER, the international

program, and our domestic program and others. Striking a balance between those goals as well as obviously other priorities in your office has not been easy. But both domestic fusion and ITER are important. We must participate in ITER for our domestic fusion program to be relevant and our domestic program must be strong to support ITER and to allow our scientists to take advantage of ITER once it is brought online.

Unfortunately, the fiscal year 2014 request shows a balance that, while funding ITER, would actually risk it by sacrificing our own domestic program and that, to many of us, was not a workable balance. How are you currently envisioning the balance between these two fronts and would you give us your view as to where these programs, certainly domestically, are located in a number of parts of the country, but how are we progressing with ITER? And how would you measure our progress domestically?

Mr. BRINKMAN. Let us address ITER first. ITER has really been moving forward rapidly now. If you go to Cadarache, France——

Mr. FRELINGHUYSEN. For the committee, I think many of the members are familiar, can you sort of give us a breakdown what our percentage is, what our contribution is, and where we stand relative to other countries?

Mr. BRINKMAN. ITER is being done by seven countries. There is the European Union, not exactly a country, but it is one of the entities; there is the United States; there is India; Japan; South Korea; Russia; and China, besides us and Europe. And the structure is, since it is in Europe, 45 percent of the construction cost is being born by the European Union while each of the rest of us 6 get basically 9 percent of the cost. And so that is the way it adds up, that we have to put up 9 percent of the cost.

Now, what has happened in the last few years is it has really been accelerated and moving forward as a construction project. And it is now getting into the phase where really big things are happening. We have made progress that we really feel quite good about on our specific things.

One of the two big items that we, as a country, need to supply is—one is what is called the central solenoid magnet. It is a very complex magnet. It is probably one of the highest field magnets ever built. It is 16 Tesla, and we are very much involved with the Japanese who are going to be supplying the wiring for that magnet. And we have made, between us and the Japanese, a lot of progress in the past year of making sure that that wire will work. So we are pleased with what has happened there.

So, this whole thing is moving forward and the construction——

Mr. FRELINGHUYSEN. On the issue of balance here——

Mr. BRINKMAN. If you look at the balance it seems to me that we do need the balance. We need to make sure we have a domestic program that will eventually be able to take advantage of this.

Mr. FRELINGHUYSEN. Well, how do you currently envision the balance between——

Mr. BRINKMAN. I think we need a stronger domestic program than we currently have frankly. I mean, my opinion—this is my opinion now and not the administration opinion.

Mr. FRELINGHUYSEN. Well, you are at the table.

Mr. BRINKMAN. I understand that.

Mr. FRELINGHUYSEN. Your opinion has weight here.

Mr. BRINKMAN. Anyway, I think we need a stronger program.

Mr. FRELINGHUYSEN. And how do we get a stronger program if it appears that either we are tipping the balance towards——

Mr. BRINKMAN. There are lots of things we can do. There are many things. We need to make sure that DIII–D atomic physics continues to run. It is doing some of the best work in terms of understanding how either will work. We need to——

Mr. FRELINGHUYSEN. There is a feeling here that——

Mr. BRINKMAN [continuing]. Princeton—but I have to be careful because——

Mr. FRELINGHUYSEN. You do not have to be careful at all. You actually have a new boss, do you not?

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. Dr. Moniz is going to be your boss, one of your friends and colleagues; is that right?

Mr. BRINKMAN. That is right. We know Ernie. So, but with respect to Princeton Plasma Physics Lab, I cannot say much because I am currently talking to Princeton.

Mr. FRELINGHUYSEN. Well, keep talking to them. We will be supportive of, obviously, we need to do more on the domestic front and I think sometimes, with all due respect to this international collaboration, that we do not give enough credit for a lot of the work that goes into the domestic program that contributes to the overall goals that we all seek.

Mr. BRINKMAN. Okay. I agree.

Mr. FRELINGHUYSEN. Good. Mr. Simpson is ready for battle.

Mr. SIMPSON. I do not know about battle.

Mr. FRELINGHUYSEN. I do not know.

Mr. SIMPSON. Princeton, is that one of those four-year schools?

Mr. FRELINGHUYSEN. All right.

Mr. SIMPSON. Just curious. Like Boise State?

Mr. FRELINGHUYSEN. Okay.

Mr. SIMPSON. I missed the first part of this because I was over at the Labor H Subcommittee, and in all honesty, they do not do half the job our staff does with providing the nutrition that is necessary for one of these hearings.

Mr. FRELINGHUYSEN. I like your tie today. It is explicitly Irish.

Mr. SIMPSON. It is Princeton purple.

Secretary Brinkman, in 2011, the DOE signed an agreement with the Chinese Academy of Science to conduct joint research. Can you tell me the status of this collaboration?

Mr. BRINKMAN. Yes. We have regular meetings, an exchange, and we have done a number of things with the Chinese. For example, this past year one of the really important experiments in particle physics was done at a place called Daya Bay and we worked with them to do that experiment. It resulted in new information about the nature of neutrinos. That was a very important thing. And we work with them in physics and plasma and fusion physics. We have had extensive interactions over what they called the East Tokamak that they have outside of Shanghai a ways and that facility very much was something that we had a lot to do with the design, and we even provided the operating system because it is essentially the

same as what is on DIII–D. And so we have done a lot of different things with the Chinese in science over the last years.

Now, we are looking for ways to cooperate in what is called our basic energy sciences and materials and chemistry, and they are moving very rapidly, building light sources like ours. But we also have changed attitudes some towards—on the whole interaction with China. Historically, we have been involved with China since the era of Deng. And after Mao died and Deng took over, one of our scientists of Chinese orientation went to Deng and said, look, how can we help? And that created an era in which we, in particle physics and other various research, tried to help China get started. Well, in the last year or so we said, wait a minute. China does not look like a third world country to us anymore, and maybe we better start thinking about how we get a quid pro quo for what is going on.

So we have been working hard to try to see to it that in our interactions with them now we get as much as we give. And that is a different attitude, and it is one that we are trying to nurture and try to be careful about. We think there are a lot of things we can do together, and we are talking with them about the domestic issues of effusion, and we are talking with China about doing things that would make a difference in that area. And so there are those kinds of things.

Mr. SIMPSON. So you would say the relationship is going well?

Mr. BRINKMAN. Pardon?

Mr. SIMPSON. You would say the relationship, collaborative effort is going well?

Mr. BRINKMAN. I think it is in a different mode.

Mr. SIMPSON. Yeah. Secretary Brinkman, as you know, there have been some difficulties associated with the production of Cobalt-60 at the ATR since the Office of Science took over the contracting authority. However, I understand that the Isotope Business Office has recently taken a more flexible approach to its contracting responsibilities, allowing customers to work directly with the INL rather than acting as a gatekeeper. I want to commend you and the Office of Science for taking this approach. Once Cobalt-60 production is restored, can we expect this operational flexibility to continue under the normal operations?

Mr. BRINKMAN. I would think so. We have been working very closely with the nuclear physics part of our office, as they manage this DOE isotope program. It is their responsibility to seeing to it that isotopes are delivered to industry, and we are trying to make these things as efficient as possible. And the particular isotope, Cobalt-60 comes out of Idaho and that is where they work from, so we assume we can establish a direct relationship, on R&D, as you described.

Mr. SIMPSON. One other question. The DOE has been encouraged to conduct a quadrennial energy review by a number of sources, and after a technology review is completed we were told the DOE would do a QER in President Obama's second term. In order to appropriate money smartly, this Committee would like to see a thoughtful plan that lasts beyond the current political appointees at DOE. Is DOE planning to do a quadrennial energy review?

Mr. BRINKMAN. I do not know about that. That is something that Ernie will have to decide, I guess, because I do not know.

We, in the Office of Science, have taken our own initiative and what we are doing is we are trying to put a plan together for our facilities for the next 10 years. And what we are doing is we have already gotten all of our FACA committees to start looking at what they feel their field will need in the next 10 years and report back to us. In fact, they are supposed to report back to us fairly soon. And we are hoping by the next fall we will have a new list of what our priorities are from the point of view of facilities across all six of our fields. So we are working at that but that is not department-wide.

Mr. SIMPSON. We will reserve the question for Dr. Moniz when he gets confirmed.

Mr. BRINKMAN. He is enthusiastic for those kinds of studies.

Mr. FRELINGHUYSEN. He is very enthusiastic.

Mr. SIMPSON. Thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. We look forward to hearing from him. Ms. Kaptur.

Ms. KAPTUR. Thank you, Mr. Chairman.

Doctor, I wanted to go back and ask on the solar energy question, is there anyone within your jurisdiction who would be able to provide an array of global technologies in the solar area talking about their energy efficiency and scientific hurdles that each of them might have to surmount in order to advance the science? So, for example, if I want to look at Chinese production, French production, German production, American production, in terms of the science and scientific hurdles, is there someone at DOE under your jurisdiction who has this knowledge?

Mr. BRINKMAN. I am sure there is. Our program managers that manage the EFRCs or even manage the materials programs would be able to do that.

Ms. KAPTUR. I would appreciate a chart going through all these different technologies.

Mr. BRINKMAN. We certainly could do that.

Ms. KAPTUR. Their production per square foot or however you measure it. And then unmet scientific hurdles for these various technologies.

Mr. BRINKMAN. Those kind of analyses are done more by EERE than we are but I can see to it that you get that.

Ms. KAPTUR. All right. Because one of the questions I have in my mind is do we need more science, and where, in that industry.

Mr. BRINKMAN. Let me get that for you.

Ms. KAPTUR. All right. I ask the same on bio refineries. This brings me to my next question, and that is many countries have a central clearing house for scientific research. And based on some of the other committees that I have served on in the Congress, we do lots of research, whether it is the National Science Foundation, if it is DARPA, or War and Tank Command. Let us say if you are into defense and into propulsion systems, NASA does propulsion system research. NASA even does energy research. So my question is as you—we seem to be set up by department and you obviously are a major player in all of this. How does the Department of Energy's Office of Science interact and collaborate with researchers

across our government so there is no duplication, so that your mission is clear, or is it likely that there is overlap in these tight budget times that we could look at? Do we need more vigor in terms of collaborative research?

Mr. BRINKMAN. Well, I do not know that there is a grand scheme for everything that you are talking about here but let me give you one example. One example which I think we have done pretty well at is in the climate world. There is a cross-agency group which's name I will get wrong because it is a complicated acronym.

Ms. KLAUSING. USGCRP.

Mr. BRINKMAN. USGCRP.

Ms. KLAUSING. U.S. Global Climate Research Program.

Mr. FRELINGHUYSEN. Could you just repeat it for the record? What was it again?

Ms. KLAUSING. USGCRP.

Mr. FRELINGHUYSEN. GCRP.

Ms. KLAUSING. Global Climate Research Program.

Mr. FRELINGHUYSEN. Okay. We got that down. Thank you.

Mr. BRINKMAN. So our people who run our part of the climate program are very much involved in this group, and this group monitors all across the government what is going on in climate because climate is an area where there is a lot of different organizations involved, a lot of different types of talent are needed. We supply certain kinds of things. We have our national laboratories with our super computers and we have our people who are very good at that. And we write a lot of programs that contribute to the climate modeling. And we also do investigations of clouds and aerosols. But all of that is brought together at this level of this Committee for that particular case.

Ms. KAPTUR. Well, that sounds pretty good to me.

Mr. BRINKMAN. I think it is pretty good.

Ms. KAPTUR. In that arena. If I look at others, let us just go back to energy. I know NASA Glenn Research is doing work on the solar arrays that go out into outer space. We have got DARPA and others at DoD working on solar production for in-theater use. You are doing that, but there appears to be no coordinated effort across the government. If I look at metals research, for example, I am aware of research in titanium. I am very interested in strategic metals and what is happening on that front, and I see Picatinny Arsenal involved with work dealing with continuously cast titanium, for example, where we have not met the scientific threshold in order to do it well. I ask myself, hmm, is that going on anywhere else in the government? The lack of coordination in some of these areas is a concern of mine.

Mr. BRINKMAN. You want to be a little bit careful because each one of these different organizations, for example, in the energy world as you were talking about, and in solar, in particular, each one of these organizations have a very different application that they want to satisfy. NASA wants to put solar cells in space where they can generate power for their satellites. And frankly, that solar cell is not a commercial solar cell; it is a different material than is a regular solar cell. So it is not a solar cell that we would try to put on earth. And so their application is different. They work it for their purpose and that is fine. It is also true that I think the

Army is interested in solar cells that you can strap on the back of a soldier. That is a different application.

Ms. KAPTUR. And they are interested in battery technologies, and you are interested in battery technologies. So would not a logical question be is there an interagency battery consortium?

Mr. BRINKMAN. I do not know that there is.

Ms. KAPTUR. As you are doing with climate change?

Mr. BRINKMAN. I do not know that there is on batteries. But again, battery applications can be very different for each group. The difference between the Boeing Dreamliner and the electric vehicle are very different applications of batteries and what is needed for the Boeing airplane is different from what we put in our electric vehicles today. Thank goodness.

Ms. KAPTUR. I will have some follow-up questions for the record there. And I thank you, Mr. Chairman.

Mr. FRELINGHUYSEN. Okay. Thank you, Ms. Kaptur.

Mr. Visclosky.

Mr. VISCLOSKY. Thank you, Mr. Chairman.

On the hubs, Dr. Brinkman, there is a battery and energy storage hub in the Office of Science. It was first funded in Fiscal Year 2012 and was awarded to Argonne National Laboratory. The battery hubs, as I understand it, involve four other national labs, five universities, and four companies. The question I have is hub is singular and we were going to have these centers of excellence. We now have 14 entities involved in one hub. How are the monies distributed and the work coordinated to represent a single thrust in achievement of a single goal?

Mr. BRINKMAN. That is right. The hub—the job of the hub management is to establish a set of goals fairly narrowly defined. In the case of battery hub, they are looking to try to invent the next generation of batteries. We have lithium ion batteries of all sorts, and they are looking to go beyond that. And they have this grand goal of a factor of five less weight, a factor of five more efficient, and a factor of five less cost. They have that kind of goal.

Mr. VISCLOSKY. On the goal, what is their goal, what is their timeframe for the goal?

Mr. BRINKMAN. Well, it is a five-year program, and hopefully it gets aware of the goal at the end of five years.

Mr. VISCLOSKY. Are there milestones between now and 2017 that we can mark their progress or lack thereof?

Mr. BRINKMAN. Oh, yes. There will be marks.

Mr. VISCLOSKY. But there are not today?

Mr. BRINKMAN. Well, they have not worked that out yet. I do not have anybody here that can tell me the answer to that question but there surely are going to be goals, and we will be measuring them against their goals.

Mr. VISCLOSKY. Do you know how much money is dedicated to that particular hub and its goals?

Mr. BRINKMAN. Well, the hubs typically are around 20 million a year—$20 to $25 million a year and at five years.

Mr. VISCLOSKY. And that would be distributed among all the 14——

Mr. BRINKMAN. The important thing is we want strong leadership in hubs which will decide on the goals and then fund the various organizations.

Mr. VISCLOSKY. Why did we give them money if they do not have the goals in place now?

Mr. BRINKMAN. They have the goals in place.

Mr. VISCLOSKY. You keep saying they are going to have goals.

Mr. BRINKMAN. I was not talking about the general goals. I was talking about the very specific one year at a time goals. Those goals I am not so sure whether they are there yet or not.

Mr. VISCLOSKY. Well, if the money was given to them in Fiscal Year 2012; this is Fiscal Year 2013.

Mr. BRINKMAN. No, no. Let us see. When did they actually get the money? Late in the year, right? They did not get the money until I think November or December.

Dr. DEHMER: It was awarded in Fiscal Year 2013.

Mr. BRINKMAN. Okay. So it was awarded late in the year.

Mr. VISCLOSKY. All right. So they have—2012 money and it was awarded to Argonne.

Mr. BRINKMAN. Yes.

Mr. VISCLOSKY. Okay. Then Argonne involves 13 other entities.

Mr. BRINKMAN. No.

Mr. VISCLOSKY. They were part of the original team that negotiated?

Mr. BRINKMAN. That is right. But these are individuals. When you really get down to it, these are individual people from the laboratories.

Mr. VISCLOSKY. And they were awarded the contract, for lack of a better term, without specific benchmarks in place and milestone?

Mr. BRINKMAN. There are a set of goals. I am sorry I do not have them here with me. I cannot recall them off the top of my head.

Mr. VISCLOSKY. For the record, could you provide us with an exact figure as to how much money is set aside for this specific hub and what their goals—and/or goals are.

Mr. BRINKMAN. Yes.

Mr. VISCLOSKY. And in a time sequence of what their milestones are so that we can judge their success?

Mr. BRINKMAN. We can do that. I just do not have them off the top of my head.

Mr. VISCLOSKY. I appreciate it. Thank you.

Mr. Chairman.

Mr. FRELINGHUYSEN. Thank you, Mr. Visclosky.

Dr. Brinkman, our bipartisan Fiscal Year 2012 Conference to Appropriations Bill directed the Department's energy programs to transition away from awarding multi-year grants that mortgaged basically future year appropriations unless absolutely necessary as is in the case for large construction projects that we simply cannot fund in one fiscal year. I am happy to report that the bulk of the Department's energy programs made this transition quickly, and now those programs are in a position to react more quickly to changes in funding in market conditions. The Office of Science, however, has not been so nimble. Of the 236 multiyear awards made by the Department of Energy program since the beginning of Fiscal Year 2013, 96 percent were made by the Office of Science.

And to clarify, these were not large projects as you are aware. The average total science award was 1.8 million.

In short, it appears that your office is simply not choosing to make this transition. What is the Office of Science's reason for the continued use of multiyear awards when the rest of DOE seems to have made the transition quite successfully?

Mr. BRINKMAN. Well, this is a complex subject and we most certainly are willing to work with you to make sure we get a clear understanding of how to do these things. We recognize that we cannot do this transition instantaneously because if you do you end up not funding about a third of the people you would normally fund for about three years. And so you cannot make a transition from three-year funding to one-year funding that quickly. We have done it in a number of cases. The EFRCs are one example where we could transition out of it. But we also feel there is a conflict here in the sense that we feel that doing funding one year at a time gives us some flexibility that we would not have in controlling what they do and keeping them honest, and so we have some——

Mr. FRELINGHUYSEN. So you are not following congressional direction?

Mr. BRINKMAN. Well, we are trying. We will be happy to work with them further.

Mr. FRELINGHUYSEN. Well, should we expect some sort of a formal response?

Mr. BRINKMAN. We can do that.

Mr. FRELINGHUYSEN. We would like that.

Mr. BRINKMAN. Okay.

Mr. FRELINGHUYSEN. Mr. Simpson.

Mr. SIMPSON. Thanks, Mr. Chairman.

I was not going to say anything else until you brought up a subject that you said was going rather well, and that was climate change. I do not happen to be a climate change denier. I will be tomorrow. I will like global warming after it snows here for a while, but they tell me that is weather and not climate.

The problem I have, and I have expressed this frustration in a variety of different places and ways, no one can tell me exactly what we are spending on climate change right now in this government, and I do not know that there is any coordination going on. I will tell you that in the Interior bill that I am in charge of, we spend money in the USGS, we spend money in BLM, in the Forest Service, the National Park Service. We spent $10 million in the National Park Service for climate change and the Forest Service, which is across the border. What are we trying to find out here. I do not think there is any coordination.

What I see it as, and maybe I am wrong, but after September 11th occurred, we all became focused on national security. Everyone that came into my office, every agency, every interest group said we had to put money into this program because it was for homeland security. If you are going to grow corn in Iowa, we were doing it for homeland security reasons. It did not matter. That was the catch phrase. Now the catch phrase is climate change, and everybody that comes in says we have got to put money into studying climate change. So I get the feeling the agencies are out there going, we better get in the climate change game and get money in

here or we are going to be left out. It is frustrating to me that it does not seem, contrary to your statement, that there is any coordination in this government about what we are doing in climate change.

Mr. BRINKMAN. I can ask the USGCRP to get some information to you about what they have been doing. That is what we can do to help this situation. From the point of view of the DOE, the climate change effort in the DOE has been around a long time now. It is not a new thing. We did not start it because climate change became popular or anything.

Mr. SIMPSON. But does the DOE know what the Department of Interior is doing? What the Department of Defense is doing? What the Department of Commerce is doing?

Mr. BRINKMAN. I think that that is what USGCRP is about and I hope they do it. I will get you a report on that.

Mr. SIMPSON. I have thought about trying to take all of the climate change money that is appropriated in the Federal Government and put it in one place so that we could track it to find out what we are doing, and have somebody in charge of it so that if the Forest Service wanted to do some research on something, they could apply to this agency, and if the DOE wanted to do something they could apply. But right now my biggest problem with the funding of it is that I just do not feel that there is coordination, and we are spending billions.

Mr. BRINKMAN. Well, let me get back to you on that.

Mr. SIMPSON. I appreciate it. Thank you.

Mr. FRELINGHUYSEN. Ms. Kaptur.

Ms. KAPTUR. Thank you. Doctor, I wanted to turn just briefly to the biologic and environmental research that is done through your office. I understand that at least one of your centers, the Joint Bio Energy Institute at Lawrence Berkeley Lab is formally collaborating with facilities and researchers in one of your sibling applied research offices, the Office of Energy Efficiency and Renewable Energy. That is encouraging because, again, it is about collaboration, whereas in the past offices have been separated. I also know that the U.S. Department of Agriculture does an enormous amount of bio energy research. How are the different biofuels science activities in your office integrating collaboration like this in their everyday activities?

Mr. BRINKMAN. We have three biofuel centers—one at Berkeley that you mentioned, one at Oak Ridge, and one at the University of Wisconsin. So these three have been, in my opinion, highly successful. They are research institutions to look at new ways to do biofuels. They have come up with a number of very interesting results. They have come up with new types of lignin. There is this molecule that plants use to hold themselves together and you have to get past that molecule before you can get to the sugars that you want to extract. They have done nice work to try to understand how to break that down better than has been in the past. The Berkeley one in particular has been very strong on microbes and enzymes and tried to improve the processing of sugars into fuels. In addition, the one in Wisconsin has been very interested in trying to understand the relationship between plants and soils that are good enough for food crops. So the idea is that you would like to

isolate biofuels on land that is not used to produce food so they do not interfere with the food cycle. And so they have done a lot of work on that. I think all of that has been good work. There are lots of patents involved in these three and in particular there is this interaction with the EERE that you mentioned at Berkeley that is funded by EERE. And that is supposed to be a transfer-type of situation to a more applied type activity.

So overall, I think they have done pretty well in what they have done on the research side of biofuels. The biofuel subject is a very complex subject. I have no idea how it is going to end up.

Mr. FRELINGHUYSEN. You have got to move closer to the mic here.

Ms. KAPTUR. It might be helpful, Doctor, if you pulled the microphone closer to yourself, if the cord is long enough.

Mr. BRINKMAN. All right. Anyway, it will be interesting to see what happens in the future. We just renewed these three biofuel centers for another five-year term. They were reviewed very, very well, and so we are pretty excited about having a second round with them.

Ms. KAPTUR. I would be very grateful for the record, Doctor, if some type of summary could be provided.

Mr. BRINKMAN. Well, we would be happy to do that.

Ms. KAPTUR. On the focus of your activities because I am very aware that the Department of Agriculture is heavily involved in this a well. And so my question is—and I think even the Department of Defense actually because of the fuel needs of the department. So, again, as we go across the Government of the United States, we find some kind of research being done.

Mr. BRINKMAN. We could talk to that question, too. I think we very much know what is going on at the Department of Agriculture. I do not think there is any question about that.

Ms. KAPTUR. All right. Could you give your opinion for the record of research areas globally where you feel perhaps on science where the United States is losing our edge?

Mr. BRINKMAN. Is losing our edge?

Ms. KAPTUR. Pardon?

Mr. BRINKMAN. You said losing our edge?

Ms. KAPTUR. Losing our edge or we have lost our edge. You obviously study this a great deal. I am told that perhaps in certain types of cell phone technology to certain biotech areas we may still have a lead, but are there any arenas where you see us slipping globally or where we have moved to a subordinate position that concern you as a scholar?

Mr. BRINKMAN. I do not think there is any question about the two areas where that has occurred. One has moved to CERN in Europe, the main effort. The other one is fusion. But you have to think about this. These two areas, fields, have gotten to the point where they have to have these very large facilities and there is only going to be one in the world. So what we have not been able to do as a country is we have not been able to capture one of these major world facilities, and that is one of the frustrations I have. We do not really have a good process for by we could do that if an opportunity appeared. For instance, there is the second machine that is called the ILC. And Japan absolutely is doing everything they

can to capture that and we are not. And that is one of the things that I think is a tricky aspect of where we are today as a country. The process of deciding future things is sufficiently complicated in Washington and people abroad are always concerned will happen. So they are very reluctant to work with us.

Ms. KAPTUR. Thank you.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur.

Mr. Visclosky.

Mr. VISCLOSKY. Dr. Brinkman, the Department has processes for review of the management of large construction projects and oversight controls. They require reviews and formal approval at any number of steps. It is my understanding that at least one program in the nuclear physics area, the Department has structured the program under a so-called cooperative agreement. And as I would understand it, thereby avoids using some of the oversight process that is usually required on larger construction projects. That is not true?

Mr. BRINKMAN. That is not true. This facility at Michigan, at Michigan State University——

Mr. VISCLOSKY. I cannot hear you.

Mr. BRINKMAN. I am sorry. That facility is a facility at Michigan State University, FRIB, and we certainly intend to use our processes to see to it that that is properly managed and run properly. In fact, we talked about earlier our critical decision processes, we have Critical Decision 1, 2, 3, 4. And it is at the stage of Critical Decision 2.

Mr. VISCLOSKY. Okay.

Mr. FRELINGHUYSEN. Will the gentleman yield? So a baseline has been established, some cost estimates relative to that project?

Mr. BRINKMAN. Oh, yes.

Ms. KAPTUR. There is no baseline yet.

Mr. FRELINGHUYSEN. This sort of gets back to my earlier question since the gentleman raised the issue here. This is the whole issue of tradeoffs.

Mr. BRINKMAN. But the estimates look—various estimates have——

Mr. FRELINGHUYSEN. There has been a baseline established? There has not.

Mr. BRINKMAN. There is not.

Mr. FRELINGHUYSEN. Anything further, Mr. Visclosky?

Mr. VISCLOSKY. Why?

Mr. BRINKMAN. Before CD-2, a project actually is not considered to be far enough along to make the baseline precise enough. We have estimates how much it could cost, and FRIB is ready to baseline, but when we refer to baseline, we really mean that this is what we expect—the actual cost of the facility. And we really are pretty rigid about that.

Mr. VISCLOSKY. And you are at the second milestone?

Mr. BRINKMAN. Well, FRIB does not yet have CD-2. We are at CD-1 today, and that is approved as a concept.

Mr. VISCLOSKY. At what milestone will you have a baseline?

Mr. BRINKMAN. Two. Next summer.

Mr. VISCLOSKY. And when will that in a timeframe occur?

Mr. BRINKMAN. Next summer.

Mr. VISCLOSKY. Summer of ’13 or ’14?

Mr. BRINKMAN. ’13.

Mr. VISCLOSKY. Thank you very much, Mr. Chairman.

Mr. FRELINGHUYSEN. Apropos of the question, so with these critical decisions what is the level of transparency here?

Mr. BRINKMAN. Oh, I think it is very transparent. These things are not done—we have a review process which we use to look into these issues. We have a process. Dan Lehman is sort of a famous man because he is in charge of all these——

Mr. FRELINGHUYSEN. I thought you were the famous man?

Mr. BRINKMAN. No, no. And he organizes reviews of every one of our projects at every stage. And he brings in outside reviewers that know the technology, that also understand project management and all the aspects of a project. And they review and there is a process whereby you get marks—a green mark, a yellow mark, or a red mark if you do not pass these reviews. And so we, at the Office of Science, think we have been very good about getting—keeping our projects on schedule and in control of costs. So we are quite proud of our record on that.

Mr. FRELINGHUYSEN. Just a couple of comments and I think it will wind down.

Three of your lab directors came in the other day to prime the pump prior to your testimony I suspect. I do not have any problem with that. I think you have some remarkable people who work with you, and certainly the lab directors each are unique personalities. One of them mentioned the work they are doing with metal organic frameworks. Are you familiar with that?

Mr. BRINKMAN. Oh, yes.

Mr. FRELINGHUYSEN. I think that is one of the most exciting things that relates to storing natural gas. Could you give the Committee just a little summary? I think it is fascinating to me. And then I have a general question and then we will release you.

Mr. BRINKMAN. All right. Metal organic frameworks are materials that are very porous and open, and they are very rigid structures but they have these openings in them and you can use these materials as filters for molecules of various types. For example, you can filter CO_2 and the material will bind CO_2 inside this framework and let through, for instance, methane. So you can separate the CO_2 from methane or natural gas. And so these things are a very exciting new set of materials that have been developed in the last 10 years or so, and so we see a lot of potential applications. We see it obviously as a potential application in the capture of CO_2 from flue gases possibly. I do not know if that is really going to work but it is something that we worked on. We see it in other chemical reactions that can be controlled inside these metal organic frameworks.

Mr. FRELINGHUYSEN. It is a view. It is like a sponge; is that right?

Mr. BRINKMAN. It is like a sponge.

Mr. FRELINGHUYSEN. And I like the idea that you can actually capture whatever you are capturing and translate that into some way to actually run a vehicle. Maybe I was not listening properly but I thought that was pretty amazing. And I wondered out loud

why if somebody is working on this that somebody is hiding this under a bushel. I think it is worth a story if it has some story.

Mr. BRINKMAN. It is. This is a very good story, actually.

Mr. FRELINGHUYSEN. Mr. Fattah.

Mr. FLEISCHMANN. Thank you, Mr. Chairman. Let me apologize for being late. I am ranking on Commerce and we had a hearing that started at the same time and I had to handle my day job. But I am happy that I got a chance to spend a few minutes here.

I visited with you a number of the labs—Argonne and Fermilab. I also visited Sandy and Los Alamos and was just out to Oak Ridge.

Mr. BRINKMAN. Oak Ridge.

Mr. FLEISCHMANN. Needless to say, an enormous amount of extraordinary science is taking place and you have got just really these are national treasures in terms of our scientific infrastructure. So I want to compliment you for your leadership and your work in that regard. The way this plays out in the real world is Boeing has got a problem with the Dreamliner, potentially with the battery. The experts, one of your labs, Argonne, which is focused on batteries and being able to work together with an American manufacturer to help solve that. And this is what is going on every day in a lot of these labs. When I was out at the Fermilab, a lot of the pharmaceutical companies, many of them based in Philadelphia, using the infrastructure there that does not exist anywhere else, able to do tests on various pharmaceutical products to make sure that they can do what they intend to do.

Mr. BRINKMAN. That is the case of Eli Lilly, for example, where they actually have a beam line. They are all in beam line but they pay for it at the facility at Argonne. And they, as a company, ship molecules of crystals of molecules back and forth between their research plants in San Diego and Chicago every day to do measurements using our synchrotrons. So it gives them a structure and gives them a clear picture of how these molecules work. And it is very, very important from their point of view as far as developing new drugs.

Mr. FLEISCHMANN. I do not want to hold the Committee up. I know we were wrapping up. I just want to thank you for your leadership. When I was at Oak Ridge, I am doing a lot of work on neuroscience and it is fascinating to see some of the work being done at Oak Ridge around how we can approach some of the challenges related to people who have physical disabilities. Many times our soldiers lose a limb and they were doing some fascinating work marrying up an additive manufacturer in terms of they created a hand that functions just like a hand along with some, kind of a computer machine interface with the brain that they can functionally use as a hand as we would do with our natural hand. It is just amazing work, so I want to thank you. And I hope that as we go forward dealing with our fiscal challenges we do not shortchange science. It is critically important.

Mr. BRINKMAN. Well, thank you very much.

Mr. FLEISCHMANN. To our country going forward.

Mr. BRINKMAN. Well, another thing, we just recently, this new gadget for people who are blind to be able to see are just now going to be on the market.

Mr. FLEISCHMANN. FDA just approved them.

Mr. BRINKMAN. Yes, FDA approved it.

Mr. FLEISCHMANN. It is a gigantic deal.

Mr. BRINKMAN. It could be a very big advance for a certain class of blindness.

Mr. BRINKMAN. Yes.

Mr. FRELINGHUYSEN. Thank you. Just the last thing, and I mentioned earlier in my comments, we talk about technology transfer and often you invoke your collaboration with scientists around the world and I think that is good. Sometimes I see a lot of technology we developed is often transferred in an unauthorized manner. A lot of our intellectual property is being sucked out. It gets to the issue that Ms. Kaptur raised in terms of how we protect our manufacturing base. God only knows we thank you for what you do, your innovation, your ingenuity, but there are certain things that might be classified as proprietary and I do hope we have systems in place that prevent, let us say, if things are going to be stolen perhaps being prematurely stolen. We are in a global marketplace. I am not naiive, but not all the forces that you deal with are so benign.

Mr. BRINKMAN. We understand that.

Mr. FRELINGHUYSEN. So I just wondered if you could make some general comments about that as an issue.

Mr. BRINKMAN. Well, we, along with American industry, have found ourselves under cyber attack.

Mr. FRELINGHUYSEN. Yes.

Mr. BRINKMAN. Very serious.

Mr. FRELINGHUYSEN. That is what I am referring to.

Mr. BRINKMAN. In the last year or so, three of our laboratories had to be shut down for close to a week because they got invaded. And so this is a very serious thing which we have now built up a bunch of countermeasures and are hoping they will work, but it is a kind of war that goes on behind the scenes. And whether our countermeasures, how long they will hold is an open question right now. But we are doing what we can do.

Mr. FRELINGHUYSEN. It is on your docket.

Mr. BRINKMAN. Very high on our radar.

Mr. FRELINGHUYSEN. Your work reaches out into many colleges and laboratories, both public and private, and I do think we do not want everything to escape.

Mr. BRINKMAN. No, not at all.

Mr. FRELINGHUYSEN. People stovepiping these things in other parts of the world and getting ahead of us.

Mr. BRINKMAN. We certainly are very, very aware of this issue. And it has been something that preoccupied us a lot in the last year.

Mr. FRELINGHUYSEN. To Ms. Kaptur, and then we were going to shut down.

Ms. KAPTUR. Thank you, Mr. Chairman.

Doctor, I would like to offer you and your staff a challenge. We know that the labs are located in certain parts of our country, and I often ask myself how can we leverage the technical capabilities of our labs to support academic research and industry innovation across the country, particularly in some of the most economically struggling regions of our nation. And I am wondering if it would

be possible, and we can provide you a list of what those regions are if you do not have them—poverty measure is a real good one—but to look at the relationships that your Office of Science might have with academic institutions and private companies in those regions. Would that be too difficult a task for you?

Mr. BRINKMAN. No. I just want to mention one program that is relevant to that kind of question. We have a program called EPSCOR. I think it is actually a government-wide program which designates states which are below a certain minimum of federal funding and research. And those states then can bid for that money separately from all the others. And we run that program. For us it is a certain fraction of our money and we run that program.

I was recently at Louisiana State University. They have a fair bit of EPSCOR money coming into that university because the State of Louisiana does not have as much money as some of the other states coming into it. And so it is that kind of thing. We could get you more information on that if you would like.

Ms. KAPTUR. All right. I would be very grateful for that.

Mr. BRINKMAN. Okay.

Ms. KAPTUR. Thank you so much.

Mr. FRELINGHUYSEN. Thank you, Ms. Kaptur.

I would like to thank you, Dr. Brinkman, and all the members for their participation.

Mr. BRINKMAN. Well, thank you very much for listening.

Mr. FRELINGHUYSEN. Thank you very much. We stand adjourned.

QUESTIONS FOR THE RECORD

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
HOUSE COMMITTEE ON APPROPRIATIONS

DEPARTMENT OF ENERGY OFFICE OF SCIENCE
FISCAL YEAR 2013 BUDGET HEARING

MARCH 20, 2013

STRATEGY AND PROGRAM MANAGEMENT

U.S. POSITION IN GLOBAL SCIENCE RACE

Subcommittee. Dr. Brinkman, the United States has invested heavily in science research over the last half-century. During that time, this investment has played a critical role in creating jobs here at home and ensuring that we have the world's leading science and engineering workforce. It has also brought great benefits to Americans and the entire world by producing breakthroughs and innovations behind everything from cell phones to high-yield crops to biotech medicines.

But there are great pressures on budgets across the federal government right now, and our science investments have to live within those constraints. But just as we experience these budgetary pressures, we also hear of other nations making unprecedented investments in science facilities and research.

Dr. Brinkman, help us put this in context. How are other countries' investment levels trending?

How would sequestration affect our standing in the global competition for science leadership? What real, specific impacts could we see?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

NEW FACILITIES COMING ONLINE

Subcommittee. Dr. Brinkman, several major facilities or upgrades are under construction and slated to come online in the next several years. These include the National Synchrotron Light Source-II at Brookhaven National Lab, and the upgrade to the accelerator facility at Thomas Jefferson Lab. These facilities promise some cutting-edge science capabilities, but also will require many tens of millions or more in operating budgets.

What impact could sequestration have on the completion and operation of new facilities or facilities currently under construction?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

OPERATION OF FACILITIES AND THE SEQUESTER

Subcommittee. The ongoing operation of facilities that enable scientific research—for example, particle accelerators—is a growing portion of the Office of Science's annual budget. In last year's budget request, facility operations took up nearly 40 percent of Science's budget.

But tight budgets in recent years have in turn put a strain on operating budgets. In fiscal year 2012, for example, the Basic Energy Sciences program's facilities were operating at only 87 percent of their optimal level—which means facilities and scientific machines we've built have been sitting idle instead of conducting useful research.

Dr. Brinkman, what percent of optimal operations are we at in fiscal year 2013?

How could the continuing resolution funding levels or the sequester impact the operation of facilities? Do you intend to keep the operation percentage low in order to fund other activities—and if so, what other activities?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

SECURITY AT BUILDING 3019 AT OAK RIDGE NATIONAL LAB

Subcommittee. Dr. Brinkman, Building 3019 at Oak Ridge National Laboratory has been an issue of particular concern over the last several years as we look deeper into security across the Department. This building stores Uranium-233, which could be used to produce nuclear weapons and must be kept secure. While the Office of Environmental Management is responsible for the disposal of materials and cleanup of the site, the security of the site falls to your office.

I understand that, while Oak Ridge may have primary security, it may need to rely on the rapid response team at Y-12, in the event that it is needed. Have the two entities entered into a formal agreement arranging for those services, and is Y-12 receiving the proper training to carry out those duties?

How much is the Office of Science expecting to spend to secure building 3019 until the sensitive materials are moved out?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

RESEARCH LEADING TO DOMESTIC MANUFACTURING

Subcommittee. Dr. Brinkman, last year this panel asked you and your colleagues in several hearings how you are ensuring that research funded by the Department leads to manufacturing in the United States—not abroad. Your answer was if a Department lab grants an exclusive or partially exclusive license to a company, then that any "licensed patents" must be "substantially manufactured" in the United States—unless a waiver is granted. There seem to be quite a few qualifiers in and exceptions in that statement, so I'd like to dig in a bit.

First off, how many waivers have been granted in the last year?

Secondly, it seems that these protections only apply to licensed patents when the license is exclusive or partially exclusive. What percent of all manufacturing that result from research at the Science labs or through Science grants are covered under this protection? In other words, your response to our question last year was that this protection exists, but how often is the Department-funded research covered by this protection?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

BENEFITS TO MANUFACTURING AND JOBS

Subcommittee. This Subcommittee has been concerned with American manufacturing for a number of years, and the Department's budget request last year had a significant emphasis in that area.

The construction of large science facilities has often driven cutting-edge manufacturing. One example many people don't realize concerns the Large Hadron Collider in Europe, which just discovered the Higgs particle last year. During its construction, American companies produced a substantial amount of the facility's superconducting materials, which helped to expand our industry's manufacturing capabilities in a cutting-edge area. Dr. Brinkman, what science projects today are or may push forward American manufacturing—projects like ITER or high performance computing systems come to mind?

How much of the current $150 million annual budget we pay to support the Large Hadron Collider is spend in the United States or on American scientists and staff?

One area that has gotten a lot of attention lately is additive manufacturing or laser printing of material. Is Science doing anything in this area?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

LONG-TERM PLANNING FOR CONSTRUCTION BUDGETS

Subcommittee. As budgets have tightened, it's become increasingly difficult over the last several years to meet all of the construction and operating budget needs for facilities across the Office of Science. It is especially difficult for us to make wise decisions when we only have your budget proposal for the coming—something that makes little sense, given the multi-year nature of construction projects and operating budgets, as well as grants that mortgage future-year funds.

To address this issue and help both the Department and the Congress plan for future years, the fiscal year 2012 Energy and Water appropriations Act required the Department to submit a five-year plan along with fiscal year 2014 and subsequent budget requests.

Perhaps on a related note, Dr. Brinkman, in late December last year, you charged all of your advisory committees with prioritizing scientific user facilities over the next ten years, to support your goal of creating a 10-year list of facility priorities by September of this year. This is encouraging, although it is not encouraging that this charge only went out to the advisory Committees two months ago.

Dr. Brinkman, since long-term planning is so important to your office given the prevalence of construction projects, operating facilities, and multi-year grants, what progress have you made towards submitting a five-year plan?

How does your 10-year prioritization relate to the Congress' requirement for a five-year plan?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

WORKSHOPS TO ACCELERATE TRANSFER OF TECHNOLOGY TO THE PRIVATE SECTOR

Subcommittee. Dr. Brinkman, the research your office supports is extremely important, but so is ensuring that real-world applications are realized and make it into the marketplace. To that end, I understand that over the last year or so, the Office of Science has held several workshops to bring together representatives from the Department, the laboratories, and industry to support collaborations in four areas: Materials for Energy Research, Modeling and Simulations, Cyber Security, and Batteries.

What concrete changes, collaborations, and commercialization of innovations have come out of these workshops?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

SMALL BUSINESS GRANTS TO LICENSE DOE TECHNOLOGY

Subcommittee. The Office of Science and other Department program offices have longstanding programs that give research and development grants to small businesses—these are referred to as "SBIR/STTR" grants. In fiscal year 2013, for the first time the Office of Science is giving small businesses the option to license technology developed at Department of Energy laboratories. How has that program gone so far? Have you had much interest from small businesses, and do you have any examples to report to us?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

FUSION ENERGY SCIENCES

PATH FORWARD FOR FUSION

Subcommittee. Dr. Brinkman, this Committee believes the Administration's proposal for Fusion Energy Sciences in its 2013 budget request was short-sighted, because it shut down one of our facilities and cut the others without offering any substantive plan to move the program forward. The fusion program remains important to our nation's ability to compete in science and engineering, and to our future energy sector, and we must chart a viable path forward.

I do appreciate that, last April, you chartered the Fusion Energy Sciences Advisory Committee with developing a plan and set of prioritize. That committee's report was released last month. Can you describe for us its findings?

What do you believe are some options for moving the domestic fusion program forward in a meaningful way?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

THE COST OF CUTTING DOMESTIC FUSION PROGRAM

Subcommittee. Dr. Brinkman, you know as well as anyone that striking a balance between ITER, our domestic fusion program, and other priorities in your office is not easy.

But domestic fusion and ITER are important. We must participate in ITER for our domestic fusion program to be relevant. And our domestic program must be strong to support ITER, and to allow our scientists to take advantage of ITER once it's brought online. Unfortunately, the fiscal year 2013 request chose a balance that, while funding ITER, would actually risk it by sacrificing our own domestic program. That is not a workable balance.

How are you currently envisioning the balance between these two fronts?

If ITER is such a priority for the Science program—and I believe it was one of your top priorities across all disciplines—shouldn't the prioritization occur at the program level? Why is it necessary to only prioritize within Fusion for ITER at the expense of the domestic fusion program?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

IMPACT OF CONTINUING RESOLUTION AND SEQUESTER ON FUSION PROGRAM

Subcommittee. The Fusion Energy Sciences program makes investments the private sector cannot that may enable a clean, long-term energy solution for the nation. The program also ensures that we keep the best scientists and engineers here in the United States. The Department's budget request for Fusion Energy Sciences a year ago was troubling.

Dr. Brinkman, if the Department were to operate our domestic fusion program under a continuing resolution at the levels under proposed in the 2013 request, can you describe what impact this would have on the Department's main fusion facilities?

Have any layoffs or terminations already been carried out at any of those facilities?

What, specifically, is the current status of the MIT facility, which your budget request last year proposed to terminate?

I find this direction quite troubling. The staff that would be laid off at these facilities are irreplaceable assets to our nation's competitiveness in fusion science, and in science and engineering as a whole. Let me give just one example: the Princeton Lab holds world-class capabilities in magnetic coil science and engineering, which has led China to us to design part of its ITER deliverables and Germany to ask us to design part of its new fusion facility. If we lose our expertise, we also lose all of that business. If the Department were to push through the plan for fusion in its 2013 budget request, is it seriously—and irrevocably—damaging American leadership in fusion science?

I would like to emphasize, Dr. Brinkman, that the Administration should not do anything under a continuing resolution that could irreversibly impact any aspects of the fusion program. The Administration should be determining a path forward for the program, not using a continuing resolution to unilaterally cripple it.

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy,

Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

INADEQUATE REQUEST LAST YEAR FOR DOMESTIC FUSION PROGRAM

Subcommittee. Dr. Brinkman, this Committee found last year's budget request for the domestic fusion energy program, which slashed that program by more than 16 percent, to be entirely insufficient to support this nation's leadership role in fusion sciences. Last April you charged the Fusion Energy Sciences Advisory Committee, the scientific body that advises the Department on the fusion program, with developing priorities for the domestic fusion program at different funding levels.

Well, the advisory committee reported back on that charge last month, and it found that the Department's 2013 request for the domestic fusion program, was, and I quote, "inadequate to address even the highest priorities in a timely way."

And so this is what the scientific community has found—your request last year was insufficient to even tread water. And now the ball is in your court. What will you do as you move further into 2013 under a continuing resolution? Will you essentially let the domestic program die while many other countries invest heavily? Or will you propose to shift funding to maintain American leadership?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

DOMESTIC FUSION FACILITY UPGRADE AT PRINCETON

Subcommittee. How might the NSTX fusion facility upgrade at Princeton be disrupted or slowed down under a CR or if sequestration takes full effect?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

ITER: STATUS OF DEPARTMENT OF ENERGY'S INVOLVEMENT

Subcommittee. In last year's fiscal year 2013 budget request, the Administration proposed $150 million for the United States' contribution to ITER, the international fusion experiment. While that amount was an increase over the previous year, it fell short of the amount required to meet our scheduled commitments to the project. Needless to say, this raised a lot of eyebrows in the international community, since all of the other participant countries had committed their funding.

Dr. Brinkman, I know you and your team have been working hard to construct a plan and funding schedule for ITER that is workable within today's budgetary realities. What is the current plan and funding schedule—and if it's not finalized yet, when can we expect to see it?

Critics of the ITER project say that we shouldn't be sending our money overseas. How much of ITER funding goes directly overseas, and how much actually goes to scientists and industry here in the U.S.?

And haven't our scientists and manufacturers done quite a bit of work for other nation's as they build their own components for the ITER project?

Some have suggested that other areas of science and energy should take priority and we should withdraw from ITER. What portion of the ITER project are we contributing, and what would be the consequences of withdrawing?

Do you see any evidence that any of ITER's partner countries will not meet their expected financial commitments, or are all of their commitments holding firm?

How will your current plan impact ITER's timeline, if at all? How would pulling out altogether impact the ITER project?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

Subcommittee. After decades of fusion research, the ITER project will generate energy on the scale of a sizeable commercial power plant—and, if successful, it will generate ten times more power than it takes to run it. This is significant step from today's fusion facilities towards commercial-scale generation.

If ITER works as intended, what are the steps between ITER and commercialized fusion power, and what will it cost to get there?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

Subcommittee. In addition to ITER, there has been quite a bit of discussion and planning in other countries—including China, Europe, and Japan—about future magnetic fusion facilities. What are some of the major plans to be aware of, and is anything similar being discussed in the United States?

What are the implications to U.S. manufacturing and energy supply if other countries pull ahead?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

INERTIAL FUSION ENERGY

Subcommittee. Dr. Brinkman, let's talk about inertial confinement fusion—the small pellets of fuel imploded by large lasers or other methods. While the Department of Energy has considerable inertial fusion facilities, all of these are part of our nuclear weapons programs.

Last month, the National Academies released a report assessing the prospects for inertial fusion as an energy source.

The National Academies report concludes that, while inertial fusion may be worth pursuing for energy purposes, the time to do so would be after we achieve ignition through our weapons-focused programs at the NNSA. That seems like a prudent approach. Would you agree with their conclusion?

Do you have any preliminary thoughts, based on that report, for whether inertial fusion could be a feasible energy source?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

SENDING AMERICAN FUSION SCIENTISTS OVERSEAS

Subcommittee. Dr. Brinkman, last year you explored the idea of sending American fusion scientists overseas to conduct their science at other nation's world-leading fusion facilities. This seemed like "waving the white flag" and giving up on American leadership in fusion, which is extremely troubling. Are you still exploring this avenue?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

BASIC ENERGY SCIENCES

NEW RESEARCH AREAS AND "MESOSCALE" SCIENCE

Subcommittee. Last year's budget request included what most called a proposal to invest heavily in so-called "mesoscale" science.

Many observers described last year's mesoscale science proposal as premature, since this program's Advisory Committees was still developing its recommendations on opportunities and priorities for such a program. For that among other reasons, our bill for 2013 did not fund the proposal.

Now that the advisory committee has released a report on this area, bring us up to speed on mesoscience. Did the Advisory Committee's findings support or evolve your proposal, and do you now think focusing specifically on mesoscale research should be a high priority?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

"LIGHT SOURCES" UPGRADES AT BROOKHAVEN, SLAC, AND ARGONNE

Subcommittee. The Office of Science's hosts a number of world-leading light source facilities. We've also got several major upgrades and construction projects in process or ready to start, including the NSLS-II at Brookhaven National Lab in New York, the LCLS-II at SLAC, and the Advanced Photon Source upgrade at Argonne National Lab.

Construction of the National Synchrotron Light Source-II at Brookhaven is scheduled to wrap up in the next year or two. In fact, we've already seen some funds in the 2013 budget request for early operations of the facility. What impact could sequestration have on the project's cost and schedule?

Construction of the LCLS-II at SLAC is ready to start in fiscal year 2013. How might a continuing resolution and sequestration impact that construction schedule, costs, and jobs at that site?

In the worst case, how could our nation's competitive posture be affected for this type of facility?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

BATTERIES ENERGY INNOVATION HUB

Subcommittee. Please provide the Committee with an exact figure as to how much money is set aside for the Batteries and Energy Storage Hub, and provide us with that Hub's exact goals.

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

ADVANCED SCIENTIFIC COMPUTING RESEARCH

GLOBAL COMPETITION FOR FASTEST COMPUTERS

Subcommittee. The United States has been a leader in advanced computing since the industry's invention, and we have dominated the list of the world's fastest computing systems in that time. The Office of Science's advanced scientific computing systems used for cutting-edge research have been at the top of that list for many years.

But over the last decade, others such as China, Europe, and Japan have ramped up their investment in advanced computing, and we've been neck-and-neck with these in the last several years.

How might sequestration impact our position as a leader in advanced scientific computing?

How much of the United States' performance in this arena is driven by federal investment through the Office of Science and other agencies?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

OAK RIDGE AND ARGONNE'S LATEST SUPERCOMPUTING UPGRADES

Subcommittee. Dr. Brinkman, since our last meeting a year ago, the Office of Science has substantially upgraded its fastest computing systems. The Oak Ridge National Lab has turned on its "Titan" system, which is now the fastest unclassified platform in the world and is about ten times faster than Oak Ridge's system last year. Argonne National Lab's system is now twenty times faster than it was last year and comes in at a mere fourth place on the worldwide ranking.

What it next on the horizon for these two facilities at Oak Ridge and Argonne? How much faster will they get over the next year and beyond?

How could those plans be affected by sequestration?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

EXASCALE COMPUTING GOALS AND IMPACT OF SEQUESTER

Subcommittee. Dr. Brinkman, the "Exascale initiative" has been the major new thrust of the Office of Science's computing programs for several years. For the benefit those in this room who, like me, aren't computer scientists, Exascale computers would be about one hundred times faster than today's fastest systems.

Last year we heard a number of dates thrown around for the Department's target timeframe for developing an exascale computing system—some said 2021, some said sometime after 2020. What is your current target date for completing an exascale system?

What might be the impact of sequestration on that target timeframe, and on the exascale initiative as a whole?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

EXASCALE COMPUTING PLAN A YEAR OVERDUE

Subcommittee. Dr. Brinkman, last year in this same hearing, this panel pointed out to you that in our fiscal year 2012 conference report, we directed the Department to deliver a plan on its exascale initiative by February 2012. We noted that this plan was a month overdue. I am unhappy to be in a position to note that the plan is now more than a year overdue.

Dr. Brinkman, what is holding things up, and when will the Department deliver the exascale report?

You have no plan in place, but you've been spending $50 to $100 million a year on exascale activities. Without having a plan in place, how is your office determining how much to spend each year? Are these numbers arbitrary?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

DATA-INTENSIVE SCIENCE INITIATIVE

Subcommittee. Last year's budget request emphasized a new $21 million initiative in the Office of Science for "Data-Intensive Science", which would develop new ways to deal with the truly massive amounts of data our scientific computing systems and networks produce and transport.

What progress has the Department made on the "Big Data" front since last year?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

NERSC: WORKHORSE OF DOE'S SCIENTIFIC COMPUTING

Subcommittee. Dr. Brinkman, when talking about advanced computing in your office, we hear most often about the fastest systems—the leadership computing systems at Oak Ridge and Argonne, and the exascale initiative. But we don't hear as much about the "High-Performance Production Computing" program.

This program, consisting primarily of the National Energy Research Scientific Computing Center at Lawrence Berkeley National Lab, which, though not as fast as the Argonne and Oak Ridge machines, is in a way the "workhorse" of the Department's scientific computing. While the Oak Ridge and Argonne machines serve about 20 to 30 large research projects each year, the Production Computing system served about 500 projects annually.

I understand that important upgrades are underway at the Production Computing center. How would a sequester impact your current plan?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

HIGH ENERGY PHYSICS

HIGH ENERGY PHYSICS AND PARTICLE ACCELERATORS: ARE THEY IMPORTANT?

Subcommittee. Dr. Brinkman, your budget request in the last several years clearly prioritized High Energy Physics below other areas in the Office of Science. When I say high Energy Physics, we're talking about things like large particle accelerators, exploring the building blocks of matter, and the search for the "Higgs Boson" we read about in the papers last year.

Why is High Energy Physics less important than other areas of science? Or why do you think it is, in fact, important?

Fermilab, the Department of Energy laboratory in Illinois, has been pushing for its new Illinois Accelerator Research Center. Will this center receive Department of Energy funds?

If so, what's the national significance that justifies federal support?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

LONG BASELINE NEUTRINO EXPERIMENT

Subcommittee. We discussed last year how, with the shutdown of the Fermilab's Tevatron several years ago, there is now no major facility operating in the United States focusing on High Energy physics, a wing of physics that explores the basic model of the fundamental particles of matter. Europe's standard bearer in this area is the Large Hadron Collider, which discovered the Higgs particle last year. Some say that the Long Baseline Neutrino Experiment, if built, could keep the United States at the forefront of the field.

Last year, you asked the labs overseeing the LBNE to re-think the project and craft a construction plan that would avoid major spikes in construction funding, and to allow the facility to phase in operations sooner rather than later. Were they successful?

So where is the LBNE project now? Will you propose to begin construction?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

UNDERGROUND FACILITIES

Subcommittee. When the LBNE was originally envisioned, the National Science Foundation was going to build and maintain the Deep Underground Science Laboratory to house the detector for the LBNE particle beam in Illinois. The NSF has since backed out of the deal, and now we hear of the Sanford Underground Research Facility (SURF) in South Dakota as its potential replacement.

If the LBNE project moves forward, will SURF officially be used to house the detectors?

We understand that SURF is not technically a DOE facility, and it gets its funding from the State of South Dakota and a variety of other sources. What is the funding breakdown for SURF, does it comply with DOE's health and safety requirements, and is there a liability to using this arrangement?

Your office is now providing about $15 million each year for operations at SURF. Is SURF officially now a DOE facility, or is it state-owned?

Under what conditions will we continue to pay for operations at SURF, and under what conditions will we no longer support it?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

INTERNATIONAL INVESTMENT

Subcommittee. We talk a lot about our participation and investments in science activities overseas, such as ITER and the Large Hadron Collider. But there are many benefits to the opposite arrangement, where other nations invest in our facilities. Those investments indicate that our experiments and facilities are world-class, and it also helps us to fund important programs when budgets are tight.

Is all of our money flowing overseas, or do you have recent or current examples of other nations investing in our scientific endeavors?

Are there any potential investments like this in the works that could substantially advance our science programs?

What are the main obstacles to the United States receiving such investments?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

NUCLEAR PHYSICS

SETTING PRIORITIES IN NUCLEAR PHYSICS

Subcommittee. Dr. Brinkman, the Nuclear Physics program in your office will likely face some difficult tradeoffs between major facilities in the near future. The Office of Science's flat or shrinking budget may simply not be able to support upgrades and operation of two existing facilities—RHIC at Brookhaven Lab and the accelerator facility at Thomas Jefferson Lab in Virginia—while also paying for construction of FRIB, a potential new facility at Michigan State University.

Last year's fiscal year 2013 budget request did not suggest how to juggle these priorities. However, I do applaud you for charging the Nuclear Science Advisory Committee, the group of scientists that oversees the program, with developing priorities under specific budget constraints.

Dr. Brinkman, if you have to live within existing budget levels, what would you cut in order to fund your top priorities within this program?

Would sequestration change your proposal? Would you need to shut down any facilities immediately if the sequester takes effect? Would there be any furloughs?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

LAX CONTROLS FOR CONSTRUCTION PROJECTS UNDER COOPERATIVE AGREEMENTS

Subcommittee. Dr. Brinkman, most of the Department's large construction projects are governed by contracts that require very specific and rigorous project management and oversight controls. Those projects require reviews and formal approvals at each step, such as the approval of a formal cost baseline and the approval of the start of construction.

In some cases—for example, F-RIB in your Nuclear Physics program, the Department has structured the project under a so-called "cooperative agreement". In practice, this has allowed the programs to avoid using the rigorous oversight process usually required of large construction projects.

How prevalent is the use of cooperative agreements, and why does the Department choose to use cooperative agreements for some construction projects?

Regardless of the exact contractual arrangement used, why shouldn't those projects follow the same project management and oversight controls as others do?

Should the use of cooperative agreements—or the relaxed oversight process the Office of Science uses under them—be limited only to smaller projects?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

BIOFUELS RESEARCH AND THE BIOENERGY RESEARCH CENTERS

Subcommittee. Dr. Brinkman, in its fiscal year 2013 request, the Department proposed to fund the three Bioenergy Research Centers for a second five-year term. These centers focus on the basic science needed to develop cost-effective biofuels. And by all accounts, these centers are producing good research and driving the science that can help to reduce our dependence on imports and address high gas prices.

But it is also important to remember that renewing these three centers for another five years is a $375 million investment, and we need to be sure to use that funding effectively. This Committee's fiscal year 2013 bill funded the extension of these centers, conditional on the Department's delivery of a report detailing their five-year performance reviews and recommendations for improvements. The Department has delivered on the first half, and the reviews are good and well-justified. But the report omits any mention of specific improvements for each center.

How is the Department pushing these centers to further improve their operation, management, and research, and when can we expect to see those recommendations?

I understand that at least one of the centers, the Joint BioEnergy Institute at Lawrence Berkeley Lab, is formally collaborating with facilities and researchers in one of your "sibling" applied research offices, the Office of Energy Efficiency and Renewable Energy. This is encouraging, as the "stovepiped" separation between offices is a longstanding problem at the Department. How are the different biofuels science activities in your office, and perhaps other research areas, integrating collaboration like this in their everyday activities?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

ENVIRONMENTAL MOLECULAR SCIENCES LABORATORY

Subcommittee. Dr. Brinkman, the Environmental Molecular Sciences Laboratory, or EMSL, funded within your Biological and Environmental Research program, is a bit of a misnomer—in reality, it enables research in a wide variety of areas relating to everything from biofuels production, to environmental cleanup, to nuclear energy.

How is a program like EMSL being impacted by the current continuing resolution, and how might it be impacted by sequestration?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

MEDICAL RESEARCH FUNDED BY THE DEPARTMENT OF ENERGY

Subcommittee. Dr. Brinkman, last year, we discussed how the Department of Energy has a history of making significant contributions to diagnostic medicine through its work in nuclear medicine, and to projects like the artificial retina. This is a double-edged sword, however. When funds are limited—and they are and will continue to be scarce—the Department must adhere closely to its own mission, which does not include medical applications.

The Department reported to this committee in June that it had fully transitioned the artificial retina project to the private sector. Just last month, the Food and Drug Administration approved this device to give limited vision to people who are blind—truly a remarkable advance, and a first for medical science.

This project has been transitioned away from your agency, but the Department's national laboratories still have capabilities that can uniquely advance certain areas of medicine, like diagnostic imaging and certain cancer therapies using radiation and particle accelerators. And while it serves the nation's interests to use those capabilities, fiscal realities demand that funding appropriated to the Department goes towards its core missions—which does not include medicine.

Dr. Brinkman, to what degree has your office explored ways to use the capabilities at your labs, but fund them by the appropriate federal agencies with medical missions? This is done quite often at Department's labs through various "Work for Others" arrangements, and it seems like the right arrangement here.

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM CHAIRMAN FRELINGHUYSEN

SEQUESTRATION IMPACTS

Chairman Frelinghuysen. Dr. Brinkman, now that we've touched on living within our budget, I'd like you to speak to the additional hit to your budget if sequestration takes full effect.

I recently met with three Science lab directors, and they said the plan under sequestration would like be to shut down early facilities that were already slated to be shut down, and then to not build anything new, whether large or small. Does this agree with your plan, or would you do something different?

Will any facilities be turned off for part of the year? And will any be put on standby or permanently shuttered? Which ones are at risk?

How many jobs are at risk at each of the national labs or universities? Which labs are at the greatest risk?

How could these cuts affect the science being conducted across the country, and how could it affect American industry—given that companies in the pharmaceutical and other industries rely on the Office of Science's facilities on a regular basis?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

MORTGAGING FUTURE-YEAR APPROPRIATIONS

Chairman Frelinghuysen. Dr. Brinkman, the fiscal year 2012 conferenced appropriations bill directed the Department's energy programs to transition away from awarding multi-year grants that "mortgage" future-year appropriations, unless absolutely necessary—as in the case for large construction projects that we simply cannot fund in one fiscal year. I'm happy to report that the bulk of the Department's energy programs made this transition quickly, and now those programs are in a position to react more quickly to changes in funding and market conditions.

The Office of Science, however, has not been so nimble. Of the 236 multi-year awards made by the Department's energy programs since the beginning of fiscal year 2013, 96 percent were made by the Office of Science. And to clarify, these were not large projects — the average total Science award was $1.8 million. In short, it appears that your office is simply choosing to not make the transition.

What is the Office of Science's reason for the continued use of multi-year awards, when the rest of the Department of Energy seems to have made the transition quite successfully!?

Since the Office of Science is going against congressional directional, should we expect a formal response to the direction in last year's conference report?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM RANKING MEMBER KAPTUR

FOREIGN COMPETITION

Ms. Kaptur. Dr. Brinkman, the United States has invested heavily in science research over the last half-century. During that time, this investment has played a critical role in creating jobs here at home and ensuring that we have the world's leading science and engineering workforce. It has also brought great benefits to Americans and the entire world by producing breakthroughs and innovations behind everything from cell phones to high-yield crops to biotech medicines.

We now face great pressures on budgets across the federal government. While I would support expanding such work, the current reality dictates that our science investments have to live within these budgetary constraints. Still, just as we experience these budgetary pressures, we also hear of other nations making unprecedented investments in science facilities and research.

Dr. Brinkman, help us put this in context. How are other countries' investment levels trending?

Is it fair to say there are areas in which we have lost our edge, and if so can it be regained? In which areas do we continue to excel and where are we maybe a little too close for comfort?

How would further budget cuts affect our standing in the global competition for science leadership? What real, specific impacts could we see?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

BENEFITS TO MANUFACTURING AND JOBS

Ms. Kaptur. This Subcommittee has been concerned with American manufacturing for a number of years, and the Department's budget request last year had a significant emphasis in that area. I am interested in carrying forward this important manufacturing focus.

How do the major science facilities support American manufacturing, and have you made changes since last year to increase support for American industry?

The construction of large science facilities has often driven cutting-edge manufacturing. One example concerns the Large Hadron Collider in Europe, which just discovered the Higgs particle last year. During its construction, American companies produced a substantial amount of the facility's superconducting materials, which helped to expand our industry's manufacturing capabilities in a cutting-edge area. Dr. Brinkman, what science projects today are or may push forward American manufacturing?

And for the record, how much of the current $150 million annual budget we pay to support the Large Hadron Collider is spent in the United States or on American scientists and staff?

3D printing have gotten a lot of attention lately, particularly when President Obama referenced the new Youngstown project in his State of the Union address. Is the Office of Science involved in this area? What other opportunities exist for similar technology hubs?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

INTERACTING OUTSIDE THE NATIONAL LAB STRUCTURE

Ms. Kaptur. We have discussed the value of our National Labs in establishing the scientific fundamentals that drive innovation and create new manufacturing opportunities in America. These labs also create a valuable local infrastructure that encourages the critical transition of federally supported research into private investments. This is a great benefit for the areas surrounding the labs, yet most Members of Congress do not have a National Lab in their district.

How does the Department interact with organizations outside of the National Lab structure? How can we leverage the technical capabilities of our labs to support academic research and industry innovation across the country? And how do we ensure that infrastructure gaps, especially financial infrastructure, do not become so outsized as to serve as a barrier to entry for innovators not geographically or institutionally tied to a National Lab?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

INTERAGENCY COLLABORATION

Ms. Kaptur. Many countries have a central clearinghouse for scientific research and development, a Ministry of Science. Our government is not set up that way. Most of our departments – DoE, DoD, HHS, even the VA – have their own R&D arm. In many ways, this is to our advantage. In approaching a new scientific discovery, researchers from different backgrounds will often find unique benefits relative to their particular field. A discovery in energy-related science may bring important benefits to the field of medicine.

How does the Department of Energy's Office of Science interact and collaborate with researchers at other agencies?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

QUESTIONS FROM MR. FATTAH OF PENNSYLVANIA

BIOSCIENCES

Mr. Fattah. Biosciences, typically considered the province of human health research, now presents great opportunities for the development of sustainable energy solutions and environmental remediation of some of our thorniest cleanup issues. From producing "drop in" biofuels that are compatible with our current vehicle fleet and fuel distribution systems, to using plants to extract dangerous chemical and radioactive materials from soil, the DOE Office of Science is leading the world in harnessing biology to solve big national challenges. Berkeley Lab's Joint BioEnergy Institute, and its sister BioEnergy Research Centers, are a great example of moving bioscience discoveries from the bench to the marketplace.

Dr. Brinkman, what is the Office of Science doing to build on its current leadership in biosciences?

Even in these tough budget times, we have to fund the priority areas that will offer the greatest return on the federal investment through technology and job creation.

What new investments do we need to fund in the biosciences to best capture these amazing opportunities?

The Subcommittee notes that at the time of this printing the Agency has still not provided answers to the QFRs. The Department of Energy, Office of Science received questions from the Subcommittee on March 15th, 2013, thirteen months prior to the printing of this volume.

WITNESSES