RADIOLOGICAL RESPONSE: ASSESSING ENVIRONMENTAL AND CLINICAL LABORATORY CAPABILITIES

HEARING

BEFORE THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

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RADIOLOGICAL RESPONSE: ASSESSING ENVIRONMENTAL AND CLINICAL LABORATORY CAPABILITIES

THURSDAY, OCTOBER 25, 2007

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 9:35 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Brad Miller [Chairman of the Subcommittee] presiding.

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Subcommittee on Investigations and Oversight

Hearing on:

Radiological Response: Assessing Environmental and Clinical Laboratory Capabilities

2318 Rayburn House Office Building
Wednesday, October 25, 2007
9:30 a.m. – 12:00 p.m.

Witnesses

Dr. Randolph Long
Chair, Integrated Consortium of Laboratory Networks (ICLN) Network Coordinating Group, Chief Technical Adviser, Chemical and Biological Division, Science and Technology Directorate, U.S. Department of Homeland Security (DHS)

Dr. Robert L. Jones
Chief, Inorganic Toxicology and Radionuclide Labs, Centers for Disease Control and Prevention (CDC)

Dr. Robert T. Hadley
Chair, Federal Radiological Monitoring and Assessment Center's (FRMAC) Laboratory Analysis Working Group, Lawrence Livermore National Laboratory, U.S. Department of Energy (DOE)

Dr. John Griggs
Chief, Monitoring and Analytical Services Branch, Office of Radiation and Indoor Air, National Air and Radiation Environmental Laboratory (NAREL), U.S. Environmental Protection Agency (EPA)

Ms. Dana Tulis
Deputy Director, Office of Emergency Management (OEM), U.S. Environmental Protection Agency (EPA)

HEARING CHARTER

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

Radiological Response: Assessing Environmental and Clinical Laboratory Capabilities

THURSDAY, OCTOBER 25, 2007
9:30 A.M.–12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

Every two years the government conducts the TOPOFF series of national counter-terrorism exercises, mandated by Congress. This year, TOPOFF IV (T4) is taking place from October 14–24, 2007, and will focus on National Planning Scenario #11, which envisions the detonation of a Radiological Dispersal Device (RDD) or "dirty bomb." In this exercise, involving thousands of federal, state and local officials and sponsored by the Department of Homeland Security (DHS), terrorists detonate an RDD in Guam, Portland, Oregon and Phoenix, Arizona. The exercise will test the handling and flow of operational and time-critical intelligence between agencies and the existing procedures and policies for domestic incident management of a major radiological event.

One of the key assumptions in the National Planning Scenario developed by the White House's Homeland Security Council and being exercised in TOPOFF IV is that all potentially exposed individuals (an estimated 100,000 people at each site) will be tested for radiological exposure and/or contamination and that a valid method exists for testing these clinical specimens. Yet, validated methods to test clinical specimens in a radiological emergency exist for only six of the 13 highest priority radioisotopes most likely to be used in a terrorist scenario. For those isotopes for which "validated" methods do exist screening 100,000 individual clinical specimens in the wake of a radiological attack could take more than *four years* to complete due to the current shortfall in radiochemistry laboratories, personnel and equipment. Environmental sampling could take as long as *six years* to complete given the current capacity and capabilities of the U.S. radiochemistry laboratory infrastructure.

Although not a focus of the TOPOFF IV exercise, in any real world event the critical lack of a sufficient environmental and clinical radiochemistry laboratory capacity will delay appropriate public health care actions and plans, increase public panic, degrade public trust in government officials and increase the economic losses due to delays in assessment and cleanup. The Subcommittee hearing on radiological response will review what steps are underway to address this critical need, what technologies or resources would help tackle this capacity gap and what federal agencies responsible for addressing this need have learned from actual radiological emergencies, such as the recent Polonium–210 poisoning in London that killed former Russian KGB agent Alexander Litvinenko last November and the 1987 (accidental) radiological release in Goiania, Brazil, that killed four people and injured hundreds. It will also examine why this crucial public health ability has received limited attention and what more needs to be done to improve the U.S. radiochemistry laboratory infrastructure.

Witnesses

Dr. Randolph Long, Chair of the Integrated Consortium of Laboratory Networks (ICLN) Network Coordinating Group and Chief Technical Adviser, Chemical and Biological Division, Science and Technology Directorate, Department of Homeland Security.

Dr. Robert L. Jones, Chief, Inorganic Toxicology and Radionuclide Labs, Centers for Disease Control and Prevention. He is also the Co-Chair of the Integrated Consortium of Laboratory Networks (ICLN) Network Coordinating Group's Radiological

Laboratory Response Workgroup and headed up the CDC's Polonium–210 response efforts last year.

Dr. Robert T. "Robb" Hadley, Lawrence Livermore National Laboratory, Department of Energy. Dr. Hadley is the current Chair of the Federal Radiological Monitoring and Assessment Center's (FRMAC) Laboratory Analysis Working Group and was formerly the Chair of the FRMAC Health & Safety Working Group.

Dr. John Griggs, Chief, Monitoring and Analytical Services Branch, U.S. Environmental Protection Agency, Office of Radiation and Indoor Air, National Air and Radiation Environmental Laboratory (NAREL) and Co-Chair of the ICLN Network Coordinating Group's Radiological Laboratory Response Workgroup.

Ms. Dana Tulis, Deputy Director, Office of Emergency Management (OEM), Environmental Protection Agency (EPA).

Chairman MILLER. Good morning. This hearing will come to order. Today's hearing is on *Radiological Response: Assessing Environmental and Clinical Laboratory Capabilities.*

If there is one punch that terrorists have clearly telegraphed, it is the detonation of a dirty bomb in an American city. A dirty bomb is a conventional bomb that broadcasts, spreads radioactive material, contaminating perhaps several city blocks. We heard years ago that Osama bin Laden had tried to obtain radioactive materials to use in a dirty bomb.

But the Federal Government was better prepared for Katrina than we are now for the detonation of a dirty bomb in an American city.

Yesterday concluded a ten-day national counterterrorism exercise called TOPOFF that included the participation of thousands of State, local, and federal officials. The exercise was based on the White House's National Planning Scenario #11 that envisions the simultaneous detonation of a "dirty bomb" or Radiological Dispersal Device in three major urban areas. The simulated attacks in this exercise took place in Guam, Phoenix, Arizona, and Portland, Oregon. Perhaps one of you could explain why Guam was included as what I had not thought of as a major American city.

In a real radiological terrorist attack, the Environmental Protection Agency estimates that they would need to collect, process, and analyze more than 350,000 environmental samples in the 12 months after the incident. The Center for Disease Control and Prevention, the CDC, is charged with monitoring and assessing the public's health in response to a radiological emergency, and the CDC estimates that they would need to screen 100,000 individuals for potential radiological exposure for internal contamination in the first days after a radiological attack.

Yet, depending on the type of radioactive materials used in a real-world event, the EPA predicts that given the Nation's current radiochemistry laboratory infrastructure, it might take them six years to analyze the 350,000 samples necessary to conduct a thorough environmental analysis, and that is just in one city. One of the key assumptions outlined in the national planning documents upon which the most recent TOPOFF exercise was based is that all potentially exposed individuals, an estimated 100,000 people in each city, will be tested for radiological contamination and that a valid method exists for testing those clinical specimens.

For those isotopes for which validated methods do exist, screening 100,000 clinical specimens in the wake of a radiological attack could take more than four years to complete because of the current shortfall in radiochemistry laboratories, personnel, and equipment. That is the good news. The CDC currently has no valid method to test clinical specimens in a radiological emergency for seven of the 13 most-likely radioisotopes, radioactive materials, used in a terrorist attack, in a dirty bomb attack.

Those drastic shortfalls may have far-reaching implications for government officials responsible for responding to and recovering from a national radiological emergency.

Today, we will hear from representatives from the CDC, EPA, Department of Energy, the Department of Homeland Security, about the gaps that exists in their ability to respond to a radio-

logical emergency effectively and efficiently by conducing rigorous and rapid analysis of radiological environmental and clinical samples. Radiochemistry laboratories provide a vital role in determining who has been contaminated and the nature and dangers of their exposures providing a roadmap for appropriate medical care.

These labs also provide assessments of environmental contamination that affect evacuation, remediation, and restoration decisions that have serious social, public health, political, and economic implications for potentially millions of people. The ability to provide policy-makers with analytical data regarding the scale, scope, and public health implications of potential radiological contamination quickly and accurately is critical to making informed decisions regarding evacuation, re-occupation, medical treatment, and environmental clean-up. But given the Nation's current lab capacity, they can't possibly get that information when we need it.

Last November, former Russian KGB agent Alexander Litvinenko was murdered in London using radioactive isotope Polonium–210. It took a long time for the British to figure out what had happened to him, and what was wrong. Fearful that others may have been exposed to the radiation, our CDC identified 160 American citizens who had been in the same hotels, the same restaurants that Litvinenko had been in at about the same time. And in the end, none of them had anything to fear. They did not suffer from any radiological contamination. But in attempting to locate a laboratory to do the clinical analysis for exposure to Polonium–210, the CDC found that only one single U.S. private lab was qualified and capable of doing the analysis, which really shows the massive shortfall in our radiochemistry laboratories.

There have been some efforts to close the gap, but the results have been slow and at times the bureaucratic response in some agencies has been infuriating. In 2005 the Department of Homeland Security established an Integrated Consortium of Laboratory Networks to help establish the capacity and capability to address this radiochemistry gap. But at the very same time, elsewhere in DHS, DHS was terminating a major, world-renowned radiochemistry quality assurance program at the Environmental Measurements Laboratory in New York.

That decision has had significant effect on many State and federal radiochemistry labs undermining their ability to certify that the sample results they provide are accurate and reliable.

Today, there are renewed calls for federal agencies to establish a proficiency testing program as part of radiological networks proposed by the CDC and the EPA to ensure that the data radiological emergency response officials and the public receive is dependable and trustworthy. We're going to have to spend some money and it is going to be to establish a program that is pretty much identical to the one that we just closed.

It is true that a radiological attack, a dirty bomb, would probably result in relatively few deaths initially, but there would be large-scale, low levels of exposure to a lot of people and a lot of critically important territory perhaps in city centers. Imagine the economic effect if we could not tell for days whether the downtown, the bottom of Manhattan, the financial district could be occupied again, whether we could use those buildings, whether we could go there,

whether we needed to demolish those buildings or clean them up before we could safely occupy those buildings again. And there would just be tens of thousands of people who would want to know whether they were contaminated, whether they suffered from internal contamination, whether their health was at risk, whether their children were affected by exposure.

Closing the capacity gap that we have as soon as possible would be an insurance policy against much worse effects of a dirty bomb attack.

The public expects that we do better than what we are prepared to do now, and the government's planning documents identify the estimated scale of the response, and it is clear that we do not have the capacity to do what is required of us. It seems we are likely headed for a radiological Katrina if terrorists do succeed in detonating a dirty bomb in an American city.

[The prepared statement of Chairman Miller follows:]

PREPARED STATEMENT OF CHAIRMAN BRAD MILLER

If there's one punch that terrorists have clearly telegraphed, it's the detonation of a "dirty bomb" in an American city. A dirty bomb is a conventional explosion that spreads radioactive material, contaminating perhaps several city blocks. We heard years ago that Osama bin Laden had tried to obtain radioactive materials to use in a dirty bomb.

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In a real radiological terrorist attack, the Environmental Protection Agency (EPA) estimates that they would need to collect, process and analyze more than 350,000 environmental samples in the 12 months following the incident. The Centers for Disease Control and Prevention (CDC), charged with monitoring and assessing the public's health in response to a radiological emergency, estimates that they will need to screen 100,000 individuals for potential radiological exposure in the first few days after a radiological attack.

Yet, depending on the types of radioactive material used in a real world event, the EPA predicts that given the Nation's current radiochemistry laboratory infrastructure it could take them as long as *six years* to analyze the 350,000 samples necessary to conduct a thorough environmental analysis—in just one city. One of the key assumptions outlined in the national planning documents upon which the most recent TOPOFF exercise was based is that all potentially exposed individuals (an estimated 100,000 people) will be tested for radiological contamination and that a valid method exists for testing these clinical specimens.

For those isotopes for which validated methods do exist screening 100,000 clinical specimens in the wake of a radiological attack could take more than *four years* to complete due to the current shortfall in radiochemistry laboratories, personnel and equipment. And that's the good news. The CDC currently has *no* valid method to test clinical specimens in a radiological emergency for seven of the 13 highest priority radioisotopes most likely to be used in a terrorist scenario.

These drastic shortfalls may have far-reaching implications for government officials responsible for responding to and recovering from a national radiological emergency. Today, we will hear from representatives at the CDC, EPA, Department of Energy (DOE) and Department of Homeland Security (DHS), about the massive gap that exists in their ability to respond to a radiological emergency effectively and efficiently by conducing rigorous and rapid analysis of radiological environmental and clinical samples. Radiochemistry laboratories provide a vital role in determining who's been contaminated and the nature and dangers of their exposures providing a roadmap for appropriate medical treatment. These labs also provide assessments of environmental contamination that affect evacuation, remediation and restoration decisions and have serious social, public health, political and economic implications

for potentially millions of people. The ability to provide policy-makers with analytical data regarding the scale, scope and public health implications of potential radiological contamination quickly and accurately is critical to making informed decisions regarding evacuation, re-occupation, medical treatment and environmental clean-up. But given the Nation's current lab capacity gap they can't possibly get that information when they need it.

Last November, former Russian KGB agent Vladimir Litvinenko was murdered in London with the radioactive isotope Polonium–210. Fearful that others may have been exposed to the radiation, the CDC identified 160 U.S. citizens that were in the same hotels and restaurants as Litvinenko around the same time. In the end, none of them had anything to fear. They did not suffer from any radiological contamination. But in attempting to locate a laboratory to do the clinical analysis for exposure to Polonium–210, the CDC found only one single U.S. private lab that was qualified and capable of doing the analysis, highlighting the massive shortfall in U.S. radiochemistry laboratories.

There have been some efforts to close this gap, but the results have been slow and at times the bureaucratic response in some agencies has been infuriating. In 2005 the Department of Homeland Security helped establish an Integrated Consortium of Laboratory Networks (ICLN) to help establish the capacity and capability to address this radiochemistry gap. Inexplicably at the very same time, the very same agency was terminating a major, world renowned radiochemistry quality assurance program at the Environmental Measurements Laboratory in New York. That decision has had a significant effect on many state and federal radiochemistry labs undermining their ability to certify that the sample results they provide are accurate and reliable. Today, there are renewed calls from federal agencies to establish a "proficiency testing" program as part of radiological networks proposed by the CDC and EPA to ensure that the data radiological emergency response officials and the public receive is dependable and trustworthy. We're going to have to spend money to establish an identical program to the one that DHS just ended a couple of years ago if we're going to have the radiological testing capacity needed to respond to a dirty bomb.

A radiological attack is likely to result in few immediate deaths but large scale low-levels of radioactive exposure to the vast majority of victims. Regardless of the actual public health impact, however, a "worried well" of tens of thousands of individuals are likely to demand clinical tests that can confirm they have *not* been contaminated with radiation. Providing that reassurance will help maintain the public's confidence in the government and will help stem a potential tide of growing fear that large segments of the public may have suffered from radiological contamination, however unfounded. Most important, this analysis will help identify those truly contaminated so that they can receive appropriate medical treatment as soon as possible. Closing this capacity gap as soon as possible would be a small insurance policy against a far larger disaster in the future. The public expects the Federal Government to be able to respond appropriately; the government's own planning documents identify the estimated scale of that response; yet the government has not moved actually to put into place the mechanisms we need to carry that response forward. Without the ability to conduct both environmental and clinical radiological assessments reliably and quickly it seems we may be headed for a radiological Katrina if terrorists succeed in detonating a dirty bomb in an American city.

Chairman MILLER. The Chair now recognizes Mr. Sensenbrenner for his opening statement.

Mr. SENSENBRENNER. Thank you very much. For once I am happy to endorse everything that the Chairman has said in his opening statement, and let me begin by saying that the potential for radiological accidents or attacks is a reality that we need to prepare for. This is something that has to be a high priority.

Several years ago I took one of those infamous Congressional oversight trips, and when I was in northern Norway, I was advised by an environmental NGO that there were over 100 beacons that the former Soviet Union put on their Arctic coast powered by cesium–137 batteries and that there were also a number of these beacons in the mountains of the Caucasus with similar powering. They are all in very remote areas. It would be very easy for someone to take the cesium–137 battery and to turn it into a dirty bomb

without anybody knowing that the batteries were missing. The day following this discovery, a scientist who was on this trip and who was temporarily on Senator Biden's staff asked the Norwegian scientists that were studying Arctic issues how many dirty bombs each of these batteries could make. The answer was 10 a piece. And as a result of this, Senator Biden and I successfully co-sponsored legislation which was signed into law amending the *Nunn-Lugar Act* to allow us to buy this nuclear material from the Russian government, like we did with other types of nuclear material, not only from Russia but the other independent republics of the former Soviet Union. It is my understanding that a battery was left by somebody in Gorky Park in Moscow to let the Russian government know that somebody had their hands on these types of nuclear materials that shouldn't have them. And this is truly scary because if the Chechen rebels have these batteries, I think we can assume that there has been a move by other terrorist organizations which target the United States and having these batteries.

If there is a dirty bomb explosion, not only will there be potentially tens or hundreds of thousands of people exposed to contamination, but the panic that will set in if large parts of major cities have to be evacuated. And I think that is one of the reasons why the exercise that just concluded yesterday was something that was real time and something that we have to prepare for.

Now, in June of 2005 the Homeland Security Department released the Technology Assessment Roadmap known as ERDAP, and that assessment found, quote, "tools to rapidly triage individuals needing medical attention and to intelligently direct medical treatment to those needing immediate care will optimize the use of scarce resources, improve survival, and enhance public confidence in government." These tools don't exist today.

Following a radiological incident, there is a critical need to determine who has been exposed and to what degree. Rapid radiological dose assessment is critical for determining who needs treatment and what treatment is needed. And as ERDAP found, quote, "lives may be saved if we can develop rapid dose assessment and can implement earlier treatment."

Despite this critical need, we are still suffering from a clear technology gap. Validated methods of testing in a radiological emergency exist for only six of the CDC's 13 highest priority radioisotopes most likely to be used in a terrorist scenario. And for those isotopes where screening methods do exist, screening the number of individuals likely to be exposed in a terrorist attack could take years.

Real-world radiological incidents should be instructive. The most recent example was the Polonium–210 poisoning in London that killed former KGB agent Alexander Litvinenko. The CDC estimated that 160 Americans were potentially exposed to radiation as the Chairman indicated. When it attempted to test these individuals, it found that there was only one laboratory in the country capable of carrying out the test and it only had the capacity to test a handful of people per day. Fortunately, all of these tests proved negative on the Americans who were exposed.

A radiological incident in an urban area could result in much greater exposure. In 1987, in Goiania, Brazil, a small source of ce-

sium–137, which is the same isotope that I referred to in these beacons in the former Soviet Union, was stolen from an abandoned radiotherapy institute. By the time the material was recognized as dangerous 15 days later, four people were dead and hundreds were injured by internal contamination. Over 100,000 people had to be examined for radiological contamination, topsoil had to be removed from several sites, and several houses were demolished. Neither of these incidents originated from an intentional effort to spread contamination. The scale of an actual radiological attack would be likely much greater.

In a report titled Creation of a National Radioanalytical Laboratory Response Network, the Integrated Consortium of Laboratory Networks workgroup found that in the case of a radiological dispersion device, better known as a dirty bomb, in an urban district, 350,000 environmental samples would need to be collected over 12 months; and more than 100,000 clinical samples would need to be collected, analyzed, and processed within the first few days. Not only did the workgroup identify a lack of capacity to deal with this volume, it also highlighted a lack of competency due to a lack of laboratory analytical methods specific for emergency response needs, reduction in radiochemistry expertise due to retirements, lack of formal training programs for radioanalytical labs, and reduction in federal radiological proficiency testing programs.

We no longer have the luxury not to maintain this capacity, and I look forward to the testimony today.

[The prepared statement of Mr. Sensenbrenner follows:]

PREPARED STATEMENT OF REPRESENTATIVE F. JAMES SENSENBRENNER, JR.

The potential for radiological accidents or attacks is a reality we need to prepare for. In a June 2005, The Department of Homeland Security (DHS) released a Technology Assessment and Roadmap for the *Emergency Radiation Dose Assessment Program* (known as ERDAP). Two years ago, the assessment found that:

> Tools to rapidly triage individuals needing medical attention and to intelligently direct medical treatment to those needing immediate care will optimize the use of scarce resources, improve survival, and enhance public confidence in government.

Today, these tools still do not exist. Following a radiological incident, there is a critical need to determine who has been affected and to what degree. Rapid radiological dose assessment is critical for determining who needs treatment and what treatment is needed. As ERDAP found, "lives may be saved if we can develop rapid dose assessment and can implement earlier treatment."

Despite this critical need, we are still suffering from a clear technology gap. Validated methods for testing in a radiological emergency exist for only six of the CDC's 13 highest priority radioisotopes most likely to be used in a terrorist scenario. And for those isotopes where screening methods do exist, screening the number of individuals likely to be exposed in a terrorist attack could take years.

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A radiological incident in an urban area could result in much greater exposure. In 1987, in Goiania, Brazil, a small source of cesium–137 was stolen from an abandoned radiotherapy institute. By the time the material was recognized as dangerous 15 days later, four people were dead and hundreds were injured by internal contamination. Over 100,000 people had to be examined for radiological contamination, topsoil had to be removed from several sites, and several houses were demolished.

Neither of these incidents originated with an intentional effort to spread contamination. The scale of an actual radiological attack would likely be greater still.

In its report titled, *Creation of a National Radioanalytical Laboratory Response Network,* the Integrated Consortium of Laboratory Networks (ICLN) work group found that, in the case of a radiological dispersion device, or dirty bomb, in an urban district, 350,000 environmental samples would need to be collected over 12 months and more than 100,000 clinical samples would need to be collected, analyzed, and processed within the first few days. Not only did the work group identify a lack of capacity to deal with this volume, it also highlighted a lack of competency due to: a lack of laboratory analytical methods specific for emergency response needs, reduction in radiochemistry expertise due to retirements, lack of formal training programs for radioanalytical labs, and reduction in federal radiological proficiency testing programs.

We no longer have the luxury to not maintain this capacity. I look forward to hearing from today's witnesses about how these capacity and competency gaps can be addressed.

Chairman MILLER. Thank you. There will be a recession following the hearing to celebrate Mr. Sensenbrenner's and my agreement.

If there are any Members who wish to submit additional opening statements which seems unlikely since no one else is here, their statements will be added to the record.

[The prepared statement of Mr. Costello follows:]

PREPARED STATEMENT OF REPRESENTATIVE JERRY F. COSTELLO

Mr. Chairman, I appreciate the Subcommittee looking into this issue today, as our nation's preparedness in the event of a radiological emergency is of the utmost importance. In a post-9–11 era, constant examination of many of our emergency response procedures is critical, given what is at stake if a radiological attack were to take place.

A central question that must be addressed is how to better prepare for an emergency given our current limited capacity to test for internal radioactive exposure? The technology already exists to test victims in the event of a radiological attack, but not enough laboratories are equipped to handle a large volume of samples. In the most common general scenario given, if Chicago were to be attacked and 100,000 samples were sent for testing, it would take more than four years to see the results.

I look forward to learning more about the possibilities for increasing laboratory capacity, working in conjunction with the CDC, EPA and DOE.

Mr. Chairman, I'd like to commend you for calling this hearing so we can better examine our nation's preparedness level in the case of a radiological attack. Staying prepared in the event of all types of emergencies is an enormous task, and this hearing is a step in the right direction.

Chairman MILLER. I will now introduce the witnesses. Dr. John Griggs is the Chief of the Monitoring and Analytical Services Branch of the United States Environmental Protection Agency's National Air and Radiation Environmental Laboratory, NAREL, Office of Radiation and Indoor Air. I hope you don't have to say your whole title very often. He is the Co-Chair of the Integrated Consortium of Laboratory Networks, ICLN, Radiological Laboratory Response Group. With Dr. Griggs is Ms. Dana Tulis, Deputy Director of the Office of Emergency Management at the Environmental Protection Agency. Ms. Tulis will read a joint statement for herself and Dr. Griggs. Dr. Robert Hadley is from the Lawrence Livermore National Laboratory at the Department of Energy. Dr. Hadley is the current Chair of the Federal Radiological Monitoring and Assessment Center's, FRMAC, Laboratory Analysis Working Group and was formerly the Chair FRMAC Health and Safety Working Group. Dr. Robert L. Jones is the Chief of Inorganic Toxicology and Radionuclide Labs at the Center for Disease Control and Prevention. He is the Co-Chair of the Integrated Consortium of Laboratory Networks, ICLN, Radiological Laboratory Response

Group, and head of the CDC's Polonium–210 response efforts last year. And unfortunately, Dr. Randy Long who chairs the Integrated Consortium of Laboratory Networks for the Department of Homeland Security was supposed to testify today, had a severe medical problem yesterday with a knee which presumably is not life-threatening, although perhaps painful and annoying, and is not able to be with us today. We hope he is up and about soon, but Dr. John Vitko, Director of the Chemistry and Biological Security Division at DHS has graciously agreed to read Dr. Long's prepared testimony into the record.

As all of your know, your full written statement will be placed in the record and your oral testimony is limited to five minutes each. We aren't real strict with that, but try to pay some attention when you see the red light go on. It is also the practice of the Subcommittee to take testimony under oath. I did not really anticipate there would be any perjured testimony today, but it is under oath. Do any of you have any objection to being sworn in? You also have a right to be represented by counsel. We just ask you these questions to put you ease. Are any of you represented by counsel today? If you would then please stand and raise your right hand. Do you swear to tell the truth and nothing but the truth?

Ms. Tulis, you may begin.

STATEMENT OF MS. DANA TULIS, DEPUTY OFFICE DIRECTOR, OFFICE OF EMERGENCY MANAGEMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. TULIS.

Good morning. Mr. Chairman and Members of the Subcommittee, I am Dana Tulis, the Deputy Office Director for the Office of Emergency Management. I appreciate the opportunity to discuss the status of EPA's efforts to assess environmental radioanalytical laboratory capability and capacity for radiological response. I would also like to share with you some of the other activities EPA has underway to protect the Nation in the event of an accidental or intentional release of radiological material.

I am accompanied today by John Griggs, Chief of the Monitoring and Analytical Services Branch for EPA's National Air and Radiation Environmental Lab, NAREL. I will summarize my remarks, but I do ask that my entire written testimony, as you stated, be submitted for the record.

EPA, working with the Departments of Homeland Security, Energy, Health and Human Services, and others, has identified a considerable gap in national environmental radiological laboratory capacity for responding to terrorist incidents involving radiological contamination. In the event of such an event fixed laboratories will serve as a critical source of high-quality data to support incident response. Data from fixed environmental radiological laboratories will be particularly critical during consequence management activities such as decontamination and clearance efforts, and restore any critical infrastructure, such as ensuring the safety of our drinking water.

Under the National Response Plan's, NRP, Nuclear/Radiological Incident Annex, the Department of Energy coordinates radiological monitoring and assessment activities for the initial phases of a re-

sponse to a radiological incident via the FRMAC, as you know, the Federal Radiological Monitoring and Assessment Center. After the immediate emergency condition of an incident is stabilized as well as other criteria, the FRMAC leadership is transferred to the Environmental Protection Agency.

Throughout the response effort, however, EPA provides resources for defining and delineating the environmental impact of the radiological incident. EPA brings to bear both personnel and equipment to this mission, including 250 on-scene coordinators and our special teams under the National Oil and Hazardous Substances National Contingency Plan.

EPA's NRP responsibilities include maintaining and enhancing the Nation's most comprehensive ambient radiation monitoring network called RadNet, which consists in part of 50 stationary and 40 portable near-real time air monitors. The stationary real-time monitors collect a beta and gamma spectrum of particulates on an air filter hourly, and transmit data to the NAREL for further analysis. The portable monitors collect ambient gamma radiation readings as well as air filters which can also be sent to a laboratory for further specific analyses.

Under the NRP, EPA has responsibility to lead the cleanup and recovery phase of a radiological incident for which no other department or agency has that responsibility, and that does include terrorist incidents such as a dirty bomb. EPA will use the Protected Action Guides for dealing with long-term site restoration following a major radiological release to help State and local authorities make protective action decisions. Through training, research, development and technical support activities, EPA continues to increase the agency's preparedness, and its response and recovery capabilities for chemical, biological as well as radiological incidents.

In April 2004, the White House released Homeland Security Presidential Directive Number 10. To fulfill our responsibilities under HSPD–10, EPA is establishing an all-media, such as soil, water, and air, environmental Laboratory Response Network (eLRN) to address environmental laboratory analytical gaps for chemical warfare, biological and radiological agents. The eLRN is leverage existing networks and capabilities, and will upgrade and expand additional capabilities to ensure EPA has sufficient capability and capacity to meet its responsibilities for an incident. EPA has also begun a demonstration study aimed at improving environmental radiological laboratory capacity through enhancing State laboratories and is developing tools to enhance the capacity of commercial laboratories as well.

However, EPA's analysis of the Nation's existing environmental radiological laboratory capacity relative to demand from only a single dirty bomb or radiological dispersal device (RDD) in a major urban business district does reveal significant laboratory gaps. As you know, the gap is based upon the Homeland Security's Planning Scenario #11 which we evaluated which actually was for three major urban business districts. However, our peak shortfall for just one RDD is approximately 7,000 to 9,000 samples per week with an average shortfall of 3,000 samples per week. This gap will result in a lack of timely, reliable, and interpretable data which will delay

national and local response as well as consequent management activities. We estimate about two years for those type of analyses.

In closing, I want to assure the Committee that EPA will continue to work closely with our other federal agencies via the DHS-sponsored radiological laboratory working group, and with states to enhance national radioanalytical capability and capacity to start to fill this environmental laboratory gap and to maintain readiness to meet our responsibilities in the event of an accidental or intentional release of radiological or nuclear material.

Mr. Chairman, that concludes my prepared remarks. Myself and Dr. Griggs would be very pleased to answer any of your questions that you or the Subcommittee Members may have. Thank you.

[The prepared statement of Ms. Tulis follows:]

PREPARED STATEMENT OF DANA TULIS

Good morning. Mr. Chairman and Members of the Committee, I am Dana Tulis, Deputy Office Director for the Office of Emergency Management at the U.S. Environmental Protection Agency (EPA). I appreciate the opportunity to discuss the status of EPA's efforts to assess environmental radioanalytical capability and capacity in radiological response. I would also like to share with you broader activities EPA has underway to protect the Nation in the event of an accidental or intentional release of radiological material.

ROLE OF ENVIRONMENTAL RADIOANALYTICAL LABORATORIES IN RADIOLOGICAL RESPONSE

In the event of a radiological or nuclear Incident of National Significance (INS), fixed environmental radiological laboratories will serve as a critical source of high quality and interpretable data to support incident response and consequence management activities. When EPA responds to radiological incidents, it is essential that the environmental radiological laboratories, whether federal, State, or commercial, that conduct analyses on environmental samples meet EPA's standards for stringent accuracy and quality control. The fixed laboratories must have the capability of analyzing for the broadest possible range of radiological contaminants while achieving the most sensitive measurements in terms of detection capabilities. Data from fixed environmental radiological laboratories will be particularly critical during consequence management activities such as decontamination and clearance efforts, and will be used to make long-term decisions to protect the public from radiological contamination, and to restore any affected critical infrastructure and key resources, such as ensuring the safety of our drinking water.

NATIONAL RESPONSE PLAN: EPA'S RADIOLOGICAL EMERGENCY RESPONSE RESPONSIBILITY

Under the National Response Plan's (NRP's) Nuclear/Radiological Incident Annex, the Department of Energy (DOE) coordinates radiological monitoring and assessment activities for the initial phases of a response to a radiological incident. DOE coordinates federal radiological environmental monitoring and assessment activities as the lead technical organization in what is known as the Federal Radiological Monitoring and Assessment Center or the "FRMAC." The FRMAC is an interagency organization with representatives from various federal, State, and local radiological response organizations. The FRMAC provides an operational framework for coordinating all federal radiological monitoring and assessment activities during a response to support the Federal Coordinating Agency, State(s), local, and/or tribal governments. In the event of a Presidentially-declared major disaster or emergency, the FRMAC also provides its information to the Federal Emergency Management Agency's (FEMA's) Federal Coordinating Officer to assure appropriate and adequate additional resources are available for the State and local authorities to draw upon. The FRMAC works with the Interagency Modeling and Atmospheric Assessment Center, or IMAAC, to produce predictive plots of plume dispersion and dose rates and collects radiological monitoring data. It develops radiation contours showing where contamination is located and the associated radiation levels, which are used to recommend appropriate protective actions.

FRMAC leadership responsibility, and leadership of federal radiological environmental monitoring and assessment activities, is transferred to EPA per the Nuclear/Radiological Incident Annex to the NRP, at a mutually agreeable time, and after

consultation with the Department of Homeland Security (DHS) and its coordination entities, as well as State, local, and tribal governments. The following conditions are intended to be met prior to transfer:

- The immediate emergency condition is stabilized;
- Off-site releases of radioactive material have ceased, and there is little or no potential for further unintentional off-site releases;
- The off-site radiological conditions are characterized and the immediate consequences are assessed;
- An initial long-range monitoring plan has been developed in conjunction with the affected State, local, and tribal governments and appropriate federal agencies; and
- EPA has received adequate assurances from the other federal agencies that the required resources, personnel, and funds are available for the duration of the federal response.

When the FRMAC is transferred to EPA, EPA assumes responsibility for coordination of radiological monitoring and assessment activities.

EPA'S PERSONNEL AND EQUIPMENT RESOURCES

Throughout the response effort, however, EPA provides resources for defining and delineating the environmental impact of the radiological incident, whether under DOE leadership or EPA leadership, and uses these resources to carry out its mission and NRP responsibilities. These responsibilities encompass maintaining personnel and asset readiness for radiological emergency responses, which include participating in emergency response situations and providing technical expertise and support. EPA brings to bear both personnel and equipment to this mission, including 250 On-Scene Coordinators and its Special Teams under the National Oil and Hazardous Substances National Contingency Plan such as the National Decontamination Team (NDT), the Radiological Emergency Response Team (RERT), the Environmental Response Team (ERT), and the National Counter Terrorism Evidence Response Team (NCERT) which each bring specialized personnel and equipment, and the expertise gained every day in protecting human health and the environment. More specifically, the RERT has up to 50 people who can be deployed to the field or a support role and the NDT has 15 people who are available for deployment. Altogether EPA has approximately 350 personnel for emergency responses and is also building a Response Support Corps to expand our response capability. The Agency's radiation health and safety and detection equipment assets run the gamut from approximately 300 personnel dosimeters to measure dose to protect response personnel to more than 200 pieces of emergency response/assessment equipment to detect alpha, beta, or gamma radiation, depending on the equipment, in different environmental matrices. Equipment also includes mobile laboratories, a scanner van, and field based equipment that can identify specific gamma sources.

In addition to personnel and assets, EPA's NRP responsibilities include maintaining and enhancing the Nation's most comprehensive ambient radiation monitoring network named RadNet, which currently consists of 50 stationary and 40 portable near-real time air monitors, 40 additional non-real time air monitors, milk collection at 37 locations, drinking water collection at 77 locations and precipitation collection at 44 locations. The stationary near real-time monitors collect a beta and gamma spectrum of the particulates on an air filter hourly, and transmit data to the National Air and Radiation Environmental Laboratory (NAREL), where radionuclide specific determinations can be quickly made. The portable monitors collect ambient gamma radiation readings through the use of air filters which can be sent to a laboratory for radionuclide specific analyses.

GUIDANCE FOR RADIATION RESPONSES

EPA has worked closely with DHS and our other federal partners to ensure that the Protective Action Guidelines, or PAGs that can be applied to almost any radiological or nuclear incident, including radiation dispersal devices (dirty bombs). EPA has developed PAGs, which suggest precautions that can be taken to keep people from receiving an amount of radiation that might be dangerous to their health. The PAGs are decision levels to help State and local authorities make protective action decisions during emergencies, and should be applied using incident-specific information. Users of PAGs may include hazardous materials teams, emergency managers, anyone working on terrorism preparedness, and nuclear power plant communities.

The PAGs Manual, which EPA issued in 1992, presented guidance for the early or emergency phase e.g., first four days, and intermediate phase, e.g., source is controlled and field data become available, of a response to primarily nuclear power

plant accidents. A revision is underway that addresses all radiological incidents such as a terrorist use of a dirty bomb, and incorporates DHS' guidance for dealing with long-term site restoration following a major radiological release. The DHS guidance does not recommend pre-established numerical guidelines for cleanup levels because of the broad range of potential impacts that may occur.

Instead, it proposes an optimization process in which potential actions to reduce radiation dose are evaluated, and the benefits of each are then compared to the detriments of the action. We have also developed guidance for Agency personnel on radiation turn-back levels. Turn-back levels help incident responders know how far they can go into a radiation area; they are exposure rates and dose limits which when met require responders to turn back and seek further guidance. The levels we developed are specific to EPA's mission and capabilities, and we recommend that other organizations develop their own.

Under the NRP, EPA has responsibility to lead the cleanup and recovery phase of a radiological incident for which no other department or agency has responsibility, including terrorist incidents such as a dirty bomb. Through training, research, development and technical support activities, EPA continues to increase its preparedness, and its response and recovery capabilities for chemical, biological or radiological incidents that threaten homeland security. The Agency continues to assemble and evaluate private sector tools and capabilities to ensure effective response approaches can be identified and evaluated for future first responders, decisionmakers, and the public to use. EPA continues to work with federal institutions and other organizations through collaborative research efforts to strengthen decontamination capabilities. EPA promotes improved response capabilities across government and industry in areas where EPA has unique knowledge and expertise. In the area of environmental laboratory capabilities and capacity, EPA has begun a demonstration study aimed at improving national radiological laboratory capacity through enhancing State laboratories and is developing tools to enhance capacity of commercial laboratories throughout the United States.

HIGHLIGHTS OF "ASSESSMENT OF NATIONAL ENVIRONMENTAL RADIOLOGICAL LABORATORY CAPACITY GAP"

In April 2004, the White House released Homeland Security Presidential Directive Number 10 (HSPD–10). This directive requires EPA to determine the nationwide laboratory capacity required to support environmental decontamination of chemical, biological, and radiochemical-nuclear agents by reviewing federal, State, local, and private laboratory capabilities specifically related to environmental sampling and testing and to ensure evidentiary considerations. To respond to HSPD–10 requirements, EPA is establishing an all media, e.g., soil, air, and water, environmental Laboratory Response Network (eLRN) to address environmental laboratory analytical gaps for chemical warfare, biological and radiological agents. The eLRN will leverage existing laboratory networks and capabilities, and upgrade and expand additional capabilities to ensure that EPA has sufficient capacity and capability to meet its responsibilities for an INS, such as a terrorist attack involving radiological or nuclear materials. In order to determine the national environmental radiological laboratory capacity needs associated with an INS involving radiochemical or nuclear agents, EPA conducted an assessment of the environmental sample demand for the White House Homeland Security Council's Planning Scenario #11 which involves the detonation of Radiological Dispersal Devices (RDD) in three major urban business districts.

The results of the assessment of the sample demand and estimates of the existing nationwide environmental radiological laboratory capacity are summarized in EPA's draft document entitled *Assessment of National Environmental Radiological Laboratory Capacity Gap*. The estimated sample demand resulting from a single RDD event is approximately 360,000 samples over a one-year period. This estimate equates to an average sample demand of approximately 7,000 to 8,000 samples per week over 52 weeks and a peak sample demand of 13,000 to 15,000 samples per week. These numbers do not include the quality control analyses the laboratories will perform in conjunction with the samples which contribute to the overall analysis demands on the laboratories' personnel. EPA's analysis of the Nation's existing radiological laboratory capacity relative to the estimated sample demand from the RDD scenario reveals a significant laboratory capacity gap with an estimated peak capacity shortfall of approximately 7,000 to 9,000 samples per week and an estimated average capacity shortfall of approximately 3,000 samples per week. This gap will result in a lack of timely, reliable, and interpretable data which will delay national and local response and consequence management activities.

It should be noted that this gap is based on a single RDD event in which the source is a single radionuclide which is among the most straightforward to measure

from a laboratory perspective. An RDD event with a more complex source—multiple, more difficult to analyze radionuclides, multiple RDD events as described in Planning Scenario 11, or multiple RDD events with different radiation sources would result in an even larger capacity gap. Although EPA has not conducted a detailed assessment, a limited analysis of an improvised nuclear device (IND) scenario indicates a contamination area of approximately 3,000 square miles, and a laboratory capacity gap with potentially millions of laboratory analyses required.

In addition to the capacity gap, EPA's national environmental radiological gap assessment also revealed capability and competency gaps. The capability gap relative to laboratory incident response is largely due to a lack of "tools" like rapid radiochemical methods and laboratory protocols specifically designed for response to radiological or nuclear incident.

The competency gap is due to an overall national declining infrastructure for radiological laboratories due to a number of factors including: reduction of personnel with radiochemistry expertise without adequate replacements; lack of formal training programs for radiological laboratory personnel; and a reduction in federal radiological proficiency testing (PT) programs.

LESSONS LEARNED FROM PREVIOUS RADIOLOGICAL CONTAMINATION INCIDENTS

EPA works continuously with federal, State, and private sector emergency preparedness and response communities to ensure that lessons learned from incidents such as the 1987 Goiania incident in Brazil and the more recent Polonium–210 murder in the United Kingdom are integrated into the Nation's preparedness efforts. While the Goiania and London incidents provided numerous lessons of potential relevance to a dirty bomb response, it should be remembered that neither actually originated as an intentional effort to spread contamination throughout a densely populated area. In fact, environmental contamination was an unintended consequence. Thus, the scale of these two incidents, in particular, needs to be assessed carefully with respect to intentional efforts to harm the Nation's people and economy by spreading radiological contamination.

However, these and other incidents have taught us that there are a number of critical aspects in responding to radiological contamination. The Protective Action Guides must be accepted and understood prior to an incident. Adequate field personnel and instruments are needed to detect, identify and quantify the radioactive material. Extensive field and fixed laboratory capacity and capability will be needed to analyze the many air, water, soil and food samples that will be used to determine public protective measures.

ROLE IN TOPOFF IV

EPA participation in the DHS-led TOPOFF IV was extensive. EPA deployed over 250 participants to the three exercise venues—Portland, Oregon; Mesa, Arizona; and Guam. Participants included EPA's On-Scene Coordinators, members of our four special teams, the Radiological Emergency Response Team (RERT), Environmental Response Team (ERT), National Decontamination Team (NDT), and the National Counterterrorism Evidence Response Tem (NCERT), as well as personnel from headquarters and EPA's regional offices. We also deployed monitoring and analytical equipment such as our mobile radiation laboratory. Additionally, the EPA Emergency Operations Center was staffed and EPA participated in various interagency coordination and support entities, such as the Domestic Emergency Support Team (DEST), the Incident Management Planning Team (IMPT), and the National Response Coordination Center (NRCC). EPA personnel filled critical positions within FRMAC, working in support of DOE, DHS, and the affected State and local governments to assess potential contamination. EPA staff also served as controllers and evaluators at the various exercise venues.

At the time this testimony was submitted to the Committee on Science and Technology, the TOPOFF IV counterterrorism exercise had just concluded, and the federal community is still working to analyze the exercise and develop conclusions. In addition to the functional exercise, TOPOFF IV includes a Long-Term Recovery table top exercise, which will occur in December 2007. During this exercise, we expect to discuss the role of environmental laboratories in supporting the recovery phase. DHS will publish a final report that will provide a summary of conclusions, and we will be happy to provide you with additional information in the future.

However, it should be noted that the primary exercise venue, in Portland, Oregon, emphasized the initial emergency response activities rather than the extended recovery phase during which the majority of fixed laboratory samples will be analyzed. As noted earlier in my testimony, the spread of radiological contamination from multiple events such as in Portland, Phoenix and Guam would require more labora-

tory analyses than the assessment of capacity and capability done to date, which assumed a single RDD event.

CONCLUSION

We appreciate the Committee's interest in examining national radioanalytical laboratory capability and capacity to support radiological response and the opportunity to update you on the status of EPA's other efforts in the area of radiological response. We understand that radioanalytical capacity is a key component of a multifaceted radiological response in an environment of declining radiochemistry infrastructure. EPA is working closely with other federal agencies via the DHS-sponsored Radiological Laboratory Working Group and with states to enhance national environmental radioanalytical capacity to maintain readiness to meet our responsibilities in the event of an accidental or intentional release of radiological or nuclear material.

Chairman MILLER. Thank you. Dr. Hadley.

STATEMENT OF DR. ROBERT T. HADLEY, CHAIR OF FEDERAL RADIOLOGICAL MONITORING AND ASSESSMENT CENTER'S LABORATORY, ANALYSIS WORKING GROUP, LAWRENCE LIVERMORE NATIONAL LABORATORY, U.S. DEPARTMENT OF ENERGY

Dr. HADLEY. Thank you, Mr. Chairman and Members of the Subcommittee. I am honored to have the opportunity to testify here today as a subject matter expert about radioanalytical laboratory issues. I am a certified industrial hygienist and health physicist from Lawrence Livermore National Laboratory with over 25 years in nuclear emergency response management, and I currently serve as the Chair of the Federal Radiological Monitoring and Assessment Center, or FRMAC, Laboratory Analysis Working Group.

We all recognize that a response to a radiological event will require many highly skilled professionals ranging from surveillance to response organizations and forensics. My remarks today are confined to my role as part of the FRMAC.

The FRMAC is part of the Nuclear Incident Response Team maintained by DOE can be activated by the Department of Homeland security in response to a nuclear or radiological incident. The purpose of the FRMAC is to provide a clear operating picture of radiological conditions in the field to responders for decision-making and incident action planning. FRMAC data is critical for characterizing the exact nature and extent of contamination which supports public health and safety efforts. FRMAC provides verified radiation measurements and characterization of overall radiological conditions. FRMAC measurements are utilized by the National Atmospheric Release Advisory Center located at Lawrence Livermore to provide an accurate and complete picture of the radioactive footprint. This information can help guide crop and food field sampling teams to areas where contamination might result in an ingestion pathway dose that exceeds health and safety limits.

FRMAC provides procedures for sample collection and analysis to all participating agencies. We work closely with CDC, EPA, and State and local responders. FRMAC also provides live and web-based instructions and participate in national and regional level exercises.

I participated as part of the FRMAC team in the recent the TOPOFF-4 exercise, at the Portland, Oregon venue. I was the senior radiological data controller at the event scene, and my responsibilities included providing radiological exposure and contamina-

tion measurements to federal, State, and local responders and other government officials including the FBI. During the first day, most of the radiological data involved direct reading instruments that provide immediate results.

FRMAC capabilities arrived and began operation on Day 2 and stayed through the end of the exercise period. FRMAC air sampling instruments were deployed within and around the contaminated area and collection of soil, plant, water, and air samples began. This data was used to determine the size of the contaminated area and provide health and safety information to local residence. FRMAC established a liaison at the Joint Field Office, and the FRMAC Web Portal was utilized to disseminate information to approved users at all levels of government. The interagency FRMAC team was well-integrated and worked together to gather requirements and provided hazard information in a timely manner. Unfortunately, due to the short duration and field play, the full radioanalytical laboratory infrastructure was not exercised. It is my understanding that remediation and recovery requirements were in notional play during this the final week of TOPOFF.

In June 2007, FRMAC released a draft analysis for the emergency phase of a response, typically the first 4 to 7 days. This is a critical period for addressing the health and safety of the public and responders. This document focuses on the federal resources activated to provide rapid support to the nuclear/radiological monitoring and dose assessment activities at the incident scene in accordance with the national response plan and nuclear and radiological incidence. It did not attempt to complete a comprehensive assessment of environmental and clinical laboratory resources that would be needed for the long-term environment remediation activities, medical response, and human health monitoring.

All scenarios were addressed as a single event and included a nuclear explosion, radiological dispersal devices, and accidental or unintentional non-explosive release of radioactive materials. For the limited scope of the study, the document suggested that current fixed radioanalytical laboratory infrastructure could handle short duration environmental monitoring and dose assessment missions. These laboratories have not been integrated into an enduring national capability focused on the long-term analytical needs.

Although the primary mission of the FRMAC is to evaluate environmental radiological data, FRMAC assets may also be called on to assist the Department of Health and Human Services with human clinical data. DOE has developed a cytogenetic dosimetry capability at Radiation Emergency Assistance Center Training Site in Oak Ridge, Tennessee, to evaluate radiation dose received based on blood samples collected from victims or responders. This capability was demonstrated during TOPOFF.

This concludes my remarks, and thank you for the opportunity to address the Committee.

[The prepared statement of Dr. Hadley follows:]

PREPARED STATEMENT OF ROBERT T. HADLEY

Mr. Chairman and Members of the Committee, thank you for the opportunity to testify here today as a subject matter expert about radioanalytical laboratory issues. I am a Certified Industrial Hygienist and Health Physicist from Lawrence Livermore National Laboratory (LLNL) with over 25 years in nuclear emergency response

management and currently serve as the Chair of the Federal Radiological Monitoring and Assessment Center (FRMAC) Laboratory Analysis Working Group. The FRMAC was formally established in 1979 following Three Mile Island. The FRMAC is an interagency effort and normally includes representation from the Department of Energy (DOE), Environmental Protection Agency (EPA), the Department of Commerce, the National Communications System, Department of Defense (DOD)/U.S. Army Corps of Engineers and other federal agencies as needed. Response to a radiological event will require many highly skilled professionals ranging from surveillance to response operations and forensics. Although LLNL's extensive scientific and technical expertise in nuclear materials behavior is routinely called upon to support many phases of the response activity, my remarks today are confined to my role as part of the FRMAC.

Under the *Homeland Security Act*, DHS has the authority to activate the Nuclear Incident Response Team (NIRT), which consists of: (1) DOE entities that perform nuclear and/or radiological emergency support, and (2) EPA entities that perform such support functions (including radiological response functions) and related functions. The FRMAC is a NIRT asset maintained by DOE that is available on request to respond to nuclear/radiological incidents. The purpose of the FRMAC is to provide a clear operating picture of radiological conditions in the field to responders for decision-making and incident action planning; it provides radiation measurements, interpretations of radiation contamination distribution and overall characterization of the radiological conditions. DOE maintains the Aerial Measuring System as well as a land-based mobile laboratory that can be established at or near the incident site to enable close coordination with DHS and other federal, State and local response agencies.

Upon activation, the FRMAC provides an operational framework for coordinating Federal, State, local and tribal government radiological monitoring and assessment activities during a response to a radiological emergency. The support the FRMAC provides includes:

- Coordinating federal radiological monitoring and assessment activities
- Maintaining technical liaison with State and local agencies with monitoring and assessment responsibilities
- Maintaining a common set of all radiological monitoring data, in an accountable, secure, and retrievable form, and ensuring the integrity of the FRMAC data
- Providing monitoring data and interpretations including exposure rate contours, dose projections and any other requested radiological assessments to DHS and other federal, State and local response agencies
- Providing personnel and equipment needed to perform radiological monitoring and assessment activities.

FRMAC assist the states, local and tribal governments in their mission to protect the health and well-being of their citizens with verified radiation measurements, interpretations of radiation distributions based on federal and local guidelines, and characterization of overall radiological conditions. FRMAC data is critical for characterizing the exact nature of the contaminant and the extent of contamination, which, in turn, supports public health and safety efforts. Integration of measurements of radioactive contamination, airborne or on the ground, is particularly valuable in the early and intermediate phases of an event.

FRMAC measurements are utilized by the National Atmospheric Release Advisory Center (NARAC) to provide a complete picture of the radioactive footprint. This technique can aid in helping guide crop and food field sampling teams to areas in which contamination might result in an ingestion pathway dose that exceeds regulatory limits.

Plans and procedures for sample collection and analysis have been developed and made available to all participating federal, State, and local agencies. FRMAC works closely with Center for Disease Control (CDC), EPA, and the Radiation Emergency Assistance Center/Training Site (REACS/TS) to assist in the dissemination of information pertaining to public health emergencies, training, and exercise opportunities. FRMAC also provides live classroom instruction and web-based training venues. National level and regional exercises have been used to evaluate the FRMAC response.

As an example of a National Level Exercise, I would like to explain how sample collection and laboratory analysis was exercised during the recent the TOPOFF–4 exercise, which was recently conducted. During this exercise, FRMAC participated in the full field exercise at the Portland, Oregon venue. I participated as the lead day-shift radiological data controller at the event scene. My responsibilities included providing radiological exposure and contamination measurements to Fire, Haz-

ardous Materials (Hazmat), Radiological Assistance Program (RAP), Federal Bureau of Investigation (FBI), and all other responding teams.

During the first day, most radiological data involved direct reading instruments that provide immediate results. Air samples were collected for laboratory analysis to evaluate airborne radioactivity that responders and the public may be breathing into their bodies, and to determine (using spectral data) the particular radioisotopes that were present. The spectral data received initial evaluation from locally deployed DOE Radiological Assistance Teams and/or local HAZMAT responders. Spectral data was also sent to DOE laboratories (usually LLNL, LANL or SNL) for confirmatory analysis. Air samples were sent to local environmental analysis laboratories (e.g., University of Oregon) for evaluation. Victims and casualties were evaluated for external contamination with direct reading instruments and then sent to hospitals for treatment and further clinical evaluation.

FRMAC capability arrived and became operational at TOPOFF–4 on Day 2 and stayed operational through the end of the exercise period. Additional air sampling instrumentation was deployed within and around the contaminated area and the collection of soil, water, and vegetation samples began. This data was used to determine the size of the contaminated area, whether occupants could return to their homes, and began addressing issues such as the safety of drinking water and local produce. FRMAC established a liaison at the Joint Field Office and products were provided to Oregon Emergency Managers and Incident Commanders, as well as Mayor of Portland and the city's incident commander. The FRMAC Web Portal was utilized to disseminate information to approved users at all levels of government, including DHS and DOE headquarters. The interagency FRMAC team was well-integrated and worked together to gather requirements and provide hazard information in a timely manner. Due to the short duration and field play for TOPOFF–4, only the mobile EPA laboratory from Las Vegas responded and the national radioanalytical laboratory infrastructure was not exercised. It is my understanding that remediation and recovery requirements were in notional play during the final week, including the hand-off of FRMAC leadership from DOE to EPA.

In June 2007, the FRMAC released a draft document titled *"Mission Analysis—Emergency Phase, An Interagency Document for Implementing the National Response Plan Nuclear/Radiological Incident Annex."* The purpose of this document was to define the overall federal radiological monitoring and dose assessment response to a nuclear or radiological incident as defined in the Nuclear Incident Annex to the National Response Plan in the "Emergency Phase," typically the first three to seven days after the event. This is a critical period for addressing the health and safety of the public and responders.

This document focused on the federal resources activated to provide rapid support to the nuclear/radiological monitoring and dose assessment activities at an incident site. While the report provided an initial compilation of personnel and equipment requirements for the environmental and dose assessment component of the emergency response, it did not attempt to complete a comprehensive assessment of environmental and clinical laboratory capabilities required for medical response and long-term environmental restoration activities.

All scenarios were addressed as a single event. The following scenarios were considered:

- Domestic Nuclear Explosion (DNE)—A low technology, low yield nuclear device detonated near ground level in a major U.S. metropolitan area.
- Nuclear Power Plant Incident or Event Involving a Significant Release
- Alpha Radiological Dispersal Device/Failed Improvised Nuclear Device (IND)
- Beta Gamma Radiological Dispersal Device

Scenarios not included in this document, but identified for future consideration include multiple simultaneous events, combined radiation/chemical events, and combined radiation/biological events.

The key findings included:

- Improved processes for electronic data processing
- Standardized internal communications (voice & data)
- Established guidelines for public monitoring support and medical registry
- Additional personnel and equipment resources to address the DNE scenario

For the limited scope of this study, the document implies that current fixed radioanalytical laboratory infrastructure could handle short duration environmental monitoring and dose assessment missions, but these laboratories have not been inte-

grated into an enduring national capability focused on the radiological contaminants.

In addition, mobile radioanalytical laboratories belonging to DOE, the Environmental Protection Agency (EPA), the Department of Defense (DOD), and the States also respond as part of the FRMAC to evaluate priority samples in support of decision-making. These laboratories must be driven or flown to the incident site and often arrive a couple of days into the response. Plans and procedures have been developed for mobile response coordination. This planning and coordination was evaluated during the FRMAC Southern Crossing Exercise conducted in August 2006 in Dothan, Alabama.

Although the primary mission of the FRMAC is to evaluate environmental radiological data, FRMAC assets may be called on to assist the Department of Health and Human Services with human clinical data. Specifically, DOE has developed a cytogenetic dosimetry capability at REAC/TS in Oak Ridge, Tennessee, to evaluate the radiation dose received based on blood samples collected from victims or responders. This capability was demonstrated at the TOPOFF–4 Exercise. Similar capability exists in only a few other locations such as the Armed Force Radiobiology Research Institute (AFRRI) and sites in Canada and in France. The number of evaluations that can be simultaneously processed is limited. DOE maintains at its various sites the capability to evaluate internal ingestion or inhalation of radioisotopes using whole body counting, lung counting, and body fluid analyses. This capability is designed to handle situations involving DOE site activities and only a few individuals—not large public emergencies.

Thank you, again, for the opportunity to address this committee.

BIOGRAPHY FOR ROBERT T. HADLEY

M.S., Biophysics and Computing, University of Utah, 1980

B.S., Life Sciences, Massachusetts Institute of Technology, 1975

Mr. Robb Hadley is a Certified Industrial Hygienist (CIH) and Health Physicist at the Lawrence Livermore National Laboratory in Livermore, California with over 25 years experience as a Nuclear Emergency Response Manager. Mr. Hadley currently serves as the Chair of the Federal Radiological Monitoring and Assessment Center (FRMAC) Laboratory Analysis Working Group.

Before joining the Nuclear Incident Response Program in 1999, Mr. Hadley managed the LLNL Industrial Hygiene Group where he was responsible for a staff of 25 health and safety professionals.

Mr. Hadley has participated in numerous national level exercises. He was the Lead Planner and control for the Diablo Bravo and Comanche Warrior exercises involving radiological incidents. He recently completed the TOPOFF–4 exercise as the Radiological Data Controller at the event scene. In this capacity his responsibilities included providing radiological exposure and contamination measurements to local responders, the Radiological Assistance Program, the Federal Bureau of Investigation (FBI), and other responding teams.

Mr. Hadley has authored several DOE Site emergency and responder handbooks, guides and procedures. He is a regular participant in several emergency response technical working groups, including DOD/DOE Nuclear Weapons Accident Response Technical Working Group, the multi-agency Population Monitoring Working Group, the Accident Response (ARG) Capability Coordinating Committee, the consequence Management Operations Working Group and the ARG Health and Safety Working Group.

Chairman MILLER. Thank you. Dr. Jones.

STATEMENT OF DR. ROBERT L. JONES, ACTING CHIEF, INORGANIC AND RADIATION ANALYTICAL TOXICOLOGY BRANCH, DIVISION OF LABORATORY SCIENCES, NATIONAL CENTER FOR ENVIRONMENTAL HEALTH, CENTERS FOR DISEASE CONTROL AND PREVENTION, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Dr. JONES. Good morning Mr. Chairman and Members of the Subcommittee. My name is Dr. Robert Jones, Acting Chief of the Inorganic Radiation and Analytical Toxicology Branch in the Division of Laboratory at CDC.

I am pleased to be here today to discuss the role of clinical laboratories, and in particular, the role of CDC's radiation lab, in protecting the health of the American people in response to a radiological event.

My testimony will address three issues. First, the essential laboratory information needed to respond to an event; second, the national laboratory capability for such a response; and third the potential methods to improve our ability to respond

Following an event with uncontrolled radioactive material, such as a dirty bomb or terrorist nuclear attack, public health officials will need to answer four questions to guide their response: what were people exposed to or contaminated with, who was exposed, how much exposure or contamination did each person have, and did it enter the body? Contamination with radionuclides can be primarily internal, that is inside the body, primarily external, outside the body such as on clothing or hair, or contamination of both. The decision to medically treat people will depend on our ability to rapidly and accurately identify and quantify internal contamination. To direct appropriate medical treatment to the truly affected, we need new methods to rapidly and accurately assess internal contamination for a broad array of radionuclides.

Nationwide the current laboratory capacity for measuring radionuclides in people in response to emergency is limited. Methods to measure radionuclides in urine must have four characteristics. First, they must be fast, with results available in a day or so; second, they must be able to process large numbers of samples per day to handle urine samples from many people involved; third, they will need to use a small amount of urine available from collecting a sample at a point in time; fourth, they must be able to identify and quantify different radionuclides likely to be used by terrorists. A few years ago, CDC recognized the gaps in current lab capacity for measuring radionuclides in an emergency event and took steps to begin developing a state-of-the-art urine radionuclide screen. To date, CDC has developed the scientific approach for the urine radionuclide screen using a combination of alpha, beta, and gamma radiation detection instruments and a specialized technique in mass spectrometry. Currently CDC has some limited capacity to measure six radionuclides in urine. Although our scientific approach is working well, considerable applied method development remains to be done.

CDC's efforts to improve lab capacity to respond to a radiological event include a validated urine radionuclide screen, which is currently in development, which would provide results within 24 hours of receiving the sample. The CDC urine radionuclide screen would require only a point-in-time, small-volume urine sample, no need for 24-hour collections, and the screen would identify and quantify 13 different priority radionuclides. When the urine radionuclide screen is ready for distribution, the CDC will consider how to build on the existing Laboratory Response Network, the LRN, a national network of local, State and federal public laboratories that provide the infrastructure and capacity to respond to public health emergencies, to establish surge capacity in public health laboratories for measuring people's exposure to a variety of radionuclides.

The recent incident in London involving the death of a former Russian KGB agent from exposure to Polonium–210 underscores the importance of having laboratory capability that can provide human exposure information.

We found that only one laboratory, a commercial laboratory, that could analyze Polonium–210 in urine. This laboratory needed a 24-hour sample and typically required 30 days for analysis. For this emergency, the laboratory did the analyses in seven days. In summary, the Nation has a limited laboratory capability necessary to identify people who may be exposed to an event involving radioactive materials. This leads to a limited capability to provide patients, their doctors, and health departments with exposure information. Completing the radionuclide screen, developing the LRNR, and transferring the urine radionuclide screen to the LRNR laboratories are options to close these gaps.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or the Members of the Subcommittee may have.

[The prepared statement of Dr. Jones follows:]

PREPARED STATEMENT OF ROBERT L. JONES

Good morning Mr. Chairman and Members of the Subcommittee.

My name is Dr. Robert Jones, and I am Acting Chief of the Inorganic Radiation and Analytical Toxicology Branch in the Division of Laboratory Sciences of the National Center for Environmental Health at the Centers for Disease Control and Prevention (CDC).

Thank you for the opportunity to be here today to discuss the role of clinical laboratories, and in particular, the role of CDC's radiation laboratory, in protecting the health of the American people in response to an event involving radioactive materials.

I will first discuss the essential laboratory information that is needed to respond to these events, focusing on the assessment of internal contamination with radioactive materials. Then I will describe the current estimate of the national laboratory capability for such a response and potential methods to improve our ability across the Nation to respond to an event. I also will address CDC's efforts to monitor and assess the potential exposure of U.S. citizens during an incident in the United Kingdom that resulted in the death of a former Russian KGB agent from Polonium–210. I also will describe briefly CDC's capabilities and readiness to meet emergency response needs under the Nuclear/Radiological Annex of the National Response Plan; and finally, I will touch briefly on our laboratory's role in the just-completed TOPOFF–4 counterterrorism exercise.

Laboratory Public Health Response

Information Needed Following a Radiation Event: Following an event with uncontrolled radioactive material, such as a dirty bomb or terrorist nuclear attack, public health officials need to answer three questions to guide their response: what were people exposed to or contaminated with, who was exposed or contaminated, how much exposure or contamination did each person have, and did it enter the body? Contamination can be primarily internal (that is, inside the body), primarily external (outside the body), or a combination of both. Hand-held radiation detectors, like Geiger counters, generally are used for assessing externally deposited contamination by certain radioactive materials and are useful for prioritizing people for external decontamination. These detectors can be used to assess internal contamination in some specific cases.

Internal contamination cannot be reliably quantified by clinical assessment of early symptoms. The decision to medically treat people will depend on our ability to rapidly and accurately identify and quantify internal contamination. To direct appropriate medical treatment to the truly affected, we need a method to rapidly and accurately assess internal contamination for a broad array of radionuclides. The new methods for measurement of radionuclides in urine are being developed to meet this need for internal contamination and dose assessment.

Current Laboratory Capabilities for Internal Contamination: In the event of a radiological incident, our ability to effectively respond to the health needs of our citi-

zens will depend on the methods we have in place to measure radionuclides in urine. These methods must have four essential characteristics: first, they must be fast, with results available in a day or so; second, they must be able to process large numbers of samples per day to handle urine samples from the many people involved; third, they need to use a small amount of urine available from collecting a sample at one point in time; and fourth, they must be able to identify and quantify the various radionuclides likely to be used by terrorists.

Nationwide, the current laboratory capability for measuring radionuclides in people in response to an emergency is limited. Currently available methods for measuring radionuclides in urine, and our national capacity to do so, are limited. Right now, the methods are slow; it typically takes five to 30 days to obtain a urine radionuclide measurement. The number of samples that can be processed per day is low—the few labs that can measure urinary radionuclides typically process fewer than 20 samples per day. Urine volume requirements are high—about half a gallon of urine, usually comprising a patient's entire urine output for a 24-hour period. Finally, we currently have validated analytic methods to measure only a few of the radionuclides of concern.

CDC recognized this gap a few years ago and took steps to begin developing a state-of-the-art Urine Radionuclide Screen. To date, CDC has developed the scientific approach for the Urine Radionuclide Screen using a combination of radiation-detection instruments that detect the three types of radiation, alpha, beta, and gamma, and a specialized technique in mass spectrometry. CDC currently has some limited capacity to measure five radionuclides in urine. Although our scientific approach is working well, considerable applied method development remains to be done.

A radiological event is one of many threats for which the Nation must prepare. At CDC, our all hazards approach to preparedness also includes preparation for chemical and biological events, as well as natural disasters. The challenges I have cited in our current lab capacity to respond to a radiological event must be balanced with the need to prepare for other public health emergencies.

Efforts to Improve Capabilities for Internal Dose Assessment: CDC efforts to improve lab capacity to respond to a radiological event include:

1) The development of a validated Urine Radionuclide Screen, which would provide results within 24 hours of receiving the sample. The CDC Urine Radionuclide Screen, which is currently under development, would require only a point-in-time, small-volume urine sample—no need for 24-hour collections—and the Screen would identify and quantify 13 different priority radionuclides.
2) When the Urine Radionuclide Screen is ready for distribution, the CDC will consider how to build on the existing Laboratory Response Network (LRN), a national network of local, State and federal public health laboratories that provide the infrastructure and capacity to respond to public health emergencies, to establish surge capacity in public health laboratories for measuring people's exposure to a variety of radionuclides.

Lessons Learned from UK Polonium–210 Event

The recent incident in London involving the death of a former Russian KGB agent from exposure to Polonium–210 underscores the importance of having laboratory capability that can provide human exposure information.

Shortly after the incident, CDC became the U.S. Public Health Point of Contact for the U.K. Health Protection Agency. The CDC radiation laboratory was asked to identify laboratories in the United States that could analyze Polonium–210 in urine because it was thought that some U.S. citizens had been exposed to the radionuclide during the incident. We contacted more than 12 federal or commercial laboratories in the United States to determine which could do the analysis. We found that only one laboratory—a commercial laboratory—could analyze Polonium–210 and had certification under the Clinical Laboratory Improvement Amendments (CLIA-certified). This laboratory needed 24-hour urine samples, and its usual time for sample analysis is 30 days. For this emergency, the laboratory completed the analyses in seven days.

In an effort to identify U.S. citizens who may have been exposed to Polonium–210, CDC began contacting these citizens directly by telephone, e-mail, or letter. In a few cases, CDC contacted the State or local health department and provided lists of citizens within their jurisdiction to contact. CDC provided State and local health departments with telephone interview scripts for this process. If the individuals or their physicians who were contacted wished to have urine testing performed, CDC referred them to a private laboratory capable of performing this analysis.

Thirty-one individuals who were tested requested that their laboratory urine results be interpreted by CDC. CDC's Health Physics staff calculated individual dose assessments based on internationally recognized and accepted methods similar to dose assessments that were used by the UK Health Protection Agency and communicated these results to the individuals or their physicians.

Communication played a key role in CDC's efforts to monitor U.S. citizens potentially exposed to Polonium–210. CDC provided citizens, their private physicians, and the State and local health department with communication and educational materials about the incident and laboratory testing. Direct communication via telephone and mail were the primary channels for communicating with the citizens and physicians involved; however, CDC also used its public web site and secure network notification systems to communicate information and updates.

During the response, contact with citizens initially was delayed in large part by a lack of complete contact information for U.S. citizens. At the outset, CDC had to rely on contact information provided by the UK Health Protection Agency, which obtained telephone and address information obtained from hotel registers or credit card receipts in places of interest. Therefore, neither CDC nor the UK Health Protection Agency can be certain that all potentially exposed people were contacted or whether other people who may have been exposed (e.g., those paying bills in cash) will ever be identified.

Communications with State and local health agencies were hampered because of limited awareness or understanding about the State and local health department responsibilities in an event involving radioactive materials. In some cases, State and local health departments did not know their Radiation Control Program contact even when this contact resided in their own organizational structure. CDC did provide this information to the requesting health departments but cannot be certain that other health departments made the correct connections to their local Radiation Control Program.

Finally, the private laboratory conducting the testing did not provide results of analyses directly to CDC, citing privacy issues. In all cases, the private laboratory would not provide results directly to CDC without the express permission of their clients. Therefore, CDC cannot be sure that it has received the results of all of the analyses conducted for U.S. citizens.

The Nation has a limited laboratory capability necessary to identify people who were exposed occurring during an event involving radioactive materials. This leads to a limited capability to provide patients, their doctors, and health departments with exposure information.

The Nuclear/Radiological Annex of the National Response Plan tasks the Department of Health and Human Services with coordinating federal assistance for performing population-monitoring activities. Population monitoring is a process that begins soon after a radiation incident is reported and continues until all potentially affected people have been monitored and evaluated for the following:

- Needed medical treatment
- The presence of radioactive contamination on the body or clothing
- The intake of radioactive materials into the body
- The removal of external or internal contamination (decontamination)
- The radiation dose received and the resulting health risk from the internal and external exposure
- Long-term health effects

Assessment of the first five items listed above, and the whole body external dose, should be accomplished as soon as possible following an incident. Long-term health effects are usually determined through a population registry and an epidemiologic investigation that will likely span several decades.

Under the Nuclear/Radiological Annex of the National Response Plan, population monitoring is the responsibility of State, local, and tribal authorities, assisted and supported by HHS. However, it is likely that in a mass casualty event involving radioactive materials State, local, and tribal authorities will very quickly request assistance from the Federal Government.

In the United States, 31 states have operating nuclear power plants. These states already have local plans for responding to an incident at the nuclear power plant in their own state or at one in a neighboring state. These plans include requirements related to population monitoring. However, effective response to a radiological or nuclear terrorism incident requires a broader scope of planning and most likely a different mode of response than those described in these current plans.

Plans need to account for several factors: first, the suddenness of an incident (as opposed to a nuclear power plant failure that would likely unfold over a 24- to 72-

hour period); second, the likelihood that the incident would be large in scale, involving a much larger urban population; and third, the unknown aspect of the radionuclide(s) involved. However, the plans and expertise already developed can be assets in preparing for a radiological or nuclear terrorism incident with mass casualties in these states.

CDC, working with technical staff from a number of other federal agencies, has developed a planning guide on population monitoring in radiation emergencies for public health officials and emergency preparedness planners at the State, local, and tribal levels. CDC is also developing materials to assist these officials in training personnel to initiate the population- monitoring process before any federal assets can arrive to assist. However, although most State, local, and tribal authorities have some limited ability to perform external population monitoring and decontamination, their ability to perform internal monitoring and decontamination is much more limited.

For the lab results to be used effectively in managing a radiation event, personnel who are radiation experts in converting radionuclide analyses into dose and risk are required. They can then communicate health risk information to health care providers and decision-makers. In every level of government, the Nation has a limited supply of the radiation health experts who provide these interpretations. CDC plans to leverage the expertise of the radiation protection experts within the Department of Energy and other federal partners. During a national emergency, these experts could be used to help CDC with the surge in needs.

TOPOFF Update

The recent TOPOFF–4 exercise represented the first mass-casualty exercise that included population monitoring as a significant exercise objective. In preparation for TOPOFF–4, I oversaw plans that would exercise CDC's clinical laboratory capabilities. These included sample acquisition, packaging and shipping, sample logistics, analysis, risk assessment, and reporting of final results to State officials. Before the exercise, CDC collaborated with the State public health laboratory in Oregon to preposition 100 urine samples in Portland.

As the Nation's premier terrorism preparedness exercise, TOPOFF–4 highlighted the essential functions and challenges involved in responding to a national incident involving radioactive materials. It is clear that we have challenges in our laboratory capacity to respond to a radiological event. We are working to complete the Urine Radionuclide Screen and consider plans to transfer the Urine Radionuclide Screen to public health laboratories in the future. At the same time, we are supporting improvements in preparedness for biological and chemical events as well, at both the federal and State levels. We continue to strive to maintain a balanced effort across all high priority threats and improve overall public health preparedness.

Closing Remarks

CDC is addressing existing gaps by systematically identifying priorities and working to alleviate these concerns. We have developed a series of goals to guide capacity improvements in preparedness and other areas. CDC wants to make sure the investments the American people make in public health are having impact.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or Members of the Subcommittee may have.

Chairman MILLER. Thank you. And now Dr. John Vitko will read the prepared testimony of Dr. Randy Long who cannot be with us.

STATEMENT OF DR. JOHN VITKO, DIRECTOR OF CHEMICAL AND BIOLOGICAL DIVISION, U.S. DEPARTMENT OF HOMELAND SECURITY; REPRESENTING DR. S. RANDOLPH LONG, CHIEF TECHNICAL ADVISOR, CHEMICAL AND BIOLOGICAL DIVISION, SCIENCE & TECHNOLOGY DIRECTORATE, DEPARTMENT OF HOMELAND SECURITY

Dr. VITKO. Good morning Chairman Miller, Ranking Member Sensenbrenner, and distinguished Members of the Subcommittee. As noted, I am John Vitko. I am the head of the Chemical and Biological Division in the Department of Homeland Security Science and Technology Directorate. And Randy Long is one of my senior advisors and also the Chair of the Network Coordinating Group for the ICLN. He expresses his regrets for not being here. He devel-

oped extreme pain in his knee last night, could barely hobble out of the office, and is seeking some emergency care probably as we speak, so please accept his regrets.

With that I will read his statements and it is that I am pleased to appear before you today with this panel to discuss the Nation's radiological laboratory capabilities and capacities to respond to an accidental or intentional release of radiological material. Insofar as the panel assembled here has the technical depth and responsibility for addressing the functional needs, I will restrict my comments to the ICLN and the role it plays in highlighting and supporting laboratory analytical requirements across the all-hazards landscape.

Assessment of contamination due to any hazard in the chemical, biological, or radiological realm requires highly technical laboratory services. Expeditious decisions that may affect large numbers of people and key assets of commerce or government critically depend on a system of quality laboratory service that is both sufficiently robust and provides the data needs for such decisions. The need to develop such a system of quality laboratory service across all hazards provided the impetus for the establishment of the ICLN.

Upon establishment, one major charge to the ICLN relevant to the subject of this hearing was the assignment of responsible federal agencies across the chem-bioradiological laboratory response spectrum.

The principal analytical matrices that would be encountered include clinical, environmental, food, drinking water, animal, and plant samples. Phases of response common to each hazard include monitoring and surveillance, incident response, remediation, and forensics. The assignment of responsible federal agencies for each matrix and phase gave consideration to existing department obligations and authorities, a history of already working toward or having established capability, and applicable executive branch directives.

In the areas of response and remediation to radiological contamination, HHS, DOE, and EPA are considered the major players. When the ICLN Network Coordinated Group considered in 2006 the establishment of a radiological working group to consider laboratory needs and gaps, it charged HHS and EPA with co-chairmanship with DOE being a key member of the group.

Another major objective of the ICLN has accomplished is a first assessment of the Nation's laboratory capabilities across the chem-bio-radiological spectrum. This study initiated in early 2006 and was finalized as a For Official Use Only report in April of 2007. The study is considered a first-order analysis of the ICLN laboratory networks in response to nine selected homeland security scenarios. These scenarios explored chemical, biological, and radiological hazards across a variety of targets, human, animal, and plants. It is functionally a self-assessment and provides a reasonable estimate of gaps that may exist between estimated analytical requirements and estimated existing capabilities.

An exceedingly important caveat is that the assessment is based on agent-specific scenarios. Changes in agent or other key scenario parameters could substantially alter conclusions found in the report. Specifically for the scenario involving radiological agent dis-

persal, the study results indicate "major shortfalls" in environmental and clinical laboratory capability in the response to and remediation of such an event. We can infer from the assessment that without the benefit of an organized framework and some expansion of quantitative analytical capabilities, decisions based on analysis of both clinical and environmental samples for a radiological dispersal event may be compromised.

The ICLN Coordinating Network Group discharged the Radiological Lab Response Working Group to consider the logical steps to be taken to close the analytical gap in this area. This group has outlined the measured approach based on building prototype capabilities consistent with best practices recommended by the ICLN which can be expanded as adjustments in funding priorities become favorable. It is our expectation that the recently concluded TOPOFF–4 exercise and the follow-on, long-term recovery tabletop exercise will substantially inform this need. The interagency laboratory response community is constituted in the ICLN Network Coordinating Group, supports forward movement in the establishment of effective radiological laboratory response capability, and very much appreciates the Subcommittee's interest in this need.

Again, I thank you for the opportunity to address this committee.

[The prepared statement of Dr. Long follows:]

PREPARED STATEMENT OF S. RANDOLPH LONG

INTRODUCTION

Good morning, Chairman Miller and distinguished Members of the Subcommittee. I am pleased to appear before you today to discuss the Nation's critical need for improved radiological laboratory capabilities and capacities to respond to an accidental or intentional release of radiological material. Insofar as the panel assembled here has the technical depth and responsibility for addressing the functional needs, I will restrict my comments to the Integrated Consortium of Laboratory Networks and the role it plays in highlighting and supporting laboratory analytical requirement across the all-hazards landscape.

THE ROLE OF LABORATORIES IN RESPONSE TO A RADIOLOGICAL INCIDENT

Assessment of contamination due to any hazard in the chemical, biological, or radiological realm requires the services of highly technical laboratory services. These services support both the determination of exposures to population, to determine who has been exposed to how much of the hazard, and the determination of the environment or physical space that remains a hazard until remediation and restoration has occurred. In both cases, decisions affecting application of medical countermeasures and evacuation from potentially contaminated spaces are effectively determined through risk assessments that rely upon quality information from laboratory systems. Expeditious decisions that may affect large numbers of people and key assets of commerce or government critically depend on a system of quality laboratory service that is sufficiently robust to provide the data needs for such decisions.

The need to develop such a system of quality laboratory service across all hazards provided the impetus for the establishment of the Integrated Consortium of Laboratory Networks.

INTEGRATED CONSORTIUM OF LABORATORY NETWORKS (ICLN)

In response to the threat posed by terrorist use of WMD threat agents, a number of laboratory networks have been established over the past several years to provide the Nation the capability to characterize, contain, and recover from such attacks on our people and our essential commodities. During the fall of 2004, the Homeland Security Council and multiple Agency stakeholders worked together to develop an organizational framework that links existing and future laboratory networks under a single interagency umbrella. The goal of the effort is to create the basis for a system of laboratory networks capable of integrated and coordinated response and consequence management of acts of terrorism and other major incidents requiring laboratory response. Establishing a laboratory network system to strengthen early de-

tection and consequence management is consistent with Homeland Security Presidential Directives 9 and 10.

The Memorandum of Agreement establishing the Integrated Consortium of Laboratory Networks (ICLN) was signed in June of 2005. Senior officials of agencies with primary responsibility for current and emerging networks as well as those with a strong supporting role joined together to endorse the laboratory organizational framework. Signatory agencies to this agreement include the Department of Agriculture (Food Safety Inspection Service [FSIS], Cooperative State Research, Education, and Extension Service [CSREES], and Animal and Plant Health Inspection Service [APHIS]), Department of Commerce, Department of Energy, Department of Health and Human Services (Food and Drug Administration [FDA], and Centers for Disease Control and Prevention [CDC]), Department of Defense, Department of Homeland Security, Department of Interior, Department of Justice (Federal Bureau Investigation), Department of State, and the Environmental Protection Agency.

As outlined by the MOA, the primary functions and motivations of the ICLN include:

- Agreement by signatories to work cooperatively to optimize national laboratory preparedness by improving coordination of laboratory response to incidents;
- Recognizing Responsible Federal Agencies' role in assuring capability of networks;
- Promoting common standards of performance across all lab response assets to ensure data supporting homeland security decisions is best quality and defensible;
- Assessing and filling gaps in coverage across multiple sample types, potential victim groups (human, animal, plant), all WMD weapons, and all response phases;
- Rationalizing and enhancing relevant interagency budgets.

Established networks included in the ICLN are the Laboratory Response Network (LRN), Food Emergency Response Network (FERN), National Animal Health Laboratory Network (NAHLN), and National Plant Diagnostic Network (NPDN). A network under development in the consortium is EPA's Environmental Laboratory Response Network (eLRN).

The managers of the networks mentioned above, along with designated representatives of other signatory agencies, comprise the Network Coordinating Group (NCG) of the ICLN, which meets on a monthly basis. A senior-level oversight group, the Joint Leadership Council, oversees their work. DHS serves to coordinate activities through chairmanship of the JLC and the NCG.

To support the efforts of the primary representatives of the NCG, the NCG established a number of technical sub-groups, addressing issues of Scenarios and Threat Prioritization, Methods Development, Quality Assurance, Training, and Information Technology and Communications. In addition, three technical working groups address specific areas of concern. These include the Environmental Anthrax Sampling Validation Working Group, the Environmental Chemical Laboratory Response Working Group, and the Radiological Laboratory Response Working Group.

In its short history, the ICLN has accomplished two major objectives relevant to the subject of this hearing: the assignment of Responsible Federal Agencies across the CBR response spectrum, and a first assessment of the Nation's laboratory capability across this same spectrum.

Assignment of Responsible Federal Agencies

In order to ensure a basis for organization and maintenance of the Nation's laboratory response infrastructure against chemical, biological, and radiological, the ICLN first considered the types of samples which might require analysis and the phase of response during which such analysis would be required. The principal analytical matrices that would be encountered include human clinical, environmental, food, drinking water, animal, and plant samples. Phases of response common to each hazard area include monitoring and surveillance, incident response, remediation, and forensics. The assignment of Responsible Federal Agencies gave consideration to existing Department obligations and authorities, a history of already working toward or having established capability, and applicable Executive Branch directives or logical extensions thereof.

These assignments are not ratified among the signatory agencies by a separate formal Memorandum of Agreement, but rather serve as a basis for development and sustainment of an effective all-hazards laboratory response capability. Accordingly, if prevailing guidance or organizational environment shifts, the assignments could,

in principle, change. Separate MOAs do need to be developed to outline the shift in operational responsibility from one agency to another during response to a crisis to enhance overall orderly process. Finally, the level of attention given to a specific analytical area is expected to be guided by consideration of risk relative to other requirements.

It will be noted that, in the areas of response and remediation to radiological contamination, EPA, DOE, and HHS are the major players. When the ICLN NCG considered in 2006 the establishment of a radiological working group to consider laboratory needs and gaps, it charged EPA and HHS with co-chairmanship.

ICLN Capability Assessment Key Findings

The assessment and addressing of gaps in the Nation's laboratory response infrastructure is a key charge to the ICLN under its MOA. The ICLN addressed this charge through a study initiated in early 2006 and finalized as an FOUO report in April 2007. The study considered nine scenarios, generally inspired by the National Planning Scenarios, which explored chemical, biological, and radiological hazards across a variety of targets (i.e., humans, animals, and plants). The Homeland Security Institute mediated the study and assimilated the report, relying heavily on modeling support and sample throughput data from technicians within the National laboratory response system.

The study is considered a first-order analysis of capabilities, capacities, protocols, and policies of the ICLN laboratory networks in response to the selected homeland security scenarios. It is functionally a self-assessment of the "as-is" operational context of the member networks and provides an "order of magnitude" estimate of gaps that may exist between analytical requirements and existing capability.

In order to assure parity across the range of scenarios and networks examined, certain bounding conditions were set: Funding, reagents, and consumable materials were not considered to be limiting factors. Normal rates of laboratory staffing were assumed. Industry and private laboratories outside Federal oversight were excluded, but laboratories within other Federal agencies were included as analytical assets to the extent they could be accessed. In addition to projected actual sick or injured, "worried well" were included. No assumptions related to policies that might mitigate analytical requirements were made, but prevailing policy was certainly considered. All qualified laboratories within established networks were considered to be accessible analytical resources, regardless of state and local boundaries. An additional exceedingly important reminder is that the assessment is based on agent-specific scenarios. Changes in agent or other key scenario parameters could substantially alter conclusions found in the report.

Specifically for the scenario involving radiological agent dispersal, the study results demonstrate "major shortfalls" in environmental and clinical laboratory capability in the response to and remediation of such an event.

For the specific agent used in the RDD scenario, various sources of data were used to identify laboratories with adequate characteristics to contribute materially to the environmental sampling needs that would support on-the-ground hazard mapping and decontamination. Against the scenario estimate of a large number of environmental samples required during the remediation process, a backlog of samples awaiting analysis would extend some 50 to 100 weeks beyond the event and substantially affect decisions regarding the remediation activity. Similarly, the scenario estimate of clinical samples requiring analysis significantly exceeds the modeled capability for such samples.

The study did not take into consideration the positive benefits of streamlined sampling and analysis, for example, the pooling of samples from multiple sites or individuals that may decrease the overall analytical burden. As such methods are developed and validated, an improvement in our analytical posture may be expected. However, without the benefit of an organized framework and adequate quantitative analytical capability, it seems clear that decisions based on the analysis of both clinical and environmental samples for a substantial RDD event would be compromised.

The testimonies of CDC and EPA will address the clinical and environmental analytical gaps and their implications on response and recovery.

STEPS TAKEN TO BUILD AN EFFECTIVE RADIOLOGICAL ANALYTICAL CAPABILITY

As noted earlier, the ICLN established a Radiological Lab Response Working Group in 2006 to begin to consider the radiological testing gap and what needs to be accomplished to close this gap. EPA and CDC were charged with co-chairing the group, which includes participation also from DOE, DHS, FDA, USDA, National Institute for Standards and Technology, U.S. Geological Survey, and Association of Public Health Laboratories.

An effective radiological lab response network would address capability gaps by establishing acceptance criteria for membership; identifying and enhancing select federal and State laboratories that have attributes closest to those required to meet acceptance criteria; providing those laboratories with the appropriate tools, resources, and analytical methods; establishing and exercising proficiency testing to ensure readiness and quality; and establishing data management and communication protocols.

The NCG advised the group that, given prevailing funding priorities, a measured approach designed to explore the relationship between analytical power and cost would be the most logical means to establish initial capability while describing the total cost associated with establishing a capability that might be considered "adequate" to meet the needs of an incident of substantial scope.

The initial vision of the Radiological Lab Response Working Group incorporates three "sub-networks," each covering environmental, clinical, and food samples, under the sponsorship of EPA, CDC, and FDA, respectively. Pilot programs have been formulated or proposed within each agency to serve as the genesis of a national radiological capability.

The effort has just begun, with the bulk of the work required to establish an effective radiological analytical capability still ahead.

TOP OFFICIALS 4 EXERCISE

This hearing occurs shortly after the end of the TOPOFF–4 exercise. Our information indicates varying levels of play by analytical resources of several government agencies (e.g., DOE, EPA, FBI) in the exercise. The exercise will explore, in various venues, gaps and deficiencies related to short-term medical monitoring, long-term health issues, effects on consumables such as food and water, decontamination, and waste disposal. Laboratory analytical information is a key component to addressing these issues. The actual exercise and associated table-top exercises, to include the Long-Term Recovery Table-top Exercise scheduled for early December, offer valuable fora for the consideration of gaps related to radiological laboratory infrastructure.

CONCLUSION

The ICLN exists to design, develop, and promote the use of best practices across the Nation's laboratory response infrastructure to inform critical decisions in the response and recovery from incidents involving chemical, biological, and radiological hazards. We have assessed a significant gap in our radiological laboratory response capability which may compromise important decisions regarding health and environment in key scenarios. We will continue to promote the need to fill this gap among the agencies identified as Responsible Federal Agencies and their partners, and appreciate very much the interest of this Subcommittee in radiological laboratory matters.

DISCUSSION

Chairman MILLER. Thank you. The bell that you heard was our being called to a vote. It appears that there is some grievance that the Minority has, and we will have a series of protest votes, temper tantrum votes. Someone has moved to adjourn, and I will need to go over and Mr. Baird will need to go over to vote against adjourning and probably pretty much as soon as we get back, someone will move again to adjourn. So we will do the best we can in trying to proceed with questions, but we will be doing kind of a middle-aged equivalent of wind sprints between here and the Capitol. Why don't we adjourn now, all go vote. We will ask over there whether another vote is coming immediately or not and try to come back and try to make some sense of today's hearing.

Mr. BAIRD. Mr. Chairman?

Chairman MILLER. Yes.

Mr. BAIRD. Is the middle age in reference to our age or the epoch?

Chairman MILLER. I suppose it could be either. I hope that this is a middle. Thank you. We will be back. Sometime. Thank you.

[Recess]

Chairman MILLER. There is no telling what the day will look like. Probably the third or fourth time I have to run back and forth like that I am probably going to be pretty cranky, so you may not want to take questions from me after that point. And this is not the kind of hearing in any case when we think witnesses are being less than forthcoming. Those kinds of hearings are a great deal more fun to conduct, but there will not be any high, hard, inside pitches here. We do fundamentally think that what you're telling us is true. And our questions will simply be to call upon you to reiterate or elaborate upon some portions of your testimony. So if we can't really complete any kind of coherent period of questioning, I am not sure that the loss will be that great. I think we have already accomplished what we needed to accomplish by your testimony already, your oral testimony and that which you have submitted in writing.

NATIONAL ENVIRONMENTAL RADIOLOGICAL LABORATORY CAPACITY GAP ASSESSMENT

With that said, I now recognize myself for five minutes of questioning. Dr. Griggs, you had a report prepared or a report was prepared for you earlier this year that assessed the national environmental radiological laboratory capacity gap. Tell us what the report found and what the findings tell us about our ability to respond to a dirty bomb if it were detonated in an American city. I think that is probably not dissimilar to what you have already testified about, but go on.

Dr. GRIGGS. Mr. Chairman, we looked at really one RDD event in a single city, and we estimated the environmental sample demand from that event. We then compared that to our assessment of the national lab capacity, and we looked at laboratories from two major aspects, one would be their capacity, their infrastructure in terms of personnel, equipment, and the ability to process samples. But we did also look at their competency, and to do that we had reviewed historically how well they had done on proficiency test samples from like the Quality Assessment Program (QAP) and other programs that send samples to laboratories and have them report back results. And what we found is that when you look at the national environmental lab capacity versus the sample demand, 360,000 samples over a year, there was a significant gap in the ability to analyze samples promptly and report the results.

And the numbers that we talked about averaging about 3,000 samples per week was the average capacity gap with peak capacity gap 7,000 to 9,000 samples per week. These numbers indicate a pretty serious gap in terms of environmental analysis capability in the country. When we look at absent in an increase in that national capacity that it would take a little over 100 weeks, or two years, to analyze the samples that would have been collected in a single RDD event, and I think as you have noted and Ms. Tulis noted the scenario 11 is actually three RDD event. So if we compare it back to that scenario, you can take that gap and multiply it times three and the timeframes times three as well. So it is indicative of a very significant gap, and that is going to be a delay in data to decision-makers, action to protect home health and

cleanup and contamination. Our major focus is on the critical recovery phase as Dr. Hadley talked about in the kind of early phase. But we are looking at the clean-up phase, recovery phase, and that is where the bulk of the laboratory samples are going to be generated, and that is where our numbers actually came from.

How the Gap Effects Response to a Dirty Bomb

Chairman MILLER. What would be the real-world consequences of that gap? How would it affect our ability to respond to the detonation of a dirty bomb in American cities?

Dr. GRIGGS. I will let Dana elaborate more, but essentially laboratory data provides decision-makers the information that they need to make decisions about is it safe to reoccupy buildings. Have the decontamination efforts been successful? Because there will be a tendency to decontaminate what can be contaminated, potential public health impacts because of the data we fed into CDC and they would likely use our data for their kind of estimates for example. So basically all the conscious management decisions that go into the recovery effort are predicated on accurate, timely data; and with this gap there is going to be deficiency of accurate and timely data. So the decision-makers will be faced with issues of either having to make decisions without the adequate data or having to delay their decisions, and that could result as you noted in your testimony in increased economic losses because of the lack of ability to go back to reoccupy the city, potential additional health impacts if the data were insufficient and incorrect decisions were made based on that data. So it creates a whole host of problems as you can imagine when you simply don't have information you need to evaluate the status of the extent of the contamination, the degree of the contamination, and likely impacts to the public health.

Chairman MILLER. Ms. Tulis, would you like——

Ms. TULIS. There is just one thing I wanted to note just to be clear. We do have field tools to be able to detect radiation very early on, and so for those critical decisions, sheltering and place, evacuation, we would be able to still make those decisions. This is more for the long-term remediation and consequence management stage.

Ability to Evaluate the Damage Done By an Attack

Chairman MILLER. The whole premise of terrorism is to create terror among a civilian population by attacking not combatants but non-combatants, attacking a civilian population, innocents, and not having the violence appear random, unrelated to anything that non-combatants had done to create terror among the population. What will be the effect on the population of an inability to know exactly what damage had resulted, what the level of contamination was, and what health effects there might be, Dr. Griggs?

Dr. GRIGGS. Well, certainly as you indicated there is going to be great panic and concern because one of the issues in addition to the impacted urban environment of the city is that as people leave the city from that area, potentially they could be taking material home with them, and their homes could be contaminated. You get kind

of transport, people moving about in that city; and I think radiation in general for a lot of people is a very fearful type of a threat. So the lack of data I think is just going to result in heightened public concern and panic and frankly a demand for answers for what risks are they at, what can be done to protect them and their families and those kinds of things. I think the longer it goes without sufficient data, the greater those concerns are going to be.

QAP PROGRAMS

Chairman MILLER. Anyone else wish to respond to that question or both questions? Dr. Griggs, you mentioned QAP which is not Elmer Fudd using a mild profanity, it is an acronym for Quality Assurance Program, a program the Environmental Measurement Lab, a government-owned and managed lab in New York which dates back to the Manhattan Project. And the Department of Homeland Security closed that lab a couple of years ago. How do the programs of QAP compare to the kind of proficiency testing that you had said is needed?

Dr. GRIGGS. Mr. Chairman, one of the things that we did when we did our evaluations of laboratories for our assessment of the national capacity is that we actually went back and looked at historical data from the QAP program and also for another acronym, the MAPEP program which is a Dewey Laboratory out of Idaho. And the data from both of those assessment programs was really critical in our evaluation of laboratories for their capability and their competency. It allowed us to look at select radionuclides that are likely to be very important in an RDD event and to see how well those labs have performed over the years in key environmental matrices like air filters, water, and vegetation. So it's a critical data set as we evaluate those laboratories and they help us to select which laboratories we could turn to.

Now, from the laboratory perspective, in addition to those that assess the laboratories, from the laboratory perspective these samples are invaluable in that they allow the laboratory to analyze externally prepared samples of known concentration that are traceable back to a national standard, general NIST, the National Institute of Standards and Technology, and it allows them to adjust, augment their measurement systems to make sure that they have the necessary accuracy and precision that they need. So these programs are invaluable to both those that assess laboratories and to the laboratories themselves.

THE DECISION TO CLOSE QAP

Chairman MILLER. On a stupidity scale of one to 10, one being Einsteinesque and 10 being stupider than dirt, dumber than dirt, how would you assess the decision to close QAP?

Dr. GRIGGS. Mr. Chairman, I don't know that I am in a position to answer that because I don't know the factors or considerations that DHS faced when they made that decision. All I can say is the data from those programs is a valuable data set.

EPA Preparedness to Deal With a Dirty Bomb

Chairman MILLER. Ms. Tulis, EPA's role at the World Trade Center has been severely criticized, being unable to tell exactly what the environmental risks were coming out of that. Is EPA better prepared now in dealing with a radiological emergency, a dirty bomb detonation, than it was to deal with the World Trade Center?

Ms. TULIS. The EPA is certainly better prepared to respond to any sort of national incident such as we had for the World Trade Center. We spent the last six years becoming more prepared, hiring more people, reorganizing, getting the right resources, having 50 additional people added to our environmental response team, creating the Office of Emergency Management, and establishing our Office of Homeland Security as well as working on various preparedness and response procedures. So we have been taking great strides to overcome some of the issues we had during that large response, although we do feel as though we did handle the response well, but we always have lessons learned and we continue to apply those to the way that we operate.

Assessing a Radiological Event

Chairman MILLER. How would the difficulty of assessing a radiological event compare to the difficulty of assessing the environmental consequences of the collapse of the World Trade Center, the towers?

Ms. TULIS. I mean, they are very different incidents, and we basically approach incidents from a site-specific basis. The World Trade Center large collapse, the impact, and the analyses would be quite different than an RDD event where it is very specific type of analyses that we would be looking at.

More on the Capacity Gap

Chairman MILLER. Is the gap that we have heard about, the capability gap, is it simply a funding issue or is there something beyond that other than that?

Ms. TULIS. I think for radiological laboratories, because the community is actually doing a good job of cleaning up the existing problems we have had, we just have an economic issue going on when we had the actual radiation laboratories from a commercial perspective. The businesses are just not being able to support, there is just not enough work out there to support this type of work anymore. It is very hard to expect a commercial laboratory to build up capacity for something that may or may not happen, and so we have almost an irony going on here where because we have been efficient to cleaning up some of our past problems, we are losing that very lab community that we would need in the event of a future large-scale incident.

Why Is There a Lack of Capacity?

Chairman MILLER. Anyone else on that issue? What is the reason for the lack of capacity? Is it simply funding? Dr. Hadley?

Dr. HADLEY. I agree with Ms. Tulis that there is not as much of demand for the radiological community for that type of sampling as

we have had in the past. We are using less materials, we have had nuclear reactors shut down, we have cleaned up places, within the weapons complex we have less weapons, less production. So there is not as much radioactive environmental or clinical analytical activity needed. And so these places have been shutting down and closing up, and only those that really need to be there, they are viable economically, are the ones that are staying open.

WHY ISN'T THE DOE PREPARED FOR A RADIOLOGICAL EMERGENCY?

Chairman MILLER. You would agree that preparedness is more effective if it is done in advance?

Dr. HADLEY. It would be very nice. That is why we are here today to work on this. I agree completely, but I think that is what is contributing to it.

Chairman MILLER. Dr. Hadley, DOE does have a significant radiochemistry infrastructure but it apparently is not certified in the way the Congress I think has specified. What prevents the DOE from being prepared to do more to analyze environmental clinical samples in the kind of emergency we are talking about?

Dr. HADLEY. Yes, I understand. DOE has developed their own clinical capability to handle its own people, its workers and its contractors that are busy working on tasks and operations for the Department of Energy. They have been sized to handle that situation. Many of the procedures that were developed were developed years ago. We have many special procedures where we will handle different isotopes than anyone else will because of the types of work that we do. Because of some of that—and the other thing is we are not available for outside—we are not a commercial lab, we do not do outside business. We keep it within-house, and we do have QA programs. We have always had QA programs. They are just not always the same one as they use for outside laboratories. So we have capabilities that are capabilities really to handle our own upsets and tasks, and so the level of capacity meets that but it is not very much more.

THE TOPOFF SIMULATION

Chairman MILLER. In your testimony you said that the national radioanalytical laboratory infrastructure was not exercised in the TOPOFF simulation. What did you mean by that?

Dr. HADLEY. I participated and I was in the area where I was watching samples being collected and what was being done with them, and really there was nothing being sent to very much of a laboratory. There was one EPA mobile laboratory who had prepared 50 samples, and so they were there and they were processing samples, but that was it. That is all that I saw from my standpoint. There were a few clinical samples. I mentioned that REAC/TS DOE, a medical-type group who advise on radiation issues, they collected three blood samples, sent them off to Oak Ridge, Tennessee, and were processed through their cytogenetic laboratory to see what type of radiation dose we would expect. But other than that, that was all of the laboratory capability I saw utilized.

One of the issues I should mention to you so that you might understand this is in the first few days of an event, the environmental laboratory needs are not as big. The first few days of an event you are most worried about evacuation, sheltering in place, where is the radiation or contamination on the ground, and much of the information can be given by direct reading instruments and by models. Also it takes time for laboratories to arrive and people to arrive to handle laboratory samples and collect those samples. So normally laboratories get involved a little bit later from an environmental standpoint. From a clinical standpoint, they will get involved early and that will come through local hospitals and others. But the FRMAC and DOE have been most concerned with the environmental ones, and even during TOPOFF we saw that because of the short duration of the TOPOFF exercise, by the time that you would start to see a significant number of laboratory samples, it was indexed and the exercise was over.

DOE EXECUTIVES

Chairman MILLER. Dr. Hadley, how much attention are these issues receiving from those further up the ladder of the DOE at the top levels, Secretary, Deputy Secretary, or Assistant Secretary?

Dr. HADLEY. We had had mobile laboratory resources mainly for our weapons program for many years. So we had had that, they know it is important. There have been emergency resources but they have been limiting in scope, not real large, not handle a large population. And beyond that I really don't know. We would like to do more in this area. We would like to exercise more and work with the other agencies in developing these networks because we see there is a need.

ENVIRONMENTAL SAMPLES

Chairman MILLER. For any of you who want to answer it, in the materials I read in preparation for this hearing, some apparently believe that the estimate of 350,000 environmental samples in a year is far too modest of what will actually be needed. In what I read, and apparently some of the other scenarios besides scenario #11 but the exercise that was built around assumes a million. Is that your understanding as well? Dr. Griggs?

Dr. GRIGGS. Mr. Chairman, I think the million could be a result of that the 350,000 is based on a single RDD event in one city, and the scenario 11 is based on three identical cities; and I think the million is probably the result of the that times three effectively. So if you look at the full scenario 11, you're looking at a little over a million samples.

Chairman MILLER. But there are some who think the 350 for an event is conservative?

Dr. GRIGGS. There is a reason to think conservative is true.

Chairman MILLER. Anyone else? Dr. Hadley? Dr. Jones?

Dr. HADLEY. Coming up with those numbers is extremely difficult because we have not had the event, we have looked at the Guyana event and I think that the one thing that we have learned from the Guyana, Brazil event, is they very much underestimated what they were going to have to deal with. So we have come up

with our best guess, what those numbers are. They may be much higher depending on what happens.

Dr. JONES. The CDC has not been involved with the estimation of environmental sample analysis, so we are not able to comment on those numbers.

WHAT DID THE POLONIUM–210 POISONING TELL US ABOUT OUR CAPACITY?

Chairman MILLER. You were involved with—and yes, I understand that CDC has a different piece of the puzzle. The testing for internal contamination on the people who are exposed to radiation, what did the response to the Polonium–210 poisoning in London tell you about our capacity?

Dr. JONES. It told us that we have a gap in our national capacity to respond to a radiological event. Because of the fact that we could only identify one later, a second laboratory much further down the road that could assist us in identifying the people that were potentially exposed and evaluating their internal exposure from the Polonium–210.

CDC USING DOE LABORATORIES

Chairman MILLER. I am not trying to start a fight between you and Dr. Hadley, but why did CDC turn down DOE's offer to conduct assessment with their labs?

Dr. JONES. In my initial evaluation discussions with the Department of Energy, it was actually the Department of Energy who pointed me toward the laboratory that we finally utilized. Their contract with one of the contract labs was the second laboratory that was utilized, or was potentially utilized, and we looked at some of the Department of Energy's bioassay laboratories, and as Dr. Hadley alluded to, the DOE laboratories are more for occupational exposure assessment. If you remember from the testimony that we gave earlier, our needs for an emergency response, the data needs and the sample size needs, are much different than the traditional DOE bioassay laboratories. And because those bioassay laboratories were not routinely measuring Polonium–210 in people at the time, we felt that it would be a much more prudent fact to look at and utilize a laboratory that was currently measuring Polonium–210 in occupational exposed individuals.

Chairman MILLER. Of course, if there were more than 31 people to test, you would have a bigger problem. What can be done for CDC to make use of the Department of Energy's capacity or can you find a way to make use of the capacity if you have more than 31 people to test?

Dr. JONES. We have already been in discussion with the Department of Energy, and we are looking at evaluating how we can utilize their laboratories, utilize their instrumentation and personnel, to apply the methods that we are trying to develop at CDC to be a surge capacity in the future, utilizing the parameters of the data needs that we have. So we have hopes that we can in the future work together to utilize their infrastructure.

Chairman MILLER. As tedious as it is for me and for you, I need to leave and go vote; and I will come back. I think we have just

a few more questions I really do want to get in. So I am not apologizing for something I did not do. I am not going and having a temper tantrum, but I will be back in just a few minutes.

[Recess.]

Chairman MILLER. I have to run back and forth from the Capitol, but you don't have to sit and wait for him to come back anymore.

ENVIRONMENTAL RADIOANALYTICAL LABORATORY RESPONSE NETWORK

Dr. Griggs, I understand that you have proposed creating an environmental radioanalytical laboratory response network to close the capacity gap. That you have described in your testimony. What is the status of that network, has it received funding, is it established already, what needs to be done to make it happen?

Dr. GRIGGS. Mr. Chairman, let me first say kind of what is underway. We have what we call a pilot initiative for this network, and it is in the form of two agreements that are going to be provided to two State and local laboratories. We are receiving applications now from those laboratories and expect to award these two agreements in possibly three months. The recipient laboratories will receive equipment for counting environmental samples, they will receive training, they will receive funding to buy supplies and standards and even personnel costs. It is called a demonstration project, but the laboratories will take this equipment and training and enhance their capacity and capability of analyzing environmental samples. So it is really in our view the pilot of this larger network that you referred to.

To give this a better sense of, you know, is this approach the right approach, are some of our budget numbers correct, are the estimates good and to kind of see the kind of results that we are going to get from providing this equipment, training, and funding to these two State and local laboratories. We are in kind of the pilot phase of this particular network. I would like to add that this radiological environment laboratory network would be a component of the ERN that Mrs. Tulis has previously addressed. And I defer to Dana, Ms. Tulis, for any comments on that?

Ms. TULIS. Yes, I mean, that is an estimate as Dr. Griggs indicated, and until we get further along, we are not going to have a better idea of exact cost. We also, as part of the overall eLRN, we are working collaboratively on funding this process as well as on working at looking at the future years as well. But it is part of our overall budget thinking and processing we are working on right now.

TIMELINE AND PLANS FOR EXPANDING THE CURRENT CAPACITY

Chairman MILLER. That answer didn't quite suggest the urgency that I feel. We have known for at least six years that Osama bin Laden tried to buy, has tried to acquire radioactive materials for a dirty bomb. How long is this pilot going to go on before you try to take it to the scale necessary to be prepared to respond to the kind of scenarios that the TOPOFF exercise just dealt with?

Dr. GRIGGS. I think the plan is we start with the two and we would add more, so it would be a phased approach as we add additional labs and——

Chairman MILLER. How long are these phases?

Dr. GRIGGS. They had projected in the proposal five years.

Chairman MILLER. And at the end of the five years, will there be the capacity to deal with the scenario #11?

Dr. GRIGGS. Well, this particular proposal really is addressed at the capacity of one RDD event, and 11 involves three, but we felt like this was initially to get positioned so that we could respond to a single RDD event. So that was the basis of this particular proposal.

Chairman MILLER. Maybe in five years we will have the capacity to respond to one-third of the need that we just conducted an exercise to try to assess our preparedness for?

Dr. GRIGGS. In addition to this particular proposal, which is primarily geared for State and local type laboratories, we are developing tools for the commercial sector. We are developing varying rapid methods, for example. We are developing guidance documents for the commercial laboratories that are really aimed at increasing their efficiency and their utilization of their existing infrastructure. We have initiated training, for example. We developed a training course we presented last month at our laboratory, the NAREL laboratory. So there are other activities in addition to this that are ongoing where the focus is trying to enhance the existent commercial capacity. That will put us in a better position to respond to such an event as well.

Chairman MILLER. Dr. Jones? I hope you feel great urgency. I know that you have proposed a radiochemistry laboratory network similar to what the EPA has proposed. That seems to be a critical need to prepare for a dirty bomb attack which could happen at any time because as Mr. Sensenbrenner has pointed out in his opening statement, the material is out there. It is not secure. It could happen tomorrow, it could happen this afternoon; and being ready maybe in five years, depending on how the pilot projects go, does not give me the reassuring sense that you feel the sense of urgency about this that feel and that Mr. Sensenbrenner feels. Where does your proposal stand? Is it a pilot or are you going to ask for funding for it? Have you received funding for it? What needs to be done to make it happen?

Dr. JONES. We have started the CDC process of requesting funding for proposals like this, and at CDC there is obviously the Polonium–210 event as well as the TOPOFF–4 exercise, awareness that this is a very important issue. It is in the process right now at this year's budgetary allocations, and I am not in a position at this time to know where we stand in that process.

WHAT ARE THE NEXT STEPS TO BEING BETTER PREPARED?

Chairman MILLER. Well, to all of you, what are the steps that you think need to happen? What can we do as Congress? We are now finding out for an oversight hearing that we are not as prepared as I had assumed we were. We are woefully short of the level of preparation that I assumed we would have given how clearly this threat has been communicated. I mean, if there is one threat,

if there is one possible terrorist tactic we know Al Qaida is considering is the detonation of a dirty bomb on an American city or several American cities. They like to do things in a big way, so if they do one in Washington, they might very well try to do one in Chicago, and I'm not really sure they are thinking about Guam but they might do them in several places. What do we need to do to be ready, to strengthen our radiological emergency response capacities to be able to know whether we can use the buildings that have been contaminated; whether they need to be demolished; whether they need to be remediated, cleaned up, before anyone can go back in; whether we can conduct economic activity in what might be critical areas; whether hundreds of thousands of people are going to be told that we will test your children for whether they have internal contamination, in a couple more years we will be able to test them but let us know if their hair starts falling out, maybe we can move them up in line. What do we need to do to be better prepared than we are? I am not really happy with pilot programs at this point. Dr. Griggs.

Dr. GRIGGS. I am going to refer this question to Ms. Tulis.

Ms. TULIS. When you say pilot, it may give a misimpression as to what we are actually doing. I mean, the concept is to be building capacity, getting additional equipment in there, and making sure that we have the performance testing that we need to incur. So it made it sound not as proactive as it is. The concept is to start to build capacity and provide the funds to do that, to learn as we are doing it, and then to continue to expand the program. So I do have a concern that it may sound like the pilot isn't a proactive enough approach. It is a way of getting out there and starting to build capacity at this point, but we don't want to just give everything out without having a good idea of how to approach this process, and so we are starting with the two and we do intend to expand.

Chairman MILLER. Dr. Hadley?

Dr. HADLEY. I think this hearing has been very useful. We appreciate being part of it and being able to bring this to the attention of the country and particularly our bosses. I think now that this has been held, this will get their attention a little bit more and funding may become a little easier. That is always an issue. But there are a lot of issues in this. There are a lot of things that need to be done.

Chairman MILLER. One of the images of Congressional Oversight hearings is that top administration officials get to hear about what is going on within their administration. Dr. Jones?

Dr. JONES. Again, CDC feels and has realized for some time now that this is a gap, and we have worked very hard at developing the science behind how would we prepare to respond to a radiological event. I believe the current issues have raised the awareness within CDC, and we are trying to act on it as best we can.

Chairman MILLER. Dr. Vitko, I know that you were here to read prepared testimony, but this is something you probably can respond to.

Dr. VITKO. I hope I can. First of all, I agree this has highlighted the urgency. I think that the ICLN as a group has an action item from this hearing to figure out how they can meet that capacity need within five years and come up with a concrete plan. I also

think the question you raised earlier about the significance of the gaps and what do we do if the gaps are not filled is one that we could put more attention on. Again, there is a question of the number of measurements versus the confidence level you place in those, and there may be other strategies to look at; and I think we owe answers on both of those in a timely way.

Chairman MILLER. Well, I have the important work to do of trotting back and forth to the Floor to vote not to adjourn, and I am sure that you all have things to do as well. So I think without further business, the hearing is adjourned. Thank you for being here.

[Whereupon, at 11:34 a.m., the Subcommittee was adjourned.]

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