

THE BP OIL SPILL: ACCOUNTING FOR THE
SPILLED OIL AND ENSURING THE SAFETY OF
SEAFOOD FROM THE GULF

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED ELEVENTH CONGRESS

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THURSDAY, AUGUST 19, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 11:39 a.m., in Room 2123 of the Rayburn House Office Building, Hon. Edward Markey [Chairman of the Subcommittee] presiding.

Member present: Representative Markey.

Staff present: Bruce Wolpe, Senior Advisor; Melissa Cheatham, Professional Staff Member; Caitlin Haberman, Special Assistant; Lindsay Vidal, Special Assistant; Jen Berenholz, Deputy Clerk; Andrea Spring, Minority Professional Staff; Mary Neumayr, Minority Counsel; Garrett Golding, Minority Legislative Analyst; and Lyn Walker.

OPENING STATEMENT OF HON. EDWARD J. MARKEY, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF MASSACHUSETTS

Mr. MARKEY. Welcome to the Subcommittee on Energy and Environment.

For anyone who has been diagnosed with a life-threatening illness, one of the best words you can hear is “remission,” whether it is cancer, HIV or some other illness. A battery of modern cures can reduce the disease to lower, perhaps even to undetectable levels. Yet even in remission, there is often unease that the disease could return and the pestering inevitable scientific and metaphysical questions arise: Where did it go? Could it come back?

Right now, we are in a similar state in this environmental disaster. After many trials and several false starts, BP finally created a system to cap and seal the well. Oil has not come from the Macondo well for about a month. We are no longer at the bleeding stage. A tourniquet has been applied to the well, and now we are told we may need to wait for the final procedure, the relief well, until September.

And so just like a patient in remission, we have reached a more stable stage of health with this bill. To say the well is capped is tantamount to a cure would be false confidence. Like unseen internal bleeding in a trauma patient, the veiled oil persisting in the Gulf poses continued risks. Today, we are here to ask the same questions about this spill as a patient or a doctor would of a disease: Where did it go, and could it come back?

According to the most recent estimates, 4.9 million barrels of oil spewed from BP's well over the course of this 100-day gusher. Of that oil, some was captured, some was dispersed and some evaporated or naturally dispersed. Yet, at least 1.3 million barrels still remain unaccounted for in the waters and marshes of the Gulf, an amount five times larger than was spilled during the entire Exxon Valdez disaster.

Just as we are worried about rogue weapons sold on the black market harming the public, we must be vigilant about rogue oil from this disaster harming the public, putting a black mark on Gulf seafood or Gulf tourism.

In addition to all the oil, millions of gallons of dispersant chemicals have been used in unprecedented ways. Just a few weeks ago, FDA told me that they had determined that dispersants have a low potential to accumulate in seafood and do not pose a significant public health risk through human consumption. While this news is welcome, it addresses only the issue of short-term toxicity. The FDA knows little about the long-term impacts that these compounds will have on marine life, nor do they know how the presence of oil and dispersants may influence the concentration of other toxic compounds in seafood species.

We have yet to see the full picture of hazards posed by this spill. The work done by the FDA, NOAA and EPA will be critical in ensuring that fish and shellfish from the Gulf is safe to eat for years to come.

And so we will ask today: where do we go from here? Where should monitoring and cleanup efforts be focused in this new chapter of recovery and restoration? Are the clouds of oil suspended below the ocean's surface still a concern? What about the plumes of methane gas? Where have these plumes gone and will microbes consuming methane use up oxygen in the water, potentially asphyxiating areas of the Gulf? What impact will all the oil, methane and the chemical dispersants have on marine life in the Gulf and on Gulf seafood supply in the years ahead? Is seafood from the Gulf safe to eat today? Will it be safe to eat in the future? American families want the only oil in their seafood to be cooking oil.

Ending BP's gusher in the Gulf does not, by itself, cure the harm that has been done. The treatment of the region from this disaster has only just begun.

To have a successful, continued response to this spill, we need to do three things going forward: One: monitor the health of the waters, wetlands, wildlife and people of the Gulf. Two: maintain the pressure on BP and others to continue the recovery and restoration process. And three: muster the attention of our entire country on solving the economic and environmental challenges from our continued dependence on oil, especially foreign oil.

We have an extremely distinguished group of witnesses appearing before us today. We appreciate the fact that it is the middle of the summer. We know that many people have gone away. However, the oil has not gone away, and it is important for the Gulf of Mexico residents to know that the attention on this issue has not gone away. That is why we are having this hearing today.

So let us turn to our first witness, Dr. Bill Lehr. He is a Senior Scientist in the Emergency Response Division of NOAA, where he

leads the spill response group. He has been active in spill research and response for more than 15 years. We thank you, Dr. Lehr, for being here. Whenever you feel comfortable, please begin.

STATEMENTS OF BILL LEHR, SENIOR SCIENTIST, OFFICE OF RESPONSE AND RESTORATION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION; DONALD KRAEMER, ACTING DEPUTY DIRECTOR, CENTER FOR FOOD SAFETY AND APPLIED NUTRITION, FOOD AND DRUG ADMINISTRATION, ACCOMPANIED BY VICKI SEYFERT-MARGOLIS, SENIOR ADVISOR TO THE CHIEF SCIENTIST, FDA'S OFFICE OF THE COMMISSIONER; AND PAUL ANASTAS, ASSISTANT ADMINISTRATOR, OFFICE OF RESEARCH AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF BILL LEHR

Mr. LEHR. Thank you, Chairman Markey and members of the subcommittee for this——

Mr. MARKEY. Could you turn on your mic?

Mr. LEHR. It should be on. There we go.

Mr. MARKEY. Thank you.

Mr. LEHR. Thank you again, Chairman Markey and members of the subcommittee, for the opportunity to testify here for the National Oceanic and Atmospheric Administration's role in the recent Deepwater Horizon oil spill response. I would like to discuss the critical roles that NOAA services during oil spills and their importance to their contributions to protect and restore natural resources, communities and economies affected by this recent terrible event in the Gulf of Mexico.

NOAA's scientific experts have been assisting with response from the first day both on scene and through our headquarters and regional offices. NOAA's support has included daily trajectories of the spilled oil, weather data for short- and long-term forecasts, special forecasts for cleanup operations such as the in situ burning. NOAA experts analyze the satellite imagery and also perform real-time observations to help verify the spill location and movement. In addition, NOAA scientists are providing expertise and assistance regarding sea turtles, marine mammals and other protected resources such as corals. NOAA is also coordinating with the federal and States co-trustees and responsible parties to conduct natural resource damage assessment which is a process that quantifies the total losses and develops restoration projects that compensate the public for their losses.

NOAA has also participated in a number of interagency expert teams. These include the Flow Rate Technical Group that estimated the size of the spill that you referred to, and also a joint effort with NOAA, the Department of Interior, the Coast Guard, the National Institute of Standards and Technology and other outside experts to develop an oil budget calculator to estimate for response purposes the fate of the spilled oil.

Now, there has been a lot of discussion on this budget, so let me get into a little detail on it. Basically, according to what our experts were able to determine, the oil that was spilled could be divided up into four basic categories. About one-quarter of it was ei-

ther recovered directly, was burned in situ or was skimmed on the surface. Another quarter either evaporated or dissolved into the water column, and another quarter, as you mentioned before several times, the size of the Exxon Valdez remains out there for cleanup purposes, and then another quarter was dispersed into the water column.

Now, part of that was through natural dispersion and other was through the use of dispersants. Dispersants for the Deepwater Horizon spill were only used where oil was present on the surface or they were applied at the wellhead on the sea floor. A total of 1.8 million gallons of dispersants were used. The effects of the dispersants are being monitored by NOAA, also the dispersed oil. There are over 2,000 water samples that have been collected in the deep waters of the Gulf. As well as analyzing for oil, they have also analyzed for components of the dispersants and thus far only one dispersant component, propylene glycol, was detected in a sample that was close to the wellhead.

In addition, EPA is monitoring surface water samples for the presence of dispersant components near the shoreline, and my colleague from EPA can discuss that.

Finally, to ensure the safety of fishermen and consumers, NOAA prohibited commercial and recreational fishing in certain areas of the Gulf of Mexico because of the spill. Now that the wellhead is capped and new oil is no longer flowing in the Gulf, NOAA scientists are going back into the spill area taking seafood samples to determine which areas are safe for fishing. An area is only reopened to fishing if visible oil is no longer present in the area and only after the seafood passes rigorous sensory and chemical testing. To date, every seafood sample from reopened waters or outside the closed area has passed sensory and chemical testing for contamination of oil dispersant. No unsafe levels of contamination of the seafood have been found. NOAA has begun to reopen portions of the closed area but only after being assured that the fish products within the closed area meet the Food and Drug Administration's standards for public health and wholesomeness.

To conclude, the attention at this point is focused on evaluating fisheries for reopening, shoreline cleanup, monitoring of subsurface oil both near shore and in deepwater, and conducting natural resource damage assessments with our co-trustees.

Thank you for allowing me to testify today, and I am happy to answer any questions that you may have.

[The prepared statement of Mr. Lehr follows:]

**WRITTEN STATEMENT OF
BILL LEHR, PH.D
SENIOR SCIENTIST
OFFICE OF RESPONSE AND RESTORATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE**

**HEARING ON
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SAFETY OF SEAFOOD FROM THE GULF**

**BEFORE THE
SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT
COMMITTEE ON ENERGY AND COMMERCE
U.S. HOUSE OF REPRESENTATIVES**

August 19, 2010

Thank you, Chairman Markey and Members of the Subcommittee, for the opportunity to testify on the Department of Commerce National Oceanic and Atmospheric Administration's (NOAA) role in the BP Deepwater Horizon oil spill response. My name is Bill Lehr and I am a Senior Scientist with the Emergency Response Division of the Office of Response and Restoration within NOAA's National Ocean Service. I appreciate the opportunity to discuss the critical roles NOAA serves during oil spills and the importance of our contributions to protect and restore the natural resources, communities, and economies affected by the BP Deepwater Horizon Oil Spill.

NOAA's mission is to understand and predict changes in the Earth's environment. NOAA also conserves and manages coastal and marine resources to meet our Nation's economic, social, and environmental needs. As a natural resource trustee, NOAA is one of the federal agencies responsible for protecting, assessing, and restoring the public's coastal natural resources when they are harmed by oil spills. As such, the entire agency continues to be deeply concerned about the immediate and long-term environmental, economic, and social impacts to the Gulf Coast and the Nation from this spill. NOAA has worked since the first day of this spill to reduce impacts on the Gulf Coast and will continue to do so until the oil is cleaned up, natural resource injuries are assessed, and restoration is complete.

My testimony today will discuss NOAA's role in the Administration's Deepwater Horizon response including NOAA's role in the use of dispersants as a countermeasure to mitigate the impacts of the spill; NOAA's role in the development of the BP Deepwater Horizon Oil Budget Report; and NOAA's role in testing and ensuring seafood safety.

NOAA'S ROLES DURING OIL SPILLS

NOAA has three critical roles mandated by the Oil Pollution Act of 1990 (OPA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP):

1. During the emergency response, NOAA serves as a conduit for scientific information to the Federal On-Scene Coordinator (FOSC). For example, NOAA provides trajectory predictions for spilled oil, conducts overflight observations of oil on water, identifies highly valued or sensitive environmental areas, and conducts shoreline surveys to determine clean-up priorities.
2. As a natural resource trustee, NOAA conducts a Natural Resource Damage Assessment (NRDA) jointly with co-trustees to assess and restore natural resources injured by the oil spill. NRDA also assesses the lost uses of those resources, such as recreational fishing, and swimming, with the goal of implementing restoration projects to address these losses.
3. Finally, NOAA represents the Department of Commerce in spill response preparedness and decision-making activities through the National Response Team and the Regional Response Teams (RRT).

Response

For a coastal oil spill, the U.S. Coast Guard (USCG) is the FOSC and has the primary responsibility for managing response and clean-up activities in the coastal zone. During an oil spill, NOAA's Scientific Support Coordinators deliver technical and scientific support to the USCG. NOAA's Scientific Support Coordinators are located around the country in USCG Districts, ready to respond around the clock to any emergencies involving the release of oil or hazardous substances into the environment. Currently, NOAA has deployed all of its Scientific Support Coordinators from throughout the country to work on the BP Deepwater Horizon oil spill. Although this left a vulnerability in other regions, priority had to be assigned to responding to the BP Deepwater Horizon spill.

With over thirty years of experience and using state-of-the-art technology, NOAA continues to serve the Nation by providing its expertise and a suite of products and services critical for making science-based decisions. Examples include trajectory forecasts on the movement and behavior of spilled oil, overflight observations, spot weather forecasts, emergency coastal survey and nautical charting capabilities, aerial and satellite imagery, and real-time coastal ocean observation data. Federal, state, and local entities look to NOAA for assistance, experience, local perspective, and scientific knowledge. NOAA's Office of Response and Restoration was called upon for scientific support 200 times in 2009.

Natural Resource Damage Assessment

Stewardship of the Nation's natural resources is shared among several federal agencies, states, and tribal trustees. NOAA, acting on behalf of the Secretary of Commerce, is the lead federal trustee for many of the Nation's coastal and marine resources, and is authorized by the Oil Pollution Act to recover damages on behalf of the public for injuries to trust resources resulting from an oil spill. Regulations promulgated by NOAA under the Oil Pollution Act ask for compensation in the form of restoration of the injured resources, and appropriate compensation is determined through the NRDA process. Since the enactment of OPA, NOAA, together with other federal, state, and tribal co-trustees, has recovered approximately \$500 million for restoration of natural resources injured by releases of oil or hazardous substances, as well as injuries to national marine sanctuary resources, including vessel groundings.

National and Regional Response Teams

The National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the NCP, is the federal government's blueprint for responding to both oil spills and hazardous substance releases. A key purpose of the NCP is to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans. NOAA represents the Department of Commerce on the National Response Team and Regional Response Teams (RRT), which develop policies on dispersant use, best clean-up practices and communications, and ensures access to science-related resources, data, and expertise during responses to oil spills.

NOAA'S ROLE IN THE DEEPWATER HORIZON RESPONSE

NOAA's scientific experts have been assisting with the response from the first day of the BP Deepwater Horizon oil spill, both on-scene and through our headquarters and regional offices. NOAA's support has included daily trajectories of the spilled oil, weather data to support short and long range forecasts, and hourly localized 'spot' forecasts to determine the use of weather dependent mitigation techniques such as oil burns and chemical dispersant applications. NOAA uses satellite imagery and real-time observational data on the tides and currents to predict and verify oil spill location and movement. To ensure the safety of fishermen and consumer seafood safety, NOAA scientists are in the spill area taking water and seafood samples, and NOAA has put fisheries closures in place to maintain consumer confidence in the safety of consuming seafood from the Gulf of Mexico region. In addition, NOAA experts are providing expertise and assistance regarding sea turtles, marine mammals, and other protected resources such as corals.

At the onset of this oil spill, NOAA quickly mobilized staff from its Damage Assessment Remediation and Restoration Program to begin coordinating with federal and state co-trustees and responsible parties to collect a variety of data that are critical to help inform the NRDA. NOAA is coordinating the NRDA effort with the Department of the Interior (another federal co-trustee), as well as co-trustees in five states and representatives for at least one responsible party, BP. NOAA and the co-trustees are currently gathering data on resources such as fish, shellfish, birds, and turtles, and mammals; their supporting habitats such as wetlands, beaches, and corals; and human uses of affected resources, such as fishing and recreational uses across the Gulf of Mexico. The trustees will then quantify the total losses and develop restoration projects that compensate the public for their losses.

THE USE OF DISPERSANTS

The BP Deepwater Horizon oil spill is a stark reminder that large oil spills still occur, and that we must rebuild and maintain our response capacity. When an oil spill occurs, there are no good outcomes. Once oil has spilled, responders use a variety of oil spill countermeasures to reduce the adverse effects of spilled oil on the environment. The goal of the Unified Command is to minimize the environmental damage and speed recovery of injured resources. The overall response strategy is to maximize recovery and removal of the oil being released while minimizing any collateral damage that might be caused by the response itself. This philosophy involves making difficult decisions, often seeking the best way forward among imperfect options. Dispersants served as an important tool to reduce the impacts of oil on sensitive wetlands, beaches and marshes.

For the BP Deepwater Horizon oil spill, the Unified Command's response posture has been to fight the spill offshore and reduce the amount of oil that comes ashore, using a variety of countermeasures including subsurface recovery, booming, skimming, burning, and chemical dispersants. No single response method is 100 percent effective, and each has its own "window of opportunity" determined by the density and state of the oil and weather and sea state conditions. Changing environmental conditions require the Unified Command to consider all available response options and select the best that can be used at the time. Given the enormous volume and geographic extent of the spill, the response has been remarkably successful in reducing shoreline impacts.

Spill response often involves a series of environmental trade-offs. The overall goal is to use the response tools and techniques that will minimize the overall environmental damage from the oil. The use of dispersants is an environmental trade-off between impacts within the water column, on the sea surface (birds, mammals, and turtles in slicks) and on the shore. Dispersants do not remove the oil from the environment, but applying chemical dispersants does speed up biodegradation of the oil. When a decision is made to use dispersants, the decision maker is acting to reduce the amount of oil on the surface where it may affect birds, mammals, and turtles, and to reduce impacts to the coastline, in exchange for increasing the amount of oil in the water column off shore. While the effects of dispersants on some water column biota have been studied, the effects of dispersants and dispersed oil below the surface on wildlife such as diving birds, marine mammals, and sea turtles are not as well known as they are in fish.

Dispersants were only used where oil was present and were applied at the water surface and at the wellhead on the seafloor. A total of 1.8 million gallons of dispersants were used. For comparison, that is one one-hundredth of the volume of oil that leaked into the Gulf of Mexico, which itself consists of approximately 640 quadrillion gallons of seawater. Dispersants are designed to dilute and biodegrade quickly. Water sampling in the Gulf of Mexico by NOAA is showing evidence of biodegradation in the 2,195 water samples collected in the deep waters of the Gulf. These samples were analyzed for components of dispersants and only one of the 2195 samples taken to date showed a dispersant component, propylene glycol, above the detectable limit. Furthermore, this dispersant concentration is well below the level of concern for human health. This one sample was taken close to the wellhead on June 3, well-over two months ago. Subsequent to this date, over a thousand samples have been taken and none have detected dispersants. Dispersants were last applied in the Gulf of Mexico on July 19th.

NOAA does not have a regulatory role in approving dispersant products, but NOAA has three main roles in respect to dispersant use: as a trustee agency on the RRT, NOAA must approve any preauthorization for the use of dispersants in that region; again, as a trustee agency on the RRT, NOAA must be consulted with by the FOSC on any incident-specific use of dispersants within the region; and NOAA participates in monitoring for the efficacy of dispersants via the Special Monitoring of Applied Response Technologies (SMART) program. NOAA's Scientific Support Team is designated as a special team in the NCP and provides a broad array of scientific services to the response, including recommendations to the FOSC on the appropriate use of dispersants. NOAA is also a member of the SMART program, an interagency, cooperatively designed program to monitor the efficacy of dispersant and *in situ* burning operations. SMART relies on small, highly mobile teams that collect real-time data using portable, rugged, and easy-to-use

instruments during dispersant and *in situ* burning operations. Data are channeled to the Unified Command to help address critical questions. NOAA also uses SMART data to inform 24, 48 and 72 hour oil fate and trajectory models as dispersants can affect the behavior of the spilled oil.

Under section 311 of the Clean Water Act, the U.S. Environmental Protection Agency (EPA) is required to prepare and maintain a schedule of dispersants and other mitigating devices and substances that may be used in carrying out the NCP. The NCP requires RRTs, in which NOAA participates, and Area Committees to plan in the advance of spills for the use or non-use of dispersants, to ensure that the tradeoff decisions between water column and surface/shoreline impacts are deliberated. As the FOSC for this spill response, the U.S. Coast Guard is responsible for authorizing the use of the specific dispersant used from the NCP Product Schedule where the use is pre-authorized. If the use of the dispersant is not preauthorized, the FOSC must receive the concurrence of the EPA representative to the RRT and consult with the DOC and DOI NRTs when practicable. Because of the unprecedented nature of the dispersant operations, the monitoring and constraints on application volumes and methodologies are being closely managed. In particular, EPA has specified effectiveness and impact monitoring plans, application parameters, and action thresholds. Any changes to specific Deepwater Horizon dispersant plans require the concurrence of EPA and other RRT decision agencies, including NOAA, under the NCP.

The Gulf coast is home to coastal wetlands and marshes that are biologically productive and ecologically important to nesting waterfowl, sea turtles, fisheries, and essential fish habitat. The Gulf of Mexico region's ecological communities are essential to sustaining local economies, recreational experiences, and overall quality of life. Although it may not be readily apparent, use of dispersants offshore and in deep water, reduced the amount of oil reaching the shoreline, reducing the amount of shoreline cleanup that will be required, and helping to reduce recovery time of injured nearshore resources. Without the use of dispersants, the shoreline impacts along the Gulf coast from the BP Deepwater Horizon oil spill would have been greater.

OIL BUDGET REPORT

On August 4, 2010, NOAA and other Federal agencies released a report titled the "BP Deepwater Horizon Oil Budget: What Happened to the Oil?" The National Incident Command (NIC) assembled a number of interagency expert scientific teams to estimate the quantity of BP Deepwater Horizon oil that has been released from the well and the fate of that oil. The expertise of government scientists serving on these teams is complemented by nongovernmental and governmental specialists that reviewed the calculations and conclusions. One team, led by Energy Secretary Steven Chu and United States Geological Survey (USGS) Director Marcia McNutt, estimated the flow rates and the total volume of oil released from the BP Deepwater Horizon well. On August 2, 2010, they estimated that a total of 4.9 million barrels of oil, with an uncertainty of plus or minus 10%, had been released into the Gulf of Mexico. A second interagency team, led by the U.S. Geological Survey and NOAA developed a tool called the Oil Budget Calculator to estimate the disposition of the oil. The calculator uses the 4.9 million barrel estimate as its input and uses both direct measurements and the best currently available scientific estimates. The interagency scientific report builds upon the calculator and summarizes what can

be said about the disposition of the oil to date. Over 25 government and independent scientists contributed to or reviewed the calculator and its calculation methods.

It is estimated that burning, skimming, and direct recovery from the wellhead removed one quarter (25%) of the oil released from the wellhead. One quarter (25%) of the total oil naturally evaporated or dissolved, and just less than one quarter (24%) was dispersed (either naturally or as a result of operations) as microscopic droplets into Gulf waters. The residual amount — just over one quarter (26%) — is either on or just below the surface as light sheen and weathered tar balls, has washed ashore, or is buried in sand and sediments. Oil in the residual and dispersed categories is in the process of being degraded. These estimates will continue to be refined as additional information becomes available.

It should be noted that even 26%, the estimated residual amount of oil remaining from the BP Deepwater Horizon oil spill is still a substantial amount of oil (over 1 million barrels or 42 million gallons); nearly 4 times the total amount that was released during the EXXON VALDEZ spill. This is not a trivial amount and will require a significant effort on the part of the Responsible Party and the Federal government to monitor the fate and effects of this residual oil and to recover whatever is available to be recovered.

Explanation of Report Findings

Unified Command Response Efforts:

Response efforts were successful in addressing 33% of the spilled oil. This includes oil that was captured directly from the wellhead by the riser pipe insertion tube and top hat systems (17%), burning (5%), skimming (3%) and chemical dispersion (8%). Direct capture, burning and skimming remove the oil from the water, while chemically dispersed oil remains in the water until it is biodegraded, as discussed below.

Dispersion:

Based on estimates, 16% of the oil dispersed naturally into the water column and 8% was dispersed by the application of chemical dispersants on and below the surface. Natural dispersion occurs as a result of the oil coming out of the riser pipe at high speed into the water column, which caused some of the oil to spray off in small droplets. For the purpose of this analysis, 'dispersed oil' is defined as droplets that are less than 100 microns — about the diameter of a human hair. Oil droplets that are this small are neutrally buoyant and thus remain in the water column where they then begin to biodegrade. Chemical dispersion also breaks the oil up into small droplets to keep it from coming ashore in large surface slicks and makes it more readily available for biodegradation. Chemical dispersants were applied at the surface and below the surface; therefore, the chemically dispersed oil ended up both deep in the water column and just below the surface. Dispersion increases the likelihood that the oil will be biodegraded, both in the water column and at the surface.

The naturally dispersed oil and some of the oil that was chemically dispersed remained well-below the surface in diffuse clouds where it began to dissipate further and biodegrade. Previous analyses have shown evidence of diffuse clouds of dispersed oil between 3,300 and 4,300 feet in very low concentrations (parts per million or less), moving in the direction of known ocean

currents and decreasing with distance from the wellhead. (citation: Federal Joint Analysis Group Report 1 and 2, <http://ecowatch.neddc.noaa.gov/JAG/reports.html>). Oil that was chemically dispersed at the surface moved into the top 20 feet of the water column where it mixed with surrounding waters and began to biodegrade.

Evaporation and Dissolution:

It is estimated that 25% of the oil volume quickly and naturally evaporated or dissolved into the water column. The evaporation and dissolution rate estimate is based on scientific research and observations conducted during the Deepwater Horizon event.

Dissolution is different from dispersion. Dissolution is the process by which individual hydrocarbon molecules from the oil separate and dissolve into the water just as sugar can be dissolved in water. Dispersion is the process by which larger volumes of oil are broken down into smaller droplets of oil.

Residual:

After accounting for the categories that can be measured directly or estimated (i.e., recovery operations, dispersion, and evaporation and dissolution), an estimated 26% is unaccounted for. This figure is a combination of categories all of which are difficult to measure or estimate. It includes oil still on or just below the surface in the form of light sheen or tar balls, oil that has washed ashore or been collected from the shore, and some that is buried in sand and sediments and may resurface through time. This oil has also begun to degrade through natural processes.

Biodegradation:

Both dispersed oil in the water column and oil on the surface of the water biodegrade naturally. While there is more analysis to be done to quantify the rate of biodegradation in the Gulf, early observations and preliminary research results from a number of scientists indicate that the oil from the BP Deepwater Horizon spill is biodegrading quickly. Scientists from NOAA, EPA, DOE and academia are working to calculate more precise estimates of this rate. It is well known that bacteria that break down the dispersed and weathered surface oil are abundant in the Gulf of Mexico in large part because of the warm water, the favorable nutrient and oxygen levels, and the fact that oil regularly enters the Gulf of Mexico through natural seeps.

The oil budget calculator is intended to present the best information available on the fate of spilled oil at this time. Some of the components were measured, and some of them were estimated. Each element of the budget has some level of uncertainty associated with it, although it is difficult to characterize this uncertainty due to the nature of the estimations. The output is intended primarily to help inform the response on the fate of the oil, and secondarily to help the public understand the fate of the oil. These estimates will continue to be refined as additional information becomes available. A comprehensive technical report on the oil budget will be released by the NIC in the coming weeks.

Continued monitoring and research:

As NOAA Administrator, Dr. Lubchenco, has stated, "It is important to remember that dilute does not mean benign." NOAA and our federal and research partners will continue to quantify and track oil that remains in the system to understand its fate and impacts. Additional research

efforts are currently being planned to further understand the fate, transport, and impact of the oil and response efforts. The federal government will continue to report activities, results, and data to the public on a regular basis. Updates and information can be found at www.restorethegulf.gov, and data from the response and monitoring can be found at www.geoplatform.gov.

NOAA'S ROLE IN ENSURING SEAFOOD SAFETY

To ensure the safety of fishermen and consumers, NOAA prohibited commercial and recreational fishing in certain areas of the Gulf of Mexico because of the BP Deepwater Horizon oil spill. The closures have been primarily a precautionary measure to ensure public health, safety, and consumer confidence in Gulf seafood. To identify areas where closures were needed, NOAA used a combination of computer modeling and daily overflights. Computer models produced trajectory maps of where the oil was likely to be in 24, 48, and 72-hour time frames based upon weather, satellite imagery, ocean buoy data, and ocean currents. This trajectory was ground-truthed by daily overflights to verify the actual extent of the oil. The data were reviewed each morning by NOAA to determine whether modifications were necessary for the closure boundaries. The areas closed to fishing in the Gulf included a five nautical mile buffer zone around the known location of oil. This was a precautionary measure to further ensure seafood products being caught are not contaminated because fish move in and out of the closure areas. NOAA has taken a conservative approach on closures in order to ensure public health and safety.

Now that the wellhead is capped and new oil is no longer flowing into the Gulf from the spill site, NOAA scientists are in the spill area taking seafood samples to determine which areas are safe for fishing. An area is only re-opened to fishing if visible oil is no longer present in the area and only after the seafood passes rigorous sensory and chemical testing. To date, every seafood sample from reopened waters or outside the closed area has passed sensory and chemical testing for contamination of oil and dispersant. No unsafe levels of contamination in seafood have been found.

NOAA has begun to reopen portions of the closed areas, but only after being assured that fish products within the closed area meet the Food and Drug Administration standards for public health and wholesomeness. NOAA has re-opened a total of more than 31,000 square miles of Federal waters in the Gulf of Mexico after conducting sensory and chemical analysis of fish in these areas. On July 22, NOAA re-opened 26,388 square miles of water to commercial and recreational fishing and another 5,144 square miles on August 10, 2010. The current fishery closed area in the Gulf of Mexico totals 52,395 square miles or approximately 22% of the Gulf of Mexico Exclusive Economic Zone; this is down from 84,101 square miles and approximately 37% of the Federal waters of the Gulf EEZ, which was the size of the closed area at its peak on July 12, 2010. NOAA is confident that commercial and recreational fishing activities can safely occur in the areas that were re-opened or never closed and that the fish harvested from the open areas are safe to consume.

NOAA's overall sampling strategy for Federal waters is based on oil density data over time within the fisheries closed area. The entire Federal closed area will eventually undergo the process for sampling and testing in accordance with the re-opening protocol. Our overall

strategy for sampling focuses first on areas least oiled and that are now not oiled as the top candidates for re-opening. The heaviest oiled areas are nearest the wellhead toward the center of the closed area. The heavily oiled areas will be more densely sampled than the more lightly oiled areas toward the outside of the closed area. NOAA assigned smaller areas in a grid-like pattern across the closed area and sampling stations within the grids. Samples are collected within the grids at sampling stations using a methodical, scientific approach beginning with the outermost grids working inward. The target species collected at each station are determined in advance as representative of the fish and shrimp species targeted by commercial and recreational fishers in the area.

To test the samples once collected, NOAA, in conjunction with the Food and Drug Administration (FDA), EPA, and the Gulf States agreed to a re-opening protocol that contains several criteria that must be met before fishing can occur in waters that were previously closed to fishing. These criteria include:

1. Low threat of exposure – Threat of exposure will be based on past observations and the status of the spill and conditions.
2. Evaluation of oil movement – Confirmation that the closure area is free of sheen on the surface by visual observation and/or aerial reconnaissance, or the presence of oil in the water column through visual observation or water testing.
3. Assessment of seafood contamination by sensory testing – Determination that the seafood is free from contamination through tissue collection and sensory testing. All specimens must pass sensory testing.
4. Assessment of seafood contamination by chemical analyses – Chemical analyses are performed on samples that pass sensory assessment to confirm that polycyclic aromatic hydrocarbon (PAH) concentrations are below the applicable FDA levels of concern for human health.

Sensory testing is performed by a team of NOAA and FDA expert assessors assembled from around the country at the NOAA National Seafood Inspection Laboratory in Pascagoula, Mississippi. Sensory testing is a proven technique and conducted in a carefully controlled state-of-the-art facility. Once a sample collected by NOAA from Federal waters passes sensory testing, the sample is sent to undergo chemical testing at NOAA's Northwest Fisheries Science Center in Seattle, Washington. At the lab, a team of chemists prepare and analyze the samples to detect the level of PAH compounds from the BP Deepwater Horizon oil spill in the tissue of a single fish or a group of fish collected at one location. The results are compared to the levels of PAH compounds of significant public health concern specified in the re-opening protocol. Similarly, samples collected in State waters undergo chemical analysis, this analysis is performed by FDA chemists at FDA laboratories and state laboratories that are part of the Food Emergency Response Network (FERN). The decision to distribute the workload in this way with NOAA conducting chemical analysis of Federal waters samples and FDA for State waters samples is indicative of the strong partnership between Federal and State agencies.

To further ensure that fishermen and consumers can have confidence in seafood from open Gulf waters, NOAA and FDA have expanded the sensory testing procedures. Sensory experts are trained to detect a combination of oil and dispersant, dispersant alone, and to note anything that is generally abnormal. Even though we do not expect dispersants to be present where oil is not, the expanded training for sensory analysts to detect dispersant alone is to increase surveillance and confidence in the process.

In addition, current modeling data on the individual components of the dispersants indicate that the dispersant used in the BP Deepwater Horizon oil spill may degrade rapidly and is unlikely to build up, or bioaccumulate, in the flesh of the fish. This is primarily based upon the assessment of their physical properties, which indicate dispersant compounds do not penetrate the gills or bodies of the fish, and therefore will not be concentrated in the edible tissues of seafood. Out of an abundance of caution, and in order to gather additional information, further research on the effects of dispersant use on seafood safety is ongoing.

CONCLUSION

As the response to this oil spill continues, the Unified Command will continually reevaluate our response strategies, actions, and planning. NOAA will continue to provide scientific support to the Unified Command. At this point, our attention is focused on evaluating fisheries for reopening, shoreline cleanup, and monitoring for subsurface oil, both nearshore and in deep water. NOAA also continues to work with our federal and state co-trustees on the NRDA, and to promote long-term regional restoration efforts. I would like to assure you that we will not relent in our efforts to protect the livelihoods of Gulf Coast residents and mitigate the environmental impacts of this spill. Thank you for allowing me to testify on NOAA's response efforts. I am happy to answer any questions you may have.

Mr. MARKEY. Thank you very much.

Our next witness is Mr. Donald Kraemer. He is the Deputy Director of the Office of Food Safety at the U.S. Food and Drug Administration, where he is responsible for the administration of the FDA's seafood policy. He has been with the FDA since 1977. You may proceed, Mr. Kraemer.

STATEMENT OF DONALD KRAEMER

Mr. KRAEMER. Good afternoon, Chairman Markey and members of the subcommittee. I am Donald Kraemer, Acting Deputy Director of the Center for Food Safety and Applied Nutrition at the U.S. Food and Drug Administration. With me is Dr. Vicki Seyfert-Margolis, Senior Advisor to the Chief Scientist at FDA's Office of the Commissioner. We appreciate the opportunity to discuss FDA's role in ensuring the safety of seafood harvested from the Gulf of Mexico in the wake of the Deepwater Horizon oil spill.

FDA is an active and integral part of the federal government's comprehensive, coordinated, multi-agency program to ensure that seafood from the Gulf of Mexico is free from contamination as a result of the oil spill. This program is important not only for consumers who need to know that food is safe but also for the fisheries industry, which needs to be able to sell its product with confidence. FDA is working closely with the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, other federal agencies and state authorities in the Gulf region. I would like to note the high level of cooperation that FDA has experienced among these agencies both at the leadership and among the technical and scientific staffs that carry out the research, testing and analysis needed to fulfill our respective missions.

The federal government is taking a multi-pronged approach to ensure that marketed seafood from the Gulf of Mexico is not contaminated as a result of the oil spill. These measures include the precautionary closure of fisheries, the surveillance and testing of seafood products and a heightened emphasis on FDA's Hazard Analysis and Critical Control Point, or HACCP, regulations. Beyond our ongoing work to ensure that currently marketed seafood is safe, FDA in conjunction with NOAA and the Gulf States have developed a strict protocol for reopening closed fisheries in a manner that will ensure the safety of seafood from these previously closed areas. We are also planning for additional research into potential hazards to the food supply presented by crude oil and dispersant chemicals.

The primary preventative controls for protecting the public from potentially contaminated seafood is the closure of fishing areas that have been or are likely to be affected by the oil spill. Immediately after the oil spill, FDA worked with NOAA and the States to ensure that the appropriate closures were put in place. These closures are enforced by federal and State wildlife officials as well as the U.S. Coast Guard.

The second element of our approach is a heightened emphasis on FDA's longstanding HACCP program for seafood in which processors are obligated to identify hazards that are reasonably likely to occur and institute preventive controls to address them. The framework of our seafood HACCP program is proving its value in

the context of this extraordinary public health challenge. Over the past several weeks, FDA has conducted more than 300 inspections of seafood processors in the Gulf region to verify that they are implementing controls to ensure that they receive fish harvested only from waters in which fishing is permitted.

The third element is a verification that the other controls are working properly. This is the analysis of a variety of seafood samples that have been commercially harvested from Gulf waters. We are testing for polycyclic aromatic hydrocarbons, or PAH, the primary contaminants of concern in oil. FDA has so far tested for PAH in about 500 animals comprising a variety of seafood including shrimp, crab and oysters from open State waters. The results of all samples have shown PAH levels well below the levels of concern, usually by a factor of 100 to 1,000, essentially the same levels as were seen before the oil spill.

With respect to the reopening of closed waters, FDA, NOAA and EPA worked in close cooperation with agencies in the five Gulf States to establish a single agreed-upon protocol for reopening to ensure the safety of seafood harvested from these waters. Under the protocol, waters impacted by oil will not reopen until, one, all oil from the spill is no longer present in quantities or forms that could contaminate seafood; two, a scientifically valid sampling plan is agreed upon; and three, all samples from the area successfully pass both sensory and chemical analysis to ensure that they contain no harmful oil residues.

In our sensory analyses, expert examiners check the odor and appearance of raw seafood and the taste and odor of cooked seafood. Samples that pass sensory testing are sent for chemical analysis for oil which allows scientists to conclusively determine whether PAH contaminants are present in the fish or shellfish tissue that could be consumed. To date, all samples have passed sensory testing for oil or dispersants and the results of all chemical analyses have shown PAH levels to be well below the levels of concern, again by a factor of 100 to 1,000. To date, Alabama, Louisiana, Florida and Mississippi have reopened some portions of their coastal waters to recreational and commercial fishing with concurrence from FDA that the criteria under the joint reopening protocol have been met. Additional reopenings are likely in the coming weeks.

Finally, with respect to the impact of dispersants used in the Gulf on seafood safety, the current science indicates a low risk that these dispersants will bioconcentrate in seafood and they are therefore unlikely to present a food safety concern. Further, NOAA and EPA data confirm that dispersants are not present at detectable levels in the overwhelming number of water samples taken. However, out of an abundance of caution and in order to gather additional information, NOAA and FDA are conducting additional studies to reaffirm that dispersants do not accumulate in tissues of fish and shellfish. FDA will continue to study the long-term impacts of chemical dispersants on seafood safety and we will take any new relevant information into account and adjust our protocols accordingly.

I see that I have exceeded my time, so I will forego my concluding comments.

Mr. MARKEY. You may continue, sir.

Mr. KRAEMER. Thank you.

Then to conclude, Mr. Chairman, the safety of consumers is FDA's highest priority and a responsibility we take very seriously. In close coordination with federal and State agencies, we have been proactive in monitoring this disaster, planning for its impacts and mobilizing our personnel and facilities to take the steps needed to ensure safe food supply. The protocols and approaches we have implemented are protecting American consumers while minimizing the negative impact on Gulf seafood processors.

Thank you for the opportunity to discuss these important issues, and I look forward to answering your questions. Thank you.

[The prepared statement of Mr. Kraemer follows:]



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Food and Drug Administration
Silver Spring, MD 20993

**STATEMENT OF
DONALD W. KRAEMER
ACTING DEPUTY DIRECTOR
CENTER FOR FOOD SAFETY AND APPLIED NUTRITION
U.S. FOOD AND DRUG ADMINISTRATION**

**BEFORE THE
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
COMMITTEE ON ENERGY AND COMMERCE
U.S. HOUSE OF REPRESENTATIVES**

**HEARING ON
DEEPWATER HORIZON OIL SPILL**

AUGUST 19, 2010

RELEASE ONLY UPON DELIVERY

INTRODUCTION

Chairman Markey and Members of the Subcommittee, I am Donald Kraemer, Acting Deputy Director of the Center for Food Safety and Applied Nutrition at the Food and Drug Administration (FDA or the Agency), an agency of the Department of Health and Human Services. Accompanying me is Dr. Vicki Seyfert-Margolis, Senior Advisor to the Chief Scientist, in FDA's Office of the Commissioner. We appreciate the opportunity to discuss FDA's role in ensuring the safety of seafood harvested from waters in the Gulf of Mexico in the wake of the Deepwater Horizon oil spill.

FDA is an active and integral part of the federal government's comprehensive, coordinated, multiagency program to ensure that seafood from the Gulf of Mexico is free from contamination as a result of the oil spill. This program is important not only for consumers who need to know their food is safe, but also for the fisheries industry, which needs to be able to sell its products with confidence.

FDA is working closely with the National Oceanic and Atmospheric Administration (NOAA) at the Department of Commerce, the Environmental Protection Agency (EPA), as well as other federal agencies and state authorities in the regions affected by the oil spill. We want to stress the high level of cooperation that we have experienced among these agencies, both at the leadership level and between the technical and scientific staffs that carry out the research, testing and analysis needed to fulfill our statutory mandates. We are taking a multipronged approach to ensure that marketed seafood from the Gulf of Mexico is not contaminated as a result of the oil spill. These measures include the

precautionary closure of fisheries, surveillance and testing of seafood products, and a renewed emphasis on FDA's Hazard Analysis and Critical Control Point (HACCP) regulations. Beyond our ongoing work to ensure that currently marketed seafood is safe, the Agency, in conjunction with NOAA and the Gulf states, has developed a strict protocol for re-opening closed Gulf fisheries in a manner that helps to ensure the safety of product from those areas. We are also planning for additional research into potential hazards to the food supply presented by crude oil and dispersant chemicals.

CLOSURES

The primary preventative control for protecting the public from potentially contaminated seafood is the closure of fishing areas in the Gulf that have been or are likely to be affected by the oil spill. NOAA has the authority to close federal waters to commercial and recreational fishing, and states have the authority to close waters within their state jurisdictional limits. Immediately after the oil spill began, FDA worked with NOAA and the states to ensure that appropriate closures were put in place and to define the conditions under which waters that were closed could re-open.

On May 2, 2010, NOAA closed to fishing a portion of Gulf waters (3 percent of the Gulf of Mexico Exclusive Economic Zone) that were known to be affected by oil, either on the surface or below the surface, as well as areas projected to be affected by oil within 72 hours and a five-nautical-mile safety zone around those areas. As the oil spill evolved, NOAA continued to revise the closed area, which now covers 52,395 miles (or 22 percent) of the federal waters in the Gulf—down from 35 percent at its height.

SURVEILLANCE

Both FDA and NOAA are analyzing a variety of seafood samples, including finfish and shellfish, that have been commercially harvested from Gulf waters for polycyclic aromatic hydrocarbons (PAH), the primary contaminants of concern in oil. This sampling is intended to provide verification that seafood on the market is not contaminated from the spill.

FDA has so far tested for PAH in about 500 animals of a variety of commercially harvested seafood, including shrimp, crab, and oysters, from open state waters. These species, if exposed, are likely to retain PAH contaminants longer than finfish.

The specimens are composited together, so that like species from the same location are analyzed as one unit, for a total of 47 analyses in the case of FDA samples. The results of all samples have shown PAH levels well below the levels of concern, usually by a factor of 100 to 1,000 below those levels, essentially at the same levels as were seen before the spill.

At the outset of the oil spill, the existing reference test for PAH took five to seven days to obtain results. Given the urgent need for testing large numbers of seafood samples as quickly as possible for surveillance testing and to make timely re-opening determinations, FDA worked aggressively to develop an alternative test that is reliable, accurate, and efficient. This new testing method reduced the time needed for analysis from more than a week down to about 48 hours. This rapid test is highly accurate, however, if PAH is

detected or if results are inconclusive, samples will undergo testing using the traditional confirmatory test. However, if PAH is detected below the established level of concern, the results can be used immediately to make decisions regarding the re-opening of waters.

FDA operates a mandatory HACCP program for seafood, in which processors are obligated to identify hazards that are reasonably likely to occur and institute preventive controls to address them. The framework of our seafood HACCP program is proving its value in the context of this extraordinary public health challenge. These science-based regulations, issued in 1997, initiated a landmark program to increase the margin of safety that U.S. consumers already enjoyed and reduce seafood-related illnesses to the lowest possible levels.

Over the past several weeks, FDA has conducted more than 300 inspections of seafood processors in the Gulf region to verify that they are implementing controls to ensure that they receive fish harvested only from waters from which harvesting is permitted.

FDA reminded seafood processors of their HACCP obligations related to environmental contaminants, such as oil, in a letter to the industry dated June 14, and we will assess compliance with those obligations with an additional round of inspections. Additional inspections will be performed as processors that had temporarily closed due to lack of product begin to re-open in the coming weeks.

TESTING FOR RE-OPENING

FDA, NOAA, and EPA worked in close cooperation with state agencies in Louisiana, Mississippi, Alabama, Florida and Texas to establish a single, agreed-upon protocol for re-opening closed fishing waters. The protocol sets the health standard for what seafood in the Gulf is considered safe to consume, including quantitative limits for PAH. Under the protocol, waters impacted by oil will not re-open until: 1) oil from the spill is no longer present in quantities or forms that could contaminate seafood; 2) a sampling plan is agreed upon that identifies the numbers, types, and locations of seafood samples that will be collected from the area to ensure that any contamination that may be present is detected; and 3) all samples from the area successfully pass both sensory and chemical analysis to ensure that they contain no harmful oil products.

Testing involves two steps—sensory (organoleptic) analysis by trained screeners for the presence of petroleum as well as dispersant residues, and chemical analysis of fish and shellfish for PAH. Sensory screeners, a cadre of analysts who have years of training and experience performing carefully controlled organoleptic testing of seafood for a variety of contaminants, were “calibrated” against a sample of oil, dispersant, and seawater mixture collected near the well head, as well as a sample of dispersant alone. Sensory experts check the scent and appearance of raw seafood, and the taste and scent of cooked seafood. Samples that pass sensory testing are sent for chemical analysis of oil, which allows scientists to conclusively determine whether PAH contaminants are present in fish or shellfish tissue that would be consumed, and if so, at what level.

Seafood samples from federal waters are being collected by NOAA. Samples collected in state waters for re-opening purposes are being collected by state personnel. All sensory analyses are being performed at the NOAA laboratory in Mississippi, using a combined team of FDA and NOAA screeners. FDA is utilizing the resources of its laboratories in Arkansas and Cincinnati, and state Food Emergency Response Network laboratories in Connecticut and Minnesota, to perform the necessary analyses of samples collected in state waters. Samples collected by NOAA from federal waters are analyzed by NOAA laboratories. To date, all samples have passed sensory testing for oil or dispersants and, as with the surveillance sampling, the results of all chemical analyses have shown PAH levels well below the levels of concern, usually by a factor of 100 to 1,000 below those levels, essentially at the same levels as were seen before the spill.

RE-OPENINGS

NOAA has jurisdiction over the re-opening of federal waters and to date has re-opened two large sectors of the federal waters. A third area has samples pending analysis. FDA is working closely with the states to facilitate the re-opening of closed state waters when the evidence indicates it is safe to do so. The states of Alabama, Louisiana, Florida and Mississippi have re-opened closed portions of their coastal waters to recreational and commercial fishing with concurrence from FDA that the criteria under the joint re-opening protocol have been met. Additional re-openings are likely in the coming weeks.

To ensure that an appropriate, representative sampling of seafood is collected, FDA first approves a state's sampling plan for each area to be re-opened. After approval of the

plan, samples are collected by state agencies and tested by FDA. Upon completion of testing, if the results demonstrate that contaminants are below the levels of concern, FDA informs the state, which then re-opens the fishery in question. We are confident that these steps ensure that state waters are appropriately re-opened, and that commercial and recreational harvest can be safely resumed.

As of August 18, nine areas designated by states in their jurisdictional waters have been re-opened to harvesting of certain seafood species, after FDA testing showed that all samples were negative for the presence of oil and dispersants. Nine more—in some stage of sampling and testing—are likely to re-open in the near future. The status of these state areas is listed in the attached Addendum.

ADDITIONAL TESTING AND RESEARCH

The current science indicates there is a low risk that dispersants will bioaccumulate in seafood and are, therefore, unlikely to present a food safety concern. Further, analysis of more than 2,500 sea water samples from throughout the Gulf by NOAA and EPA have shown only one sample with detectable levels of dispersant compounds, and these were located close to the wellhead, not in areas presently open for seafood harvest. However, out of an abundance of caution, and in order to gather additional information, NOAA and FDA are conducting additional studies to reaffirm that dispersants do not accumulate in tissues of fish and shellfish. FDA is refining its ability to test for dispersants by working with NOAA to develop a practical and efficient chemical test for dispersants in edible portions of seafood that can be deployed in federal and state labs to provide rapid yet

reliable results. FDA will continue to study the long-term impacts of chemical dispersants on food safety. We will take any new, relevant information into account and adjust our protocols accordingly.

Additionally, FDA, in partnership with the National Institutes of Health, the Centers for Disease Control and Prevention, and the Agency for Toxic Substances and Disease Registry, has begun to plan for testing of important toxicological endpoints, biological activities, and tissue targets for crude oil, dispersant chemicals, and related mixtures that are appearing in the Gulf. The agencies will conduct studies to include literature evaluations, analytical chemistry activities, and biological, toxicological and toxicity pathway screens to inform and extend our understanding of the hazards presented by these complex materials.

CONCLUSION

The safety of consumers is FDA's highest priority and a responsibility we are taking very seriously. In close coordination with other federal and state agencies, we have been proactive in monitoring this disaster, planning for its impacts, and mobilizing our personnel and facilities to continue to take the steps needed to ensure a safe food supply. Now, in the midst of responding to these unprecedented events, we can see the results of our approach. Gulf waters are being re-opened only as the seafood harvested from those areas is demonstrated to be free of contamination as a result of the oil spill. The protocols and approaches we have developed, in cooperation with our federal and state

partners, are protecting the American people, while minimizing the negative impact on Gulf seafood producers and exporters.

Thank you for the opportunity to discuss FDA's activities with regard to seafood safety.

I look forward to answering any questions you may have.

Addendum

State Waters Re-openings in the
Gulf of Mexico as of August 18, 2010

Alabama

- Mississippi Sound, upland out to Dauphin Island—re-opened for finfish and shrimp on August 8, 2010;
- Lower Mobile Bay to state/federal boundary—re-opened for finfish on August 16; samples of shrimp passed sensory testing and are undergoing chemical testing;
- Mississippi Sound, upland out to Dauphin Island—crabs are undergoing sensory testing;
- Lower Mobile Bay to state/federal boundary—crabs are undergoing sensory testing.

Florida

- Western end of state waters off Pensacola—re-opened for finfish fishing on July 31; cleared to re-open for commercial harvest of shrimp on August 13.

Lousiana

- Mississippi Delta to Mississippi State Line—re-opened for finfish and shrimp on July 29;
- Barataria Bay and vicinity—re-opened for shrimp and finfish on August 14;
- Terrebonne and Timbalier Bays and vicinity—re-opened for shrimp and finfish on August 14;

- Mississippi Delta to Mississippi State Line—crabs passed sensory testing;
- Mississippi Sound—Cabbage Reef, Bay Boundreau/Christmas Camp Lake, and Lake Maichais/Lake Fortuna—partial re-opening for oysters.

Mississippi

- Mississippi Sound—re-opened for finfish and shrimp on July 30;
- Barrier Islands out to federal waters—re-opened for finfish and shrimp on August 6;
- Mississippi Sound—oysters passed sensory testing and are undergoing chemical analysis;
- All of Mississippi Sound and Barrier Islands out to federal waters—crabs passed sensory testing and are undergoing chemical analysis.

Mr. MARKEY. Thank you, Mr. Kraemer, very much.

Our next witness is Dr. Paul Anastas. Dr. Anastas is the Assistant Administrator for EPA's Office of Research and Development and the EPA Science Advisory. He has conducted groundbreaking research on the design, manufacture and use of environmentally friendly chemicals. We welcome you, Doctor. Whenever you feel comfortable, please begin.

STATEMENT OF PAUL ANASTAS

Mr. ANASTAS. Thank you, Chairman Markey. I appreciate the opportunity here to testify on the important issue of dispersants and their use in the BP Deepwater Horizon crisis.

We have now passed day 120 of the BP oil spill tragedy, a tragedy that resulted in loss of life, livelihoods, and put the Gulf Coast ecosystem in peril. We are relieved that the well is currently sealed and that dispersant use has been reduced to zero. We hope and expect that this will continue to be the case.

As the President has said, this tragedy does not end with the sealing of the well. The President and EPA are committed to the long-term recovery and the restoration of the Gulf Coast, one of our most precious ecosystems. In addition to its other responsibilities with oil spill response, EPA continues to rigorously monitor the air, water and sediments for the presence of dispersants and crude oil components that could have an impact on health or the environment. These data are posted on EPA's Web site and are publicly available.

EPA has a role in the use of dispersants, which are chemicals that are applied to the oil to break it down into small particles. The dispersed oil mixes with the water column and is diluted and degraded by bacteria and other microscopic bacteria. Specifically, EPA is responsible for managing the product schedule of dispersants available in the oil spill response.

The decision to use dispersants as part of a larger oil spill response is not one that EPA took lightly. When considering dispersant use, we are faced with environmental tradeoffs. The potential long-term effects on aquatic life are still largely unknown, and BP has used over 1.8 million gallons of dispersant in a volume never before used in the United States, but because of our aggressive and constant monitoring, what we do know right now is this: our monitoring data overwhelmingly confirm modeling results that dispersants are not present at levels of detection per our method. For the rare anomaly, we investigate to either confirm or disprove the validity of a detection. To put this in context, of the more than 2,000 NOAA-generated samples and the nearly 1,000 EPA-generated samples, there have been only two detections above the method detection limit. These were immediately investigated, and our monitoring continues. Our monitoring results also show that oxygen in the water is not being depleted to dangerous levels.

Now, given the unprecedented nature of the spill, the EPA directed BP to identify less-toxic alternative dispersants. When the company failed to provide this information, EPA decided to conduct this testing independently in a rigorous, peer-reviewed manner. Specifically, EPA conducted acute toxicity tests to determine lethal concentrations of eight available dispersants. First, we tested each

of the eight dispersants alone. Then we tested the Louisiana sweet crude oil alone. And finally, we tested mixtures of the oil with each of these eight dispersants. These standard tests screen species called mysid shrimp and silverside fish to determine the relative hazard of each of the dispersants. These two species are widely considered to be representative of those found in the Gulf and were tested during a juvenile life stage when organisms are most sensitive to pollutant stress. The tests were conducted over a range of concentrations including those much greater than what aquatic life is generally expected to encounter in the Gulf.

EPA's testing delivered three important results. One, all of the eight dispersants when tested alone could be categorized as slightly toxic to practically nontoxic. Two, the oil alone was generally moderately toxic. Three, mixtures of oil and each of the eight dispersants were no more toxic than the oil alone in these tests. All of these results indicate that the eight dispersants tested possess roughly the similar acute toxicities.

While these data are important, I want to emphasize that continued monitoring is absolutely necessary. EPA has directed BP to monitor for indicators of environmental stress like decreased oxygen levels and increased toxicity to small organisms called rotifers. To date, we have not seen dissolved oxygen levels approach levels of concern to aquatic life. We have also seen no excessive mortality in rotifers. While more work needs to be done, we see that the dispersants have worked to help keep oil off of our precious shorelines and away from sensitive coastal ecosystems.

The crisis has made it evident, that additional research is needed. Congress has recently appropriated EPA \$2 million to begin a long-term study on the impacts of dispersants. These funds will support research on the short- and long-term environmental and human health impacts associated with the oil spill and dispersant use. We will also further our research efforts to include innovative approaches to spill remediation and to address the mechanisms of environmental fate, transport and effects of the dispersants. EPA will continue to take science-based approaches to dispersant use. We will continue monitoring, identifying and responding to public health and environmental concerns. In coordination with our federal, State and local partners, EPA is committed to protecting Gulf Coast communities from the adverse environmental effects of the Deepwater Horizon oil spill.

In conclusion, we will persist in asking the hard questions until we more fully understand the long-term effects of the BP oil spill and conduct the investigations required to enable the Gulf's long-term recovery. EPA is fully committed to working with the people of the Gulf, our federal partners, the scientific community and NGOs toward the recovery of the Gulf of Mexico and the restoration of its precious ecosystem.

At this time I welcome any questions.

[The prepared statement of Mr. Anastas follows:]

**TESTIMONY OF
PAUL ANASTAS, PhD
ASSISTANT ADMINISTRATOR FOR THE
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY**

**BEFORE THE
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT
UNITED STATES HOUSE OF REPRESENTATIVES**

August 19, 2010

Chairman Markey, and Members of the Subcommittee, thank you for the opportunity to testify on the role of the U.S. Environmental Protection Agency (EPA) in the use of dispersants in the Deepwater Horizon oil spill response. My testimony today will provide an overview of EPA's role and activities in the affected Gulf Coast region following the April 20, 2010 Deepwater Horizon explosion and resulting oil spill. I will also discuss EPA's latest findings on the toxicity of dispersants used in the Gulf that were released earlier this month.

Oil Spill Response

The National Contingency Plan (NCP) is the federal government's blueprint for responding to both oil spills and hazardous substance releases. Additionally, it provides the federal government with a framework for notification, communication, and responsibility for oil spill response. Under the NCP, the EPA or the United States Coast Guard (USCG) provide federal On-Scene Coordinators (FOSCs) for the inland and coastal zones, respectively, to direct or oversee responses to oil spills. The exact lines between the inland and coastal zones are determined by Regional Response Teams (RRTs) and established by Memoranda of Agreement.

(MOAs) between regional EPA and USCG offices. USCG is the FOSC for the Deepwater Horizon oil spill response.

Other federal agencies with related authorities and expertise may be called upon to support the FOSC. The NCP established the National Response Team (NRT), comprised of fifteen federal agencies, to assist responders by formulating policies, providing information, technical advice, and access to resources and equipment for preparedness and response to oil spills and hazardous substance releases. EPA serves as chair of the NRT and the USCG serves as vice-chair.

In addition to the NRT, there are thirteen RRTs, one for each of EPA's ten regional offices and one each for Alaska, the Caribbean, and the Pacific Basin. RRTs are co-chaired by each EPA Region and its USCG counterpart. The RRTs are also comprised of representatives from other federal agencies and state representation, and frequently assist the FOSCs who lead spill response efforts. The RRTs help OSCs in their spill response decision making, and can help identify and mobilize specialized resources. For example, through the RRT, the FOSC can request and receive assistance on natural resource issues from the Department of the Interior (DOI), the Department of Commerce, and the States, or borrow specialized equipment from the Department of Defense or other agencies. Involvement of the RRT in these response decisions and activities helps ensure efficient agency coordination while providing the FOSC with the assistance necessary to conduct successful spill response actions.

Under the NCP, authority to use dispersants rests with the FOSC but requires concurrence of certain RRT members. For example, RRT representatives from EPA, DOI, the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and the states with jurisdiction over the navigable waters under consideration may pre-authorize

application of approved dispersant products so that the FOSC can authorize dispersant use without obtaining further concurrences. The USCG also serves as NRT chair for this specific incident under the NCP and since the Spill of National Significance designation under the Oil Pollution Act (OPA).

EPA is also responsible for maintaining the NCP Product Schedule, which lists chemical and biological products available for federal OSCs to use in spill response and cleanup efforts. Due to the unique nature of each spill, and the potential range of impacts to natural resources, FOSCs help determine which products, if any, should be used in a particular spill response. If the application of a product is pre-authorized by the RRT, then the FOSC may decide to use the product in a particular response. If the product application does not have pre-authorization from the RRT, then the FOSC must obtain concurrence from the EPA representative and the representatives of states with jurisdiction over the navigable waters under threat. In addition, the FOSC must consult with representatives of DOI and NOAA, as natural resource trustee agencies before authorizing incident-specific use of a dispersant.

Use of Oil Dispersants in the Gulf

In order to ensure consensus on the use of dispersant, the USCG, as the Federal On-Scene Coordinator, in consultation with EPA, DOI, NOAA, and the State of Louisiana, authorized BP to apply dispersants on the water surface to mitigate the shoreline impacts on fisheries, nurseries, wetlands and other sensitive environments. Dispersants contain a mixture of chemicals, that, when applied directly to the spilled oil, can disperse oil into smaller drops that mix vertically and horizontally in the water column. Microscopic organisms are then able to act rapidly to degrade oil within the droplets. While dispersant use on the surface was preapproved for the Gulf, the

RRT did activate and confirm the use for the surface and convened again in consultation with the NRT to assist the FOSC in making the determination for the sub-surface application of dispersant.

The application of dispersant is part of a broader environmental response strategy to minimize environmental impacts. The spill management strategies, practices, and technologies that have been implemented include containment, mechanical removal techniques (booming and skimming operations), *in-situ* burning, and dispersant use. Environmental tradeoffs are associated with the widespread use of large quantities of dispersant. However, dispersants are generally less toxic than oil; they reduce risks to shorelines, and degrade quickly over several days to weeks, according to modeling results. To be clear, dispersants were only used where oil was present.

In addition, the use of dispersants at the source of the leak represents a novel approach to addressing the significant environmental threat posed by the spill. Due to the unprecedented nature of this event in which oil was continuing to spill into the Gulf from the wellhead, the USCG, as the Federal On-Scene Coordinator, in consultation with an activation of the full RRT and EPA, approved subsurface dispersant application. This approval was contingent on rigorous, constant monitoring for potential environmental effects, as recommended by EPA. Subsurface use of the dispersant is believed to have been effective at reducing the amount of oil reaching the surface and has also resulted in significant reductions in total amount of dispersants used.

On May 10, 2010, EPA and USCG issued a directive requiring BP to implement a monitoring and assessment plan for both subsurface and surface applications of dispersants. Additionally, on May 26, 2010, EPA and USCG directed BP to significantly decrease the overall

volume of dispersant used. In the month following the directive, the total volume of dispersants used fell by 75% from their peak levels.

We have now passed the 100th day of the oil spill tragedy. We are relieved that the well was capped and sealed on July 15 and that no dispersant has been applied since July 19. We hope and expect that this will continue to be the case. However, this tragedy does not end with the sealing of the well. The President and the EPA are committed to the long-term recovery and restoration of the Gulf Coast, one of our most precious ecosystems. EPA continues to rigorously monitor the air, water, and sediments for the presence of dispersants and crude oil components that could have an impact on health or the environment. All monitoring information and data are posted on EPA's website at: <http://www.epa.gov/bpspill/>.

According to NOAA's subsurface data, out of more than 2000 water samples that were analyzed for dispersant constituents propylene glycol and 2-butoxy ethanol, only one station had a positive occurrence for propylene glycol from a sample collected close to the wellhead. Additional monitoring and testing is ongoing and all data will be properly reviewed through the quality assurance process.

EPA Releases Toxicity Testing Data for Eight Oil Dispersants

Because of the unprecedented volumes of dispersant being used in this spill, Addendum 2 to the May 10, 2010 directive required BP to determine whether a less toxic, equally effective product was available. When the company failed to provide this information, EPA began its own scientific testing of eight dispersant products on the National Contingency Plan Product Schedule to confirm the accuracy of the data being provided by the manufacturers and to make the best informed decision on appropriate dispersant use. As part of an overall assessment of BP's use of

Corexit 9500A, EPA conducted toxicity tests with mysid shrimp and silverside fish to ensure that the response proceeded in a cautious and protective manner in determining the relative hazard of pollutants.

EPA initiated testing to ensure that decisions about ongoing dispersant use in the Gulf of Mexico continued to be grounded in the best available science and data. This includes screening tests to assess cytotoxicity (cell death), endocrine activity, and acute toxicity of eight available dispersants. *In vitro* assays were used to test the degree to which these eight dispersants are toxic to various types of mammalian cells. EPA also tested the potential for each dispersant to exhibit endocrine activity because some of the dispersants include nonylphenol ethoxylates (NPE). NPE breaks down in the environment to nonylphenol (NP), a substance that could potentially cause endocrine disruption. On June 30, 2010, EPA released the results of the initial round of toxicity testing that showed that two dispersants showed a weak signal in one of the four estrogen receptor (ER) assays, but integrating over all of the ER and androgen receptor (AR) results these data do not indicate that any of the eight dispersants display biologically significant endocrine activity via the androgen or estrogen signaling pathways. None of the dispersants triggered cell death at the concentrations of dispersants expected in the Gulf.

EPA also conducted acute toxicity tests on mysid shrimp and silverside fish to determine lethal concentrations of the eight dispersants alone, the Louisiana Sweet Crude oil alone, and a mixture of the Louisiana Sweet Crude oil with each of the eight dispersants. These are coastal species found in the Gulf and were tested during a juvenile life stage, when organisms are even more sensitive to pollutant stress. These phase 1 results demonstrate that the dispersants, when tested alone, displayed roughly the same toxicities (slightly toxic to practically non-toxic). JD-2000 and COREXIT 9500 were generally less toxic to small fish and JD-2000 and SAF-RON

Gold were less toxic to the mysid shrimp. Test results are posted at:

<http://www.epa.gov/bpspill/dispersants-testing.html#phase1>. The results from the second phase of testing, released on August 2, 2010, demonstrate that for all eight dispersants in both test species, the dispersant alone was less toxic than the dispersant-oil mixture. The dispersant-oil mixtures can be generally categorized in the moderately toxic range. Oil alone was found to be more toxic to mysid shrimp than the eight dispersants when tested alone (and data for the silverside fish was inconclusive and are being re-tested with oil alone). Tests on oil alone had similar toxicity to mysid shrimp as the tests on dispersant-oil mixtures, with the exception of the mixture of Nokomis 3-AA and oil, which was found to be more toxic.

<http://www.epa.gov/bpspill/reports/phase2dispersant-toxtest.pdf>

Results indicate that the eight dispersants, when tested alone and in combination with oil, are similar to one another. This confirms that the dispersant used in response to the Gulf oil spill, Corexit 9500A, is generally no more or less toxic than the other available and tested alternatives.

These externally peer reviewed results are publicly available on EPA's website at:

<http://www.epa.gov/bpspill/dispersants-testing.html>.

These tests were designed to determine toxicity effects so that a relative comparison could be made. They were conducted over a range of concentrations, including those much greater than what aquatic life is expected to encounter in the Gulf. While these data are important, to date, for subsurface monitoring, we have not seen dissolved oxygen levels approach levels of concern to aquatic life and no excessive mortality in rotifers.

While more needs to be done, we see that the dispersants are working to help keep oil away from our precious shorelines and away from sensitive coastal ecosystems. We also know

that the dispersants are less toxic than the oil released into the Gulf. To date, EPA monitoring has not found dispersant chemicals near coasts or wetlands. These results are posted at: <http://www.epa.gov/bpspill/water.html>. EPA will continue its environmental monitoring to identify any changes in conditions that could have an impact on human health or the environment.

Regarding the safety of seafood from the Gulf, while FDA has the lead for seafood safety issues, I want to simply mention that to date, every seafood sample from reopened waters has passed sensory testing for contamination with oil and dispersant. Modeling data on the individual components of the dispersant indicate that the dispersants used to combat the oil spill break down rapidly and become highly dispersed in Gulf waters. Science, to date, also indicates that dispersants do not accumulate in seafood. Thus, all our evidence shows that seafood from the reopened Gulf waters is safe to eat.

Research and Development

This crisis has made it evident that additional research is needed. The Administration requested supplemental funds for dispersant research associated with the Deepwater Horizon oil spill which this Congress approved with the passage of the Supplemental Appropriations Act of 2010. EPA will engage academic institutions and other federal agencies, such as NOAA and DOI, who have the knowledge and expertise to supplement EPA's efforts. The additional \$2.0 million requested by the President and approved by Congress will support research on the short and long-term environmental and human health effects associated with oil spill response technologies and dispersant use, and will further our research efforts to include innovative approaches to spill remediation. EPA in concert with our federal partners, will pursue an

aggressive research agenda to address the mechanisms of environmental fate, effects, and transport of dispersants.

Summary and Conclusions

EPA will continue to provide full support to the USCG and the Unified Command and will continue to take a science-based approach to dispersant use. We will continue monitoring, identifying, and responding to potential public health and environmental concerns, including waste management and beach cleanup. In coordination with our federal, state, and local partners, EPA is committed to protecting Gulf Coast communities from the adverse environmental effects of the Deepwater Horizon oil spill.

We will persist in asking the hard questions until we more fully understand the long-term effects of the Gulf oil spill and conduct the investigations required to enable the Gulf's recovery. We have taken nothing for granted. EPA has constantly questioned, verified, and validated decisions with monitoring, analysis, and use of the best available science and data.

EPA is fully committed to working with the people of the Gulf Coast, our federal partners, the scientific community and NGOs toward the recovery of the Gulf of Mexico and the restoration of its precious ecosystem. At this time, I welcome any questions you may have.

**Assistant Administrator for the Office of Research and
Development
Science Advisor to the EPA**

Paul Anastas, Ph.D. is the Assistant Administrator for EPA's Office of Research and Development (ORD) and the Science Advisor to the Agency. Known widely as the "Father of Green Chemistry" for his groundbreaking research on the design, manufacture, and use of minimally-toxic, environmentally-friendly chemicals, Dr. Anastas has an extensive record of leadership in government, academia, and the private sector. At the time he was nominated by President Obama to lead ORD, Dr. Anastas was the Director of the Center for Green Chemistry and Green Engineering, and the inaugural Teresa and H. John Heinz III Professor in the Practice of Chemistry for the Environment at Yale University's School of Forestry and Environmental Studies. Prior to joining the Yale faculty, Dr. Anastas was the founding Director of the Green Chemistry Institute, headquartered at the American Chemical Society in Washington, D.C. From 1999 to 2004 he worked at the White House Office of Science and Technology Policy, concluding his service there as the assistant director for the environment. Dr. Anastas began his career as a staff chemist at EPA, where he rose to the positions of chief of the Industrial Chemistry Branch, and director of the U.S. Green Chemistry Program. It was during his work at EPA that Dr. Anastas coined the term "green chemistry."

Trained as a synthetic organic chemist, Dr. Anastas' research interests have focused on the design of safer chemicals, bio-based polymers, and new methodologies of chemical synthesis that are more efficient and less hazardous to the environment. A leading writer on the subjects of sustainability, green chemistry, and green engineering, he has published ten books, including "Benign by Design," "Designing Safer Polymers," "Green Engineering" and his seminal work with co-author John Warner, "Green Chemistry: Theory and Practice."

Dr. Anastas has been recognized for his pioneering work with a host of awards and accolades including the Vice President's Hammer Award, the Joseph Seifter Award for Scientific Excellence, the Nolan Sommer Award for Distinguished Contributions to Chemistry, the Greek Chemical Society Award for Contributions to Chemistry, the Inaugural Canadian Green Chemistry Award, a Scientific American 50 Award for Policy Innovation, the John Jeyes Award from the Royal Society of Chemistry, and an Annual Leadership in Science Award from the Council of Scientific Society Presidents. He was a Special Professor at the University of Nottingham and an Honorary Professor at Queens University in Belfast where he was also awarded an Honorary Doctorate.

Dr. Anastas earned his B.S. from the University of Massachusetts at Boston and his M.A. and Ph.D. in chemistry from Brandeis University.

Mr. MARKEY. Thank you, Dr. Anastas, very much.

The Chair will now recognize himself for a period of asking questions.

Dr. LEHR, intended or not, I think the reaction to the oil budget report that was released last week is one of relief. People want to believe that everything is OK, and I think this report and the way it is being discussed is giving many people a false sense of confidence regarding the state of the Gulf. Overconfidence breeds complacency and complacency is what got us into this situation in the first place. Dr. LEHR, how much oil was actually discharged into the Gulf?

Mr. LEHR. By the best estimates of the combined efforts of the FRTG plus the Department of Energy National Laboratories, the best estimate to date would be 4.1 million barrels plus or minus 10 percent.

Mr. MARKEY. So it would be 4.1 million barrels discharged?

Mr. LEHR. That were actually discharged into the environment. There was 800,000 barrels that was released from the wellhead but was captured directly and pumped up above.

Mr. MARKEY. So is the 800,000 included in the oil budget baseline?

Mr. LEHR. The oil budget baseline follows closely the form that is established by the Incident Command System Situation Unit for preparing categories of where to record the oil, and for the purpose of response, that would be the standard procedure, so we follow the standard procedure, and yes, that is included in that budget for response.

Mr. MARKEY. But that oil went directly into ships on the—

Mr. LEHR. That is correct.

Mr. MARKEY [continuing]. Surface and never was in the water at all. Is that correct?

Mr. LEHR. That is correct.

Mr. MARKEY. The 800,000 barrels. So there were 4.1 million barrels that were actually discharged into the water?

Mr. LEHR. That is correct.

Mr. MARKEY. Now, out of the 4.1 million barrels discharged, how many barrels are still in the Gulf or on its shores in some form?

Mr. LEHR. Probably about three-fourths would still be, roughly, I would say. To go through the calculations that we have, the only oil that you would say that is actually removed from the environment would be that 800,000 plus the amount that was burned. The stuff that evaporated into the atmosphere is still in the environment, the stuff that is dissolved into the water column, the amount that dispersed into the water column as droplets plus the amount that was on the sheen on the surface or in small tar balls, so in that case, I would say most of that is still in the environment. It is not available for response, which was the purpose of the oil budget numbers. You cannot do any recovery operation on oil that is evaporated or is dissolved into the water column.

Mr. MARKEY. So even according to the calculations of the oil budget, the report that was released last week, between 60 and 90 percent of the discharged oil, that is, the oil that actually went into the ocean, remains in the Gulf of Mexico, and that would be between 2.45 and 3.675 million barrels. Is that accurate?

Mr. LEHR. I would have to do the calculations here in my head, but when you were including your numbers there, I mean, the oil that evaporated, which was a substantial amount, whether it is still in the Gulf of Mexico, I don't know. You would have to look at how it was transported by the wind. So I think you would want to stick with just the amount that would be in the water column or on the shoreline, and that would be the amount that we estimated as being naturally dispersed or chemically dispersed, and the amounts that are on the shoreline. Now, some of that has been recovered on the shoreline as well and the amount that has been dispersed is biodegrading. We still are working to determine the rate. So again, the numbers that we put in the budget calculator for response purposes, to answer the question about what is the fate of it in the long term, that is a different question. That is for the damage assessment.

Mr. MARKEY. Dr. Lehr, I am interested in understanding how BP has performed in terms of removing spilled oil from the Gulf before it hits land. What percentage of the oil that was spilled into the Gulf was actually removed from the ocean? I am talking about burning and skimming and actually removing the oil from the ecosystem. That is, of the—

Mr. LEHR. Of course, you want—

Mr. MARKEY. Let me say it. Of the 4.1 million barrels of oil that actually went into the ocean, what percent was removed by BP?

Mr. LEHR. I would have to redo these calculations since these were based on the 4.9 million as opposed to—

Mr. MARKEY. But—

Mr. LEHR. Are you talking about—

Mr. MARKEY. Actually the only issue I think that the American people are concerned about is the 4.1 million barrels that actually went into the ocean, so it is important for us to discuss that issue and separate it from the oil that just went directly into the ships and never was in the ocean at all, because that is where the concern is, and people should have a very good understanding of what percentage of that oil has been removed thus far. So do you have a number or—

Mr. LEHR. You would have to take the ratio of 4.9 divided by 4.1 and then multiply that by these fractions that we have down here for—

Mr. MARKEY. So if you could use your own chart, Dr. Lehr, and break that down in a way that could help us to understand of the 4.1 million barrels, how much BP did—

Mr. LEHR. So if you take the 5 percent that was burned and multiply that by the ratio of 4.9 to 4.1, and I must admit, in the era of pocket calculators, I can't do that math in my head. And then if you take the amount that was skimmed, 3 percent, and multiply that by 4.9, by 4.1—

Mr. MARKEY. Now, are you using 4.9 or 4.1 as you are doing this?

Mr. LEHR. No, you asked me to use it with the new ratio.

Mr. MARKEY. OK, 4.1.

Mr. LEHR. Then I have to multiply those numbers by that ratio. I could get a calculator and see what that ratio is.

Mr. MARKEY. Do you have assistants here with you? Has anyone accompanied you here this morning, Dr. Lehr? Could one of your assistants do that?

Mr. LEHR. I have got a calculator here. I need to multiply by 1.2 times each of those percentages, so roughly the burn would then roughly be 6 percent, and the skimmed would be 4 percent, roughly.

Mr. MARKEY. So between the skimming and the burning, 10 percent of the 4.1 million barrels would have been removed from the ocean, leaving 90 percent unaccounted for?

Mr. LEHR. Well, there would also be whatever was recovered on the shoreline, which we didn't—

Mr. MARKEY. No, that is what I am saying. In the arithmetic we are doing right now, so the burning is 6 percent, the skimming is 4 percent?

Mr. LEHR. Right.

Mr. MARKEY. So let us continue then with the arithmetic. What else—

Mr. LEHR. OK. So then you had whatever was captured in the residual, and we have not quantified that quantity and how much of that as they do the beach recovery and so on. So I can't give you the numbers on that. We were again looking at it for response purposes.

Mr. MARKEY. So again, let us recapitulate here for a second. Six percent was burned, 4 percent skimmed, and an unknown amount was collected on the beaches. Is that correct?

Mr. LEHR. Right.

Mr. MARKEY. And can you tell us the reason that has not been calculated yet?

Mr. LEHR. It was mixed in with—you know, you don't pick up just oil on the beaches. You pick up oil and debris and there is a question of trying to separate that out. It is not a simple process.

Mr. MARKEY. Has there been even a range that has been put together in terms of some estimate of how much oil that might represent?

Mr. LEHR. There may have been. I am not aware. But I could get back to you and get that answer to you.

Mr. MARKEY. Well, in the wake of the Exxon Valdez spill in 1989, both the Government Accountability Office and the Office of Technology Assessment published reports looking at the capacity to recover oil after a major spill. They found that given technologies available at that time, we could really only recover 10 to 15 percent of the spilled oil. So it seems to me that BP's oil recovery effort comes in on the low effort of what was achievable 21 years ago. You seem to have come in at the number of approximately 10 percent plus whatever was on the beaches, but still within that range of 10 to 15 percent that was determined to be recoverable after the Exxon Valdez spill. Would you agree with that?

Mr. LEHR. Yes. I mean, in terms of the actual oil on those categories. Now, there was of course in this case the unusual event of a large amount of natural dispersion and the addition of large amounts, a record amount, as far as I'm aware, of chemical dispersants, and that is considered a type of response. So one would have to say, how do you weigh that, so—

Mr. MARKEY. I understand, but I am just—

Mr. LEHR. In terms of the standard mechanical and, you know, burn operations, beach recovery, I would say yes, this was about average for what we have seen from major spills.

Mr. MARKEY. I am just trying, if I could, Doctor, I am just trying to divide the question so that the public can understand what it is that we are talking about. So in terms of just recoverable oil, it is somewhere in the range of 10 percent?

Mr. LEHR. And in my mind, that is not a passing grade, only 10 percent of 4.1 million barrels actually having been recovered. I think we all saw this coming, and with all of BP's talk about using golf balls, nylons and hair to clean up the spilled oil, I think it is important that even using a 21-year-old grading system that BP has done a very poor job in cleaning up the Gulf.

So Dr. Lehr, throughout the entire BP saga, I have pushed for BP and the Unified Command to make this process as transparent as possible. The way I see it, the more people we have independently analyzing and verifying the data and information associated with the spill, the better and more informed our response decisions will be.

With regard to the oil budget, is this something NOAA does as part of the operational response to a major oil spill?

Mr. LEHR. The oil budget is a traditional part of a response. As I mentioned before, there's a special form that's filled out as part of the situation unit in the Incident Command System. The standard procedures for that use, amongst other things, a model that was developed by NOAA but also they used some other techniques such as observers estimating the size of the spill. In the case of this spill, because it was so large, because it went on for so long and in particular because it was occurring at a mile underneath the water surface, it was necessary to develop the special tool, which is what we did with the budget calculator. Now, I have noticed in the press that this is called the NOAA budget calculator. I would like to receive credit for that but one thing in science that you have to do is to recognize the contributions of other, and so this really was a joint effort of both government agencies and the outside experts in the field to develop this tool.

Mr. MARKEY. Now, Doctor, is there an established methodology for making the oil budget calculations?

Mr. LEHR. There is a standard form that you would calculate to divide the budget into, but in terms—and there is a normal procedure that we had to modify because of the circumstances for the spill.

Mr. MARKEY. In the case of the Deepwater Horizon spill, how long has NOAA been calculating an oil budget to guide the response efforts from the Unified Command?

Mr. LEHR. In terms of the Incident Command, we started working I believe in either June, starting to work on the development of the tool, and were providing guidance for some time in July for the Incident Command.

Mr. MARKEY. So has NOAA been using the established methodology for calculating an oil budget in this case?

Mr. LEHR. I am going to have to ask for clarification, what you mean by—we did use the standard procedures for estimating oil for

each of the techniques based on methods that had been used in the past but were modified. Let me give you an example. In calculating dispersion, natural dispersion, this is based on looking at something called the energy dissipation rate that is due to breaking waves. Now, we of course obviously in the case here, we had a plume that was subsurface. We didn't have breaking waves but we did have an energy dissipation rate and we had to then employ some of the experts that worked on the FRTG to help us calculate that energy dissipation rate so we could get a new estimate for natural dispersion.

In the case of evaporation, we have some standard models for estimating the evaporation of Louisiana sweet crude. It is in our oil library database. But that is for spills that happen at the surface, and the spills that are coming from a mile deep, there is dissolution that occurs before it gets to the surface. Many of the same molecules that would evaporate on the surface become dissolved in the water so we had to modify that to handle those cases. So it was the standard procedures, and to the extent that we had to modify them for the specific instances that happened in this spill.

Mr. MARKEY. Can I ask, has NOAA made available the background data and formulas that were used to reach conclusions on what happened to the spilled oil?

Mr. LEHR. In terms of the—one component in terms of the flow rate, there have been reports on that. In terms of the oil budget calculator, which is what I assume that you are referring to, this was an oil spill emergency, not an oil spill experiment. When we put together the team, our priority was to get an answer as quickly as possible to the Incident Command. Now, the technical documentation is being written and will be peer reviewed. It will be long. It will be boring. It will be filled with graphs and charts and all the references and the passive voices that are typical of such reports, and I assure you, it will bore everybody except for those handful of us who actually like to do oil spill science, but I noticed that some of our academic friends have asked us for this.

For our younger friends, I would suggest that patience in this case is a virtue. In an emergency, you first get the answer. You do not tell Admiral Allen that he has to wait 3 months while your report goes through peer review, but that will come. We welcome people's comments on it. I would encourage the new people who are coming into the field from nontraditional areas of this to stay interested in it. We like to welcome the new blood, but you are going to have to wait a little bit for that report to get out.

Mr. MARKEY. Well, I appreciate the desire to complete a full peer review, Doctor, but you have already issued four pages of findings and a 10-page supplement that explains some of the calculations in greater detail. If much of this oil budget is standard procedure for NOAA in response to an oil spill, why can't that information be made available sooner, especially given the historic issues that many independent scientists have voiced regarding the conclusions of this report?

Mr. LEHR. Well, I would say this. I would prefer, and I think all the scientists would prefer that because the questions now are on a different time frame and we move from the response to damage assessment, that it is better to take the time to do it right. Now,

yes, some of the methods are standard but some of them had to be modified, as I mentioned in my testimony, in terms of the evaporation calculations and the natural dispersion. We are doing a thorough literature survey because again our understanding is, this report is going to be looked at not only by oil spill scientists who have been doing this for 20 years, in many cases are contributing to the report, but by other scientists who are coming to this, this is their first major spill event, so we wanted to provide a complete document here that will answer all their questions.

Mr. MARKEY. Let me ask this. Will NOAA agree to make available to the public the citations of the scientific literature, formulas or actual algorithms that would allow independent scientists to evaluate the report's findings?

Mr. LEHR. Of course.

Mr. MARKEY. Will you release that now?

Mr. LEHR. It is still being compiled.

Mr. MARKEY. You have already released a report last week. Could you give us for the public consumption the citations of the scientific literature, formulas or actual algorithms that you used in creating your oil budget?

Mr. LEHR. All that—first of all, and again, I am going to come back to this. This is not a NOAA product, this is a product of a joint effort, and the—

Mr. MARKEY. What we are trying to do, Doctor, is to get at the methodology so that we understand what was used in order to produce your initial oil budget. You are saying that it has to be reviewed for some time in order to determine whether or not you got it right and so in order, I think, to ensure that we have this done in a time frame that provides the information to the residents of the Gulf of Mexico, that you release these algorithms, you release the scientific literature that you relied upon so that there can be independent eyes, independent judgments that are also allowed in real time to be able to make judgments as to whether or not the formula which was used was the correct one to be used, given the consequences to the public if that formula was not constructed accurately. In other words, would you support making that information available to the public, speaking for NOAA?

Mr. LEHR. For NOAA—and I would assume that all the experts that contributed will also be releasing this information. That's what the purpose of the report is. Representative Markey, what we are doing in this case is going through the standard procedure which is done for a scientific report. We get the experts. They all contribute to the report. We send it back to them for them to look at to make sure that we have got their comments and their opinions and their assessments correct and then we send it out, as you say, to independent scientists. That is what a peer review is. We sent it out to people, and we will welcome recommendations for peer review.

Mr. MARKEY. But when will that happen, Doctor?

Mr. LEHR. Excuse me?

Mr. MARKEY. What is the time frame for that to happen?

Mr. LEHR. Well, it has been delayed by a week, because I am having to come here, but we are hoping to get it out within 2 months.

Mr. MARKEY. Two months? That is not timely enough, Doctor. That is the problem. That is what we are trying to get at right here. We are trying to telescope the time frame that it will take in order to get that information into the hands of independent scientists.

So you don't want to make all of the data and models available but you have given us conclusions that result from these models of the data. You then say you don't want to make the models and data available to outside scientists because you are still having everything peer reviewed post release of your budget report. That is to me unacceptable. We need to have that information. The report that you released last week received international attention. There are many people who are making decisions based upon that report. So it is important right now, Dr. Lehr, for that information then to be made public so that not only is it being peer reviewed in the regular process but because of the real-life consequences for the lives of the people in the Gulf of Mexico and outside of the Gulf of Mexico, because of the toxic nature of the material in the Gulf, that that information be made public. There is too long of a gap that is going to elapse under the process that you have adopted.

The real issue here is that the public has a right to know right now what is going on in the Gulf of Mexico, and your report should be analyzed by others right now so that we are sure we got it right, because if your numbers are wrong, 2 months from now could be too late in terms of the remedial recommendations which are made to the public, to the fishing industry, to the consuming public in terms of the consequences for their families. So I ask again for you to release that information, that data.

The flow rate team estimated that 4.9 million barrels of oil flowed from the Deepwater Horizon well. The uncertainty of this estimate is plus or minus 10 percent, as you said. Does NOAA have certainty with regard to the figures for the estimates of what happened to all 4.9 million barrels? What is the best and worst case estimate for the residual oil that remains in the Gulf?

Mr. LEHR. We have—we do, as part of the calculator, do have the estimates of uncertainty for each of the various processes, so, for example, in terms of the burn, there are some ASTM standards for the burn rate that were applied to the spill. It gives us a high degree of confidence. We have very low uncertainty for the estimates for that. For evaporation and dissolution, again, we have taken samples and matched them up with models from both NOAA, from Environment Canada and from a large research organization in the European Union, and those results match closely so we are fairly confident on those values.

Now, when we get into the dispersed oil, the uncertainty becomes larger, particularly for the use of the chemical dispersants subsurface, which is a new experience to us, and we were very conservative there. Now, we employed the expertise of the National Institute of Standards and Technology, who has brought in some very excellent statisticians to calculate the net uncertainties on it. That is given in those extra pages that I believe you were given there, but that will also be in the final report, and Representative Markey, I will commit today to do whatever I can to speed up the report. I appreciate the concern on it. I hope that you and the public

and the other academics appreciate that because of the importance, because of the points that you just stressed, we want to make sure that it is done right, and that is why I am making sure that we brought in the experts and——

Mr. MARKEY. Here is the thing, Doctor. You shouldn't have released it until you knew it was right because so much is going to depend upon that release, and if you are not confident that it is right, then it should not have been released because it basically sent a signal with regard to how much of the problem remains, and that is really something that is obviously of great concern to people who live in the Gulf. They don't want to be forgotten. They don't want this to be downplayed or lowballed, which is in some quarters what has happened since that report was released. So I think it is important, since it has been released, to be examined right now so that we can be sure that those numbers were accurate and independent scientists can quickly look at the formulas and corroborate or question, but it should not be something that is done in a boring academic setting over a prolonged period of time. It is something that has to be done in a dynamic setting in real time because of the resources that may need to be dedicated to this problem to ensure that it is remediated in a shorter period of time than otherwise if your estimates are inaccurate, so that is critical, and from a political perspective, the longer the time that elapses is the lower the political pressure and the public attention will be there to ensure that the resources are brought to the problem. And so we have to make sure that we do this in a timely fashion so that unlike the Exxon Valdez spill, we actually do something in real time so that everything that can be learned about it is learned about it, and you agree, Doctor, that the amount of oil which is still in the Gulf of Mexico and unaccounted for is at least five times the size of the Exxon Valdez spill? You do agree with that?

Mr. LEHR. Well, I agree that this is—and I also note that NOAA is taking a lead role in monitoring the oil that is out there. We will continue to do that. I don't think the report should be interpreted as saying that somehow this spill is over with.

Mr. MARKEY. No, it is not that it is over with, but there was an optimistic spin in some quarters that was placed upon that report, and since that is happening in real time, then the independent evaluation of that report must happen in real time because if it is wrong, then many opportunities for a calibrated response to the defects in the report will have been lost and so that is why it is important for you to surrender this information now to independent scientists.

So according to NOAA's oil budget, 408,792 barrels of oil were chemically dispersed out of a total of 4.1 million barrels, approximately 9 percent of the total oil in the Gulf of Mexico. This means that 43,900 barrels of dispersant were needed to get rid of 408,792 barrels of oil. This means that one barrel of dispersant dispersed just over nine barrels of oil, yet according to your budget documentation, a dispersant-to-oil ratio of one to 20 is considered successful. Dr. Lehr, it seems to me that the ratio used in this disaster of one to nine would not be successful by NOAA's own definition. Would you agree with that?

Mr. LEHR. What we did for—and this is an area that we had the hardest time calculating, was the effectiveness of the chemical dispersant. The dispersant that was applied subsurface, what we called ideal conditions. We made sure—I mean, the dispersant was being injected into the oil so it was making direct contact. It was a very turbulent flow regime there. So this would be the ideal conditions for dispersant operations. We asked the people who make a living applying dispersants what they thought would be the effectiveness and they had numbers as high as 30 or 40 to one ratio. We looked at the literature, and the oil industry literature suggested that a successful operation was 20 to one, so we decided to be conservative and say we will go with the 20 to one. We may very well have underestimated the effectiveness of that subsurface dispersant.

Now, at the surface where a lot of the dispersant was applied, they were applying on oil which had partially weathered and had partially emulsified. The viscosity was high, and according to past spills, dispersants would have been not as effective, but there was a study that was done by SINTEF, a research group out of Norway, with this emulsified oil using these dispersants that said that it was showing some effectiveness, plus there were some observations on scene by NOAA personnel and Coast Guard personnel that suggested that the surface operations were being at least partially effective. So what we did was to scale down what we would estimate would be the effectiveness of the surface operation. I believe we estimated it would be like four or five barrels per amount of dispersant sprayed and that would take into account that some of the dispersant did not interact with the oil. You don't always hit the oil. And secondly, the fact that the oil had emulsified to such an extent that it was more difficult to disperse and to form the small droplets that are necessary for the oil to disperse in the water column.

Mr. MARKEY. So Dr. Anastas, according to the budget documentation of dispersant-to-oil ratio, one to 20 is considered successful but this was a ratio which was one to nine. Do you believe that that constitutes a successful application of dispersant?

Mr. ANASTAS. I think my colleague, Dr. Lehr, noted the significant uncertainty in the estimates of dispersion. All of the evidence, all of the monitoring that was conducted in an ongoing way that was required by EPA during the application, especially the subsurface application of the dispersant, showed effectiveness. We ensured through fluorescent spectrophotometry that particles were being formed. This was a high-energy system. We have reason to believe and evidence shows that it was an effective and relatively efficient—

Mr. MARKEY. So given your own numbers and your own analysis, how successful would you say that it was?

Mr. ANASTAS. Well, I don't think that there is a way to measure the ratio between chemically dispersed and biologically dispersed oil, so I don't think we can have precise numbers. I do think the estimates, as Dr. Lehr noted, whether it is 20, 30 or 40 to one in terms of a ratio would be more potentially in the ballpark.

Mr. MARKEY. Well, dispersed doesn't mean exactly the same thing as gone, does it?

Mr. ANASTAS. No, it does not.

Mr. MARKEY. For example, if I put a spoonful of sugar in my iced tea and stir it, the sugar is dispersed. You can't see it. But if I then drink the iced tea, it still tastes sweet because the sugar is still there. The sugar is dispersed but it is present. Isn't that somewhat analogous to the situation we face in the Gulf with this dispersed oil as well?

Mr. ANASTAS. Not exactly. The sugar dissolves in solution. Dispersant means that it is being broken up into small particles, the whole purpose of which is to make them more ingestible and digestible by the microbes because the only time that oil actually goes away is when it is degraded. Now, that degradation can happen through biological processes. It can happen through physical processes. Physical processes, when it is broken down by the water itself, is called hydrolysis. When it is broken down by temperature, it is called thermolysis. When it is broken down by light, it is called photolysis. These degradation processes all combine and the whole purpose of the dispersant is to make it more accessible to these degradation processes.

Mr. MARKEY. What is the time frame for that process to take place? How do you measure that in terms of the actual amount of oil that is as a result more subject to being consumed because the dispersant has been released? How can you measure that over such a vast area?

Mr. ANASTAS. There have been studies done even by the EPA and its partners, and part of the rationale for applying dispersants is because we have seen rates of degradation increase by as much as 50 percent with the use of dispersants.

Mr. MARKEY. Did you say 15 or 50?

Mr. ANASTAS. Five zero, 50 percent, over those untreated.

Mr. MARKEY. Thank you.

Dr. Lehr, government scientists have now estimated that 4.9 million barrels of oil escaped from the BP Macondo well but that number does not include the methane that also came out of the well, much of which entered the Gulf of Mexico. Although the impacts of methane are not well understood as that of oil is understood, we know that it has the potential to cause harm when released at such significant levels above the natural seepage of methane in the Gulf. As part of the natural resources damage assessment and associated restoration plan, will NOAA be looking at the impact of the release of methane from the BP well?

Mr. LEHR. In terms of the effect, I would believe the NOAA folks would take that into consideration for sure. Now, I am not part of the damage assessment team. We have a different group that does that. And the oil budget calculator did not take it into account because it was an oil budget calculator. There is no response to dissolved gases that you can't put skimmers out and so on. So that is why it wasn't in the report that you saw. But in terms of the damage assessment, certainly you would take into account all the hydrocarbons that were released and what effects they would have on the environment.

Mr. MARKEY. Just a few weeks ago in response to a letter I wrote, FDA explained that while it does not presently monitor for dispersant chemicals in the issue of seafood, the agency is working closely with NOAA to conduct further studies to determine if dis-

persant chemicals or their metabolites can bioconcentrate in the flesh of seafood species. Mr. Kraemer, what is the status of these studies?

Mr. KRAEMER. Mr. Chairman, I would like to refer this question to Dr. Margolis.

Mr. MARKEY. Could you identify yourself for the record, Doctor?

Ms. SEYFERT-MARGOLIS. Dr. Vicki Seyfert-Margolis.

Mr. MARKEY. And what is your title, please?

Ms. SEYFERT-MARGOLIS. I am the Senior Advisor for Science Innovation and Policy in the Office of the Commissioner of Food and Drug Administration.

We have been working with NOAA on developing chemical methodologies for the detection of one of the major components of dispersant, which is dioctyl sulfosuccinate sodium salt, or DOSS. This component is about 20 percent of the total Corexit dispersant which was applied in the Gulf. Essentially what we have done is two series of studies where we are exposing crabs and fish in tanks in controlled settings to DOSS at 100 parts per million, which is an effective concentration of 20 parts per million of the DOSS. We then do exposure 24 hours with subsequent washouts in clean salt-water for 24, 48 and 72 hours and then assess the concentration of DOSS in the hepatopancreas or liver as well as the muscle tissue. We have preliminary data to date suggesting that there is not any bioconcentration of DOSS in the hepatopancreas or in the muscle tissue of crabs.

Mr. MARKEY. Could you explain what DOSS is so that the public who is watching can understand what that is?

Ms. SEYFERT-MARGOLIS. Sure. DOSS is a detergent, essentially a detergent-like compound that is actually found in a variety of products including a number of over-the-counter products. It is used to help disperse the oil but it is generally an inert nontoxic substance, and there have been significant studies on toxicity of DOSS demonstrating a lack of toxicity of this particular component of Corexit.

Mr. MARKEY. Please continue.

Ms. SEYFERT-MARGOLIS. So essentially we conducted these tank studies and we found no evidence to date of bioconcentration of DOSS in the crabs and some shrimp that have been tested so far. We are still actively assessing these samples in the controlled setting, and additionally we are able to go back to all of the retrospective samples which were collected because this particular component is present in the fraction or extract that we made for monitoring PAH for the reopenings.

Mr. MARKEY. What about the other components of Corexit in addition to DOSS? Have you done the analysis of the other components of Corexit, this chemical that was shot into the ocean in order to determine the toxicity of those components?

Ms. SEYFERT-MARGOLIS. We have not. We have started with this as a marker for DOSS because it is one of the principal components of the Corexit and therefore will be very readily detectable so it essentially serves as a marker for the dispersant.

Mr. MARKEY. What is the time frame that you are going to use in order to do an analysis of the other components in Corexit to determine whether or not there is a toxicity, there is a danger that could attach to it if human beings consumed that chemical?

Ms. SEYFERT-MARGOLIS. Some of the other components that are present in Corexit such as the petroleum distillates would be found in our PAH analysis as well, so it would be difficult to distinguish those from petroleum distillates in the oil itself. We are not currently looking at any of the other components of Corexit.

Mr. MARKEY. You are—can you repeat that?

Ms. SEYFERT-MARGOLIS. We are not currently doing tests on the other components of Corexit right now because we wanted to establish the methodologies using the principal, one of the principal components which we felt we could detect readily as a first step.

Mr. MARKEY. How long will it take you before you actually conduct experiments on the other components?

Ms. SEYFERT-MARGOLIS. I can't speak to that because it is not clear whether or not we have the methodologies in hand to detect all those at the present time.

Mr. MARKEY. So if you find DOSS in your seafood samples, then what?

Ms. SEYFERT-MARGOLIS. Then we would consider that as something that we would need to go back and reevaluate the samples for a possible presence of dispersant.

Mr. MARKEY. Are there potentially other components in Corexit that are known to be toxic?

Ms. SEYFERT-MARGOLIS. There are a number of components of Corexit. I think the EPA could probably speak better to toxicity studies that have been done on the various components of Corexit.

Mr. MARKEY. Dr. Anastas, are there other components in Corexit that have been known to be very toxic?

Mr. ANASTAS. I guess I would first start off by saying that the testing that we conducted, that the Administrator ordered conducted, was on Corexit itself. So of course when you are looking at the entire formulation, all of the components and their contributions to toxicity would be considered, and it is important to look at the formulation as a whole. So the toxicity results that I reported in my opening statement—

Mr. MARKEY. So are you saying that as a result, that there is no point in even bothering to examine the other components in Corexit because you have already studied Corexit?

Mr. ANASTAS. No, I am saying that when you do toxicity studies on the Corexit as a whole, you are in essence doing toxicity studies on the components.

Mr. MARKEY. And what I am asking, as a result, if I can go back to the FDA, does that mean that there is no reason to do any further studies of these materials, even though some of them are known to be toxic?

Mr. KRAEMER. Mr. Chairman, FDA, first of all, is fully aware of what are the components of Corexit, and we have looked at each one of these for toxicity, and as you are aware, in our response to your letter to the agency, each of these components are low toxicity to humans. I think we have to separate here the distinction between toxicity to marine animals as I think was the concern that EPA was suggesting from toxicity to humans if it is present in the flesh of the fish, so of course FDA's concern is the latter toxicity to humans if it in the flesh of the fish. We have looked at each of these components of Corexit and they are all very common house-

hold constituents so they are in things such as lip gloss and toothpaste and a variety of over-the-counter drugs, so they have been approved for use for consumption by people. These are components that FDA reviews for food additive purposes, also reviews—

Mr. MARKEY. You have yet to put in place, though, a test in order to determine whether or not any of these components are in the fish. Is that correct? You have only done a study so far on the DOSS as a marker but not on these other chemicals. So as you are sitting here as the FDA and representing the public's interest in determining whether or not these fish are safe to eat, it is without having completed the study in terms of these actual component chemicals inside of the fish. Is that correct?

Mr. KRAEMER. I would to, if you don't mind, put that question in the context of what we have done, and I do intend to answer your question specifically, but the first question that FDA wanted to answer with respect to dispersants is whether the constituents of or the components of the Corexit, what do we know about those and what do we know about whether, one, they can get into the flesh of the fish, and two, if they were in there, what would be the risk to humans. The answer to all of these is that they have a very low potential to get into the flesh of fish. That doesn't mean they won't get in at any level, it means that they have a low likelihood of getting into the fish and are highly unlikely to accumulate at levels above what is in the environment, which we believe is comforting.

The second question as I mentioned is, do the components, are they toxic in and of themselves, and as I said, we are aware of all of these components and they have common uses in products that either intentionally consumed, or as in the case of lip gloss, do get consumed as a matter of course because of the way they are used, and these components have approval levels in each of those uses, and those levels are much higher than the levels that under any circumstance you could imagine would end up in the flesh of the fish. So it is true that we have decided that in the case of DOSS in particular, at least as a starting place, we are looking to see whether—we want to confirm in a definitive study what we already believe we know the answer to, and that is, that is unlikely to bioconcentrate, and as Dr. Margolis put forward a minute ago, the studies, although just underway at the current way, but the preliminary information is very suggestive that they will not bioconcentrate, so again confirming what we believe we already knew. It is a reasonable question to ask if we can look at the other components. I think that is something that we ought to do.

Mr. MARKEY. Just so I can understand, Doctor, so right now in the parts of the Gulf that have been reopened for fishing, you have okayed the consumption of that food, those fish, even though you haven't completed testing on the component parts of Corexit but with the belief that it does not accumulate in fish at a level that would pose a danger to the public as they consume that fish. Is that correct?

Mr. KRAEMER. It is correct to an extent, but what I would like to clarify is that we are doing some analysis of the fish. This is through the sensory testing that I mentioned earlier. And to give you an understanding there, these are experts who are trained. I

think there is a misunderstanding by many about the nature of this test. Quite frankly, these are folks who go through significant training. Not every one of them can get through that training and demonstrate the skill to be able to pick up different odors, but the panels that we have in place on the Gulf Coast now, these are both NOAA and FDA people working together, are truly expert, and they have been calibrated against the standard of seawater, oil and dispersant that was collected at the well site so they can detect that combined odor. They were also calibrated specifically against the odor of dispersant, which has a much milder odor but still detectable, and so all of the samples that we are using for reopening of waters have been run through this analysis. We recognize that there is more comfort in having a chemical test, and that is the reason that we have engaged with NOAA in the development of the chemical test for the DOSS component. We believe it is highly unlikely that dispersant will be present by itself but there is certainly the possibility that it could, so that is the purpose for the development of that test capability.

But again, I don't want to suggest that we lightly came to the conclusion that the components of Corexit are unlikely to accumulate and if they did are nontoxic. There is an extensive body of science around all of these components which FDA has looked into. So as we have said and made public statements, we are confident that based on the current science, the likelihood for bioconcentration in fish is very low, and should it occur, the toxicity of those components would be very low. The studies that we are talking about are really there because of the unprecedented nature of this spill. We want to be able to assure the public that we have a test but we don't believe there is any risk to the fish that is caused as a result of the fish that are already on the market.

Mr. MARKEY. In the same letter, FDA stated that it defers to EPA to determine if dispersant and oil residues can accumulate in aquatic plants and eggs. Dr. Anastas, can oil and dispersant bioconcentrate in fish eggs?

Mr. ANASTAS. The properties of oil and the degree to which it dissolves in fat can allow oil to in principle enter into fat tissues and potentially enter those biological systems. All of the models that we have done on the dispersants would certainly suggest that we would not see the dispersants entering into and bioaccumulating and biomagnifying in the way that oil may.

Mr. MARKEY. Is it possible that a fish may be caught and test clean in the adult tissues but contain eggs that have high levels of these toxic chemicals?

Mr. ANASTAS. I am not aware of a mechanism by which that could occur.

Mr. MARKEY. You believe that it could occur?

Mr. ANASTAS. No, I am not aware—

Mr. MARKEY. You are not aware?

Mr. ANASTAS [continuing]. Of a mechanism by which that could occur.

Mr. MARKEY. Do you believe that further testing on eggs meant for human consumption be performed to ensure that all fish products on the market are safe?

Mr. ANASTAS. I am sorry. If you could repeat that, please?

Mr. MARKEY. Should further testing on eggs meant for human consumption be performed to ensure that all fish products on the market are safe?

Mr. ANASTAS. I would defer to my FDA colleagues on that. I would have to say that the more data that we have, the more sampling we have to verify this is always good, that we need to rely on the data and the data needs to drive us.

Mr. MARKEY. Dr. Lehr, how do FDA and NOAA ensure that fish that were located in oiled waters and were contaminated with toxic chemicals from the oil have not been swimming to areas that have been cleared for fishing?

Mr. LEHR. I mean, the presumption here is that when you take it, the fish is guilty until proven innocent, so to speak. So when they do their sampling, the fish has to—you don't assume that it is cleared. You assume that it has to pass the tasting test, and then only then if it passes those does it then go to the laboratories of NOAA for the testing for the PAHs. So I would say that in the case here that we have that that we would take that into account. However, to be on the safe side, there is a five-mile buffer between the area where the places would be open or have not been closed in the first place and where oil has appeared so—

Mr. MARKEY. Are you—

Mr. LEHR. You would have to be an athletic fish.

Mr. MARKEY. Are you right now engaging in intensive testing where the oil is still present in large quantities? Are you doing testing there?

Mr. LEHR. The testing for the fish is being done in areas where the oil is no longer present on the surface.

Mr. MARKEY. Where the oil is—

Mr. LEHR. It is in the areas where either oil was never present or in areas where it hasn't been present for some time. Then they do the sampling. And then of course, every sample has turned out to be negative. They never detected any PAHs in the fish.

Mr. MARKEY. And I am just going to use a hypothetical, and I don't know how accurate this is but let us just use it as a hypothetical, that the bluefin tuna, which is ultimately caught off of Georges Bank off of New England does spawn down in the Gulf of Mexico. Let us say just for the sake of the discussion and only for the sake of the discussion that some of that spawning is going on right now inside of the much more oiled area of the Gulf. We know that those fish are ultimately going to migrate up off the coast of New England. What is the testing for that fish or other fish that is going on inside of the oiled area that will ensure that it is safe when it finally reaches the part of the ocean where that fish or any fish is caught?

Mr. LEHR. I think I am going to defer that question to experts that can answer that better than I can right now.

Mr. MARKEY. Is there someone here who can do that for us? Can you move up to the microphone, please, and identify yourself?

Mr. GRAY. Chairman Markey, I am John Gray. I am the legislative affairs person. We don't have a person from the fisheries service here. We had one witness and it was going to be Mr. Lehr, so we can get those answers to you but we don't have that person here.

Mr. MARKEY. I think that is an important issue to be resolved in people's minds because it just seems, I think, to someone that thinks about the fishing industry that these are not stationary or territorial entities in many instances. We are seeing sharks all up and down the coastline of New England and they don't seem to limit themselves just to a 5-mile radius right now, and just to say don't worry about it a few miles further away, that the sharks only stay within a 5-mile radius doesn't seem as though that would be the kind of warning that the public would think was sufficient in order to guarantee the safety of their families. So I think this is important information for us to have and the more that it can be put in very simple terms for the public, I think the better it will be for the fishing industry and for the consuming public.

Mr. Kraemer, you are seeking recognition?

Mr. KRAEMER. Yes. I would just like to respond a bit on that. I think there are several answers to that question or several pieces of the answer to that question. The NOAA testing has included testing outside of the closed areas, and the purpose of that testing was to look for whether or not—first of all, to determine whether or not the closures were sufficiently protective, so this 5-nautical-mile buffer zone that was put around it we believe is sufficiently protective. The question, though comes, was it sufficiently protective. So testing was performed outside the area in which the closures were. Beyond that, both NOAA and FDA have done market sampling, so this is fish that were commercially harvested certainly in open waters so samples were collected there, and we believe we would have picked up any indication that there were fish that had higher than expected levels. And then finally, especially true for finfish, they clear the PAHs very rapidly from their body, usually within a matter of days. So a scenario of a fish that contaminated in the Gulf making it up to New England I think is highly improbable and we don't believe that that would be something that consumers should be worried about.

Mr. MARKEY. Are you actually testing for that, though, given the unprecedented underwater experiment—

Mr. KRAEMER. We are testing Gulf product, that is, product that has been commercially harvested in the Gulf and that is currently being marketed, so we are testing that product, and again, it is not showing levels of PAHs above the background levels that were there before the spill occurred. So we believe that the fish coming out of the Gulf do not have levels that are of concern.

Mr. MARKEY. Mr. Kraemer, is the FDA monitoring seafood recovered from the Gulf for the presence of heavy metals present in crude oil?

Mr. KRAEMER. We are not, no, but there is a NOAA program, the Mussel Watch program, that it is a bit of a misnomer in the Gulf in that it is not mussels that are being tested, it is oysters, but these are what we would call a sentinel species in that they are the species that is most likely to absorb contaminants including heavy metals, the most likely to hang onto that within their flesh and also the species most likely to bioconcentrate, that is, have it at levels above what would be in the environment. So this program has been in place for decades in the Gulf so we have a very solid—well, in fact, nationwide—so we have a very solid background level.

We know what the levels of these contaminants are. It includes any of the heavy metals, for example, that you would be concerned about.

Mr. MARKEY. But are you monitoring for it right now?

Mr. KRAEMER. I would defer to NOAA to answer what has been done on this but I wanted to mention that FDA has not but the NOAA program we believe is a good sentinel program.

Mr. MARKEY. Let me go to NOAA then because it is my understanding that compounds like mercury, arsenic and other heavy metals that are present in crude oil have the ability to accumulate in the tissues of fish in levels that may cause harm particularly to pregnant women and children. Has the FDA or NOAA here examined seafood for the presence of heavy metals? Dr. Lehr.

Mr. LEHR. There is some monitoring that is being done as part of the Mussel Watch program in the area. Again, I am going to defer to my colleagues to answer that correctly, and we will get back to you with an answer to that.

Mr. MARKEY. So Mr. Kraemer, back over here at FDA, you don't screen for heavy metals. You think that NOAA may but the witness today does not know the answer to that question.

Mr. KRAEMER. I hate to speak for NOAA in this regard but it is our understanding that NOAA has collected a sampling run, if you will, from one end of the Gulf to the other where they would normally collect for the Mussel Watch but that the results are not yet back, so we don't have analyses of them. We do not expect to see an increase based on this spill but certainly those results will be confirmatory of that.

Mr. MARKEY. Well, Mr. Kraemer, I wrote a letter to the FDA on this issue of heavy metals 6 weeks ago and I have yet to receive an answer from the FDA.

Mr. KRAEMER. And I apologize for that, Mr. Chairman. I would be happy to respond to those questions at this time.

Mr. MARKEY. I would not have asked the question if I did not believe that it was important. I mean, heavy metals obviously have a danger that attaches to them and to have this kind of regulatory black hole be created here today between the FDA and NOAA in terms of knowing what the response is to testing for heavy metals in this fish which we know can accumulate in fish is something that obviously should have been identified within the last 6 weeks since I wrote the letter. When can I expect that response from the FDA?

Mr. KRAEMER. In a matter of days.

Mr. MARKEY. Thank you, Mr. Kraemer, very much.

Dr. Lehr, how does FDA and NOAA ensure that fish that were located in oiled waters and were contaminated with toxic chemicals from the oil are not then swimming to other areas? I am sorry. I have already asked that question.

Let me move on to the FDA and NOAA. You have agreed on a protocol to examine when closed federal harvest waters can be reopened. That protocol relies heavily on surveillance tests and sampling that generate data about the concentration of particular contaminants found in seafood. It is my understanding that there have been fishery reopenings in State waters within 3 miles of the coastline of Louisiana and Mississippi. Does NOAA and FDA have ac-

cess to the data that is used to drive the reopening decisions in State waters within 3 miles of the coastline of Mississippi and Louisiana? Mr. Kraemer.

Mr. KRAEMER. Thank you, Mr. Chairman. The answer is yes. The protocol that was developed jointly by FDA, NOAA and EPA along with the five Gulf Coast States calls for the States to provide that data to FDA and NOAA. I should say that for reopening purposes, the States are acting under their own authority, as I think you know.

Mr. MARKEY. What role does the FDA and NOAA have in the opening and closing of State waters?

Mr. KRAEMER. When the State has made a decision that they would like to reopen a portion of their waters for a particular fishery, for example, for finfish or for shrimp, they develop a sampling protocol or plan, and that identifies how many of each of the species and where they are going to be located that they intend to collect. FDA and NOAA review that proposal and either concur with it or make recommendations for changes, and at that point the State then goes out and collects those samples and submits them to the NOAA laboratory in Pascagoula, Mississippi, which is where the sensory testing that I described a minute ago is performed. If a sample passes the sensory testing, then it is submitted to a chemical laboratory, and this is where the samples split. If it is federal waters, which isn't the question you raised, the sample would go to a NOAA laboratory. If it is a State waters, then the sample is handled by FDA or one of the State laboratories that we have under contract, and that is where we perform the analysis for PAH. The sensory analysis, as I mentioned, is for odors indicative of oil as well as odors that are indicative of oil contamination—I am sorry, of dispersant contamination.

Mr. MARKEY. So can the FDA and NOAA state unequivocally that fish caught in the State waters are safe to eat? Can you state that unequivocally?

Mr. KRAEMER. FDA has expressed confidence in the fish that are commercially marketed from the Gulf Coast, and as I said, we—I didn't mention that the sample results then come back to FDA and NOAA for review and FDA then provides its concurrence to the State before the State reopens. So we are aware of the state of the oiling in that area and we are aware of the levels of the results of the analytical tests before the water is reopened by the State. So yes, we are able to vouch for the safety of those fish with respect to the contamination from the spill.

Mr. MARKEY. Dr. Lehr, do you agree with that? Do you agree that the federal government is able to vouch unequivocally that the fish caught in State waters are safe to eat as well as federal waters?

Mr. LEHR. I would say that the fish caught is meeting all the standards that were developed by FDA and NOAA.

Mr. MARKEY. And what about noncommercial fishing? Recreational fishing is a major tourism sector in the Gulf. Can we be sure that those fish are safe to eat as well? Mr. Kraemer.

Mr. KRAEMER. FDA is directly responsible for recreational catch but I can tell you that again the States again exercise that control except in federal waters where NOAA exercises that control. But

the States have implemented closures for recreational catch that mirror the closures that they have for commercial catch. So the safety of the recreational catch should be at the same level as commercial.

Mr. MARKEY. Thank you, Mr. Kraemer.

Dr. Anastas, with regard to the use of dispersants, Dr. Suatoni of the Natural Resources Defense Council says in her testimony that "it would be unwise to draw conclusions about the safety of this unprecedented application of chemical dispersants from two laboratory experiments and field observations." Do you agree or disagree with that statement?

Mr. ANASTAS. I think it is important to follow the data.

Mr. MARKEY. Excuse me?

Mr. ANASTAS. I think it is important to follow the data, and what that means is that we look at the data and what that data tells us but never remain satisfied. That is why we have ongoing monitoring programs. That is why we will always continue to ask the tough questions. That is why we are looking to have an ongoing long-term research plan so we do understand not only the current situation but the long-term effects.

Mr. MARKEY. Thank you.

Mr. Kraemer, polyaromatic hydrocarbons, PAHs, are one of the most concerning compounds present in oil because of their significant health impacts. However, these compounds are also very quickly metabolized in aquatic species, particularly in certain types of fish. It is my understanding that polyaromatic hydrocarbons are often metabolized into products that are retained in the flesh and can be more toxic than the parent compounds. In the market surveillance, is the FDA examining the metabolites of PAHs in the analytical sampling tests?

Mr. KRAEMER. It is my understanding that what we are looking for is specific PAHs and not any metabolites of those PAHs. So I think the short answer is no.

Mr. MARKEY. Dr. Seyfert.

Ms. SEYFERT-MARGOLIS. I think there is two points of clarification I would like to add, Chairman Markey, to go back to your question on heavy metals, which I would like to get to. To clarify on the metabolite issue, we have been engaging some experts in academia to discuss just this. I have had several conversations with Dr. Overton at LSU about their experiences with PAHs and metabolites that may be derived from those but we are not currently testing for those, but I do want to add that to date we haven't found any level. In fact, almost every test that we have conducted on the fish and shrimp that have been collected to date and other seafood has been completely negative, below our limit of detection for the PAHs themselves, if not very, very low levels as Mr. Kraemer stated, a thousand times below what would one—

Mr. MARKEY. Have you been looking at fish that are right now inside the oiled areas?

Ms. SEYFERT-MARGOLIS. No.

Mr. MARKEY. I think that that is important for people, and I would recommend to you that you do some testing there. I think it is important for the public to know that inside the oiled area you are also doing testing because people will be concerned that there

could be some migration outside of that oiled area subsequently, especially if the fish then move to areas where they are traditionally caught that might not be there in that area and that might not be this month or next month or the month after but some point in the future I think it would be very helpful if you would do some of that testing as well just so that we can see what happens in the most concentrated area as opposed to where you are now testing, and I think that is important information. I actually think it is important information going forward long term. We should know what happens to fish where the oil is most dense at this time, Doctor.

Ms. SEYFERT-MARGOLIS. Just one more point of clarification on I think this point which is very well taken and your points on heavy metals. We are also engaging with NIH and other scientists to develop long-term toxicity studies. I think those are incredibly important in terms of looking at potential for accumulation of heavy metals and toxicities that may derive from that. And again, I would add that we do think that the surveillance through the Mussel Watch program is an incredibly important first line of defense but that there are active discussions about long-term toxicity studies and we will be engaging in these studies for years to come.

Mr. MARKEY. Again, I would think that it would be important to begin those studies right now by going to the most potentially toxic areas and finding the samples now that are then used as your baseline, and I think that is long term going to be something that a lot of people wished was there in significant quantities in order to match off about what is then found at the periphery, so I would recommend to you that you do that.

And again, let me ask the question again. Do you plan to test for metabolites?

Ms. SEYFERT-MARGOLIS. I think this is part of our ongoing discussions with NIH. In fact, there is a meeting happening right now with several of the agencies and long-term toxicity studies and the design of those is one of the points under discussion.

Mr. MARKEY. Thank you.

Mr. Kraemer, there has been much criticism of the seafood sampling plan, particularly about the method of risk assessment. It is my understanding that the level of contamination with PAHs that is considered safe does not take into account vulnerable populations such as pregnant women and children, and this is because the assumptions made in the plan calculate safe levels based on an average adult male body weight of 176 pounds. Has the FDA produced guidelines to ensure that children and pregnant women are adequately protected from contaminants that may be present in seafood?

Mr. KRAEMER. I think the short response to that is that we believe that the levels of concern that we established for the reopening protocol are quite conservative and will be sufficiently protective for all populations but we also acknowledge that these are valuable comments and we are committed to looking again at the calculation of the levels of concern to make any judgments about whether we need to modify the levels that we have established for the reopening. I would like to point out, though, that again as we mentioned before, the levels that we are finding in fish flesh are essentially at levels that they would have been at before the spill.

So whether or not the values would change, we are not seeing levels that should be of concern for children or pregnant women.

Mr. MARKEY. And I appreciate the conclusion which you reach, but as you know, for 100 years, almost all medical research was done on the prototypical 176-pound male and only in the 1990s under pressure from the women's movement that independent research that dealt with the unique nature of women and children begin to be introduced. So the very fact that the classic 176-pound male is still used here is something that I think you should reexamine in terms of whether or not that is sufficient to deal with the more vulnerable population which are women and children in this particular instance. The extrapolation of all of these lessons over to women and children I think is something is probably not outdated and this may be one of the last remaining models that continues to stay on the books as the exclusive means by which such a measurement is in fact made of the risk to human beings.

Mr. Kraemer, if an analytical test conducted by NOAA indicates that contaminated seafood has been found that was harvested from open waters, how does NOAA communicate this to FDA and what is the feedback method to stop others from fishing in the same place?

Mr. KRAEMER. Well, we have communications with NOAA at a number of levels so we communicate at the senior leadership level, we communicate through the National Incident Command process and we also communicate on multiple daily calls between all three agencies at the staff, scientific and technical levels, so any one of those routes could be used to move that information. Fortunately, we haven't had to deal with that information yet, but if it were to occur, we would immediately investigate, and that investigation would be to look at the analytical results, confirm that they in fact show that the product is what FDA would call adulterated and if we found in fact that it did reach that level of concern, either we or the State would act through our authorities to remove that product from the market, and also to reevaluate the adequacy of the closure that is in place.

Mr. MARKEY. Thank you.

Dr. Lehr, last Friday Admiral Allen issued a directive for a coordinated integrated system of ocean monitoring involving federal, State and academic monitoring efforts to detect remaining submerged oil in the Gulf. Can you tell us more about this effort and why this directive was necessary at this time? Was this coordination not occurring over the past 4 months?

Mr. LEHR. Coordination in terms of tracking the subsurface oil has been happening since the beginning of the spill. In fact, early on in the spill, we went out and made arrangements with the experts who are experts in, for example, well blowouts from the Carson University, provided us their information of how the oil would act. We also made arrangements with SINTEF, which has a subsurface model that we could track the oil and now we have brought in our own models that are tracking it as well, tied in with all the detailed sampling that is being done. Now, I think the directive now of course other groups and other agencies have been doing it and the idea is to now bring them all together as a coordinated approach. I think that is a good idea.

Mr. MARKEY. Are you saying that this is nothing more than a continuation of what has been going on all along?

Mr. KRAEMER. I would say this—

Mr. MARKEY. And I guess I would ask, why was a new directive necessary if this was something that is nothing more than a continuing effort?

Mr. KRAEMER. I think what the admiral is stressing is that we are focusing now on the subsurface oil with the surface problem being removed and bring in extra resources to do that. Many of the folks at NOAA that I know of who are doing the surface trajectory have now been transferred to working on the subsurface trajectory collection, so I think to say it is a redirection as the problem has evolved and leave it at that.

Mr. MARKEY. Thank you. What do we know about the dispersed oil and dispersant that is on the ocean floor? What species are affected there and how does that impact the food chain? Dr. Anastas.

Mr. ANASTAS. I think you are asking an extremely important question. There are issues that we are looking to in real time develop research plans in the immediate and the longer term to fully understand what the oil is doing. I do refer back to the opening statements about we are not detecting dispersants in any concentrations to the limits of our methods of detection, so we are not seeing the presence of those substances.

Mr. MARKEY. So are you saying you are not seeing dispersants and oil collecting on the ocean floor at this time?

Mr. ANASTAS. In the thousands of samples that have been run, we are not detecting dispersants, the dispersant constituents on the ocean floor at this time. We have not seen a hit of dispersants at this time. We have the one hit that was referred to in NOAA, the one hit that was referred to at EPA in EPA testing. But the question that you asked about the oil on the ocean floor, we have seen some reports in the media that have talked about the oil on the ocean floor. This is something that as we look to ensure we understand the long-term effects, that this is exactly one of the questions that we need to investigate and find out, either confirm or disprove the presence of this oil and also to understand the impacts of this oil.

Mr. MARKEY. Thank you.

Why don't we do this? Why don't we hear from each one of you in reverse order of your opening testimony so that you can tell us what it is that you want the American public to understand about the state of the Gulf of Mexico at this particular point in time? We will begin with you, Dr. Anastas.

Mr. ANASTAS. Thank you very much. I think the single message that Administrator Jackson has sent is that we need to be vigilant on understanding what the nature of the problems are, the immediate term and the long term, and that monitoring is crucial, that this crisis is not over, that the monitoring will continue, the work will continue, the research will continue into the long term, and getting that understanding not only to inform our decisions but to make sure that we get it to the American public as quickly as possible is one of our primary goals in accomplishing our mission of protecting human health and the environment.

Mr. MARKEY. Great. Thank you, Dr. Anastas, and thank you for your work on this issue.

Mr. Kraemer.

Mr. KRAEMER. Thank you. The question that we are very often asked in FDA is, what should a consumer do to make sure that their next meal of Gulf seafood is safe, and the answer I like to give to that and I would like to respond here is that they needn't do anything. That is FDA's job. And we take that job very seriously. We are confident that the program that FDA has put together along with our colleagues in the federal and State governments is sufficiently protective and that they need not take any steps to protect themselves from the seafood, that it is essentially at the same level of safety as it was before the spill. Having said that, we recognize that this is an unprecedented event, and our looking at the long-term safety of this source of food is something that we can't overlook, and I think we have mentioned here a few ideas of things that we do need to look at into long-term studies, the development of methods that can detect contaminants that we presently can't detect, and we think those are positive steps to providing further assurance to the public.

Mr. MARKEY. Thank you, Mr. Kraemer, very much.

And Dr. Lehr.

Mr. LEHR. Thank you, Mr. Chairman. Before I get to my closing, I want to correct one thing. I am a good scientist but perhaps a bad impromptu speaker, and so one of the things that you brought up was to suggest that this calculator was not involving independent scientists. The independent scientists contributed to the development of the calculator and independent scientists, very qualified scientists, will be the ones who are doing the reviewing of it. The field of oil spill science I like to say is so small that we could have a meeting in a ballroom and still have plenty of room to dance, and we have been able to tap many of the biggest names in that field for both the review and for the development. So I would like to stress that, particularly since there are other folks who this is their first big spill and they are coming in and perhaps don't have the background in this area.

Now, for my other comment, as my colleagues have said, this is a continuing operation. The spill is far from over. We are beginning in a new phase, and NOAA and all the other agencies will be involved in this, and for those of us who are spill experts, we get paid for doing this but what I would like to think and people don't get enough credit to, when we went to develop our tools both in terms of the flow rate calculations and in terms of this budget calculation, we went out to many of the independent academics and other experts, and in many cases they were not being paid any compensation. I have not yet had a single instance where any of those folks have refused to work on any of the projects and the requests that we have done. So if there is a silver lining in the terrible event of the spill, it is the extent to which the American people are willing to volunteer their efforts at both the highest expertise levels down to the fellows who are volunteering to come out and clean up the beaches. Such tragedies do bring out the best in our country and I think that that is something that should be more brought forward perhaps.

Mr. MARKEY. Thank you, Dr. Lehr, and again, thank all of you for your work.

The point that I was making earlier was that in terms of the study that was released last week, first you gave the answer and now you are going to be showing your work, but in a peer-reviewed way, and that is the opposite of the way in which a study of that magnitude would be released, and all I am saying is that given the way that this has unfolded, that it is important that everyone including independent scientists who may not have participated in your creation of these models can see the assumptions upon which they were based now, given the fact that the peer review is going on right now but the science experiment in the Gulf of Mexico is occurring in real time so that there can be a real capacity to have all questions asked and answered not months from now as part of a boring academic exercise sometime next year but right now when concern is at its highest.

So again, I restate my request to you that you provide that information to independent scientists who are not part of your study so that there can be a fresh set of eyes and minds that are applied to it because the consequences are great if you are wrong. If you are wrong, the consequences could be great. So let us just err on the side of safety. Let us have that information be given to the rest of the scientific community given the way in which that record was put together.

So we thank you, Dr. Lehr, and again, in no way do we want to say anything other than we thank you for the work which you have done thus far. It is an exceedingly difficult working environment. It is unprecedented what has occurred in the Gulf of Mexico. We have this hearing principally because the public has a right to know, that there should not be a 6-week period, a month-and-a-half period where Congress has not been working on this issue, given the fact that it is our responsibility to make sure that the public interest in all aspects is protected.

So we thank you, and we ask you perhaps to make yourself available to return again to answer additional questions because this is something that obviously is going to affect the Gulf of Mexico for months and years to come. With the thanks of the committee, we appreciate your contribution.

Before we hear from our next set of witnesses, for the record, the subcommittee invited the Louisiana Department of Wildlife and Fisheries to participate in this hearing. The Louisiana Department of Wildlife and Fisheries makes the decisions regarding opening or closing of fisheries in State waters affected by the spill and has been working in consultation with the FDA regarding opening and closing of fisheries. Although nobody from the department was able to attend, the Louisiana Department of Wildlife and Fisheries submitted a statement for the record which I ask unanimous consent to move into the record at this time. Without objection, so ordered.

[The information was unavailable at the time of printing.]

Mr. MARKEY. I would also like to move into the record a statement from the Center for Science in the Public Interest. Without objection, so ordered.

[The information was unavailable at the time of printing.]

Mr. MARKEY. We will now move to hear from our witnesses, and we ask those witnesses to please move up to the witness table.

Welcome back to the Subcommittee on Energy and Environment. Let me begin by making a unanimous consent request that all members be allowed to submit statements for the record and any questions which they would like to submit to the witnesses who are testifying here today. Without objection, so ordered.

Our next witness is Dr. Ian MacDonald. Dr. MacDonald is a Professor of Biological Oceanography at Florida State University. His research uses satellite imaging to locate natural oil releases on the ocean surface. We thank you for coming, Dr. MacDonald. Whenever you feel comfortable, please begin.

STATEMENTS OF IAN MACDONALD, PROFESSOR, DEPARTMENT OF OCEANOGRAPHY, FLORIDA STATE UNIVERSITY; DEAN BLANCHARD, PRESIDENT, DEAN BLANCHARD SEAFOOD, INC.; ACY COOPER, JR., VICE PRESIDENT, LOUISIANA SEAFOOD ASSOCIATION; MIKE VOISIN, CHIEF EXECUTIVE OFFICER, MOTIVATIT SEAFOOD, LLC; AND LISA SUATONI, SENIOR SCIENTIST, OCEANS PROGRAM, NATURAL RESOURCES DEFENSE COUNCIL

STATEMENT OF IAN MACDONALD

Mr. MACDONALD. Well, I am a Professor of Oceanography at Florida State University. Today, however, I am speaking solely on my own findings, and I wanted to say before I embark on technical discussions that I have 30 years of professional and private experience traveling around, cruising on, diving to the bottom of the Gulf of Mexico, and I deeply and fiercely love this ocean and its people and I thank you for your exemplary service during this catastrophe.

I would like to comment briefly with a critique on the NOAA oil budget report which we discussed earlier. I feel that this report was misleading, and although it presents science, it was done by very competent scientists without any citation to the scientific literature. Without the algorithms, without the formulas and the actual budget that are referred to, it is impossible for someone reading this report to check the numbers that are there, and we have concern about those numbers.

So as I think you very ably demonstrated in your examination, we really can only account for 10 percent of the oil that was discharged, that 4.1 million barrels that was discharged through burning and skimming. The balance of the oil remained in the environment. There may have been some 10 percent that evaporated into the atmosphere that is gone from the ocean but the balance is still in the ocean. The question is, how is it partitioned between the water column and the floating material that will have sunk to the bottom or become buried on the beaches, and this partitioning which was done or this separation into categories which was done by the oil budget is really pretty theoretical at this point. We need to check on that. There are findings that are coming out that I think will cause this into question.

But let us just take this 26 percent, this 1.3 million barrels. As you say, this is five times the Exxon Valdez release. This oil has

already degraded, has already evaporated and emulsified. It is going to be very resistant to further biodegradation. This oil is going to be in the environment for a long time. I think that the imprint of the BP release, the discharge, will be detectable in the Gulf of Mexico environment for the rest of my life, and for the record, I am 58 years old, so there is a lot of oil. It is not gone and it is not going away quickly.

I would also like to comment on an aspect of the spill that hasn't received a lot of attention and that is the methane gas. All of the numbers about the release, the discharge have been presented in volumes of oil, barrels of oil. If, however, we calculate, we know that the Macondo field well was very rich in gas and we have good numbers on that from the Flow Rate Technical Group. If we take those numbers and we present all the discharge in terms of units of mass equivalents or barrel of oil equivalents, it turns out that the oil plus the gas is equal to 1.5 times the oil alone. In other words, if we conclude that there are 4.1 million barrels of oil released, the actual discharge in barrel of oil equivalents is in excess of 6 million barrels. Because this oil, this material was released at the bottom of the ocean, it transited the ocean. Some of it, much of it perhaps still remains in the ocean so I would contend that for the purposes of the Oil Pollution Act, this was a discharge and this total pollutant load should be included in our assessment of how far this spill went down.

I would also like to comment on the so-called resilience of the Gulf of Mexico. Now, a fair reading of the report indicates that this 90 percent, this huge volume of oil represents a massive dose of hydrocarbons in the Gulf of Mexico ecosystem. There has been some talk about the resilience of the Gulf of Mexico. My concern, my first concern is not for a whole-scale die-off but for a depression, some decrease, 10 percent, 15 percent of the productivity and the biodiversity of the Gulf of Mexico ecosystem. Now, this might be—if we had a 10 percent decrease, this might be very difficult to demonstrate scientifically. It might be even harder to prove in a court of law. Nonetheless, if we sustain this impact over many years, it would be a severe affect.

My greatest concern, however, is that some of the damage will be so severe that we may have tipping point effects that will overwhelm the resilience of the ecosystem, and this unfortunately has been the case, has been the scientific result looking at Prince William Sound in the wake of the Exxon Valdez spill. We need to hope that this won't happen. We need to do more than hope. We need to watch very carefully, and I have drafted as part of my submission here a list of species that I think we should be watching closely. These include some of the big species, the shrimp, the tuna and so forth, but they also include more humble members of the ecosystem such as fiddler crabs, the Coquina clams that are so abundant on the beaches. We need to be watching these populations through time, not just next year but for years to come, because it may take several years to notice the impact. A healthy environment has to support the species that depend on the healthy environment. If we watch those species, we will know they go. Is my time up? OK.

[The prepared statement of Mr. MacDonald follows:]

Testimony for Energy and Environment House Subcommittee:

Thursday, 19 August 2010, 10:00 AM -- Room 2123 Rayburn House Office Building

The BP Oil Spill: Accounting for the Spilled Oil and Ensuring the Safety Seafood from the Gulf

My name is Ian MacDonald. Thank you for inviting me to testify for your committee. I am a professor of oceanography at Florida State University and a member of the steering committee for the Florida Oil Spill Academic Task Force. You have my CV. I have conferred extensively with colleagues on the matters before this committee; however, my testimony today is solely on my own opinions and findings. I will confine my remarks to questions of the extent and effects of the oil and oil/dispersant contamination from the BP spill on the environment including marine life. Could I also testify, before I embark on technical discussion, that I have spent 30 years of professional and private life travelling around, cruising on, and diving to the bottom of the Gulf of Mexico. I deeply, fiercely love this ocean and its people.

I would first offer a critique of the report titled "BP Deepwater Horizon Oil Budget: What happened to the oil?" that was authored by NOAA and the DOI.

I believe this report is misleading and raises more questions than it answers. It purports to explain what happened to the oil discharged from the broken well and what the effect of that oil could be on the Gulf of Mexico environment. The findings are summarized in a single pie-diagram, which lists several categories of oil, each as an exact percentage of the total oil released. This graphic is misleading because it mixes very different categories together and makes sweeping and largely unsupported arguments about the fate of each category in the Gulf of Mexico environment.

First of all, the chart includes as part of the total, oil pumped into tankers from the various caps and other tools, *oil which was never discharged into the ocean*. This inflates the total amount by 17% and gives the impression that the clean-up efforts were more effective than they actually were. The press has widely reported variations of Carol Browner's statement¹ that "more than three quarters of the oil is gone." This statement does not stand up to scrutiny. The report discusses oil "released from the well." The difference in meaning of the terms "released," meaning oil that came out of the well, and "discharged," meaning oil that escaped into the environment -- under the definitions of the Oil Pollution Act (OPA) of 1990, blurs the distinction between oil that can harm the environment going forward and oil that posed no such threat once it was pumped into waiting tankers. In all of my following statement, I recalculate percentages based on the discharged amount.

The total volume of discharged oil was slightly more than 4.1 million barrels. Of this, the NOAA report cites data from the Unified Command Response Effort indicating that 6% was burned and an additional 4 % was skimmed. Thus, only 10% of the oil in the ocean was actually removed from the ocean. The response effort has dispersant application records suggesting that chemical dispersion broke down an additional 10% of the oil, thereby allowing it to become diluted in the ocean. These data account for only 20% of the discharged oil. Fully 90% of the discharge was not removed from the marine

¹ Carol Browner, Wednesday, August 4th, 2010 in NBC's "Today Show."

environment by human agency; a fraction; perhaps 10%, will have evaporated into the air. The balance *remains in the marine and coastal ecosystem* even if it has changed form and become less visible.

Explanation for the fate of almost 90% of the discharge (3.3 million barrels) has been based solely on a theoretical model, which the report calls an "Oil Budget Calculator" composed of "scientific estimation" and "algorithms." There appear to be no samples or measurement to support these claims. My strong criticism is that neither the report nor its on-line references² provides *any* citations of scientific literature, formulas, or actual algorithms that would allow an independent reviewer to determine where these numbers actually come from. In short, it is impossible to check the calculations of this crucial report. So when the report claims that 26% of the released oil (31% of the discharge) is residual, i.e. still present in the ocean or its soils and still harmful to the environment, we really cannot check whether this number should actually be 36% or 19%. The committee should note that this residual estimate of 1.3 million barrels is 5 times the discharge from the MV EXXON VALDEZ, so a shift of percentage points would be significant.

Finally, for the oil still in the ocean, the report makes the claim that the oil in all its forms in the ocean "is biodegrading quickly." It is my testimony to this committee that science simply does not know how quickly or slowly oil will degrade either in surface waters or in the deep waters of the Gulf. Preliminary evidence suggests that oxygen depletion has been minimal compared with the quantities of oil and gas discharged, which would indicate a slow rate of degradation. The residual oil that has resisted dispersion and evaporation will be very persistent. Judging from past spills in the Gulf, this material will remain potentially harmful for decades. I expect the hydrocarbon imprint of the BP discharge will be detectable in the marine environment for the rest of my life. The oil is not gone and is not going away anytime soon.

I would like to comment briefly on an aspect of the discharge that has received scant attention from the Unified Command, namely the magnitude of the gas discharged by the BP spill.

The Macondo Field product contained a high proportion of hydrocarbon gas, i.e. methane, ethane, propane, butane, pentane, etc. Indeed the enormous pressure of this gas in the reservoir and certainly its explosive properties contributed greatly to the tragedy of the DEEPWATER HORIZON. However, all the reports of the pollutant load discharged from the well have been issued in barrels—a unit of liquid volume—and have ignored the gas. In fact, if calculated in equivalent units of weight (mass) or energy (barrel of oil equivalents), the magnitude of the oil plus the gas is equal to 1.5 X the oil alone. In other words, it is my testimony that if 4.1 million barrels of oil were discharged, the total discharge in barrel of oil equivalents (oil plus gas) was actually over 6 million barrels.

The Unified Command has made no mention of this gas, but it should not be ignored. Because the discharge occurred at 5000 ft depth, all the material rising toward the surface or drifting in subsurface plumes is *in the ocean* for hours, days, or months and can have a significant chemical and biological effect. So the hydrocarbon gas meets the OPA definition of "discharged." The hydrocarbon gas is highly

² <http://www.noaa.gov/stories2010/PDFs/DeepwaterHorizonOilBudget20100801.pdf>

soluble in the deep, cold waters of the Gulf. Based on previous measurements,³ much of the gas released at depth will dissolve before it reaches the surface. Microbes degrading this material will compete for nutrients (like oxygen) with those attacking oil and will significantly affect the overall degradation process held to be so important by NOAA and DOI. Fish exposed to concentrated methane have exhibited mortality and neurological damage. The hydrocarbon gas was a major component of the total pollution load discharged from the BP well.

My next comment concerns the so-called "resilience" of the Gulf of Mexico.

As a fair reading of the Oil Budget Report affirms, the northeastern Gulf of Mexico received a massive dose of hydrocarbon. Hundreds of miles of shoreline in four states were oiled, shoreline that includes numerous distinct habitats, each with its individual value and vulnerability. The seabed, crucial for oyster, shrimp, and crab fisheries, as well as for its indispensable roles in nutrient recycling and marine food webs, has been sprinkled with tar-balls over thousands of square miles. Buried oil impacts seafloor life and is readily exhumed by storms and potentially by upwelling to cause more damage to the coast. The oceanic surface, the zone of plankton production that drives the food web of the entire system, has endured months of volatile organic toxins from the floating oil. Some species could swim below the worst effects. Other species, including whales, sea turtles, flying fish, sargassum communities, and the larvae of many recently spawned species to name a few, were trapped in the zone of greatest exposure.

This total insult was not delivered to a vibrant and healthy ocean, rather to marine and coastal ecosystems already greatly stressed by serious existing problems. Let us not overlook the hypoxic dead zone, the fishing closures for shrimp and fin fish due to declining stocks, and the accumulated effects of coastal development and runoff. The Gulf can and will rebound, but how much and how fast it does so will take years to determine. In many cases, we do not know how the impact will occur because the experiments have not been carried out. For many species, the impact could be occurring at every life stage. Consider reef fish that have complex life cycles. Eggs and larvae could be hit at the surface by oil; those that survive to reach coastal estuarine nursery habitats could be hit again because oil entered coastal marshes and seagrass beds; and the adults in their benthic existence could have oil components magnified through trophic webs as they eat species that have taken in oil in the diet. This could have indirect effects on their fecundity (number of eggs they produce) and on their general condition and ability to survive.

My immediate concern is for a decline in the productivity and diversity in broad sectors of the ecosystem. As a percent of the total--say 10%--this effect might be difficult to demonstrate scientifically, and perhaps even harder to prove in court. The sustained impact over years, particularly if added to already stressed systems, could be severe. My greatest concern is that portions of the ecosystem may experience "tipping point" effects that overwhelm resiliency. This has been the

³ Leifer, I. and I. R. MacDonald (2003). "Dynamics of the gas flux from shallow gas hydrate deposits: interaction between oily hydrate bubbles and the oceanic environment." *Earth and Planetary Science Letters* 21(3-4): 411-421.
Solomon, E. A., M. Kastner, et al. (2009). "Considerable methane fluxes to the atmosphere from hydrocarbon seeps in the Gulf of Mexico." *Nature Geoscience* 2(8): 561-565.

scientific result in Prince William Sound⁴ after EXXON VALDEZ. And it is consistent with observations after the Gulf Ixtoc blow out. We can hope that mitigating factors --depth, distance from shore, dilution, a light oil product, etc. will mitigate the impact. It is not enough to hope however; we have to watch with utmost scrutiny and respond quickly wherever there is the chance of mitigation.

I suggest that we monitor a set of key indicator species and habitats of special concern. By focusing on individual species, we have the chance of verifying damage, or hopefully sustained recovery. In consultation with colleagues from the Florida Oil Spill Academic Task Force, the National Wildlife Federation, and elsewhere, I have compiled a preliminary list of watch species and habitats--appended to my testimony. I will not read it here, I would ask this be entered into the record, and I ask my learned colleagues at NOAA, NMFS, FWS, and other agencies to please consider this approach.

My final comment concerns the debt we owe to our Gulf of Mexico.

Consider the three points I just made: that the majority of the oil persists in the environment, that the gaseous fraction of discharge has not been adequately addressed, and that the ecological impact will take years to assess and mitigate. It is clear that the sincere and strenuous efforts of our responders barely have made a dent in cleaning up the ecological impacts created by BP's exploded well. The Gulf of Mexico system has been required to dispose of some 3.7 million barrels of oil and an additional 1.8 million barrel-of-oil-equivalents of gas. The circumstances of discharge--deep in the ocean, far from land--spreads the impact over an unprecedented geographic extent of the ocean basin. As noted, this cannot happen without lasting damage. We are making Mother Nature clean up our big mess and she is suffering for it.

Over the past three months, the people of the region, and of the entire country, have undergone a traumatizing sympathetic reaction to the Gulf's suffering. Now that the acute phase appears to have passed, what have we learned? Even though it is unthinkable to imagine a Gulf of Mexico without her oystermen, shrimpers, beach-goers, boaters, and recreational fishermen, this culture and way of life will not continue unless the Gulf is restored to health and placed on a path toward rejuvenation.

How should this be done? Much as I sympathize with the economic hardship caused by the BP discharge and desire that restitution be paid, a big part--the biggest part--of our response must put the Gulf herself first in line for repayment. A massive and unfaltering effort must be launched to restore, understand, and sustain the coastal and marine ecosystem of the Gulf of Mexico in perpetuity. What I mean are the coastal wetland restoration plans already formulated in Louisiana, but stalled for lack of funds. I mean the creation of extensive marine protected areas to preserve marine biodiversity, which will require public education and enforcement. I mean mitigation of farming practices in the Mid West that burden the Mississippi River with excessive nutrients. I mean regulation and subsidies to treat residential sewage in coastal development. The list is very long and the costs are high and recurring.

⁴ Peterson, C. H., S. D. Rice, et al. (2003). "Long-Term Ecosystem Response to the Exxon Valdez Oil Spill." *Science* **302**(5653): 2082-2086.

Fortunately, we do have visionary leadership in this regard in the U.S. Congress. I am speaking of the bipartisan legislation⁵ proposed by Senators Snowe and Whitehouse and supported by Florida's Senator Nelson that would create a permanent *Ocean Endowment* to protect, conserve, restore, and understand the Nation's oceans, coasts, and Great Lakes. This endowment would be funded by criminal fines and fees on the offshore industry. The need and the way forward could not be more clear. Certainly the House and Senate and hopefully the two parties can work together for this worthy legislation. You will be joined by massive support from the people of the Gulf of Mexico region.

⁵ S.3641 National Endowment for the Oceans Act

Appendix: Draft list of species and habitats that could serve as indicators of marine and coastal ecosystem health.

Oceanic species--

- Tuna-- Three important species are blue fin, yellow fin, black fin. The adults will have been able to avoid concentrations of oil, but the larvae will be vulnerable. Our baseline knowledge of population levels are poor. Yellowfins are a hugely important recreational species and changes in landings may give a clue--next year! Blue fin tuna are already severely stressed by fishing pressure.
- Sea turtles--Three species of sea turtles are critically endangered, two are endangered, and one is vulnerable and there have been a number of reported mortalities.
- Sperm whales--also a vulnerable species. One confirmed mortality--the area of the major concentration of the spill corresponds to the normal summer feeding grounds of a resident sperm whale population in the Gulf of approximately 200. It will be crucial to evaluate this population post spill.
- Other cetaceans--pilot whales (status unknown), spinner dolphin (status unknown), even orcas (status unknown).
- Sargassum communities--this comprises the diverse assemblage of fish and invertebrates associated with floating masses of sargassum plants.

Forage Species

- Flying fish--a particularly vulnerable species because they live in the upper most layer of the water where the floating oil was concentrated and where they feed on plankton. They are an important forage species for larger sport fish, including mackerel, tuna, swordfish, marlin, dolphins, porpoises.
- Menhaden -- filter feeders, critical forage species for many economically important fishes. Also the third largest fishery in the country with catch going into industry and livestock feed.

Coastal species

- Brown pelicans--a previously threatened species with rookeries badly hit.
- Bird species including gannets (which live offshore and "monitor" those conditions) and oyster catchers Saltmarshes--I'm very worried about the channel edges that got oiled. If there is a die back of the oiled edge, the result would be that the channels are dilated--even a 5-10% dilation would potentially have a huge impact on wetland hydrography.
- Coquina (Donax)--bivalves living in oiled beach sands. Important burrowers.
- Fiddler crabs, mole crabs, ghost crabs--vital for aerating the soils. All burrowers are very important for keeping the sand aerated. Burrowing will be inhibited by buried oil. And lack of aeration will tend to preserve buried oil. A vicious circle.
- Marsh periwinkle (*Littoraria irrorata*) are very abundant grazers who might be impacted by buried oil.
- All three species of commercial shrimp (*Penaeus*) occur in coastal waters and may be impacted by oil on the seabed.

Plankton

The oceanic and coastal plankton need to be closely monitored using satellite methods and direct sampling. This is the base of the food chain and it is also potentially the source of harmful algal blooms that can affect human health.

Microbial community

The bacterial assemblage that breaks down oil could be a sensitive indicator of residual oil in the environment--even if the oil is not directly detectable. The disappearance of oil degrading microbes might then indicate complete disappearance of oil.

Shelf-edge and Slope species

- Any of the offshore habitat engineers in these habitats could be important indicator species because they serve as the focus for community development and biological diversity and because they actively manipulate the sediment, contributing significantly to the three-dimensional architecture of the seabed. These would include things like red grouper on the shelf edge which creates holes roughly 15 ft across and 3-6 ft deep (density in gulf of mexico ~250/km²) ; tilefish on the slope because of the pueblo-like burrows they create (density in gulf of mexico 600-1600/km²)
- Sharks, which are top-level predators and comprise many threatened species

Deep Sea Corals

Cold-water corals are widely distributed throughout the Gulf of Mexico (http://fl.biology.usgs.gov/documents/20100504Gulf_corals_v1.pdf). While there is tremendous need to know more about the distribution and composition of these deep-water communities (the structure), it is also essential that we gain greater understanding of their function in terms of ecosystem services and their response to the presence of dispersants/oil combinations and oil alone.

Across Depth Strata

Sponges and soft corals provide a suite of ecosystem services, including filtering water, nutrient cycling, providing nursery habitat and shelter for a diverse group of fishes, shrimps, crabs, etc. We know little about their distribution, composition and function in most sites from inshore to the deep sea.

Mr. MARKEY. Yes, it is, but you will have time during the question-and-answer period to elaborate.

Our next witness is Mr. Dean Blanchard. He is the President and sole owner of Dean Blanchard Seafood located in Grand Isle, Louisiana. Dean Blanchard Seafood is the largest dockside shrimp broker in the United States and the third largest in the world. Thank you for coming, Mr. Blanchard. Whenever you feel ready, please begin.

STATEMENT OF DEAN BLANCHARD

Mr. BLANCHARD. Yes. Thank you for having us, Chairman.

I want to say, we visit your State regularly, and gosh, it reminds me of Grand Isle.

We are here today to talk about seafood safety, and we have a few concerns, and basically I have taken a moment to outline a few of my major concerns as an independent seafood business owner of Grand Isle regarding the effects of the BP oil spill.

If a seafood product is put onto the market and is later determined to have made the consumer ill because of oil and/or dispersant contamination, who will be determined to be the responsible party? That is one of our major concerns right now because we are having trouble getting product liability insurance. I have been responsible for moving, it is just a guess, but I believe in my lifetime about 300 million pounds of shrimp, and I have never seen anyone get sick. You know, we are born in this business. Pretty much everyone in the seafood business is born and raised in it. You don't just decide one day I am going to be a seafood business guy. So we have good people in our business and we know the shrimp, you know, and I am hoping that will keep the public safe. We are testing our shrimp. We are checking it. I won't put nothing on the market that I won't eat myself. I stayed about 2 weeks without eating shrimp, and I felt like I was going to die and I decided I was going to start eating it again because it was so good. But that is one of our major concerns is, who is going to be responsible. I have a feeling that if I get sued I am going to be the one paying the bill.

Another concern we got, our commercial shrimpers and fishermen are hesitant to fuel up their boats, buy ice and oil and salt because they believe that the open waters will be closed once more, or that they will find oil-contaminated seafood which they know I will not buy and they are going to have to dispose of it. It is difficult for an out-of-work fisherman to pay for these expenses without the confidence in the government, who dictates the openings and closures, and without the confidence in BP's press releases which state that virtually all of the recoverable oil has been recovered.

You know, if you go out shrimping right now and you watch to catch oil, they can go catch oil. But if you want to catch good shrimp, you can catch good shrimp also. So, you know, I told every fisherman, you know, when you bring me the product, it is going to be scrutinized 10 times more than it has ever been before, so if you think anything is wrong, don't bring it to me. I will not buy it. I will not take the chance of getting sued or getting someone sick. You know, the last thing I ever want is for somebody to say I got them sick or a pregnant woman, you know, that would be

hard to live with, so we are taking extra precautions to make sure that doesn't happen.

You know, we are having, like I said, a difficult time locating insurance companies who will sell us insurance, and that is—you know, what I am scared of is not somebody actually getting sick, I am scared of someone trying to make money off of this, you know. That is the scary part, you know.

Basically in summary, we in the seafood industry have very little trust in the government, you know. When I try to sell seafood, I tell them, I say well, the government said they did thousands of tests and everything is all right, and they say is that the same government that said only 1,000 barrels a day was leaking out the well, and I say well, it is the same government but it is a different branch.

So that is some of the problems we are having and we appreciate with the help of people like you that maybe we will get down to the bottom of it, but I firmly believe that all the seafood I have seen so far is safe. I eat seafood probably six, seven times a week. I haven't had any problems with the seafood. So we are hoping that the government is doing the right job and making sure everybody is safe and maybe we can all get through this one day. Thank you.

[The prepared statement of Mr. Blanchard follows:]

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July 17, 2010

**Edward J. Markey
Chairman
Subcommittee on Energy and Environment**

Dear Sir:

I have taken a moment to outline the major concerns I have as an independent seafood business owner from Grand Isle, La., regarding the effects of the BP oil spill.

1) If a seafood product is put onto the market and is later determined to have made the consumer ill because of oil and/or dispersant contamination, who will be determined to be the responsible party?

2) Our commercial shrimpers and fishermen are hesitant to fuel up their boats, buy ice and oil and salt because they believe that the open waters will soon be closed once more, or that they will find oil contaminated seafood which will have to be disposed of. It is difficult for an out of work fisherman to pay for these expenses without the confidence in the government, who dictates the openings and closures and without the confidence in BP's press releases which state that virtually all of the "recoverable" oil has been "recovered".

3) Regarding public perception of our seafood in the Gulf of Mexico: The public sees portions open to fishing and shrimping as well as portions closed to fishing and shrimping. They ask me why this is if all the seafood is deemed safe to eat. Also they are concerned with the food chain, for example, commercial harvesting of crabs and oysters in most areas are still prohibited. If a crab dies, fish feed off of it. Whatever killed that crab has now been consumed by the fish, and so it goes on.

4) We are having a difficult time locating insurance companies who will sell product liability insurance on Gulf seafood to us. We have never had product liability insurance before because there was never a need for it.

5) In summary, we in the seafood industry have very little trust in our government and we feel as though our government has done more to help BP than it has to help the impacted businesses and people of the Gulf Coast. We want to know what you can do to change this perception.

**Respectfully Submitted,
Dean P. Blanchard
President
Dean P. Blanchard Seafood, Inc.**

Mr. MARKEY. Thank you, Mr. Blanchard, very much, and thank you for being here today.

Our next witness is Mr. Acy Cooper, Jr. He is a fisherman from Plaquemines Parish and the Vice President of the Louisiana Shrimpers Association. He is the owner of the commercial shrimp boat the Lacy K, and we thank you for coming, Mr. Cooper. Whenever you are ready, please begin.

STATEMENT OF ACY COOPER, JR.

Mr. COOPER. I would just like to talk a little bit about the damages done to our community.

This oil spill, we have oil on the bottom of our waterways. We have reports of numerous fish kills. We know the oil is there. NOAA keeps saying that the oil is not there. Everybody said it is not there. We know it is there. I worked in one part of this particular bay for 2 months and we wear hazmat suits, we wear gloves, we taped up. They said oil is not there. When they got rid of me the last day I was working for BP, I found oil is on the bottom. I reported it to the Coast Guard, reported it to BP, brought them up there, showed them it was there.

This has catastrophic effects on our community, our industry, our way of life. We do not need to let this lay because BP is going to step out of here and they are trying to get out of here now. We need to make sure we stop on top of things because if we let them leave now, we are going to be in deep trouble. Everybody says it is over with. They want to paint a picture that in a perfect world it would be. Right now, as you have seen this morning, 90 percent of the oil is still there, and that is one thing we are definitely scared of. The places that we do have that is clean, we know it is clean, like they were just stating. We are worried about when it comes in tomorrow or the day after tomorrow that we can't fish there anymore.

The main thing is that we monitor the fish areas that are clean. Let us work in the fish areas that are clean. Where it is not clean, we can just stay away from it. Our fishermen are not going to come in and sell anything that is bad. We want to make sure what we put on the market is good. That is one of the main things that we discussed. We have meetings on our own and we do discuss this.

Now, we need to make sure that BP stays in place for as long as it needs to be because we see right now that they are trying to move out and they are trying to go. We don't need to let them leave now. Finish the job they started. They did it. They need to clean it up. Like Dean said, if we get somebody sick, it is going to come back on us. The process of having a dockside waiver saying that we caught them in open areas in the marsh, they are making us sign waivers that we caught them in open marsh. Now, who are we going to make responsible for that? Is BP going to step up and be responsible for what we have to do? I signed it for Dean. He signed it for the processors. Who signs for us? So we are going to wind up with the burden of having to take the brunt of this. We can't make any money.

It opened on August 16, the season. I went out. Normally I would catch a couple thousand pounds to 10,000 pounds. I caught 500 pounds of shrimp at \$1.25. Those same shrimp last season was

around \$2, \$2.25. They went down \$1. Now, if I can't get the price for my shrimp and I can't catch them, how am I going to survive? I have been doing this for 35 years. My father is 74 years old. He still does it. My sons do it. Hopefully their sons will do it, hopefully. I don't see any future in it. With the prices and everything that is going on now, we may not have a future. Who is going to be liable for that? BP needs to step up and make sure they pay us for what they have done, keep this industry going. Our docks can't afford to keep going. What happens if they go out? One link is broken in this chain and we lose our industry. This is something we have been doing all our lives. Who do we go to then?

I just want to make sure they understand that we are not happy with what is going on right now. They said the oil is gone. It is not gone. It is on the bottom. We can take you and show you. I brought the Coast Guard, I brought BP and showed them. You stir the bottom up and oil comes up. So whoever said it is gone, as you heard today, they said 75 percent was gone before, 90 percent is still there and it is going to come into our shores eventually somewhere, if not in Louisiana, somewhere else. Thank you.

[The prepared statement of Mr. Cooper follows:]

Testimony for the Subcommittee on Energy and Environment

August 16, 2010

My name is Acy J. Cooper, Jr. I am a commercial fisherman from Venice, Louisiana-Plaquemines Parish-Ground Zero. I am also the Vice President of Louisiana Shrimpers Association, a state wide organization that represents shrimpers throughout our state.

I would like to speak about the extent and effects of oil contamination due to the Deepwater Horizon Oil Spill.

The extent of the damage is wide spread. Oil is on the bottom of our water ways and our seafood estuaries. We have reports of numerous fish kills which include different species of marine life. Some include Menhaden redfish, shark, turtles and many more. We have also seen a large number of birds being contaminated by the oil in our waters. Some are rescued and rehabilitated but some are not so lucky. We have reports of dead birds in our community and in our waterways that do not have evidence of oil contamination; the cause of death is unknown to me.

This oil spill has had a catastrophic effect to our community's environment. Our way of life and our industry has been greatly crippled. The total impact of this may not be known for many years. On Monday August 16, 2010 our commercial shrimping season in Louisiana began. Normally on opening day the average fisherman would bring in catches of a couple of thousand pounds. Today my catch was 500 pounds. This was a bad turnout. The exact reason is unknown to me. In my opinion this decrease is due to the waters being contaminated by oil and dispersants. The Shrimp Industry in the state of Louisiana employs 14,000 people and was a \$1.4 billion dollar industry. I do not think it will be so successful in the years to come.

I worked on the cleanup job through BP for the past 3 months. I was laid off so that other fishermen could have an opportunity to work and be compensated. In my last week of working with BP, I found oil on the water bottoms in bays. (The same water ways that were opened today for commercial shrimping.) I reported this find to the Coast Guard on the day that it was found and was told by them that it was not oil. It took me 3 days to have someone listen to my plea about this oil in this area. To this day I do not believe that this bay was skimmed or that the oil was cleaned up. We need our coast guard, our government officials and BP to take a more extensive approach to cleaning oil that is lying on the water bottoms. The dispersants that were used on this oil has caused it to sink and is making its way into our inland shores undetected.

The "VOO" (Vessel of Opportunity) program is a great program. It gives our fishermen a way to work and not depend on government handouts. It also gives us a way to help in the oil recovery efforts. There are many flaws in this program. But most are caused by contractors that do not know anything about our water ways or our coast or how to clean up or prevent oil from entering. Fishermen have to accept jobs with the VOO program when called. The future of the industry is so unknown that we cannot rely on the fishing industry alone. The openings and closures may mean that we fish today but are unemployed again tomorrow. The fishermen that

did not get an opportunity with the VOO program may not survive through our winter months. If they cannot survive this year, how will they get through future years? Stress, depression, abuse, suicides will be greater than ever. Our community is already seeing friends fighting against friends and families being divided because of this disaster.

I am worried about the affects of dispersants on our seafood and our marine life. Presently there is not testing being done for the dispersant corexit contamination to our seafood. I would like you to force the issues that a test to be developed and used for this. We do not want one bit of contaminated seafood to enter our markets. This would finish off our market for our seafood that has already been tarnished if not destroyed.

I agree with the opening and closing of the Louisiana waters to commercial fishermen when these waters have positive oil sightings. Again we do not want contaminated seafood to get into our market. But I also believe that testing in inshore waters have not been extensive enough.

I would like to ask that our Federal Government and Federal Agencies stay close and on top of all issues and affects on safety and recovery to our coast and waterways. It seems like BP Oil is trying to down size the present and future affects of this catastrophe.

Another issue that I have is that oil spill workers in our fishing areas must wear hazmat protective clothing and gloves to be in these areas. These are the same areas that we are being allowed to harvest and sell seafood from. Does this make sense to you? It does not to me.

We have had meetings to plan recovery from this disaster. How can we plan to recover when we do not and will not know the extent of the damage for years to come? This is the largest oil spill in America's history and everyone wants to paint a picture that it's all fine today. In reality the battle has just begun for our Fishing Industry and our wetlands. We as an Industry have a long way to go and may never come out of it.

Acy J. Cooper, Jr.
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Mr. MARKEY. Thank you, Mr. Cooper. And just so you know, the reason that we are having this hearing is that BP knows that we are not going away. We are going to stay on them until they do the job. We know that BP did not stand for Be Prepared. Right from the very first day when they said there was 1,000 barrels per day all the way until today, they never had a plan put in place to deal with something like this, and we just can't allow them to believe that the coast is clear, that they can retreat without having to pay for everything that they are responsible for.

Mr. COOPER. Let me say one more thing. You heard them talking earlier about 5-mile bumpers. Where I found the oil, the season was open in that area this last—the 16th. It was open where I found the oil at. And they are talking about giving a tradeoff, a tradeoff for the dispersants, and the only tradeoff that we feel they gave to is our industry because when you sink it like that, we can't see it coming in. Our shrimp and fish, they are all bottom feeders. That is where it went, to the bottom. So it is deeply concerning for us where it is out there coming in on our bottoms.

Mr. MARKEY. Thank you, Mr. Cooper.

Now we will hear from Mr. Mike Voisin. He is the Chief Executive Officer of Motivati Seafood, and oyster processing plant in Houma, Louisiana, a family-owned business. The Voisin family has been involved in the seafood industry since 1770. Mr. Voisin also serves on the Louisiana Wildlife and Fisheries Commission, the Louisiana Oyster Dealers Association and the Louisiana Oyster Taskforce. We welcome you, Mr. Voisin.

STATEMENT OF MIKE VOISIN

Mr. VOISIN. Thank you, Mr. Chairman, and good afternoon. The opportunity to come before you is a pleasure today, and thank you for this opportunity.

Mr. MARKEY. And may I also say that in Congress there are two places that everyone thinks has a very funny accent, and one of them is Louisiana and the other one is from Boston, so this is a gathering of those. The other 48 States, they all think they speak plain English but we know that our accents are the authentic ones, so welcome.

Mr. VOISIN. Thank you, Mr. Chairman.

Our company has an oyster farm in south Louisiana that comprises about 10,000 acres of water bottoms. We produce anywhere from 45 to 75 million oysters annually, and on the bottom we always have 2- to 3-year classes of oysters or 135 to 225 million oysters on the water bottom at any time.

In addition to running my family business, you mentioned my relationship with the Wildlife and Fisheries Commission of Louisiana as a member. I am also past chairman of the National Fisheries Institute.

Louisiana is second only to Alaska in total seafood landings. In 2008, our commercial fishermen harvested 1¼ billion pounds of seafood, which represented nearly \$660 million in dockside value. Meanwhile, 3.2 million recreational fishermen along our shores took to the water, completing a total of 24 million fishing trips.

The Deepwater Horizon oil spill is clearly an ecological and human tragedy that will surely affect not only the fragile habitats

where fish and shellfish are harvested, but the very core of the community that brings these iconic delicacies from the waters of the Gulf to the tables of America. That culture and those Americans need your support during these challenging times.

The seafood community has been actively engaged with both state and federal officials as they closely monitor the Gulf waters and only now begin to reopen those waters. We have worked closely with NOAA, the Department of Wildlife and Fisheries, Department of Health and Hospitals and other groups including the Environmental Protection Agency as well.

We strongly supported the precautionary closures at the outset of this tragic event in order to ensure consumers continue to have access to seafood maintained with the level of quality and safety expected in the Gulf of Mexico. And now, as we did then, we support regulators as they reopen those same waters and continue their ongoing efforts to protect consumers.

We agree that closing harvest waters which could be exposed to oil was the best way to protect the public because this prevented potentially contaminated seafood from entering the marketplace. Closures made with the intent to ensure seafood was as safe as possible were balanced with not closing any fishing areas unnecessarily. And as a testament to that system, we know now that no contaminated product has made its way into the market.

Waters are reopened only when oil from the spill is no longer present and the seafood samples from the area successfully pass chemical testing. Sensory analysis testing is a heavily established, verifiable and highly scientific way to detect contamination. That testing continues aggressively as well. In fact, FDA has collected 5,658 specimens, as well as NOAA, that all of these samples have been 100 to 1,000 times below the threshold levels for any margin of safety relating to any human health concern.

The Gulf seafood community applauds the Administration for taking the lead on the coordination of a comprehensive multi-government agency response and we appreciate the collaborative efforts of NOAA, FDA, EPA and the State authorities including the Louisiana Department of Health and Hospitals. We are pleased that the State agencies are working closely with the federal government and we are thoroughly confident that every necessary step is being taken to ensure the continued safety of seafood sourced from the Gulf. After thousands of tests, the public should not be concerned about the safety of Gulf seafood. We have all seen media reports raising questions about that same seafood, which stand in contrast to all the federal and State testing we have seen. It is absolutely critical to the Gulf seafood community that a consistent and precise message continues to be delivered to the consumers who may unnecessarily shy away from this otherwise very healthy product.

The Gulf of Mexico has 600 square surface miles of water, and during the 100 days or so of this event, the Mississippi River carried 1,600,000,000 plus gallons of water into that Gulf of Mexico. We know it is 5,000 feet deep, probably more like 10,000 to 13,000 feet deep. There is a lot of water out there. We have corresponded with doctors, MDs, and we have spoken to scientists. We have educated ourselves and understand that the demonstrable risk from

dispersants is negligible and we hope further studies will be able to help consumers better understand that challenge.

I would like to thank you and the Administration for all the efforts that are you are putting forth to make sure that we continue to do the right things relating to this seafood concern. Thank you, Mr. Chairman.

[The prepared statement of Mr. Voisin follows:]

**Testimony of Mike Voisin
CEO, Motivati Seafood, LLC**

**House Energy and Commerce - Subcommittee on Energy and Environment Hearing
entitled "The BP Oil Spill: Accounting for the Spilled Oil and Ensuring the Safety
of Seafood from the Gulf."**

Thursday, August 19, 2010

Good Morning, Mr. Chairman and thank you for the opportunity to speak to the Subcommittee today about the impact of the Deepwater Horizon oil spill on the safety of seafood sourced from the Gulf of Mexico.

I am a seventh generation oyster farmer and processor located in Houma, Louisiana. Our farm comprises approximately 10,000 acres of water bottoms in coastal Louisiana which produce between 15 million and 25 million pounds of in-shell oysters annually. This represents 45 million to 75 million individual oysters each year. Since our oysters can take anywhere from 2 to 4 years to grow to harvest size, our farm may contain anywhere from 135 million to 225 million individual oysters at any one time.

In addition to running my family business, I am also active in many government organizations along the Gulf and South Atlantic region and serve on the Louisiana Wildlife and Fisheries Commission. I am also the former Chairman of the National Fisheries Institute, which is the nation's leading advocacy organization for the seafood industry.

Louisiana is second only to Alaska in total seafood landings. Gulf seafood has been culturally important for hundreds of years to the people of Louisiana and our coastal communities. While we lead the nation in crawfish, shrimp, and oyster production, we also have a wealth of fresh and saltwater finfish that has made our state one of the largest commercial and recreational fisheries in America. In 2008, our commercial fishermen harvested 1.27 billion pounds of seafood from the Gulf, which represents nearly \$660 million in dock side value alone. Meanwhile, 3.2 million recreational fishermen along our shores took to the water completing a total of 24 million fishing trips.

The Deepwater Horizon oil spill is clearly an ecological and human tragedy that will surely effect not only the fragile habitats where fish and shellfish are harvested, but the very core of the community that brings these iconic delicacies from the waters of the Gulf to the tables of America. The Gulf community is one built not only on the bounty of pure waters, but on the backs of small business men and women whose families, like mine, emigrated to the shores of Louisiana, called by the sea and a culture like no other in this country.

That culture and those Americans need your support during these challenging times. Fishermen, shrimpers and oystermen who have harvested safe healthy seafood from the Gulf for generations have been severely economically impacted by the precautionary closures of State and federal waters along parts of the coast. The seafood community has been actively engaged with both state and federal officials as they closely monitor the Gulf waters and only now begin to reopen those waters. We have worked closely with the National Oceanic and Atmospheric Administration (NOAA) and the Louisiana Department of Wildlife and Fisheries (DWF) on monitoring the opening and closing of fishing areas.

We strongly supported the precautionary closures at the outset of this tragic event in order to ensure consumers continue to have access to seafood maintained with the level of quality and safety expected from the Gulf. And now, as we did then, we support regulators as they reopen the waters and continue their ongoing efforts to protect consumers.

We agree that closing harvest waters which could be exposed to oil was the best way to protect the public because this prevented potentially contaminated seafood from entering the marketplace. Closures made with the intent to ensure seafood was as safe as possible were balanced with not closing any fishing areas unnecessarily. And as a testament to that system, we know now that no contaminated product has made its way into the market.

Waters are reopened only when oil from the spill is no longer present and the seafood samples from the area successfully pass chemical testing. Areas considered for reopening must be free of oil before seafood testing even begins. NOAA follows a strict reopening protocol in which they work in collaboration with the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA) and the Gulf States to take product samples from an area that is designated to be reopened. The product samples are then turned over to scientists like the ones at NOAA's National Seafood Inspection Laboratory in Pascagoula, Mississippi. The product is logged, dissected and divided into parts that are sent for sensory analysis and chemical analysis testing. A panel of seven experts from NOAA and FDA perform a sensory analysis test; in order for a sample to pass, five of the seven experts must give the ok. If three out of the five panelists say no, then the fish fails or the sample fails and the area from which the fish was caught will not be reopened.

Sensory analysis testing is a heavily established, verifiable and highly scientific way to detect contamination. The testing consists of a raw odor evaluation, a cooked odor evaluation and a cooked flavor evaluation -- the product must pass all three of these evaluations. If the product fails the sensory analysis testing, then testing is ended and the source area will not be reopened. If the product passes the sensory analysis testing, it then goes on to the next step where a chemical analysis is performed.

The samples for the chemical analysis for federal openings are sent to NOAA's Northwest Fishery Science Center in Seattle, Washington and the state samples are sent to a FDA laboratory. At these labs, samples are tested for the complex mixture of components of crude oil called hydrocarbons. Polycyclic aromatic hydrocarbons (PAHs) are of greatest concern because they are most likely to accumulate in seafood tissue and, in very high concentrations, may pose a health threat to people who eat seafood often over several years. In order for a sample to pass the chemical analysis, any chemicals detected by the laboratory must be below established "levels of concern," or exposure levels that may cause health problems. Scientists will test for 12 different polycyclic aromatic hydrocarbons and the sample must be below the agreed upon threshold for all 12 in order for it to pass.

NOAA and the FDA have collected 5,658 specimens, and NOAA reports that all of its samples have been at least 100 to 1,000 times below the threshold "level of concern," so these samples are not just passing -- they are passing with a huge margin of safety. As for the sensory tests, there were only seven hits out of all the fish inspected where a person thought they smelled oil or tasted oil, and every single seafood sample from reopened waters has passed the necessary screening done by FDA and NOAA.

NOAA has the authority to close federal waters to fishing, and states have the authority to close waters within their jurisdiction. NOAA is closely monitoring the surface and subsurface movement of oil and has the ability to expand closed areas, as do states. We support state and federal regulators acting to re-close areas should they find evidence that reopened zones have been in contact with previously undetected oil.

The Gulf seafood community applauds the Administration for taking the lead on coordination of a comprehensive multi-government agency response effort and we appreciate the collaborative efforts of NOAA, FDA, EPA and the state authorities including the Louisiana Department of Health and Hospitals (DHH.) We are pleased that the state agencies are working closely with the federal government and we are thoroughly confident that every necessary step is being taken to ensure the continued safety of seafood sourced from the Gulf.

Species found in the Gulf do not recognize federal or state waters and pass freely from one to the other. That is why the testing being done by federal regulators is so important in concert with the testing being done by regional regulators like the Louisiana Department of Health and Hospitals. To date, Louisiana scientists have collected hundreds of sample batches that represent thousands of individual fish and shellfish from Lake Pontchartrain to Cameron Parish, even collecting samples already harvested at seafood wholesale and processing facilities. Like their federal brethren they too, time and again, find clean safe seafood.

After thousands of tests, the public should not be concerned about the safety of Gulf seafood. We've all seen media reports raising questions about the safety of Gulf seafood, which stand in contrast to all the federal and state testing we have seen. It is absolutely critical to the gulf seafood community that a consistent and precise message continues to be delivered or consumers may unnecessarily shy away from this healthy product.

Throughout this crisis there has been a tremendous amount of finger pointing associated with the response. I am pleased to be able to report that, when it comes to food safety and public health, there are no fingers being pointed at federal and state regulators. With refreshing speed and undeniable dedication, myriad branches of government have come together to protect consumers and help us protect our way of life. We are grateful for that and have confidence that as these agencies collaborate in their further investigation of dispersants they will apply the same perseverance.

We have corresponded with PhD's, we have met with MD's, and we have spoken to scientists. We have educated ourselves and understand that the demonstrable risk from dispersants is negligible and we hope further studies will be able to help consumers understand this.

I would again like to thank the Administration, the FDA, EPA, NOAA and local regulators for all they have done. And I thank the Subcommittee for the opportunity to address the importance of this issue. I would be pleased to answer any questions. Thank you.

Mr. MARKEY. Thank you, Mr. Voisin, very much, and we thank the members from the Louisiana delegation, Mr. Melancon and Mr. Scalise, for their work in helping to make sure that we keep BP accountable and the government accountable to ensure that the innocent victims of this continue to be protected.

Our next witness is Dr. Lisa Suatoni. She is the Senior Scientist in the Oceans Program at the Natural Resources Defense Council. She earned her PhD in ecology and environmental evolutionary biology from Yale University. We welcome you, Dr. Suatoni.

STATEMENT OF LISA SUATONI

Ms. SUATONI. Thank you. Thank you for this opportunity to testify.

Mr. Chairman, recent communications by the federal government on the oil spill have been optimistic. We are hearing that pieces of the puzzle are falling together, that the picture looks better than many of us had feared and that we have turned the corner. However, previous experience from other oil spills tells us that we are only at the beginning stages of this event from an ecological perspective, that the story is necessarily complex and many unanswered questions remain.

In my testimony today, I will focus on three recent actions from the federal government that have raised concerns. First, the concerns, the tradeoffs associated with the use of dispersants. As we heard from Dr. Anastas today, the EPA conducted recent toxicological studies on the dispersants Corexit and we heard that Corexit had equal toxicity to other dispersants, that Corexit had much lower toxicity than the oil itself and that the Corexit-oil mixture had about equal toxicity to the oil, at least to two test species. However, with the release of these findings, the federal government concluded that the picture is becoming clearer, that the use of Corexit was an important tool in this response. Well, it may be tempting to conclude that use of dispersants was a wise decision in this oil spill, we think that conclusion is premature. As you already mentioned today, we think it is unwise to form that conclusion on the basis of two toxicological studies and observations in the field that Corexit is at exceedingly low concentrations. As you pointed out, you raised many important additional questions today and there are additional ones too.

For example, what proportion of the oil that would otherwise have ended up on the coast didn't because of the use of dispersants? Where is the chemically dispersed oil? Is it encountering vulnerable benthic ecosystems on the shallow shelf or in deep ocean canyons? Is the chemically dispersed oil more able to get into the food chain than the oil alone? Is it getting into the food chain? Is it possible for the dispersant to biomagnify in the food chain? These are all outstanding questions. It is clear that the use of chemical dispersants is a tradeoff but it is not at all clear that we understand what tradeoff we have made.

On the remaining oil in the environment, we have already heard a critique from Dr. MacDonald about the federal oil budget, and NRDC agrees with him, the assertion that 75 percent of the oil is no longer in the environment is an overinterpretation of the data and misleading. Because of the uncertainty associated with the

rate of biodegradation of the oil, we really don't know how much oil remains in the environment. This needs to be directly measured. If you do a more direct interpretation of the federal oil budget, it reveals that 50 percent of the oil may remain in the environment. That is over 100 million gallons, or nine times the Exxon Valdez spill. That is a lot of oil.

In addition, the federal oil budget appears to be a preliminary budget that was perhaps prematurely released. It was released before peer review. It was released without any discussion of the precision associated with those estimates. It is a partial tally of the hydrocarbons in the environment. Again, as we have heard today, it didn't contain methane, which scientists believe comprised half of the total hydrocarbons that went into the environment. And it was a partial analysis of the fate of the oil. For example, it didn't provide estimates of how much oil went into an oil slick or what proportion of the oil made it to the coast or what proportion of the oil is now on the sea floor. As presented, the federal oil budget was a partial snapshot of the oil in time. It doesn't directly address where the oil was, where it is going and how long it will remain in the environment, and it of course didn't address the ecological impacts. To fully understand the risk of the remaining oil or the impacts to the environment, this picture needs to be filled out and the oil budget needs to be refined.

Relating to the safety of seafood, recent statements from the federal government made today in fact assure Americans that the open fishing grounds and the seafood in the market have no oil in them and present no health hazard whatsoever. Again, many important questions remain. My colleague, Dr. Gina Solomon, who is in the health program at NRDC, highlights three primary concerns that we have.

First, much of the data in the contamination of the Gulf seafood are not publicly available so scientists cannot independently review the findings. NOAA has released data on fewer than 100 of the samples out of thousands that they say they have, and only on finfish, not on shrimp. Data from the State waters has not yet been released. Second, the seafood monitoring that is currently being done may not be adequate in terms of sample size and in terms of failure to monitor heavy metals, which you discussed today, and the dispersants. Third, assumptions using the FDA risk assessment fail to adequately account for exposure to polycyclic aromatic hydrocarbons to vulnerable populations, mainly developing fetuses, young children, and subsistence fishing communities, and that is largely because of the assumptions you already raised about the weight of adult males.

In conclusion, the Gulf oil disaster represents the largest oil spill in U.S. history. We understand that the government wants to turn the corner and wants to signal that the Gulf is on its way to recovery. However, the facts simply do not bear that out. This is still a huge amount of oil in the environment. No matter how you interpret the federal oil budget, everyone agrees with that. It does a disservice to the Gulf region and to the public at large to diminish the problem that this oil presents to the health of Americans and the ecosystems of the Gulf of Mexico. The government needs to take the time to do a careful study to assess the fate and the effects of

this spill and greater transparency is warranted. In the end, we believe that this follow-through is the only thing that will keep this catastrophe from being such a big disaster.

[The prepared statement of Ms. Suatoni follows:]

August 19, 2010

**House Committee on Energy and Commerce, Energy and Environment Subcommittee, Hearing on
“The BP Oil Spill: Accounting for the Spilled Oil and Ensuring the Safety of Seafood from the Gulf”**

Testimony of Lisa Suatoni, Senior Scientist, Oceans Program, Natural Resources Defense Council

Thank you for this opportunity to testify. I am a Senior Scientist with the Oceans Program at the Natural Resources Defense Council (NRDC). My testimony is presented on behalf of NRDC, a national environmental organization with over a million members and online activists, dedicated to the protection of the earth – its people, plants and animals and the natural systems on which all life depends.

Recently communications about the oil spill from the federal government have been optimistic. We are hearing that pieces of the puzzle are falling into place, that the picture looks better than many had feared, that we have “turned the corner.”

However, previous research on oil spills tells us that we are at the beginning stages of this event, that the story is necessarily complex, that many crucial questions remain unanswered.

In my testimony today, I will focus on three recent actions by the government that have raised concern.

Trade-off associated with dispersants

The recent EPA laboratory studies on the toxicity of chemical dispersants found that the dispersant Corexit is less toxic than the oil released and that the dispersant/oil mixture has roughly the same toxicity as the oil itself.

With the release of these findings the federal government concluded that “the picture is becoming clearer” that dispersants were an “important tool in this response.”¹

While it may be tempting to conclude that the use of dispersants during this oil spill was a good idea, this conclusion is premature. It would be unwise to draw conclusions about the safety of this unprecedented application of chemical dispersants from two laboratory experiments and field observations that the dispersants are successfully dispersing the oil.

Many important questions remain:

What estimated proportion of the oil that would otherwise likely end up on the coast was redirected to the open water? What organisms and ecosystems have been exposed to the chemically dispersed oil? Is the chemically dispersed oil encountering vulnerable benthic ecosystems by settling onto the shallow shelf or into deep ocean canyons? Is the chemically dispersed oil – or are the dispersants – getting into the food chain? Is there the potential for them to get into the food chain? What are the public health implications of exposure to dispersants by the response workers?

It is clear that the use of chemical dispersants is a tradeoff – but it’s not at all clear that we fully understand the tradeoff we made yet.

Oil Budget

A few weeks ago, an oil budget by the National Incident Command was released under the banner that 75% of the oil has been “taken care of by mother nature.”² Exact percentages of the oil had been removed, evaporated, or dispersed were presented.

In actuality, nothing in the report suggests that 75% of the oil is gone. Given the lack of information about the rate of biodegradation, it is not clear what fraction of the oil remains in the

¹ Paul Anastas, Monday, August 2, 2010 in press conference on phase II EPA dispersant test results

² Carol Browner, Wednesday, August 4, 2010 in NBC’s “Today Show.”

ocean. Dispersed oil is not the same as disappeared oil. A more direct interpretation of the federal government's analysis shows that up to 50% of the oil may remain in the environment. This is a lot of oil – over 100 million gallons – or the equivalent of *nine Exxon Valdez* spills.

In addition, the federal oil budget was a partial tally of the hydrocarbons released into the environment (it did not include methane, which can also cause ecological harm) and an incomplete assessment of the fate of the oil.

Many important questions remain:

What is the location and the fate of the methane (which appears to equal the amount of oil released into the environment)? Where did the dispersed oil go? What is the rate of biodegradation of the oil in the water? What proportion of oil went to the coast or is on the bottom?

The released oil budget represents a 'snapshot' of the oil, in a moment in time. It does not directly address where the oil has been, where it is going, and how long it will remain in the system (or, importantly, the ecological impacts throughout). To fully understand the risks of the remaining oil and the extent of the damage, we need this picture to be filled in and this oil budget to be refined.

Seafood Safety

Recent statements by the federal government assure Americans that open fishing grounds and seafood in markets are free from oil and pose no risk to consumer safety.

However, many important questions and concerns remain. These include:

1. Much of the data on contamination in Gulf seafood are not publicly available, so scientists cannot independently review the findings. NOAA has released data on less than 100 samples out

of thousands that they say they have, and only on finfish, not shrimp. Data from state waters have not been released.

2. The seafood monitoring that is currently being done may not be adequate, in terms of small sample sizes and the failure to monitor for toxic metals and dispersants.

3. Assumptions used in the FDA risk assessment fail to adequately account for exposure of polycyclic aromatic hydrocarbons (PAHs) to vulnerable populations, such as the developing fetus, young children, and subsistence fishing communities.

4. Due to lack of public transparency, questions remain about the scientific basis by which states are making decisions on reopening fishing area. For example, is subsurface oil (in the water or on the bottom) being taken into consideration?

The Gulf oil disaster represents the largest oil spill in U.S. history. We understand that the government wants to turn a corner and signal that the Gulf is on the road to recovery. However, the facts simply do not bear this out.

There is still a huge amount of oil still in the ecosystem. Even accepting the government's characterization that 75% is gone, then there would be as much as 50 million gallons in the system, almost 5 times the size of the *Exxon Valdez* spill. If the dispersed oil is included in that remaining fraction, the amount is potentially 100 million gallons.

It does a disservice to the Gulf region and to the public at large to minimize the problem that this amount of oil can cause. Recent research results suggest that there is reason to be concerned and that subsurface oil is doing harm.

The government needs to take the time to do careful study and assessment of the fate and effects of the spill on humans and wildlife before drawing broad conclusions. And, greater transparency is warranted. In the end, it's the follow-through that will make this catastrophe less of a disaster.

Mr. MARKEY. Thank you, Doctor, very much.

Now we will turn to questions from the committee, and I will begin with you, Dr. MacDonald.

I think that there is a lot of concern about how far the oil and methane from the spill has spread in the Gulf, how long it will remain and what harm it could cause. I know that these questions are areas of active research for you and for the broader academic community. Can you give us a brief overview of what academic scientists are finding in that regard?

Mr. MACDONALD. Well, this week and today in fact we have seen the release of a number of careful studies, one by the University of South Florida reporting on results from a recent research cruise with the research ship *Weather Bird*, a careful study of the oil budget by a scientist at the University of Georgia in Athens, and today the release of a major paper published in *Science* by Richard Camilli and colleagues. These reports collectively show different aspects of the spread of the oil and its related compounds that raise major concerns. The Camilli report documents the—and this is the best science that I have seen yet out of this process. The Camilli report documents the spread of compounds called BTEX, and these are the polycyclic aromatic hydrocarbons, and the ones of greatest concerns, these are benzenes, xylene, toluene and so forth. These are the most toxic components of the oil, and they track a very large plume of this material spreading to the south and the southwest of the spill.

Now, I will note that in that report, they document that some 6 to 7 percent—I believe those numbers are correct—of the BTEX released from the well, the total discharge was included in that plume. This plume is at 1,100 meters. If that BTEX is a tracer on the total amount of oil released and entrained into these deepwater layers, that suggests that we don't know very well what happened to the balance, and in fact, the upper layers of the ocean including the surface of the ocean may have received a bigger dose of oil than we are presently worried about.

We do know from my work and other work that has been done that the oil spread over an area of many thousands of square kilometers, and as it degraded, as it emulsified and sank, it rained down particles of oil, and this oil became more concentrated as it reached the coast so we now have a very widespread amount of oil that is scattered in layers, and this is what the findings from the *Weather Bird* documented. They took core samples going towards Panama City and they found oil on the bottom everywhere. Now, just sampling with a core, that suggests that either you are very unlucky or there is a lot of oil on the bottom, and the Georgia study confirmed many of the points that have been made in this hearing.

Mr. MARKEY. OK. Great. Thank you.

While this hearing was ongoing, the Woods Hole Oceanographic Institute released a study, and it is a snapshot from the middle of June, and what they found was a plume of oil from the well at least 22 miles long, 1.2 miles wide and 650 feet high at a depth of 3,000 feet below the surface in the Gulf, and contrary to government oil budget report that said dispersed oil is biodegrading quickly, Woods Hole scientists found that microbes are degrading the plume relatively slowly, in the words of Woods Hole. That

means that the oil is persisting for longer periods than expected. They don't know how toxic it is or if it poses a threat, and unlike some other researchers, they did not find areas of severe oxygen depletion, that is dead zones. They explained this discrepancy because of their use of an older lab-based technique rather than the use of modern sensors which can give oxygen readings that are too low when the sensors are coated with oil. So I just wanted to put that on the record.

Mr. COOPER. How many years have you been shrimping?

Mr. MARKEY. Thirty-five years myself.

Mr. MARKEY. Now, have you been out shrimping recently?

Mr. COOPER. Yes, sir, on the 16th of August it opened up and I went that day.

Mr. MARKEY. Now, did you see anything different or unusual in terms of the waters or the shrimp?

Mr. COOPER. Not in the area I went, which we didn't have a whole lot of concentration of oil come in, it was a clean area, so no, at that point I didn't. I just didn't have enough shrimp. It wasn't there.

Mr. MARKEY. Dr. Suatoni, would you like to comment on that in terms of the long-term impact?

Ms. SUATONI. Well, we are concerned primarily with regard to the shrimp and the presence of the subsurface oil, and that, as Mr. Cooper said, oil is present in open grounds and that there may be more exposure. The marine invertebrates do not process polycyclic aromatic hydrocarbons as quickly as food fish so we think there needs to be special care taken with the sampling of invertebrates.

Mr. MARKEY. Dr. MacDonald, would you like to comment?

Mr. MACDONALD. Well, I think that the survival of the Gulf seafood industry requires the survival of seafood, and we have to be concerned. I mean, this is anecdotal. This is one fishing trip and I am sure you have gone out before, Mr. Cooper, and not caught as many fish as you wanted to.

Mr. COOPER. Correct.

Mr. MACDONALD. So this one event doesn't tell us the whole story. But the fishermen, however healthy the seafood is, if they can't catch it because there has been a lot of some year classes, then all of the protection and the vigilance of the FDA is not going to sustain the Gulf seafood industry because it won't be there. So that is my concern.

Mr. MARKEY. Mr. Cooper, are you going to go out shrimping again soon?

Mr. COOPER. Yes, sir.

Mr. MARKEY. What is your plan right now?

Mr. COOPER. When I get back home, I will be back in the water.

Mr. MARKEY. OK. Great. Now, Mr. Cooper, are you convinced that there is no oil in the areas open to shrimping?

Mr. COOPER. Like I told you earlier, one spot where I did find the oil was, they say a 5-mile bumper zone. It wasn't 5 miles that one of the bays I did find oil in.

Mr. MARKEY. Now, in your opinion, is there any way that NOAA or the FDA can be sure that there is no oil in the water where shrimping is taking place?

Mr. COOPER. I found it the last day when I was working with BP over 2 months in the same area, and it just so happened, one of my last days that I worked, we found it. I called the Coast Guard and BP and had them come out there and I had to bring it to their attention. The Coast Guard wouldn't come. Finally, I caught one that was in the bay and brought him over there and showed him, so I went to a town hall meeting and I brought it before them and invited them all to come see what I found, and they did come, the commander of the Coast Guard and BP came with me and I did show them in this bay, disturb the bottom and the oil comes to the top, and they say it is unrecoverable oil but still yet this opened this bay up for trawling.

Mr. MARKEY. Now, Mr. Blanchard, some have suggested that people raising concerns about the quality of seafood simply want to continue to collect checks from BP. Can you deal with that issue for us just so we can understand what is going on down in the Gulf in terms of the relationship between this program to pay the fishermen who need to be paid and again an incentive to get back out there as soon as you can, everything is OK. So how should we be viewing this tension?

Mr. BLANCHARD. Well, I told BP from the very beginning that they was going about it the wrong way. What we asked them to do was to help the fishermen and give them an incentive to go back fishing. If they would have left the fishermen fish, even though they had to go further away from their home, even though they would have to go to different fishing grounds, well, pay them for that. Give them an incentive to go out. Then it would have kept the market going, you know. But BP took the approach that they were going to do a PR program and put all the shrimpers to work for them, but in my opinion, BP never tried to pick up the oil. They have never tried to pick up the oil. I have talked to hundreds of boats that said they found oil, contacted BP and BP told them not to try to pick it up and go the other way, and this has been going on for a hundred and some days. I have lived through this.

Mr. MARKEY. Why do you think that is the attitude of BP?

Mr. BLANCHARD. It was cheaper to sink it. Out of sight, out of mind and out of here. That is the approach BP took, you know.

But as far as going back to seafood testing, all the seafood right now is probably being tested more than any other product in the world, you know. I don't believe beef or pork or any seafood in the world—we get seafood from foreign countries that personally wouldn't eat. It's probably being grown in a sewer, and the FDA checks 1 to 2 percent out of it, and out of the 1 to 2 percent they check, 40 percent to 60 percent is no good, it is rejected. So, you know, that is one thing I wanted to bring up. All the seafood right now is being tested probably more than any product in the world, so hopefully they are doing their job and they are doing it right.

What I would like to see is for one time before I die is somebody that works for the government be held accountable for something. Whoever is testing it, whatever agency is testing it, they ought to come out and give us a paper and say we guarantee this product is good, and if something goes wrong, they will be held accountable, not us.

Mr. MARKEY. Well, you know that is why we are having this hearing. You know that is what is happening here today. We are sending a very strong signal to those who are responsible that—

Mr. BLANCHARD. Well, that is what I would like to see.

Mr. MARKEY [continuing]. They are representing to the American people that this is safe.

Mr. BLANCHARD. I think if they would be held accountable, people would have more trust in the government agencies. But, you know, there are certain government agencies that are responsible for this oil spill when nobody is being held accountable.

Mr. MARKEY. Well, you know, we are going along beginning with the Minerals Management Service—

Mr. BLANCHARD. That is what I would start with.

Mr. MARKEY [continuing]. And there are a lot of people there who are going to be made accountable, and we are going to move through this entire process. We are not going away. We are going to make sure that all of the lessons that can be extracted from what happened are learned and implemented in order to protect the public.

Mr. Cooper, in your testimony, you indicated that BP required you to wear a hazmat suit when you went out into the waters. How long ago was that?

Mr. COOPER. Oh, 2 weeks ago.

Mr. MARKEY. Now you are being told to head back out into the same waters without any additional protection. Is that correct?

Mr. COOPER. And that is very troubling, yes, it is.

Mr. MARKEY. Do you think that you are being asked to work in an unsafe environment?

Mr. COOPER. Not necessarily. Some of the areas, they didn't have the oil, so I don't see in those areas that it is unsafe, but in some of the areas, yes, it is unsafe. If they are going to make us wear hazmat suits and tape up and take hazmat training, how can you send fishermen back out again? But some of the areas, yes, the oil never came, no, it is not there. Some of these guys had to take these jobs instead of fishing, and I know there is a big controversy in Louisiana right now. A bunch of people wants the fishermen to go back to work. We only have limited areas to fish. They want to put them back into the waters and make them go to work but then they are paying us lower prices, with high fuel prices. The price is not there. We don't have the area to work. So these guys have to do it. But the opening and closing of the seasons with wildlife and fisheries, they pretty much had to do what they had to do, and if it means going out there and working for BP to make a living, well, so be it. That is what they had to do.

Mr. MARKEY. Now, in your testimony, you indicated a smaller than normal size catch this week. Have you noticed any other changes to the shrimp or to the fish, the color, the size, the spots, the smells?

Mr. COOPER. Not in this area, no, sir. This area was a clean area.

Mr. MARKEY. Thank you.

Mr. Voisin, would you like to inject your thoughts at this point?

Mr. VOISIN. Thank you, Mr. Chairman. I just want to say that there are two small areas in south Louisiana that have been oiled, and that is the Barataria system where Mr. Cooper actually har-

vests and Mr. Blanchard has his dock, and then out at the mouth of the river, Pasalutra. We have 7,500 miles of shoreline in south Louisiana if you go in and out every bayou and every bay and lake. Only about 400 miles of those were oiled. It happens to significantly be where Mr. Blanchard and Mr. Cooper are located. Seafood from throughout Louisiana is safe. It is wholesome. And while there can be questions raised——

Mr. MARKEY. You are saying that the seafood which is being sold is safe but there are many areas where if it was caught and sold it would not be safe. Is that what you are saying?

Mr. VOISIN. No, the seafood——

Mr. MARKEY. You are saying all seafood caught anywhere off of the coastline of Louisiana is now safe? Is that what you are saying?

Mr. VOISIN. All the seafood caught off the coastline of Louisiana is now safe and that is put into the commercial market. Yes, sir. Eighty-seven percent of our State is currently open to the harvest of seafood. That occurred last week as a result of the intensive testing and protocols. And I know we have talked a lot about protocols today and about the dispersant testing and oil testing. Looking at the risk assessment based on the protocol, Mr. Chairman, I took a look at it, and in terms of oysters, oysters are consumed at about a quarter a pound per capita consumption. In the risk assessment, they used a number between 9 and 10 pounds per capita consumption on an annual basis, and they figured that exposure at 5 years, so they are exceeding the per capita consumption by 40 times and they exposure by 5 years, and they are looking at the risk of illness at one in 10,000, which is traditionally looked at as one in either 100,000 or one in a million, so that is being magnified significantly, and we are meeting by 100 to 1,000 fold all of the criteria in the reopening protocols.

Mr. MARKEY. So I just wanted to again clarify. You are not represented that in the areas, the federal waters that are now closed, that it is safe to eat the fish that is caught in those areas. You are not saying that?

Mr. VOISIN. I did not say that, sir. In the open waters where fish are being harvested and commercially sold, I would feed it to my kids, my wife, and we do eat it often, yes, sir.

Mr. MARKEY. But in those other areas, you would not feed that fish to your family, in the waters are now closed?

Mr. VOISIN. In the waters that are closed, we can't. I mean, we can't harvest from those——

Mr. MARKEY. That is what I am saying.

Mr. VOISIN. So the bottom line is, that as they do the reopening and go through the protocol, absolutely I would feed that to my family.

Mr. MARKEY. Let me get back to you, Mr. Cooper. Can you give us a comment? And then you, Mr. Blanchard.

Mr. COOPER. Would I eat the shrimp? We have been eating them. I have been eating them. Not in the areas that are closed, no, I haven't eaten them, but the ones I caught, I did eat. I will eat them.

Mr. MARKEY. Mr. Blanchard.

Mr. BLANCHARD. I definitely eat them. I don't think there is any difference on what is open and what is closed.

Mr. MARKEY. OK. Great. Thank you.

Dr. MacDonald, could you comment here, and divide the question here first in terms of what you believe is safe and what is not safe and how the American people should be viewing this.

Mr. MACDONALD. Well, I would certainly eat them too, and perhaps I can have the occasion sometime. I will say that my concern remains the productivity, not the safety. I think that we have to have a productive Gulf, and the 350-mile statistic is heartening, that it could have been worse. But as you move offshore, you get a lot of areas that have got oil on the bottom, you know, further out, and as you go to the east, we see a lot of oil off Mississippi, Alabama and Florida, my State. In those areas when people go offshore and take samples, they are finding this buried oil and they are finding this buried oil in the beaches and they are finding this oil in the marshes, and that 350 miles did get a lot, and the edges of these marshes where the marsh grasses were oiled, my concern is that, you know, if it dies back 10 percent or 5 percent, that opens up, that dilates these channels. It makes them wider. That means the flow of water through is greater. That means the loss of wetland is greater. We have a tremendous amount of work to do to restore the Gulf of Mexico. We had a lot to do before all this and now we have a whole bunch more.

So my concern is the ecosystem and the productivity. I believe in the fishermen and the FDA and protecting our safety.

Mr. MARKEY. Dr. Suatoni, you have heard the comments on this question. Can you add yours as well?

Ms. SUATONI. I would like to emphasize, build on what Dr. MacDonald said, but emphasize that long-term monitoring is imperative. What we learned from the Exxon Valdez spill was that oil that gets into the coast and into low-oxygen zone stays toxic in its kind of full toxic form for decades, and any time it gets disturbed or it rains, it can seep into the environment, and these near-coastal fisheries, I think it is important that they continue to monitor for the exposure to polycyclic aromatic hydrocarbons and metals over the long term.

Mr. MARKEY. Can I ask this, Dr. Suatoni? Was there anything that was of concern to you that you heard on the opening panel from the government officials? What is it that stuck out that you think needs more attention?

Ms. SUATONI. A few things stuck out. One was that they are only now developing tests to examine whether or not dispersants bioaccumulate. That seems to be something that we should have known since dispersants are a common tool in oil spill response. Another thing that you know we are concerned about is that the risk assessment used by the FDA is not adequately conservative for specific vulnerable populations. It was reassuring to hear that they are open to reconsidering that margin of safety. And I would say with regards to seafood, those were the two primary concerns.

Mr. MARKEY. Was there anything of concern, Mr. Voisin, that you heard in the opening testimony that you would like us to continue to focus on?

Mr. VOISIN. Thank you, Mr. Chairman, and I would say that I stated earlier in response to Dr. Suatoni that I feel that the risk assessment that deals with the protocol for reopening basically are

much more conservative than there should be any concern related to. I think they have gone way beyond what would be conservative to the nth degree, and I described that a moment ago in my answer to you.

Mr. MARKEY. Even though you heard concerns about heavy metals and other issues, that is not of concern to you?

Mr. VOISIN. Having spent countless hours talking to PhDs as well as doctors relating to this and the metabolization of all of these things through finfish and shellfish, I personally think that there is no concern relating to those, although there is a concern and we should be concerned——

Mr. MARKEY. Even though there have never been any studies on this subject, you still have no concern?

Mr. VOISIN. I personally do not, no, sir, given the——

Mr. MARKEY. Do you have concerns, Mr. MacDonald?

Mr. MACDONALD. Regarding the government report?

Mr. MARKEY. About any aspect of this including the testing for heavy metals and the other issues that seem to still be unresolved.

Mr. MACDONALD. Yes. My concern is for the coastal and marine ecosystem of the Gulf of Mexico. I am concerned that I have not yet heard from NOAA their plan for monitoring the continued health of this ecosystem and I think that when we look at the oil spill budget, it is unmistakable that an enormous dose of oil was given and really putting it simply, Mother Nature is being made to clean up our big mess, and I think Mother Nature suffers for it. I think that we need to endow a permanent fund for the restoration, the understanding and the sustenance of the Gulf of Mexico coastal and marine ecosystem in perpetuity, and I don't hear that coming from NOAA and I would like to hear that.

Mr. MARKEY. Great.

Mr. Blanchard, Mr. Cooper, Mr. Voisin, everyone wants the Gulf seafood industry to rebound from the BP disaster. Your industry did not cause this mess. Your industry, your business and livelihoods were harmed by the spill. What would each of you ask the federal government to do to help establish the safety of Gulf seafood and to help reassure the consuming public about the safety of Gulf seafood? You heard the questions that I posed to the government panel that appeared here earlier about the need for additional tests to be done to help address some of the issues that have not yet been definitely addressed such as the metabolites of the oil, the effect of dispersants, heavy metals and long-term impacts that this disaster could have on the quality and productivity of seafood in the Gulf. Do you agree that those should be priorities and what other issues would you like the government to address?

Mr. BLANCHARD. Well, what I didn't like what I heard about the government, it looked like they were just checking the open places. If it would be me, I would go to the worst place and check that first and then see what I am looking at, you know. It looked like every time you listened to the government, they would say we just checked the open places. Well, why don't we check the closed place and see why it is closed, you know? Nobody seems to be checking that. And, you know, we have been severely harmed by this. I call them bad people, BP. You know, since this happened in this 100-some days, I got my secretary to look at the bills we paid. We paid

\$488,000 in bills, and I received \$165,000 in payments from BP, and, you know, it reminds me, I heard the President said that he wasn't going to let our cash flow be interrupted, but if I don't have \$323,000 to pay my bills, I am out of business. You know, why is nobody holding BP accountable to come in and make it right what they have done to us?

Mr. MARKEY. Well, I will tell you one thing. This committee wants to work with you, Mr. Blanchard. We want to make sure that BP stands for "bills paid."

Mr. BLANCHARD. Yes, that sounds better.

Mr. MARKEY. And that includes your bills. So let us work together on that and make sure your bills are paid but other people's bills as well. Thank you.

Mr. BLANCHARD. Thank you very much.

Mr. MARKEY. Mr. Cooper?

Mr. COOPER. Just to make sure they keep long-term testing and they just don't forget about it, and one other issue as far as what is going on in the Gulf now with the Vessel of Opportunity. They are trying to take the money that we made working with BP off our claims, and that is not fair for the fishermen that went out there and did the job. We were cleaning their mess, and now they are going to hold us, our claims towards that money, and that is not fair for what we just did. We went out there. We put our lives on the line. We cleaned their mess up and now they are going to take it against our claims, and that is totally wrong. For BP to even think about doing something like this is uncalled for because we did a job and we expect to get paid for the job that we did.

Mr. MARKEY. Mr. Voisin.

Mr. VOISIN. Thank you, Mr. Chairman. I believe that long-term testing is critical to the Gulf and the survival of the Gulf. I believe that the State of Louisiana—I know that the State of Louisiana has requested \$457 million from BP for a 20-year testing program. We have not approved it yet but it is needed to continue to monitor the health of our species, the viability of its reproductive cycles.

But more importantly, one of our great challenges is the brand of the Gulf of Mexico. The brand of Gulf seafood has taken the greatest hit in the history of my seven generations of family that have plied the waters of south Louisiana. People need to understand there may be questions but there are no questions about what is in the market today, that there may be questions about fishing areas that are closed, and we should ask those questions, but that product that is in the market today is wholesome and safe based on tremendously conservative science and we need to convince those American people. Customers at restaurants are now instead of ordering oysters on the half shell, very close to my heart, shrimp cocktails, they are saying instead of having that as an appetizer, I will have chicken wings, and instead of having that grouper as my main course, I will have a steak. We need to overcome that. A hundred-plus days of oil gushing in the bottom right-hand corner of the TV screen has branded us as something other than we are. We have a challenge. We will meet that challenge.

However, the challenge is in a very small part of the whole Gulf of Mexico. We need to look at the whole. It is 200 million gallons of oil that has escaped from this situation. We need to deal with

it. We are blessed in the Gulf of Mexico with having the microbes that will eat oil. That was not the case in relationship to the Valdez incident where they don't have the warm water. We are cursed with that warm water and that warm water as well.

Mr. MARKEY. Would you like to see more testing in the areas that have the heaviest concentration of oil right now? Would you like to see that implemented now so that we will have that information in the long term going forward, Mr. Voisin?

Mr. VOISIN. I think it is happening, Representative Markey. I believe that that is happening. Could more—more is better. I think NOAA—

Mr. MARKEY. We heard on the opening panel that there was no intensive program to do that right now. You would like to see that kind of intensive program right now?

Mr. VOISIN. I would support that, and I have been on conference calls with NOAA where they have reported they are doing testing in the closed areas. I have been on conference calls with the FDA as well. Now, that is what they have indicated on those conference calls, that they have done testing of seafood products in those areas. They have done oil plume testing and they have indicated that they are continuing to do that. Today, I forget the guy from NOAA—

Mr. MARKEY. So you want them right now to be testing the fish inside of the closed areas? You want that to happen?

Mr. VOISIN. I believe, Mr. Markey, they are. Yes, I do want it.

Mr. MARKEY. But if they are not doing it right now, you believe it is important for them to test the fish inside of the most oiled areas right now?

Mr. VOISIN. Absolutely, yes, sir.

Mr. MARKEY. Absolutely?

Mr. VOISIN. Absolutely.

Mr. MARKEY. OK. Great. That helps us a lot.

So let us do this. Why don't we ask each one of you to give us your closing thoughts in reverse order of the opening statements so that we have a sense of what it is that you want us to retain, to focus on, as we are going forward in the Congressional oversight of this greatest of all environmental calamities. So we will begin with you, Dr. Suatoni.

Ms. SUATONI. Thank you. NRDC is concerned with the recent tone of the communications and analyses coming out of the federal government. There is a desire to rush to judgment, to turn the corner and accelerate the analysis of the impacts the oil has had on the ecosystem, and it is of great concern. According to the Oil Pollution Act, the federal government is required to fully and fairly assess the impacts of the oil spill, and we hope that they take the time and do the necessary comprehensive study that is required to get that done.

Mr. MARKEY. Thank you.

Mr. Voisin.

Mr. VOISIN. Thank you, Mr. Chairman. The Gulf of Mexico States, the State of Louisiana that I live in, have been challenged in the last 5 years by five major events, this spill being the most recent significant event. We will be scarred but we will not be broken as a result of this. The seafood community is a viable commu-

nity. My family left France under exile orders in the 1770s, went to Canada and was kicked out of Canada. So far we have not been kicked out of Louisiana and hopefully that won't occur. We will be resilient.

You know, people aren't really interested necessarily in the rough seas that you have but whether or not you bring the ship in, and we are going to be about, and I hope the federal government continues its effort and doubles if appropriate and needed to bring that ship in and that is safe seafood of clean and healthy Gulf Coast. We will have scars from this just like I do from different accidents and challenges in my life but I am viable. The Gulf is a viable place to live. The seafood is wholesome and safe. It is harvested from the Gulf of Mexico and we want Americans to know that.

Mr. MARKEY. Thank you, Mr. Voisin.

Mr. Cooper.

Mr. COOPER. Long-term testing on the oil, testing on the Corexit and also testing on our harvest and whether it is has been depleted or not, a stock assessment to see what is happening to our fisheries because the last season that just opened, it really opened your eyes and said what is going to happen, so that is some of the things that we would like to see, testing on the Corexit for sure, no doubt, and the oil for long term.

Mr. MARKEY. Great. Thank you.

Mr. Blanchard.

Mr. BLANCHARD. Yes. Thank you. Well, basically for 28 years of my life I have had a product that has always been known as the best because it was the best, and I would just like the perception of the American public to know it is the best again, you know. You know, in our business, we don't work 9 to 5, we work 5 to 9, you know. We work 7 days a week. It is my life. I guess I will say it like Tony Hayward: I pretty much want my life back. You know, I want my life back. They took everything that I worked for all these years and one company doesn't know what they are doing or cut too many corners and put me out of business, I mean, just ruined my whole life, and nobody is being held responsible but me, and I didn't do anything wrong. I mean, I am just so confused. I go to work like I always do. I walk around in circles, don't know what to do. I mean, until it happens to you, you know, until you live through what we are living through, you know, it just—I don't know what is going to happen, you know. Every night I go to sleep, I can't sleep. I lay down in my bed. I know how many squares I got on the ceiling, you know.

You know, I just hope that the government makes BP clean everything up and everything returns back to normal and the American public has confidence that the seafood that we are going to buy, we are not going to sell them anything I wouldn't eat myself, and the last thing we want to do is get anybody sick and we will do the best that we can and make sure everything is all right. Thank you.

Mr. MARKEY. Thank you, Mr. Blanchard.

And to you and Mr. Cooper, we thank you for coming here today. We know that you are individuals who have a tremendous amount at stake here, and just so you know, if at any point tomorrow, next

week, next month, that you can just dial our number here on the committee to help you personally with your own family situations as you are going forward, and we will give you the number to call as soon as this hearing is done just so that you know that there is someone who will be behind you.

Mr. COOPER. Thank you very much.

Mr. MARKEY. It takes a lot of courage for you guys to be here today and we appreciate that.

Dr. MacDonald.

Mr. MACDONALD. BP is going to have to pay a fine, Mr. Chairman, a big fine, and my concern is that that fine will be dedicated to restoring the Gulf of Mexico, not disappear into a treasury somewhere, and I hope that the houses of Congress can work together and the parties can work together to guarantee that the money that is paid here goes into permanent restoration projects. I am talking about restoring marshes. I am talking about marine protected areas where they are needed. I am talking about better enforcement of coastal runoff. Those are all things that have to happen to make our Gulf whole again. That is what we all want. If you all will do that, you will have massive support from the people of the Gulf of Mexico. Thank you very much.

Mr. MARKEY. Thank you, Dr. MacDonald, very much. And I would also like to add, Dr. MacDonald, that the House of Representatives just 3 weeks ago did adopt one of your recommendations to the oil spill response bill that we passed on the House Floor to create a new trust fund for oceans so that funds raised from drilling in our oceans will also go towards protecting and improving our oceans. The Senate has said that they will take up the legislation when they return in September. That is always problematic, dealing with the Senate, but we did in the House of Representatives take your recommendation and implement it, and hopefully the same will be true in the Senate so that it can go to President Obama's desk.

What we have learned today is that the oil is not gone. The oil remaining in the Gulf waters or washed up on the floor is equivalent to 10 Exxon Valdez-size spills and could be much more. Most of the Gulf has been reopened to fishing but the industry is not in the clear. Long-term impacts on stocks remain unknown. If one contaminated catch makes it to market and makes people sick, then the reputation and the credibility of one of America's most important fisheries will be in jeopardy.

So we must engage this issue with continued caution and vigilance is necessary. We have seen some premature celebration. Dispersed oil is not the same as oil which has disappeared. Data, formulas, algorithms need to be made public so that independent scientists can verify the conclusions that are now shaping the debate on what to do now. We need to test the fishing stocks in the closed fishing areas now so that we understand what is going on now. That will help us in the future to protect the fishermen, to protect the consumers of fish in our country, but we must spend the money now so that in the future there are no questions that are unexamined, that we ensure that the compensation is given to those who will need it for as long as possible until we make everything as safe as is possible. All of that is in my opinion going to

be something that this committee and the American people will need to be vigilant to ensure is put in place so that the people in the Gulf of Mexico at the end of the day are made completely whole.

BP in my opinion will try to walk away as fast as they can. BP lowballed the size of the spill in the first week saying it was 1,000 barrels. Then they said it was 5,000 barrels. They knew in the first week that it was a huge spill. It turns out to be between 53,000 and 63,000 barrels per day. That is not 1,000 barrels. That challenged the level of response in those first weeks, in those first months because of the misleading information. People were less vigilant than they would have been. The response was less intense than it would have been if we understood the magnitude. We must continue that level of vigilance. We must assume that we need to use all of our resources to understand what is going on right now so that in the future there can be the proper protections which are put in place and that the proper compensation is given to all of those whose lives have been adversely affected by what has happened.

So while BP might be spending tens of millions of dollars on their television commercials saying that they are on the job, even today we identified many questions which have yet to be answered in a satisfactory fashion and we need to make sure that they are for the long-term wellbeing of the residents of the Gulf.

We thank you all for being here today and we hope to be able to stay in close contact with you. Thank you.

[Whereupon, at 3:05 p.m., the Subcommittee was adjourned.]

