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THE BP OIL SPILL: HUMAN EXPOSURE AND ENVIRONMENTAL FATE

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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THE BP OIL SPILL: HUMAN EXPOSURE AND ENVIRONMENTAL FATE

THURSDAY, JUNE 10, 2010

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

The subcommittee met, pursuant to call, at 2:54 p.m., in Room 2123, Rayburn House Office Building, Hon. Edward J. Markey [chairman of the subcommittee] presiding.

Present: Representatives Markey, Butterfield, Melancon, Matsui, McNerney, Dingell, Capps, Gonzalez, Ross, Matheson, Barrow, Waxman (ex officio), Upton, Stearns, Burgess, and Scalise.

Staff Present: Phil Barnett, Staff Director; Bruce Wolpe, Senior Advisor; Greg Dotson, Chief Counsel, Energy and Environment; Jackie Cohen, Counsel; Michal Freedhoff, Counsel; Melissa Cheatham, Professional Staff Member; Caitlin Haberman, Special Assistant; Peter Kethcham-Colwill, Special Assistant; Karen Lightfoot, Communications Director, Senior Policy Advisor; Elizabeth Letter, Special Assistant; Mitchell Smiley, Special Assistant; Aaron Cutler, Minority Counsel; Audrea Spring, Minority Professional Staff; and Garrett Golding, Minority Legislative Analyst.

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

Mr. MARKEY. Good afternoon.

We apologize to all of you who have been waiting. We just had nine roll calls on the floor of the House of Representatives. And it did lead to a delay in the Members' ability to arrive so that we could have this very important discussion.

It has been 52 days since the BP Deepwater Horizon drilling rig began spewing oil into the Gulf of Mexico, creating a manmade environmental catastrophe of a magnitude never before encountered in this country. A few weeks ago, I led a congressional delegation to the BP oil spill in the Gulf of Mexico. We flew over the disaster and witnessed the streams of oil that stretch as far as the eye can see and saw the billows of smoke from the burning oil rising hundreds of feet above the sea surface. This past weekend, I returned and saw the stain of BP's oil on the cane in the marshland.

Every day, as this oil encroaches on our wetlands and our estuaries, we all sense the doom facing the countless species that live both above and below the surface. Oil has made its way onto the beaches and marshes of four coastal States. Dispersants are being

used in unprecedented quantities and at depths never before attempted. Methane and other gases spew from the gaping wound BP has inflicted on the ocean floor, mixing with the oil and dispersants to create a toxic stew of chemicals.

Hundreds of animals, fish, birds, turtles, dolphins and other species have already been found dead. We have also heard reports that there may be clouds of subsurface oil that pose an insidious threat to deepsea coral and other marine life, oil that will not make its presence known by the clear signs of tar balls or oiled birds but which could nevertheless harm generations of aquatic life.

As these enormous toxic clouds drift through the ocean, naturally occurring bacteria that eat the oil and gas will also consume the oxygen needed by other marine plants and sea life. So in addition to slowly being poisoned by the toxic stew, marine plants and animals are therefore also being faced with death by asphyxiation. Large portions of the food chain of the Gulf region may be at risk of annihilation.

The impacts of this calamity do not end in the water or on the shores. The crude oil and burning operations have left the air in the regions closest to the incident thick with a mixture of chemicals that have been tied to acute health problems, such as headaches, dizziness, nausea and respiratory irritation. These chemicals have also been linked to the development of cancer and other chronic diseases.

In addition, there is increasing concern that seafood from the Gulf is being contaminated with petroleum products and other chemicals, putting human health in the direct line of fire and tugging at the Gulf region's already sensitive economy.

After 6 weeks of failed junk shots and top kills and endless television images of ineffective skimmers and booms, BP has finally admitted the truth: There was no viable response plan because BP did not invest the time or resources and, therefore, didn't have the tools. Its response plan included walruses and seals and sensitive biological species in the Gulf of Mexico, where they do not exist. It listed as its experts some who were long deceased and phone numbers for offices that did not exist. It claimed that there would be almost no impacts associated with a worst-case release of 10 times as much oil as we now face.

It is clear that we cannot trust BP to assess or address anything. Today we have before us experts who have been in the Gulf studying this bill and who can share with us the ecological and human health impacts that BP's oil will have. I look forward to hearing this important testimony, but first I would like to recognize my distinguished colleague, the ranking member, the gentleman from Michigan, Mr. Upton.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Thank you, Mr. Chairman.

There is no question, no question at all, that every one of us is outraged and heartbroken by the disastrous oil spill in the Gulf that left 11 dead and has spread an unknown quantity of oil into the sea. It is truly a very tragic event for our entire Nation.

As I have said many times, it needs to be made crystal clear to everyone involved that the polluter will pay, and the American taxpayers should not and will not be on the hook for the cost of this accident, both economic and environmental.

And as someone who grew up along the shore of Lake Michigan, I understand firsthand the economic and environmental importance of protecting our natural resources. As the oil continues to gush at an untold rate, I am looking forward to hearing the testimony today to learn more about the impact of the spill on human and environmental health and what the future may hold.

While it is imperative that we produce oil and natural gas domestically to lessen our dependence on foreign oil, we must do so in a responsible manner to ensure that we do not compromise the integrity of our natural resources.

Just as Lake Michigan provides the very foundation of our livelihood and economy in the Midwest, so does the Gulf of Mexico for the States that surround it.

Our health and the health of future generations depends upon our ability to wisely manage our ecosystems.

I yield back my time.

Mr. MARKEY. Great. The gentleman's time has expired.

The chair recognizes the gentleman from California, the chairman of the full Energy and Commerce Committee, Mr. Waxman.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

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

Thank you for recognizing me and for holding this hearing.

We are looking at this issue from so many different perspectives. Our committee has jurisdiction over energy and over oil and gas extraction.

But we cannot avert our eyes to what is happening right now in the Gulf of Mexico. The tragic consequences are on so many different levels. This oil spill by most estimates has now surpassed even the Exxon Valdez spill of 1989. To date, millions of gallons of oil have flowed into the Gulf of Mexico with no end in sight until the end of August.

It is too early to tell the full extent of the environmental and human health impact of this spill. That is why I am glad we are holding this hearing because we need to understand that: Nothing like this has ever happened before. A spill of this magnitude under these circumstances is unprecedented.

We can, however, anticipate some of the likely effects. And that is why it is so important we are having the hearing. And we are looking forward to the testimony of the witnesses.

It is too obvious the spill will have serious environmental consequences. We have seen the devastating pictures of coated shoreline, oiled wildlife. We are hearing about the possible plumes of oil under the surface of the ocean, threatening entire underwater ecosystems.

What we don't know is the long-term environmental impact of oil as it settles into the ocean floor, into the marsh ecosystems and as its chemicals move into the ocean food chain.

The health impacts of the spill could also be extremely serious. We know that crude oil contains many substances known to be toxic to people, including the chemicals known commonly as BTEX chemicals. These chemicals can cause short-term acute health effects, such as headaches, nausea. We have already heard reports from people that are suffering those consequences. We know that they also have been shown to cause cancer and other long-term neurologic and reproductive damage.

We are going to have consequences from this spill for decades. So it is important now that we start understanding the problem and preparing for those consequences. And I think that it is appropriate that we have three experts who can help us understand the likely impacts of the spill. I look forward to their testimony. I hope your work will prepare us for the inevitable impacts of this catastrophe. Thank you.

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

The chair recognizes the gentleman from Louisiana, Mr. Melancon, for an opening statement.

OPENING STATEMENT OF HON. CHARLIE MELANCON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. MELANCON. Thank you, Mr. Chairman.

Thank you for holding this hearing today and for starting the discussion on what impact this environmental catastrophe is having and will have on the residents of the Gulf Coast, including families I represent in the Third District of Louisiana.

I would like to thank all the witnesses for coming today, but I would like to give a special thanks to Dr. Trapido, from New Orleans, for participating today.

Thank you, Doctor.

I remain concerned about the physical and mental health of the workers, volunteers and the residents of Louisiana's Third District and, for that matter, of all of the State of Louisiana.

I believe no one knows for certain the long-term health effects that face the people of Louisiana and the Gulf Coast. And I worry about these people every day. We need to protect them at all costs and ensure that their health remains a top priority, even after the leak is stopped.

We have learned from Katrina that the end of the immediate disaster doesn't mean the end of the response. Respiratory problems linked to formaldehyde in trailers and mental health issues that still linger in our communities are constant reminders that the unanticipated impacts of a disaster may last for years or even decades to come.

In disaster response, the best way forward isn't always in black and white. So we should be erring on the side of caution and taking every opportunity to make certain that the health and safety of the Gulf Coast residents is a priority.

Thank you, Mr. Chairman. I yield back the balance of my time.

Mr. MARKEY. We thank the gentleman.

The chair recognizes the gentlelady from California, Ms. Matsui.

OPENING STATEMENT OF HON. DORIS O. MATSUI, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. MATSUI. Thank you, Mr. Chairman, for calling today's hearing.

I would like to also thank the witnesses for being with us today.

In the 6 weeks since the Deepwater Horizon rig explosion, an estimated 500 million to 1.1 million barrels of crude oil has poured into the Gulf of Mexico. Recent reports of the dozens, including residents in the coastal areas, cleanup workers and those providing relief aid, who have been hospitalized with health problems should raise concerns about the short- and long-term health effects associated with sustained exposure to the chemicals contained in crude oil which are known carcinogens to humans.

As we continue our ongoing efforts to stop this spill, hold those responsible accountable and ensure that the natural resources along the Gulf Coast are protected and restored, it will also be important to have a regional and national endeavor to assess the health impact.

It is still unclear as to how this environmental disaster will affect the deepsea ecosystem. But it is critical that we carefully review the previous assessments made by scientists about past oil spills to prepare our continuing response.

Beyond all of the undersea environmental consequences, the oil has already begun to seep into the coastal wetlands besieged by overdevelopment, pollution, and the lingering damage of Hurricane Katrina.

This catastrophe also underscores the need to look beyond oil production and consumption and invest in clean energy alternatives to help save our health as well as our environment.

Thank you, Mr. Chairman, for holding this hearing. I yield back the balance of my time.

Mr. MARKEY. We thank the gentlelady.

The chair recognizes the gentleman from California, Mr. McNerney.

Mr. MCNERNEY, Thank you, Mr. Chairman.

And I thank the witnesses for coming here today.

An absolute tragedy and disaster. We need to pray for the people that live in the affected areas and work for their betterment.

But now that the disaster is unfolding, we need to get some sort of quantitative idea of the results of the spill. So some of the questions I am going to be asking are, what is the habitat damage? How bad is it? How permanent is it? How many species are lost? What fraction of the species are lost? And should we expect long-term health consequences for humans that live in the area? And what are the quantifications of that? Should we accept settlements from BP, or should we hold off and try and get an assessment?

Those are the things I think we need to try to understand here today.

I yield back.

Mr. MARKEY. We thank the gentleman.

The chair recognizes the chairman emeritus of the full committee, the gentleman from Michigan, Mr. Dingell.

OPENING STATEMENT OF HON. JOHN D. DINGELL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. DINGELL. Thank you, Mr. Chairman.

You are most courteous, and I thank you for holding the hearing today. Your commitment on this issue is both evident and commended.

We are now on day 52 of the biggest oil spill in history. More than 2.19 million feet of containment boom, 2.46 million feet of solid boom have been deployed to try and contain the spill.

God alone knows how much oil has actually spilled, and nobody knows when it is going to stop. We do not know what all is going to come of this.

We suspect that more than 1.09 million gallons of dispersant have been deployed, although we do not know the environmental and health effects of that dispersant and how they might affect us or the future of the area.

We also know that there have been more than 125 controlled burns conducted, which have removed more than 3.2 million gallons of oil from the open water. But we don't know at what cost to the folks who are working on the cleanup.

We know, Mr. Chairman, that more than 32 percent of the waters of the Gulf of Mexico have been closed to fishing, which, in addition to oil and gas drilling, is the lifeblood of the Gulf region. We don't know how long these waters will be closed to fishing, but I suspect that it will be longer than any of us expect or any of us would like.

Frankly, we have to find out what has happened, and we cannot allow a spill like this to ever again happen. In order to ensure that, we must get to the bottom of what has happened.

It is equally important, however, that we know the consequences not only of the spill but what we have done to control it.

I look forward to hearing some insights on these matters from our witnesses. The information they can provide will be important as we look at the long-term effects and costs, health, environmental and monetary of this tragedy.

Thank you, Mr. Chairman.

Mr. MARKEY. We thank the chairman.

The chair recognizes the gentleman from Texas, Mr. Burgess.

Mr. BURGESS. Mr. Chairman, I will waive.

Mr. MARKEY. The chair recognizes the gentleman from Louisiana, Mr. Scalise.

OPENING STATEMENT OF HON. STEVE SCALISE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. SCALISE. Thank you, Mr. Chairman.

It is certainly important that we fully understand the potential health effects that could result from inhalation or other contact with oil, oil vapors, or chemicals. While I appreciate the topic of our hearing today, it is critically important that we continue to focus on the cause of this disaster and ways to stop the oil from inundating the coastlines of the Gulf.

Each week, when I return home to my constituents, I hear stories of anger and frustration with the lack of effort on the ground by both BP and this administration to stop the leak and contain the oil. The efforts are not working.

BP and the administration seem to be dragging their feet, allowing bureaucratic red tape to impede progress and ignoring ideas on ways we can fight the Gulf oil.

It took over 3 weeks for the administration to even approve the sand-berm plan that State engineers submitted as a method of protecting our valuable marshlands. These kind of delays are simply unacceptable.

There are many people around my State and the country who have submitted ideas to BP and the Federal Government with potential ideas on how to stop the leak and protect our fragile coastal ecosystems. You have heard ideas ranging from hay to supertankers to collect the oil and control the ever growing flow in the Gulf.

Unfortunately, these ideas have seemingly gone into a black hole and have not been implemented. There is more than enough oil in the Gulf of Mexico to test all of these ideas being submitted. And if a plan works, you do more of it. And if it doesn't work, you toss that one aside.

Frankly, I, along with the people of Louisiana, have had enough and are sick and tired of the excuses that we continue to be given by BP and the Obama Administration.

While the President likes to publicly claim that he has been in charge of the situation from day one, we continue to see examples of BP being put in charge of decisions on the ground that they have no business being responsible for.

BP should not be the gatekeeper on the ground when our local officials are looking to go get boom.

They shouldn't be the ones that determine which beaches are cleaned up.

The President has got to recognize his role under the law and start acting.

The claims process for small businesses that are losing their livelihoods is backlogged, and it has to be improved for our fishermen and the other industries that support and are affected by this spill.

BP needs to be focused on finding ways to stop the oil from coming out of the well, and the President must step up his efforts to take control of the situation when it comes to protecting our marshlands from the oil.

Also, we are beginning to hear more reports about arguments between rig workers over when to remove drilling mud from the drill pipe during the well-capping process. During a hearing of this committee on May 12th, I explicitly asked BP and Transocean whether there was a heated disagreement on board the rig just before the explosion regarding the process of displacement and removing mud. Both companies denied knowledge of these arguments, and yet we continue to hear report after report that there was a major disagreement about this process prior to the explosion. We need to get more answers for a lot of these questions, and hopefully, we will get some today.

Thank you, Mr. Chairman.

Mr. MARKEY. Thank you.

I thank the gentleman from Louisiana.

The chair recognizes the gentlelady from California, Mrs. Capps.

OPENING STATEMENT OF HON. LOIS CAPPS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mrs. CAPPS. Thank you, Mr. Chairman, for holding this increasingly important hearing.

Each day it is becoming increasingly evident that BP's oil spill in the Gulf of Mexico is not only an environmental and economic disaster but a human health crisis as well. Fishermen working on the cleanup have become ill after working long hours near waters fouled with oil and dispersant, reporting nausea, dizziness, headaches and chest pains. These local fishermen and shrimpers not formally trained in how to work with hazardous chemicals and must rely on BP for impromptu training and provision of necessary protective equipment.

However, an internal Department of Labor memo has described significant deficiencies in BP's handling of worker safety issues, warning that there has been a general systemic failure from BP to ensure the safety and health of the responders.

Last month, I wrote to BP with Health Subcommittee Chairman Pallone urging BP to take the necessary steps it was clearly not doing to ensure the health and safety of the workers and volunteers cleaning up their giant mess. Not surprisingly, BP never responded. But the reports of worker illness and lack of protective gear persist.

And shockingly, according to a recent report by McClatchy News Service, BP's own offshore air monitoring plan allows workers to remain in areas where harmful vapors are up to four times higher than accepted practice to prevent an explosion.

BP has made clear that they are incapable of making the protection of the public's health their priority. When it comes to public and worker health, there is no reason to believe that BP has the expertise, the resources, or the incentives to really address the issues involved.

That is why I have written the Obama Administration urging them to relieve BP of their role in the public health response; instead leverage the good work that the administration is already doing in public health protection across agencies in a coordinated way.

The fishermen and shrimpers working to clean up BP's mess must be protected now to ensure their health and safety long into the future.

As a public health nurse who lived through the 1969 spill in Santa Barbara, I know the damage wrought by an oil spill can continue to haunt the public's health long into the future. While I hope we hear more today about the acute health problems associated with exposure to oil and dispersants and the detergents used to clean it up, I hope we can also discuss some the long-term effects, health effects that can come from this exposure. We must move the public health consequences from BP's disaster out of the shadows and into the forefront of our conversations.

BP's oil spill has already caused enough economic and environmental damage to the Gulf Coast. We must now do all that we can to protect human health from any potential long-term effects.

I yield back.

Mr. MARKEY. The gentlelady's time has expired.

The chair recognizes the gentleman from Florida, Mr. Stearns.

OPENING STATEMENT OF HON. CLIFF STEARNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. STEARNS. Thank you, Mr. Chairman, and I thank Ranking Member Upton for calling, as many pointed out, a very crucial and important hearing on the environmental impact of the oil spill and the methods chosen by the administration to address it.

I think it goes without saying that the Deepwater Horizon discharge of oil is unprecedented in American history, and it has resulted, obviously, in devastating damage to the economic, environmental and social interests of every community in the Gulf Coast and the Nation as a whole. And we don't know the impact across this country yet.

My home State of Florida has the most densely populated coastline in the United States. This spill threatens the beaches on which people live and on which our hospitality and tourism depends and on which are commercial and recreation boating, fishing and diving industries also depend. Florida is home to 84 percent of the Nation's coral reef ecosystems that contribute over 7 billion in direct economic activity and 71,000 jobs to Florida's economy annually.

We must use all available resources and the brightest minds in this country to stop this spill and determine the impact it will have on the environment and the people who work and reside near the Gulf of Mexico.

So I, again, urge my colleagues to listen carefully to our witnesses, and I look forward to their testimony.

Mr. MARKEY. We thank the gentleman.

The chair recognizes the gentleman from Arkansas, Mr. Ross.

OPENING STATEMENT OF HON. MIKE ROSS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARKANSAS

Mr. ROSS. Thank you, Chairman Markey, for holding today's hearing to examine the health and environmental effects of this spill.

I first want to express my frustration, my disappointment that we are on day 52 of this environmental disaster and BP has still not developed a clear path forward to stop the leak or to clean up the oil that has been gushing into the Gulf of Mexico for almost 2 months now. That is why I believe this administration and our government must do more to hold BP accountable.

This preventible accident is a wake-up call for the oil and gas companies and the government agencies that regulate them. We must take this opportunity to not only examine our safety standards in deepwater drilling but to also examine how this spill is affecting our wildlife, ecosystems and the health of all those individuals affected by the spill, as well as its cleanup.

And we can never, never forget those who died in the explosion, nor the families they leave behind.

I also want to thank the experts who have come before this subcommittee today to testify about the health effects this disaster is causing, and I look forward to discussing ways that we can mitigate these harmful effects.

After weeks of oil still pouring into the Gulf, it is clear that the procedures were not in place or did not work effectively to prevent this disaster. And it is clear BP was not prepared to respond to such an event.

Additionally, I am hopeful we can find the best possible solutions to guarantee that the health and environmental effects caused by the spill are properly addressed. Our natural resources, including our beaches, wetlands and wildlife, are what set the States affected by this spill apart from the rest of the country. I am hopeful that this tragic event and this hearing can be a learning experience to ensure that these important habitats and wildlife are preserved, restored, and protected for generations to come.

I yield back, Mr. Chairman.

Mr. MARKEY. We thank the gentleman.

The chair recognizes the gentleman from Georgia, Mr. Barrow.

Mr. BARROW. Thank you, Mr. Chair. I will waive an opening.

Mr. MARKEY. The chair does not see any other members seeking recognition to make an opening statement.

STATEMENTS OF CHRIS REDDY, PH.D., ASSOCIATE SCIENTIST, DEPARTMENT OF MARINE AND GEOCHEMISTRY, WOODS HOLE OCEANOGRAPHIC INSTITUTION; EDWARD J. TRAPIDO, SC.D., FACE, ASSOCIATE DEAN FOR RESEARCH, PROFESSOR AND WENDELL GAUTHIER CHAIR OF CANCER EPIDEMIOLOGY, LSU HEALTH SCIENCES CENTER, NEW ORLEANS, SCHOOL OF PUBLIC HEALTH; AND GINA SOLOMON, MD, MPH, EPA SCIENCE ADVISORY BOARD, SENIOR SCIENTIST, NATIONAL RESOURCES DEFENSE COUNCIL, ASSOCIATE CLINICAL PROFESSOR OF MEDICINE AT THE UNIVERSITY OF CALIFORNIA AT SAN FRANCISCO, ASSOCIATE DIRECTOR OF THE UCSF PEDIATRIC ENVIRONMENTAL HEALTH SPECIALTY UNIT

Mr. MARKEY. We will turn to our very distinguished panel.

Our first witness, Chris Reddy, is a marine chemist, and he is director of the Coastal Ocean Institute at the Woods Hole Oceanographic Institution. Dr. Reddy studies the impact of oil spills and other contaminants on marine ecosystems, with a focus on how contaminants disperse and decay over time.

We welcome you, Dr. Reddy.

Whenever you are ready, please begin.

STATEMENT OF CHRIS REDDY, Ph.D.

Mr. REDDY. Good afternoon, Chairman Markey, Ranking Member Upton and other members of the subcommittee.

I thank you for the opportunity to speak to you about the British Petroleum spill. As you had said, I study oil spills. I am particularly interested in how nature responds to these uninvited guests. And I am currently or have studied oil spills that occurred in 1969, 1974, 1996, several in 2007, natural oil seeps off the coast of Santa Barbara and now currently the British Petroleum spill. And next

week, I will be leaving for a 12-day cruise funded by the National Science Foundation to investigate any oil that exists on the subsurface.

Today I am going to speak briefly about dispersants and what has occurred in this spill in the last 52 days. When responders act on an oil spill, their ultimate goal is to reduce damages. And there are many ways that they have in their toolbox, anywhere from mechanically removing the oil to in situ burning or using dispersants. Dispersants are one of these toolboxes. They are often used after, when mechanical opportunities are not available, dispersants can be used when the weather is not as favorable than when there is mechanical activities—mechanical approaches are not available.

Simply, dispersants are used to break up large pieces of oil into smaller droplets. The theory is that these large amounts of oil can affect the coastal areas and also wildlife that would be impacted with the surface. Breaking up produces small droplets of oil that get pushed below the sea surface, just a little bit below the sea surface. So it is not a removal of the oil per se, but more of a removing from one compartment to the other. From sitting on the surface of the oil, this is traditionally to putting small droplets below the surface. And ideally, those small droplets can get diluted and then broken down naturally under a term collectively we call weathering.

Dispersants can carry their own risks, and there are significant tradeoffs in using them. If they are not used properly or effectively, then we are actually adding more chemicals to a problem that already exists in terms of an oil spill.

In actuality, if they do work effectively, they also carry their own risks because we are adding chemicals below the sea surface—in this case, traditionally, when we add them right on top of the sea surface, we are exposing organisms to oil that live beneath the surface. So there is a large tradeoff.

We have to consider, when they use these dispersants, do they want to reduce the damages that may happen because oil is sitting on the surface? Or do we want to—when we traditionally use them, or do we want to potentially expose with these small little droplets that you make anything that is living right below the sea surface?

They have been used in the Gulf of Mexico multiple times. They have been considered a success. Right now there are two dispersants being used, Corexit 9500 and 9527. As of yesterday, there have been about a million gallons used. About 800,000 have been sprayed from the surface. About 330,000 have been injected at the wellhead.

While the amount of oil still continues to be difficult to constrain, we are looking at about 2 percent—I have picked 50 million gallons that have spilled. If that is the case, then 2 percent of the dispersants have been added to the total amount of oil that has spilled.

When you consider that the United States has not had an oil spill greater than 1 million gallons in the last 20 years, then the release of 1 million gallons of dispersants makes this an unprecedented response to an oil spill. So we have an unprecedented oil spill, and we also have an unprecedented use of dispersants.

To communicate a little bit more about dispersants, I would like to comment on the executive summary of a recent report that was

released, entitled "Deepwater Horizon Dispersant Use Meeting Report." This was held a couple of weeks ago at Louisiana State University. There were approximately 50 scientists from academia, the Federal Government, industry, other countries as well. And collectively, they made a series of conclusions.

I think the most important one to read today is their statement here, which is, "It is the consensus of this group that up to this point, use of dispersants and the effects of dispersing oil into the water column has generally been less environmentally harmful than allowing the oil to migrate on the surface into the sensitive wetlands and near shore coastal habitats."

After reviewing this report and other studies on dispersants, I tend to agree with this finding. I am considerably more comfortable about using dispersants on the surface of the ocean, where we have added about 700,000 gallons.

I am going to reserve my judgment about the success and efficacy and potential damages of the 300,000 gallons that have been injected at the wellhead at the subsurface. This has never been done before, and I am waiting to see data that exists, water samples that would have been collected before and after the usage of these dispersants, before we can fully appreciate whether or not dispersants used on the subsurface have been effective or actually caused negative damages.

It is noteworthy that there was a review about dispersant usage—or a book on dispersants by the National Research Council in 2005, and there was no discussion about deepwater usage of dispersants.

In summary, the response and release of dispersants, though I suppose unprecedented, experts have recently concluded that the usage of them has been worthwhile. And my most important end point is that it is important that we continue to study this oil spill right now. This oil spill is a crime scene. We need to collect as much data as possible. Not only to be able to understand the impacts of this oil spill right now, but also use it as a scientific tool to study future spills. I thank you for allowing me to speak today.

[The prepared statement of Mr. Reddy follows:]

WRITTEN TESTIMONY OF
CHRISTOPHER M. REDDY, Ph.D.
WOODS HOLE OCEANOGRAPHIC INSTITUTION*

HEARING ON

"The BP Oil Spill: Human Exposure and Environmental Fate"

SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT
COMMITTEE ON ENERGY AND COMMERCE
2123 RAYBURN HOUSE OFFICE BUILDING.

JUNE 10th, 2010; 2pm EST

Introduction

Good afternoon Chairman Markey, Ranking Member Upton, and members of the Subcommittee. Thank you for the opportunity to speak today about the British Petroleum (BP) Oil Spill. My name is Christopher Reddy, and I am a scientist at the Woods Hole Oceanographic Institution in Woods Hole, MA, principally investigating marine pollution. I have published >85 peer-reviewed scientific journal articles and several book chapters on this and related subjects. I have studied or am currently studying the aftermaths of oil spills that occurred in 1969, 1974, 1996, 2003, 2007, and 2007 as well as natural oil seeps off the coast of Santa Barbara, CA and more recently the BP spill. I am leaving for a 12-day research cruise on June 17, 2010 to quantify and characterize oil below the sea surface in the Gulf of Mexico.

For today's hearing, I will provide a brief overview on the environmental chemistry of oil spills and then some comments on dispersants used by BP.

Petroleum composition and environmental chemistry

Petroleum or crude oil is a complex mixture of compounds formed from organic debris acted on by geologic processes over millions of years[1]. Refineries convert crude oil into different products, such as gasoline, jet fuel, diesel fuel, etc.

The thousands of molecules that compose a crude oil or a refined product can have widely different properties, which dictate their fate in the environment. Each compound has it own tendency or likelihood to evaporate, dissolve in water, be eaten by microbes, or degraded by sunlight. These processes, collectively called weathering, can act on oil immediately, changing its composition dramatically. For example, I collected and analyzed oiled grasses approximately 50 miles away from the Gulf spill zone several weeks ago and found that evaporation and/or dissolution had already acted on the oil.

* The views expressed here are my own.

All oil spills are different, and comparisons from one to another should be done carefully[2]. Just as a particular compound can be weathered differently, so can it have its own toxic effects, at its own schedule of toxicity. Recovery from oil spills in the environment can also vary temporally, spatially, and at the individual- and community-wide level.

For example, I have studied two diesel fuel spills that occurred in 1969[3] and 1996[4] in Southern New England. Both spills resulted in devastating short-term impacts. For example, the 1996 spill led to the deaths of 10 million lobsters, two thousand birds, and 20 million surf clams and the closure of 200 square miles of shell fishing beds for as long as five months. Today, however, there are no detectable remnants of oil in or near the oiled region from this 1996 spill. Surprisingly, the effects of the 1969 spill persist, as crabs, grasses, and mussels are significantly impaired by trace amounts of weathered diesel at this site.

Our best knowledge about oil spills is from the National Research Council's *Oil in the Sea III*[2].This book and its predecessors have represented the state of our knowledge about oil's inputs and fates as well as effects on the ocean. Another book published by the National Research Council entitled, *Oil Spill Dispersents: Efficacy and Effects*[4] is an excellent resource on dispersants.

Comments on dispersents used by BP

When responding to an oil spill, the main goal is to reduce damages. Numerous tools, such as dispersants and skimming, can be used.

Dispersants are deployed to "break-up" large pieces of oil into small droplets. Traditionally, the goal of dispersants has been to move oil from the surface of the ocean to below the surface. This approach attempts to reduce oil exposure or contamination from surface oil that could affect wildlife or coastal areas. Ideally, the dispersed oil droplets under the sea surface are then diluted and eventually weathered.

However, dispersants can carry their own risks. If not deployed in a proper, effective, and accurate manner, adding more chemicals to an oil spill may increase damages in the area. If they do work, the dispersants can increase the oil concentrations below the sea surface, exposing undersea wildlife to greater risk.

Hence, there are significant trade-offs to using dispersants. Historically in the Gulf of Mexico region, they have been used numerous times and considered a success. Quantifying the extent of success relative to not using them is challenging. Oil spill responders are not always afforded the luxury of a true control situation, where they could compare the effects of the two scenarios, as one might have in the calmer setting of a laboratory.

I believe two dispersants, Corexit 9500 and 9527, have been used in the Gulf. As of June 8, 2010, 790,000 gallons have been used on the surface and 331,000 gallons have been injected below the surface since the spill occurred. While the amount of oil released has

not been fully constrained, if an estimated 50 million gallons has leaked, then dispersants are only 2% of the volume compared to the oil released.

However, considering that the United States has not had an oil spill greater than one million gallons in almost 20 years, one million gallons of dispersant is nevertheless a sizeable amount—perhaps qualifying this as an unprecedented response to an oil spill.

To communicate my views on dispersants, I would like to comment on the executive summary of the recently released "*Deepwater Horizon Dispersant Use Meeting Report*," which was the result of a two-day meeting on May 26 and 27, 2010 of over 50 experts from academia, the Federal government, Environment Canada, industry, and non-governmental organizations[5]. Among their conclusions were:

> *"It is the consensus of this group that up to this point, use of dispersants and the effects of dispersing oil into the water column has generally been less environmentally harmful than allowing the oil to migrate on the surface into the sensitive wetlands and near shore coastal habitats".*

After reviewing this report, I tend to agree with this finding. I am considerably more comfortable about the usage of dispersants on the surface, where 700,000 gallons have been used and it is easier to monitor. I reserve a more confident judgment on the efficacy and potential damages of using the dispersants in the subsurface until more data becomes available. Due to the novelty of injecting dispersants in the subsurface, it may be necessary to use laboratory and computer-based models to grasp fully this aspect of the oil spill response. It is noteworthy that the usage of dispersants in deepwater was not discussed, nor research recommended, in the executive summary of *Oil Spill Dispersents: Efficacy and Effects (2005)*[3]. The recent availability of the formulations of Corexit 9500 and 9527 will be useful in designing methods to analyze for these components in samples as well as testing and evaluating biological effects.

After the *Deepwater Horizon Dispersant Use Meeting Report* was released, the chief technology officer of Nalco, which manufactures the Corexit dispersants, stated:

> *"The use of COREXIT dispersants to break up the oil in the Gulf of Mexico has been widely acknowledged by government officials as a safe, effective and proven response. Its ingredients rapidly biodegrade, do not bio-accumulate and are commonly found in popular household products".*

This statement is true but carries some caveats: The safety of Corexit dispersants depends on how, where, and in what amounts it is used; biodegradation of these products may occur but not necessarily rapidly; some ingredients may be found in household products, but they are in considerably smaller concentrations. Regarding bioaccumulation, I picked one of the major compounds (30 to 60%) in Corexit 9527, butoxyethanol, and compared its bioaccumulation factor to that of the pesticide DDT. While there are other variables

that must be considered when estimating bioaccumulation, DDT is about 40,000 times more likely to bioaccumulate in an organism that butuxyethanol[6].

In summary, the response and release of dispersants in the BP oil spill is unprecedented. Experts have recently concluded that the usage of them has been worthwhile. However, detailed studies from samples collected near and around areas that have been have been sprayed or injected with dispersants should be considered in the full context of all available data. Environmental monitoring should continue for months and years to understand the fate of the spilled oil.

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

Our next witness is Edward Trapido. He is associate dean for research and Wendell Gauthier Chair for Cancer Epidemiology at the Louisiana State University School of Public Health. He is responsible for coordinating the entire research effort of the Louisiana State University Health Sciences Center related to the Deepwater Horizon Gulf oil spill.

Dr. Trapido's research focuses on cancer incidence and prevention in humans.

We welcome you, Doctor. Whenever you are ready, please begin.

STATEMENT OF EDWARD J. TRAPIDO, SC.D., FACE

Mr. TRAPIDO. Thank you, Chairman Markey, Ranking Member Upton, and distinguished Congressmen and women.

Let me begin by saying that I am a cancer epidemiologist working in public health, by training and by experience. I am also a resident of Orleans Parish, and I live three blocks away from the Mississippi River. So this has direct bearing on my life as well as the lives of countless other people in Louisiana and in the other Gulf Coast States for the moment.

Prior studies of the effects of oil spills have been cross-sectional in nature. What I mean by that is they, at one point in time, classified people as to their disease and as to their exposures. There haven't been follow-up studies. There haven't been what we call cohort studies which have followed people who have been exposed to the oil spill over a period of years.

You might say, well, why is that important? As a cancer epidemiologist, I can tell you that cancer is a disease of long latency, meaning it takes up to 20 or 30 years for cancers to be clinically detectible after exposures have occurred. It doesn't always take this long. Sometimes it is quicker. If people already have some pre-existing condition that they may have inherited or are smokers or have been exposed occupationally before, then this might be the key that drives them to a much quicker diagnosis.

Looking at this as a potential public health crisis, there are reasons to be concerned. The oil contains benzene, benzopyrene, arsenic compounds, polycyclic aromatic hydrocarbons. And all of these are classified as Class I carcinogens by the International Agency for Research on Cancer, which is part of the United Nations.

In addition to that, these chemicals can enter the food chain, and we don't know the long-term consequences of that in terms of cancer because, as I say, long-term studies have not been done.

It also clearly increases stress, and you have to realize that we have got parishes in southeast Louisiana that, in the last 5 years, have already had three hurricanes, and now they are having to be exposed to this and are losing their livelihoods. So the amount of stress is incredible, and the likelihood that will result in the some short- and long-term effect is unquestionable.

There are genotoxic and endocrine effects associated with these chemicals. And we know from the literature that these chemicals can result in acute myeloid leukemia, multiple myeloma, lung cancer, and chronic lymphocytic leukemia.

So it is not just the population—it is not just the people who have been on the oil rigs. It is not just the first responders. It is not just the health workers and the people involved in cleanup. It is the communities.

It is the communities that are around the parishes and so what we have—and within the communities, we have got pregnant women. We have got young children. There are some very vulnerable groups, especially vulnerable groups, that have to be studied and have to be followed for years.

We need to have unexposed people, and there certainly are. I don't want to say there will be cancer in 20 years. That is why we need to study this. We suspect, we have reasons to be concerned. But we don't know for sure that there will be excess cancers, but there is enough to make us feel that it is worth studying.

What we need is fast access. We have all said in one way or another, this is day 52, and yet we haven't been able to go in, interview people, get biological samples, get specimens from the oil, from the dispersants, from the water, from the air. And time is of great importance in terms of measuring exposure.

We need to get in. We need to be able to collect this information and to begin to follow up people. We have, for cancer at least, a robust way of capturing all cancers that occur in the United States and in Louisiana. It is because there is a tumor registry funded by the National Cancer Institute. In other States, it is either CDC or NCI that fund these.

However, we don't have a robust surveillance system for other conditions that may result over the course of time from the oil spill, and we desperately need to have that in place.

And then let me just add one more point. We are now in hurricane season. We think we know where the oil spill will go in the absence of a hurricane. We know the Gulf Coast always ends up getting a tropical storm or hurricane, some of them severe. So everything I have said remains the same, except we really don't know yet what the target population will be.

We need buy-in from the community. We need to have confidentiality issues addressed because people may be afraid to talk, that it will interfere with their careers, that it will interfere with their ability to get economic benefits or health benefits or their legal rights. And we need to not pull these resources from helping the communities and from other important research.

So, just by way of summary, I want to say that there is a potential public health crisis awaiting us. We see the acute effects. We need to be measuring the long-term effects. Now is the time to get in and have access. Thank you very much.

[The prepared statement of Mr. Trapido follows:]

Qualifications of Edward Trapido, ScD, FACE

Edward J Trapido, ScD, FACE, is Associate Dean for Research at the Louisiana State University School of Public Health, Professor and Wendell Gauthier Chair for Cancer Epidemiology at the LSUHSC School of Public Health, and the Deputy Director for Population Science at the Stanley S. Scott Cancer Center at the LSUHSC School of Medicine. He is also Senior Advisor to the Dean of the LSU School of Medicine, for Interprogram Research, which includes coordinating the entire research effort of the LSU Health Sciences Center related to the Deepwater Horizon Gulf Oil Spill. Dr. Trapido is also leading the evaluation of the International Atomic Energy Agency's Program of Action in Cancer Therapy. Prior to joining the faculty of LSUHSC, he was Professor and Acting Division Director for the Department of Epidemiology and Public Health at the University Of Miami Miller School Of Medicine. His leadership experience includes appointments at the NCI as Deputy Director for International Cancer Control in the Office of International Affairs and as Associate Director of the Epidemiology and Genetics Research Program within the Division of Cancer Control and Population Sciences. In addition, he has co-chaired of the Trans-NIH Tobacco and Nicotine Research Interest Group and served as Senior Advisor to the Director of the International Agency for Research, in Lyon, France. He led the Southeast Regional Cancer Information Service and Florida Cancer Data System for many years.

His degrees include a master of science in public health in parasitology from the University of North Carolina, and both a master and doctor of science in epidemiology from Harvard University.

He directs the Louisiana Cancer Research Consortium (LCRC) Population Sciences research program, a joint initiative involving the Stanley S. Scott Cancer Center, the Tulane Cancer Center, Xavier University, and the Ochsner Health System.

Testimony

I have been asked to provide a risk assessment of the BP oil spill from the perspective of a cancer epidemiologist, which I am by training and experience.

Unfortunately, there are essentially no long term epidemiologic studies of persons who have been exposed to oil spills, their clean up, the communities nearby, health care workers, or families of workers. Similarly, population research on the development of cancer when the oil, its breakdown products and dispersants enter the food chain has not been done. So, while there is much talk about this being an unprecedented event, in terms of long term epidemiologic studies providing answers as to what will happen to the long term health of exposed individuals, it is unprecedented. We cannot look to the past and know exactly what to expect.

However, there can be no argument that there are cancer producing chemicals contained within the crude oil that has leaked into the Gulf of Mexico. The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans. Substances found in crude oil, including benzene, benzo (a) pyrene, and arsenic are class 1 carcinogens, meaning they cause cancer in humans. Other chemicals in the oil and dispersants may be carcinogenic as well. These chemicals have been linked with acute myeloid leukemia (AML) chronic lymphocytic leukemia (CLL), multiple myeloma, and lung cancer. In addition, the oil spill and its sequela have considerably raised stress levels among people in the community and the workers. Emerging epidemiologic evidence demonstrates an association between human stress, environment and adverse health effects, such as cancer

We could speculate with some certainty where the oil will go, were it not Hurricane season. Planning for that possibility is an entirely separate and equally important issue, but that is not the topic I was asked to present information on. So, while my approach is largely based on the hope that the Gulf will be spared a hurricane or tropical storm, the cancer issues remain the same, but the potential for the community exposure to oil and associated chemicals increases substantially.

There are other reasons to be concerned- and these are more related to mechanism by which exposure to heavy oil could result in an increased cancer risk. Although I am not a cancer biologist or an environmental epidemiologist, there is literature to suggest that heavy oil is associated with immunosupression, increased chance of DNA damage, and contaminants may have estrogenic affects.

Because cancer is a disease of long latency, which can take up to twenty or more years to develop, I do not expect to see cancers arising from exposure to chemicals in the oil or dispersant to be evident right away, on the whole. On the other hand, exposures to the chemicals in the oil may hasten the development of cancer in persons who already might be at higher risk, due to past environmental and personal exposures, or inherited genetic characteristics associated with activating carcinogens or detoxifying carcinogens. Not every cancer arising in these populations will be due to exposure to the oil spill, however we know what to expect in terms of cancer occurrence based on existing data from the Louisiana Tumor Registry. Our task is to provide evidence of excess cancers that develop, which are highly likely to be associated with exposure. This is where public health experts predominately environmental health scientists and epidemiologists and prospective population studies come in.

There are many issues that arise and challenges to designing and performing optimal epidemiologic studies in this environment. Particularly, we must have meaningful community involvement, so that their concerns about cancer and other chronic diseases- physical, emotional and behavioral can be addressed.

Populations: We need to conduct a study of oil rig and response workers who were exposed to the oil and dispersant and unexposed workers. In addition, other clean up workers on ships, and on the shore must be included. Other first responders, including health care workers, need to be included. Finally, samples of individuals from the surrounding parishes need to be identified, with special attention to those involved in maritime/marine activities, and their families. Clearly, these need to be recruited in a manner that guarantees the confidentiality of individual, and doesn't jeopardize their future careers, medical care, or legal rights.

Exposure: From my experience as the NCI representative to the World Trade Center follow-up of workers, it is difficult and costly to accurately measure and estimate exposure. However, with the addition of biomonitoring, genotoxicity studies, exposomics, risk assessment, we are better able to determine exposures and their effects, than were studies before. Exposure is time dependent, and we need to identify and enroll the workers, their families, and the communities now, and to collect basic epidemiologic, occupational, and baseline health data, as well as biological samples from participants. These would ideally be blood, a buccal smear, and a urine specimen.

Oil and Chemicals. We need to get samples of the fresh and old oil- from various places, with and without dispersant, crude, light, and weathered, as well as what has been collected in the booms. These need to be collected on a periodic basis.

Follow-Up and Outcomes. We will need to follow persons, exposed and unexposed, at least annually, so that we have a scientifically appropriate comparison group. This will, of necessity, be a long term study- perhaps extending 20 to 30 years from now. Such long term studies are not uncommon in other venues, and have greatly contributed to what we know about the causes of chronic diseases.

We need to simultaneously coordinate our work with hospitals, doctors, and clinics in the area, to set up a system to monitor outcomes, and collect follow-up information and biologic samples. Ultimately, cancers among Louisiana residents will be reported to the Louisiana Tumor Registry, an NCI supported SEER registry housed at the LSU School of Public Health. Coordination with other cancer registries will be required for residents residing n other gulf coast states. However, registries for other chronic diseases (e.g. respiratory) do not yet exist so a robust infrastructure to enable comprehensive follow up is essential.

Conclusion. There are many other issues related to design and analysis of a comprehensive epidemiologic study, but unfortunately there is not sufficient time to present them. However, to end my presentation, I would like to say that there is a genuine reason to have concern about cancer and other diseases of long latency arising from this unfortunate occurrence. In order to address the concern, we need to conduct appropriate population based research. We have the tools and expertise to

perform such studies, and I feel strongly that all parties must act with expedience, thoughtfulness, and commitment to the populations of the SE United States, and not pull these resources from other important research, economic support, clinical care and support.

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

Our final witness is Dr. Gina Solomon, who is a senior scientist in the health and environmental program of the National Resources Defense Council and is a specialist in adult internal medicine, preventive medicine and occupational and environmental medicine. She also serves as an associate clinical professor of medicine at the University of California at San Francisco, where she is the director of Occupational and Environmental Medicine Residency Program and associate director of Pediatric Environmental Health Specialty Unit.

We welcome you, Dr. Solomon.

STATEMENT OF GINA SOLOMON, MD, MPH

Dr. SOLOMON. Thank you, Mr. Chairman, and members of the subcommittee. I am very happy to be here to talk about this very important topic today.

And I am very happy to see that this subcommittee is recognizing that the BP Gulf oil disaster is not just a problem for wildlife and ecosystems but also very much a problem for human health. I have been down in the Gulf Coast over the past few weeks talking with fishermen, workers, community residents, all along the coast of Louisiana.

And I have been reviewing available data from BP, EPA and other agencies, and I am quite concerned about both immediate short-term and also longer-term health issues in this area.

The three main health concerns that I have identified are air quality, direct skin contact and toxicity from the oil, and the concerns about seafood contamination.

On the air quality issue, according to the National Academy of Sciences, an estimated 40 to 70 percent of the oil that bubbles to the surface evaporates, and the evaporated oil creates a vapor that blows with the wind. Depending on the temperature and wind direction, it can blow into areas where people are working or onto the coastline and affect local residents. The vapor phase contains volatile organic compounds, chemicals such as benzene and toluene, which are of significant health concerns. Benzene is known to cause cancer in humans. Toluene is a neurotoxic chemical.

It also contains semi-volatile organic compounds, such as naphthalene, which is classified by the National Toxicology Program as reasonably anticipated to cause cancer in humans. It also contains a hydrogen sulfite gas, which comes off of the oil, which is neurotoxic and also a powerful respiratory irritant.

And other issues are happening as part of the cleanup. Oil is being burned off, which creates particulate matter, which is both toxic to the cardiac and respiratory systems and contributes to premature death. And dispersant chemicals, as we all know, are being applied in unprecedented amounts. And these chemicals are insufficiently studied but have been linked to nose and eye irritation and headaches and vomiting.

The greatest risks are to the workers that are out there, closest to the oil and the dispersants. These workers have not been provided with respirators, and that is a significant health concern to many people.

BP has released finally some air-monitoring data. The air-monitoring data, in my opinion, are of insufficient but also somewhat disconcerting because there are elevated levels as documented by BP of both benzene and 2-butoxyethanol, which is one of the dispersant chemicals, over the level that the National Institute of Occupational Safety and Health considers to be safe. The NIOSH level is set for an 8-hour work day. Of course, as we all know, these guys who are doing the clean up out there are really 24 hours a day.

In addition, EPA has actually been doing an admirable job of monitoring air quality along the shoreline. That has actually helped to reassure myself and some of the community residents that the air quality is actually not as bad as feared in many of the shoreline areas. But there are still some disconcerting increases, short-term elevations in air quality concentrations that could certainly explain many of the odor complaints and even many of the health complaints that we are hearing from community residents.

The other thing I am concerned about is skin contact because we have photographs of workers doing clean up on the beaches without gloves or adequate protective suits. We have photographs of children swimming in oil contaminated areas and people touching tar balls with their bare hands. These chemicals can cause dermatitis, folliculitis and have been linked to skin cancer over the long term. So there needs to be more public awareness and outreach about those issues.

On the seafood safety issue, just briefly, nearly 20 percent of the Gulf is now already closed to fishing. Plumes are still spreading. And there is a near-term need for a clearer process for making sure that the nutritious fish, shellfish and shrimp are available in the U.S., but that that food supply is protected. And there needs to be a clearly laid out process for the public about who is in charge there and to make sure that oil-tainted seafood doesn't get onto the market.

But in the longer term, there are going to be issues about setting criteria for reopening areas or new closures. Those need to be clearly set, and the metals and some of the PAHs in the oil have not even begun to bioaccumulate yet. They will become a much bigger problem in the future.

I want to thank you very much for allowing me to speak here today.

[The prepared statement of Dr. Solomon follows:]

TESTIMONY OF

GINA M. SOLOMON, M.D., M.P.H.

SENIOR SCIENTIST, NATURAL RESOURCES DEFENSE COUNCIL
ASSOCIATE CLINICAL PROFESSOR, U.C. SAN FRANCISCO
DIRECTOR, UCSF OCCUPATIONAL & ENVIRONMENTAL MEDICINE RESIDENCY PROGRAM
ASSOCIATE DIRECTOR, UCSF PEDIATRIC ENVIRONMENTAL HEALTH SPECIALTY UNIT

BEFORE THE U.S. CONGRESS
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT

AT HEARING ENTITLED:

THE BP OIL SPILL: HUMAN EXPOSURE AND ENVIRONMENTAL FATE

JUNE 10, 2010

Health Effects of Oil Spills: Air Quality

Oil spills destroy ecosystems and kill wildlife, but people's health is directly affected too. As the disaster in the Gulf Coast continues to unfold, the local communities and workers must be protected.

Oil is semi-volatile, which means that it can evaporate into the air and create a vapor that under some weather conditions stays near the surface - in the human breathing zone. A report from the National Academy of Sciences (NAS) estimated that: "Within a few days following a spill, light crude oils can lose up to 75 percent of their initial volume and medium crudes up to 40 percent."[1] Figure 1, adapted from the NAS report, shows the evaporation rates of various petroleum products, including crude oil. The evaporation process may spare the ocean slightly, but it poses a host of hazards to anyone who breathes the air.

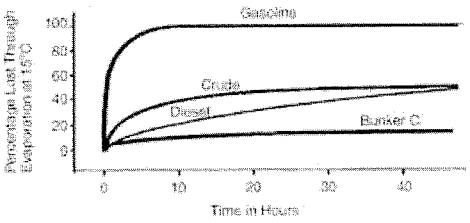


FIGURE 1: Evaporation rates of different types of oil at 15ºC (adapted from Fingas, 2000).

Even some of the oil that does not evaporate can end up in the air. When winds whip up oily sea water, the spray contains tiny droplets - basically an aerosol, which is small enough to be inhaled deep into the lungs. We know that evaporation, and maybe also aerosol formation, is happening in the Gulf Coast, because people are reporting a heavy oily smell in the air. If the oil is burned, it generates particulate matter (PM) which is an additional respiratory hazard.

Crude oil contains a mixture of chemicals. The main ingredients are various hydrocarbons, some of which can cause cancer (eg. the PAHs or polycyclic aromatic hydrocarbons); other hydrocarbons can cause skin and airway irritation. There are also volatile hydrocarbons called VOCs (volatile organic compounds) which can cause acute health symptoms as well as cancer and neurologic and reproductive harm. Specific VOCs that cause health concern include benzene, toluene, ethylbenzene, and xylene (BTEX). Oil also can release hydrogen sulfide gas, and it contains traces of heavy metals such as mercury, arsenic, and lead.

Inhalation hazards are mostly from the VOCs, hydrogen sulfide gas, and some of the semi-volatile PAHs. The heavier PAHs and the metals do not get into the air, and are mostly a human health hazard because of long-term contamination of fish and shellfish.

Health Effects of Oil Vapor Inhalation

"I live on the Northshore of New Orleans, less than a mile from Lake Ponchartrain. Many of us have noticed a smell in the area and a very slight filminess in the air or on skin at times. I have been suffering from headaches for the past few weeks and have had several people tell me the same or that they have a scratchiness to their throats or eyes burning. I walked my dog the other day of the lakefront and came home with a pounding headache. Could the oil or dispersants be affecting us here?" Maria, May 19, 2010.[2]

There have been numerous reports from clean-up workers and from people in the coastal communities of nausea, headaches, dizziness, cough and difficulty breathing. These types of symptoms are what might be expected from the oil vapors. The CDC warns:

> *Inhalation of fresh crude oil could result in inhalation of associated volatile hydrocarbons. Symptoms including headache, dizziness, confusion, nausea, or vomiting, may occur from breathing vapors given off by crude oil.*[3]

EPA lists the health symptoms that are generally associated with VOCs as:

> *Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, dizziness.*[4]

CDC also put out a consumer fact sheet which says the following about the "smells" along the Gulf coast:

> *People may be able to smell the oil spill from the shore. The smell is similar to what you can smell at a gas station. It comes from "Volatile Organic Compounds" (VOCs) in the oil. You can smell these VOCs at levels well below those that would make you sick (sic). VOCs are also in the gas you burn in your car every day and can include benzene, toluene, ethylbenzene, xylene and naphthalene.*
>
> *Exposure to low levels of VOCs may cause irritation of the eyes, nose, throat, and skin. It is possible that people with asthma may be more sensitive to the effects of inhaled VOCs.*
>
> *The VOC smell may give you a headache or upset stomach, so you should stay indoors to limit your exposure, close windows and doors, and set your air conditioner to a recirculation mode. The smell may become stronger if the wind or weather change.*[5]

I do want to add a comment about CDC's claim that people can smell VOCs at levels "well below those that would make you sick". Table 1 lists the odor thresholds and the toxicity levels for some of the major chemicals in crude oil vapors. It's clear that some of the chemicals in oil vapors are hazardous to human health at levels below those that trigger odor complaints. In fact, benzene is hazardous to health at levels more than 1000-fold below the odor threshold. This is an important fact, since it is not appropriate to assure people that what they are smelling is not hazardous.

Chemical	Odor Threshold (average, ppm)	NIOSH REL 8hr (ppm)	ATSDR MRL (ppm)
Benzene	97	0.1	0.009
Toluene	7.6	100	1
Ethylbenzene	0.6	100	10
Xylene	0.73 - 5.4	100	2
Naphthalene	0.038	10	0.0007 (Chronic)
Hydrogen sulfide	0.02	N/A	0.07
2-butoxyethanol	0.1	5	6

ppm = Parts per million
NIOSH = National Institute of Occupational Safety and Health
REL = Recommended Exposure Limit for worker populations
ATSDR = Agency for Toxic Substances and Disease Registry
MRL = Minimal Risk Level for community residents

Sources

Odor Thresholds:
http://nepis.epa.gov/Exe/ZyNET.exe/2000BHG5.txt?ZyActionD=ZyDocument&Client=EPA&Index=1991%20Thru%201994&I
File=D%3A%5CZYFILES%5CINDEX%20DATA%5C91THRU94%5CTXT%5C00000004%5C2000BHG5.txt&User=ANONY
&MaximumDocuments=10&FuzzyDegree=0&ImageQuality=r105g16/r105g16/x150y150g16/i600&Display=p%7Cf&DefSeekF

Note that range for xylenes is due to isomers: ortho-, meta- and para- xylene

Odor Threshold for H2S: http://www.osha.gov/dts/sltc/methods/validated/1008/1008.html

NIOSH RELs: http://www.osha.gov/web/dep/chemicaldata/

MRLs: http://www.atsdr.cdc.gov/mrls/mrls_list.html

The good news for the general public is that the EPA network of air monitors along the Gulf coast has so far mostly indicated that there is not a likelihood of long-term health effects. The CDC analysis of the EPA air quality data concludes: "The levels of some of the pollutants that have been reported to date may cause temporary eye, nose, or throat irritation, nausea, or headaches, but are not thought to be high enough to cause long-term harm. These effects should go away when levels go down or when a person leaves the area. The low levels that have been found are not expected to cause long term harm."[6] I have been independently reviewing the EPA air monitoring data. There are numerous things EPA could be doing to improve their monitoring, but overall I concur with the CDC and EPA conclusions that there is no reason for panic about the air quality on shore. I list recommendations for improving the EPA air monitoring program at the end of my testimony.

Skin Toxicity from the Oil

Oil is irritating to the skin and can cause potentially severe skin rashes. The CDC states the following:

> *"some people are especially sensitive to chemicals, including the hydrocarbons found in crude oil and petroleum products. They may have an allergic reaction, or develop dermatitis or a skin rash, even from brief contact with oil. In general, dermal contact with oil should be avoided....Prolonged skin contact with crude oil and petroleum products can cause skin erythema (reddening), edema (swelling), and burning. The skin effects can worsen by subsequent exposure to sunlight, because trace contaminants in the oil, such as the PAHs, are more toxic when exposed to light. Skin contact can result in defatting of the skin, increasing the possibility of dermatitis and secondary skin infections.*
>
> *Some persons may be, or may become, sensitive to the crude oil. Depending on the amount and duration of exposure, skin contact with crude oil may be mildly to moderately irritating; in a sensitive individual, the skin effects may be more pronounced after a smaller or shorter exposure."* [7]

People should absolutely avoid any direct skin contact with the oil. This means no swimming in waters that may be contaminated with oil. Reports from Mississippi have indicated that Governor Barbour has been encouraging people to go swimming despite the oil spill.[8] In fact, CNN reported that children were swimming in oil-contaminated water along the Gulf coast.[9] That is a serious mistake both because of direct skin toxicity, and because children's skin is far more permeable to toxic chemicals that is adult skin, so they can absorb some chemicals into their bodies that could lead to more serious health effects.

Worker Health

"My Husband he is on site where the oil leak working to stop the leak they have to wear a resperatory mask and they are couphing and have scrathy throught doctor told them not to worry that there is no long term health effect once they are away from the job breathing the fresh air they will be fine and they will be breathing normal again i am very worried about my husband they are on the ship weeks and weeks working to stop the leak what is the risk on their long term health?" Maria, May 22, 2010.[10]

Over the past few weeks, fishermen who have been involved in the spill clean-up have begun to come forward with complaints about their health. Some clean-up workers have been hospitalized with respiratory problems, chest pain, nausea, and other symptoms. Treating physicians have diagnosed some of the workers with exposure to "inhaled irritants", such as from oil or dispersants.

There are also disturbing photos that have been posted on the internet and in the LA Times, showing clean-up workers on beaches in regular street clothes without even the benefit of gloves. These people are in contact with the weathered oil (as opposed to fresh oil bubbling up from the continuing leak). Weathered oil is considered less dangerous than fresh oil because the toxic vapors have dissipated, but it is not benign. Skin contact with even the weathered oil is very damaging, so gloves should be required. In addition, the oil can contaminate shoes and clothing, and could then be worn home where it could pose a risk to young children.

We have received dozens of requests for respirators from fishermen involved in the clean up effort. They certainly didn't get any from BP. Instead, BP officials told the fishermen that the air quality is fine out where they are working to clean up the oil, but they have not released enough of their data on air quality for me to assess whether the BP claims are correct or not.

Hidden on its website, BP posted a document with no title and no author that includes a general summary of the "Offshore Personnel Sample Results" conducted between April 28 and May 13 2010 for benzene and total hydrocarbons.[11] The document provides no information on the sampling method, the location the samples were taken, the duration or time of sampling, or the raw data behind the graphs. In addition, the data is classified into rough cut-offs that make it difficult to interpret the actual health risks. The majority of samples (128 out of 187) in the summary had detectable levels of total hydrocarbons and 28 had levels greater than 10 ppm, the level of concern EPA has identified for its onshore monitoring of Volatile Organic Compounds (VOCs). In contrast, the BP summary cites an action limit of greater than 100 ppm. 11 samples had detectable levels of benzene with measurements up to 0.5 ppm. This range encompasses the National Institute of Occupational Safety and Health Recommended Exposure Limit (REL) for occupational exposure to benzene of 0.1 ppm. From the data presented it is impossible to ascertain how many of the samples taken exceeded this health based value intended to prevent cancer. The document contained no data at all on hydrogen sulfide, naphthalene, dispersant chemicals, and other air pollutants that are harmful to health and that workers are likely to be exposed to. BP's document concluded that the monitoring data, "demonstrate that there are no significant exposures occurring". However, the data summarized in this document do not substantiate these assurances and raise significant questions about what the fishermen are being exposed to.

BP should release all of their air monitoring data - or the federal government should do independent measurements of air quality offshore and release it to the public. Fishermen are falling ill. Something is in the air, and we need to know what it is.

Dispersants

"My son has gone through some extensive tankerman training and knows his chemicals and he's been asking for the MSDS's on some of the chemicals being used to spray the oil with from the boat and having no luck recieving (sic) any info on any of the chemicals." Comment from Nickie, May 25, 2010.[12]

Several weeks ago, the EPA told BP that it must identify a safer and more effective dispersant within 24 hours, and must switch to safer dispersants within three days. This was a good idea for health and the environment. BP should be required to use the safest and most effective approaches possible, rather than the most convenient or cheapest products. There are dispersants that have already been approved by EPA that appear to be both much safer and more effective than the ones BP has chosen.[13]

I looked into the toxicity of the Corexit 9500 and 9527 products that BP has been using, and had concerns, especially for worker safety and for the health of fish and marine mammals. The ingredients in these products - even the 2-butoxyethanol which worries me most - might not be a problem if used in small amounts. But the use of over 700,000 gallons of even modestly toxic chemicals can become a serious problem.

I'm not an expert on the pros and cons of dispersants, or on their effects on marine life. But I do have some expertise on human health, and I also have some common sense. One important principle in medicine is that you pick the drug that is the most effective and has the fewest side-effects to treat the disease. As hundreds of thousands of gallons of dispersant was poured into the Gulf, I began to wonder if that principle was being considered here.

When BP released their response[14] to the EPA order on dispersants, the flaws of the U.S. chemical safety system became clear. BP refused to switch dispersants because, among other reasons, they say there's not enough information about their safety.

Tables in the BP memo contain a row that is supposed to list: "Persistence, bioaccumulation, and chronic effects, and endocrine disruption" for the various dispersants, but the boxes in that section contain the words "Proprietary mixture" for almost all the products. That means that the public has no access to the full ingredients lists of these products, or any ability to independently verify their safety. Amazingly, neither, apparently, does BP.

In fact, the BP memo complains about the information gap and cites this as a reason for not switching to other dispersants. But the information gaps don't stop there: Major portions of BP's memo have been redacted, so the public can't even review much of BP's analysis of the alternatives.

These information gaps have their root in the Toxic Substances Control Act (TSCA)'s broad protections for "confidential business information". It is a continuous source of frustration to me as a physician and an environmental scientist – I need to know what the hidden ingredients are in products in order to protect my patients and the public. Right now we definitely need to know what's in these alternative dispersants in order to understand the risks and trade-offs. Now is the time to require chemical manufacturers to disclose their trade secrets. The dispersant debacle is proof enough that it's time for change.

Seafood Contamination

Crude oil contains traces of heavy metals such as lead, mercury, and cadmium. It also contains large amounts of polycyclic aromatic hydrocarbons (PAHs), some of which are environmentally persistent. In the near term, various hydrocarbons from the oil itself will contaminate fish and shellfish, so there is an immediate need to assess seafood safety and assure that contaminated fish and shellfish do not reach people's tables. But the problem will not go away when the obvious oil dissipates in the water. The persistent chemicals – the metals and PAHs - will remain in the sediments of the Gulf, and will accumulate in the food chain for years, and likely for decades.

Furthermore, the drilling mud that BP used in an attempt to plug the leaking oil could have human health impacts through the leaching of persistent organic compounds and heavy metals that can also accumulate in the food chain. Information is not publicly available on the make-up of the specific drilling fluid utilized by BP; in fact, many of the specific chemical components of drilling fluids are not well known.[15] However, some studies have demonstrated the potential for metals to accumulate in marine organisms which are harvested for local and commercial consumption. When EPA modeled contaminant concentrations in shrimp after the use of synthetic drilling fluids they projected some contamination with mercury, lead, and polyaromatic hydrocarbons. [16] Additional studies have found that drilling fluid consisting of barite and bentonite also has the potential to leach heavy metals into the environment.[17] [18]

The chemicals in the oil and the drilling mud have the potential to bioaccumulate in seafood and could pose a human health risk when higher trophic levels (eg. large, carnivorous fish such as swordfish or king mackerel) are consumed, particularly for populations which rely substantially on Gulf seafood as a large portion of their diet.

Recommendations:

Improve Response to Community Complaints

Oil spill-impacted communities have been experiencing odors and health complaints and not receiving adequate attention. EPA should be responding to these complaints as quickly as possible to conduct the appropriate monitoring and communicate the results. To facilitate this, EPA should dedicate a portion of the website to providing information on how to report a complaint, locate the results of any monitoring conducted in response to a complaint, and related relevant information on odors and health effects.

Monitor Wind Patterns to Estimate Most Impacted Areas

Meteorological data on wind conditions and weather patterns should be assessed to evaluate the degree to which existing fixed monitoring stations are capturing the areas of highest impact. The results of this assessment should be updated regularly and posted on the website. In the event this modeling reveals areas of potential impact that are not included in the current monitoring network, EPA should develop an expanded monitoring plan to address these areas.

Obtain All Relevant Data on Pollutant Releases
Efficient and comprehensive monitoring plans would be greatly assisted by accurate and complete information on the location and quantity of pollutant releases. This should include up-to-date monitoring of the spill and also all applications of dispersants. In particular, the location, quantity, and application method for all airborne dispersant applications should be reported to the public. This should include data on the chemical make-up of the crude oil, dispersant, and oil-dispersant mixture. This information can inform onshore air monitoring and the development of offshore buffer zones to keep clean-up workers and communities safe.

Ensure Public Disclosure of All Air Monitoring Data
All data collected on air quality, both offshore and onshore, should be made public regardless of where it originated. EPA is the agency best suited to be a clearinghouse for this data and make it available to the public. This should include information on both the oil-related compounds and the dispersants. It is essential that the public, and medical providers in particular, have access to health relevant information on all chemicals released into the environment.

Require Testing and Public Release of Information About All Dispersants Used
Manufacturers and processors of dispersant chemicals should provide data sufficient to determine the potential for these chemicals or their breakdown products to persist or accumulate, or contribute to adverse effects on human health or the environment. Ingredients of dispersant products should be made publicly available for independent scrutiny. EPA should reassess these chemicals to assure their safety and efficacy for their intended uses.

Communicate Monitoring Results Effectively
Data on air quality onshore and offshore are difficult to access and poorly presented. A web-based clearinghouse should facilitate queries by specific location. Also, all data files should include enough information to enable a user to determine what was sampled, where it was sampled (latitude, longitude, city, county, state), when it was sampled (date and time) what method was used for the sample collection and analysis, and the relevant limits of detection. In addition, the EPA and the Coast Guard should conduct community forums to explain the monitoring efforts and results to community members. Such forums should be conducted in collaboration with local community groups and should include presenters from relevant agencies and outside experts.

Protect Worker Safety and Health
The Department of Labor should strongly enforce OSHA's Hazardous Waste Operations and Emergency Response standards requiring personal protective equipment, including respirators as required under Respiratory Protection standards. All air monitoring relevant to worker exposures should be publicly released, and data should be obtained in places where workers may be exposed to vapors from the oil. The Department of Health and Human Services should conduct a Health Hazard Evaluation of workers, and should design and conduct a health surveillance program for clean-up workers.

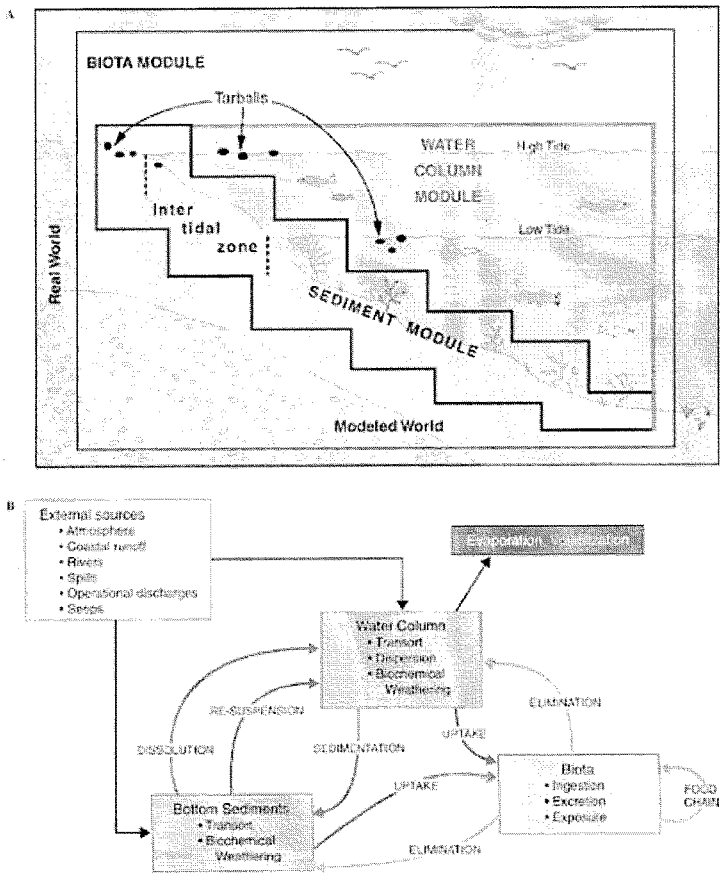


FIGURE 2 Graphic representation (A) and detailed interactions (B) of a conceptual model for the fate of petroleum in the marine environment. Various modules depicted are often included as significant components of computer models attempting to simulate or predict behavior and fate of petroleum compounds. From NAS "Oil in the Sea III: Inputs, Fates, and Effects, 2003.

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[1] Committee on Oil in the Sea: Inputs, Fates, and Effects. Oil in the Sea III: Inputs, Fates, and Effects. National Academies Press (2003) p. 90.

[2] Comment posted at: http://switchboard.nrdc.org/blogs/gsolomon/the_gulf_oil_spill_human_healt.html

[3] CDC. Light Crude Oil Information for Health Professionals. http://www.cdc.gov/niosh/oil_spill/light_crude_health_professionals.htm. May 19, 2010.

[4] http://www.epa.gov/iaq/voc.html#Health Effects.

[5] CDC. Information for Coastal Residents. http://www.cdc.gov/nceh/oil_spill/information_residents.htm#3. May 5, 2010.
[6] http://epa.gov/bpspill/odor.html, visited on June 7, 2010.
[7] http://www.epa.gov/iaq/voc.html#Health Effects.
[8] EMILY WAGSTER PETTUS and MELINDA DESLATTE. Miss., La. govs contrast in responses to oil spill, May 14, 2010. http://www.google.com/hostednews/ap/article/ALeqM5i_a92ez92-2O6BM4YU2SYmlG6fcAD9FMFFK04.
[9] http://edition.cnn.com/video/data/2.0/video/us/2010/06/02/lok.zarella.oil.alabama.cnn.html. 6/2/2010
[10] Comment posted at: http://switchboard.nrdc.org/blogs/gsolomon/the_gulf_oil_spill_human_healt.html
[11] http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/incident_response/STAGING/local_assets/downloads_pdfs/monitoring_summary_report_may20_2010.pdf
[12] http://switchboard.nrdc.org/blogs/gsolomon/oil_spill_clean-up_workers_get.html
[13] http://blogs.edf.org/nanotechnology/2010/06/06/another-bp-leak-%e2%80%93-this-time-its-their-2009-gulf-of-mexico-oil-spill-contingency-plan/. June 7, 2010.
[14] http://www.epa.gov/bpspill/dispersants/5-21bp-response.pdf. May 20, 2010
[15] http://www.endocrinedisruption.com/chemicals.fracturing.php (see drilling mud additives like aluminum tristearate and EZ Mud)
[16] US EPA. Environmental Assessment of Final Effluent Limitations Guidelines and Standards for Synthetic-Based Drilling Fluids and other Non-Aqueous Drilling Fluids in the Oil and Gas Extraction Point Source Category. 2000. http://www.epa.gov/waterscience/guide/sbf/final/env/finalenvpart1.pdf
[17] Neff, Jerry M. Estimation of bioavailability of metals from drilling mud barite. 2008. Integrated Environmental Assessment and Management. 4(2) pp. 184–193
[18] C. Terzaghi , M Buffagni, D. Cantelli, P. Bonfanti, M. Camatini. Physical-Chemical and Exotoxicological Evaluation of Water Based Drilling Fluids used in Italian Off-Shore. 1998. Chemosphere, 37(14 15) pp. 2859-2871

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

The chair will recognize himself for a round of questions.

Dr. Trapido, you said that you are being denied access to the water, to the samples, which you need in order to make the early evaluations. Could you talk a little bit about that? And who is denying you access?

Mr. TRAPIDO. I don't mean to say that I have personally been denied access. I mean that we need to be able to go in a systematic way of getting logs of people, names of people who have been on the vessels, speak to the people on the vessels, speak to the clean-up workers, the first responders.

Mr. MARKEY. So when you say "we," you mean no one is being denied access?

Mr. TRAPIDO. That is right.

Mr. MARKEY. And who is making that decision that there is no access to these people who have been exposed to these chemicals? Who is making that decision?

Mr. TRAPIDO. I am not sure, to be honest. I just know that when we have made attempts to get lists of individuals, get rosters, we have been told that they are not available at this point.

Mr. MARKEY. Will you work with our committee?

Mr. TRAPIDO. Absolutely.

Mr. MARKEY. Tell us what you need, and then we will ensure that you get access to the information you need because you do believe it is critical as to what is going to occur inevitably, in your opinion, in the long term.

Thank you for that.

Dr. Solomon, do you believe there is a problem with regard to access to the information which you need in order to be able to make these early samplings to be able to identify long-term health risks?

Dr. SOLOMON. I do believe there is a serious problem, and the problem extends to data on monitoring. We have been pushing for 2 months now for BP to release data on air monitoring. We finally got a little bit this week, but it is by no means sufficient.

We have been pushing for more data on what is actually in the oil itself that is coming up. What is the fraction of benzene? And obviously, the dispersants have been a huge problem with the products that were being used were not being publicly disclosed.

Mr. MARKEY. If you will work with the committee to identify the information you need, we will make sure that we use the power of this committee to ensure that you and others like you gain access to that information at this critical, still relatively early, point in the process, given the long-term health concerns.

It is BP's spill. But it is America's ocean. And it is the American people who are going to be exposed to the consequences, especially the people who live in Louisiana and in the Gulf.

Dr. Reddy, 2 days ago NOAA Administrator Jane Lubchenco confirmed that plumes of oil have been found as far as 3,300 feet below the surface, stating we have always known that there is oil under the surface. Yet, just a few weeks ago BP's CEO, Tony Hayward, stated that all the oil is on the surface; there aren't any plumes. And yesterday BP's COO, Doug Suttles, denied it again. Do you agree that oil, gas and dispersants could be suspended in plumes or clouds thousands of feet below the surface of the ocean?

Mr. REDDY. Yes, Mr. Chairperson. I have seen that analytical data from the samples that were collected as part of Dr. Lubchenco's press release. And it appears to be quite sound, and it was done in the highest quality. So I believe that there is subsurface oil in the region.

Mr. MARKEY. Dr. Reddy and Dr. Solomon, it is my understanding that naturally occurring bacteria eat some oil and gas, and as they do that, they also use up oxygen that is needed for plants and animals. When this happens deep in the ocean, there is no way to quickly replace the oxygen that is used.

Dr. Reddy, is it possible that this process could reduce the oxygen to levels that cause marine plants and animals to die in certain areas?

Mr. REDDY. There is no doubt that microbes are eating the oil. In fact, some of my colleagues who are finding oil in subsurface are doing it by looking for minima amounts of oxygen. So they are actually not finding the oil when they are trying to sample it. They are using, the best way is to see where there is the least amount of oxygen.

Whether or not the microbes will be able to have the capacity to eat all the oil to a point where there is no oxygen is not known. But clearly, any oxygen below what should be there is less than ideal. And you are correct; it will be difficult for oxygen to get replaced from water at depths of 3,300 feet.

Mr. MARKEY. And, Dr. Solomon and Dr. Reddy, is it also possible that the oil, the gas and dispersants contained in these plumes could poison the marine plants and animals that are exposed to them?

Dr. Solomon.

Dr. SOLOMON. Yes, it is, in my opinion, highly likely that any living thing that is exposed to high enough concentrations, obviously if it is oil and dispersant mixtures, are very likely to be poisoned.

The other question that is also important is that many of these creatures will be damaged but may not die and, over time, may accumulate chemicals in their bodies. And in particular, the heavy metals in the PAHs are chemicals that may not kill the fish and other marine organisms outright but will have long-term health effects on the health of the marine ecosystem and also on anyone who consumes seafood.

Mr. MARKEY. Let me ask, finally, to the two of you, so I would ask both Dr. Solomon and Dr. Reddy this. We are only just starting to characterize these plumes. We don't know how many there are or how far or how deep they extend in the ocean. Is it possible that entire generations of species needed to sustain the food chain in the Gulf of Mexico could be annihilated by this spill in some locations?

Dr. Reddy.

Mr. REDDY. I would reserve making any types of long-term comments until I see more data. There is a significant effort out in the ocean right now collecting samples to characterize this region, and I hope to do so next week.

I think when we have a greater grasp on the distribution of oil out there, then we can start to get a feeling. It is most important for us to grasp that it is the dose makes the poison and that the

presence of oil alone—although never is ever good—has to be put into play before we kind of get an idea or a snapshot of the long-term impacts. But certainly the presence below the sea surface is less than ideal.

Mr. MARKEY. Dr. Solomon.

Dr. SOLOMON. This is not as close to my area of expertise, because I am not an expert on the marine ecosystem.

But on the toxicology front, these chemicals are present, obviously, unfortunately, in quite high concentrations and are widespread in the Gulf, and there are many endangered species in the Gulf of Mexico that are at high risk. And many of them are ones that my understanding is they don't travel that far, so they may not be able to get away. So we will likely be seeing major impacts on the ecosystem and also on fisheries for a very, very long time to come, I am afraid.

Mr. MARKEY. Thank you, Dr. Solomon.

My time has expired.

The chair recognizes the gentleman from Michigan, Mr. Upton.

Mr. UPTON. Thank you, Mr. Chairman.

Dr. Reddy, walk us through what your analysis is on what should have happened with the use of the dispersant Corexit? Should that have been approved, or should the letter have come back and told BP not to go ahead with it?

Mr. REDDY. Well, they have to get permission from the Federal on-scene coordinator in order for them to move forward I believe.

Mr. UPTON. It was on the list of 12 originally, right, was it not? I think they had 12 substances, and that was one.

Mr. REDDY. There were two that were used. In fact, yesterday they disclosed the full formulations of both of them, which will be quite useful for us to understand and measure and look for these dispersants.

If you don't know what you are looking for, it is very hard to measure it.

The decisions to use dispersants is very difficult, and there—this is a total—there is no win-win here. You have nature, which doesn't take direction well, and you have oil, which is an uncontrollable beast, and you have to make decisions about using them. The on-site people decided to use them and are continuing to use them under their best judgment.

Mr. UPTON. How quickly does it work? I mean, we have seen——

Mr. REDDY. It is pretty quick. If you have seen any of those pictures where—I mean, if you drop some Dawn detergent on a sheen of oil, you can see it break open. In theory, the beginnings of that idea, concept. So it is relatively rapid in that respect.

Mr. UPTON. In your opinion, does it work as well under water as it does at the surface or——

Mr. REDDY. I reserve judgment about the success of using the dispersants underneath the sea surface, one, because it has never been done before. So it is, again, this term unprecedented becomes a little laborious, but nevertheless, we have used 300,000 gallons of dispersant below with about 50 million gallons of oil. So, whether it was worth it, effective, and whether there were any damages, we have to see what type of data that has—the samples were collected when they were doing this, and the data is streaming out,

slowly but surely. Because it takes some time for analysis to come through. I look forward to looking at that data, and I can get back to you about what I think are the outcomes of that.

Mr. UPTON. I look forward to that. And, too, as we think about the hurricane season, which in essence could be upon us, what are your thoughts in terms of what is going to happen, based on the chemicals that have been used up to this point, the failure to stop the flow? What is going to happen?

Mr. REDDY. It just makes things—at this point, we have so many things out of our control for ourselves in terms that the oil continues to flow. It is difficult to corral all this oil. And now that it is showing at the subsurface, you have another factor. The hurricane factor is just something that we just can't even comprehend. It may not make a big impact. It may make a large one. Ideally, it just doesn't happen.

Mr. UPTON. What should be happening with all these different underwater plumes that have been reported? What is the best way to deal with that?

Mr. REDDY. There is nothing you can do. I would believe——

Mr. UPTON. Or if you put Corexit down below and broke it up and sent it to——

Mr. REDDY. It already is dispersed. So the Corexit, most of those plumes are the result of either natural dispersion—you know, you have to think about this oil coming out of this wellhead, and it is pretty violent. So it is breaking up some portion of them into small droplets, which I think is a source of these subsurface plumes.

Unfortunately, at 3,300 feet below the surface, if this plume and perhaps others like that, there is really not much you can do to do about that. What we hope for them is to continue that nature acts upon them and breaks them down and, with time, that they get diluted until they become a signal which is not as damaging.

Mr. UPTON. Is there any sense they are beginning to migrate?

Mr. REDDY. There are a variety of research vessels that have been vectored and are collecting samples as we speak, and I hope to do the same next week. And I think at some point we will be able to start to have kind of a three-dimensional image of how these plumes are at one point and then how they migrate, and then also how the oil changes with time. With time, oil weathers; and in fact, what is somewhat comforting is that some of the more dangerous chemicals can also be broken down by nature, and so there is some comfort that this will happen.

Mr. UPTON. Have you been able to date from some of the early flow, from 45 to 50 days ago, to where we are at 52 days in terms of any progress breaking up based on what chemicals might have been used or dispersants? Is there any marked progress?

Mr. REDDY. No, not at the time. I have looked and analyzed samples that were collected about 50 miles away from the spill zone, and they have been significantly weathered either by some of the more harmful chemicals that have been spoken about by my colleagues, and either have been evaporated away or they have been washed into the water column. At this time I haven't had an opportunity to closely look at the samples. But the oil has changed a lot since it spilled. But trying to put a time as to how old one sample is relative to the other is quite difficult.

Mr. UPTON. I yield back.

Mr. MARKEY. The gentleman's time has expired. The Chair recognizes the gentleman from California, Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Dr. Trapido, how long do you believe that people that are exposed to the vapors, to the physical contact, the food contamination, how long should they be monitored? Is there an effective way to tell when that monitoring is done or should be concluded?

Mr. TRAPIDO. My sense is that individuals need to be monitored for at least 20 years, perhaps longer. Now, although that sounds like an impossibility, let me assure you that there are a large number of cohorts studied that are going on for that length of time. They only become more valuable over the duration of time.

You know, if we have a woman who is pregnant and gives birth to a child, we have to follow that child as that child grows up. And there is no magic moment when we say, oK, we are done, there can't be any more damage. So that, in essence, it is following people for what we consider to be an average latency period of about 20 years. I think you would feel fairly safe at that point that you had seen the bulk of anything that would develop in excess. We know what rates of cancer are expected to occur in any population, so we should be able to detect increases above those expected rates over the course of time.

Mr. MCNERNEY. So basically what you are saying is that we need to hold BP accountable for health monitoring responsibilities for a good 20 years.

Mr. TRAPIDO. That would be a fair rewording of my thoughts for sure.

Mr. MCNERNEY. Thank you.

Dr. Reddy, I am going to follow up a little bit on one of the chairman's questions about the permanent damage and decline and extinction of the food chain in the Gulf there. And I know you don't have an answer to that, but, again, how long will it take for us to understand what those effects are and how permanent they are, just to get some idea of what is involved here?

Mr. REDDY. I think, as you mentioned, it will be difficult to predict at this time. I think what will happen is perhaps in the next 4 to 8 months, when there is sufficient data that has been collected and evaluated, groups of interdisciplinary scientists will be able to get perhaps the first kind of views about how long and potentially the damages that have occurred.

At this point, you know, it is so difficult to constrain the damages. What we see only on TV is perhaps only just a small snapshot. And so we have to do a really strong case of bookkeeping and accounting of what has happened, and also how things may have changed in the cellular, molecular level, and with that we can start to get an idea.

As much as I would like to give you an answer, I think perhaps in the next 6 to 8 months a team of experts will be able to give a better idea.

Mr. MCNERNEY. Thank you. Dr. Trapido, what are the most effective steps that we can take to prevent long-term health impacts to people that are in the vicinity—the workers, the residents?

Mr. TRAPIDO. That is a very good question, and I wish there were a very easy answer to that. I think people, number one, need to take care of their already—the risks they can control. There is a good chance, for example, that tobacco use will compound the effects. There are things with exercise and diet that people have to do. But beyond that, we need to look at stress, and those that can be addressed now. We need to have a surveillance system in place that can begin to monitor early signs of potential problems.

I mean, if somebody has been exposed at this point, there is not much we can do other than observe them. And we can look for the diagnoses that we know about, but this is unprecedented in—sorry to use that again. This is unprecedented in terms of the particular exposures to length of time that the people are being exposed to it.

I can only say that I worked—I was the NCI representative to the workers after 9/11 to follow up the New York City workers. And once people had been exposed, it was very difficult to know what to tell people to do, because people obviously get concerned and they start to have symptoms. But what needed to be done there was to have a good surveillance system. And, fortunately, there was great collaboration from all the groups, from the communities, from the unions. There was not a BP equivalent in that case.

So what we need to do is to begin to monitor them, to interview them, to deal with their current problems of stress, because stress will only increase their likelihood of developing these conditions, and to have them manage the cancer-related risk factors that they can now manage.

Mr. MCNERNEY. Thank you. I guess, Mr. Chairman, we have our work ahead of us in putting those systems in place. I yield back.

Mr. MARKEY. I thank the gentleman very much.

The chair recognizes the gentlelady from the State of California, Mrs. Capps.

Mrs. CAPPS. Today, the Center for American Progress released a report calling for the administration to take total control of the public health response away from BP. In this report, they note that the evidence is very clear that we cannot afford to leave any part of this important response to the very corporation that caused the problem in the first place.

A couple short brief questions to ask you, Dr. Solomon, just for the record.

Dr. Solomon, do you trust BP to handle the public health response and adequately protect the cleanup workers?

Dr. SOLOMON. No. I don't trust BP to protect the cleanup workers or handle the public health response.

Mrs. CAPPS. In your opinion, who should be in charge of the public health response?

Dr. SOLOMON. The public health response could be guided by a consortium of Federal agencies, with a leader. So EPA has been doing an excellent job and has been constantly improving, and people from CDC and NIHS have also been very involved and they are quite capable.

Mrs. CAPPS. So from within the government?

Dr. SOLOMON. Absolutely.

Mrs. CAPPS. I want to just continue with you one more question. According to BP's offshore monitoring plan, workers are allowed to stay in an area when vapors are at a level four times higher than the accepted practice to prevent an explosion.

Should we be concerned that workers will be exposed to very high levels of toxins from a public health perspective? You did mention this in your remarks, but I would like to give you a chance to go further into it if you would, please. These workers are often working more than 8 hours a day out in harsh conditions, not typically even measured for laboratory tests.

Dr. SOLOMON. The BP sampling plan and the data that were released this week gave us a little window of information into what is going on out there in the water, and it was a disturbing one.

First of all, in the sampling plan, the plan focuses on workers on stationary rigs and on large vessels. And as you know, many of these large vessels are multiple stories high; the workers are not right at water level.

The smaller boats were referred to in the sampling plan only obliquely as "other vessels," and were deemed reduced priority, which means that there really wasn't an effort or anything within the BP sampling plant to monitor for the health and safety of the people on the fishing boats. And there is an estimated 1,500 people out there on these fishing boats that are much closer to water level and therefore right in the thick of things, literally. And as you yourself have pointed out, the workers have not been provided with respirators.

The levels of concentration to chemicals that BP is tolerating are quite high, both for explosive potential and also for toxicity, and are ones that may perhaps be legal under some of the outdated OSHA standards, but are certainly not safe for the workers.

Mrs. CAPPS. Thank you.

Dr. Trapido, it was very disheartening to hear that long-term epidemiological studies on the human health effects of oil spill exposure seem to be nonexistent. I will let you verify whether or not—you are nodding.

Mr. TRAPIDO. That is absolutely the case.

Mrs. CAPPS. I heard you clearly.

One of the keys to this sort of study, as you mentioned, is to start enrolling people in the study and taking exposure measurements as soon as possible. Do you know what kind of monitoring and surveillance is currently underway?

Mr. TRAPIDO. There is no systematic monitoring, as far as I can tell. There are reports of people going to local doctors and clinics for acute effects, but there is not a systematic process in place. And so what we get is anecdotal data, and it is hard to make conclusions based on those.

And my sense, although this is a sense partially from the media, is that people are a little bit afraid to publicly come forward and state that they have a problem for fear that they may lose their employment, they may lose their income. And so we have got to be able to assure the workers and the residents that if they need help for this, health care, that they can get it without fear of reprisal or loss of their legal rights.

Mrs. CAPPS. Thank you. Just one quick follow-up. Do you know, has BP created any kind of registry to track who is even being deployed to do the cleanup work, those whom they are hiring?

Mr. TRAPIDO. If they have, I have not been made aware of it. I do not believe there is, but I would suspect that they know. They must have a roster of everybody who has been on any of the vessels they have either owned or hired workers for.

Mrs. CAPPS. And you would find that information very important.

Mr. TRAPIDO. Absolutely.

Mrs. CAPPS. And these would be the people you would like to see examined.

Mr. TRAPIDO. Among the groups.

Mrs. CAPPS. Among the groups for sure.

Thank you, Mr. Chairman.

Mr. MARKEY. I thank the gentlelady.

The gentleman from North Carolina, Mr. Butterfield, is recognized.

Mr. BUTTERFIELD. Thank you very much, Mr. Chairman. And let me thank the witnesses for their testimony today.

Mr. Chairman, I would like to go back to the question of dispersants, because I think this is a very important issue. It provides an example of the weakness in our chemical regulatory scheme.

BP chose to use two dispersants, as I am told, COREXIT 9500 and 9527, which have not been determined to be safe. In fact, the ingredients in those two dispersants were not revealed until last week. Nalco, the manufacturer of the chemicals, had claimed that the ingredient list was proprietary, and only waived that claim this week in response to pressure from our EPA.

We have seen these types of claims before for other chemicals regulated under the Toxic Substances Control Act. We know that chemical companies are overclaiming confidentiality, and that EPA is trying to do a better job of policing those claims. It is disturbing that EPA did not have the power to release this information, and that the public had to wait for the manufacturer to waive the claim. The Commerce Trade and Consumer Protection Subcommittee has been examining this issue in the context of TSCA reform. So I would like to ask our witnesses just a few questions to get a sense of whether the confidentiality claims surrounding these dispersants are business as usual in the chemical industry.

Let me start with you, Dr. Solomon. Does it surprise you that the manufacturer claimed that the ingredient list was proprietary?

Dr. SOLOMON. No. It doesn't surprise me at all. In fact, as a physician, I am frequently in a situation where I am seeing patients exposed to various products or chemicals in their workplace or other environments; and when I try to get information about the ingredients of those products in order to counsel my patient, I am told that the list is proprietary. I am unable to get the information.

Mr. BUTTERFIELD. Well, have you now reviewed the list of ingredients that the EPA published this week?

Dr. SOLOMON. Yes, I have.

Mr. BUTTERFIELD. Would you say that the list is easy to understand and comprehend to the layperson? Or is it really just some-

thing that scientists could use to analyze the safety of these chemicals?

Dr. SOLOMON. The information would be very difficult or impossible for the layperson to understand, but it would be very useful to scientists.

Mr. BUTTERFIELD. So the people that were really kept in the dark about the ingredient lists are scientists, like you, who can make an assessment regarding the safety of these ingredients. Right or wrong?

Dr. SOLOMON. That is correct. Though, of course, the role of the scientist is then to communicate the information to the general public and others.

Mr. BUTTERFIELD. Well, I am told that BP selected these particular dispersants from a list of approved dispersants. EPA has looked at the efficacy and toxicity of the chemicals, but has never determined that they are safe. In fact, we found out very quickly that there are safer alternatives.

Dr. Solomon, let me ask you this. As someone who has worked on chemical policy and studied hazardous chemicals, does it surprise you that the safety of these dispersants has not been determined?

Dr. SOLOMON. No. That doesn't surprise me at all. In fact, many—most chemicals that are on the market today have never been fully tested for their toxicity to humans or the environment.

Mr. BUTTERFIELD. Do you think that companies like BP or scientists like yourself have enough information available to effectively evaluate the safety of these chemicals or their alternatives?

Dr. SOLOMON. No. I don't believe that scientists or physicians or the general public have the information that we need in order to assess safety of chemicals.

Mr. BUTTERFIELD. Let me try this one. As a scientist, are you concerned that BP has been using large amounts of these chemicals without a determination that they are safe and without sharing the ingredient list?

Dr. SOLOMON. Yes. I am very concerned that these chemicals are being applied by workers who are not necessarily being adequately protected, and they are drifting potentially into inhabited areas.

Mr. BUTTERFIELD. That is not good. Do you think that our chemical regulations are sufficient to ensure that we know the risk of the chemicals that we use?

Dr. SOLOMON. No. I don't believe that the current regulations do that.

Mr. BUTTERFIELD. Well, I have got about 50 seconds. Dr. Trapido, let me try you for just a moment. As you stated earlier, exposure is time-dependent, and the residents of communities affected by air and water contamination from the spill will need to be monitored, you said, over several years in order to obtain a full understanding of the effects of the oil spill on the health of the affected communities.

In your opinion, sir, what organization or organizations should oversee the long-term study of the residents of those affected? And how should this effort be coordinated?

Mr. TRAPIDO. I think this effort needs to come out of HHS, and then they can decide whether it belongs to CDC or NIH or CNS.

But all these require a fair amount of scrutiny. I would prefer to see it there than in the regulatory agencies, because the regulatory agencies can provide information to the scientists in HHS.

But I want to make a statement that the affected communities need to have a voice in this. We actually learn a lot from our parish presidents about what is really going on versus what we may hear on the nightly news. And so I think that while the government needs to play a role, and an important role, in managing and making sure that the science is sound and that it is not affected by the fact that BP may be actually supplying the funds for it, I think it is very important that the communities have a voice in this. And ultimately, you know, we are all here to serve the communities.

Mr. BUTTERFIELD. Mr. Chairman, I thank you for your indulgence. This is pretty serious stuff, and I thank you for convening this hearing today. And we want to assure you and the American people that we are going to fulfill our responsibility. Thank you. I yield back.

Mr. MARKEY. Thank you, Mr. Butterfield.

The gentleman from Texas, Mr. Burgess, is recognized.

Dr . BURGESS. Thank you, Mr. Chairman. I apologize for being out of the room during part of the hearing.

Director Solomon, let me just be sure that I understand correctly. Now, you reviewed the EPA monitoring being done down in the Gulf region; is that correct?

Dr. SOLOMON. The EPA monitoring? Yes.

Dr . BURGESS. And if I understand correctly, the EPA's assessment is that, with regard to the dispersants, there were no long-term health effects at issue?

Dr. SOLOMON. The EPA has just begun to do some monitoring for some of the dispersant chemicals. So far, they have mostly been focused on the vapors that come off of the oil itself.

Dr . BURGESS. We heard testimony from Dr. Wilma Subra on Monday in Chalmette. And maybe she was talking about the off-gassing or the out-gassing of the vapors, but my impression was from her that the EPA said that there was—at present levels, there was no danger.

Dr. SOLOMON. The EPA has said that they think that there is a very low likelihood of long-term health effects from the levels that have been measured so far.

Mr. BURGESS. Is there more the EPA could be doing about this?

Dr. SOLOMON. Yes. Quite a few things that the EPA could be doing better. Some of them, the EPA has been responsive to community concerns and has made some changes in their sampling efforts and their public communication, but there is still more that can be done.

Mr. BURGESS. Such as?

Dr. SOLOMON. EPA has only recently begun to respond to odor complaints, but they have not yet actually had community meetings to collect information from community residents.

Mr. BURGESS. I don't mean to interrupt you. Do you know if they have made canisters available to people in those communities to collect air samples at the time the odors are present?

Dr. SOLOMON. No. My understanding is that community members don't have canisters. EPA is the only entity deploying those.

Mr. BURGESS. I can see where that would be a problem. I am sorry. Continue.

Dr. SOLOMON. In addition, there is more need for meteorological monitoring and modeling of where the air plumes may be going. We have heard about the need to model where the subsurface plumes are going, but we also need to know where the wind is blowing, and then target sampling to those areas along the coastline. Right now, that is not happening as well as it should be. And in addition, it would be very helpful to provide publicly any information about exactly where the dispersants are being applied offshore. This would help also with predicting where they might go.

Mr. BURGESS. Could I ask you a question about that? The dispersants at one time were being placed subsea; but with the collection apparatus on top, they can no longer do that. Is that correct? Those dispersants are not being used currently, are they?

Dr. SOLOMON. My understanding is that there is still subsurface application going on as well as surface application of dispersants.

Mr. BURGESS. But the surface application is aerials, so that those flight patterns should be known to someone; is that correct?

Dr. SOLOMON. Exactly. So the aerial application of dispersants is the one that could generate air contaminants that could pose a hazard to local communities.

Mr. BURGESS. Well, you and Mr. Butterfield were talking about alternatives, safer dispersants than the ones that are being used currently. Do you know if there are any available that are safer?

Dr. SOLOMON. Well, I was pleased to see that one of the dispersants is being used in lesser quantities or perhaps has been fully phased out at this point, and that was the one that contained a chemical called 2-Butoxyethanol that was the most significant health concern. At this time, my understanding is that COREXIT 9500 does not contain that chemical of concern. And so although there are still questions about the efficacy and whether this is in fact the best way to go, the health concerns have greatly decreased with that switch.

Mr. BURGESS. But is there another dispersant that is available in scalable amounts that would be necessary to manage a leak of this size? Is there really anything else out there off the shelf?

Dr. SOLOMON. BP responded to EPA's request to find an alternative dispersant with a memo that was interesting because it highlighted the data gaps on all of the dispersants. In fact, the BP memo contained a table of all of the different dispersants. And then there was a row in the table that was supposed to list the persistence, bioaccumulation and chronic effects of each of these dispersants. And each cell in the table was filled with the same words: proprietary mixture. In other words, there wasn't information that would allow at least independent scientists to confirm whether there really is a safer alternative or not. And so that information——

Mr. BURGESS. So we just don't know.

Dr. Trapido, let me ask you a question. You discussed the importance of registries. Your background is in cancer; is that correct?

Mr. TRAPIDO. That is right.

Mr. BURGESS. The cancer registry that was set up years ago has provided valuable data. I believe you also in your testimony talked

about lacking registries for other chronic diseases, particularly respiratory illnesses. So could you give us just very briefly some of the importance of the registries and their roles in the assessment of health hazards?

Mr. TRAPIDO. Certainly. Population-based registries record information on every diagnosed case of a particular illness in a defined geographic area. And so then we can link those back to the people who we have in the—who we have been following, who either may be first responders, who may be people along the shore in the communities, and link those back and make connections there. But the point is that we need to be looking at some of the early symptoms that might occur, some early respiratory problems that might be indicative of further scrutiny for the development——

Mr. BURGESS. Longer-term problems. My time is going to be up here, so quickly. We just went through a fairly intense and brutal markup of a bill dealing with 9/11 first responders in this committee. I can't help but feel that there are perhaps some similarities in the two situations. Perhaps the right things weren't done at Ground Zero after 9/11, and should we have learned some lessons with this disaster and our approach to it.

So right now, what is the involvement of the CDC in monitoring and assisting with the health assessments? Are they on board?

Mr. TRAPIDO. My impression is that—I have not seen a lot of their presence. I don't want to say it is not there, but I have not seen a lot of CDC's presence in the community. I don't know if they are doing surveillance, I suspect that they are. But that is about all that I know.

Mr. BURGESS. Because if there are these long-term problems, one of the obligations of the people who caused this disaster would be to set up a trust fund so that the taxpayers are not then the ones that are looked to to provide the health benefits that people may need over a longer term period of time. That is my concern. And I am afraid if we don't manage things appropriately at this end, then 8 or 9 years later, which is where we were with the 9/11 stuff just 2 or 3 weeks ago, it becomes very, very difficult in retrospect to sort stuff out.

Mr. TRAPIDO. I think that is absolutely right. One of the problems that HHS has is the ability to respond very, very quickly to events like this. On infectious outbreaks they are very good. And some of these kinds of outbreaks—not outbreaks, occurrences, it is harder because the mechanisms are just not there for quick response. And so that I think this identifies an area that needs further investigation.

Mr. BURGESS. We do have a hearing in our Subcommittee on Health next week. Too bad Mr. Waxman is gone. I would ask him if we could invite Secretary Sebelius to be with us that afternoon, but maybe we will submit that in writing. So thank you, Mr. Chairman.

Mr. MARKEY. We thank the gentleman very much.

I have one final question, if I may, to Dr. Reddy and Dr. Solomon.

During BP's failed top-kill procedure, they injected 30,000 barrels of drilling mud into the well, hoping to clog it up and stop the leak. As we all saw on the spill cam, much of that drilling mud found

its way out and into the ocean floor, coating anything in its path. But drilling mud isn't just dirt; it is actually made of synthetic oils and chemicals whose identities are kept secret.

Do you think that BP should immediately disclose all of the chemicals used in its drilling mud so that the scientific community can best assess the potential impacts? Mr. Reddy.

Mr. REDDY. Yes. Actually, I actually spent most of yesterday trying to investigate what the composition was of the drilling muds used, and I was unsuccessful.

Mr. MARKEY. Why were you unsuccessful?

Mr. REDDY. I couldn't find it. I looked on the Web and I was unsuccessful.

Mr. MARKEY. Would you like us to get you access to that information?

Mr. REDDY. I think it would be scientifically, and also in terms of the response, important.

Mr. MARKEY. It is hard to investigate something that you do not have the evidence in front of you.

Mr. REDDY. You are absolutely correct.

Mr. MARKEY. Even we non-scientists know that. CSI New York helps us to see how important it is to get that information into your hands. Dr. Solomon?

Dr. SOLOMON. When I looked into the composition of the drilling muds and drilling fluids, I hit the same kind of data gaps that Dr. Reddy described. I did find a little bit of data suggesting heavy metal contamination of some of these drilling muds, and that raised my level of interest and concern quite a bit higher and it made me think that we really do need to gather the scientific information on the composition of these.

Mr. MARKEY. BP should release immediately the chemicals that are included in that drilling mud so that there can be a complete, immediate, scientific analysis of what those chemicals are and what the potential harm is not only to ocean animals and fauna, but also potentially to human beings. And one—and I can recognize members if they would like. But one other—no. I can end it right there, and I think I will end it right there. But thank you very much for your help.

Dr. Burgess.

Mr. BURGESS. May I just ask a follow-up question along that line? Does not OSHA or the EPA require that there at least be a posting of the components of that drilling mud if there is a Hazmat application, if there is an accident, and whether it be fire personnel or Coast Guard personnel need to respond? Are there not requirements that the contents of—again, they don't have to give the proprietary formula, but at least the contents, the potential hazards, be on display or be retrievable by someone?

Mr. REDDY. I would defer.

Dr. SOLOMON. I would be happy to try to answer that question. There is a requirement that companies provide material safety data sheets, MSDSs, on chemicals that are handled by workers. And the drilling muds I would imagine would fall into that category. The problem with these MSDSs is that they do not actually have to list the ingredients. They do have to list the acute toxicity

of the chemical. And so that would be useful and important for someone who is actually directly exposed to it.

My concern with the drilling muds is actually less a worker health issue than an ecosystem health issue if these were discharged into the ocean, and we don't quite know what is in them and whether there is a potential for material that could end up in the food chain. But it is a good point that there is at least some minimal information available through material safety data sheets.

Mr. BURGESS. Mr. Chairman, I would just request that we try to get those MSDS sheets from BP, or whoever was involved, and at least have that as a starting point.

Mr. MARKEY. We will work with the gentleman to be able to obtain that information.

We thank each of you for your testimony today. It is very helpful, very timely. If there is other information which you think our committee should know of, please let us help you help the people in the Gulf.

With that, this hearing is adjourned. Thank you.

[Whereupon, at 4:28 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

Statement of the Honorable Joe Barton

Hearing Entitled "The BP Oil Spill: Human Exposure and Environmental Fate"

Subcommittee on Energy and Environment

Committee on Energy and Commerce

Thank you, Mr. Chairman, for calling this hearing today. All of the news from the Gulf has not been bad, but too much has been. The Coast Guard seems to believe that BP will capture up to 28,000 barrels per day by next week, and that's very good news. Even so, this has turned into a far greater disaster than expected when the initial explosion occurred on the Deepwater Horizon rig on April 20. Since then, we have witnessed the future of a regional economy come into question. And many residents have what I think are legitimate concerns for their own safety and health as oil billows up from 5,000 feet below the surface and spreads in every direction.

I look forward to hearing testimony from our witnesses today. I think it is crucial that we closely monitor these developments so government can make the most informed decisions possible in the midst

of this disaster. For instance, if the wrong information was put out about contaminated fish and shrimp, what would the impact be for that industry and the fishermen? What if we got it wrong and consumers were harmed? A careful and deliberate airing of the facts regarding health and environmental impacts should be the focus of this hearing and future investigations.

As the Obama Administration directs efforts to stop the spill and contain what has already been released, new questions are being asked in regards to the methods being employed. If questions are being raised on the health and environmental effects of chemical dispersants, why did EPA approve their use? If burning oil on the surface was initially explained to us to be the safest and most effective way of getting rid of the oil at sea, what are the new questions surrounding its effect on air quality? If none of the current methods are environmentally responsible, what should be done in their place? What would the situation look like if they weren't being carried out altogether?

Finally, what do we anticipate the long-term consequences of this disaster might be? Although the Santa Barbara spill in 1969 killed

thousands of birds and fish, the surrounding ecosystem recovered very quickly. Conversely, the site of the 1989 Exxon Valdez spill still experiences diminished wildlife populations and oil is still just inches beneath the rocks on the shore all these years later. Does the Deepwater Horizon spill compare to either of these events in its long-term impact?

As we move forward, we must get as clear a picture as possible of this accident so we work to prevent an event like this occurring in the future. It is important to look for solutions in this disaster and not rush to judgment. We cannot allow Deepwater Horizon to become the Three Mile Island of domestic energy exploration. Too many jobs and too many lives are at stake to simply move forward with massive shutdowns and cancellations of offshore operations. It should be instructive to all of us that even the widows of those who tragically lost their lives during the explosion support continuing offshore drilling.

I appreciate this hearing being held and look forward to testimony and questions. With that, I yield the balance of my time.

