

# OIL SHALE RESOURCES

---

---

HEARING  
BEFORE THE  
COMMITTEE ON  
ENERGY AND NATURAL RESOURCES  
UNITED STATES SENATE  
ONE HUNDRED TENTH CONGRESS  
SECOND SESSION  
TO  
RECEIVE TESTIMONY ON DEVELOPMENT OF OIL SHALE RESOURCES

—————  
MAY 15, 2008



Printed for the use of the  
Committee on Energy and Natural Resources

—————  
U.S. GOVERNMENT PRINTING OFFICE

44-640 PDF

WASHINGTON : 2008

---

For sale by the Superintendent of Documents, U.S. Government Printing Office  
Internet: [bookstore.gpo.gov](http://bookstore.gpo.gov) Phone: toll free (866) 512-1800; DC area (202) 512-1800  
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

COMMITTEE ON ENERGY AND NATURAL RESOURCES

JEFF BINGAMAN, New Mexico, *Chairman*

DANIEL K. AKAKA, Hawaii	PETE V. DOMENICI, New Mexico
BYRON L. DORGAN, North Dakota	LARRY E. CRAIG, Idaho
RON WYDEN, Oregon	LISA MURKOWSKI, Alaska
TIM JOHNSON, South Dakota	RICHARD BURR, North Carolina
MARY L. LANDRIEU, Louisiana	JIM DEMINT, South Carolina
MARIA CANTWELL, Washington	BOB CORKER, Tennessee
KEN SALAZAR, Colorado	JOHN BARRASSO, Wyoming
ROBERT MENENDEZ, New Jersey	JEFF SESSIONS, Alabama
BLANCHE L. LINCOLN, Arkansas	GORDON H. SMITH, Oregon
BERNARD SANDERS, Vermont	JIM BUNNING, Kentucky
JON TESTER, Montana	MEL MARTINEZ, Florida

ROBERT M. SIMON, *Staff Director*

SAM E. FOWLER, *Chief Counsel*

FRANK MACCHIAROLA, *Republican Staff Director*

JUDITH K. PENSABENE, *Republican Chief Counsel*

# CONTENTS

## STATEMENTS

	Page
Allard, Hon. Wayne, U.S. Senator From Colorado .....	12
Allred, C. Stephen, Assistant Secretary for Land and Minerals Management, Department of the Interior .....	23
Bingaman, Hon. Jeff, U.S. Senator From New Mexico .....	1
Domenici, Hon. Pete V., U.S. Senator From New Mexico .....	2
Hansen, Jim, Representing Oil Shale Exploration Company, Farmington, UT .	43
Hatch, Hon. Orrin, U.S. Senator From Utah .....	4
O'Connor, Terry, Shell Exploration and Production Company, Denver, CO .....	55
Ritter, Hon. Bill, Jr., Governor, State of Colorado .....	16
Salazar, Hon. Ken, U.S. Senator From Colorado .....	15
Smith, Steve, The Wilderness Society, Denver, CO .....	48

## APPENDIXES

### APPENDIX I

Responses to additional questions .....	73
---	----

### APPENDIX II

Additional material submitted for the record .....	81
--	----



## OIL SHALE RESOURCES

---

THURSDAY, MAY 15, 2008

U.S. SENATE,  
COMMITTEE ON ENERGY AND NATURAL RESOURCES,  
*Washington, DC.*

The committee met, pursuant to notice, at 1:50 p.m. in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

### OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Ok. Why don't we go ahead and get started here. Senator Domenici is going to have to go on to an Appropriations hearing. So we're starting a little earlier than we had earlier planned to.

Today the committee is receiving testimony on the topic of development of oil shale resources. The Nation has vast oil shale resources. We hold over 50 percent of the world's oil shale resources amounting to over two trillion barrels. Most of this resource is concentrated in Colorado, Utah and Wyoming with much of it occurring on Federal lands that are administered by the Department of Interior.

However, because of the state of the technology and economic factors and environmental concerns our oil shale resources have not yet been developed. The Department of Interior currently has a research development demonstration leasing program which I think is an important step. However as part of the EPACT 2005, Congress enacted some broad, sweeping, new requirements with respect to commercial leasing of Federal oil shale resources.

Some have voiced concern that this legislation pushed commercial leasing too far and too fast and is not realistic given the state of the technology. Obviously premature leasing could lead to speculation and be counter productive. That was the concern.

On the other hand we hear that industry needs some additional certainty as to the lease terms and other requirements for commercial leasing in order to proceed with developing the technology for this research. It seems to me there should be a way forward that does not involve premature commercial leasing that protects the interests of the American people to a fair return on their resources and that addresses concerns of local citizens and still provides industry with the certainty that it needs. I also hope the committee can carefully consider impacts to local economies and to land and water resources.

In this era of soaring prices and increasing dependence on foreign oil, our domestic oil shale resources can potentially play an important role. However we must proceed with care as we craft a policy leading to its future development. I look forward to working with Senator Domenici and Senator Salazar who are two of the leaders on this issue here on the committee, as well as other members of the committee on this important matter.

I thank all the witnesses for being here. Senator Domenici, go right ahead.

**STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM  
NEW MEXICO**

Senator DOMENICI. First of all, thank you, Mr. Chairman for calling this hearing. I have a prepared statement. I would ask that you make it part of the record.

[The prepared statement of Senator Domenici follows:]

PREPARED STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM  
NEW MEXICO

Mr. Chairman, I appreciate your willingness to hold this hearing. I have spoken extensively over the last few months about the growing threat of our dependence on foreign oil. Such dependence threatens our national security and our economic security. In short, it threatens our way of life.

A couple of weeks ago, I introduced legislation that will try to reverse this growing trend by opening vast areas here in America for oil and gas production. I urge my colleagues to rethink their positions in light of the ever changing fact of higher prices and greater foreign dependence. We can not keep asking OPEC for the very thing that we have here in America. I also believe strongly that oil shale development will help our efforts to strengthen this nation's energy security. And, I am pleased that we will be examining this issue in detail today.

I have now been a member of the Senate for more than 35 years. During that time, America's oil imports have grown from 6 million to 12 million barrels per day—from 35 percent of our supply to nearly 60 percent. At the same time, domestic oil production has fallen sharply. Last year, we produced roughly half of what we produced in 1970.

We confront the sobering realities of this arrangement every day. As demand for energy increases, prices continue to rise. But because we have chosen not to develop our own resources, we will ship nearly half a trillion dollars overseas to import oil this year alone.

We simply must re-exam our energy production policies and take steps to dramatically increase the use of our own resources to meet our own needs. The comparatively lower price of oil had a bearing on oil shale development in the 1970s, but as crude oil prices continue to rise above \$120 a barrel, development of our nation's vast oil shale deposits shows a greater promise than ever before. Oil shale must play a part in the effort to reduce our growing dependence on foreign oil.

Our oil shale reserves can provide an important source of strategically located, reliable, affordable and secure oil. Oil shale production here in the United States could directly offset much of the loss of OPEC production, and hold down both world oil prices and the prices consumers pay for gasoline and other fuels.

More than 70 percent of the oil shale in the U.S. is located on federally owned and managed lands. Some 1.9 million acres of federal lands across the Green River Basin in Colorado, Utah and Wyoming contain 1.2 to 1.8 trillion barrels of potentially-recoverable oil. On an energy-equivalent basis, those deposits contain three times as much energy as the proven oil reserves of Saudi Arabia.

In 2005, we passed the Energy Policy Act which contained a provision to facilitate development of this terrific source of domestic oil. This bill promoted the improvement of technologies needed to recover petroleum from oil shale on public lands. It also directed the Bureau of Land Management to issue final regulations for commercial leasing by the end of 2008.

Unfortunately, last year—without the benefit of full debate and conference like we had in the Energy bill in 2005—Congress placed a one-year moratorium on preparing and publishing the final regulations for a commercial leasing program. This undid the good, bipartisan work of 2005. The moratorium strips the agreed-upon

timeline to publish final regulations for no apparent reason other than to slow down development. I hope we can fix that, as I proposed in the American Energy Production Act.

Everyone understands that commercialization is still a few years away, but BLM needs to be able to move forward with final regulations. We need to establish the lay of the land and create some regulatory stability, including diligence requirements, royalty rates to conversion fees, and operating and environmental standards. Any delays in finalizing the regulations may discourage private investment in research and development. There is no question in my mind—whenever it is economically and environmentally possible—that we must seek to produce energy here at home. We cannot talk from both sides of our mouths—on the one hand setting up programs to promote energy production, while slapping on onerous restrictions that harm development.

I understand that attempts to develop oil shale have failed in the past. But that was decades ago without the promise we now see from innovative production technologies and without the unprecedented price of oil and level of importation that we face today. I am confident that this country, known for its science and ingenuity, can make it work. We already have companies willing to invest upwards of \$5 billion dollars in advanced technologies that will help realize the potential of oil shale. We need to do all we can to support these efforts.

I want to extend a special welcome to our colleagues, Senator Hatch and Senator Allard, who are here to speak about the importance of this resource to their respective states.

I also want to thank our panel of witnesses for joining us today. Your testimony will be important as we examine the great opportunities associated with oil shale development. I look forward to your testimony.

The CHAIRMAN. Glad to do that.

Senator DOMENICI. I just want to state after thanking everybody that's come here to today to just talk a minute on the record. This committee and its counterparts in the U.S. House produced a national energy policy about 4 years ago, called EPACT. We were careful in that to do many things bipartisan. That's why the bill was such a success.

Mr. Chairman, one of the things we did bipartisan was to determine that oil shale might have a future in terms of the mix for American crude oil development and that it might be part of diminishing our enormous dependence upon foreign oil. In that bill that we passed together, we provided that the Department of Interior would issue final regulations by the end of 2008.

I think that that was well thought out. Because that did not mean that we were going to proceed ahead of the environmental concerns, ahead of the community concerns. What it meant was that final regulations would be issued so that industry and the private sector would have some stability justifying enormous investments.

Without something like this, clearly, you're operating without knowing what the rules are and spending enormous amounts of money without the rules being determined. So I was quite surprised, if not shocked, to find that apparently from the area those who thought otherwise than what the committee that you and I served on thought, went to the Interior Appropriations committee last year and put a moratorium on the issuance of these final regulations.

Let me repeat. I was quite shocked. Because I didn't think that we had done anything other than that which was appropriate in the act which we passed unanimously and bipartisan.

I think both Senators who are waiting to testify agree with what I said and helped us with the bill. I thought you agreed, Mr. Chairman. You worked and helped with the bill.

I very much appreciate your statement. I listened carefully. I believe that I would agree with everything in your statement because you recognize the value of shale.

You recognize that it could be part of America's energy production. Your concern is that the development be done appropriately in terms of the environment and otherwise. I feel the same way.

But I believe that something like final rules, final regulations, have to be part of this development and part of what the Department of Interior does to stabilize and assure the big investments that have to occur, that there is a time line. There is—they are going somewhere. It's not just in limbo.

I note there are some people from the area. I heard the Governor's testimony. I'm not sure if he is one of them, that he might be concerned that we're moving too fast. I hope I get a chance to talk with him about this. Because I don't think we're advocating moving fast just because some of us want regulations that industry can look at.

We will also hear from industry today. Some will be shocked to find out how much of a commitment is already being made by companies like Shell Oil Company. A huge number of millions of dollars have been committed to experiment and research in this area.

I believe if we just made one step toward indicating that we were going to move and we were going to convert, even if it was small quantities, that said we were going to find out how. I think it would have a tremendous impact on oil prices in the world. If those who were holding us hostage knew that there is a chance that they can't hold us hostage, I think it would have a very big impact.

So, I think this is a serious problem that we ought to address with a very serious eye and not be disposed or dispelled by those who harken back to 25, 30 years ago. Remember when it was tried before, Mr. Chairman, I put this just on the record, the price of oil was not \$120 a barrel. I couldn't find the price and the date. But I would be surprised if it was more than \$10 a barrel, \$15, something like that when we were last playing in this field. Think of the difference in terms of what can be spent on the environment, on clean up, on all kinds of things and still make a profit and get ourselves out of this dependency problem.

Thank you, Mr. Chairman. Again, I apologize when I leave, you know about it. It's not because I'm lacking interest.

I have to go to Appropriations. They called it at the same time. I'll go there and come back as soon as I can. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. We have two of our distinguished colleagues here, Senator Hatch and Senator Allard. We welcome both of you and are ready to hear any statements you'd like to make.

Senator Hatch, why don't you go ahead?

**STATEMENT OF HON. ORRIN HATCH, U.S. SENATOR  
FROM UTAH**

Senator HATCH. Thank you, Mr. Chairman. I may be just a little bit longer than 5 minutes, if I can here.

The CHAIRMAN. Take as long as you want.

Senator HATCH. Thank you very much. I appreciate it. I want to thank you for holding this hearing today and for the opportunity of giving the two of us, Senator Allard and me and a whole raft of others, to add our testimony.

As you know, working closely with members of this committee and with Senators Pete Domenici, Wayne Allard, Robert Bennett and Ken Salazar, I introduced the Oil Shale and Tar Sands Development Act which is used as basis for Section 369 of the Energy Policy Act of 2005. Now I've heard from press reports that Senator Salazar has a new proposal which according to the reports, sink some more thoughtful approach to oil shale development. I've not seen it yet.

But to be honest, Mr. Chairman, I would argue that the road we're on has been pretty darn thoughtful. In fact Section 369 specifically allows Governors and other officials in relevant states to decide how quickly or slowly to move forward on oil shale production in their respective states. Apparently, Mr. Chairman, my colleagues on the other side of the aisle prefer a different approach, or at least some of them, when it comes to Utah. They would rather not give our Governor the same courtesy and instead would prefer to control the timing of the decision themselves.

Now let me be frank, Mr. Chairman. It's an offense to me that this decision is being withheld from Utah's Governor and other elected officials in my State. The fact that there are efforts to delay the decision even further only deepens the offense.

I have a copy of a letter from Governor John Huntsman Jr. of Utah to the Senate Appropriations Subcommittee on Interior and Related Agencies. He asked the committee to rescind the moratorium on implementing Section 369.

In his letter Governor Huntsman states, "I recommend lifting these restrictions. Utah is home not only to substantial oil shale reserves, but also to businesses willing to develop oil shale using new technology that will make extraction cleaner and more efficient. We have State and Federal regulators who are capable of ensuring that this resource is developed in an environmentally, responsible manner."

I would ask that the Governor's letter be included in the record at this point.\*

The CHAIRMAN. We'll be glad to include it.

Senator HATCH. Thank you, Mr. Chairman. Let me just take a minute to lay out what our current law on unconventional oil actually does. First it sets up a research and development leasing program on BLM lands. That program is now underway. I believe the Federal Government has shown a great deal of thoughtfulness and caution with regard to how these R and D leases were granted.

Next the law calls for a multi-State programmatic environmental impact statement to consider the larger environmental issues associated with the development of oil shale in tar sands. Section 369 pushed for a vigorous timeframe for the completion of the PEIS. The BLM responded to that direction by denying an extension to an earlier comment period request by the State of Colorado.

---

\*See Appendix II.

Admittedly that was a regrettable outcome of the tight schedule given to the BLM. I was pleased, however, that the BLM did provide an extra month to the comment period to the draft PEIS giving a full 4 months for the public to comment on the study. After the release of the final PEIS, Section 369 directs the Interior Secretary to consult with the Governors of states, interested Indian tribes and other interested persons to determine the level of support and interest in the states in the development of tar sands and oil shale resources. If the Secretary finds sufficient support and interest exists in a State, the Secretary may conduct a lease sale in that State under the commercial leasing program regulations.” Now in my view, no further impediment is needed to ensure that a thoughtful approach is pursued and controlled by State and local officials.

Finally, Section 369 establishes a task force on strategic unconventional fuels which includes the Governors and local officials of the relevant states to consider the relevant issues surrounding unconventional oil production. A report by the task force is available to the public. It addresses many of the questions regarding oil shale development and gives voice to the concerns held by some participants of the task force.

Those concerns need to be heard and addressed. That is the purpose of the PEIS and of the requirement that the Secretary consult with decisionmakers in each State. In the final analysis if the decision is to move forward it will then be up to members of industry and their investors to determine when the technology is ready for commercial operation.

It will be a business decision that no governmental official is well equipped to make. But there are a number of very legitimate questions and concerns that government officials and the public do have a role in raising. Let’s take a look at some of those.

In the late 1970s the government invested very heavily in a major effort to develop oil from oil shale in Western Colorado. When OPEC dropped the price of oil down to \$10 a barrel, a dramatic boom turned into a devastating bust in the blink of an eye. At that price even conventional oil production was not profitable.

That is an event that is well remembered by those who lived through it. I sympathize with some of their negative views associated with oil shale production. However that was a quarter of a century ago.

Today is a very different world than in the late 1970s and early 1980s.

First of all there is no huge governmental corporation spending big government dollars on oil shale development.

Second, OPEC no longer has anywhere near the spare capacity necessary to flood the world market. In fact, due to the meteoric rise in global demand for oil, I doubt OPEC has the capacity to cause even a significant drop in the price of oil.

Third, technology and regulatory protections in every aspect of oil, gas and mining have matured impressively since the early 1980s. Those advances not only make oil shale development much more viable. But they also ensure much better protections for the environment.

Some critics of oil shale and tar sands production have raised air quality concerns. Let's be clear. There's no aspect of Section 369 which would exempt industry from any Federal or State air quality laws or regulations.

In fact these industry members plan to comply and even exceed air quality requirements. They also express a readiness to address climate change questions on the same schedule that other industries may be required to control carbon emissions. One Utah company, called Cre Energy, is now building a pilot plant to demonstrate their ability to produce upgraded syn crude from oil shale with little or no carbon emissions.

Another concern is the acreage and wildlife habitat that would be disturbed by oil shale development. It's a sobering fact that with every new home, ski cabin, road and hotel that we build in this country, we're destroying wildlife habitat. Why is it that such new activities occur daily in all of our states, but we only raise our eyebrows at the acreages used for oil production?

Mr. Chairman, I'm a fan of ethanol production. I was the sponsor of the Clear Act which provides the current tax incentives for E85 infrastructure and E85 fuel when sold for vehicle use at retail. But I'm also aware that it takes a full acre of corn to produce about five barrels of equivalent ethanol.

Mr. Chairman, do you know how many barrels of oil would come from one acre of oil shale? On the low end, one acre of oil shale will produce about 100,000 barrels of oil. On the high end, one acre of oil shale will produce one million barrels of oil.

Now let me make sure everyone in this room heard me correctly. That's about five barrels of ethanol for each acre of corn and between 100,000 and one million barrels of oil for each acre of oil shale. A typical acre of oil shale will produce ten times more oil than a typical acre of conventional oil.

There is no other hydrocarbon resource on earth that is this concentrated in terms of a yield per acre basis. So I hope the members of this committee are able to contain themselves when opponents express their "concern" for land disturbance and wildlife habitat related to oil shale development. Unlike construction projects we accept everyday, oil shale companies are present on the land only temporarily and are and will, restore the land to nature when they are finished.

Another very legitimate question often raised with regard to oil shale development is water availability in the West. No doubt water is always a concern in the States of Colorado, Wyoming and Utah, which Utah being the second driest State of the Union. So I have to say I was initially surprised that not one company interested in oil shale development that I have talked to, considers water availability to be a significant constraint.

Is that because they are ignorant of water constraints in the West? Actually the opposite is the case. They are very well aware of water constraints and have each developed technology that requires moderate amounts of water, or even no water, for oil shale production.

Let's go back to ethanol for a moment. I want to emphasize that while I oppose Federal mandates for ethanol production, I'm a strong supporter of ethanol incentives. But one barrel of ethanol re-

quires somewhere between 800 and 1,700 barrels of water just to grow the corn.

I'm happy to report that so far, most corn for ethanol receives this amount almost exclusively from rainfall. However as corn is grown in some of the drier states, it requires approximately 785 barrels of irrigated water for every barrel of ethanol produced. Then the processing of ethanol fuel takes an additional two to four barrels of water for each barrel of ethanol.

The Department of Energy has calculated that with respect to oil shale production, the water needed for dust control, mining, processing, upgrading and land reclamation would combine for approximately three barrels of oil or for each barrel of upgraded syn crude. A favorite approach by opponents of oil shale production is to the oil shale production being planned in the United States to all the alleged negative aspects of oil sands production in Alberta, Canada and then to completely ignore any comparison to the gigantic and economic and energy supply successes that Canada has enjoyed by developing unconventional resources.

From the standpoint of water and natural gas used.

Senator DOMENICI. Mr. Chairman, I wish you would ask the senior senator to reduce his remarks. The three of us must go to Appropriations and we would like to be able to be here for part of our hearing. We would like to hear Senator Hatch, but we would like to hear others also.

Senator HATCH. I'll be happy to wind this up. I have a number of other remarks to say so I would ask that my full remarks be placed—

The CHAIRMAN. Why don't you go ahead and summarize the remainder of your remarks and we'll put the rest in the record and hear from Senator Allard.

Senator HATCH. I would say this. That from the standpoint of water and natural gas, you understand there's not that much comparison to be made between the processes being used and considered in the two countries. I think we need to evaluate all oil shale and oil sands production in the United States based upon the actual processes being developed by companies in the United States.

Now there are a lot of other things that I have in this particular set of remarks that I think go to how important it is that we follow up on this, that we compete with—and one last point I'd really like to make. We are sending approximately \$600 billion a year offshore for offshore oil. A lot of that money is going to Venezuela, to Russia, to other countries that really do not in many respects have the United States best interest at heart.

We need to keep that \$600 billion here in this country to utilize for our people, for our needs, for our compassionate needs and of course, for our development of energy that we have the capacity to develop. Right now I think the least you could say is that we're not doing it. Frankly to lose \$600 billion a year is bad.

Now it's estimated that three trillion barrels of oil in the States of Colorado, Wyoming and Utah and much of it in oil shale. About 1.2 billion barrels of oil is recoverable according to—and I would like to basically have that be considered recoverable oil which is where it should be. I believe that's the smart thing to do.

I think we ought to wake up in this country. We ought to go full boar in developing this oil and keeping our economy going and making us less dependent on the rest of the world and saving that \$600 billion for our country rather than for many who are enemies throughout the world. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

[The prepared statement of Senator Hatch follows:]

PREPARED STATEMENT OF HON. ORRIN G. HATCH, U.S. SENATOR FROM UTAH

Mr. Chairman, I thank you for holding this hearing today and for the opportunity you have given me to add my testimony. As you know, working closely with members of this committee and with Senators Pete Domenici, Wayne Allard, Robert Bennett and Ken Salazar, I introduced the Oil Shale and Tar Sands Development Act, which was used as a basis for Section 369 of the Energy Policy Act of 2005.

I have heard, from press reports, that Senator Salazar has a new proposal, which, according to the reports seeks a more thoughtful approach to oil shale development. I have not seen it yet, but to be honest, Mr. Chairman, I would argue that the road we are on has been pretty darn thoughtful. In fact, Sec. 369 specifically allows governors and other officials in relevant states decide to how quickly or slowly to move forward on oil shale production in their respective states. Apparently, Mr. Chairman, my colleagues on the other side of the aisle prefer a different approach when it comes to Utah. They would rather not give our governor the same courtesy, and instead would prefer to control the timing of that decision themselves.

Let me be frank, Mr. Chairman, it's an offense to me that this decision is being withheld from Utah's governor and other elected officials in my state, and the fact that there are efforts to delay the decision even further only deepens the offense.

I have a copy of a letter from Governor Jon Huntsman, Jr., of Utah to the Senate Appropriations Subcommittee on Interior and Related Agencies. He asks the committee to rescind the moratorium on implementing Sec. 369. In his letter, Governor Huntsman states,

*I recommend lifting those restrictions. Utah is home not only to substantial oil shale reserves...but also to businesses willing to develop oil shale using new technology that will make extraction cleaner and more efficient. We have...state and federal regulators who are capable of ensuring that this resource is developed in an environmentally responsible manner.*

I ask that the governor's letter be included in the record. Thank you Mr. Chairman.

Let me take just a minute to lay out what our current law on unconventional oil, actually does. First, it sets up a Research and Development Leasing program on BLM lands. That program is now underway, and I believe the federal government has shown a great deal of thoughtfulness and caution with regard to how those R&D leases were granted. Next, the law calls for a multi-state Programmatic Environmental Impact Statement to consider the larger environmental issues associated with the development of oil shale and tar sands. Sec. 369 pushed for a vigorous time frame for the completion of the P.E.I.S., and the BLM responded to that direction by denying an extension to an earlier comment period request by the state of Colorado. Admittedly, that was a regrettable outcome of the tight schedule given to the BLM. I was pleased, however, that the BLM did provide an extra month to the comment period for the Draft PEIS, giving a full four months for the public to comment on the study. After the release of the Final PEIS, Sec. 369 directs the Interior Secretary to,

*Consult with the Governors of States, interested Indian tribes, and other interested persons, to determine the level of support and interest in the States in the development of tar sands and oil shale resources. If the Secretary finds sufficient support and interest exists in a State, the Secretary may conduct a lease sale in that state under the commercial leasing program regulations.*

In my view, no further impediment is needed to ensure that a thoughtful approach is pursued and controlled by state and local officials.

Finally, Sec. 369 establishes a Task Force on Strategic Unconventional Fuels, which includes the governors and local officials of the relevant states to consider the relevant issues surrounding unconventional oil production. A report by the task force is available to the public. It addresses many of the questions regarding oil

shale development and gives voice to the concerns held by some participants of the task force. Those concerns need to be heard and addressed. That is the purpose of the PEIS and of the requirement that the Secretary consult with decision makers in each state.

In the final analysis, if the decision is to move forward, it will then be up to members of industry and their investors to determine when the technology is ready for commercial operation. It will be a business decision that no government official is well equipped to make.

But there are a number of very legitimate questions and concerns that government officials and the public do have a role in raising. Let's take a look at some of those.

In the late 1970's, the government invested very heavily in a major effort to develop oil from oil shale in western Colorado. When OPEC dropped the price of oil down to \$10 a barrel, a dramatic boom turned into a devastating bust in the blink of an eye. At that price, even conventional oil production was not profitable. That is an event that is well remembered by those who lived through it, and I sympathize with some of their negative views associated with oil shale production.

However, that was a quarter of a century ago. Today is a very different world than in the late 1970's and early 80's: First of all, there is no huge government corporation spending big government dollars on oil shale development.

Second, OPEC no longer has anywhere near the spare capacity necessary to flood the world market. In fact, due to the meteoric rise in global demand for oil, I doubt OPEC has the capacity to cause even a significant drop in the price of oil.

Thirdly, technology and regulatory protections in every aspect of oil, gas, and mining have matured impressively since the early 1980's. Those advances not only make oil shale development much more viable, but they also ensure much better protections for the environment.

Some critics of oil shale and tar sands production have raised air quality concerns. Let's be clear, there is no aspect of Sec. 369 which would exempt industry from any federal or state air quality laws or regulations. In fact, these industry members plan to comply and even exceed air quality requirements. And they also express a readiness to address climate change questions on the same schedule that other industries may be required control carbon emissions.

One Utah company called CRE Energy is now building a pilot plant to demonstrate their ability to produce upgraded syncrude from oil shale with little or no carbon emissions.

Another concern is the acreage and wildlife habitat that would be disturbed by oil shale development. It's a sobering fact that with every new home, ski cabin, road, and hotel we build in this country, we are destroying wildlife habitat. Why is it that such new activities occur daily in all of our states, but we only raise our eyebrows if the acreage is used for oil production?

Mr. Chairman, I'm a fan of ethanol production. I was the sponsor of the CLEAR Act which provides the current tax incentives for E-85 infrastructure and E-85 fuel when sold for vehicle use at retail. But I'm also aware that it takes a full acre of corn to produce about five barrels of oil equivalent ethanol.

Mr. Chairman, do you know how many barrels of oil would come from one acre of oil shale? On the low end, one acre of oil shale will produce about 100,000 barrels of oil. On the high end, one acre of oil shale will produce one million barrels of oil.

Let me make sure everyone in this room heard me correctly: that's about five barrels of ethanol for each acre of corn and between 100,000 and one million barrels of oil for each acre of oil shale.

A typical acre of oil shale will produce ten times more oil than a typical acre of conventional oil. There is no other hydrocarbon resource on Earth that is this concentrated in terms of yield per-acre basis.

So I hope the members of this committee are able to contain themselves when opponents express their "concern" for land disturbance and wildlife habitat related to oil shale development. Unlike construction projects we accept every day, oil shale companies are present on the land only temporarily and are will restore the land to nature when they are finished.

Another very legitimate question often raised with regard to oil shale development is water availability in the West. No doubt, water is always a concern in Colorado and Utah, which is the second driest state in the Union. So I have to say I was initially surprised that not one company interested in oil shale development that I have talked to considers water availability to be a significant constraint.

Is that because they are ignorant of water constraints in the West? Actually the opposite is the case. They are very well aware of water constraints and have each developed technology that requires moderate amounts or even no water for oil shale production.

Let's go back to ethanol for a moment. And I want to emphasize that while I oppose federal mandates for ethanol production, I'm a strong supporter of ethanol incentives. But one barrel of ethanol requires somewhere between 800 and 1,700 barrels of water just to grow the corn. I am happy to report that, so far, most corn for ethanol receives this amount of water almost exclusively from rainfall. However, as corn is grown in some of the drier states, it requires approximately 785 barrels of irrigated water for every barrel of ethanol produced. Then, the processing of ethanol fuel takes an additional two to four barrels of water for each barrel of ethanol.

The Department of Energy has calculated that with regard to oil shale production, the water needed for dust control, mining, processing, upgrading, and land reclamation would combine for approximately three barrels of water for each barrel of upgraded syncrude.

A favorite approach by opponents of oil shale production is to tie oil shale production being planned in the U.S. to all the alleged negative aspects of oil sands production in Alberta, Canada, and then to completely ignore any comparison to the gigantic economic and energy supply successes that Canada has enjoyed by developing unconventional resources.

From the standpoint of water and natural gas use, there is not that much comparison to be made between the processes being used and considered in the two countries. Mr. Chairman, might I suggest that we evaluate oil shale and oil sands production in the United States based on the actual processes being developed by companies in the U.S.

With regard to oil sands, Mr. Chairman, of the two oil sands companies I'm aware of in Utah, both have developed separate methods that use water-based, environmentally benign solutions that effectively drop the sand right out of the bitumen at room temperature and then the water solution is recycled back into the process. Their energy inputs are basically the electricity to run the water pump. Rather than pretending to evaluate dirty phantom technologies that would never be used. Let's look at what U.S. companies are actually pursuing.

For the most part, the very legitimate questions surrounding oil shale development have very good answers. But I've come to the conclusion that some opponents of oil shale would rather ignore the legitimate answers to their concerns, and when that's the case it tells me that their concerns are smokescreens for a hidden agenda. There are a number of environmental groups that have made it clear by their actions that they just plain oppose oil production and are especially afraid of any new sources of oil, such as from oil shale or from tar sands.

The question for you, Mr. Chairman, and for the members of this committee, and I should add, for the Democratic leadership of Congress, is whether you will adopt the anti-oil agenda of the environmental movement as an element of your own energy policy. So far, I have heard of proposals to tax successful energy production, to investigate the oil futures markets, to ban Canadian oil imports in favor of oil from Venezuela, Russia, and the Middle East, and to call for delay after delay in the commercial production of oil shale. At times, it almost appears that the anti-oil agenda is the ONLY element of the energy policy of some members of Congress.

These policies would not produce one drop of oil. In fact, they are sure to achieve the opposite effect. Last time I checked, less oil meant higher prices and economic harm, and more oil meant lower prices and economic benefits.

Mr. Chairman, I'm being frank, because I know that you and the members of this committee, for the most part, are not anti-oil. Rather, I believe that members of this committee on both sides understand energy. You understand that liquid fuels are produced and sold in a global market, that global demand is outstripping global supply, and that no combination of alternative fuels can match the scale of the global oil deficit coming our way.

The total proven oil reserves in the world are approximately 1.6 trillion barrels of oil. Current proven reserves in the U.S. are a mere 22 billion barrels.

It is a well-established fact that oil shale resources in Utah and Colorado hold somewhere between 800 billion and two trillion barrels of recoverable oil. Can we get it out tomorrow? No. Can we begin to develop it in a few years? Yes. Is it economic at \$40 a barrel or less? Yes.

I would like to read a statement by one of our nation's foremost experts on oil shale, Dr. James Bunger. He states:

By proving the commercial viability of a suite of technologies for different resource characteristics, Canada was able to book 174 billion barrels of oil sands as proven, making them the second largest holder of proven reserves in the World, second only to Saudi Arabia at 260 billion barrels. It should be the goal of the private sector and the United States government to prove technologies that will allow oil shale ... to be reclassified from its current

status of in-place resource, to “proven reserves.” Achieving a goal of reclassifying 400 billion barrels as proven is well within our capabilities and the characteristics of the resource and, if achieved would make the US the holder of the largest oil reserve in the World.

Mr. Chairman, I ask that Dr. Bunger’s full statement be made part of the record. Thank you Mr. Chairman.

It would be nice to pretend we’re not dependent on oil; that we can skip immediately to some yet-to-be identified alternative, 30 years down the line. But we can’t. Truckers and farmers need diesel today. Mom’s need to get to soccer and ballet practice tonight, Americans want to visit their national parks this summer.

Because we have made domestic oil production so difficult in this nation, we now send \$600 billion each year to our foreign competitors for oil, and they’re laughing all the way to the bank. This is a huge and constant stream of money leaving our nation once and for all. We are funding the rise of our international competitors and causing our own decline. It is a fact largely ignored by the media, by the current presidential candidates, and by the current Congressional leadership. But it’s a trend this committee cannot ignore.

Mr. Chairman, we must pursue alternative sources of energy, but in the meantime, there is no room in our energy policy for an anti-oil or -oil-shale attitude.

If leaders in Colorado and Wyoming wish to slow down oil shale and sands production in their states, then I congratulate them, because that power was given to them years ago in Sec. 369. But it is not right to artificially slow shale development down in areas that are prepared to meet the challenges of supplying our nation with domestic oil. It’s not right for my state and it’s not right for Americans who are sending their money to our competitors overseas.

Thank you, Mr. Chairman.

Senator Allard.

**STATEMENT OF HON. WAYNE ALLARD, U.S. SENATOR  
FROM COLORADO**

Senator ALLARD. Thank you, Mr. Chairman. First of all I’d like to commend you for holding this hearing along with Ranking Member Senator Domenici and I see that my colleague is here from Colorado. It’s good to see him.

I’d like to also congratulate Senator Hatch for a very complete and thorough statement that he’s made on oil shale. He has reviewed some very important facts that pertain to the development of oil shale. I hope the committee carefully reviews his statement.

I’d also like to commend the Department of Interior, especially Assistant Secretary Stephen Allred and the BLM on the positive working relationship that have been established with the affected states. This is an extremely important issue, not only to the State of Colorado, but to the Nation.

The Green River Basin of Northwestern Colorado, Eastern Utah and Southwestern Wyoming contains the largest, most concentrated quantities of potentially recoverable oil shale in the world. This basin has a considerable amount of oil reserves in it as was mentioned by Senator Hatch. There has been much discussion about proceeding and the thoughtful and deliberate manner. I believe that is just what we have been doing.

Section 369 of the Energy Policy Act of 2005 outlined a deliberate and thoughtful process for approaching the research and eventual commercial development of oil shale. This committee held a field hearing in Colorado in June 2006. Discussions, research, investments were ongoing for several years before either of these actions took place. We’re in the midst of a multi year, thoughtful and deliberate approach.

The 2007 issuance of research development demonstration leases and the December release of the programmatic environmental impact statements were important steps. While it may take many years of research to establish whether commercial leasing is viable. It is essential that commercialization regulations be released so that companies interested in oil shale development know the "rules of the road."

I want to stress the fact that the release of commercialization regulations does not equal offering commercial leases. There's a difference. Commercialization regulations will simply include provisions like what the link, the oil shale leases, the royalty rate and site reclamation requirements.

This is the type of information that companies need to make sound investment decisions about whether commercialization will ever work for them. It is bad business policy to spend millions of billions of millions of dollars building up the commercialization of a product if you have no idea what the environment in which you will be able to commercialize will be. Governments simply must provide a more certain operating environment or oil shale development will never be a reality. Businesses cannot operate in an uncertain regulatory environment.

I'd like to say that I'm pleased that our colleagues and Senator Hatch has also provided that testimony today. We keep talking about technology that is years from producing oil from shale. In Colorado, that is true. But it is my understanding there are companies in Utah that have technology that is ready to go this year. These companies, especially, have a very real need for commercialization regulations.

I will say it again. Business cannot operate in an uncertain, regulatory environment. Without these regs the opportunity to unlock the oil trapped in the ground in Utah could slip away.

If we allow the opportunity to develop this resource slip away it would be a real disservice to the citizens of this country, considering there is well over one trillion barrels of oil locked in the shale beneath Colorado, Utah and Wyoming. This is not an inconsequential amount of energy. One trillion barrels of oil would provide for the current consumption levels at 20 million barrels a day for over 136 years.

I'm hard pressed to understand how some find that that fact is so easy to dismiss. At a time when oil prices remain over \$120 a barrel, we should not be placing unnecessary road blocks in the way of developing additional resources. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. Thank you both very much for your very good statements. We appreciate your presence here at the hearing.

Let me also mention Congressman Mark Udall has also submitted a statement that he's asked be included in the record. We're glad to do that.

[The prepared statement of Mr. Udall follows:]

PREPARED STATEMENT OF HON. MARK UDALL, U.S. REPRESENTATIVE  
FROM COLORADO

Thank you, Chairman Bingaman and Senator Domenici, for holding this hearing. I appreciate having the opportunity to provide this statement for the hearing record.

Oil shale has great potential as an energy source, so it's an important part of our energy policy. And it's important to the taxpayers, who own most of it. They have an interest in what return they will get for this resource. But it's particularly important for Colorado because our state has some of the most important deposits of oil shale, and Coloradans—particularly those on the Western Slope—will be directly affected by its development.

Back in 2005, a report from the RAND Corporation spelled out the great benefits that can come from developing oil shale. But it also made clear it's important for the development to happen in the right way.

The report said oil shale development will have significant effects, not just on the land but also on air quality and on both the quality and quantity of our very limited water supplies.

And it said what Coloradans knew already—large-scale oil shale development will bring significant population growth and is likely to put stress on the ability of local communities to provide needed services.

In short, the report reminded us how much Colorado and our neighbors had at stake when Congress debated the oil shale provisions of the 2005 Energy Policy Act.

The current law appropriately requires the Interior Department to prepare a programmatic environmental impact statement (PEIS) on oil shale. The draft version of that PEIS has been released, and many Coloradans have responded with comments. I think the comments of our Governor, Bill Ritter, are particularly pertinent and well-founded and I encourage all members of the Committee to pay careful attention to them.

But the 2005 law also includes several oil shale provisions that I think are seriously flawed.

In particular, the law requires BLM to proceed promptly toward commercial leasing, regardless of what the PEIS says—and, even before we know the outcome of the ongoing research and development work that Shell Oil and others are doing on R&D leases.

I have been concerned that this risks a rush to commercial development before the Interior Department knows enough to do it right and before Colorado's communities have a chance to prepare for what will follow.

My concern on that point was heightened last year, when the House's Committee on Natural Resources held a hearing at which a witness from the RAND Corporation testified that "the economic, technical, and environmental feasibility of oil shale development is not adequate to support the formulation of a commercial leasing program on the timescale mandated" by the 2005 law and that "the fundamental approach the Department of the Interior is currently taking may be counterproductive if the goal is to keep open the option for a sustainable domestic oil shale industry." I am attaching the full testimony,\* for the information of the Committee.

In response, I worked with the other Members of the Natural Resources Committee to develop revisions to the oil shale provisions of the 2005 law. Those revisions were included in the energy bill (H.R. 3221) passed by the House of Representatives in August of last year. Their purpose was to make it more likely that any commercial development of oil shale occurs in an orderly way that takes full advantage of the important research and development work now underway.

If the House-passed bill had been enacted, the BLM would not be faced with an unrealistic deadline for finishing the programmatic environmental impact statement, and after it was completed they would have a year—not just six months, as under current law—to prepare commercial leasing regulations. And, under the House-passed bill, the requirement would be for BLM to issue proposed—not final regulations, with at least 120 days for people in Colorado—and everyone else—to review and comment on them.

The House-passed bill also called for developing an overall strategy for sustainable and publicly acceptable large-scale development of oil shale in Colorado, Utah, and Wyoming, and it retained the current law's requirement for consultations with the Governors of Colorado, Utah, and Wyoming before any commercial leases are issued.

I think BLM's analysis, as set forth in the draft PEIS, can help us understand what will be involved in any commercial leasing program, even though it cannot and will not answer all the questions. But I believe that revising the oil shale provisions of the 2005 law along the lines of the corresponding provisions of the House-passed bill would be a better way to proceed and one more likely to yield a good result.

The House-passed bill also included a provision I added in the Natural Resources Committee to establish a fund to help local governments pay for infrastructure and services made necessary by future commercial oil shale development. This provision

\*Document has been retained in committee files.

reflected my concern about what large-scale commercial development of oil shale can mean for Colorado's Western Slope and the problems it could bring to that mostly rural part of our state. Coloradans remember the seriously disruptive economic impacts on our communities from previous oil shale development efforts. I think the federal government—if it is going to promote development of this resource again—should also learn from that experience and help mitigate any potential impacts from an oil shale program. That's what this provision was designed to accomplish.

Regrettably, these provisions of the House-passed bill were dropped from the version of last year's energy legislation that was finally sent to President Bush for signing into law. But I still think they would have been a great improvement over the current oil shale provisions in the 2005 Energy Policy Act.

Because of the same concerns that prompted my efforts to amend the 2005 law—and to free BLM from some of that law's oil shale mandates while I worked to amend it—I offered an amendment to the Interior Department's fiscal 2008 appropriations bill to bar BLM from issuing final regulations for commercial oil shale leasing and from issuing commercial oil shale leases prior to October 1st of this year. As you know, the House of Representatives adopted that amendment, which was ultimately enacted and is now in effect. And while some have raised objections to that moratorium, I think it was and remains well-founded.

In conclusion, Mr. Chairman, I commend to your attention Governor Ritter's comments on BLM's draft PEIS for a commercial oil shale program—and in particular his statement that “Colorado supports the research and development approach and continues its continued support of that effort. Once data is available from the research and development projects, it is possible that land allocation decisions can be made and regulatory requirements can be developed. But making land available or promulgating regulations in the absence of underlying data from the research and development projects is reckless and will lead to long-term significant impacts on Colorado.”

I completely agree, and I urge this Committee and the Senate to free BLM from the current law's requirement of pursuing such a course.

The CHAIRMAN. Why don't we call the first panel forward. The first panel consists of Governor Bill Ritter from the State of Colorado and the Honorable Stephen Allred who is the Assistant Secretary for Land and Minerals Management in the Department of Interior.

Yes, let me call on Senator Salazar to go ahead and make some statements here in welcome of Governor Ritter.

**STATEMENT OF HON. KEN SALAZAR, U.S. SENATOR  
FROM COLORADO**

Senator SALAZAR. Let me just at the outset say this is a very, very important hearing for the State of Colorado because we know that that is where 80 percent of the world's oil shale reserves are located. So it is important for us to hear from the Chief Executive of Colorado, Bill Ritter.

Bill Ritter has been the Governor of Colorado now for the last several years. He's been a champion of moving forward in a thoughtful way in the development of our natural resources in the State of Colorado including oil and gas. At the same time making sure that what we're doing is protecting the sustainability of Colorado's precious environment, its land and its water.

So his appearance here before the U.S. Senate Energy and Natural Resources Committee, Mr. Chairman, is very important. We very much are looking forward to your comments.

The CHAIRMAN. Governor, we're pleased to have you here. We know you've come a long way to speak to us. Please, if you could take 6 or 8 minutes and summarize the main points you think we need to understand. Obviously we'll include your entire statement in the hearing record.

[The prepared statement of Senator Salazar follows:]

## PREPARED STATEMENT OF HON. KEN SALAZAR, U.S. SENATOR FROM COLORADO

I want to thank Chairman Bingaman, Ranking Member Domenici, and the Committee Staff for working so hard to put together today's hearing, which is on a topic that is very important to my state: the development of oil shale resources. I would also like to thank our witnesses for taking the time to share their expertise with us today, particularly Governor Ritter and our other Colorado witnesses.

There is no doubt that oil shale offers staggering potential for our energy future. Oil shale deposits in Colorado, Wyoming, and Utah amount to somewhere between 500 billion and 1.1 trillion barrels of oil. That is more than double the proven reserves of oil in Saudi Arabia.

According to the U.S. Geological Survey, 80% of the Nation's oil shale lies within 150 miles of Grand Junction, Colorado. My state is blessed to have these resources. But we in the West are also highly aware of the challenges that oil shale poses. We remember how the energy crisis of the 1970's stirred an oil shale mania, and when this oil shale speculation busted on "Black Sunday" in 1982, devastating Western Colorado.

Today, with oil above \$120 a barrel and gas over \$4.00 a gallon, some people—including some of my colleagues—are once again looking to oil shale as the cure-all for our energy woes. However, it is not clear why commercial leasing of federal lands is even necessary, since industry is not developing the nearly 200,000 acres of oil shale rich lands that they already own or control.

The reality is that we in the West have been working to find an economical and responsible way to develop oil shale for well over a hundred years. There's even a saying in Western Colorado that says: "Oil shale has a bright future—always has had and always will."

However, I do think that some day we will find an economical and safe way to develop our oil shale reserves. Today's hearing is critical in helping us understand the potential of this development and will help us understand the important factors that we must consider in approaching this development.

There are several important issues that I hope our witnesses will be able to address. First, we must determine the economic feasibility of oil shale development. Industry leaders estimate that commercial oil shale production will not even commence before 2015. Second, we need to ensure the protection of our land and water. Furthermore, we must better understand how much water is needed for oil shale production. Lastly, we need to better understand the impact of this development on the hunting, fishing, and recreational resources that these lands have to offer.

Rather than rushing ahead with a commercial leasing program, we need a framework for developing such a program in a sensible way. In addition, if an oil shale process is commercialized, federal assets will be worth far more than today's proposed lease prices.

For this reason, I introduced legislation this week that will allow the voices and expertise of Western communities, scientists, and Congress to shape our country's commercial oil shale leasing program. Specifically, my bill will give the BLM one year after completion of the PEIS to develop a commercial leasing program and proposed regulations, it will require the Department of the Interior to analyze and report to Congress on RD&D programs and technologies, and require compliance with NEPA to name a few provisions. I look forward to working with my colleagues to ensure the passage of this legislation.

We in the West have over a century of experience with the challenges and perils of oil shale development. It is not the quick-fix for our energy problems that some of my colleagues dream of. It is not without impacts to our water supply and our land. And it is not yet ready for commercial development. I hope today's hearing will help us understand the best way to address this important issue.

Thank you.

**STATEMENT OF HON. BILL RITTER, JR., GOVERNOR, STATE OF COLORADO**

Governor RITTER. Thank you, Mr. Chairman. Thank you, Senator Salazar and members of the committee. It is both an honor and a privilege for me to appear here today. I appreciate the invitation to testify.

I would ask also that the written version of my remarks be entered into the record, Mr. Chairman.

The CHAIRMAN. Will be.

Governor RITTER. I'd like to offer special thanks to Senator Salazar for his introduction and as well his leadership on energy and natural resource issues. As I'll discuss I support the provisions of the bill he introduced this week, the Oil Shale and Tar Sands Leasing Act of 2008.

My State, the State of Colorado is home to extraordinary oil shale resources, among the richest in the world. The area's estimated to hold nearly 500 billion barrels of proven oil shale reserves. That's more than double the proven reserves of Saudi Arabia.

Successful development could provide a substantial new source of domestic oil for the United States of America. But past efforts to develop Colorado's oil shale, quite frankly failed, due to technical, economical and environmental challenges. These challenges remain.

Certainly Colorado is ready and able to help this country meet its future energy needs. But at the same time we must be thoughtful and responsible about our approach, especially in light of the magnitude of such development and the potential for significant impacts. I have serious concerns about the pace of Federal efforts to develop a commercial oil shale leasing program before public and private research efforts are completed before we fully understand what the impacts to air, to water, to wildlife and to the Western Slope communities will be.

Potential impacts to the water supplies are an important area for us. We don't know how much water will be needed for large oil shale industry or how those water demands will affect other water users in Colorado. There are questions about environmental impacts on both surface water and ground water quality due to extraction operations particularly when considering its experimental institute technologies.

Regarding wildlife the Piceance Basin contains unique and irreplaceable habitats for a variety of species. Oil shale development could cause significant habitat loss and fragmentation. We do not know the amount of energy that will be needed to process shale oil, the sources or locations of necessary power plants, the impacts of such energy production on air quality and visibility or the greenhouse gas implications.

We also must be concerned about our communities. Where do we house the work force needed to develop our oil shale resources. How do we pay for it? Is it or is our transportation system capable of handling such an influx of workers. Those are just some of the questions that need answering before we move ahead.

Colorado oil shale reserves are located in Northwest Colorado where we're blessed with exceptional resources and a vibrant, diversified economy. The region holds clean coal reserves that are being produced at record levels, a significant oil field that has produced for decades and trillions of cubic feet of natural gas which is being developed at an unprecedented rate. There are currently twice as many drilling rigs and 40 percent more active oil and gas wells in Colorado than there were just 5 years ago. We now have 35,000 active wells across the State.

In 2007 the State issued a record 6,368 oil and gas drilling permits over half of which were in Colorado's Northwest Piceance

Basin. The Bureau of Land Management proposes amending management plans to allow up to 17,000 new gas wells to be drilled in this region over the next 20 years. So I have a particular concern about the potential for significant, cumulative impact when oil shale developments placed on top of the current boom in oil and gas development.

The region of Colorado also boasts a remarkably diversified economy in which agriculture, tourism, recreation, hunting and fishing, natural gas and mineral development, retirement communities and their economic drivers co-exist now in a relatively balanced and supportive way. This economic diversity grew in large part out of the last energy bust. The current energy boom should not diminish the businesses and culture that emerged from that diversity.

Northwest Colorado is a vitally important to Colorado's future. Everything State and Federal policymakers do with regard to this region must protect the resources, values and diverse economies. Colorado is committed to working with the Federal Government and with industry on oil shale efforts going forward. But it requires a thoughtful approach rather than a rush to premature leasing and regulatory decisions that will create legal rights and expectations before we have any understanding of the full impact.

My written testimony addresses two pieces of pending Federal legislation regarding oil shale resources. I want to just touch on them briefly here. First the American Energy Production Act of 2008 would eliminate the current restrictions on the use of Federal funds to publish final commercial leasing regulations or to conduct commercial lease sale.

I want to make it clear that I support the restrictions contained in the 2008 Consolidated Appropriations Act. It will not stop the BLM from finalizing the programmatic EIS or preparing draft rules for oil shale leasing. Nor does it slow or prevent activities on Federal research and development leases. Again, I support a thoughtful, measured approach to oil shale. That means letting research and development activities yield meaningful results before irreparably locking up Federal resources through commercial leasing.

Second, the Oil Shale and Tar Sands Leasing Act of 2008 that I referred to earlier in my testimony. This would eliminate some of the unreasonable timing requirements of the Energy Policy Act of 2005. It would also expand opportunities for me and other Governors from other oil shale states and the public to comment on environmental reviews, the proposed oil shale regulations setting out a more responsible and realistic time line in legislation is consistent with sound policy. Giving Governors, local officials and the public greater opportunity to comment will be valuable for the entire process.

The legislation also calls for an oil shale status report from the Interior Department regarding Federal R and D leaders and for a National Academy of Science Study. I strongly support these provisions. It would do nothing to slow current research and development activities yet they would yield vital information that is now missing from the public debate.

In conclusion I am consistently encouraged by the ingenuity displayed by the companies seeking to develop new oil shale development technologies. However, I am concerned by Federal efforts to

fast track decisions about commercial oil shale leasing including promulgation of leasing regulations. I continue to believe that the prudent course of action is to see the research and development program called for in the Energy Policy Act through so that accurate information be forthcoming about the likely costs, about the risks and the impacts of commercial development activities.

Then and only then might the Federal Government be assured that its rules and regulations can both encourage oil shale development while ensuring a fair rate of return for Federal oil shale resources, protecting the environment and communities of Colorado. On behalf of the people of Colorado, I appreciate the opportunity to speak with you today. I would be happy to answer any questions, Mr. Chairman. Thank you.

[The prepared statement of Governor Ritter follows:]

PREPARED STATEMENT OF HON. BILL RITTER, JR., GOVERNOR, STATE OF COLORADO

Mr. Chairman, thank you for this opportunity to provide the State of Colorado's perspective on oil shale resources. Oil shale development creates significant opportunities and challenges for Coloradans, and all Americans, with respect to energy supplies, environmental protection, water resources, socioeconomic impacts, and national security. From this perspective, I thank the Committee for the time and thoughtful consideration you are giving to reviewing these issues.

Northwest Colorado is home to extraordinary oil shale resources, among the richest in the world, yielding 25 gallons of oil or more per ton of rock. The area is estimated to hold nearly 500 billion barrels of proven oil shale reserves, which is more than double the proven reserves of Saudi Arabia. Successful development of this resource could provide a substantial new source of domestic oil for the United States, which would have positive implications for our national energy policy and national security.

Even though Colorado's oil shale resources are remarkable, they have remained in the ground since their discovery over a hundred years ago. Past development attempts have failed due to a number of challenges—technical, economic, and environmental—that have yet to be overcome, notwithstanding billions of dollars invested by both government and industry. Just as it was 30 years ago during the last push for oil shale development, the State of Colorado is ready to do its part to help the country meet its energy needs. At the same time, we need to be thoughtful about our approach, especially in light of the magnitude of such development. In fact, if the Department of the Interior were to authorize a commercial oil shale industry in Colorado, the development would constitute the largest industrial development in the State's history—with enormous implications for all of Northwest Colorado and for the State itself.

Since coming into office nearly 18 months ago, I have followed with keen interest federal efforts to jump-start a domestic oil shale program. I have strongly supported continuation of the Research Development and Demonstration (RD&D) process, and look forward to continuing to work with the Administration, Congress, and the private sector to make that possible. Once we understand the results from this federal RD&D process and the other efforts that are being pursued on private land holdings, and once we have a clear understanding of viable technologies and the steps necessary to manage and mitigate the environmental and socioeconomic impacts of such technologies, thoughtful and meaningful regulations can be developed and a commercial federal leasing program can be put in place. Establishing a leasing program prior to understanding what technologies are viable and the implications of these technologies would be a dangerous course, with enormous risk of unintended consequences. Such a course of action would not be in the best interest of the nation and certainly not in the interest of Colorado.

This position is consistent with Colorado's previous administration which appeared before this very committee three years ago to urge caution with respect to oil shale development and noted that "oil shale technology development is still fraught with uncertainty". I would like to emphasize that the same is true today. Similarly, I have heard from many local mayors, county commissioners and citizens who support a thoughtful and measured approach to oil shale development. In addition, the Western Governor's Association has expressed in a letter to this Congress that they are "very concerned about the accelerated timetable mandated in the [Energy Policy Act] for the development of a commercial scale oil shale industry." As

the Governor of Colorado, I will continue to emphasize the need to be responsible and thoughtful when it comes to oil shale development.

#### BACKGROUND PRINCIPLES

Colorado will play an active role in any development of the nation's unconventional fossil fuels, particularly oil shale, and has consistently articulated a desire to move forward in a thoughtful and measured manner with regard to shale. We must ensure that projects are fiscally and environmentally responsible, and that our communities are protected from any harmful boom and bust cycle such as we saw in the 1980s. As the epicenter of the oil shale resource in the United States, Colorado has the most to gain if the resource is developed responsibly and the most to lose if the risks are not managed appropriately. While a reliable, sustainable domestic oil-based resource is increasingly important, equally important, from Colorado's perspective, is the protection of the State's exceptional environment, including our water supplies, our clean air, our mountains, and our wildlife. Colorado's oil shale country also boasts a remarkably diversified economy in which agriculture, tourism, recreation, hunting and fishing, natural gas and mineral development, retirement communities, and their economic drivers co-exist in a relatively balanced and supportive way. This economic diversity grew in part out of the last energy bust, and the current energy boom should not diminish the businesses and culture that emerged from that adversity.

For Colorado, then, there is much at stake in the outcome of any federal oil shale program, including the need for thoughtful development of a commercial leasing program through leasing regulations. That is why I am here today: I am concerned that federal efforts to develop a commercial oil shale leasing program are moving forward too quickly, before public and private research efforts are completed, with necessary testing and monitoring to ensure that the impacts to air, water, wildlife, and communities are fully understood.

My testimony today will provide the Committee with background on the area of Northwest Colorado containing the nation's richest oil shale deposits—the Piceance Basin. I will also discuss the status of the federal research and development program, and provide my perspective on pending legislation concerning federal oil shale resources and appropriate steps forward.

#### COLORADO'S OIL SHALE COUNTRY

Northwest Colorado is truly blessed with diverse, exceptional natural resources and a vibrant, diversified economy. While being the epicenter of oil shale country, the Piceance Basin is also home to other world-class hydrocarbon resources. Natural gas, oil, and coal—all vital components of a national energy strategy—are commingled in this same geographic region. This area holds centuries of clean coal reserves that are being produced at record levels, a significant oil field that has produced for decades, and trillions of cubic feet of clean-burning natural gas which are currently undergoing an unprecedented boom in development. There are currently twice as many drilling rigs operating in Colorado as there were just five years ago, and the number of active oil and gas wells statewide has increased 40 percent during this period to top 35,000 wells. In 2007, the State issued a record 6,368 oil and natural gas drilling permits—over half of which were located in the oil shale country of Northwest Colorado's Piceance Basin—and the Bureau of Land Management (BLM) proposes amending management plans to allow up to 17,000 new gas wells to be drilled in this region over the next twenty years.<sup>1</sup> In 2006, natural gas and other energy-related development accounted for 15 percent of direct and secondary employment in the region. Attached is a recent comprehensive economic study of Northwest Colorado forecasting that population in the region will double in the next 30 years due to the boom in natural gas drilling, and that an additional 50,000 people could move into the region if oil shale development were to occur.\*

This hydrocarbon-rich area also supports incredible wildlife resources. The Piceance Basin is home to the largest migratory mule deer herd in North America, a robust migratory elk population, one of only six greater sage-grouse populations in Colorado, populations of Colorado River cutthroat trout, and a host of other wildlife species. These wildlife resources have been built up over millennia, are part of active recovery programs, and are of long-term statewide and national economic, ec-

<sup>1</sup>See Reasonable Foreseeable Development Scenario for Oil and Gas Activities in the BLM White River Field Office: Rio Blanco, Moffat, and Garfield Counties, Colorado, Executive Summary at 3, available at <http://www.blm.gov/rmp/co/whiteriver/documents/RFD-Executive-Summary.pdf>.

\*Attachments have been retained in committee files.

ological, and aesthetic importance. Colorado's future is reliant on these resources remaining strong and healthy.

In the last twenty years, the region has developed a growing tourism industry as well as a vigorous hunting and fishing economy. In 2006, approximately 17,000 jobs were supported by the tourism industry for the region including Moffat, Rio Blanco, Garfield, and Mesa counties—representing about 15 percent of the jobs in the area. About 20 percent of the tourism jobs in Northwest Colorado are in the outdoor recreation segment—or about 3,400 jobs.

The region also sustains a healthy agriculture industry, a vibrant and long-standing ranching tradition, and growing retirement communities. Employment in the agriculture and ranching industry—a 16 billion dollar industry in Colorado—contributes between 6 percent and 15 percent of all base jobs in the counties in this region. Retirees comprise 13 percent of the population in the region, and their spending supports 11 percent of the basic jobs.

As a result of its abundance of natural resources, particularly the growth of the natural gas industry, Northwest Colorado is experiencing extraordinary changes in population and associated challenges. Housing affordability is a significant challenge to these local communities, and the capacity of local communities to absorb growth is already largely consumed. Many workers are housed in hotels and motels rather than conventional housing. Much of the transportation infrastructure in these communities is in disrepair and is being severely stressed by growth. The costs to repair infrastructure will require up-front financing, before revenues become available from traditional sources such as severance taxes, property taxes, sales taxes, and federal royalties.

This region is vitally important to Colorado's future. Everything state and federal policy makers do with regard to Northwest Colorado must protect the resources, values, and diverse economies and interests that have been embodied there for decades. We cannot simply think of this region as an area where development of one resource can supplant protection of other social, economic, and natural resources.

#### MOVING FORWARD WISELY ON OIL SHALE

In 2005, the Congress considered various pieces of legislation related to oil shale resources and ultimately enacted oil shale measures in Section 369 of August 2005's Energy Policy Act. Among other things, the Energy Policy Act called for a research and development leasing program for federal oil shale resources; a regional study of federal oil shale resources and the likely impacts of commercial leasing in Colorado, Utah, and Wyoming; and the adoption of final regulations establishing a commercial leasing program for federal oil shale resources.

Given the significant oil shale resource and exigent national energy interests, Colorado is committed to seeing ongoing oil shale research and development move forward. For example, Shell Exploration and Production has been a collaborative corporate leader in its efforts to develop successful in-situ development technologies and we support their efforts to move forward. State officials also assisted the Department of the Interior in reviewing and narrowing the applications for these federal RD&D leases. The State is currently home to five 160-acre RD&D leases that were issued in 2006. If successful, these research and development projects could set the foundation of a subsequent commercial oil shale industry.

Construction has not yet begun on the federal RD&D leases, and none of the companies looking at Colorado's oil shale are talking about commercial development any time in the next decade. I believe that the projects on federal RD&D leases are critical in showing that new proposed technologies work, that they can be utilized economically, that they will not have unacceptable impacts on Colorado's environment, and that the resulting communities are sustainable. Colorado has consistently maintained that development of the information that will allow us to address historic challenges to development of the resource is a prerequisite to federal oil shale leasing, regulation, and development.

In March of this year, I submitted comments to the BLM on the agency's draft Programmatic Environmental Impact Statement for Oil Shale and Tar Sands Resources in Colorado, Utah, and Wyoming. That document proposes to make nearly 2 million acres of federal lands in the three states—including nearly 360,000 acres in Colorado—available for application for commercial oil shale leases.

Today, I reiterate the conclusion I reached after reviewing the BLM's draft document: the approach put forward by the BLM is unwise. The agency proposes to open nearly 2 million acres of federal oil shale resources to potential oil shale development, yet it lacks information about the technologies that would be used or their impacts on the environment. One is a logical consequence of the other—and we have

neither at this time. The prospect of oil shale development raises a number of significant questions that must be answered before large-scale leasing goes forward:

- We do not know how much water will be needed for a large oil shale industry or how those water demands will affect other water users. The State is rapidly approaching full allocation of its Colorado River entitlements and will soon enter a new period of trading and sharing water between different users.
- We do not know what the environmental impacts will be on both surface water and ground water quality due to extraction operations, particularly when considering experimental in-situ technologies.
- We do not know the scope of potential impacts on wildlife. The Piceance Basin contains unique and irreplaceable habitats for a variety of species, and oil shale development could cause significant habitat loss and fragmentation that would damage important wildlife populations, including greater sage-grouse and big game species.
- We do not know the amount of energy that will be needed to process shale oil, the sources or locations of necessary power plants, the impacts such energy production would have on regional air quality and visibility, or the greenhouse gas implications.
- We do not know how the infrastructure needed to house the incoming workforce will be developed, financed and managed.
- We do not know whether the cumulative environmental and economic carrying capacities of the region have been exceeded, in light of the current natural gas development boom.

Given the information missing from the BLM's analysis, a decision to make 360,000 acres of federal land in Colorado available for oil shale leasing at this time is ill-advised. The State of Colorado, therefore, recommended selection of Alternative A, which would allow activities on federal RD&D leases to continue and potentially expand to commercial leases on over 25,000 acres of federal lands for which the RD&D lessees have preference rights. I am attaching a copy of my comments on the BLM's environmental review for the Committee's use.

For the same reasons that it is inappropriate for the BLM to make land use decisions without results from the federal RD&D leases, it is likewise inappropriate for the BLM to move forward to finalize commercial leasing regulations at this time. The BLM lacks the information necessary to finalize any comprehensive set of rules and regulations for oil shale development. These regulations will establish environmental-protection standards, set royalty rates and address bonding, establish standards for diligent development, determine the allowable size of leases, and make myriad other important decisions that will directly and significantly and irreversibly affect how oil shale development proceeds. Until the basic answers are derived from the RD&D program, establishing the rules for commercial leasing is premature. Promulgating regulations in the absence of the data from the RD&D projects will likely create an illusion of "regulatory certainty" rather than a comprehensive set of regulations that will be viable for commercial leasing and development.

Colorado is committed to working with the federal government and industry on oil shale efforts going forward. But this requires a thoughtful approach rather than a rush to premature leasing and regulatory decisions that will create legal rights and expectations before we fully understand the economic, environmental, and social implications.

#### COLORADO PERSPECTIVES ON PENDING OIL SHALE LEGISLATIVE PROPOSALS

Finally, I would like to offer my perspective on two pieces of legislation concerning federal oil shale resources.

#### AMERICAN ENERGY PRODUCTION ACT, S. 2958

Section 433 of the Consolidated Appropriation Act, 2008 provides that none of the funds made available by that Act can be used to prepare or publish final commercial leasing regulations or to conduct a commercial lease sale for federal oil shale resources. I support this restriction, and recently sent a letter to Congress expressing my desire that this funding limitation continue.

A provision in the American Energy Production Act would eliminate this restriction on Department of the Interior expenditures. I oppose this provision.

The oil shale funding limitation contained in the 2008 Consolidated Appropriation Act will not prevent the BLM from finalizing the Programmatic Environmental Impact Statement or preparing draft rules for oil shale leasing. Importantly, it will also not slow or prevent activities on the federal research and development leases. As I have made clear, I support a thoughtful, measured approach to oil shale, which

means letting research and development activities yield meaningful results before irreparably locking up federal resources with an uncertain fate through commercial leasing.

OIL SHALE AND TAR SANDS LEASING ACT OF 2008, S. 221

This legislation would eliminate some of the timing requirements of the Energy Policy Act and expand opportunities for me and other Governors from oil shale states, as well as the public, to comment on environmental reviews and proposed oil shale regulations. I support these provisions. The Energy Policy Act of 2005 sets out unreasonably ambitious deadlines for preparing regional environmental analyses and adopting leasing regulations. It should be noted that these deadlines have passed. Setting out a more responsible and realistic timeline in legislation is consistent with sound public policy.

The legislation would also direct the Department of the Interior to submit to the Congress a report on the status of activities on federal research and development leases as well as various policy issues surrounding a potential commercial leasing program. It would also call for a study by the National Academy of Sciences concerning oil shale resources, research activities, timing of commercial development activities, and positive and negative implications of such development on the environment and various resources. I strongly support these provisions. They would do nothing to slow current research and development activities, yet they would yield vital information that is now missing from the public debate about commercialization of federal oil shale resources.

Finally, the legislation would provide me and the Governors of other affected states, as well as executives of affected local governments, the opportunity to submit recommendations regarding the size, timing, or location of any proposed oil shale lease sales or with respect to any proposed development or production plans. I support these provisions as well. The State of Colorado and local governments have much at stake in commercial leasing decisions, and I support provisions giving expanded voice to their concerns.

CONCLUSION

The State of Colorado supports a thoughtful approach to oil shale development. I am encouraged by the ingenuity displayed by the companies seeking to develop new oil shale development technologies, but I am concerned by federal efforts to fast-track decisions about commercial oil shale leasing, including promulgation of leasing regulations. I continue to believe that the prudent course of action is to see the research and development program called for in the Energy Policy Act through so that accurate information might be forthcoming about the likely costs, risks, and impacts of commercial shale development activities. Then, and only then, might the federal government be assured that its rules and regulations can both encourage oil shale development while ensuring a fair rate of return for federal oil shale resources and protecting the environment and communities of Colorado.

Thank you for this opportunity to offer the State of Colorado's perspective on oil shale development.

The CHAIRMAN. Thank you very much. Mr. Allred, why don't you go right ahead with your testimony?

**STATEMENT OF C. STEPHEN ALLRED, ASSISTANT SECRETARY FOR LAND AND MINERALS MANAGEMENT, DEPARTMENT OF THE INTERIOR**

Mr. ALLRED. Thank you very much, Mr. Chairman, members of the committee. It's a pleasure to be here and to be on the panel with the Governor. Even though we have different views we have an excellent working relationship as we deal with these issues.

This hearing comes at a particularly challenging time. As you know, oil prices continue to reach record levels almost everyday. These energy prices are affecting our Nation and citizens in a very profound way.

As energy demand continues to rise and you know I have to have my charts\* at every one of these. But as you can see from the chart and I'd be glad to talk about it later in questions. As those continue to rise we must focus on the need to provide for future energy supplies.

The U.S. will continue to be dependent upon oil for the foreseeable future. Oil shale is a domestic resource that if developed, can help to meet that demand. Total U.S. energy use will increase 19 percent while China and India use is doubled.

Over the next 25 years domestic production of all energy resources oil, gas, coal, unconventional and renewable resources is going to be extremely important to our economy. Oil shale holds much potential for addressing that challenge because new sources of energy take such a great amount of time and private capital to develop and to bring online. It is imperative that the Federal Government act now to meet those future demands.

The U.S. Geological Survey estimates total U.S. oil shale resource in place is some 2.1 trillion, 1.5 trillion of which is located in the Green River Basin. That's with a T, trillion barrels of oil. That's primarily located in Green River Basin and then related areas of Colorado, Utah and Wyoming. Even if only a small fraction of this resource is ultimately recovered it could represent a significant impact on the Nation's energy supply. A strategic and conventional task force that's been referred to previously estimates that as much as 800 billion barrels of oil equivalent can be recovered.

In keeping with the direction that's contained in Section 369 of EPACT and on BLM's RD and D program we are working in a thoughtful, deliberative manner to provide the framework for an environmentally sound and economically viable oil shale industry to help meet our future needs. We have taken a three pronged approach. With each element building on the other and that is why promulgating regulations at this point in time is so important.

The three elements are first, the oil shale RD and D projects which were authorized to ensure that oil shale technologies can develop at economically and environmentally acceptable levels.

Second was to develop an oil shale programmatic environmental impact statement to identify the most geologically promising oil shale areas including environmental considerations in the three states.

Third is to develop commercial oil shale regulations that will allow companies to make the investment decisions in the RD and D efforts that are now so important to develop commercial activities at a later point in time.

Six RD and D projects are underway using private capital. The publication of the PEIS has already occurred. We are finalizing the PEIS which incidentally we received over 100,000 comments on and are working on the third prong, developing the regulations. The proposed regulations are now undergoing administration review and should be ready for publication soon.

Proposing and publishing the proposed regulations will provide an opportunity for the public and the interested parties to remain engaged on that important issue. Final regulations which will lay

---

\*Graphics have been retained in committee files.

out the framework for potential commercial operations are vital to both completing the RD and D projects and for industry to agree to commit the significant capital investments that are necessary to bring this important resource to fruition. The regulations will provide clear rules of the road. You can see some of the things on the board that they will include, so that industry will know what will be expected of them.

Based upon my experience in the private sector I strongly believe that we need to promulgate these regulations now to help alleviate the uncertainty and provide the necessary framework industry needs in order to make informed decisions regarding the investment in the oil shale development absolutely assuring the certainty of those regulations would bring. The private sector, I believe, will not be willing to invest the necessary dollars for the research and development that is so important to bring this vast resource to fruition. As you know the 2008 Consolidated Appropriation Act prohibits BLM from spending any funds to publish the final regulations.

I urge Congress to lift that ban on spending 2008 funds in order to allow us to proceed at a pace that will meet the reasonable and thoughtful goals that Congress visioned during the development of EPACT. Publishing final regulations does not mean that oil shale development will take place immediately. In fact, as you'll see from this next slide, this is a long, long process that will take many years to complete. But without the development of the regulations and the certainty they would bring we do not believe that that process can be completed efficiently.

Much work needs to be done before commercial development will take place. As you'll see from the chart, I believe you have a copy of it. The current PEIS is only one of three which will take place. The three NEPA processes will take place before there is any commercial development. Those are full public processes that people will have the opportunity to be involved in.

I appreciate the opportunity to visit with you on this subject and to identify for you the progress we are making. There are many challenges that we will face in completing the program as we go forward. I believe that a delay in finalizing these regulations may discourage private investment in research and development that you and we are so dependent upon.

The uncertainty of the results from not having rules of the road may only affect investments to advance economically viable and environmentally sound oil shale development technology. Thank you very much. I'd be most happy to answer questions.

[The prepared statement of Mr. Allred follows:]

PREPARED STATEMENT OF C. STEPHEN ALLRED, ASSISTANT SECRETARY FOR LAND AND MINERALS MANAGEMENT, DEPARTMENT OF THE INTERIOR

Mr. Chairman and members of the Committee, thank you for the opportunity to participate in this oversight hearing to discuss the development of oil shale resources on federal lands.

I understand the key leadership role this Committee played in the development of Section 369 of the Energy Policy Act of 2005 (EPAct), directing the Department of the Interior to ready itself to meet future requests for the commercial development of oil shale on Federal lands.

This hearing comes at a particularly challenging time as oil prices are reaching record levels, and energy prices are affecting the Nation and our citizens in a num-

ber of profound ways. As energy demand continues to rise, we must focus on the need to provide for future energy supplies. The U.S. will continue to be dependent on oil for the foreseeable future, and oil shale is a domestic source that, if developed, can help to meet this demand. Total U.S. energy use will increase 19 percent and demand in China and India will double. Over the next 25 years, domestic production of all energy resources, oil, gas, coal and renewable energy, will be important to our economy. That is why this hearing is so important today.

Oil shale holds much potential for helping to address this challenge. It is imperative that the Federal Government act now to meet our future energy needs. New sources of energy take a great amount of time and private capital to develop and bring on line. With the legislative provisions concerning oil shale in EPAct 2005 Section 369(d)(2) establishing final regulations for commercial oil shale leasing, we can provide the framework for the development of an environmentally sound and economically viable oil shale industry to help meet our future energy needs. Accordingly, I would urge Congress to repeal the current prohibition on the finalization of the oil shale regulations.

Section 369 of EPAct, which builds on the oil shale research, development, and demonstration (RD&D) leasing program initiated by the Department of the Interior (DOI) in 2004, directs the Secretary to develop a Programmatic Environmental Impact Statement (PEIS) and commercial leasing regulations for oil shale. The concept is a comprehensive three-pronged approach: 1) Permit oil shale RD&D projects to ensure that oil shale technologies can operate at economically and environmentally acceptable levels prior to expansion to commercial-scale operations; 2) develop an oil shale PEIS to identify the most geologically prospective oil shale areas in Colorado, Utah, and Wyoming; and 3) develop commercial oil shale regulations that will allow companies to make investment decisions in RD&D efforts now, so that when technologically, commercially, and environmentally feasible, the Federal government is prepared to move forward to allow commercial oil shale leasing. Each of these steps builds upon the other, and each is executed in an open, public process with full consideration of social and environmental concerns.

Finalizing oil shale regulations is a critical component in realizing the potential of this vast resource. Unfortunately, the Consolidated Appropriations Act for Fiscal Year 2008 prohibits the BLM from spending FY 2008 funds to publish final regulations on oil shale. While the prohibition limits the BLM from publishing final regulations, the BLM intends to publish proposed regulations this summer. These regulations will lay out a proposed framework for potential commercial operations. However, absent the certainty that final regulations would bring, the commercial oil shale industry may not be willing to invest the necessary dollars for research, and this vast domestic resource will remain untapped at a time when our Nation is searching for ways to further its energy security.

#### OIL SHALE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The BLM published and accepted comments on a draft PEIS for the future development of oil shale and tar sands. The draft PEIS is not a leasing document, but will serve to inform land allocation decisions by analyzing the most geologically attractive oil shale areas in Colorado, Utah and Wyoming. Decisions that result from the PEIS will identify lands that may be open to receive applications for future commercial oil shale and tar sands leasing, and will amend 12 associated land use plans. Forest Service and National Park Service lands are not included in the analysis for such development at this time. It is important to note that any future leasing and development will be contingent upon the successful completion of site-and project-specific environmental analyses.

The RD&D projects will identify commercially viable technologies that can provide the basis to conduct the appropriate site-specific environmental analysis prior to leasing.

The draft PEIS was developed with the help of 14 cooperating agencies including the states of Colorado, Utah, and Wyoming, and several local governments from those states. It was published and released to the public in December 2007 for a 90-day comment period. In response to requests from the State of Colorado and others for more time, an additional 30-day comment period was granted. The public comment period ended April 21, 2008, and more than 100,000 comment documents were received and are currently being reviewed. A final PEIS is scheduled for completion late this summer, and a record of decision is scheduled for completion by the end of this calendar year. It is important to note that no leasing will occur until RD&D has produced viable technology and a leasing EIS is completed.

## OIL SHALE REGULATIONS

Section 369 of EPAct also directs the Secretary to develop regulations to establish a commercial oil shale leasing program. The regulations are being developed in keeping with the overall goal of the Act, that a BLM oil shale program is to promote economically viable and environmentally sound oil shale production that augments current domestic oil production while addressing the potential effects of development on states and local communities.

The BLM plans to publish proposed regulations this summer for public review and comment that will provide the roadmap for future industry management decisions. They incorporate applicable provisions of EPAct and the Mineral Leasing Act of 1920 (MLA) that establish oil shale lease size, maximum acreage limitations, and rental rates. The proposed regulations will also address direction in EPAct to establish work requirements and milestones that ensure diligent development of leases. In addition, the proposed regulations will address the key comments received in response to the BLM's August 2006 advance notice of proposed rulemaking.

Moving forward with these regulations does not mean commercial oil shale production will take place immediately. To the contrary, with thoughtfully developed regulations, thoroughly vetted through a public process, we have only set the groundwork for the future commercial development of this resource in an environmentally sound manner. With the administrative and regulatory certainty that regulations will provide, energy companies will be encouraged to commit the financial resources needed to fund their RD&D projects, and the development of viable technology will continue to advance. Actual commercial development and production will be dependent upon the results of the RD&D efforts and more site-specific environmental evaluations.

As discussed earlier, consistent with the language in the Consolidated Appropriations Act for FY 2008, the BLM is not spending FY 2008 funds to develop and publish final oil shale regulations; however, the agency is moving forward in a thoughtful, deliberative manner to publish proposed regulations on oil shale. These proposed regulations will address much of the input already received. The publication of the proposed regulations will provide an additional opportunity for the public and interested parties to comment on the proposed regulatory framework and remain engaged on this important issue.

## RD&amp;D

The DOI has been a leader in advancing opportunities for oil shale technology RD&D on Federal lands. DOI's Oil Shale Task Force, initiated in 2004, examined options for promoting oil shale development on Federal lands, resulting in the RD&D leasing program's initiation in 2005. In 2007, the Bureau of Land Management (BLM), after a competitive process, authorized six oil shale RD&D projects on public lands in northwestern Colorado and northeastern Utah. These projects provide industry access to oil shale resources to further their efforts to develop oil shale technologies. Despite the potential for significant return, investors face challenges in the development of new technologies and uncertainty in the regulatory and administrative arena. Based on my experience in private industry, I strongly believe we need to promulgate regulations now to help alleviate some of this uncertainty, thus providing the necessary framework the companies need in order to make informed decisions to invest in oil shale development both now and in the future.

This type of research will require significant private capital, with an uncertain return on investment. Part of the wisdom of Section 369 is that it envisions the private sector will lead this investment—not the American taxpayer. However, for this to be successful, for these companies to invest the large sums of money, a level playing field and a clear set of regulations or “rules of the road” are required. Developing a regulatory framework now will aid in facilitating a producing program in the future. Impeding the Federal Government's efforts at this stage could significantly impact our ongoing efforts to achieve greater energy security.

## THE CASE FOR OIL SHALE

Declining domestic oil production leaves us vulnerable to rising energy costs. Households across America are struggling to deal with these additional costs and experts predict that the trend is set to continue. In looking beyond traditional energy resources to unconventional and alternative fuels, the Department of the Interior has a key role to play in the development of oil shale.

The potential of the U.S. oil shale resource to serve the Nation's needs is staggering. The U.S. Geological Survey estimates that the total U.S. oil shale resource in place is 2.1 trillion barrels—1.5 trillion barrels of which is located in the Green

River Basin of Colorado, Utah, and Wyoming. Even if only a fraction of this resource is ultimately recovered, it could have a significant impact on our Nation's energy supply. The Strategic Unconventional Fuels Task Force has estimated that as much as 800 billion barrels of oil equivalent could be recoverable from oil shale resources depending on technology and economics, enough to replace the oil we import for more than 180 years.

#### CONCLUSION

Thank you for the opportunity to testify on the progress we are making, and the challenges we face in establishing a program for the commercial development of oil shale on federal lands. As I stated earlier, any delay in finalizing these regulations may discourage private investment in much needed research and development and create a high level of uncertainty that will ultimately affect investments to advance economically viable and environmentally sound oil shale development and technology. I urge Congress to lift this ban and allow us to move forward with the public process of finalizing regulations for commercial oil shale development on federal lands.

The CHAIRMAN. Thank you. Thank you both, Governor and Secretary Allred for your testimony. Let me ask a few questions and then defer to my colleagues here.

On this chart that you have up there now, Mr. Allred, I notice that the actual lease sale is way out on the right hand side of the chart there, as I read it at any rate in Phase III. We're still in Phase I somewhere, I believe, in this R and D research and development and demonstration phase. I'm not sure how far through that we are, but we're in there somewhere.

How long do you see it taking before the BLM would reasonably be ready to conduct a commercial lease sale for oil shale?

Mr. ALLRED. Mr. Chairman, it's many, many years down the road. The first full scale development is—if you look at the chart. The first phase is that which is ongoing now, which is to take the concepts that have been developed by the companies and for those companies to try those out on a very small scale.

Based upon the results of those efforts, the next phase is to scale those up as part of the RD and D project to try them on the preferential leases that we provided in the RD and D program to work out all of the operating issues. Assuming that the technology will work that will be involved in what the third phase is, which is the commercial leasing. One of the difficulties we have is that in addition to answering questions with regard to whether or not they will want to provide the financing to continue with the research and development effort is that we are unable to issue the leases, the preferential leases which are included in the RD and D program until and unless we have regulations in force. So not having the regulations will stop, at some point in time here, the RD and D program from going forward.

But then you can also see from that chart that—once that occurs, we then have to go through additional NEPA analysis as we prepare for any leasing program and that obviously will be based on better information than we have now and can give us more information to make that decision on.

Then once the leasing is done, many years down the road, when we get a plan for development from one of the companies, with regard to their specific lease, we also have to undergo another round of NEPA analysis to make sure that the specifics that are being planned for that particular lease are environmentally acceptable. So as you can see there is a tremendous amount of opportunity for

the public and for the deliberation that needs to take place before this becomes commercial.

The CHAIRMAN. Just sort of following up on that. It would seem to me that to make sense that we get whatever results we can from this research, development and demonstration activity before we finalize what the terms of these leases are going to be. Am I missing something there?

Is there a reason why we should not be postponing—once we finalize these rules that are the subject of this discussion here. Once those rules are finalized, those do create legal rights, as I understand it on the part of potential lessees. Wouldn't we want to know the results of the R and D and demonstration phases before we did that?

Mr. ALLRED. Mr. Chairman, the adoption of the regulations won't create the legal right. What would create the legal right is the issuance of the lease. Those leases will not be issued, I cannot imagine any circumstances where there would be any leasing these companies in the RD and D programs to show us that they have a commercially viable operation that can proceed.

So until that point in time there would be no legal right, other than what's contained in the RD and D program leases. There would be no legal rights established until that leasing had occurred. But by definition that leasing could not occur until such time as we have the information from the RD and D program.

However, I don't think the RD and D program will be completed unless there are some rules of the road.

The CHAIRMAN. Alright. I believe the next person in order of arrival here is Senator Barrasso.

Senator BARRASSO. Thank you very much, Mr. Chairman. The, you know, I think that Congress needs to be particularly cognizant of the signals that it sends in terms of energy policy. Congress really needs to offer a clear, declarative policy framework and not stifle development through off again, on again signals, policies and incentives.

By analogy, Mr. Chairman, I would turn to the renewable production tax credit. Today and in the past Congressional policy is characterized by on again, off again, incentives for wind, for solar and for geothermal energy. While the details matter, jolting government policies are short sighted and lack a predictable vision.

Mr. Chairman, the Energy Act of 2005, Congress identified and clearly articulated a national policy for oil shale and that policy in brief bears repeating. We want to reduce the growing dependence of the United States on politically and economically unstable sources of foreign oil imports. We want to do it in an environmentally sound manner. We want to put emphasis on sustainability. I think the Congress has recognized the promise that oil shale offers for energy security and for national security.

So with that, Mr. Allred, I'm going to just start with some history. As I understand these research development demonstration leases they begin with small leased areas, 160 acres or so and then in preferred option to expand to another maybe 5,000 acres for full commercial development. Are the final leasing regulations required to be complete prior to the expansion of these leases? How is that going to work?

Mr. ALLRED. Senator, the way the RD and D program was initiated and has been implemented was that the idea was first to create the small area, 160 acres, where the companies could do their proof of concept testing and this is to take their ideas to try them out to develop the techniques that they thought would be successful. That is not necessarily proof that they can commercialize it.

Then we provided additional, about 40—600 acres or so. I'm not sure of that acreage, but in that neighborhood where they could take that proof of concept and try it out on a commercial scale. It would not be commercial operation, but a commercial scale. They could sell whatever they could develop. But it would then allow them to try the techniques and gather the operating information that would be necessary for the full scale development at some point in the future.

The way the program was set up is that they receive the first 160 acre lease. The next lease is based upon the oil shale regulations that would be adopted under EPACKT. So we're unable to issue that next step which is where they take their proof of concept and apply it in a more large scale or full scale basis to develop the rest of the information that's necessary.

So from that standpoint we have to have adopted the regulations in order to go to that next step on the RD and D program.

Senator BARRASSO. Then if the Department publishes final regulations regarding a leasing program for oil shale on public lands are there future BLM reviews that would be conducted. You know, future opportunities for public input. How does that all work?

Mr. ALLRED. Senator, the—yes, the process provides a number of different opportunities. Once we are through with the RD and D program. Let me go back to the regulations.

The regulations will be issued here for public review in the near future. There will be the opportunity there for the public and any interested party including obviously the states to review those proposed rules and to provide comments. One of the documents that I had up before and that you have in front of you, lays out the types of things that those regulations would include. They are very similar to our other leasing regulations.

We would then adopt those based upon that public input. At which time we would then use them to make the decisions on the second portion of the RD and D program. Now once that—and we would also have to do an environmental analysis with regard to those leases. But that's a very small amount of land.

Once we then make a decision that the technology is such that it can be commercialized and there is interest in proceeding further on the part of the companies who will be involved, and this would be an open competition, we then have to do another set of NEPA analysis.

That NEPA analysis would inform us with regard to leasing decisions and leasing areas based upon those specific areas. One of the problems right now is you're dealing with two million acres it's hard to get very specific. But when we make specific decisions with regard to leasing, we then can go in and do the NEPA analysis on that specific area and that informs us on how we go about what the requirements are in those leasing documents.

Once we have issued a lease which is the first place the “rights” are established. Then the companies have to come forward to us with specific plans of development on how they are going to do the exact things that they propose to us to do. The regulations will include diligent development milestones.

At that point in time we have to do another NEPA analysis based on that specific plan. Then that is used to inform us as to whether we ought to, not to, approve that plan. So a number of opportunities way down the road for continued public input on those decisions.

Senator BARRASSO. Thank you, Mr. Chairman. My time’s expired. Thank you.

Senator SALAZAR [presiding]. Thank you very much, Senator Barrasso. Let me ask a question to the Governor Ritter. What I have behind me here is a map of the Piceance Basin that essentially shows the level of oil and gas activity that is already underway in the State of Colorado.

Some people have said, you know, we’re not contributing enough to the supply end of the oil and gas challenges that we face. This chart demonstrates in the black, all of the wells that have already been constructed, those that are going to be permitted. I think between 2008 where we are now to 2015 there’s going to be, as I understand it, 50,000 to 60,000 wells in this whole area of the State.

So my question to you, Governor Ritter, is how is the State already making a contribution to meeting the oil and gas and energy needs of the country in this area?

Governor RITTER. Thank you, Mr. Chairman. I think in my testimony I addressed just last years permitting. It was over 6,200 and some permits that were allowed.

We have seen, just in a 5-year period, just an extreme increase in the development of both oil and gas resources with significant impacts to the Western Slope. Impacts that we’re doing all we can to guard against that involve both air quality concerns and water quality concerns, but as well, wildlife impacts. There’s the largest mule deer population in the United States of America is in that Basin right there in Northwestern Colorado. There’s a large elk population as well.

So all of those play into the present activity and we’re being, I think, if you look at just the increase in activity. So much of it around gas production but as well around oil production, I think that the State is doing a significant amount to contribute to the demands placed upon this country, the increased energy demands placed upon this country and that’s just if you think about that Basin and really just about oil and gas.

We’re doing a host of very aggressive things around the production of renewable resources as well around wind and solar and those kinds of resources that are available as renewable. But we consider this an important industry to the State of Colorado. It’s a \$23 billion industry in the State of Colorado.

So we understand its role that it plays in our economic vibrancy. But at the same time we believe that it is important that we not build out the industry and this includes really with respect to oil shale, in a way where we cause irreversible impacts on water and

air quality. I think among our concerns that those would be the greatest.

Senator SALAZAR. Let me ask you another question, Governor and that is relating to water. You know, for us who are from the West as Senator Barrasso knows we say, water is for fighting, whiskey is for drinking and so we know the importance of water in the West and how water is so much the life blood of our communities.

In terms of the water use with respect to oil shale development and the kinds of quantities that are being talked about. Is there a concern about whether or not the water supply is in fact there and available for the oil shale development?

Governor RITTER. There's a great concern and if you think about the Colorado River Basin that most significantly feeds the Piceance Basin. The Colorado River is fully appropriated for Colorado uses.

But it is a part of an Interstate Compact. That Interstate Compact has been the subject of great debate in terms of our ability as an Upper Basin State to provide the adequate amounts under a 1922 treaty to the Lower Basin States and an International treaty that involves the United States and Mexico. So because the Colorado River is such an important Basin River for Upper Basin, Lower Basin and for Mexico, we have to be very careful about water usage and extended water usage.

I know that Shell which is one of the companies that's involved in the RD and D process and really furthest along in terms of Colorado RD and D projects. That is has purchased water rights. There's a great concern on the part of the Front Range which takes some of the Colorado River across to the Front Range, concerns about water availability.

But certainly significant concerns on the part of communities and other kinds of uses on the Western Slope if in fact oil shale development goes forward and it turns out to consume as much water as we suspect to estimate. This is one of the real concerns, Senator, is that we don't know. That's one of the reasons that we come to this place of asking not to do commercial—to write the commercial regulations is because we can't sit here today and say when we take this industry to scale this is what the water consumption will be.

Without knowing that in a place that arid, where you have fully appropriated water rights already over extending the Basin, it is of a great concern to me as the Governor of the State and to many, many people and interests in the Western Slope and other parts of the State.

Senator SALAZAR. Thank you, Governor. My time is up. So I will then call on, let me see who is next. It is Senator Murkowski.

Senator MURKOWSKI. Thank you. I'm announcing to you all that in my State of Alaska we are the first State, I understand, to top the four dollar mark in terms of the statewide average for the price of oil. In a lot of our remote communities, you know, they've been at four bucks and over for years.

So for us in the State, we're looking at anything that will help to alleviate the price of gas at the pump and the price of home heating fuel. When I look at what we have with the potential here in this country for oil shale knowing that the United States has 50

percent of the world's oil shale potential for 2.1 trillion barrels. I'm just—it's amazing to me. I'm used to looking at big numbers when it comes to oil and gas.

In looking at the chart, this is Senator Craig's chart. He had to go to a mark up and wasn't able to be here. But we were talking about it before the committee and to recognize that between the four states here, or three states, Wyoming, Colorado and Utah to have the equivalent of 1.5 trillion barrels is really nothing short of phenomenal. I think we need to appreciate the value of this resource.

Then when you factor in what our technology allows us to do with development of a resource. We've seen up in Prudhoe Bay how the technology has allowed us to move forward with a level of development reducing the footprint, going underground with directional drilling, really being smart in our technology. Governor, I applaud you for what you are doing in Colorado. When Senator Salazar asks you to point out Colorado's contribution to the Nation in terms of energy source and supply, I think it is to be recognized.

I hear your concerns. You always want to try to find that balance between the development of the resource which is so greatly needed, providing jobs for your constituents while at the same time allowing for care to the environment. It's a tough challenge. But I am convinced that we are smart people in this country. We can do it if we put our minds to it and commit to doing it right.

Secretary Allred, I want to ask you about your Phase I, Phase II, and Phase III. Between Senator Bingaman's comments or questions and Senator Barrasso's, I think you probably answered my question. We've got a process in place, proposed anyway, that really is going to take a number of years before we can get to the point of commercial leasing.

Did I understand you correctly though to say that if we fail to put the regulations into place that the RD and D stops or has the potential to stop so that we can't even advance that aspect of oil shale development? I just want to make sure that I'm understanding exactly how we phase through this process.

Mr. ALLRED. Senator Murkowski, that's right probably from two standpoints. The first is the legal standpoint and that in order to go to the what's the second phase we have to have regulations to issue those preference leases so they can go to the full phase.

The second one is that my fear. I think you'll hear more from this or have the opportunity to ask the companies as this as well. But my fear is that without some assurance and certainty that comes from having the rules of the road which would be provided by the regulations, these companies will not continue to invest the kind of money that it's going to take to do the research and the developments necessary.

Senator MURKOWSKI. So they—So you're saying that they want that regulatory certainty before they make that commitment to capital?

Mr. ALLRED. That would be my belief, Senator.

Senator MURKOWSKI. One last question, very quickly. In terms of the known resource up in Alaska for oil shale, we're kind of on the map and it just says, large. Do we know how large, large is?

Mr. ALLRED. Senator, I do not. Obviously there's a lot we don't know about Alaska. Alaska has huge resources. I think we need to understand more as well up there as well as elsewhere around the United States.

Senator MURKOWSKI. Thank you. Appreciate it. Both of you, thank you.

Senator SALAZAR. Senator Sessions.

Senator SESSIONS. Thank you very much. Gentlemen, you know we're not independent actors here. Governor, I know you know we have an ultimate Board of Directors and that's the people that elect us. When I travel about people say they want us to do something now.

So we say nuclear power has potential to help us, but we've killed off the nuclear power industry. It will be at least 10 years before we can get a new plant online. We've got bills that would open up some more of our Outer Continental Shelf or give an option to, not really open it up and that may be years before we pass it. We presume that we prefer to import oil from Venezuela than produce it here.

We see the potential for several trillion barrels of shale oil and that's, Senator Hatch said, a 140 years. But I'm confident if we had 70 or 80 years worth of oil that we could produce out of that oil shale that would transition us into a non carbon age.

You know, I think we're doing the work that will eventually break the back of carbon as the thing that's controlling us. All of which I'm coming around to say that I think we need to do some things now. Mr. Allred, let's say that based on current circumstances assuming no dramatic problems were to occur.

I am told that oil shale oil can be produced far cheaper than we can buy it on the world market. Is that correct? Your best judgment?

I know that you think it happened if we start infecting the water supply, Governor. You cannot allow that to happen or other things that might happen. But I don't think the companies that are investing hundreds and millions of dollars are unaware that if they make those kinds of mistakes they'll be shut down and in a hurry.

They must think there's a realistic possibility of producing large amounts of oil below the current world price. Is that fair, Mr. Allred?

Mr. ALLRED. Senator, I don't think we know what the costs are yet for oil shale development. That's one of the things that we'll find out with the RD and D programs if they go forward. There are two benefits, I think, from additional energy supplies, oil supplies.

If you look at the price of oil, it's—and I'm really going to simplify this. I mean from the standpoint that it's not nearly as simple as I'm going to relate it is. But there really are two components with regard to the oil price, the international oil price.

The first has to do with cost of producing oil. You can get different opinions on that. But for just discussion purposes it might be in the neighborhood of \$60 to \$80 a barrel. Then there is—

Senator SESSIONS. The oil shale.

Mr. ALLRED. Of all oil, oil shale.

Senator SESSIONS. It's less than \$10 I understand in Saudi Arabia, per barrel?

Mr. ALLRED. It is. No, what I'm talking about is a general overall average in the world. Yes, sometimes, in fact I believe there are some places in the United States it may be even less than \$10 on some of the old fields.

But if you look at that price, that initial cost of production is someplace maybe half the current price. The next one is what I refer to as the risk or the opportunity cost. That really is determined by the perception of those people buying oil is to how much they can plan on the oil being there.

So there's two ways to affect the price of oil. One of them is develop new oil. That takes a long time, including oil shale. The second one is try to convince people that it's going to be developed. That has a much quicker impact perhaps on oil.

So as you look at what you do, I think you have both those components so that you could—

Senator SESSIONS. My time is about up. I would just say from what I hear, from the industry spokespersons, they believe they can produce oil in oil shale for less than \$60 a barrel. So that says to me that well, why don't we—if you're talking to my constituents, they'd say well, why don't you guys get together and figure out some regulations. So we can find out if there's environmentally efficient and safe way to produce this oil. Get busy.

I mean that's what it is. That's what I'm hearing. People and I—it's not an answer to say well, this regulation and this year and next year and 10 years we might know whether or not we can produce oil shale. We ought to know now. If we can't do it we might as well find out now.

I would also add, Mr. Chairman, it does produce, I understand, a distillate that's favorable to diesel fuel which gets about a 30 percent, at least, better gas mileage. The Europeans now have 50 percent of their cars diesel. Our diesel prices, unlike Europe, are more expensive than gasoline.

So this could help us also to reduce dependence on foreign oil. So you get oil here that we don't have to spend our wealth all abroad, if it can be made safely. We get a better quality that could allow us to knock down the number of gallons by 30 percent because we're getting more efficiency.

It means we could end this spending \$500 billion a year of American wealth every year to importing. So I guess, I'll submit some questions for the record.

I've got a critical hearing I've got to attend. I would just want us to think that the American people don't want business as usual. They want us to try and move forward with something that will make a difference. Thank you.

Senator SALAZAR. I thank you for having been a part of our Set America Free Coalition. Looking at renewables and efficiency and a whole host of other things that really show how on the energy agenda we can bring together republicans and democrats, conservatives and progressives to try to solve the problems that we face. I will say only one thing to my colleagues here that the problem that we have with oil shale is that this has been a dream of people from way, way back.

It was included in the 1920 Mineral Leasing Act as one of the natural resources that could be leased. Then boom and bust includ-

ing in the 1980s that left the catastrophe in the Western Slope of Colorado. Because of the fact that 80 percent of the oil shale reserves are located in my State I think the way we move forward in exploring the possibilities of this resources is very, very important.

The research and development efforts that are already moving forward with Shell really being the leader in the industry is showing that those R and D efforts are moving forward. So I think there's way in which we can find a way of moving forward. But at the same time allowing this research and development effort underway could be way to be able to provide us with answers to some of the very central questions that we have.

So I want to ask a couple of questions to Secretary Allred. First, I look at your chart on oil shale development on public lands. You have at some point on that chart this little brown dot that says, project completion, Phase III commercial. When do you think that will happen? What year?

Mr. ALLRED. Senator, it's hard to predict that because—

Senator SALAZAR. 2011?

Mr. ALLRED. No, I think—

Senator SALAZAR. 2016?

Mr. ALLRED. Probably in the later half of say, 2015 and beyond.

Senator SALAZAR. Ok. So between 2008 and 2015 whatever happens here will not have any impact of adding additional supply to the oil markets of America? Is that correct?

Mr. ALLRED. Not physical supplies, that's correct.

Senator SALAZAR. Ok. Let me ask you about water availability. Under the Colorado River Compact, as the Governor described, there's a significant share of water of the Colorado River between all of the seven states, Upper Basin, Lower Basin. We had a share of water within Colorado that we are entitled under the Compacts to consume for Colorado water users.

Do you know today how much of that water consumption under those compacts would be required to be able to implement a commercial oil shale leasing program?

Mr. ALLRED. Senator, we do not. That's part of the purpose of the RD and D leases, to try and determine that. Let me point out though that that will be a State decision.

Senator SALAZAR. Let me ask you because of the limited amount of time. I'm going to try to go through some of these questions. Ok.

We do not know how much water is going to be required for oil shale development in Colorado. Because of the fact we don't know whether or not the technology is there to be able to develop the oil shale or what kind of technology is going to be used. That is specifically the purpose for the research and development projects that are underway is for us to be able to develop that kind of information.

Now to do an adequate environmental impact statement on oil shale development wouldn't it be necessary for you to understand, as your developing this program, how much water is actually going to be consumed in the development of that oil shale?

Mr. ALLRED. Senator before there's any decision to do leasing or development we will have that information. There will be a full NEPA analysis with that available information.

Senator SALAZAR. Ok. But we do not have that information now to be able to include it in the programmatic environmental impact statement. You, as the Assistant Secretary of the Department of the Interior, overseeing the BLM, do not have the information to be able to analyze in your programmatic environmental impact statement with respect to how much water will be consumed in the development of oil shale.

Mr. ALLRED. Senator, we do not. But I don't believe that was the reason for the PEIS as defined by the legislation.

Senator SALAZAR. Ok. Let me ask you a couple of other quick questions because I know Senator Barrasso also has some questions. National Parks. The Department of Interior is responsible for the crown jewels of America, the crown jewels that we have in Colorado including units of the National Park system.

According to the draft PEIS of that was issued, the National Park Service has identified eight units. This is from your Department where they say, "have a very high potential for being adversely affected by cross boundary or direct impacts from exploration and development activities and what the PEIS calls a region of influence. They include the Arches, the Black Canyon of the Gunnison, the Canyon Lands, the Capitol Reef National Parks, Colorado Dinosaur and Fossil National Monuments and Glen Canyon Recreation Area."

What is your position in terms of the oil shale development that you foresee occurring and the impact that it would ultimately have on these units of the National Park system?

Mr. ALLRED. Senator, one of the things you have to know in order to do that analysis is what specific proposal for the development will be. So if we have an oil shale project by definition under the Clean Air Act, it cannot affect those monuments.

Senator SALAZAR. Ok. I will have some more questions for you.

But I think your answers to those two questions just on water and on the National Park system demonstrate the point that I'm trying to make here. That is that I think we have a long ways to go before we are ready with the knowledge in hand to move forward with creating the legal set of regulations for commercial leasing of oil shale.

What we were trying to do in the legislation that I introduced this week was to come up with an orderly process that would allow us to provide answers to these questions and would allow the companies, like Shell which has done a tremendously positive job in moving forward in a responsible way, do to the research and development to be able to provide us with the answers to many of these questions that we have.

Senator Barrasso.

Senator BARRASSO. Thank you, Mr. Chairman. I do have a complete statement I'd like to submit for the record, if possible.

[The prepared statement of Senator Barrasso follows:]

PREPARED STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM WYOMING

- Thank you, Mr. Chairman.
- The development of oil shale holds great promise.
- Resources in Colorado, Utah, and Wyoming are estimated to translate into approximately 1.8 trillion barrels of oil.

- Just considering the 800 billion barrels of recoverable oil, this translates into enough oil to meet U.S. demand at current levels for more than 100 years.
- The development of the economically recoverable shale resources hinges on several factors.
- Two of the primary factors include:
  - The economic competitiveness of oil shale when compared to petroleum-based oil and
  - Government policy.
- The benefits to the states of Wyoming, Utah, and Colorado and nation are many and varied:
  - American jobs;
  - Tax revenue at the state, local, and federal level;
  - Royalties for the federal government and the impacted states;
  - Long-term relief for American consumers coping with high prices at the pump and in the form of a hidden, inflationary tax in the goods and services we all consume.
- In the Energy Act of 2005, Congress identified and clearly articulated a national policy for oil shale.
- That policy bears repeating:
  - 1) “United States oil shale, tar sands and other unconventional fuels are strategically important domestic resources that should be developed to reduce the growing dependence of the United States on politically and economically unstable sources of foreign oil imports;
  - 2) the development of oil shale, tar sands, and other strategic unconventional fuels, for research and commercial development, should be conducted in an environmentally sound manner, using practices that minimize impacts; and
  - 3) development of those strategic unconventional fuels should occur, with an emphasis on sustainability, to benefit the United States while taking into account affected States and communities.”
- Congress has recognized the promise oil shale offers for energy security and national security.
- With an appropriate regulatory framework and if the price of oil shale is competitive to that of petroleum-based crude oil, then oil shale will achieve prominence in America’s energy mix.
- Oil shale can provide an important contribution to:
  - Reducing America’s reliance on foreign oil and
  - Meeting the growing energy demands of America.
- If and when it becomes economically and technically viable to develop oil shale, it must be done with utmost care and protection of the environment.
- It must be developed in a sensible, rationale manner.
- Politicians, conservationists, and industry are all expressing similar concerns.
- Those concerns are over uncertainty, such as the timing and content of regulatory frameworks.
- Congress should be particularly cognizant of the signals it sends in terms of energy policy.
- Congress should offer a clear, declarative policy framework and not chill development through on-again/off-again signals, policies, or incentives.
- By analogy, I would turn to the renewable production tax credit or P-T-C.
- Today, and in the past, congressional policy is characterized by on-again, off-again incentives for wind, solar, and geothermal energy.
- While the details matter, jolting government policies are shortsighted and lack a predictable vision.
- Policies governing the development of oil shale deserve the same certainty—certainty for producers, certainty for states, and certainty for affected communities.
- Communities on both sides of Wyoming are coping with substantial energy development.
- On the western side of Wyoming, the community of Pinedale has experienced extraordinary challenges due to recent natural gas exploration and development.
- On the eastern side of Wyoming, the community of Douglas is conducting community assessments in advance of a dramatic and developing interest in both uranium and wind energy.

- County officials representing Pinedale have raised concerns over socioeconomic impacts with folks throughout the Department of Interior, including Stephen Allred, here today.
- I believe there is clearly room for improvement when it comes to planning.
- Part of that obligation rests with Congress.
- Congress should provide a rationale expectation to affected communities.
- This includes insisting on an appropriate and timely regulatory framework.
- Government's role should be characterized by:
  - assistance in meeting challenges;
  - assistance in finding solutions; and
  - assistance in meeting its obligations within the context of a predictable, rationale framework.
- Thank you, Mr. Chairman.

Senator BARRASSO. One quick question. I think, Governor Ritter, I heard you say that the regulations are not needed now until the research is complete because things may change. Did I hear that correct?

Governor RITTER. I think what I hoped to communicate is that establishing the legal framework at this point in terms of writing regulations around commercial leasing seems premature and partly I addressed it in response to the Senator's question regarding water consumption and the fact that we do not know. We do not know the technology that will go forward nor what water will be consumed at all.

So, Senator, we really don't know the power generation necessary to really mine the shale. We don't know the source of that power. If in fact, we get to a place where we understand the amount of power necessary to mine the resource. We don't know what it's—how that will be produced and what its impact will be on greenhouse gas emissions.

So it's all of those things that are really off in the world of the unknown that cause me to say, it is premature to establish a legal framework through the regulatory process and write commercial leasing rules.

Senator BARRASSO. Mr. Allred, if I could just ask you your thoughts on that answer and what your thoughts are on regulations now.

Mr. ALLRED. Senator, it's kind of like the chicken or the egg, the question. But the problem is that we cannot develop the information that's necessary to answer these questions unless we have, we believe, the rules of the road in place by which we would do that.

Senator BARRASSO. Thank you. Mr. Chairman, no further questions. Thank you.

Senator SALAZAR. Thank you, Senator Barrasso. I will point out to Senator Barrasso that I supported his leadership in this committee in a hearing that we had last week in his efforts to carry out a vision for Senator Craig Thomas in connection with the Wyoming Range. In that particular circumstance what Senator Barrasso was trying to do was to find a balance between development and the protection of what makes the Wyoming Range such a wonderful and beautiful place.

In that same way, Senator, this is what we are trying to do in Colorado. Recognizing that we have this level of development where you see all these black dots in this area of Northwestern Colorado where you are seeing a huge amount of oil and gas devel-

opment which is going to increase 12 fold between today and the year 2015. Then placing on top of that this potential for oil shale development drives me and the Governor to conclude that what we want to do is to move forward in a thoughtful way. So that we don't jeopardize the sustainability of what makes places like Colorado and the Western Slope or places like the Wyoming Range such a spectacular place.

Let me ask some—a few more questions if I may of you, Secretary Allred. In terms of air and water quality, as you move forward in putting together your programmatic and environmental impact statement how have you addressed the air and water quality concerns which were addressed in the Governor's written testimony as well as in his oral testimony here before?

Mr. ALLRED. Senator, the regulations will, as with all the rest of ours, depend upon regulations already adopted by the Environmental Protection Agency or by the states. The companies who develop with regard to the oil shale as elsewhere will have to comply with those regulations or they will not be able to operate.

Senator SALAZAR. Let me—one of the things that has been said is that the companies that are interested in oil shale development need to move very quickly in their view beyond the research and development leases. Which have already been issued which were authorized under the 2005 Energy Policy Act, which I worked on in this committee for a long time. Are you familiar with the following numbers?

Exxon Mobil owns already 50,000 acres of oil shale lands in Rio Blanco and Garfield Counties. Red Leaf Resources controls 16,500 county acres in Utah State. A whole bunch. I can keep giving you a number for a bunch of companies, Royal Dutch Shell, 36,000 acres of oil shale lands in Rio Blanco and Garfield Counties.

With that amount of acreage that's already in control of the oil companies that already has an abundant amount, those acres contain an abundant amount of oil shale reserves. Why is, from your point of view, it necessary for us to move quickly to develop the commercial oil shale regulations and then to issue commercial leases for significant additional acreages to this land in an expedited way?

Mr. ALLRED. Senator, that's probably a better question to ask companies that are, I understand some will be here. I have asked that same question. What my understanding is is that the reserves that are on that private land are not the type of reserves that are conducive to the in situ development that are currently being researched in the RD and D programs.

Obviously under EPACT what I deal with are, as you directed, as the committee directed, are Federal lands. I have no authority over what happens on those non-Federal lands, certainly the State does. But that's my understanding. That's the answer I get when I ask that question.

Senator SALAZAR. Ok. Secretary Allred, are you aware that the 2005 Energy Policy Act that was signed by the President was very different with respect to oil shale development than the bill that was part of that which passed out of the Senate in 2005?

Mr. ALLRED. Senator, I'm not aware. At that point in time I was in retirement and not worrying very much about this stuff.

[Laughter.]

Mr. ALLRED. So, I am not aware of it.

Senator SALAZAR. Just for your information. I would ask you and the Department of Interior and the BLM to go back and take a look at that legislative history we put together. I'm proud of the three energy bills that I've worked on in this committee, the 2005 Energy Policy Act, the 2006 Energy Act that opened up Lease Sale 181 and last year's 2005 Energy Efficiency Act.

Good pieces of legislation. Worked closely with your Department and others in getting that legislation done. I would ask you to go back and to look at the 2005 legislative history because in that legislation we essentially put together the concepts for oil shale development in Colorado which are mirrored today in the legislation that I introduced, Senate 3019.

The legislation which we passed out of the Senate back in 2005, passed with a significant bipartisan support and majority here. That legislation went over to the House of Representatives. Many of the protections that we had put in there were simply taken out.

It had been our view back then in 2005 that the way to move forward in the development of oil shale in Colorado and Wyoming and Utah was to move through a process that would take us through a phase where we would do leasing for research and development. Then at a subsequent time, once we knew what the technologies were going to be that could be used for oil shale development to then move forward with the finalization of the program. In those dark days of 2005 someone over in the House of Representatives, I understand his name was Pombo and some other people decided they were going to strip out protections that we had put in here in the Senate.

So my legislation, S. 2016 is simply a way of going back to approaching oil shale development in a thoughtful way. I know you've had a great working relationship with Governor Ritter and the State of Colorado. We do so much with all of the branches of the Department of Interior including the BLM in our State.

You own as I understand, I think it's 33 percent of the State of Colorado. You're our biggest landlord. So we have to have a good and positive relationship with you. I would simply ask you as the Assistant Secretary of Interior to take another look at what we were trying to do back in 2005 and that we now are trying to correct with S. 3019.

Let me at this point, let me give just a few minutes to close up this section of the hearing before we call up the next panel. So why don't we have Secretary Allred, you give us a two to 3 minute closing statement on what you have heard here this morning. Then we'll have the Governor have the last word here.

Mr. ALLRED. Thank you very much. Again it's a pleasure to be here to visit with you. We are trying to do a right both for the people of the United States to preserve things for the Federal Government and for the people of Colorado and Utah and Wyoming. We have a deliberative process. Those are very difficult, as you know in the public policy area.

Our goal is not to do things without being fully informed as to what steps we should take. So we're going to do the best job we can. We're going to follow the law.

We appreciate very much the opportunity to talk about this in a hearing and all of the relationships as we go forward with this committee and individual Senators. Again, I appreciate very much the working relationship we have with Colorado. And even though at times that's portrayed differently than the Governor and I believe it is. It is a good working relationship as it is with all of the delegations that are here.

Senator SALAZAR. Thank you very much, Mr. Secretary.  
Governor Ritter.

Governor RITTER. Thank you, Senator Salazar. Again thanks for your leadership on this issue. I want to echo what the Undersecretary has said in terms of our working relationship.

We found ourselves in different places over the past year and a quarter. But he and I have been able to communicate with each other in a respectful way. Actually there's far more that we agree upon than we disagree upon.

Today I think the disagreement is really a question of timing around establishing the legal framework for commercial leasing. There's a reason we disagree upon it. I won't speak for him. He's done that quite well himself.

But I will just say from the perspective of the State that has the lion share of the oil shale resources and a history with this industry having gone from boom to bust and having a dramatic impact on the communities in the Western Slope of Colorado I think we have a perspective that needs to be heard and that is that we believe establishing that legal framework should come only after we have more certainty ourselves. In terms of the issues that I've talked about today that relate to water consumption, that relate to impact on water quality, that relate to the need for energy to produce this valuable energy resource and the source that provides that energy that we don't know that.

Because we're at a place where the technology we're looking at is very energy consumptive. Again Shell's technology which I'll believe they'll speak to involves a great deal of energy consumption, electron consumption to heat the shale in the ground and get it to a place where you can extract a fluid, or a crude oil from it. We don't know how much it takes. Also ultimately if we utilize for instance a traditional coal fired furnace, what the impact will be on greenhouse gases.

This comes at a time where the State of Colorado as well as the country is looking for ways to reduce the emissions of greenhouse gases. This is right now a technology that could take us in the opposite direction. It's not that we don't want to develop oil shale. We're supportive of the idea. But this is an important resource for the United States of America, for the State of Colorado. But we believe that it is important that we answer these presently unanswered questions before we go forward in establishing the legal framework.

I visited Canada in November of last year. In Canada in the province of Alberta they're rewriting the rules right now around the royalties for oil and gas development and that rewriting of the rules has caused a great deal of uncertainty in investments that were already made.

Our notion is providing certainty is important but it's providing certainty once we know the kinds of impacts that will flow from the technology that becomes the technology for which we utilize to go forward on oil shale development. So I think that's the perspective that you and I probably share, Senator. It is certainly my perspective as the Governor of the State that there is so much in the way of present uncertainty on impact that we need to know before we establish the legal framework. That's really the plea today from me as the Governor of the State.

So thank you again for the opportunity to speak. Thank you, Secretary Allred for just such a thoughtful discussion and really for the relationship that we've been able to maintain. So thank you.

Senator SALAZAR. Thank you, Governor Ritter and thank you, Secretary Allred. The next—you will be excused and the next panel if they'll come up are Jim Hansen from the Oil Shale Exploration Company. Terry O'Connor from Shell Exploration and Steve Smith from The Wilderness Society.

As you are coming up and taking your seats I'm going to take about a four, 5 minute break. I'll be right back.

[Recessed]

Senator SALAZAR [presiding]. Let's reconvene the Energy Committee and hear from our second panel of witnesses. Again this is the U.S. Senate Committee on Energy and Natural Resources. The purpose of this oversight hearing is to receive testimony on the development of oil shale resources.

The second panel is made of Jim Hansen. Jim Hansen is representing Oil Shale Exploration Company of Farmington, Utah. Steve Smith, who is with The Wilderness Society out of Denver, Colorado. Terry O'Connor who last time I had from him he was Vice President, some high level person with Shell Exploration and Production Company also out of Denver, Colorado.

So why don't we begin with you, Mr. Hansen. We'll just go across the board. And if each of you could take up to 5 minutes to summarize your written testimony and all of your written testimony will be made a part of the record.

Mr. Hansen.

**STATEMENT OF JIM HANSEN, REPRESENTING OIL SHALE  
EXPLORATION COMPANY, FARMINGTON, UT**

Mr. HANSEN. Thank you, Mr. Chairman. I appreciate the opportunity of being here. Prior to doing this my last job in Congress I was Chairman of the Committee of Resources in the House. That was before Mr. Pombo, I want to make that point to you right now.

Anyway prior to that I did serve 22 years on that committee and spent an awful lot of time working on oil and especially in Alaska and a few other states which was a desirable thing. Right now I am working with Oil Shale Exploration Company, as you mentioned. In 2007 this company was granted a BLM RD and D lease on the 160 acres known as the White River Mine Site.

The White River Mine Site was one that was very productive where they worked very diligently in the 1970s. That was really composed of Phillips, Sun Oil, Sohio. They came up with a figure. I remember I was Speaker of the House at the time. They came in to talk to me and Governor Matteson.

They pointed out that they felt they could do oil for \$38 a barrel. At that point, at that time I should say, the oil was going for \$12 a barrel. So it wasn't feasible for them to do it. That sat idle for some time until Oil Shale Exploration Company received this RD and D leases they have at this particular time.

I think it's been said many times here today and I won't repeat it about how much oil shale there is in the United States. I guess we could debate about how much is in Colorado, Utah and Wyoming. But there's a lot of recoverable oil shale.

The richest deposits in the Green River formation basically is 1.5 trillion barrels. If you could recover just 800 billion barrels of that, that would supply us for over 100 years. Basically I think what we are is we're the Saudi Arabia of oil shale happens to be in those three states.

Let me point out that as far as we're concerned in Utah and I can't speak for your State or for the State of Wyoming, but as far as we're concerned this isn't a science project. We have a provable technology that we have proven. It is working.

That technology is called the ATC technology that comes out of Canada. It's basically an offshoot of what was done on tar sands in those particular areas. We have proven that. We are in the process of using this horizontal re-torque which basically right now could probably come up with around 3,500 barrels a day.

You brought up the question of oil, or excuse me, of water concerning what you have in the State of Colorado. That is not an issue with us as we have the White River Mine Site and it's really a negligible amount of water that would be used on this technology. That's the technology we're working on.

People always ask well, is that the best one? We think it is right now. Of course, just like maybe we're in the tin lizzie of this type of time. There will be better ones. As better things comes along I think it's only important that all of the companies who are looking at look for some other kind.

Some people have said it would take 12 coal fired generating plants to do it. Not the one, not this crocker, not this technology. It is self generating. Once you start it you take no electricity.

So we feel that it would be a good technology for what we have over in our area. I think people should be cognizant of what happened in Canada. About the time when I was telling you back in the late 1970s when these people were working on the White River Mine Site, the people up in Canada received—had gotten in a big fight with some of the environmental community. They said we'll do it our way on tar sands.

At Fort McMurray they did. I've had the privilege of spending time talking to the people up there and especially the Mayor. They now have an extremely, extremely productive oil process. In fact 40 percent of the oil that we get in your State, my State and a few others comes from that particular area.

What bothers me is the folks in China want that oil as bad as we do. As I understand as we talk there's negotiations going on to try and buy all of that oil with a pipeline that would go from Fort McMurray to the Pacific Ocean. At that point, again, we will be in a little more trouble.

But it's a great analogy because they stayed with it. They had the courage to stay with their program. We backed off. I think if America had stayed on it in the late 1970s we would have an extremely productive oil shale program going at this particular time.

A lot of people try to bring up the idea that oil shale is a new idea. It's not, as you alluded to. In the First World War they used that. In fact in Estonia now, and as a Chairman of that committee I took a CODEL over there and I can tell you that they totally rely on oil shale.

They use a vertical re-torque. I think it's kind of an antiquated idea compared to what we're using. But it seems to work. That seems the one their using.

Probably the Nation that coming on better than any is Brazil, they're using oil shale on a regular basis. Also you have some other nations that are already involved in that. For example, China is starting to do it. Russia is working on it and producing oil shale.

So it's not a new idea. It's not something well let's try it and see if it's going to work. It's not like we're all in high school and college working on these things. It's a provable thing that will work.

Actually the question always comes up on environment. I totally agree that you should be environmentally friendly, have no argument with that. That makes a lot of sense.

On the other side of the coin, if you look at most of this area and I invite people on a regular basis, come on out and look at it. What is there in the State of Utah where we're looking? It's called sage brush and more and more sage brush. It's kind of like, if I may respectfully say this without getting clobbered here, would be the Grand Staircase Escalante which is 95 percent sage brush.

But anyway, maybe that's beautiful to the eyes of some. I guess beauty is to the eye of the beholder. But in this instance, that's what we have there is sage brush.

Will there be some disturbance? Of course there's disturbance. Just like every time you build a road. Every time you put in a bridge. Every time you build something there's some disturbance.

Senator SALAZAR. Will you take another 30 seconds and wrap up?

Mr. HANSEN. I'll wrap up. But in this particular case, that refuse can be used. In China they make bricks out of it. We've talked to people about using road base. I think road base would make a good idea.

I appreciate your giving us an opportunity to speak. I worry sometimes. I can't speak for the industry, but just for myself as a past Congressman and past Speaker of the House and someone who is extremely interested in energy development. It bothers me that it seems that some way sometimes we find Congress and some other people opposing these things.

I think it should be done correctly. I agree with that. But still on the other hand I would hope that the people in America would say this is a valuable source. It's something that will help solve the energy problem of America which in my mind is extremely critical at this time. I thank you, Mr. Chairman.

[The prepared statement of Mr. Hansen follows:]

PREPARED STATEMENT OF JIM HANSEN, REPRESENTING OIL SHALE EXPLORATION  
COMPANY, FARMINGTON, UT

Mr. Chairman, Members of the Committee, my name is Jim Hansen and I am testifying on behalf of the Oil Shale Exploration Company, more commonly known as OSEC. I appreciate the opportunity to testify before this Committee to discuss the most critical energy source for our nation's future, oil shale.

US OIL SHALE RESOURCE

The United States is blessed with many natural resources and still has huge, untapped energy resources in its oil shale deposits. Over 70% of the world's oil shale resources occur in the United States and the richest deposits are in the Green River Formation in Colorado, Utah and Wyoming. These deposits contain over 1.5 trillion barrels of shale oil. If only 800 billion of this can be recovered, that alone would supply all of our current domestic petroleum needs for the next 100 years or more.

ELSEWHERE WORLDWIDE

Oil shale deposits are found in at least 15 other countries worldwide and some countries rely on the production of these domestic resources to meet some or all of their needs. Currently shale production is taking place in Brazil, China, Estonia and Russia and development efforts are underway in Israel, Jordan, Australia, and Morocco, as well as elsewhere.

PAST US EFFORTS

The presence of oil shale in both the western and eastern states has been known for over 100 years. Early oil shale operations in the eastern US were terminated when natural oil wells were developed in Pennsylvania in 1859. The discovery of rich oil shale in the western United States drew attention during World War I as the shortage of oil prompted exploration for unconventional fuels; there was a rush to develop these western oil shale resources and the country looked to oil shale as its future fuel supply. In 1920 the Mineral Leasing Act was passed to allow the government to lease its oil shale land at a manageable pace. Then, shortly thereafter, the vast oil deposits in west Texas and Oklahoma were discovered and oil shale lost its attraction.

During World War II, oil shale was again looked upon as the answer to our military needs and the government established an oil shale research center at Anvil Points, Colorado managed by the Bureau of Mines. Following the war, interest again waned and the Alaska oil fields and imports seemed sufficient to meet the nation's needs.

The OPEC oil embargo in 1973 again forced the nation to look at its domestic oil supplies and the government issued its first ever oil shale leases in Colorado and Utah in 1974. The Synthetic Fuels Corporation was established by the Carter administration in 1980 and it finally looked as though the nation was going to do something to diminish its reliance on imported oil. Then, the world oil prices declined in the 1980s and all of the government programs were abolished and the dozen major oil shale projects were terminated by 1985.

Between 1985 and 2005 the nation had no concerted effort to develop its major unconventional fuels, including oil shale. During this same period, Canada was developing its oil sands resources and today is producing well over one million barrels/day, much of it exported to the US. The oil sands industry of Canada is a tremendous success story and production continues to increase. If the US had maintained its oil shale program after 1985, we would be producing shale oil in this country today.

Again, between 1985 and 2005, there was no federal oil shale program, no significant budget, no policy and no leasing of federal oil shale resources. Finally, the 2005 Energy Security Act offered industry an opportunity to lease federal research parcels of 160 acres each. Congress decided once again that it was time to consider oil shale, especially since the government controls over 80% of the western resource and nothing was going to happen unless the government made federal land available.

CURRENT US PROGRAMS

The 2005 Energy Security Act demonstrated that the US government might finally encourage the development of these valuable oil shale resources. The nation's production of crude oil has been declining since the 1970s while its demand has continued to increase, making the country increasingly dependent on imported oil and much of the foreign supply is controlled by nations unfriendly to the US. Oil shale

is the largest untapped domestic resource with the greatest potential to decrease our dependence on foreign oil.

Recent reports completed by DOE and by the Unconventional Fuels Task Force, working with DOE, DOD and DOI, clearly document the value of the US oil shale resources and show that the nation, under the right government programs and leadership, could be producing up to two million barrels of shale oil by 2030.

However, there are lingering questions about our ability to produce shale oil in this country. Most of these questions center on key issues such as: (1) is the technology available and will it work on a large scale?; (2) can shale oil be produced profitably?; (3) can shale oil be produced in an environmentally responsible manner?; and (4) what are the socio-economic impacts going to be on the local regions where these developments occur?

The 2005 Energy Security Act set out to answer these questions and industry has stepped forward to cooperate. The plan is to go slow and answer those questions during an interim research program that precedes huge commercial development efforts. There were six research, development and demonstration leases signed in 2007; five of these in Colorado (three to Shell, one to Chevron and one to EGL Resources) and one in Utah (Oil Shale Exploration Company). Each of these companies has active programs underway. There are other companies working on private and state lands. Each of these projects is working to answer the same crucial questions, although their technical approaches might differ. Commercial development will not occur until investors are convinced that the risks are manageable and that the government is supportive.

So, oil shale is again garnering some attention but not nearly at the level justified. Industry is anxious to ramp up its research programs but it needs the assurance that the federal government is a willing, cooperative partner. Oil shale requires an expensive, high-risk, long-lead time development program and the federal government controls most of the resource and will ultimately determine whether or not shale oil is ever produced at a level sufficient to improve our economic and national security.

Industry was burned in the past when federal oil shale programs were discontinued and proposed leasing programs were terminated. We can't continue to start and stop these programs. The nation can't afford to delay any longer; it is time to make a national long-term commitment to oil shale and other unconventional fuels.

#### OSEC AS AN EXAMPLE

In 2007 Oil Shale Exploration Company (OSEC) was granted a BLM RD&D lease on the 160 acres surrounding the idle White River Mine site in Uintah County, Utah. The mine had been developed by Sun, Phillips and Sohio on the BLM commercial prototype oil shale leases Ua and Ub granted in 1974; when the price of oil dropped and the federal oil shale programs were abandoned in the early 1980s, the companies relinquished the leases in 1985 and the mine reverted back to the government. It has sat idle for over 20 years!

OSEC has initiated an aggressive research program at the site. Its approach is to use conventional underground mining and surface processing of the oil shale through a retort plant. This is in contrast to the in-situ technologies being researched by some of the other projects in Colorado.

In September 2007 OSEC tested 300 tons of Utah oil shale in a retort pilot plant in Calgary, Canada. The test program was very successful and OSEC is currently securing permits to reopen the White River Mine and continue its technology demonstration program, which is focused on answering remaining questions on the technology, economics and environment.

As the OSEC project matures, future expenditures will be in the hundreds of millions of dollars for research and demonstration prior to the final decision on whether or not to build a commercial plant at a scale of 50,000 barrels per day or more. As the level of the expenditures and the risks increase, OSEC, like other oil shale development groups, is asking itself where the federal government stands on oil shale.

The DOE has essentially no oil shale program at this time, even though oil shale produces excellent transportation fuels, including crucial jet fuels and diesel fuel important to the military. DOD is very interested in fuels from shale oil but is getting little direction or funding. The BLM is being told to slow down the proposed commercial leasing program and delay issuing regulations.

Before OSEC can justify more expensive research on the federal RD&D lease, it would like to know the terms of the preferential lease it might secure if its research is successful, as it believes it will be. The terms of that future commercial lease will depend on the leasing regulations, now delayed.

## NEED FOR A FEDERAL OIL SHALE PROGRAM

From industry perspective, it appears as though the federal government is opposed to developing oil shale. While federal programs have assisted research and development programs for solar, wind, biomass, ethanol, coal bed methane, clean coal and so on, there is currently very little being done with the unconventional fuels (oil shale, heavy oil, tar sands, and coal-to-liquids) which have the most potential to increase our domestic supplies and improve our national and economic security.

The world oil supplies are decreasing and world demand is increasing as countries industrialize and populations grow. The US global leadership position is jeopardized by the growing power of the OPEC countries that control the world's oil supply; many of these countries are adversarial. Their control of the world oil supply and prices threatens our standard of living and our national security. We cannot afford to further delay efforts to develop our domestic oil shale resources. We have already lost the past 20 years and cannot afford to continue putting off this decision.

While we need to consider all energy supplies, including an aggressive energy conservation program, most of these will have only minor impacts on our fuels shortfall, while costing huge amounts of money and demanding extensive resources that might be better directed elsewhere. It is time to consider the 800 pound gorilla that we have been neglecting all too long, oil shale.

## DOMENICI BILL

We appreciate the fact that Senator Domenici and his co-sponsors recognize the problem and are willing to address it head on. These are dire times and will only get worse if the US doesn't address the energy issue. The world is watching as the US fumbles and squanders opportunities. It is time for bi-partisan leadership to come forth and co-sponsor a program that will get us on the course to a meaningful domestic energy program that is more than fancy, feel-good window dressing. This bill can get us started in the right direction and we are prepared to offer further suggestions and assistance. It will take many years of dedicated, cooperative effort between government and industry. Industry is willing to do its part if it is assured that the government is committed and will stay the course.

Senator SALAZAR. Thank you, Mr. Hansen.  
Mr. Smith.

**STATEMENT OF STEVE SMITH, THE WILDERNESS SOCIETY,  
DENVER, CO**

Mr. SMITH. Thank you, Mr. Chairman and members of the committee for this opportunity to highlight some key environmental issues that must be addressed as Congress and Federal land managers consider the possible development of oil shale resources in sensitive arid Western states. My name is Steve Smith. I live in Glenwood Springs, Colorado, 30 miles from one of the richer deposits of oil shale and within 100 miles of what is projected to half of the world's supply of oil shale.

Over the past 19 years living there I've watched the local people, communities and economies slowly recover from what was the disaster of the last oil shale experiments in our county. That disaster was a result of Federal attempts to move oil shale too quickly with artificial acceleration and unsustainable subsidies. It is essential that Congress learn both from the mistakes of that past experience and from currently evolving research to cautiously craft and implement oil shale policy.

I am also Assistant Regional Director for The Wilderness Society in Colorado and Utah. I encourage you to carefully consider four basic facts. No technology or company is anywhere near being ready to develop oil shale at commercial scale.

Research into the technical and environmental feasibility of various oil shale technologies is barely begun on Federal lands already leased for that research with tangible results seven to fifteen years

away. Oil shale companies have long owned or had access to extensive amounts of oil shale rich lands. Yet no commercial oil shale production is taking place there.

Finally the production and consumption of oil shale would result in immense amounts of energy consumption with corresponding huge increases in greenhouse gas emissions with significant negative impacts on the global climate. The oil shale research and policy sequence outlined in the Energy Policy Act of 2005 is a logical one. The Act however, is forcing that sequence into an unwise, accelerated pace and schedule.

Commercial leasing should be considered only if and when technical difficulties of oil shale production are solved. When negative environmental and social effects of commercial development including climate effects are fully understood and avoided or mitigated. I'm particularly concerned with Mr. Allred's reading of the Energy Policy Act to say that leasing on the preferential research parcel that was 5,000 acre chunks could proceed immediately on completion of these commercial oil shale leasing regulations.

I'm also concerned under the same logic or his same reading of that Act that those regulations put in place for what he called Phase II of the research would be held over and applied to the much larger scale commercial leasing program later without the benefit of learning from that Phase II and therefore adjusting the regulations before going to a larger scale operation. As I noted extensive undeveloped oil shale resources, perhaps as much as three million acres are already controlled by oil shale companies and have been for over two decades.

Even so no commercial production has occurred on those lands. I think it's prudent for Congress to ask the companies with those holdings how it is that they are seeking access to additional Federal lands while they haven't yet seen it to be useful to develop commercially on the lands they already have. For all the energy potential oil shale has it must be taken considered in the context of the other features and benefits of the land's communities that are near where that resource lies.

Particularly we have a concern about the inputs of energy and water, as you've highlighted, Mr. Chairman, that are needed for oil shale production and the effects that those inputs would have on the local landscape and on the global climate. According to the Rand Corporation report on conventional fuels, oil shale production of 100,000 barrels per day would require 1.2 gigawatts of dedicated electric generating capacity equal to the largest coal fired power plant now operating in Colorado. Such a plant would cost \$3 billion to build, consume five million tons of coal a year and produce ten million tons of greenhouse gases. The off touted 500,000 barrels per day production level would obviously have even larger effects.

Recently regional water agencies have estimated that 500,000 barrels per day oil shale industry itself, just the production would require 25,000 acre feet of water annually. Either from new sources or diverting from existing ones which in this region in this part of Colorado at least, is primarily from agriculture and the laws of crop lands and other soil covering—the benefits of irrigated agriculture in that would be a significant difficulty as well.

Each of these factors exacerbates impacts on global climate in a spiraling inter related cycle. As you produce more energy to produce the oil shale you add greenhouse gases which adds demand for further energy. To respond to it domestically you reduce the supply of water as the climate begins to heat up and change even as this industry is needing more water.

To sum up I think it's essential that all of these factors be thoroughly and thoughtfully analyzed in depending final programmatic EIS and in other analysis before any decisions are made about leasing of Federal lands for commercial oil shale production. Oil shale holds a potential contribution to our energy supply if carefully considered in the important context of communities, the natural environment and the climate itself. Thank you very much, Mr. Chairman for this opportunity to offer some remarks.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF STEVE SMITH, THE WILDERNESS SOCIETY, DENVER, CO

Thank you, Mr. Chairman, and members of the committee, for this opportunity to highlight some key environmental issues that must be addressed as Congress and federal land managers consider the possible development of oil shale resources in sensitive and arid western states.

My name is Steve Smith. I live in Glenwood Springs, Colorado, 30 miles from one of America's richer deposits of oil shale and within 100 miles of what is projected to be half the world's supply of oil shale. Over the past nineteen years living there, I have watched the local people, communities, and economy slowly recover and revive from what was the disaster of the last oil shale experiment in our county.

That boom-bust disaster was the result of attempts to move oil shale too quickly with artificial acceleration and unsustainable subsidies. It is essential that Congress and federal land managers learn both from the mistakes of that past and from currently evolving innovations when—cautiously—crafting or implementing oil shale policy and activities.

BASIC FACTS

I encourage to carefully consider three basic facts:

- Oil shale production technology still is slowly evolving. No technology—or company—is anywhere near being ready to develop oil shale at commercial scale;
- Research into the technical and environmental feasibility of various oil shale technologies is barely begun on federal lands already leased for that research;
- Companies with interest in oil shale already own or have access to extensive amounts of land containing oil shale ore; and
- The climate impacts of oil shale development—both from the use of produced fuel and from the immense amount of energy needed just to produce it—are serious concerns that must be addressed before proceeding with anything approaching commercial scale production.

OIL SHALE, AN IMPORTANT POTENTIAL RESOURCE

This possible source of fuels warrants careful consideration, both of its potential contribution and of its potential effects on other important values and resources. As you know, various provisions of the Energy Policy Act of 2005 direct the Bureau of Land Management:

- to make federal lands selectively available for research and development activities for oil shale and tar sands resources; several such leases have been awarded;
- to analyze, through a programmatic environmental impact statement, the environmental, economic, and social impacts of potential commercial oil shale and tar sands development in three western states; preparation of that PEIS continues; and
- to adopt new regulations for commercial leasing of oil shale and tar sands, and if there is sufficient local interest and support, potentially lease federal public lands for commercial oil shale production.

That is a logical sequence—to research carefully whether public lands should be opened to oil shale development and, if so, how. The pace of that sequence, as imposed by the 2005 Act, is now proving too ambitious and too hasty.

None of the research intended on federal lands leased for that purpose have begun. Indeed, at least two of the research leasing companies with research leases have announced their intention to rewrite their original research leasing proposals or to revise their research plans.

Meanwhile, the PEIS process is moving deliberately but slowly, which is appropriate, considering the large amount of land and water potentially affected and the significant amount of key information that just is not known.

It just makes sense to take all the time needed for a thoughtful review of the research results from the preliminary research leasing program before considering any public lands leasing for commercial oil shale production—and before attempting to craft commercial leasing regulations.

Federal managers, local citizens and their leaders, and the industry itself need additional time to evaluate whether and how well the new oil shale extraction technologies work and how they could affect local economies, communities, and the natural environment so key to both.

Commercial leasing should begin, if it begins at all, only if and when technical difficulties of oil shale production are solved and when negative environmental and social effects of commercial development—including climate effects—are fully understood and then avoided or mitigated.

#### CAREFUL RESEARCH BEFORE CONSIDERING COMMERCIAL DEVELOPMENT

Even recent innovations in oil shale production include many very new ideas and accompanying unknowns. The BLM is currently evaluating five in-situ oil shale research and development proposals in Colorado, each using technology that is the first of its kind. Nowhere on the planet has large-scale oil shale development occurred using the in-situ techniques being considered in Colorado's Piceance Basin. For all the effort and investment it has expended, the oil shale industry is in its infancy, and each of these is a one-of-a-kind operation.

The BLM should let companies conduct extensive—and long-term—research and development activities—and carefully evaluate the results of that research—before it considers holding a commercial lease sale.

	Technology		Commenced test operations?	Time to commercial decision	Time to initial commercial operations	Time to production growth	Federal Lands (acres)
Chevron	In-situ	ICP - Hot gas frac. (suspended)	NO	10-15 years	12-16 years	>20 years	160
Shell #1	In-situ	ICP - Electrostatic heaters	NO	7-10 years	12-16 years	>20 years	160
Shell #2	In-situ	ICP - Bare electrode	NO	7-10 years	12-16 years	>20 years	160
Shell #3	In-situ	ICP - Nahcolite, then shale (suspended)	NO	7-10 years	12-16 years	>20 years	160
AMSO	In-situ	ICP - Natural gas heat source	NO	7-15 years	12-16 years	>20 years	160
OSEC	Surface retort	ATP rotary retort	NO	Unknown	12-16 years	>20 years	160
Shell Mahogany	In-situ	ICP	YES	7-10 years	12-16 years	>20 years	

Interim production.—This sound, cautious approach to—indeed, strategic postponement of—commercial oil shale leasing on public lands does not mean foregoing oil shale energy production. In fact, the potential resource recovery from the BLM research-and-development leases themselves is very large. According to the Plans of Operations submitted with the research lease nominations, the estimated in-place oil shale resources for the 160-acre Colorado tracts are 284 million barrels, 280 million barrels, 300 million barrels, 274 million barrels, and 356 million barrels, respectively. Thus the total resource to be conveyed in the research-and-development leasing program alone is approximately 1.5 billion barrels in place.

We note that this number does not represent the amount of oil that would be recovered, but rather the “resource in place”. Because we do not yet know the potential recovery rate for the development methods proposed by research lessees, it is difficult to estimate the number of barrels that could actually be recovered. At a 70% recovery rate, which might be possible with the newer in situ processes, these

research leases stand to deliver over 1 billion barrels of oil over their life, which would represent a substantial domestic supply.

In addition, the companies holding research leases have already nominated 4,960 acres of federal land preference rights adjacent to each of the research lease tracts. Once they demonstrate the viability of their technology, the BLM can confer the additional acres for development. Until and unless experimental leases can definitively demonstrate high rates of recovery and effective environmental protections, larger tracts should not be offered for what would be speculative commercial leasing.

Commercial leases offered later in time also will be likely to generate greater returns to the federal treasury. This view was supported by the Congressional Budget Office (CBO) when it evaluated legislative proposals to mandate large-scale oil shale and tar sand leasing in the next five years. The CBO found that because the technology to successfully develop shale has not yet been developed, bonus bids for commercial leases would be insignificant over the next five years.

In addition, CBO found that any increased receipts from early lease sales would be offset by forgone receipts from sales that would otherwise occur later, when the technology has been developed, as well as by administrative costs. Leases will simply be more valuable when potential lessees know what they will be able to do on them.

Extensive undeveloped oil shale resources are already in private hands.—If oil shale and tar sands were a commercially viable resource to substitute for more traditional fossil fuels, surely some of the extensive oil shale and tar sands resources already in private hands would be under commercial development. They are not.

Oil shale and tar sands resources in private hands are extensive within the Green River Formation. For example, according to an April, 2006 Department of Energy Report, approximately 3,000,000 acres of oil shale and tar sands resources are in non-federal ownership in Colorado, Utah and Wyoming, and hold in-place reserves of approximately 360 billion barrels of oil equivalent (DOE, Office of Naval Petroleum and Oil Shale Reserves, “National Strategic Unconventional Resource Model,” April, 2006, p. 6).

Several prominent companies either own outright or control large oil shale or tar sands resources, according to both federal government and industry sources. For example,

- ExxonMobil owns 50,000 acres of oil shale lands in Colorado’s Rio Blanco and Garfield counties alone;
- Red Leaf Resources controls oil shale leases of about 16,500 acres on Utah state lands;
- Great Western Energy, LLC owns or controls oil shale leases on 16,500 acres of state lands in Uintah County, Utah;
- Millennium Synfuels, LLC controls approximately 34,000 acres of oil shale leases in Utah;
- Royal Dutch Shell owns 36,000 acres of oil shale lands in Rio Blanco and Garfield counties Colorado ;
- The Oil Shale Exploration Company controls over 45,000 acres of oil shale lands in Colorado.

These six companies control over 200,000 acres of oil shale and tar sands resources, but none of these companies have moved forward with any plans to commercially exploit the resources under their control.

Moreover, at least some of the oil shale resources in private hands have been characterized by the United State Geological Survey as among the richest in the Piceance Basin in terms of barrels of oil equivalent per acre. For instance, at a hearing before the Senate Subcommittee on Mineral Resources Development and Production of the Committee on Energy and Natural Resources held on October 16, 1987, regarding the patenting of 82,000 acres of old oil shale claims, testimony was presented regarding USGS estimates that 42 billion barrels of recoverable oil equivalent were present within the 82,000 acres patented. Royal Dutch Shell, though not an original patentee, acquired a substantial proportion of those 82,000 acres of patented oil shale claims, which apparently comprise the lion’s share of its holdings in the Piceance Basin. Shell, though carrying out a robust research program, has not moved to commercial production of these resources. According to the same hearing record, between 1920 and 1980 the federal government issued patents on over 345,000 acres of oil shale claims in Colorado, Utah, and Wyoming. None of these claims are in commercial production.

It seems to us that before the Congress lifts the current moratorium on commercial oil shale and tar sands leasing—which could result in the imprudent transfer of additional tens of thousands of acres of oil shale and tar sands resources into the hands of companies that already possess large inventories of these resources—it

should find out more about the status and nature of the extensive oil shale and tar sands resources already in private hands. The USGS likely has information in its possession describing the nature of these resources, since much of it apparently derived from patents issued prior to the late 1980s. It would be prudent for Congress to find out from the companies holding these extensive private resources why they are pressing to acquire more federal resources, when they have not found it opportune to develop that which they already possess.

#### PROTECTING THE ENVIRONMENT AND CLIMATE

Even as technological improvements advance, however, researchers and policy-makers must fully consider and integrate into the oil shale equation the protection of our communities, our water, our wildlife, our clean air, and the scenic beauty of this region, as well as a better understanding and avoidance of climate impacts from this potential industry.

The public lands in question, in northwest Colorado, northeast Utah, and southwest Wyoming, certainly have large energy potential. Those lands already are producing unprecedented volumes of oil, natural gas, and coal for regional and national energy needs, and they contain a very large theoretical volume of additional energy from oil shale.

Those same public lands also include integrated and critical wildlife habitat, popular hunting and other recreation opportunities, water supplies for local agriculture and communities, and astounding scenic wonders. For all its energy potential, the oil shale country must be considered in the larger context of natural and public values. Correspondingly, any energy policies affecting those lands must protect those other, more enduring and more complex values and the region's tourist-and recreation-dependent communities that rely on those natural features.

Energy inputs.—The amount of energy needed, as an input, to make oil shale production work is immense. Traditional, above-ground retorts must heat mined and pulverized oil shale to 900 degrees Fahrenheit, consuming 40% of the energy value produced from the shale itself. Even in the new in-situ heating technique, underground electric heaters must bring the ore to 700 degrees Fahrenheit and hold there for up to four years!

The Rand Corporation's report, *Oil Shale Development in the United States, Prospects and Policy Issues*, prepared for the U.S. Department of Energy last year, notes that oil shale production of 100,000 barrels per day (less than one half of 1% of U.S. daily oil consumption), using the so-far most advanced in-situ underground heating retort technique, would require 1.2 gigawatts of dedicated electric generating capacity. That equates to construction of a dedicated power plant equal in size to the largest coal-fired plant now operating in Colorado. Such a plant cost of about \$3 billion to build and would consume five million tons of coal each year, producing ten million tons of green house gases.

A 500,000 barrels-per-day industry—the scale projected by some oil shale enthusiasts—would require five such plants, 6 gigawatts of new electric power, an amount equal to that generated from all of Colorado's existing coal-fired power plants.

Although some small amount of that electric generation might be fueled by natural gas, a by-product of the in-situ process, most of it likely would be fueled by the abundant coal supplies in the vicinity, prompting additional technological challenges in providing carbon sequestration and particulate air pollution control.

Water.—The region underlain by oil shale is notably arid, with relatively low annual rainfall, and existing over-commitment of existing water supplies and facilities. Against that dry backdrop, the Rand report cites the Office of Technology Assessment's projection that traditional oil shale operations require between 2.1 and 5.2 barrels of water to produce one barrel of shale oil product. While the new in-situ processes may require relatively less water, the Rand report notes that "considerable volumes of water may be required for oil and natural gas extraction, post-extraction cooling, products upgrading and refining, environmental control systems, and power production."

The BLM projected in 1996 that oil shale (by traditional methods) would reduce the annual flow of the White River by up to 8.2 percent and "would result in the permanent loss or severe degradation of nearly 50% of BLM stream fisheries."

More recently, local water agencies have estimated that a 500,000 barrels-per-day oil shale industry itself would require 25,000 acre-feet of water annually, either from new sources or diverted from existing uses, noting that such supplies of water adequate for the newer oil shale extraction technologies might not be available and, even if they are, might not remain available in a changing global climate.

Additional water would be needed for domestic and municipal uses in response to significant growth in population centers near the oil shale production areas.

All of these water factors should be—and are not—thoroughly analyzed in the PEIS and other comprehensive reviews to provide information essential to decisions about the possibility and timing of commercial-scale oil shale leasing and development.

Air quality.—The Rand report notes that there were no publicly available analyses regarding how modern pollution control systems could be incorporated into oil shale production facilities, and that further studies would be needed to determine the extent to which nonpoint-source air emissions (i.e. dust and off-gassing) from both surface and in-situ operations could be prevented or controlled. Rand also found that no studies of the cumulative impacts of oil shale development on air quality had been reported since the 1980s. Because so much has changed in terms of air-quality regulations, mining and process technologies, and pollution-control techniques, the earlier air quality analyses were found to be no longer relevant. Rand characterized available studies on air quality effects of oil shale development as “so out of date, it is not possible to provide an analytically based estimate of the extent to which air quality considerations will constrain the technology profile, pace of development, and ultimate size of an oil shale industry.”

Additional air quality study and modeling must be completed before making decisions about commercial oil shale production.

Climate impacts.—Each of these factors—energy inputs, water use, air pollution—exacerbate impacts on the global climate in a spiraling, interrelated cycle.

As energy production increases to power oil shale development, corresponding significant releases of greenhouse gases would contribute to a reduction in water supplies, either reducing the amount of water available for oil shale production and energy generation or requiring diversion of even more water from other uses.

As agriculture is by far the largest user of water in northwest Colorado, loss of irrigated cropland and soil cover may contribute further to the climate change cycle.

Increasing global temperatures would increase demand for domestic electricity consumption, either competing with power production for oil shale or requiring still more power generation, with still more greenhouse gas emissions, etc.

These dynamics stack on top of the direct climate impacts that would result from the burning of oil shale fuels themselves.

As noted, the energy required to extract oil from shale will likely result in the generation of huge quantities of greenhouse gas emissions. The 6 new gigawatts of electricity needed to power that 500,000 barrels production level could generate up to 60 million additional tons of carbon dioxide per year—according to EPA data, that would be a 45% increase in the carbon dioxide emitted by all existing electric utility generating units in 2005 in Colorado, Wyoming, and Utah combined.

Due to the required energy inputs, the fuels derived from oil shale would have a carbon footprint that is substantially higher than conventional fuels. Researchers at the University of California reviewed the global warming contribution of the leading oil shale extraction technologies, as well as the emissions released when the fuel is burned, and found that the fuels derived from shale would lead to substantially greater carbon emissions than from conventional fuels. For example, the Alberta Tackuk Processor, an above-ground extraction technique now being pursued by Oil Sands Exploration Company (OSEC) on a federal research and development lease, produces between 37.5 and 40.8 grams of carbon equivalent per unit of delivered energy, compared to an average of 25 grams of carbon equivalent for conventional fuels.

None of these climate impact factors—primary or secondary—are adequately addressed in the current PEIS process, if addressed at all. More complete analysis of these factors must be completed before informed decisions about commercial-scale oil shale leasing or production can be honestly or effectively contemplated.

All of these factors must be thoroughly and thoughtfully analyzed in the pending programmatic EIS and used as the basis for decisions about where oil shale activities will be allowed, and where they would not be appropriate and so will not be allowed, and at what pace development should proceed.

#### CONCLUSION: GO SLOW, GO CAREFULLY

Oil shale holds a potential contribution to our energy supply. Researched carefully, developed prudently, and considered in the important contexts of communities, recreation, and the beauty and natural environment of these wondrous states, it might be able to make that contribution without destroying longer-term resources and values. We do not know enough at present, however, to conclude that it can be done safely or efficiently.

Congress and federal land managers should, in careful consultation with states and local communities, learn from the oil shale research leasing program before beginning any commercial leasing or commercial production on public lands.

The oil shale will be there when we are ready to develop it in a truly sustainable and environmentally sound manner. We should not venture too fast until we are.

I invite your questions on that document, on my comments today, and on any other opportunity that we may have to help with your work and consideration.

Thank you again for this opportunity to address the committee.

Senator SALAZAR. Thank you, Mr. Smith.

Mr. O'Connor.

**STATEMENT OF TERRY O'CONNOR, SHELL EXPLORATION AND PRODUCTION COMPANY, DENVER, CO**

Mr. O'CONNOR. Yes, thank you, Senator. I'm delighted to be here today for a number of reasons. Not the least of which is—I guess I should turn that on shouldn't I?

That you and I have always considered ourselves friends as we've known each other for many years prior to each of our present positions. So I'm delighted and honored to appear before you today and talk about Shell's activities. In so far as our 27 years of development of in situ conversion process technology on oil shale is concerned.

In 1981 Shell commenced development in our laboratories and in some of our lands in Houston on a radically different type of a technology. Unlike any that has been tested in the past on oil shale anywhere else in the world by any other company in the world called the in situ conversion technology. Unlike prior technologies which involved the development of mining operations bringing the rock to the surface where it was crushed and cooked and re-torque.

Our technology involves literally drilling lots of holes into the ground and dropping down electric heaters. Slowly heating the rock over a period of a few years up to certain temperatures at which we're able to see a remarkable break down of some of the hydrocarbon molecules. That allows us to recover a very light end liquid that's relatively easily processed into diesel jet fuel and naphtha which is used for gasoline as well as a substantial amount of natural gas that can be used for a multitude of different purposes.

We commenced our research as I said in 1981. In 1996 we went on to some of our lands that we owned that have been referred to earlier in this hearing. I hope one of you will ask the question about why we're not looking at developing those commercially. But I'd like to get on the rest of my testimony before we get into that.

We have developed five separate R and D field projects. We've now completed each of those five that were developed sequentially. Through the course of that 10-year period from 1996 to 2007 we've been able to demonstrate that at least on a small scale this ICP technology absolutely does work.

We're able to model and predict and then produce the type of product under the time constraints, the type of mixture and the quantities that we had previously predicted. Our challenge now is to determine whether or not we can do this on a large commercial scale and do it in an economically feasible, environmentally acceptable and socially sustainable manner.

That's where I'd like to talk for the remaining minutes this afternoon. We're currently involved in a very large and complex freeze

wall test. We've got a picture of the freeze wall test in the back of my testimony today as well as a couple of other pictures.

We won't be completed with that until late in 2009 or well into 2010 perhaps. But that technology in just a few words, is designed to protect our activities from Colorado's precious ground water. I will say today and I don't know how to say this any more forcefully, that unless we can clearly demonstrate both to our Royal Dutch Shell Board of Directors as well as to the various Federal and State regulatory authorities that we can and will protect the precious ground waters of Colorado, we will not proceed at commercialization. That's what this freeze wall test is all about to make that demonstration.

It also, before we proceed into our RD and D three pilot projects we want to see preliminary results from this. That is a large part of the reason why we're waiting for another year or so before we proceed into those R and Ds. The research and development program that was originally proposed by BLM and sanctioned and endorsed in the Energy Policy Act of 2005, we believe is the right way to start out in a slow and methodical manner to proceed with testing untested procedures such as what we're looking at.

We thank BLM and Congress for enabling that. We also want to thank the Department of Energy and its unconventional fuels task force some of its very good strategic work. That's looked at in terms of looking at the impacts of oil shale development from a strategic domestic energy standpoint.

In sum we'd like to—I'd like to comment very quickly on two issues that are really of concern to us. One you've already heard a fair amount about is whether or not regulations should be developed. We're frequently asked, well, you don't really need regulations now if you're not going to make a commercial decision until the middle part of the next decade or perhaps later. Our answer is that yes, we need them. We desperately need them now.

It's no coincidence that no one has ever developed a large scale commercial project on oil shale anywhere in the world. The reason why in the past is because yes, the technologies have been perhaps, not where they should be. But in addition this is a very steep, difficult hill to climb.

If we don't have regulations that can at least give us a sense of destination in terms of what needs to be done. Not just on regulations but operating rules and environmental rules. It makes that hill very, very steep to the point where there's a serious question whether we're not really even be able to proceed with our R and D projects in the future. We think that there are opportunities for us to resolve these problems and we'd like to have discussions around those in the coming days.

One final point just to touch on before I conclude is another provision in the Energy Policy bill, Section 526 prohibits the use by any Federal department or agency of the use of any fuels that are produced from unconventional or alternative fuels. There's not much legislative history on that. But it would seem to be geared perhaps at some of the oil sands in Canada, perhaps oil shale. We don't know.

But we do know this. That Canada is now the largest provider of oil into the United States and to the extent that creates a bar-

rier for the importation of fuels from our friends to the North. We think that is very bad public policy. We think both of those provisions need to be eliminated, amended or dealt with in some positive fashion.

In closing I'd like to note that the two above mentioned policies, we've learned a lot, undeniably, drive the United States to greater dependence on imported sources of domestic oil or imported sources of fossil fuels. As our domestic energy demands grows as it will in the coming decades so does our reliance on imports. Shell well understands our need to balance our needs for reducing greenhouse gas emissions and dealing with the plethora of environmental issues that need to be dealt with and to balance those with our domestic energy needs.

Shell is investing heavily in renewable technologies with the view that in the latter part of this century that we hope we will be largely a renewable society. But for much of this century the oil shale can and should be a critically important bridge to our renewable energy future. Thank you very much and I can take questions.

[The prepared statement of Mr. O'Connor follows:]

PREPARED STATEMENT OF TERRY O'CONNOR, SHELL EXPLORATION AND PRODUCTION COMPANY, DENVER, CO

Chairman Bingaman, Ranking Member Domenici, and Members of the Committee: I am pleased to have this opportunity to speak with you today on the topic of oil shale development in the United States.

Let me begin by discussing the broader global energy challenge that we face today. Shell believes, and our Chief Executive Officer Jeroen Van der Veer has stated, that there are three hard truths about our global energy future:

First, the global demand for energy is accelerating . . . not just growing, but accelerating. The reason is that China and India in particular are entering the energy-intensive phase of their development.

Second, the growth rate of supplies of 'easy oil' will struggle to keep up with growing energy demand.

And, third, increased use of coal, plus the overall dominance of fossil fuels, will cause higher CO<sub>2</sub> emissions, possibly to levels we deem unacceptable. More energy means more CO<sub>2</sub> emitted at a time when climate change looms as a critical global issue. Even though it is predicted that fossil fuels will still be a major part of the energy mix by mid-century, Shell is committed to CO<sub>2</sub> reduction through effective and stable regulatory frameworks. These measures should also serve to enhance energy efficiency and promote alternative energy.

(Quoted from Jeroen van der Veer Speech—The Resources Trilemma between Efficiency, Social Justice and Security—St. Gallen, May 31, 2007)

The recent National Petroleum Council study on "Hard Truths" noted most of the same issues that Shell sees in our future and recommended a series of necessary actions, including:

Expand and diversify production from clean coal, nuclear, biomass, other renewables, and unconventional oil and natural gas; moderate the decline of conventional domestic oil and natural gas production; and increase access for development of new resources.

Oil shale is America's most concentrated fossil fuel resource and one of the largest oil resource deposits in the world. There are also oil shale deposits in Australia, China, Estonia, Jordan, Morocco and other nations. The Green River Formation covers portions of Colorado, Utah and Wyoming. According to the Rand Corporation,

Estimates of the oil resource in place within the Green River Formation range from 1.5 to 1.8 trillion barrels," of which between 500 billion and 1.1 trillion barrels is recoverable. They continued, "the midpoint in our estimate range, 800 billion barrels, is more than triple the proven oil reserves of Saudi Arabia. Present U.S. demand for petroleum products is about 20

million barrels per day. If oil shale could be used to meet a quarter of that demand, 800 billion barrels of recoverable resources would last for more than 400 years.

As of today, U.S. demand has passed 21 million barrels per day, on the way to 22 million barrels per day. And demand is increasing.

Clearly, this resource represents a significant strategic advantage for the United States and, if developed, would increase U.S. energy security.

Oil shale is a marlstone containing kerogen, an immature hydrocarbon laid down millions of years ago as plants and animals died and drifted to the bottom of an ancient lake that then covered large parts of Colorado, Utah and Wyoming. Left in current form, kerogen would slowly form into liquid oil and natural gas through increasing temperature and pressure over millions of years.

In the late 1970s and early 1980s, large energy companies joined forces with the U.S. government in an attempt to develop this resource in an era of significant global energy stress. The initial attempts to develop oil shale required mining the ore and heating the shale to temperatures near 1000 degrees Fahrenheit in large surface kilns called retorts. When global energy prices collapsed in the 1980s, the expensive energy and water intensive surface retorting projects were abandoned, leaving western Colorado in an economic downturn that persisted for many years. While other energy companies exited their oil shale research, Shell stayed on, although with a radically different technology.

From 1981 to today, Shell has pursued a deliberate but cautious approach to the research of new oil shale extraction technologies. Over the course of the past quarter century and more, and without seeking any financial subsidies from the U.S. government, Shell has pursued the development of a very different and unique method called In-Situ Conversion Process (ICP) technology for oil shale recovery on our privately-owned Mahogany property in Northwest Colorado. The process involves inserting heaters directly into the underground shale formation and heating the rock to roughly 700 degrees Fahrenheit. This heating causes the kerogen molecules to crack, transforming them into lighter-end hydrocarbons that then can be produced using conventional means. The heavier end of the carbon chain molecules is left behind in a solid and immobile state. We have determined that the product produced is roughly one-third gas and two-thirds light transportation liquids, with an API gravity of 36 or better.

Shell has pursued this research on our private Colorado land since 1981. We have developed and completed five complicated field tests of various heater and groundwater protection technologies. In 2005, Shell conducted its most recent field test, called the Mahogany Demonstration Project South. This field test, which followed our predicted production models very accurately, produced approximately 1800 barrels of light liquid and gas. This particular test has convinced Shell that our ICP technology indeed works. Now our challenge is to determine if it can work on a long-term, sustainable commercial basis.

Our current research efforts are focused on groundwater protection research, as Shell is committed to developing oil shale in an environmentally responsible manner. The Shell private property Freeze Wall Test (FWT) will build, dewater, stress, break and then heal an impermeable wall of groundwater ice. Although Shell's application to oil shale development is unique, freeze wall technology is not new and has been used effectively for many years in the mining and construction business. We drilled closely spaced wells to a depth of approximately 1700 feet around an area the size of a football field and circulated a super-cooled liquid through a closed pipe network down those wells to remove the heat and eventually freeze the groundwater in place creating a "wall of ice" that prevents communication of water between the heated area and lands outside the freeze wall. Then we pump out water from the inside of the ice canister we have created. As an analogy, imagine an empty barrel standing in a river.

It is not our intention to perform any heating activities inside this particular freeze wall at the current time. Rather, we will test the durability of the freeze wall and prepare the concept for deployment on our Research Development and Demonstration (RD&D) leases. The freeze wall test is absolutely critical to future Shell oil shale development plans because, unless we can clearly demonstrate both to our Board of Directors and to the various federal and state regulatory authorities that we can and will protect the precious ground waters of Colorado, we will not proceed to commercialization. You may ask, "How can Shell expect to surround an area that will reach 700 degrees Fahrenheit with a wall of ice?" The answer is that the shale is not a particularly good conductor of heat. Therefore, a small buffer zone is created around both the area to be heated and the freeze wall to prevent heat communication between the separated areas.

As our research moves forward, we are grateful to have the opportunity to perform needed tests on BLM land through the Research Development and Demonstration program created by BLM and sanctioned by Congress in Section 369 of the Energy Policy Act of 2005. The U.S. government's support for cautious and careful oil shale development in Colorado is particularly critical inasmuch as approximately 75 percent of the oil shale-rich Piceance Basin of northwest Colorado is owned by the U.S. government and managed by BLM. We thank Congress and the BLM for the creation and implementation of the RD&D program. Shell believes that the opportunity to test new technologies in the most geographically prospective areas is a smart path to a sound and sustainable oil shale development policy for the future.

In late 2006, Shell applied for and received three 160-acre RD&D leases in the Piceance Basin. Our applications proposed to test a new, energy-saving heater-type on the northern lease, to test oil shale and nahcolite recovery together on the southeastern lease, and to perform a field test simulating commercial conditions of the ICP technology on the third lease. According to the leases, each 160-acre research test pilot is surrounded by a roughly 5000-acre-sized Preference Right Lease area. If the lessee can show that it is capable of producing "commercial quantities of shale oil from the lease," the lessee will earn the right to expand the surrounding Preference Right Lease area, subject to the payment of an undetermined conversion fee (presumably to be established by regulation).

Shell hopes to perform separate pilot projects on each of the three RD&D lease areas, to evaluate differing commercial variants of the ICP technology and then to apply to convert these leases to commercial-scale oil shale development projects sometime in the middle part of the next decade.

We also thank the Department of Energy and its Unconventional Fuels Task Force. This group has conducted a number of valuable studies on the feasibility of creating an oil shale industry here in the United States. Its findings have been interesting and, in some cases, quite enlightening. If you have not had an opportunity to review these DOE studies, I encourage you to do so. We very much appreciate the assistance and encouragement of the Department of Energy and the Department of Interior and their respective divisions and agencies dedicated to responsible oil shale development. At Shell, we will live up to their charge (which is also our charge) to develop this tremendous domestic resource in an economically viable, environmentally responsible and socially sustainable way.

The BLM recently closed the comment period on the draft Programmatic Environmental Impact Statement for Oil Shale and Tar Sands. Shell submitted significant and detailed comments on the PEIS. We believe that the final PEIS and the future regulatory structure of oil shale development are critical keys to both corporate investment in research projects and the eventual development of this vast U.S. energy resource. The draft PEIS delineates the significant safeguards to both the land and the people of the Rocky Mountain west. The number of NEPA procedural tollgates set forth in the PEIS will ensure that development of oil shale takes place in a cautious and environmentally sound manner.

In sum, I would like to comment on two issues of concern to Shell and other companies involved in research and development of new technologies to develop oil shale.

First, in December 2007, Congress passed and the President signed a spending bill that included a provision that states:

None of the funds made available by this Act shall be used to prepare or publish final regulations regarding a commercial leasing program for oil shale resources on public lands pursuant to section 369(d) of the Energy Policy Act of 2005 (Public Law 109-58) or to conduct an oil shale lease sale pursuant to subsection 369(e) 8 of such Act.

It appears that such a moratorium may likely remain through the next fiscal year, leading us to believe that the moratorium on potential future development of America's vast oil shale resource may be intended to become permanent in nature. The extension of this moratorium may well have a chilling effect on our efforts to develop this resource in the future. Ironically, preventing BLM from issuing regulations around any oil shale regulations also could have the unfortunate effect of undermining our efforts to develop carbon minimization solutions, as they would relate to oil shale development. Major commercial scale decisions for development take years to research, design and analyze. Although we are still in the research phase of our development activities, we would be helped greatly by regulatory stability on everything from diligence requirements and royalty rates to conversion fees and operating and environmental standards in order to make informed decisions, even in the RD&D stage that will lead to responsible development.

Shell has always pursued a thoughtful and cautious approach to oil shale development in order to prevent a repeat of the past oil shale boom and bust cycle. We expect to invest substantial capital in each of our three small but rather complex RD&D projects to demonstrate that our ICP technology is economically viable, environmentally responsible and socially sustainable. The long history of unsuccessful attempts to responsibly and economically develop oil shale illustrates the significant risks for investors in research in oil shale. Lack of clarity about the economic and environmental regulations governing a potential commercial development of oil shale will add significant additional risk to our potential research investment. Shell urges Congress to allow the BLM to create such a regulatory framework.

Second, the 2007 Energy Bill contained a provision (Section 526) that prevents federal agencies from contracting to purchase fuels produced from alternative fuels if the carbon footprint of those fuels may exceed certain limits. Such a provision is not only harmful to U.S. energy security, as we already receive significant oil supply from Canadian oil sands, but also will be extremely difficult to administer as gasoline and diesel fuels are mixed from various sources in refineries. And let us not forget that our friends to the north now provide more oil to the United States than any other country on Earth. Congress should act to repeal this provision.

Shell understands that the Governor and the Colorado delegation believe that oil shale should be developed in an economically viable, environmentally responsible and socially sustainable way. At Shell, we share this desire. However, preventing the BLM from completing needed regulations or preventing the government from contracting for unconventional fuels is not the way to achieve this end. The BLM has placed a series of safeguards in the draft PEIS on oil shale to prevent uncontrolled leasing and development, including several required NEPA actions before a project can be approved. These federal safeguards are in addition to a host of stringent county, state and federal permits required from 47 separate regulatory agencies to assure protection of the environment. It is time for us to work together to make this tremendous American resource a reality of our energy security.

In closing, I would like to note that the two above-mentioned U.S. government policies will undeniably drive the United States to greater dependence on foreign sources of energy. As our domestic energy demand grows, so does our reliance on imports. It does not have to be this way. Shell understands the global energy and climate challenge. We also understand that the use of fossil-fuel-based energy will be with us for many decades into the future. Shell invests heavily in renewable energy technologies and we are committed to growing our portfolio over time, but for much of this century, oil shale can and should be a critically important bridge to a renewable energy future.

Thank you again for the opportunity to speak with you today.

Senator SALAZAR. Thank you, Mr. O'Connor. Let me start out with you, Mr. Hansen. You describe a technology which is different from the institute technology that Shell is using at the Mahogany Project. Can you—and you say your technology is ready to go? It's not science. It's up and running?

Describe to us how—what kind of water use—describe your process to us, the ATC technology that you currently are using in Utah.

Mr. HANSEN. It is a horizontal re-torque. I'm not an engineer or technol, but it takes very little water. It does take some electricity to get it going. And then it generates itself.

It can handle about 25,000 tons a day. And we had legislators from—

Senator SALAZAR. How far along—

Mr. HANSEN. I'm sorry. Excuse me.

Senator SALAZAR. How far along are you in terms of developing the technology?

Mr. HANSEN. Of course, the one that I'm referring to has been built and it's in Canada as we speak. So we took some people up to look at it from the State Legislature in Utah. Out of it came sweet crude at the end. They were very impressed when they came.

We intend to take that and take it down to the White River Mine Site. Now the White River Mine Site which a lot of folks don't un-

derstand is underground. It is not above ground. It's not a strip mining type of operation.

Senator SALAZAR. Let me just ask you because of limited time here. The ATC technology which your company currently uses, you're adopting that from Canada. Are the oil shale or tar sands that are being used to develop the fuel in Canada similar to the oil shales that you would find in Utah?

Mr. HANSEN. The process, I couldn't explain their process. But they are the ones—this people developed this particular horizontal re-torque that we're taking down to Utah. Yes.

Senator SALAZAR. I'm not trying to be unfriendly. I'm trying to find out what is happening with the horizontal re-torque in Utah today. Is it a project—

Mr. HANSEN. We're trying to put it in.

Senator SALAZAR. You're trying to put it in.

Mr. HANSEN. The problem we've got is what everyone has alluded to is the idea until the regulations go through and I can't speak for Shell or any of these others, but these large companies can probably stand the financial problem of waiting for that to come on.

Oil Shale Exploration Company has got some people in it that they're well healed, I'm sure. But we're a little company. We're the little guys. That's why we would be the first. We would be the first to start.

Actually if we could ever get this regulation thing worked out. I would think in this year or next year we'll be developing on the first re-torque that we'll put in there. Then the possibility is always there which we intend to do is to put more re-torques on that particular property that I'm referring to which is called the White River Mine Site.

Senator SALAZAR. Mr. Smith, can you comment from your perspective on the issue of water supply that might be used with respect to oil shale development and if you were to use the technology like the one that Mr. Hansen described, which from his testimony indicates it would use very little water. Why would oil shale development from your point of view in Colorado or Wyoming or Utah create a water supply problem?

Mr. SMITH. Thank you, Senator Salazar. Certainly what little we do know about the water requirements for each of these very different technologies is that it consumes some. The old traditional room and pillar mining and surface re-torque from 25 years ago consumed three to four barrels of water for each barrel of oil equivalent produced.

The projections for the in situ technique that according to the Rand Corporation may be less than that, but still is, as the Colorado River district suggested may require 25,000 acre feet of new water storage or diversion from other uses. I don't—certainly any technology that doesn't require water input would be of interest in an arid State, but the ones that we've seen get the most attention still require significant water supplies.

Senator SALAZAR. Mr. O'Connor, one, another oil company by the name of Chevron wrote a letter very recently that where they said this, "Chevron believes that a full scale commercial leasing program should not proceed at this time without clear demonstration

of commercial technologies.” What’s your response to their point of view?

Mr. O’CONNOR. I have two responses to that question. One is that we believe under the draft programmatic environmental impact statement that’s been proposed by the Department of Interior. That it essentially mandates a multiple sequential EIS process that if one can’t stop the timeframes to do these, even assuming they’re not litigated and that’s probably an optimistic assumption in this litigious world today is probably going to essentially assure that there would not be any new leases on a competitive commercial basis issued until well into the middle part of the next decade. So I think that there’s sort of a fail safe there that assures that there won’t be.

A second point is that as you are well aware, we’ve secured three research development and demonstration leases that give us a preferential right if we prove up the technologies to convert those to commercial size leases. That’s the direction which we, Shell, have cast our lots in terms of securing oil shale acreage.

Senator SALAZAR. Senator Murkowski.

Senator MURKOWSKI. Thank you. Mr. O’Connor, you were practically begging for the question to be asked that Mr. Smith has raised. So I will pose it to you. Why over a couple of decades with the leases that you have, have you not moved to development?

Mr. O’CONNOR. You’re such a nice Senator. Thank you very much for asking that question.

Senator MURKOWSKI. I’m dying to know the answer.

Mr. O’CONNOR. Yes. Shell basically has three quite large blocks of lands that we own in a two county area in Northwestern Colorado. One the Mahogany properties where we have engaged in our five different R and D tests so far and two other properties in which we’ve really done nothing. They’re down in Garfield County to the South on the West flank of the Royal Plateau.

First addressing those two, and those two are each about 10,000 acres plus or minus. Shell secured one of those about 40 years ago at a time when at that time, like all the other oil companies, Shell had these perhaps naïve aspirations of developing re-torque technologies up in that area. We no longer have those plans. So we don’t have any plans for that one block that we’ve now had for many decades as I indicated.

The other block of land as I recall relates to an acquisition on the third block that we made up in Rio Blanco County. I think we acquired both of those at about the same time from a couple of families and that second block in Garfield County, we don’t have any plans for it either because it’s more a re-torque capable than in situ capable. So if anybody is interested in a good deal, come and talk to me after the hearing.

On the third block where we have actually done our R and D testing, we’ve known all along that it is not conducive to first generation or maybe even second generation oil shale development. The oil shale there is while close to the surface, is a rather low grade of oil shale. The terrain is not very good for our in situ technologies. But it was ideal for us to engage in these tiny little R and D tests that we have engaged in because it was easy to get to the

oil shale. But as I said it's low grade and it's not commercial capable.

Our ICP technology really needs to go into an area where the oil shale is very rich and very thick where the terrain is relatively modest and flat. We've shown you a picture of that general terrain that's on the back of our testimony. None of our Mahogany properties really meet that test or those tests. Thank you.

Senator MURKOWSKI. Let me ask you about this freeze wall test. How you're coming with that because you've stated pretty clearly here today that you're not going to move toward commercialization unless you can find some, I guess, satisfaction, or some assurance that the issues with water are resolved. The freeze wall is a process that we've seen before that you're saying that this is the first time that it has been utilized or tested then with the oil shale technology.

How far along are you into this particular R and D project?

Mr. O'CONNOR. Yes, thank you. That's a very appropriate and good question. We actually built a small freeze wall that was about 50 feet in diameter and went down about 1,200 feet into the subsurface 3 years ago. We're able to demonstrate that at least in that location and going to 1,200 feet this is the technology that does seem to work pretty well in terms of being able to isolate the ground water system from what we're doing.

We've now moved into a larger, much more expensive, much more complex test in which we have, we're in the process of freezing a large freeze wall that's about 15 acres in size, about the size of a football field that's going down about 1,700 feet. We started development on this about a year and a half ago. We're in the latter stages of freezing. We hope we'll have it completed in the latter part of this year.

At the completion of freezing it then we will pump out of the water of the inside of this canister that we have created. We're not going to put any heaters so this is purely an environmental protection test. After we pump the water out of the inside of this ice canister that we have created, we will then deliberately fracture that freeze wall in a number of places. Because we need to be able to demonstrate to ourselves, to regulators, to our Board, to concerned citizens and to everyone alike that this is a technology that if something goes wrong that we have the capability to repair the freeze wall.

So we're going to engage in a number of resealing techniques from the standpoint of those of us including yourself, Senator, who come from a cold State. We know that if water doesn't flow very fast in a stream it will freeze. But if it flows pretty fast it may not.

We don't know what it will take where it would freeze on its own. What if we had an earthquake and it cracked and it starts to—water starts to rush in. Actually would it reseal on itself? What if it doesn't?

We need to be able to demonstrate that whether it's through grouting or pumping to slow down that water input or actually the construction of a second freeze wall in that particular area. What can we use as belt and suspenders to absolutely assure everyone that this is a technology that if everything goes wrong we can still protect Colorado's precious ground water?

Senator MURKOWSKI. I appreciate your response. My time is up. But I would ask the indulgence very quickly. With this particular project with this freeze wall test that you're doing with the three or four different projects that you have underway.

If we were to not put in place the regulations that we're speaking about earlier does it affect your ability to move forward with these research projects?

Mr. O'CONNOR. Yes, it does. Yes. I can't give you assurances of what the result is. But just to give you one very clear example. Under our RD and D leases that we have secured if we demonstrate that we can produce in commercial quantities we earn an exclusive non-competitive right to convert the small leases to large leases.

So we have this legal right that we have secured if we meet the obligations. On the other hand if there are not regulations BLM will be unable to issue those very leases for the reason that there won't be any lease terms. So we're heading toward a legal train wreck. Now the question one might ask is well that won't happen for a number of years. Can't we wait to issue regulations until the latter days into the next decade? The answer is no because we right now, don't have any really definitive guidelines in terms of environmental standards, of operating standards, of lease boundaries, of diligent development or any of the things that we're going to need to do many with respect to the RD and D leases.

As I alluded to generally if we can't go forward with the RD and D leases, you know, because we're already climbing a very, very steep technology hill that nobody's ever climbed before. If we have blindfolds that are put on us it puts a great question in terms of whether we're going to be able to climb that hill or not. An unfortunate irony is that a major part and parcel of our RD and D efforts involve developing and implementing technologies to reduce our CO<sub>2</sub> footprint. If we can't go forward with the RD and D leases because of the absence of regulations it has the unfortunate byproduct effect of slowing down our CO<sub>2</sub> minimization research also.

Senator SALAZAR. Thank you.

Senator SESSIONS.

Senator SESSIONS. Thank you, Senator Salazar. Mr. O'Connor, do you have an estimate of what kind of CO<sub>2</sub> footprint there is to reduce shale oil from shale? Is that something you can give us an estimate on now?

Mr. O'CONNOR. No, I do not today because we don't know what a commercial operation is going to look like. I will answer that we are abundantly aware that while this ICP technology has a huge range of advantages. One of its large challenges is that it's an energy intensive technology. It requires a substantial amount of electrical generation in order to do so.

We're looking at a whole range of options. Some of our range of options go to the question of what should be the feed stock for power generation and where we haven't discounted any option at this point in time. We're looking at a full range of everything from coal to gas. When we say gas we will produce a lot of our own gas. That's an option.

We're looking at what opportunities we can engage in with regard to renewables, particularly wind energy. There's nothing

that's off the table. As we get deeper into our research we'll certainly be landing on some specific ranges.

But even aside from that we're looking at a number of other technologies within the operation itself to reduce the CO<sub>2</sub> footprint. One of those I would mention that's one of the great advantages of this technology is really the fact that because we just bring out the light end product and we leave the heavy product in the ground. In a way that's the smartest type of carbon capture and sequestration because we're leaving that carbon in a solid state in the ground. We're not bringing it to the surface and then re-injecting it in the form of gas. So it's a smart sequestration.

Senator SESSIONS. I mentioned earlier that the product that you produce would be good for diesel fuel. I think you mentioned that.

Mr. O'CONNOR. Yes, sir.

Senator SESSIONS. Diesel I've come to realize is far superior to gasoline in mileage and in CO<sub>2</sub> emissions and we are short apparently in diesel in the United States. We certainly are. It's more expensive and we're not using it very much.

Is that a compensating factor for an evaluation of CO<sub>2</sub> emissions to produce fuel that would produce less CO<sub>2</sub> than gasoline would?

Mr. O'CONNOR. Yes. I'm going to qualify myself just a tad here because I'm not a surface processing engineer. So my field of knowledge is somewhat limited here. But as I understand it we've got some flexibility in the processing to control how much of the mix is diesel, how much of it is jet fuel and how much of it is gasoline. That option will exist and will probably be augmented as we go further into our research.

Senator SESSIONS. But jet fuel is not important. We heard from an aircraft company executive who said that it has doubled his cost. That's really, really important that we have a larger source, I think, of that.

Let me just ask both of you this. This is a fundamental question I have. I think we, as policymakers have to work on. That is that it's not enough to say well, we're working on something that may be 10 or 15 years down the road.

If that's all we can do, that's all we can tell our constituents. That's all we can tell them. Mr. Hansen, you've been an elected official. I would just, would say that we need to be able to tell them with authority that we haven't created unnecessary bureaucratic hurdles to prompt evaluation and production of a domestic American source of energy, if we can produce it.

So let me just briefly ask you, Mr. Hansen. Just summarize just briefly because I think I have a minute left. Both of you, how would a smart, fair, protect the environment and public Congress or government deal with the problem of oil shale. Can we do it faster and still protect the public?

Mr. HANSEN. Senator, it would be very difficult for me to outline and articulate exactly what type of legislation I think would work. I think everybody here will be working on one, trying to come up with one. I would think basically it would be well if you kind of realized the goal is to come up with an energy solution and one that would be relatively safe. I honestly—

Senator SESSIONS. Could I just ask you this?

Mr. HANSEN. Can I just ask one quick thing?

Senator SESSIONS. Yes.

Mr. HANSEN. I honestly feel oil shale is kind of picked on. I mean I don't see the same things happening to biomass. I don't think it happening to ethanol. I don't see it happening to wind turbines or any of those things. I just wonder who's got it in for oil shale.

Oil shale seems like it is a whipping boy in this particular instance. Whatever it is I think it ought to be equitable and fair to everybody concerned in this business.

Senator SESSIONS. Mr. O'Connor, you talk about investing maybe billions of dollars. Are there things that we can do as Congress to help bring it to the point where we will know whether it's a feasible or not and environmentally safe or not, quicker than we now are on track to do?

Mr. O'CONNOR. I hope so.

Senator SESSIONS. Any suggestions in general terms?

Mr. O'CONNOR. In general I've identified the two specific issues that are a grave concern to us right now, the embargo on BLM from issuing regulations and the section 526 issue.

Senator SESSIONS. If the embargo were lifted you could go to some oil shale areas that are perfectly configured for your technology and you could get a better test of how effective they would be? Because you've got some oil shale now you could test.

Mr. O'CONNOR. Yes. We'd certainly test. We've, you know, completed five separate field tests on this freeze wall test we're engaging on on our own property. But we're at a point where to go further we need to go into an area where the oil shale is optimally configured for our ICP technology and that means Federal land.

So we need this access to Federal land. We think the RD and D program is an elegant way to do it. Our problem is that we see a potential of road block that we're going to run into that may—

Senator SESSIONS. That's what was slipped in to one of these bills in the dead of night without a hearing. Would you want to use that phrase? I'll use that phrase.

Mr. O'CONNOR. At this point in time my—

Senator SESSIONS. There was slipped in some legislation without a real discussion of it, I got to tell you. After we had full debate had put it in. Thank you, Mr. Chairman.

Senator SALAZAR. Thank you, Senator Sessions. I'm going to ask a question of you, Mr. O'Connor. We look at what I hear you telling us. We really are not going to know whether the freeze wall technology for oil shale development is going to work for many years to come. We may not be able to commercially develop oil shale. We don't know that answer yet.

You're optimistic, obviously. Your company has invested significant resources in there. But even under the most optimistic of scenarios we really are looking at going into commercial scale development, oil shale, probably even middle of the next decade or beyond, but probably no sooner than 2015 from everything that I've heard to everything that I know.

So for my edification tell me again why it is that it is important that the Department of Interior and Bureau of Land Management move forward with the issuance of final regulations for commercial scale leasing of oil shale instead of just moving forward with the research and development efforts which are already underway.

Mr. O'CONNOR. Yes. First a slight qualification or slight clarification from something you said and that is that we hope it's not going to be quite a number of years before we see the results of our freeze wall test. We hope that we will have learned by the end of next year or by early 2010 enough to be able to make the next steps into our final stage RD and D efforts.

So it's maybe, you know, a year and a half or 2 years away, not quite a number of years. But as an international oil company that has a suite of business opportunities here and in other places around the world that all have to compete for capital before they're authorized. We have to go to our Board of Directors to compete for substantial amounts of capital.

While these three pilot projects, and we need to develop three of these, three separate projects, each of which test variants of the ICP technology. While they're small, they're very complex and they're going to be quite expensive. These are not little tinker toy activities.

If we're not able to demonstrate to our Board of Directors what a success case looks like it raises a real question about whether our Board is going to grant us the money to be able to develop these RD and D projects themselves because we won't know what the royalties are. Existing guidelines talk about some huge buffer zones that would literally take away a third of the resource. That's going to have an impact on, as we have to stay great distances from the boundary lines. That will have economic impacts in terms of what we're going to do.

There are just a host of operating uncertainties that we're not going to be able to demonstrate and even talk intelligently about to our Board of Directors

Senator SALAZAR. With—

Mr. O'CONNOR. In terms of these RD and D projects and their preference right to leases that follow on.

Senator SALAZAR. Mr. O'Connor, because of those unknowns that are out there, Shell at this point in time and probably any of the other companies that have received the RD and D leases cannot today in 2008 say that we have uncovered the technology that's going to allow us to develop oil shale. Am I correct in making that statement?

Mr. O'CONNOR. We are very confident that this technology works, at least on a small scale. We've demonstrated that. The what we don't know is will it work in a much more complex environment.

Senator SALAZAR. In a much more complex and larger environment.

Mr. O'CONNOR. That's right.

Senator SALAZAR. Where you have to bring it up to commercial scales so that your Board of Directors at Shell will invest in the projects. We don't know the answer to that yet, which is why you're moving forward with these pilot RD and D projects. Is that correct?

Mr. O'CONNOR. Yes, that's right.

Senator SALAZAR. We're not going to know for sure whether or not the Institute Process Technology that you're using is going to be commercially viable for at least several years.

Mr. O'CONNOR. That is true.

Senator SALAZAR. Ok. Would you, at Shell, be supportive of more—of a different approach which would be to provide more limited regulations with respect to the research and development leases that would allow the conversion of those leases to the 5,120 acres that was contemplated in the 2005 EPACT?

Mr. O'CONNOR. First of all, we have a right to have those converted if we demonstrate that we have produced in commercial quantities. So that's not, the conversion is not an issue.

Senator SALAZAR. So let me ask you.

Mr. O'CONNOR. The issues around that are conversion fees and what are going to be the rules of the road.

Senator SALAZAR. Ok. So if we set up the rules of the road for those that conversion leases, those 5,120 acres, would that set of regulations be helpful to you as you move forward to continue your exploration of the oil shale potential?

Mr. O'CONNOR. I think that would be helpful on an interim basis. We still think that there needs to be a commercial leasing program. I might add that we have suggested a couple of compromises to deal with this issue recognizing the legitimate concerns that Governor Ritter and you, sir and others have had with early preemptive massive leasing by suggesting that it might make good sense to have a statutory provision that says that competitive commercial leasing would not occur until sometime, you know, into the next decade.

We don't have a fixed date. But, you know, we think that's something that is certainly negotiable and makes sense. As a means of absolutely assuring that not only the 47 State, Federal and county agencies with whom we will have to get permits and in many cases, many permits from each one of those 47. In addition to all of those, we have suggested and would be prepared to endorse a substantive provision that would mandate that in addition to the programmatic environmental impact statement that is underway now.

In addition to the programmatic EIS that we'll need to support the legislations that a site specific EIS be made as a precondition, not just a NEPA compliance through an EA, but through a full blown site specific EIS be a statutory requirement for any commercial project before it's approved.

Senator SALAZAR. Thank you, Mr. O'Connor.

Senator Barrasso.

Senator BARRASSO. Thank you very much, Senator Salazar. I was just actually in the back room visiting with your Governor who is—had a wonderful discussion with him. It sounds like from watching on the television screen and all the questions that I had listed that I was interested in have already been asked. With that I have no further questions. Thank you, Senator.

Senator SALAZAR. Thank you very much, Senator Barrasso. I want to thank the three witnesses for their excellent testimony here this afternoon. I would ask each of you to take 2 minutes and sum up what it is that you want this committee to know about oil shale from your perspective.

You've traveled a long ways here. I appreciate my constituents and friends from Colorado, Mr. Smith and Mr. O'Connor partici-

pating in this hearing and so that we'll start with you, Mr. Hansen and move across the board. Two minutes a piece.

Mr. Hansen.

Mr. HANSEN. Thank you, Mr. Chairman. I appreciate the opportunity of being here. Let me point out as the issue has come up I know that it's pretty obvious that what's going on in Colorado is extremely interesting to this committee and to yourself. I can well understand that.

Let me point out that when it comes to a small organization, when we talk about these regulations. If we have to sit and wait for these regulations to come about I don't know if our company really has the financial capacity to do that. I mean, they know they've got a proven technology. They know it works.

We've got all the work of getting the mine site. Really a lot of money, by our standards have been put into it. But you have certain investors that are saying, well, we want to see some results on this thing. So, if we have to sit and wait for a commercial thing to come along, it's going to be extremely, extremely difficult to stay in business. I personally feel that we're in a position to produce oil shale sooner than anyone that I have heard of at this particular point.

I think it will be productive. I think it will work. I think America is in a position where it to be nice to say that we can do all these things like drilling in Anwar, like offshore, the coal to gas and all of those things. But here we have a technology that I really feel is now on the way. It's had its ups and downs there's no question. In the 1970s it did have a problem.

But as I've seen it, seen the oil come out and see it work and it is useable and can be used. It just seems to me that if I was still a Member of Congress I would work my head off to try to make the regulations or the—yes, I agree with you. We have to protect the environment. I have no problem with that.

But it can be done in a way that we can be environmentally friendly, that we can take care of the water. We can take care of these problems and still produce something that would be very advantageous to the United States of America. As I see our good friends in OPEC who are just doing all they can to help us out.

I was assigned to work with Saudi Arabia when I was on the Armed Services Committee and I say this respectfully, but I don't look at them as a good friend or some others as I may say so. I feel that we have a chance—

Senator SALAZAR. Thank you, Mr. Hansen. We very much understand the importance energy independence.

Mr. HANSEN. Yes. Thank you, Mr. Chairman. Thank you for my time.

Senator SALAZAR [continuing]. National security implications.

Mr. Smith.

Mr. SMITH. Thank you, Senator Salazar. Two basic points, a primary and very timely theme for the 110th Congress has been the issue of global warming, global climate effects of our current policy, especially our current energy policy. As we consider a new technology and a new fuel source that has the potential to greatly extend the time in which we use another fossil fuel and have potential climate effects just from the burning add to that, that the en-

ergy input of great intensity for the production of that fuel with this climate ramifications. We need to go at this very carefully and very slowly.

The second point that I think relates to that is to build on Secretary Allred's characterization of their three phase program, the current research and development work on small plots. What he called a Phase II research on the larger preferential lease plots and then a Phase III, a larger, broader potentially commercial scale leasing program. If regulations are put in place soon for the sake of generating that Phase II and then left in place for what he calls Phase III without learning the lessons from Phase I and Phase II, without learning what needs to be regulated and how best to do it, especially for the climate exacerbating concerns, but also, for all social and environmental concerns.

Then we're really getting carts way ahead of horses. There's got to be some way to build on the knowledge that comes through that logical sequence that the Energy Policy Act established and not get commitments to regulations sooner than we should.

Senator SALAZAR. Thank you, Mr. Smith.

Mr. O'Connor.

Mr. O'CONNOR. Yes, sir. I'll take less than 2 minutes because I took more than my allotted 5 minutes. I thank you for your patience when I was doing my original testimony.

The only point I would make today in conclusion in addition to those that I made earlier is that as I listen to Governor Ritter and as we have had discussions with your staff and others, it seems as though that in a 99 percent of everything relating to oil shale we are in lock step agreement. We absolutely want to prevent another boom and bust like what we saw and what we lived through, those of us that lived in Colorado at the time. What we saw in the early 1980s.

At all costs we've got to take steps to prevent that from happening. We've got to be careful and cautious about how we proceed with this. Golly, you know, there is no track record about what large scale oil shale is going to look like because nobody's ever been able to do it in the world before. So we've got to be very careful.

I think that that's one of the things I most proud of being with Shell for. That we've taken now 27 years and counting to reach this point. We're still not close to making a commercial decision.

We're not trying to do something preemptive. We want to make sure that we do it right. Doing it right means protecting the environment, looking at the socioeconomic impacts and dealing with those in a proactive basis. But also, certainly, as a matter of sustainability coming up with a mechanisms where we can ultimately make a profit over the long term.

So the remaining 1 percent, we think there's, you know, there must be some solution to this issue of the regulations. We hope that with that we'll be at 100 percent lock step with you and the Governor.

Senator SALAZAR. Thank you, Mr. O'Connor. I also finally here will note for the record letters that I will submit for the record which include letters in opposition to lifting the moratorium on the commercial leasing regulations from the Northern Colorado Water Conservancy District, Colorado Springs Utilities, Rural Water

Works of Pueblo, Southeastern Colorado Water Conservancy District, Twin Lakes Reservoir and Canal Company, Town of New Castle, Garfield County Commissioners, city of Rifle, Town of Silt, Pitkin County Board of County Commissioners, Routt County Board of County Commissioners, San Miguel County Board of County Commissioners, Grand Junction, Rio Blanco County and Eagle County. We'll submit those letters for the record.\*

I thank the witnesses for sharing their testimony here today. Look forward to working with all of you as we figure out a way of moving forward with oil shale development in Colorado. With that, the meeting is adjourned. Thank you.

[Whereupon, at 4:26 p.m. the hearing was adjourned.]

---

\*See Appendix II.



## APPENDIXES

---

### APPENDIX I

#### Responses to Additional Questions

---

##### RESPONSES OF JIM HANSEN TO QUESTIONS FROM SENATOR BINGAMAN

*Question 1.* When will OSEC make a determination of whether to commercialize production?

Answer. OSEC is proceeding on a fast-track commercial development schedule that includes the construction of its first commercial-scale RD&D module (4,000 barrels per day) beginning in 2012. To meet that time table, OSEC will need to spend well over \$100 million on up-front research, pilot plant tests, engineering, environmental studies, and permitting activities. Before it is willing to incur such costs on the BLM RD&D Lease, OSEC needs to know the terms upon which it can obtain its Federal BLM Preferential Lease within the first six months of 2009 or the project will incur significant delays.

*Question 2.* When does OSEC need a commercial lease?

Answer. OSEC will need to know what it will take to obtain its BLM Preferential Lease within the first six months of 2009 or it will need to consider delaying its RD&D project or moving the project to private land which will also result in significant delays. OSEC does not intend to invest the \$100 million plus on the 160-acre BLM RD&D Lease until it knows two things: (a) what regulations will apply to the Preferential Lease when it is awarded to OSEC and (b) when will the BLM be authorized to issue the Preferential Lease.

*Question 3.* Is OSEC developing oil shale resources on private lands?

How many acres of mineral rights to oil shale does OSEC own? Where is this located?

Answer. OSEC has option to purchase or lease over 30,000 acres of private oil shale land adjoining its BLM Preferential Lease on the ease. OSEC took these options after being selected to receive the RD&D Lease at the White River Mine, since, when combined with the Preferential Lease, these lands form a logical development unit and together provide sufficient resource for a large commercial oil shale project. OSEC's research work is currently focused on the BLM RD&D Lease due to the existing mine infrastructure. Although OSEC could move its research to private land if the terms and timing of the Preferential Lease are not made known soon, this could significantly delay OSEC's RD&D program and add to its costs. It is in the public's interest to advance the oil shale research program at the White River Mine so that the industry-government cooperative research effort can be fulfilled as planned under EPACT 2005.

*Question 4.* Does the technology use much water? Please provide estimates of the amount that would be required for commercial production. What are the other anticipated environmental impacts?

Answer. None of the surface retorts use water in the process itself. The retorts heat the rock and in the process vaporize the small amount of connate water (less than 2%) contained in the rock. The resultant steam is condensed and the water is used elsewhere on site. Water that is consumed on site is mostly used for cooling spent shale and dust control. OSEC's goal is to get water usage down to less than one barrel of water per barrel of shale oil produced. To reach this goal, the hot spent shale will be sent through modern heat exchangers to co-generate power. Also, OSEC is looking at value-added products from the spent shale and the production of these products will reduce the need for water associated with the spent shale disposal. So, OSEC looks at the RD&D phase as an opportunity to consider all options for reducing water usage, learn more about the environmental issues, and dem-

onstrate that the technology can produce shale oil commercially. It is too soon to know all the answers. Industry needs to conduct its RD&D programs and build some commercial-scale units and learn as we go.

Environmental impacts of OSEC's proposed White River Mine RD&D project were evaluated in a 300-page Environmental Assessment released by BLM in April 2007, after a draft of that document had been made available for public comment. OSEC is committed to providing environmental protection and will in fact be required to do so as it complies with federal and state permitting requirements and the environmental stipulations in the RD&D Lease.

#### RESPONSES OF JIM HANSEN TO QUESTIONS FROM SENATOR DOMENICI

*Question 1.* Your written testimony mentions that OSEC is using a retort technology. Could you please explain how this differs from the in-situ technology? Please comment on the advantages and disadvantages of each.

Answer. Oil shale needs to be heated to pyrolyze or retort the contained solid mineral material known as kerogen. In the process, the kerogen converts from a solid to a vapor and that vapor is then condensed to produce crude shale oil. The heating of the shale rock (retorting) can be done either in the ground (in-situ retorting) or in a surface machine known as a retort. When a surface retort is used, the oil shale must first be mined from either an underground mine or a surface mine.

The location and the geology of an oil shale deposit influence which method will work best. In Utah OSEC believes underground mining and surface retorting are most applicable for its project. Surface retorts have various designs and some types have been used in Europe for over 80 years. OSEC initially selected the Alberta Taciuk Process (ATP), which is a modified, horizontal, rotary kiln adapted from the iron ore and cement industries. OSEC also studied and evaluated other retorts, such as vertical shaft furnaces, and has determined there may be significant benefits to use of such retorts such as the one used in Brazil for over 30 years. Both horizontal and vertical kilns are used worldwide. OSEC will select its preferred retort unit based on further testing and feasibility analyses over the next two years and then that choice will be enlarged into OSEC's first commercial-scale module with construction starting in 2012.

A surface retort has advantages as the rock is removed from underground and it is heated rapidly in a surface vessel. This works very well in bedded oil shale deposits where the mining zone is not too thick and where groundwater is not an impediment. The spent shale, essentially devoid of residual hydrocarbons, is a non-hazardous material that can be placed back underground in the mine void spaces or used for landfill on surface. Spent shale has natural cementing properties and OSEC is looking at it as a feedstock for construction building materials. The underground mine and surface retort scheme proposed by OSEC has a small surface footprint.

*Question 2.* What is OSEC doing to ensure that the environment is protected as you move forward with oil shale development?

Answer. OSEC is committed to complying with all environmental regulations and, in fact, will be required to do so as conditions of the permits issued by the state and federal governments and due to the numerous environmental stipulations in the BLM RD&D Lease. OSEC's RD&D program will provide many answers to the crucial environmental questions. Until we as a nation build and operate a few pilot plants and demonstration plants, we won't have all the answers. That's why they call it research, development and demonstration. OSEC will not and cannot expect to build a commercial plant if it cannot comply with the environmental regulations and secure the permits. There are already enough safeguards in place to assure that that will not happen. Existing State and Federal laws and regulations provide excellent protection of environmental resources.

*Question 3.* How many acres of surface disturbance will occur with your re-tort technology? How much water will use? And will there be any disturbance to wildlife?

Answer. OSEC's first commercial-scale RD&D project producing 4,000 barrels per day can be constructed on the 160-acre RD&D lease but it will be very tight. OSEC will not build it there unless there is assurance that that the regulations are in place for the Preferential Lease and OSEC has the assurance it will get the added acreage in the Preferential Lease. It is simply too large an investment and too risky if those unknowns are still present.

A commercial 50,000 barrel per day plant (underground mine & surface retorts) will occupy over 640 acres. However, a large plant like this needs the assurance that it will have adequate oil shale resource to continue operating for over 25 years, which is why a large, contiguous land and resource position is crucial.

Water usage is addressed above. OSEC's goal is to get net water usage to less than one barrel of water per barrel of oil produced.

Naturally, there will be some disturbance to wildlife. Fortunately, OSEC's project is not in a prime wildlife area. It is arid and only gets about 12 inches of moisture per year. It is not prime mule deer or elk habitat and is not a principal wintering grounds for either.

*Question 4.* Are the local communities in Utah supportive of commercial development of oil shale?

Answer. From what OSEC has seen and heard, the Utah communities and county governments are supportive of oil shale development, especially the approach being proposed by OSEC. OSEC's RD&D program is designed to answer questions that are important to the area residents. These questions include the following: Does the technology work? Can shale oil be produced and sold profitably? What are the potential environmental impacts on the region? What sort of socioeconomic impacts will occur in the region? OSEC realizes it must answer these questions before it commits to investing in a huge commercial plant. But, more importantly, OSEC realizes it must have the answers before it ever expects to get the permits for a commercial plant. OSEC has been open with citizens of the region. They realize the oil shale resource is huge and the nation cannot continue to put off development; they just want us to work with them to be sure it is done right.

#### RESPONSE OF JIM HANSEN TO QUESTION FROM SENATOR SALAZAR

##### AVAILABLE RESOURCES

*Question 1.* Mr. Hansen, I understand your company already possesses the rights to 41,000 acres of private oil shale lands in Utah, containing some 2.3 billion barrels of oil equivalent. May I ask why you think your company needs additional federal oil shale resources, when your company already has so much oil shale in its possession, which the company is not developing at a commercial scale?

Answer. OSEC selected the White River Mine site as the choice for the BLM Lease specifically because it has a preexisting mine and infrastructure which has been dormant for over 20 years. OSEC is willing to do the work to restore the mine and infrastructure to operating condition. OSEC believes this will significantly benefit the RD&D program in several ways. First, this oil shale research facility can supply oil shale rock to multiple research groups and, in so doing, advance the nation's knowledge of oil shale and its potential to meet our domestic energy needs. Second, it will enable OSEC to complete its RD&D work faster and achieve commercial production sooner. Third, development of the federal lands, of course, results in royalties and other revenues for the treasury.

Although OSEC has options to lease or purchase over 30,000 acres of private land that adjoin its nominated Preferential Lease, these lands do not have the advantage of the White River Mine, which, when employed, accelerates OSEC's RD&D program to the benefit of both the government and industry. Moving to private land would simply delay OSEC's program and preclude the government-industry cooperative research program envisioned by EPACT2005. OSEC secured the RD&D Lease as its initial research center to be used by OSEC and others as a source of oil shale for pilot plant tests, mine research, spent shale studies, etc. As noted earlier, the White River Mine site sat idle for over 20 years while the federal government had no oil shale research program. The site is an ideal research center and, under OSEC's management, it will benefit the entire industry and the nation.

Also, OSEC's long-term, underground mine development plan utilizes the existing White River Mine to access the oil shale within the Preferential Lease lands to insure that the federal lands are developed in a prudent manner. The mine expansion would then move to the private lands or other neighboring federal lands.

OSEC now needs assurance that the federal government is a willing and cooperative partner in the development of this important resource. When the leasing regulations are finalized, OSEC will know the terms and expenses associated with the Preferential Lease. This is crucial to OSEC's immediate planning and decision making. In 2005 when OSEC competed for the White River Mine RD&D Lease, it understood the regulations, as stated in EPACT 2005, would be forthcoming in 2007. These regulations were to then be the guiding principals of OSEC's Preferential Lease. With the current delay, OSEC is in a quandary as to whether or not to continue investing at the White River Mine site. The uncertainty is difficult when so much is at stake in terms of timing and capital investment.

## RESPONSES OF STEVE SMITH TO QUESTIONS FROM SENATOR BINGAMAN

*Question 1.* What impacts do you anticipate to our land and water resources and on local economies from oil shale development?

Answer. Our understanding of potential land and water impacts from oil shale development derives from four primary sources:

- Portions of research results released by Shell Exploration and Production, based on research work at its private-land research facility in Rio Blanco County, Colorado;
- The draft programmatic environmental impact statement published by the Bureau of Land Management;
- The Rand Corporation's report and corresponding comments on the draft PEIS; and
- The Office of Technology Assessment's 1980 publication "An Assessment of Oil Shale Technologies."

Those results and projections, respectively, suggest that the primary impacts of commercial-scale development would include:

- 100% surface disturbance of large expanses of sage and pinon-juniper land—elimination of all vegetation, removal of topsoil, potential soil erosion and surface water contamination;
- Diversion of water supplies—now primarily dedicated to agriculture or important to wildlife and scenic values—to oil shale production and, more significantly, to greatly expanding electricity production;
- Impact on groundwater movement, quantity, and quality from potentially extensive underground heating and freezing;
- Compounding carbon emissions, and corresponding increase in global warming, from drilling operations, gas processing, transportation, and burning of produced fuels; and
- Even more significant carbon emissions from dramatic increase in local electricity production apparently needed for heating oil shale in situ.

Perhaps the more important response to this question is that we don't really know the full extent and detail of impacts from oil shale development, at any scale. That is why it will be so important to complete the anticipated research & development program, then thoroughly analyze and assimilate the knowledge and information obtained from those research results, before finalizing a commercial leasing program or considering leasing or production at a commercial scale.

*Question 2.* What information do you have on the development of oil shale on private lands in Colorado?

Answer. According to the U.S. Department of Energy, Office of Petroleum Reserves, 3,135,000 acres of oil shale resource are currently held by non-federal entities in Colorado, Utah, and Wyoming. This is in addition to 960 acres of federal land recently leased to private companies for oil shale research & development, along with 29,760 adjoining acres of preferential leasing areas for those same companies. In spite of this extent of private holdings, no successful commercial development of oil shale has ever occurred on any of these lands.

## RESPONSES OF STEVE SMITH TO QUESTIONS FROM SENATOR DOMENICI

*Question 1.* In your written testimony you have provided a litany of issues that need analysis before a decision is made on commercialization of oil shale. Do you think that the wilderness society can support an oil shale program on public lands if these issues can be adequately addressed?

Answer. Yes. That is a very high threshold, however. Overcoming the impacts on greenhouse gas emissions just from burning the large amount of fuel that is projected from oil shale is difficult to imagine. Meanwhile, the extensive direct impacts of 100% surface disturbance, alterations to groundwater movement and quality, loss of agricultural and municipal water supplies, impacts from more localized air quality impacts, and the need for (and impacts from) greatly expanded local electricity production, are factors that must be fully understood and addressed before commercial scale production can even be considered.

*Question 2.* In your perspective, what areas are suitable for some type of oil shale development?

Answer. We can support a meaningful oil shale research and development program within the Piceance Basin, so long as it is carefully managed, minimizes impacts to the environment, and produces useful information that can potentially form the basis for decisions about a possible larger oil shale program.

*Question 3.* Comment on the necessity of four NEPA analyses before future development. How can we ensure that duplicative environmental work does not delay and hinder much needed domestic resources?

Answer. We agree that analyses should be coordinated, efficient, and timely. It is very important that those analyses be based on complete and tangible information. That is why, for example, it is so important to complete work on the oil shale research & development lease tracts, and to thoroughly analyze and extrapolate from those research results, before considering commercial scale leasing or production.

Moreover, our concern is not that we will have too much information regarding the impacts of oil shale development to the environment. Our concern instead is that we would move forward with a commercial oil shale program in the absence of sufficient information about the impacts of the extraction and development of this resource on the environment.

---

RESPONSES OF TERRY O'CONNOR TO QUESTIONS FROM SENATOR BINGAMAN

*Question 1.* When will Shell make a determination of whether to commercialize production?

Answer. We expect to make a commercial decision sometime in the middle part of the next decade. However, we should note that any delay in issuing oil shale regulations will likely slow down and put at risk our research and development program. Globally, Shell is interested in research projects that have a future hope of commercialization. We need to completely understand royalty rates, diligence requirements, holding fees, operating provisions, environmental compliance requirements and many other regulatory areas in order to contemplate a potential future commercial development. These factors are crucial to our understanding of the economics, design and planning of any future project.

*Question 2.* When does Shell need a commercial lease?

Answer. We do not currently have a commitment date in mind for obtaining a commercial lease; however it is clear that we need federal oil shale regulations many years in advance of a move towards a commercial decision. We need time to finalize project design, get all necessary permits, construct the project, operate it to see how it performs, analyze the results, submit an economic and environmental analysis to BLM, and undertake reclamation. We certainly need commercial leases sometime in the middle part next decade but need BLM to finalize oil shale regulations many years in advance of actual preference right lease issuance.

*Question 3.* Does your technology use much water? Please provide estimates of the quantity that would be used in commercial development.

Answer. The answer to this question is still unknown largely because we have not yet designed a commercial scale project. It is important that our research and development projects proceed expeditiously in order to determine water quantity requirements as soon as possible.

*Question 4.* Is Shell developing oil shale resources on private lands?

Answer. Shell has completed five major tests of our In Situ Conversion Process technology and is currently running a large-scale groundwater protection Freeze Wall Test on private land as well. However, private land development does not have the same potential as federal land because of the much richer quality of federal land oil shale.

*Questions 5 and 6.* How many acres of mineral rights to oil shale does Shell own? Where is this located?

Answer. Shell Frontier Oil & Gas Inc. owns approximately 40,671 net acres of oil shale in Rio Blanco and Garfield Counties, Colorado, out of about 42,000 gross acres of land where we own oil shale rights. Our largest tracts of land (Mahogany—19,500 acres, and Pacific—13,300 acres) are properties where Shell owns oil shale and surface only.

RESPONSES OF TERRY O'CONNOR TO QUESTIONS FROM SENATOR DOMENICI

*Question 1.* Why is it important for the Department of Interior to publish final regulations for commercialization of oil shale?

Answer. Timely publication of final regulations is important in order to provide a reliable framework for making future commercialization decisions. In other words, we must understand the rules of the road in some fashion in order to consider our research efforts further. To illustrate the point, imagine a pharmaceutical company deciding whether to spend huge amounts of research and development dollars for a new cancer cure when the company knows in advance that there is no method by which the drug can be taken to market. The pharmaceutical company would obviously not make the investment, and so it is with oil shale development. We are

trying to climb a technology hill that no one has ever been able to climb before. The Congress has now made that climb more difficult by putting a regulatory blindfold on us. If regulations are not issued soon, we may never be able to reach the top of this steep technology hill.

*Question 2.* How will the moratorium on final regulations for oil shale commercialization affect Shell's RD&D projects?

Answer. The lack of a firm regulatory structure places our research and development efforts at risk, as Shell is less likely to invest in research without an end in sight.

*Question 3.* Please explain the difference between technology that was used in the 1970s and 1980s and the current technology for oil shale development?

Answer. Our In Situ Conversion process is very different from anything ever tried before in oil shale development. Instead of bringing the rock to the heat, we are bringing the heat to the rock by increasing the temperature of the oil shale while still in place in the ground. We have less surface disturbance than other technologies and have no surface disposal of spent shale. We also believe that recovery efficiencies are higher. Plus, the quality of the recovered oil and gas is better than with other technologies. Shell has been engaged in researching this technology for over 27 years.

*Question 4.* What is Shell doing to ensure that the environment is protected as you move forward with oil shale development?

Answer. Over the past 27 years of our oil shale research and development projects, Shell has taken unprecedented care to protect the environment. We are committed to developing oil shale in an economically viable, environmentally responsible and socially sustainable manner. Our current large scale Freeze Wall Test is a testament to that caution as the entire test is designed to help us find the best way to protect ground water.

*Question 5.* Explain the technologies that Shell will use to reduce the amount of water in developing oil shale. How significant will this reduction be?

Answer. We currently have made no decisions on large-scale projects and so do not have a firm answer at this time regarding the quantity of water that will be required. Our In Situ Conversion Process actually does make some water. We will re-inject water removed from the Freeze Wall canister created in the ground. We are considering water storage to collect excess wet year seasonal runoff to use on site. We are looking to maximize the use of air-cooling as opposed to water-cooling in our surface processing. Shell is actively seeking ways to minimize water usage as we move forward.

One thing is certain—without regulations, the answers to all of these questions is further away. The lack of regulations potentially impacts not only oil shale research and development in the US, but also our Carbon Capture and Storage (CCS) research in the US insofar as it would relate to minimizing potential oil shale development impacts.

---

[Responses to the following questions were not received at the time the hearing went to press:]

#### QUESTIONS FOR C. STEPHEN ALLRED FROM SENATOR BINGAMAN

*Question 1.* What is the earliest time that you think BLM could reasonably conduct a commercial lease sale for oil shale?

When do you think the technology will be ready for commercialization?

*Question 2.* How can we guard against the kind of speculation that could result from commercial leasing prior to the technology being proven?

*Question 3.* Do you have ideas on how the Department could provide certainty for the industry without issuing commercial regulations?

*Question 4.* Shouldn't the Department have the benefit of the information gained from the RD&D projects before issuing commercial regulations and moving to commercial leasing?

*Question 5.* I understand that the Department of the Interior has made two attempts at leasing oil shale. One was during the 1960's and the other was a Federal Prototype Oil Shale Leasing Program established during the 1970's.

What can we learn from these past attempts at leasing?

*Question 6.* Does the Department plan to undertake any further RD&D leasing?

*Question 7.* What have you learned about potential impacts to water quantity and quality? Please describe. Please provide estimates of the amount of water that would be required by commercial development.

*Question 8.* How many acres of lands containing oil shale were patented pursuant to the Mining Law of 1872? Please provide an estimate by state together with an estimate of the barrels of oil equivalent contained in these lands.

QUESTIONS FOR C. STEPHEN ALLRED FROM SENATOR DOMENICI

*Question 1.* We hear a lot of talk about BLM's rush to lease, or that the Administration is rushing to authorize a commercial industry. Will the process we outlined in Section 369 of Energy Policy Act of 2005, that you are now implementing, lead to an immediate leasing program on Federal Lands?

*Question 2.* The argument is being made by some that regulations are not needed until the research is complete, and that doing them now is premature. In your opinion, are regulations needed now? And why?

*Question 3.* In your testimony, you spoke about public comments, as well as having a number of states and local governments assisting your current efforts. What other opportunities for public involvement will be available over time, prior to leasing or authorizing commercial development?

QUESTIONS FOR C. STEPHEN ALLRED FROM SENATOR SALAZAR

WATER AVAILABILITY

*Question 1.* Without proven, or even proposed, oil shale extraction and processing technologies, how can the water requirements for commercial scale leases be properly assessed?

*Question 2.* The State of Colorado has appropriated \$1 million (\$500,000 awaiting Governor Ritter's signature) to assess Colorado's remaining water entitlement under the Colorado River Compacts. Until that supply assessment is complete, isn't an assessment of oil shale's competing demands for Colorado water premature?

*Question 3.* The Preliminary Draft EIS does not place oil shale's related demands in the context of the cumulative demands of other energy development and its attendant water demands. Will this be done in the final EIS?

*Question 4.* The combined Yampa/White River basin and the mainstem Colorado River basin are jointly sponsoring a water demand study related to current and projected energy activity, including oil shale, in northwest Colorado. This study is just getting underway. Again, aren't current commercial leasing deadlines premature until this work is completed? (Study results from this energy study and the state's Colorado River water supply availability should be available in 2009-2010.)

*Question 5.* How will climate change and the projections of less water and greater evaporation in the Colorado River basin be factored into oil shale's water supply and demand provisions?

*Question 6.* What, if any, commitment is there for the DOE, BLM, or BOR to work with locally affected states and communities to identify water supply projects that will provide multiple benefits to the region and its environment?

*Question 7.* The optimistic rule of thumb in Colorado is water storage projects require a minimum of 20 years to get from initiation to completion. How can the oil shale industry or the federal government shorten that timeframe in order to ensure adequate and timely water supplies to the industry and to meet its secondary water demands?

NATIONAL PARKS

In its comments on the draft PEIS, the National Park Service identifies eight units that "have a very high potential for being adversely affected by cross-boundary or direct impacts from exploration and development activities in what the PEIS calls the Region of Influence : Arches, Black Canyon of the Gunnison, Canyonlands and Capitol Reef National Parks; Colorado, Dinosaur and Fossil Butte National Monuments; and Glen Canyon Recreation Area. Numerous additional park units in the western United States could be adversely impacted by regional air and water impacts likely to be generated from large scale, industrial activities associated with oil shale and tar sands development." National Park Service, page 2

*Question 1.* What will BLM and NPS do to guarantee there is no adverse impact from oil shale development on the Nation's Parks?

AIR AND WATER QUALITY

Likewise, the State of California and even Shell identified GHG emissions as an area of concern:

In sum, the GHG emissions from oil shale and tar sands leasing on almost 2.5 million acres of federal land constitutes a significant cumulative

impact on the environment. The available data (which was ignored by BLM) does not support the agency's conclusion that the project will not have a significant impact on climate change. California Attorney General, page 3.

Section 3.5.1.2, entitled "Climate Change," should be expanded to encompass a more thorough discussion of the potential impacts of oil shale development on climate change and should provide an explanation of why a quantitative analysis is not possible at this time. Shell, page 30.

*Question 1.* What will BLM do to address these and other concerns expressed by numerous stakeholders with respect to likely impacts from oil shale development on air quality, including greenhouse gas emissions, and water quality?

*Question 2.* Do the proposed rules include proposed lease terms and conditions related to air quality and water quality? GHG emissions?

---

QUESTIONS FOR HON. BILL RITTER, JR., FROM SENATOR DOMENICI

*Question 1.* Just four years ago, as Congress prepared to begin a policy discussion on oil shale, America was facing the prospect of \$50 oil. Today the price of oil stands at about \$125 per barrel. Please comment on how this sharp rise in price, the growing rise in world demand, and production levels that fail to keep pace with this demand impact your views on the importance of developing oil shale here at home.

*Question 2.* Understanding that the oil sands resources in Canada differ, but acknowledging that both your state and Canada are rich in non-traditional resources. How does Canada's great success inform your choices in Colorado?

*Question 3.* Recently in a CNBC interview you were very positive about the possibilities of oil shale production, but your testimony today seems to differ with that statement. Please explain these differing sentiments.

*Question 4.* What is your administration doing to foster a responsible oil shale program in Colorado?

*Question 5.* Why should a royalty rate not be set now and potentially readjusted later if necessary?

APPENDIX II

Additional Material Submitted for the Record

---

STATE OF UTAH,  
*Office of the Governor,*  
*Salt Lake City, UT, May 13, 2008.*

Hon. DIANNE FEINSTEIN,  
*Chair,*

Hon. WAYNE ALLARD,  
*Ranking Republican Member, U.S. Senate Committee on Appropriations, Subcommittee on Interior, Environment, and Related Agencies, SD-131, Dirksen Senate Office Building, Washington, DC.*

DEAR SENATOR FEINSTEIN AND SENATOR ALLARD, This letter serves to request that the oil shale lease regulation moratorium imposed on the U.S. Bureau of Land Management (BLM) by section 433 of the Consolidated Appropriation Act of 2008 be lifted, and funds be appropriated to implement subsections 369(d) and (e) of Energy Policy Act of 2005 (EPACT).

EPACT was intended to foster the development of oil shale as an energy resource. EPACT provides that the BLM (1) lease several parcels of federal oil-shale land for research, development, and demonstration (RD&D), and (2) issue final commercial-leasing regulations. These actions would be conducted consistent with the provisions of the National Environmental Policy Act (NEPA) and other environmental protection laws. EPACT also specifically directs the BLM to issue the final commercial-leasing regulations before the RD&D program is completed. In spite of that clear directive, section 433 of the Consolidated Appropriation Act of 2008 directed that none of the funding authorized by that Act may be used in connection with the preparation or publication of such final regulations, or upon efforts to conduct any oil shale lease sale, pursuant to subsections 369(d) and (e) of EPACT.

I recommend lifting those restrictions. Utah is home not only to substantial oil shale reserves (most of which are located upon BLM lands), but also to businesses willing to develop oil shale using new technology that will make extraction cleaner and more efficient. We have workers who will benefit from the jobs created by oil shale development, and state and federal regulators who are capable of ensuring that this resource is developed in an environmentally responsible manner.

As the price of oil surpasses \$120 per barrel and we become increasingly dependent on foreign oil, our national security is in jeopardy. We cannot afford to wait any longer to develop this critical energy resource. The opportunity for environmentally sound energy development must be supported.

Therefore, I respectfully request that you lift the moratorium imposed on the BLM by section 433 of the Consolidated Appropriation Act of 2008 and appropriate funds to implement subsections 369(d) and (e) of EPACT. Thank you for your consideration of this request regarding a matter of great importance to Utah and our Nation.

Sincerely,

JON M. HUNTSMAN, JR.,  
*Governor.*

---

STATEMENT OF JAMES W. BUNGER, PH.D., PRESIDENT, JWBA, INC.,  
SALT LAKE CITY, UT

Good afternoon Chairman Bingaman, Ranking Member Domenici and Members of the Energy and Natural Resources Committee:

My name is James Bunger, President of JWBA, Inc. a Salt Lake City based firm specializing in oil shale and tar sand resource and technology development. I hold

a bachelors degree in Chemistry and a Ph.D. in Fuels Engineering. I have had the pleasure of working in the field of oil shale and tar sands for 40 years and have recently served as special technical advisor to the Strategic Unconventional Fuels Task Force.

My comments summarize the potential for oil shale to become a productive, secure source of energy for our Nation. I will summarize what the Government can and should do to assure that this resource is developed. I will discuss the current global market for liquid fuels and the practical role that fossil resources, including oil shale, must play in the development and delivery of liquid fuels.

#### ROLE OF OIL SHALE IN GLOBAL MARKETS

To understand the significance of oil shale, I believe it is important to recognize what is happening with World energy supply. Energy markets anticipate a future shortfall in supply and do not see a plausible solution to the growing disparity between demand and supply. As a consequence, current energy prices have become largely uncoupled from their historic cost basis and prices can be expected to rise, destroying demand and maintaining a balance between supply and demand. The major concern is that worldwide economic recession will be the result. US oil shale, measured at 2 trillion barrels<sup>1</sup>, and the richest and largest accumulation of oil on earth, has the potential to change these global energy dynamics and as a consequence have a moderating effect on World oil prices.

#### KEY QUALITIES OF THE RESOURCE

There are several characteristics of oil shale and the technologies for recovering oil that support the proposition that oil shale development will provide a significant, long-term supply.

- The resource grade is rich—30 gallon per ton (gpt) oil shale is 40% richer than Alberta oil sands being produced commercially today.<sup>2</sup>
- The resource is concentrated—The heart of the deposit will yields more than 1 million barrels/acre (100 times a typical oil or gas operation). This means low surface impact for high economic benefit. Yields of 100,000 barrels/acre or more will be common at all prospective sites.<sup>3</sup>
- Yields high net energy production—about 7 Btu are produced for each Btu consumed. This ratio is similar to Alberta oil sands.<sup>4</sup> Oil shale has the potential to be completely energy self-sufficient, with no demands for external energy.
- Requires limited water consumption—about 10,000—17,000 acre-ft/yr for 100,000 bbl/day production (this amount also includes reclamation and community water needs).<sup>5,6</sup>
- The resource is huge—Nearly 800 billion barrels exist at 25 gpt, or greater.<sup>7</sup> To put this in perspective, just half of this amount, or 400 billion barrels, would be enough to offset imports from OPEC (currently 6 M-bbl/day) for 180 years.

#### A NEW ENERGY SUPPLY BUSINESS MODEL

These characteristics are consonant with an emerging business model where economics reward long-term assured production. With oil shale and oil sands, by con-

<sup>1</sup>J. R. Dyni, Geology and Resources of some World Oil-Shale Deposits, Scientific Investigations Report 2005-5294, USGS, 2006.

<sup>2</sup>J. W. Bunker, P. M. Crawford and H.R. Johnson "Is Oil Shale America's Answer to Peak Oil Challenge?" Oil and Gas Journal, Aug. 9, 2004, pp 16—24 (available on-line <http://fossil.energy.gov/programs/reserves/publications/Pubs-NPR/40010-373.pdf>).

<sup>3</sup>See isopachs maps available from K. E. Stanfield, et.al. Oil Yields of Sections of Green River Oil Shale in Colorado, 1957-63 USBM RI 7051, 1967., K. E. Stanfield, et.al. Oil Yields of Sections of Green River Oil Shale in Utah, 1952-62, USBM RI 6420, 1964., and J. R. Dyni Oil-shale resources of the Mahogany Zone in eastern Uinta Basin, Uintah County, Utah OFR 91-285, 1991.

<sup>4</sup>US DOE Office of Petroleum Reserves—Fact Sheet—Energy Efficiency of Strategic Unconventional Resources—2007. (Available online [http://www.unconventionalfuels.org/publications/factsheets/Energy\\_Efficiency\\_Fact\\_Sheet.pdf](http://www.unconventionalfuels.org/publications/factsheets/Energy_Efficiency_Fact_Sheet.pdf)).

<sup>5</sup>DOE Office of Petroleum Reserves—Strategic Unconventional Fuels Fact Sheet: Oil Shale Water Resources (available on-line [http://www.unconventionalfuels.org/publications/factsheets/Oil\\_Shale\\_Water\\_Requirements.pdf](http://www.unconventionalfuels.org/publications/factsheets/Oil_Shale_Water_Requirements.pdf)).

<sup>6</sup>Similar estimates can be found in the Draft Oil Shale and Tar Sand Programmatic Environmental Impact Statement, US BLM, DOI (available online <http://ostseis.anl.gov/documents/dpeis/index.cfm>).

<sup>7</sup>Culbertson, W.J., and Pitman, J.K., "Oil Shale" in "US Mineral Resources," USGS Professional Paper 820, Probst and Pratt, eds. pp. 497-503, 1973. Donnell, J.R., "Geology and Oil-Shale Resources of the Green River Formation," Proceedings, First Symposium on Oil Shale, Colorado School of Mines, pp. 153-163, 1964.

trast to petroleum, there is no exploration risk, there is no production risk, and there is no decline curve. The significance of assured production cannot be over-emphasized, because once a first-generation facility is established, the capital for expansion of production can be amortized over a larger production base, greatly improving the economics for growth in the industry. Government tax and royalty policies can be set to favor early payout of capital investment with complete assurance that the government will be adequately compensated for its resource over time.

#### A STEP-CHANGE IN DOMESTIC PROVEN RESERVES

Oil shale has the potential of making the United States the holder of the largest 'proven reserve' in the World. By proving the commercial viability of a suite of technologies for different resource characteristics, Canada was able to book 174 billion barrels of oil sands as 'proven', making them the second largest holder of proven reserves in the World, second only to Saudi Arabia at 260 billion barrels.<sup>8</sup> It should be the goal of the private sector and the United States government to prove technologies that will allow oil shale deposits to be reclassified from its current status of 'in-place resource', to 'proven reserves' Achieving a goal of reclassifying 400 billion barrels as 'proven' is well within our capabilities and the characteristics of the resource and, if achieved, would make the US the holder of the largest oil reserve in the World.

Such an accomplishment would establish a long-term Petroleum Reserve from which production could be grown as necessary to complement the current Strategic Petroleum Reserve, and that we could count on for a century, or more, of production. Once such a goal is achieved, we will have bought ourselves an insurance policy of assured, domestic production for the future. Development would strengthen our Nation and would open a range of economic and foreign policy options we do not now have.

Moreover, the United States could immediately affect world oil prices of oil through a direct and clear policy to develop this vast and viable resource. If the energy markets came to believe the United States was committed to the delivering liquid fuels to the market by development of its extensive oil shale reserves, a direct affect could be realized on World oil prices as this would offer a measure of risk to holding long term futures.

#### IMPEDIMENTS TO DEVELOPMENT

The biggest impediment to the private sector development of this resource lies in the inability to access oil shale deposits until the federal government makes a decision that development of this resource is in the Nation's interest. Access to federal land, consisting of more than 75% of the acreage and about 80% of the resource, has been under an effective leasing moratorium since President Hoover's Executive Order 5327 in 1930 withdrawing oil shale from leasing. While that order was lifted by President Truman's Executive Order 10355 in 1948, there has been no general oil shale leasing program for more than 70 years. It is imperative that the federal government move quickly to reach conclusions about this resources including progressively moving forward with current RD&D programs, creation of commercial leasing regulations, and establishment of the critical resource development zones.

Technologies have been developed and many companies are moving forward to deploy those technologies to deliver meaningful quantities of liquid fuels in manner that is both economically and environmentally sustainable. It is clear, however, that further deployment requires the promise of a resource base upon which to deploy the technology. It is unreasonable to expect large private capital expenditures for research, development and scaleup of technology until a resource base is secured. Therefore, commercial leasing regulations must be issued before we can expect large scale activity in the field.

The federal government can also play a role in mitigating uncertainty in the areas of regulatory standards, permitting timelines, rights-of-way, and fiscal regime. Completion of the Programmatic Environmental Impact Statement will help establish a regulatory framework within which the private sector can respond.

#### COMMUNITY IMPACTS AND BENEFITS

Oil shale development can deliver sound and stable economic benefits to the communities in which operations develop but there is an immediate need for a mecha-

<sup>8</sup> [http://www.eia.doe.gov/cabs/Saudi\\_Arabia/Profile.html](http://www.eia.doe.gov/cabs/Saudi_Arabia/Profile.html), <http://www.eia.doe.gov/emeu/international/oilreserves.html>, <http://www.eia.doe.gov/cabs/Canada/Profile.html>

nism that assures that community impact funds are available when required. Prospective avenues are:

- Remove the Payment Law clause from PILT legislation, thereby allowing current mineral lease funds to flow directly to the impacted communities.
- Allow communities to keep 100% of mineral lease bonus payments (as was done in the Prototype program of the 70s)
- Allow industry to prepay production royalties directly for community impact needs.
- Fund major infrastructure needs such as highways or water projects from the federal portion of the Mineral Lease account, with the confidence those funds would be restored many times over in the later years of the project.

Further significant socioeconomic benefits can be attained by coordinating oil shale development with on-going oil and gas development in the Rocky Mountain west. By some projections, the region will reach its maximum oil and gas labor activity in the next 5 to 10 years. Planning for significant oil shale growth in the 5 to 10 year timeframe would dovetail nicely with an anticipated downturn in regional oil and gas field drilling activity. If we start now, oil shale production could in-fill jobs and maintain on-going production royalties that would otherwise be lost in the downturn of labor needs in the conventional oil and gas industries.

#### PROGRESS AND STATUS OF THE PLANNING PROCESS

If oil shale is so attractive, why don't we already have investment? This is the question tackled by the Strategic Unconventional Fuels Task Force established by Section 369 of the Energy Policy Act of 2005. The Task Force, comprised of the Secretaries of Energy, Interior and Defense, and the Governors and local representatives from five interested States, identified key impediments to investment, including access to federal resources, uncertainty about technology reliability, indefinite permitting timelines, fiscal treatment of CO<sub>2</sub> emissions, and uncertain federal, state and local policy. The task force made recommendations to Congress and the Administration for mitigating these impediments. I urge this Committee and other Members of Congress to take a careful look at the findings of this Task Force.<sup>9</sup>

With respect to CO<sub>2</sub> emissions, a topic that is on Congress' mind; it is tempting to impede investment as a means of limiting emission. This does nothing to address the supply need. A recommended course of action would be to establish general legislation for all sources of CO<sub>2</sub> that is scientifically sound, administratively transparent and economically balanced. Under these conditions oil shale projects, or any energy project for that matter, would be able to factor in CO<sub>2</sub> mitigation costs, providing greater certainty to investment and give the Nation the best opportunity to develop needed energy while simultaneously meeting the goals of improved efficiency and mitigation of environmental impact.

#### SUMMARY

In summary, the United States is blessed with a huge, rich resource of fossil energy capable of supplying a large portion of our fuel needs for decades to come. Energy costs are competitive with current petroleum production and projects appear permitable under current and anticipated environmental standards and regulations. We have the opportunity to bring a huge store of resource into the category of 'proven reserves'. But each day of indecision, or failure to address the impediments to investment, delays the day when this resource is available for our energy needs. I believe current global energy cost trends warrant a sense of urgency to resolve those issues that only government can resolve.

I thank you for the opportunity to provide this perspective for your consideration. I will be pleased to respond to any questions.

#### STATEMENT OF DAVID C. MOORE, MAYOR, TOWN OF SILT, SILT, CO

Dear Member of Congress: In the FY 08 Appropriations Bill Congress approved a funding limitation withholding monies for the Bureau of Land Management's (BLM's) implementation of commercial leasing regulations for oil shale. The Town of Silt requests that the administration consider extending the funding limitation into FY 09. The Town of Silt has previously commented on the Draft Programmatic Environmental Impact Statement (PEIS) for commercial oil shale development, released to the public on December 21st, with concerns regarding the baseline data

<sup>9</sup>[http://fossil.energy.gov/programs/reserves/npr/npr\\_oil\\_shale\\_program.html](http://fossil.energy.gov/programs/reserves/npr/npr_oil_shale_program.html)CO<sub>2</sub> Emissions

as well as the estimated commercial production of oil, the power and water needs, the impacts of production waste and transient workers, and the increased infrastructure demands resulting from the oil shale industry. The Colorado future consumptive water uses contemplated in the report seem low. Also, there is little discussion of how the significant power demands will be met, and the estimated water needed for these demands may be underestimated.

Before the leasing process progresses, we would like to be part of a collaborative process where energy and water supply, waste solutions, employee housing, and increased infrastructure demands are considered so that multiple purposes and objectives can be met while striving for improvements.

We respectfully request a special review committee be convened, with the proper stakeholders from our communities and experts from the BLM and the industry. This committee would identify in detail the potential impacts to our communities and would propose adequate mitigation strategies prior to any lease agreements. Our regional government representatives have built cooperating relationships with the industry operators which demonstrates that we are capable of conducting a successful collaborative process. We believe that the extension of the funding limitation will give additional emphasis to the needs of our community, locally and regionally, and we ask that this leverage be considered.

---

SUPPORT FOR COMMERCIAL LEASING MORATORIUM

STATE OF COLORADO

*Water Districts*

- The Front Range Water Users Council:
- Northern Colorado Water Conservancy District
- Colorado Springs Utilities
- Aurora Water
- Board of Water Works of Pueblo
- Southeastern Colorado Water Conservancy District,
- Twin Lakes Reservoir and Canal Company

*Towns/Counties*

- City of Rifle
- Town of Silt
- Pitkin County Board of County Commissioners
- Routt County Board of County Commissioners
- San Miguel County Board of Commissioners

---

STATEMENT OF JIM SIMS, PRESIDENT AND CEO, THE WESTERN  
BUSINESS ROUNDTABLE

Dear Members of the Committee: On behalf of the CEOs and Western business leaders of the Western Business Roundtable, I write express our strong support for allowing the Bureau of Land Management ("BLM") to continue to develop regulations to allow responsible oil shale development through commercial leasing of federal lands in the West. We urge Congress to not further delay this process.

We understand that some may urge the Committee to further restrain the BLM's efforts to pursue commercial leasing of the vast oil shale resources in the West. We believe this approach is terribly wrong. Ironically, additional delay will hinder the development of the very technology many of the proponents of more delay are requesting. It would certainly delay the objective of becoming a more energy independent country in an unstable world, and it will diminish the economic opportunities for jobs in our Western communities. Perhaps most importantly, delay will further pressure the high prices associated with fuel that are already hurting so many vulnerable American families.

Specifically, the Roundtable supports uninterrupted continuation of the BLM regulatory process for the following important reasons. Continued work to access our rich oil shale resources:

- will ultimately lead to greater energy security through domestic production of energy for the United States;
- will foster investment in research and development of technological advancements for the resource and the environment;
- will offer greater economic opportunities to the citizens of our Western communities; and

- will allow a responsible means to achieve a balanced and sensitive approach for our environment and for our economy.

Timing is important and further delay could be deadly, particularly for the research and development aspect of oil shale development. Businesses are making commercial decisions now about investment in research and development of the technology that will be necessary to achieve the many goals we have with regard to our energy needs.

The American West offers the world's largest deposits of oil shale. The Green River formation in Colorado, Utah and Wyoming is estimated to contain 1.2-1.8 trillion barrels of oil. Using even conservative estimates, there are 800 billion barrels of recoverable oil from the oil shale in this area. Keep in mind that this is three times larger than the proven oil reserves in Saudi Arabia. The federal government can significantly and positively impact this domestic opportunity. It controls over 70 percent of these oil shale reserves.

Given the potential offered by oil shale resources in the Western United States, the business leaders of the West ask you to not further delay the regulatory process currently underway, which would certainly jeopardize what are currently solid commitments by the business community to focus on technology commercialization for oil shale development.

---

STATEMENT OF BRENT C. FRYER, SC.D., ST. GEORGE, UT

MY CREDENTIALS

When it comes to the development of oil shale I am not operating from a position of ignorance. I am the developer of the proprietary above ground Black Box Oil Shale Pyrolysis Process I and the underground Process II. I was one of 18 applicants for the BLM's Oil Shale RDD program. I was Exxon USA's Lead Senior Staff Mechanical Engineer on the Colony Oil Shale Project (a \$6 billion dollar effort) TOSCO Pyrolysis Unit, and have a Sc.D. from MIT with over 45 years of Experience/Education in Energy/Process Industries and Water Conservation/Utilization. I have been retired for 8 years—6 of which have been spent on resurrecting work done 30 years ago for optimizing dry cooling towers for electric generation power plants to save water, and the development of my proprietary Black Box Oil Shale Pyrolysis I & II Processes. I have two goals for oil shale: (1) beat out the competition on the basis of the merits of my processes; and (2) participate as a stakeholder in the development of oil shale to insure this national treasure is developed on a sound basis with: (a) minimum environmental impact, (b) maximum resource recovery in the form of liquid and gaseous fuels; (c) maximum energy efficiency; (d) maximum energy self sufficiency; (e) highest economic benefit and profitability; and (f) minimum water usage.

MY COMMENTS ON THIS HEARING AND THE BIGGER PICTURE

What in fact can we learn and conclude from this hearing, previous House and Senate Hearings, political influence, political activities of both Republicans and Democrats, Energy Policy Act of 2005 and its mandated Task Force, BLM RDD Program, PEIS, the written public comments on the Draft PEIS, the Proposed Rule Change for Commercial Leasing, the moratorium on commercial leasing, Senator Salazar's newly introduced bill S 3019, and the state of oil shale technology? As documented in the following, and written up for the public record elsewhere (Prior Senate hearings, BLM RDD lease holder EAs, PEIS, Rule Change, etc.) we can conclude the following.

1. The BLM RDD leasing program has been underway for 3 ½ years but not a drop of shale oil has been produced in the USA from this program. In less time than this the Manhattan Project produced the first atomic bomb during World War II. Meanwhile during this same time period light sweet crude oil has increased in price 3 fold, reaching a high in the last few days of over \$134/barrel.

A couple hundred barrels of shale oil from shale mined almost 30 years ago at the White Mine in Utah have apparently been produced in Canada by one BLM RDD lessee, OSEC, using a small old Taciuk pilot plant. There's nothing new here. The Australian company, SPP, did the same thing decades ago at the same pilot plant, later built a commercial scale Taciuk plant, spent hundreds of millions of dollars, and went bankrupt about 4 years ago. The BLM's RDD program was supposed to demonstrate the economic viability of "today's" new technologies over a lease period of ten years. If the non economic viability of

“yesterdays” old Taciuk process with a fat Australian subsidy, an easy low overburden mining situation, and raw shale oil low nitrogen content making hydrotreating much less expensive than for US shale oil, was demonstrated with bankruptcy—what was the credible basis for the selection of a project based on this old technology by the DOI/BLM? The financial receivers of the Australian SPP project have apparently abandoned that technology and are evaluating other technologies, etc. to determine if there is a rational path forward for them.

2. About a year ago Big foreign oil company, Royal Dutch Shell (RDS), withdrew its Colorado State Licensing Application to proceed with its first BLM RDD tract lease even after RDS’s heavy lobbying, previous House and Senate Hearing Testimony, and this Senate Hearing where they repeated their call that they desperately need commercial regulations now. Now in this hearing RDS stated that although they had a legal right to the 24 section preference right leases, not having commercial leasing Rules/Regulations in place would result in a “legal train wreck” and that the RDS Board of Directors in the Hague, Netherlands, would be unwilling to allocate capital to proceed with the BLM RDD technology testing. This desperate need for commercialization regulations comes after RDS has spent 27 years working on their ICP process on their private land, producing only 1500 barrels of oil, or about 6 gallons/day (.07 cups/minute) and after they have withdrawn their state licensing applications to proceed on R&D? During the last 27 years how were they ever going to prove to themselves and others that the ICP technology was worthy of financial investment at the commercial scale without the commercial federal regulations in place?

3. OSEC stated that they also desperately need commercial regulations so that the preference lease can be viewed as a “collateral asset” to obtain financing—for both continuation of the BLM RDD lease testing and subsequent larger scale commercial operation. Without the regulations they cannot obtain financing to go forward with even the RDD effort. The position taken that the preference lease is needed as a “collateral asset” from which to obtain financing for both RDD testing and commercial project development is inconsistent with the requirements of the BLM RDD program, requirement 13, “proof of investment capacity”. BLM RDD program applicants who did not have the financial capacity to conduct the RDD activities they proposed to accomplish should not have been awarded a lease in the first place. The preference lease was an incentive to achieve demonstration of commercialization which the RDD lessee may “earn”. It should not be treated as an “asset” until it is earned; otherwise it promotes speculation—which may have already occurred with the sale of EGL to IDT.

4. BLM RDD leases are now restricted to four organizations, RDS, CVX, EGL (now IDT), and OSEC. RDS has 3 leases (including preference lease rights) totaling 24 sections of land, 24 billion barrels of Fischer Assay recoverable oil, worth as hydrotreated syncrude of the order of \$3.2 trillion—which they captured for a mere \$6000 in application fees. Of these the RDS and EGL processes have unacceptable energy efficiency, energy self sufficiency, environmental impact, economic benefit, and resource recovery characteristics. These are non starters and should be banned as a matter of public policy. The CVX process with certain modifications may have some merit. The Taciuk process selected by OSEC resulted in bankruptcy in Australia a mere 4 years ago. There are other processes out there which have much, much better characteristics—these have now been frozen out or excluded from any further BLM RDD leases. My processes, Black Box Pyrolysis-I & II, are two of these and access to small BLM RDD tracts/leases are needed to demonstrate their viability in a national, merit based, cook-off prior to taking on a commercial scale project. An 8 section preference lease right would be nice as an incentive—but it is not needed as a “collateral asset” to obtain financing for either the RDD testing, nor the commercialization of a larger project. Technology that can not stand on its own financially should be excluded from the outset—no tax payer federal subsidies are needed or wanted for the Black Box Pyrolysis Processes.

Chevron stated that they don’t support commercial leasing until there is a clear demonstration of the technology. Chevron encourages the BLM to consider expanding the RD&D leasing program

ExxonMobil urges the BLM to recognize in any leasing program that there is a need for ongoing opportunities to develop and test new technologies on a phased basis to avoid precluding the development of new and potentially better ideas for the recovery of shale oil.

They note that in their specific comments that both the PEIS's Alternative A and Alternative C of the PEIS will, they believe, effectively limit competition in the oil shale development sector to the companies that currently have RD&D leases. This will preclude development and testing of alternative technologies having the potential for improved total resource recovery and minimization of other impacts.

They urge that the DPEIS reflect the high probability of mineral co-development in the future and afford, through the envisioned leasing program, opportunity for these types of technologies to be tested. According to ExxonMobil this is best accomplished through further leasing similar in scope and detail to the BLM's previous RD&D leasing action.

No urgency is expressed on the part of ExxonMobil for commercial leasing regulations.

Redleaf Resources recommends that BLM initiate further RD&D programs beyond the five oil shale projects on public lands in Colorado and Utah, stating, RD&D should be considered as a fundamental aspect of BLM's land management options for oil shale.

The position of the DOI/BLM on future RDD leases is that the current program meets the requirements of EPA2005 and therefore there will be no more RDD leases. Not only were the four BLM RDD lessee's selected behind closed doors, without transparent selection criteria or publicly named interdisciplinary selection committee members, the elimination of oil shale development competition reeks of anti-trust action and consequences.

5. The Draft PEIS is not a PEIS as mandated by EPA2005 and is therefore in defiance of EPA2005. An actual PEIS is required by the Energy Policy Act of 2005 to provide a basis for commercial leasing. Without that commercial leasing cannot go forward

6. The annual Task Force reports required by EPA2005 are at least a year behind and the conclusions and content of the first report are not concurred to by key Task Force members—specifically State Governors.

7. EGL, BLM RDD lessee has been bought by IDT, a non oil/gas or non oil shale company. Could this be a sign of land/resource speculation that the DOI/BLM have stated they will prevent?

8. There has been, and continues to be, unabated undue and unacceptable influence on the part of the foreign big oil company, Royal Dutch Shell, in the promulgation of the Energy Policy Act of 2005, modifications to the Minerals Leasing Act, the Rule Change, at House and Senate Hearings, and now an 82 page submittal on the PEIS with demands that substantive issues critical (specifically) to RDS be addressed and revised. This on top of the fact that the PEIS was initiated under the stewardship of the previous Secretary of Interior, who is now employed by RDS as head legal counsel on oil shale. Was the ex-Secretary the ghost writer for the RDS PEIS written comments? Is the ex-Secretary now trying to revise the document that the ex-Secretary initiated, the PEIS, to the benefit of the ex-Secretary's current employer, RDS? Meanwhile RDS continues to be involved in energy business dealings with Iran which is prohibited by U.S. law. Why isn't the State Department conducting additional review of RDS's business dealings with Iran to determine if they should be allowed to continue doing any business in the USA—let alone control the lion's share of US oil shale reserves?

9. The cost, technology, and hydrogen/natural gas sources need for downstream hydrotreating of the raw shale oil is essentially ignored in the entire federal oil shale development program. This could easily be the largest single cost component for converting kerogen in the shale to refinery acceptable syncrude. Given that fact, why is so little attention provided in the federal program, hearings, etc.?

10. Technological ignorance and/or incompetence on the part of high level decision makers is at the root cause of all these problems. This is true, not only for oil shale, but for all other energy alternatives now in play. Until the decision makers come up to speed on the technological issues, they will continue to make knee jerk reactions, that result in the above mess, as well as such disasters as the corn to ethanol fiasco.

11. The current battle in Congress going on between the Democrats and the Republicans and in the Senate and House Energy committees must stop. Republican acceleration of commercialization at the behest and threats of a big foreign oil company's board of directors (with a technological process that should be banned) and others who have no in house experience in oil shale development, is being countered by the Democrats bills to slow down development and

do more thorough study by high powered scientific groups who have never made a drop of oil, are leading this country into disaster.

In summary we can conclude that the state of development of the federal oil shale development program is in a sad state. What can be done to improve this situation?

First the key decision makers who created this mess must come to a recognition that the Federal Oil Shale Development Program is a mess, and how it got there. The BLM RDD program was initiated by DOI/BLM months before passage of EPA2005, putting the horse before the cart. Second, key factors were either never in the EPA2005, or were removed by folks like Pombo, etc. EPA2005 should have required and included transparent independent third party reviews and continual access to BLM RDD leases. No meaningful, public and transparent, criteria for selection of BLM RDD lessees was used with the result that most of the technological processes selected have no merit and should have been banned by public policy. RDS has captured 24 sections, while the Minerals Leasing Act in place at initiation of the BLM RDD leasing program limited any individual/organization to 8 sections. The draft PEIS was mandated to provide a basis for commercial leasing and the Rule Change. The draft PEIS is not a PEIS and is therefore in defiance of EPA2005 and therefore commercial leasing cannot go forward. There has been undue and unacceptable influence on the part of the foreign big oil company, Royal Dutch Shell, in the promulgation of the Energy Policy Act of 2005, modifications to the Minerals Leasing Act, the Rule Change, and now an 82 page submittal on the PEIS with demands that substantive issues specifically critical to RDS be addressed and revised. This on top of the fact that the PEIS was initiated under the stewardship of Gale Norton, Secretary of Interior, who is now employed by RDS as head legal counsel on oil shale. The BLM RDD program thus far has been nothing more than a big land grab, and elimination of future BLM RDD leases has essentially eliminated competition.

By far the three most important improvements needed are: (1) make BLM RDD leases/tracts available on a continual basis—without that the USA is stuck with the current 4 technologies, none of which may be successful, two of which should have been banned from the outset, and 1 of which has already failed in Australia; (2) the influence of big foreign oil companies dictating USA energy policy must stop; and (3) Republican and Democrat Congressmen must get educated on the technology, economics, environmental issues and get their act together.

These conclusions, recommendations and basis thereof can be arrived at by the reader on his own by doing his own homework. However, to assist the reader in this, the following extractions taken from the PEIS written comments, the recent Senate hearing Web cast, and related news article are provided.\* The reader is also referred to written public comments made by me and others on Senate/House hearings, BLM RDD lease EA's, the Rule Change, and the so called PEIS.

---

STATEMENT OF H.J. BARRY, MANAGER, DENVER BOARD OF WATER COMMISSIONERS,  
DENVER, CO

The Front Range Water Users Council (Council)—consisting of Denver Water, Northern Colorado Water Conservancy District, Colorado Springs Utilities, Aurora Water, Board of Water Works of Pueblo, Southeastern Colorado Water Conservancy District, and Twin Lakes Reservoir and Canal Company—formally requests Congress extend Section 433 of the Consolidated Appropriations Act of 2008 which prohibits the Department of the Interior from issuing oil shale and tar sands leasing regulations. This moratorium is slated to expire at the end of the current fiscal year.

The Council members are the largest water suppliers of municipal, commercial, industrial and agricultural water needs in the state of Colorado. Approximately one half of the population receives water from Council members.

As stated in our March 20, 2008, comments on the Bureau of Land Management's (BLM) programmatic environmental impact statement for oil shale and tar sands development, the Council believes the BLM's analysis raises significant questions that must be fully addressed before anyone can assess the full range of impacts of oil shale development. While oil shale would be developed in western Colorado, because of the enormous amount of water needed to process shale and the associated energy needs, the impacts would be felt statewide. We are concerned, as we expressed in our comments to the BLM, that the "development of oil shale in Colorado could significantly affect the Council's ability to serve existing customers and the future growth projected for the Front Range of Colorado."

---

\*Documents have been retained in committee files.

The research leases Congress authorized in the Energy Policy Act of 2005 are designed to provide meaningful data necessary to make informed decisions. Those leases are ongoing, but as the BLM and industry acknowledge, it will be years before new technologies are developed and we will know whether commercial development is possible. Before adopting leasing regulations, federal and state officials must first understand critical issues such as process performance, infrastructure demands (especially, water, power, processing facilities, and pipelines), and options for protecting and water quality. Without this data informed decisions cannot be made.

Accordingly, committing to leasing regulations prior to a full and complete evaluation of the results from these research leases puts the cart before the horse. We ask that order be restored to the process and that the moratorium be maintained until such time that all involved can assess the impacts of oil shale development.

---

STATEMENT OF JACK HATFIELD, CHAIRMAN, PITKIN COUNTY BOARD OF COUNTY COMMISSIONERS, ASPEN, CO

Dear Members of Congress: We ask you to support extension of the oil shale funding limitation into FY 09:

In the FY 08 Appropriations Bill, Congress, approved a funding limitation withholding monies for the Bureau of Land Management's (BLM's) implementation of commercial leasing regulations for oil shale. The funding limitation was approved because development technologies remained unproven and the viability of those technologies unknown.

In the past year little has changed. Both industry and the BLM agree that years will pass before technology is proven and the feasibility of oil shale development is known. The Only notable information gained in the past year is that BLM's Draft Programmatic Environmental Impact Statement (PETS) shows the impacts of commercial oil shale development in western Colorado will likely be significant to the clean air, clean water, water supply, wildlife habitat, as well as local economies and communities. It could also have substantial global warming impacts.

Given what little we know about oil shale development, it only makes sense to refrain from designing and implementing a regulatory framework for this industry. To push ahead would put action before information which would be ill-conceived.

Importantly, the Energy Policy Act of 2005 does not mandate that the Interior Department hold a commercial lease sale, for oil shale resources. Instead, the law says the Department of Interior may hold a commercial lease sale ythe Interior Secretary finds sufficient support for such a program among'state governors, Native American Tribes and other affected parties, which most certainly includes local municipalities who value Colorado's quality of life.

We need results from meaningful analysis of oil shale RD&D before we can implement an effective regulatory framework. We need to know What technologies will be used and where development will make sense economically. Accordingly, we strongly encourage you to support efforts to extend into the FY 09 Interior Appropriations Bill, the current Congressional funding limitation barring the BLM from issuing final commercial oil ,shale leasing regulations, or issuing commercial leases until we have more information.

---

STATEMENT OF KEITH J. LAMBERT

Dear Member of Congress: In the FY 08 Appropriations Bill Congress approved a funding limitation withholding monies for the Bureau of Land Management's (BLM's) implementation of commercial leasing regulations for oil shale. The funding limitation was approved because development technologies remained unproven and unknown. In the past year nothing has changed. Technologies have not advanced significantly. In fact, the only notable change is that BLM's Draft Programmatic Environmental Impact Statement (PEIS) suggests the impacts of commercial oil shale development could be significant on western Colorado. For these reasons we ask that the administration extend the funding limitation into FY 09.

Given what we know, and don't know, it only makes sense to refrain from designing and implementing a regulatory framework for an industry that may rely on unproven and unknown technologies. Simply, to do otherwise would put the cart before the horse.

It is important to note that Energy Policy Act of 2005 does not mandate that the Interior Department hold a commercial lease sale for oil shale resources. Instead, the law says the Department of Interior may hold a commercial lease sale if the Interior Secretary finds sufficient support for such a program among state gov-

ernors, Native American Tribes and other affected parties, which most certainly includes local municipalities who value Colorado's quality of life.

Accordingly, we strongly encourage you to support efforts to extend into the FY 09 Interior Appropriations Bill the current Congressional funding limitation barring the Interior Department from issuing final commercial oil shale leasing regulations, or issuing commercial leases, before meaningful analysis of oil shale RD&D projects on federal land has been completed. We respectfully request that Congress require the BLM to prove oil shale can be not only economically viable, but will not adversely affect the water, wildlife and welfare of local communities before authorizing this federal program.

---

STATEMENT OF DIANE MITSCH BUSH, CHAIR, ROUTT COUNTY BOARD OF COUNTY COMMISSIONERS

Dear Members of Congress: We ask you to support extension of the oil shale funding limitation into FY 09.

In the FY 08 Appropriations Bill, Congress approved a funding limitation withholding monies for the Bureau of Land Management's (BLM's) implementation of commercial leasing regulations for oil shale. The funding limitation was approved because development technologies remained unproven and the viability of those technologies unknown.

In the past year little has changed. Both industry and the BLM agree that years will pass before technology is proven and the feasibility of oil shale development is known. The only notable information gained in the past year is that BLM's Draft Programmatic Environmental Impact Statement (PETS) shows the impacts of commercial oil shale development in western Colorado will likely be significant to the clean air, clean water, water supply, wildlife habitat, as well as local economies and communities. It could also have substantial global warming impacts.

Given what little we know about oil shale development, it only makes sense to refrain from designing and implementing a regulatory framework for this industry. To push ahead would put action before information which would be ill-conceived.

Importantly, the Energy Policy Act of 2005 does not mandate that the Interior Department hold a commercial lease sale for oil shale resources. Instead, the law says the Department of Interior may hold a commercial lease sale the Interior Secretary finds sufficient support for such a program among state governors, Native American Tribes and other affected parties, which most certainly includes local municipalities and counties who value Colorado's quality of life. We need results from meaningful analysis of oil shale RD&D before we can implement an effective regulatory framework.

We need to know what technologies will be used and where development will make sense economically. Accordingly, we strongly encourage you to support efforts to extend into the FY 09 Interior Appropriations Bill, the current Congressional funding limitation barring the BLM from issuing final commercial oil shale leasing regulations, or issuing commercial leases until we have more information.

---

STATEMENT OF JOAN MAY, CHAIR, SAN MIGUEL COUNTY BOARD OF COMMISSIONERS, TELLURIDE, CO

Dear Members of Congress: We ask you to support extension of the oil shale funding limitation into FY 09.

In the FY 08 Appropriations Bill, Congress approved a funding limitation withholding monies for the Bureau of Land Management's (BLM's) implementation of commercial leasing regulations for oil shale. The funding limitation was approved because development technologies remained unproven and the viability of those technologies unknown.

In the past year little has changed. Both industry and the BLM agree that years will pass before technology is proven and the feasibility of oil shale development is known. The only notable information gained in the past year is that BLM's Draft Programmatic Environmental Impact Statement (PEIS) shows the impacts of commercial oil shale development in western Colorado will likely be significant to the clean air, clean water, water supply, wildlife habitat, as well as local economies and communities. It could also have substantial global warming impacts.

Given what little we know about oil shale development, it only makes sense to refrain from designing and implementing a regulatory framework for this industry. To push ahead would put action before information which would be ill-conceived.

Importantly, the Energy Policy Act of 2005 does not mandate that the Interior Department hold a commercial lease sale for oil shale resources. Instead, the law says

the Department of Interior may hold a commercial lease sale if the Interior Secretary finds sufficient support for such a program among state governors, Native American Tribes and other affected parties, which most certainly includes local municipalities who value Colorado's quality of life. We need results from meaningful analysis of oil shale RD&D before we can implement an effective regulatory framework.

We need to know what technologies will be used and where development will make sense economically. Accordingly, we strongly encourage you to support efforts to extend into the FY 09 Interior Appropriations Bill, the current Congressional funding limitation barring the BLM from issuing final commercial oil shale leasing regulations, or issuing commercial leases until we have more information.

---

STATE OF COLORADO,  
OFFICE OF THE GOVERNOR,  
*Denver, CO, april 23, 2008.*

Hon. DIANNE FEINSTEIN,  
*Chairman [sic],*

Hon. WAYNE ALLARD,  
*Ranking Republican Member, Subcommittee on Interior, Environment, and Related Agencies, SD-131, Dirksen Senate Office Building, Washington, DC.*

DEAR CHAIRMAN FEINSTEIN AND SENATOR ALLARD: As you know, the Energy Policy Act of 2005 (EPACT) has several provisions intended to foster development of oil shale as an energy source.

The Bureau of Land Management (BLM) has already implemented some of those provisions, by leasing several tracts of oil-shale lands for research, development, and demonstration (RD&D) projects and by issuing a draft programmatic environmental impact statement (PEIS) for a commercial-scale leasing program.

The draft PEIS indicates that BLM is proposing to make large areas of Northwest Colorado available for that purpose while delaying study of the cumulative impacts of proposed oil shale projects until BLM receives applications for commercial leases.

On March 20th, I submitted formal comments on that draft PEIS.

I pointed out that we have much at stake—because while Colorado recognizes the importance of the oil shale resource, we place equal importance on protecting our State's air quality, water quality, vegetation, and soil resources because they are vital to the agriculture, hunting and fishing, recreation, and retirement communities which, along with development of energy and mineral resources are key to our continued economic vitality.

I also noted that if BLM were to authorize a commercial oil shale industry in Colorado, the result would likely be the largest industrial development in our State's history, with enormous implications not only for the Western Slope but for all of Colorado.

EPACT requires BLM to proceed with issuance of final commercial-leasing regulations without waiting for completion of the RD&D program. However, section 433 of the Consolidated Appropriation Act, 2008 provides that none of the funds made available by that Act can be used to prepare or publish such final regulations or to conduct an oil shale lease sale pursuant to subsection 369(e) of EPACT.

I support that restriction, because I am convinced that for BLM to prepare regulations for commercial oil shale leasing without the benefit of data from the ongoing RD&D projects will mean that the regulations will be premature and not well founded.

That is why, as I said in my comments on the draft PEIS, Colorado will continue to oppose any commercialization plan that calls for commercial leasing, or even the promulgation of leasing regulations, prior to a meaningful evaluation of the RD&D projects and proper NEPA analysis.

However, unless Congress acts to extend the restriction it will expire on October 1, 2008. Accordingly, I request that you actively work to extend it by having a similar restriction included in the Interior, Environment, and Related Agencies appropriations bill for fiscal year 2009.

Thank you for your consideration of this request regarding a matter of great importance to Colorado.

Sincerely,

BILL RITTER, JR.,  
*Governor.*

STATEMENT OF CHRISTOPHER S. LOLLEY, OIL SHALE MANAGER, CHEVRON,  
HOUSTON, TX

Chevron would like to thank you for the opportunity to provide comments on the Draft Oil Shale and Tar Sands Resource Management Plan Amendments to Address Land Use Allocations in Colorado, Utah, and Wyoming and Programmatic Environmental Impact Statement (PEIS). We appreciate the effort which has gone into this work and recognize that this effort included collaboration with other federal, state and local agencies.

Chevron is committed to helping provide the energy the world needs in a way which is socially and environmentally responsible. We desire to positively impact the communities in which we operate, and our vision with regard to oil shale development, as with all projects we undertake, is to be the company most admired for its people, partnership and performance.

The Energy Policy Act of 2005 declared that oil shale and tar sands development are strategically important domestic energy resources that should be developed to reduce the nation's growing dependence on oil from politically and economically unstable foreign sources. Chevron fully supports this declaration and believes that the vast oil shale resources in the United States are an important part of this strategy.

CHEVRON'S VIEW ON COMMERCIAL LEASING PROGRAM

Chevron believes that a full scale commercial leasing program should not proceed at this time without clear demonstration of commercial technologies. The BLM's original intent in issuing RD&D leases was to help accomplish this task. The RD&D program helps to insure that oil shale technologies can operate at economically sustainable and environmentally responsible levels prior to full-scale commercial leasing. To that end, Chevron encourages the BLM to consider expanding the RD&D leasing program. Chevron also feels that the infrastructure and socioeconomic needs of local communities need to be addressed as the industry goes from research to commercial development. Our efforts are to work in cooperation and partnership with pragmatic environmental groups, local communities and government to move oil shale development forward in a way that is environmentally responsible, economically sustainable, and proven initially on a small scale.

Chevron, however, does support discussions on developing a path forward for eventual commercial leasing. It is important that discussions take place now to help develop the proposed rules and regulations around the eventual issuance of these leases. In particular, Chevron would like to see improved regulatory consistency between the BLM, state and local governments. A possible solution would be to establish some sort of joint review process or board with decision making powers.

CHEVRON AGREES WITH THE BLM'S RECOMMENDED ALTERNATIVE B

Given the three scenarios put forth in the PEIS by the BLM, Chevron agrees with the BLM's recommendation of Alternative B. This scenario is the only one of the three which were considered that allow for full and adequate development of the vast oil shale resource. Both of the other alternatives are too restrictive.

Programmatic Alternative A does not allow for the eventual issuance of commercial leases. Chevron recommends clarification on the description of Alternative A. This alternative essentially limits development to the existing RD&D leases which have been granted. However, according the BLM leases, the lessee "...shall have the exclusive right to acquire any or all portions of the preference lease area for inclusion in the commercial lease, up to a total of 5,120 contiguous acres..." The BLM needs to clarify whether or not their intent was to include the contiguous acres which are already part of the approved lease programs.

Chevron views Alternative C as too restrictive for the eventual commercial development of the vast oil shale resources available. Chevron believes that the spirit of the Energy Policy Act of 2005 was not to unnecessarily restrict oil shale development to small isolated parcels of land, but rather to maximize the potential development of this resource for the energy security of the country.

One alternative which was not considered was a hybrid alternative which would represent a middle ground between Alternative B and Alternative C. This might provide additional contiguous land for adequate commercial development activity while protecting additional land if that is deemed necessary.

CHEVRON BELIEVES ADEQUATE CHARACTERIZATION OF THE OIL SHALE RESOURCE IS  
ESSENTIAL TO UNDERSTAND ITS IMPACT ON DOMESTIC ENERGY RESOURCES

The PEIS represents a significant document which will be reviewed by many in the public domain. As such, it is important to accurately quantify the potential oil

shale resource in the United States. Chevron recognizes that there is uncertainty in all resource estimates. We also recognize the resource estimates are dependent on the assumptions used for the calculation. There is significant literature in the public domain which has attempted to quantify the potential volumes of oil shale resources in the United States. Chevron suggests that the BLM consider publishing a range of potential resource volumes rather than a single deterministic number as shown in Table ES-1. This would adequately communicate to other government, industry and public officials not only the magnitude of this important and vast resource, but also the uncertainty in trying to quantify the volume depending on the set of assumptions used.

Chevron would like to again thank you for the opportunity to comment on the Draft Oil Shale and Tar Sands Resource Management Plan Amendments to Address Land Use Allocations in Colorado, Utah, and Wyoming and Programmatic Environmental Impact Statement (PEIS). We appreciate the effort which has been put into the study and look forward to working with peers in our industry, the BLM, other federal, state, and local agencies as well as the public in helping to unlock this vast resource.

Please contact me if you have any questions or need clarification on our comments.

---

ROCKY MOUNTAIN FARMERS UNION,  
*Greenwood Village, CO, May 14, 2008.*

Hon. DIANE FEINSTEIN,  
*Chairman,*

Hon. WAYNE ALLARD,  
*Ranking Member, Subcommittee on Interior, Environment, and Related Agencies,  
Committee on Appropriations, SD 131, Dirksen Senate Office Building, Wash-  
ington, DC.*

DEAR CHAIRMAN FEINSTEIN AND RANKING MEMBER ALLARD,

Rocky Mountain Farmers Union requests that Congress extend Section 433 of the Consolidated Appropriations Act of 2008 which prohibits the Department of the Interior from issuing oil shale and tar sands leasing regulations. This moratorium is slated to expire at the end of the current fiscal year, and we feel it is appropriate to extend this moratorium for the reasons listed below.

Water users on both sides of the Continental Divide use the water resources of the Western Slope, from agricultural producers to recreational and municipal users. Instead of playing a game of chance with Colorado's most precious natural resource, Congress should authorize oil shale leases only when comprehensive data from research leases are properly analyzed.

The issues before us are complex. We must fully understand the possible demands on statewide infrastructure from water needs to energy consumption to transportation demands before leasing regulations are adopted. Rocky Mountain Farmers Union is opposed to the leasing of commercial oil lease resources before the full effectiveness of and impacts from research and development are fully known. Please do not play games with Colorado's precious water resources.

Sincerely,

KENT PEPLER,  
*President.*

---

THE STATE OF WYOMING,  
OFFICE OF THE GOVERNOR,  
*Cheyenne, WY, May 16, 2008.*

Hon. DIANNE FEINSTEIN,  
*Chair,*

Hon. WAYNE ALLARD,  
*Ranking Republican Member, Subcommittee on Interior, Environment, and Related  
Agencies, SD-131, Dirksen Senate Office Building, Washington, DC*

DEAR CHAIRMAN FEINSTEIN AND SENATOR ALLARD: I am writing to share the state of Wyoming's perspective on the oil shale provisions of the Energy Policy Act of 2005 (EPACT).

Because the technologies that may one day be used for large-scale, economical production of synfuels from oil shale are unproven and still unknown, I believe the best course for the future of oil shale development is to support the current Research, Development and Demonstration (RD&D) leasing program. Commercial

lease-land allocations and the promulgation of regulations for oil shale development should occur only after the RD&D phase has clarified what the deployable technologies and their impacts may be.

At present, the limitations on developing oil shale are defined by technology rather than policy. For this reason, section 433 of the 2008 Consolidated Appropriation Act, which provides that none of the funds made available by that Act can be used to prepare or publish final regulations or conduct an oil shale lease sale pursuant to subsection 369(e) of EPACT, is appropriate and ought to be extended for fiscal year 2009.

Thank you for your consideration of this matter. I have attached a copy of the state of Wyoming's comments on the Oil Shale and Tar Sands Programmatic Environmental Impact Statement (PEIS) to clarify my position further.\*

Best regards,

DAVE FREUDENTHAL,  
*Governor.*

ATTACHMENT

THE STATE OF WYOMING,  
OFFICE OF THE GOVERNOR,  
*Cheyenne, WY, March 19, 2008.*

BLM Oil Shale and Tar Sands,  
Attn: Draft Programmatic EIS Comments,  
9700 South Cass Avenue,  
Argonne, IL.

To Whom It May Concern: Thank you for the opportunity to comment on the Oil Shale and Tar Sands Programmatic Environmental Impact Statement (PEIS). Because I believe a careful, research-driven approach is the key to unlocking the energy potential of western oil shale, I support the "No Action" Alternative A at this time.

The technologies that may one day be used for large-scale, economical production of synfuels from oil shale are unproven and still unknown. Based on this lack of technological information, it is not feasible to make long-term policy decisions to manage this industry. Potential technologies and their impacts must be understood before oil shale leasing, lease-land allocations and Resource Management Plan modifications move forward.

*The Energy Policy Act and current RD&D projects*

Following the enactment of section 369 of the 2005 Energy Policy Act, the U.S. Congress charged the BLM with publishing final regulations for commercial oil shale leasing. Since then, noticeably less emphasis has been placed on oil shale commercialization, and a restriction has been put on Interior Department appropriations preventing the preparation or issuance of final oil shale commercial leasing regulations in fiscal year 2008. The state of Wyoming interprets these signals from Congress as an invitation to take a more deliberate, circumspect approach to oil shale—one which will allow private industry to continue research and development, and provide adequate time for public understanding of what future developments might entail.

The five Research, Development and Demonstration (RD&D) projects currently underway will serve as the foundation from which to identify technological hurdles, gauge economic viability, and assess socioeconomic and environmental impacts. Only if one or more of these 160-acre projects are proven economically and environmentally viable should the ramping up to commercial-scale operations be considered. Finally, the promulgation of regulations should await completion of the RD&D phase, in order to give states the necessary data and time to completely understand the risks.

*Advantages of Alternative A over Alternatives B and C*

Oil shale development has had a checkered past, and, if not undertaken cautiously and correctly this time, efforts at commercial development could be impeded for years to come. The state of Wyoming remembers well the results of the "Colony Project" and "Black Sunday" in the Colorado's western slope communities. Between 1969 and 1979, the U.S. Department of Energy funded an in-situ fracturing and re-ort operation near Rock Springs. Efforts to remediate that operation are still ongoing.

\*Document has been retained in committee files.

Alternative A defers action, but it also does something very important for future oil shale development. It provides adequate time to identify a reserve, the synfuel that theoretically could be contained within the oil shale resource. Alternative A does this without attempting to describe the synfuel reserve. The PEIS has identified a tremendous oil shale resource in Wyoming and estimated billions of barrels of synfuel, but the reserve is governed by unknown technological, environmental, geological, socioeconomic, and economic constraints. Before a reserve is identified and quantified, potential impacts must be assessed. It would seem a peculiar use of time and money to allocate lands available for commercial leasing for an unknown synfuel reserve, especially when there is no known technology to recover the energy reserves.

Alternatives B and C both intersect with Adobe Town, an area in south central Wyoming that was recently designated by the Wyoming Environmental Quality Council (EQC) as "Very Rare or Uncommon." Once this designation is finalized under Wyoming Statute 35-11-112 (a) (v) and Chapter 7 of the Rules of Practice and Procedure rules by the Environmental Quality Council, development in the Adobe Town area for oil shale and gravel development will be subject to state regulation. Specifically, non-coal mining will be limited by the Director of the Department of Environmental Quality under Wyoming Statute 35-11-406 (m) (iv) if the proposed mining operation would irreparably harm, destroy, or materially impair Adobe Town.

*Conclusion*

I appreciate your consideration of these comments and urge the selection of Alternative A in the PEIS. I firmly believe that it is the best option for both the state and the future of oil shale development. It is worth underscoring once again that Alternative A would still allow the five RD&D leases to operate, which if any of the projects prove viable, could result in both commercial-scale development and data sets that would clarify the still-uncertain impacts.

Best regards,

DAVE FREUDENTHAL,  
*Governor.*

---

RAND CORPORATION,  
*Arlington, VA, May 12, 2008.*

Hon. JEFF BINGAMAN,  
*Chairman, Senate Committee on Energy and Natural Resources, 304 Dirksen Senate Office Building, Washington, DC.*

DEAR CHAIRMAN BINGAMAN: Thank you for the invitation to testify before the Senate Committee on Energy and Natural Resources hearing regarding oil shale on May 15, 2008. Unfortunately, I will not be able to testify in person before the Committee; however, I would like to submit a copy of my testimony "Policy Issues for Oil Shale Development" for the record. This testimony was given on April 17, 2007 to the House Committee on Natural Resources Subcommittee on Energy and Natural Resources.

I would welcome the opportunity to meet with you and your staff to discuss issues pertaining to the development of oil shale resources.

Regards,

JAMES T. BARTIS,  
*Senior Policy Researcher.*

[Enclosure.]

JAMES T. BARTIS<sup>1</sup>

THE RAND CORPORATION

POLICY ISSUES FOR OIL SHALE DEVELOPMENT<sup>2</sup>

APRIL 17, 2007

Chairman and distinguished Members: Thank you for inviting me to speak on the development of our nation's oil shale resources. I am a Senior Policy Researcher at the RAND Corporation with over 25 years of experience in analyzing and assessing energy technology and policy issues. I am also the principal author of a RAND report that addresses the prospects and policy issues of oil shale development in the United States.<sup>3</sup> This work was sponsored and funded by the National Energy Technology Laboratory (NETL) of the U.S. Department of Energy. Since that work was published in the summer of 2005, I have continued to follow the industrial progress and government activities associated with oil shale development in Colorado and Utah.

The Energy Policy Act of 2005 (EPACT) established the framework the federal government is currently using to move forward in developing the domestic oil shale industry. In some areas, such as in the awarding of small lease tracts for research and development (R&D), significant progress has occurred. But in other areas, such as in preparing for early commercial leasing, I am concerned that the EPACT oil shale provisions fall short of what is needed to ensure that the strategic potential of this unique resource could be realized.

Today, I will discuss the key problems and policy issues associated with developing the domestic oil shale industry and the approaches Congress can take to address these issues. My key conclusions are as follows: (1) the knowledge base about the economic, technical, and environmental feasibility of oil shale development is not adequate to support the formulation of a commercial leasing program on the timescale mandated by EPACT; (2) the fundamental approach the Department of the Interior is currently taking may be counterproductive if the goal is to keep open the option for a sustainable domestic oil shale industry; (3) meanwhile, important opportunities for early action are not being addressed; and (4) additional legislation may be appropriate to ensure that federal actions are most effectively directed at the sustainable development of oil shale at a level commensurate with its importance to our national security and economic well-being.

## THE IMPORTANCE AND VALUE OF OIL SHALE

The potential public wealth embedded in our oil shale lands is staggering. Many, if not most, of the potential lease tracts in Colorado will contain over 2 million barrels of oil per surface acre. That means that a single 5,760-acre lease tract holds nearly 6 billion barrels. Assuming a modest recovery of the total oil within a lease tract, the potential public value of a single lease is clearly in the tens of billions of dollars. The potential public value of the total oil in place in oil shale deposits in the Green River Formation is in the trillions of dollars. However, realizing this potential depends on making further technical progress and on developing a regulatory and land management framework that ensures environmentally sustainable oil shale production.

As part of RAND's examination of oil shale development, our research addressed the strategic benefits of having in place a mature oil shale industry producing millions of barrels of oil per day. Such a level of production would yield considerable economic and national security benefits, primarily by causing world oil prices to be lower than what would be the case in the absence of oil shale development. As a result, consumers would pay tens of billions of dollars less for oil. Lower world oil prices would also cause a decrease in revenues to oil exporting nations, some of which are governed by regimes that are not supportive of U.S. foreign policy objec-

<sup>1</sup>The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of RAND or any of the sponsors of its research. This product is part of the RAND Corporation testimony series. RAND testimonies record testimony presented by RAND associates to federal, state, or local legislative committees; government-appointed commissions and panels; and private review and oversight bodies. The RAND Corporation is a nonprofit research organization providing objective analysis and effective solutions that address the challenges facing the public and private sectors around the world. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

<sup>2</sup>This testimony is available for free download at <http://www.rand.org/pubs/testimonies/CT279>.

<sup>3</sup>Oil Shale Development in the United States: Prospects and Policy Issues, Santa Monica, CA: RAND MG414-NETL, 2005.

tives. These benefits associated with lower world oil prices accrue to our nation as a whole; however, they are not captured by the private firms that would invest in oil shale development.

If shale-derived oil can be produced at prices well below world oil prices, then the private firms that do invest in oil shale development could garner economic profits above and beyond what is considered as a normal return on their investments. Through lease bonus payments, royalties, and taxes on these profits, we estimate that roughly half of these economic profits could go to federal, state, and local governments and, thereby, broadly benefit the public.

While the prospects of major economic and national security benefits motivate the development of oil shale, federal actions need to be tempered by the need to address the adverse environmental impacts and risks that accompany such development. Moreover, with the growing realization of the role of carbon dioxide in promoting climate change, these adverse impacts are not just local and regional, but also global.

#### THE CURRENT COMMERCIAL LEASING SCHEDULE

At present, a number of firms are making appreciable investments in research directed at furthering the development of technologies required to produce liquid fuels from oil shale. However, to my knowledge, none of these firms has gathered technical information adequate to warrant a decision to invest hundreds of millions, if not billions, of dollars on first-of-a-kind commercial oil shale plants. These firms continue to focus on process development, improvement, and evaluation, but they have not yet conducted the front-end engineering and design work needed to establish the economic viability, oil recovery potential, and environmental performance of the approaches under consideration.

The fact that industry is years away from establishing commercial viability and environmental performance calls into question the analytic basis of the current, legislatively imposed schedule for establishing regulations for commercial leasing. The programmatic Environmental Impact Statement (EIS) for commercial leasing is being prepared with very limited information on the environmental performance of important new processes, especially the in-situ extraction methods that offer to reduce significantly the environmental impacts of oil shale development. There is limited information on the response of local vegetation and wildlife to ecosystem loss or damage, on the eventual options for habitat restoration, or on how carbon dioxide emissions will be managed, including the feasibility of geological sequestration.

A reasonable alternative is to eliminate the legislative requirement to fast-track the promulgation of regulations for a commercial leasing program. Instead, the federal government could focus its efforts on the critical steps required for developing oil shale, as further discussed in this testimony.

#### THE CHALLENGE OF OIL SHALE LEASING

For several reasons, the federal approach to oil shale leasing cannot be based on the approach used to lease other energy resources—such as coal, petroleum, and natural gas—that occur on federal lands. First, as discussed above, there is no prior commercial experience that is relevant to the development of the rich U.S. oil shale resources. The government lacks important information about the costs and risks of development. It thus runs the risk of either being too lenient about lease bonus and royalty payments, allowing firms to have access without adequate compensation to the public, or too zealous, causing a loss of private-sector interest in oil shale development, especially for initial commercial plants.

Second, because of the vast size and geographic concentration of the highest-value oil shale resources and the need to perform extensive on-site processing, leasing decisions made by the federal government may have a profound impact on the residents of northwestern quarter of Colorado and the northeastern quarter of Utah. In particular, large-scale development of oil shale will cause federal lands to be diverted from their current uses, will almost certainly have adverse ecological impacts, and will likely be accompanied by socioeconomic impacts that could be particularly severe, especially within the northwestern quarter of Colorado.

Finally, and most important, the impacts on air and water quality, the provisions taken to meet demands for water, and the infrastructure associated with the initial round of commercial plants may impede, if not fully preclude, the development of oil shale to a level commensurate with its potential economic and national security value to the nation. As with the previous issue, this problem derives from the geographic concentration of all high-value oil shale resources to the very small area encompassed by the Piceance Basin of Colorado and within a small portion of the Uinta Basin within Utah. As an example of this problem, estimates made in the

early 1980s predicted that shale-derived oil production could not exceed a few hundred thousand barrels per day, based on considerations of how just a few plants located in the Piceance Basin would degrade regional air quality.

#### THE CRITICAL PATH FOR OIL SHALE DEVELOPMENT

In my judgment, establishing a broad-based commercial leasing program within the next five years is not necessary and, in fact, may be detrimental to oil shale development. Since the publication of the 2005 RAND report sponsored by NETL on the prospects and policy issues of oil shale development, important technical progress has taken place. A number of highly reputable firms have announced their interest in pursuing oil shale. Some of these firms are participating in the Research, Development, and Demonstration (RD&D) lease program being administered by the Bureau of Land Management (BLM). Others are interested in participating, if a second round of RD&D leases becomes available. However, based on our knowledge of where these firms are in technology development and evaluation, none—with the possible exception of Shell Oil—will be prepared to make a financial commitment to a pioneer commercial-scale oil shale facility for at least five and, in some cases, as many as ten years.

Given this judgment about corporate preparedness to move forward with oil shale, I suggest the federal government direct its efforts at the list of “early actions” listed in the RAND oil shale report, viewing those actions as priority measures for developing oil shale as a strategic resource for the United States.

#### *Conducting critical ecological and environmental research*

This includes developing and implementing a research plan directed at establishing options for mitigating damage to plants and wildlife, conducting mathematical modeling and monitoring of the subsurface environment, and conducting research directed at identifying options for long-term spent shale disposal.

#### *Developing a federal oil shale leasing strategy*

The overall goal of this strategy should be preserving the option of the sustainable, and publicly acceptable, large-scale development of oil shale within the Green River Formation. While developing information and analyzing options for eventual commercial leasing should be an important component of this strategy, the near-term objectives should focus on obtaining information required for determining when, how, where, and how much development should occur on federal lands within the Green River Formation. Beyond the above-mentioned ecological and environmental research, critical information needs include process performance, infrastructure demands (especially, water, power, processing facilities, and pipelines), options for protecting regional and local air and water quality, analysis of the feasibility of multi-mineral development, and options for carbon sequestration.

#### *Fostering technology development*

By providing small RD&D leases within the Piceance Basin to three firms, the BLM has made important progress in moving oil shale technology forward. However, this should not be a one-time program. In preparing for a second round of RD&D leases, the BLM should review the continued appropriateness of provisions that may not be consistent with a strategic plan for large-scale oil shale development. Examples of questionable provisions include requiring multi-mineral development and granting preference rights to future commercial leases. Other firms that appear to be highly qualified to invest in oil shale development are interested in obtaining small lease tracts suitable for RD&D. Encouraging their participation is in the national interest, because a broader set of participants will promote greater innovation and competition. We also suggest that the federal government consider sponsoring high-risk, high-payoff research directed at improving the yield and environmental performance of oil shale technologies. To the extent that this research is conducted at universities and national laboratories, it offers the important benefit of educating and maintaining a cadre of scientists and engineers that are highly knowledgeable of oil shale development.

#### *Providing land access to early commercial plants*

While a commercial leasing program is premature, a mechanism is required for providing access to federal oil shale lands to those firms prepared and able to finance, construct, and operate pioneer commercial oil shale production facilities. Given that production from a single lease may have a public value of tens of billions of dollars—once oil shale technology is commercial and competitive leasing is possible—we suggest that the government refrain from attempting to establish the regulatory parameters for the full exploitation of a lease site that would occur after ex-

pansion of the pioneer facility. An alternative approach is for the government to provide land access and possibly other assistance in the context of a cooperative agreement with the industrial proponent of the project. Such an agreement would be project-specific and would include provisions covering the schedule and duration of the project, environmental performance, environmental monitoring, and payments to the government, all of which would be consistent with the government's overall leasing strategy. Most important, the initial cooperative agreements should not prejudice how lease agreements might be done in the mature phase of an oil shale industry.

*Fostering early commercial experience*

In building first-of-a-kind plants, a private firm will take on considerable technical risks, as well as the market risks associated with fluctuating world oil prices. Considering the economic and national security benefits associated with achieving large-scale oil shale production, it is appropriate for the government to share in these risks. This is a policy area that RAND is currently examining. At this time, I can say that we are considering a number of options, such as allowing capital investments in pioneer plants to be expensed and deferring lease bonus and royalty payments until the production facility is operating at a profit. The efficacy and economic and fiscal impacts of these options require further analysis.

However, based on my own professional experience and judgment, I caution against the use of federal loan guarantees. Firms with the technical and management wherewithal to build and operate first-of-a-kind oil shale plants—and then move forward with subsequent plants—generally have access to needed financial resources. Loan guarantees can induce the participation of less-capable firms, while shielding the project developer from the risks associated with cost overruns and shortfalls in plant performance. The public then ends up with the bill if the project fails.

*Dealing with the impact of oil shale development on global climate change*

Most process concepts for producing liquid fuels from oil shale cause carbon dioxide emissions in excess of those associated with refining conventional crude oils. Since most of these emissions will come from large stationary sources, such as power plants providing electricity to oil shale facilities and plants for processing shale-derived oil, it may be feasible to capture this excess carbon dioxide. For initial commercial shale processing plants, an option is to use this captured carbon dioxide for enhanced oil recovery in nearby oil production areas.

But the extensive development of oil shale would likely produce carbon dioxide at levels beyond the capacity of the enhanced oil recovery market. In this case, the captured carbon dioxide may need to be geologically sequestered. At present, however, the technical feasibility of geological sequestration has not been demonstrated. Thus, a critical issue in developing oil shale may be successfully demonstrating geological sequestration in the general vicinity of the Piceance Basin. Toward this end, planning for oil shale development should include assessing the potential use of co-produced carbon dioxide for enhanced oil recovery and the viability of geological sequestration, including a large-scale demonstration.

*Options for Legislative Action*

Congress has the opportunity to address a number of existing legislative constraints and mandates that may not be in the best long-term interest of the nation, if oil shale development is to remain a viable option. There are also a few areas where Congress may need to assert its will, such as including the U.S. Environmental Protection Agency in federal planning for oil shale development. I suggest the following for consideration by the Committee.

- 1) Rescind the requirement to prepare a programmatic EIS for a commercial leasing program within 18 months. Instead, require that the programmatic EIS be a phased effort for establishing an oil shale leasing and development strategy for the federal government. The initial phase of this effort should be directed at establishing critical information needs so that appropriate research programs can be formulated and carried out.
- 2) Rescind the requirement to establish final regulations for a commercial leasing program within six months of completing the programmatic EIS. As discussed above, within the next few years, it is unlikely that adequate technical, economic, and environmental information will be available to formulate fair and equitable leasing regulations.
- 3) Require that the Department of Energy, the Department of the Interior, and the Environmental Protection Agency cooperatively develop a federal oil shale leasing strategy.

4) Require that the Department of Energy, the Department of the Interior, and the Environmental Protection Agency investigate and report on alternative approaches to providing access to federal lands for early first-of-a-kind commercial facilities.

5) Require that the Department of the Interior make available for leasing additional lands for the purpose of conducting RD&D activities.

6) Require that the Department of the Interior and the Department of Energy prepare plans for conducting critical environmental and ecological research; high-risk, high-payoff process improvement research; an assessment of carbon management options; and a large-scale demonstration of carbon dioxide sequestration in the general vicinity of the Piceance Basin.

In closing, I commend the Committee for addressing the important topic of moving forward with oil shale development. In much of the policy debate on oil shale development, I see two sides. On the one hand, there are the boosters who overestimate the benefits and urgency of moving forward and often dismiss the serious environmental and policy issues that need to be addressed. They advocate using the development of oil sands in Alberta, Canada, as a model for the development of U.S. oil shale. Anyone familiar with the heavy subsidization of early oil sands production and the environmental degradation that continues to be associated with Canadian oil sands extraction knows that the “Alberta model” is a nonstarter for development in the Green River Formation. On the other hand, there are the naysayers, who in their concern for environmental protection appear to dismiss the economic costs of importing high-priced oil and the national security consequences of continued wealth transfers to certain oil exporting nations.

At RAND, our research has identified a course that addresses both the environmental concerns and the national benefits that accrue from large-scale production. We often refer to the RAND approach as a “measured approach” in that it involves gathering information and proceeding at a slow enough pace to enable evaluation and course correction along the way but fast enough to advance understanding and preparation for possible large-scale commercial production so that in a decade we are in much better position to weigh both benefits and costs. The current framework established by EPACT to rush forward with commercial leasing is clearly not a measured approach.

The United States has before it many opportunities—including oil shale and coal, renewables, improved energy efficiency, and fiscal and regulatory actions—that can promote greater energy security. Oil shale can be an important part of that portfolio. And it will be as long as we proceed with a strong commitment to take a well-informed path, recognizing that we have important environmental, economic, and national security issues at stake.