even with--is this daily?

Chairman BARTLETT. Excuse me. The buzzer going off is simply informing you that we aren't doing anything on the Floor.

Mr. VAN KIRK. Will the lights go out if there is no signs of intelligent life in here? Is that an automatic switch? We have been producing oil for more than 100 years and unfortunately we can recover today only approximately 1/3 on average, and we have 2/3 of oil left in the ground. Enhanced oil recovery, cooperative efforts with industry, universities, and the government, have been essential to us in the past and continue to be essential to us in the future.

And, in fact, I would say, based on my experience and working with industry for all these years and government representatives, that the support for oil and gas exploration and production research should be increased, not decreased at this time. I thank you very much for the opportunity to serve you today, and I will be happy to answer any questions.

[Statement of Mr. Van Kirk follows:]

************** INSERT 10 **************

Obtained and made public by the Natural Resources Defense Council, May 2002
Chairman BARTLET. Thank you very much, Mr. Huffman.
STATEMENT OF ALAN R. HUFFMAN, MANAGER, SEISMIC IMAGING TECHNOLOGY CENTER, CONOCO, INC., HOUSTON, TEXAS

Mr. HUFFMAN. Thank you, Mr. Chairman, and good morning to you and the members of the Committee. I would like to thank you for the opportunity to testify today as a concerned technology leader in the petroleum industry. The United States faces a significant challenge over the next 10 years in the area of safe and environmentally sustainable energy development. The recent power problems in California and other parts of the United States, along with the simultaneous critical supply and infrastructure problems in the electricity, gas, and oil markets, indicate that the Nation is entering a period of sustained energy challenges that could cause serious damage to the national and global economies if significant steps are not taken soon to address the problem.

During the 1960s, the United States demonstrated the vision, courage, and commitment that was required to put a man on the moon. This effort took significant resources and a coordinated effort from all of the stakeholders in space exploration to assure success. As we enter the new millennium, our Nation faces an energy challenge that is much greater than space in the level of technology that is required for success. It is my belief that this crisis requires a technology effort of similar scope and scale to
During the next few minutes, I would like to enroll you in a new vision for a national technology program that will allow government to work closely and collaboratively with industry and academia to help solve our national energy crisis. This program will focus on the development, deployment, and commercialization of innovative technologies that will increase domestic energy supplies, reduce domestic energy costs to the consumers, and will be revenue positive to the Federal Government.

I propose that the Congress, as part of the National Energy Plan, authorize the creation and funding of a national energy technology effort which, for illustrative purposes, I have called the United States Energy Center, or USEC. USEC will act as the catalyst for the next generation of innovative energy solutions that are required to achieve a secure energy future for the United States. The Center will be the focal point for industry collaboration with government and academia and will bridge the gap between research and development of new technologies and the commercial world by focusing on the development, first field deployment, and commercialization of major energy technologies.

USEC should be established using a model similar to the Joint Oceanographic Institutions, which manages the ocean drilling program. The Center should be overseen by an
expanded interagency working group that includes representatives from the key agencies with an interest in safe and environmentally sustainable energy supplies, including the DOE, Minerals Management Service, NSF, the United States Geological Survey, NOAA, NASA, EPA, the Naval Research Lab, and the Coast Guard. The oversight mechanism should be through an Advisory Board consisting of the federal stakeholders and the Center corporate, and academic and NGO members.

The Center should be closely aligned with the DOE Gas and Oil Technology Partnership Program at the National Labs to assure maximum leveraging and transfer of technology from DOE to USEC programs. Close coordination with other federal science programs should also be encouraged to achieve economies of scope and scale where possible. Center programs should provide timely information to regulatory agencies, including the MMS and EPA so that new regulations can be developed using the latest technical information and input from all stakeholders.

The first major program undertaken by USEC should be a technology effort called the Offshore Technology Program. In contrast to many petroleum regions of the United States, the deep water and ultra-deep water Gulf of Mexico hold very large reserves of oil and gas that should be included as a critical component of a future comprehensive U.S. energy
strategy. One way to stem the decline in U.S. oil and gas production is to begin a massive development of the reserves contained in the deep water environment. This development would produce an increase in domestic production similar to when the North Slope of Alaska was brought on line in the 1970s and '80s.

One of the great challenges facing the industry is how to execute such an aggressive deep water development campaign when many of the technologies required for the effort are still in their infancy. The scale of operations in deep water is so massive that no single operator can afford to spend the money required and take the risks involved without support and risk sharing from other stakeholders in deep water. Individual technology development and field trial costs for some of the technologies can exceed $100 million, which is clearly out of the reach of even the largest operators. This type of massive development challenge lends itself very well to a cooperative effort by government and industry.

The Office of Natural Gas and Petroleum Technology of DOE has been working with industry and academia to formulate a technology strategy to accelerate deep water development in the Gulf of Mexico. This strategy, called the Offshore Technology Roadmap, or OSTR, was assembled through a closely coordinated partnership with the DOE labs, the MMS, the operating, service, and engineering companies, and academia.
The OTP implements the OSTR by lowering critical technology barriers, enabling deep water developments to proceed at a faster pace, and allowing development of many smaller fields in deep water that are not commercial today.

The potential of this program is very significant and could provide several million barrels per day of incremental production in future years. OTP's key components would include a high-intensity design competition for the next generation of ultra deep water facilities that will allow dramatic cost reductions in deep water operations, component technology programs for those technologies that will allow major cost reductions in specific operational areas and development programs that will integrate the expertise of the industry, academia, and the U.S. National Labs.

I recommend that the Congress appropriate a minimum of $25 million in funding for 2002 to support the Center operations and first year of the OTP. With industry-matching funds of 25 million, this would result in full funding of $50 million for the first year of the program. Preliminary economic models indicate that a properly funded and managed OTP effort will be revenue positive to the Federal Government with approximately 3.5 billion in new revenue generated in the first 10 years of the effort.

These budget amounts should be put in perspective with the energy needs of the United States. The initial 25 million
in 2002 federal funding for the Center and OTP would be equivalent to purchasing one million barrels of crude oil for the strategic petroleum reserve at $25 a barrel. This is equal, as was mentioned earlier, to about one hour of oil consumption in the United States. If the program is successful, the increase in deep water production after a few years, would provide this same benefit in 1 day at significantly reduced cost to the consumer.

The U.S. Energy Center has been structured to be a win-win for all parties that will address the Nation's energy needs while reducing energy costs and generating incremental revenue for the taxpayers through the rapid deployment of new technologies. All of the details of the Center and OTP concepts, structure, and funding requirements are described in the USEC business overview that was provided to you along with my written testimony. Work is currently underway to enroll the entire energy industry in the USEC vision, and we will keep you informed as this support grows.

I encourage the Committee to vigorously support this exciting new concept as part of the comprehensive national energy strategy. Thank you for your attention, and I would be happy to answer any questions.

[Statement of Mr. Huffman follows:]

*************** INSERT 11 ****************

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[The information follows:]

************* INSERT 11A *************
Chairman BARTLETT. Thank you very much. I want to thank all of the witnesses for their testimony. And let me turn now to Mr. Costello for his questions and comments.

Mr. COSTELLO. Mr. Chairman, thank you. Mr. Huffman, let me follow up on your testimony. Did I hear you correct that you are recommending 25 million the first year?

Mr. HUFFMAN. The minimum requirement that I propose in the testimony is 25 million. Ultimately, as I said in the statement, this will require significantly larger amounts of money, not as much as the Space Program cost, but significant amounts of money that would have to be matched by industry and government working together to solve the problems that we face in deep water on the technology side of our business.

Mr. COSTELLO. And five is for the Center and 20 is for the program. Is that correct?

Mr. HUFFMAN. That would be for the first year. Yes.

Mr. COSTELLO. And how do you see, looking down the road, 10 years--a 10-year plan? How much would you expect the Congress to appropriate over a 10-year period?

Mr. HUFFMAN. If you look in the last page of the summary, the business overview that I have provided to you, there is actually a graph. The assumption in that economic model is that the program would ramp up to $250 million a year of federal funding in the 4th year and then would stay stable at that level through the 10-year first phase of the program.
And there are obviously different models that you can run, but that model is revenue-positive to the Federal Government over the lifetime of the program, including the tax credits that would be taken for R&D, the revenues from royalties, and not including the trickle-down effects from the income taxes and other industrial impacts of a large program like this.

Mr. COSTELLO. Let me ask you to direct your attention to the deep water Gulf of Mexico. I know that little work has been done there. But, one, what do we know about the potential for oil and gas production from the deep water in the Gulf at this time?

Mr. HUFFMAN. Based on the numbers that we have from our current exploration and production in the Gulf, it is probably one of the most prolific remaining frontiers within the United States for future production of oil and gas. There are, to my knowledge, no other areas that are currently being explored and developed that contain the scale of potential that the deep water contains.

Mr. COSTELLO. And what might that scale of potential be? Do we have any idea?

Mr. HUFFMAN. In terms of production, it could be several million barrels a day of additional production over a 10 or 20-year lifetime. So a fairly significant total reserve base exists out there yet to be developed.

Mr. COSTELLO. And what is that potential reserve
base--how did we determine that? What is that based upon?

Mr. HUFFMAN. That is based on the industry projections.

And I can get you some detailed information on that later if you would like to see some more actual numbers. I didn't bring those with me today.

Mr. COSTELLO. Dr. Van Kirk, you mentioned in your testimony about the technology advances in the '60s and '70s, and that today's supplies of oil and natural gas would not be here today had it not been for the development of those technologies. And I just wonder how much of those technology advances were attributed to government oil and gas research versus the private sector?

Mr. VAN KIRK. I cannot quantify the distribution, whether it be 50 percent--I can't do that and I don't think anybody can, but it has been significant. Department of Energy participation with us in our researches on university campuses and with private industry almost always are partnerships among three or four of our groups--government, industry, and universities, and academia. And the funding is shared also. Usually, there is a requirement for cost sharing on the university's part and with private industry. Government's participation and contributing some funding is--has been essential and crucial and useful. And also the government participation guarantees distribution of the results on a broad basis to everyone in the country.
2409 Mr. COSTELLO. I wonder if--and I realize you have--you
2410 said you cannot give a definitive answer. But did you
2411 have--is it 50/50, more than 50/50? Or, Mr. Kripowicz, would
2412 you know, during that period of time?
2413 Mr. KRIPOWICZ. I would agree with Mr. Van Kirk. It would
2414 be very difficult to align the percentages. Industry, in
2415 general, spends— you know — what they count as R&D, a
2416 considerable amount more than the government does, but the
2417 government focuses on high-risk areas. And so, over time, the
2418 government research has more bang for the dollar than you
2419 would think because it looks at high-risk things that the
2420 industry might not look at immediately, and the industry
2421 picks it up and spends a great deal more money bringing that
2422 technology to market.
2423 Mr. VAN KIRK. Mr. Costello, may I--
2424 Mr. COSTELLO. Please.
2425 Mr. VAN KIRK. --proceed? Thank you. I hadn't thought of
2426 it this way before, but it occurs to me that if you are
2427 asking for a distribution, and we cannot quantify it, I think
2428 it is similar to considering an athletic team, a team sport,
2429 where the team is successful, and then to try to distribute
2430 the success among the team players. You can't do it just by
2431 how many points are scored or how much money somebody put in.
2432 Mr. COSTELLO. I wish I could explain that to my
2433 constituents back home. They don't look at it that way. But
let me ask a question about the oil companies--and it is my understanding that their R&D commitment has been reduced in the past few years. And I wonder if I might ask anyone who would like to answer the question why that has been. I am sure there are several obvious reasons, but I wonder if you would begin, Dr. Van Kirk.

Mr. VAN KIRK. Well, I am speaking on my perspective from the university standpoint and my close association with professionals in industry also--our professional societies and meetings and conferences. Over the past 15 years, there has been quite a consolidation in our industry. Depressed prices, 10, 15 years ago, consolidations, mergers, and the oil industry reducing its own internal research and development activities and evolving and migrating into a newer relationship with universities and the government and the DOE doing research and service companies also--major oil field service companies, doing joint-team research. So there has been an evolution in recent years. And, as a matter of fact, last week in our meeting in Houston, we talked about continuing that evolution even further.

Mr. COSTELLO. Mr. Huffman.

Mr. HUFFMAN. Well, that is the job that I do inside my company, is running a technology organization. And, yes, you are correct in the general statement that over the last, say, 10 to 15 years, the total amount of money spent by industry
2459 has dropped significantly. That has been partly, as Dr. Van
2460 Kirk said, to the long period of low energy prices and the
2461 resulting low return on capital that the industry was able to
2462 achieve in that environment.
2463 The second thing that has occurred is the consolidations,
2464 as Dr. Van Kirk mentioned. And if you look at the industry
2465 research laboratories, some of the finest labs in the
2466 industry are now gone. Two of them, Amoco and Arco’s research
2467 labs, for example. And those were legendary laboratories. And
2468 it is unfortunate that we have seen that happen, but that is
2469 what happens when you do consolidate. The R&D spending in the
2470 last year or so, as prices have gone up, has actually begun
2471 to increase again. But, as you can imagine, after 15 years of
2472 poor returns, the industry is hesitant to rapidly begin
2473 investing large amounts of money until we are sure that the
2474 return on capital employed is going to be sufficiently high
2475 enough to warrant those R&D expenditures.
2476 The other issue, and in particular to what I spoke of in
2477 deep water, is the risk issue. And I think this is one of the
2478 reasons that the deep water is an attractive area for us in
2479 getting government support and co-funding with industry, is
2480 that is a very risky environment.
2481 Now, some of you may recall the recent incident in
2482 Brazil, where the P-36 semi-submersible rig, at Roncador
2483 Field sank in the south Atlantic. That incident was of
sufficient magnitude in cost that it would break a smaller oil company than Petrobras. The total cost of that incident will be somewhere between a half a billion to a billion dollars against Petrobras' bottom line.

So we have to balance both the risk of our research, but I believe we are increasing the spending in the industry right now. I know our company is. We have seen significant increases in R&D expenditures in the last 2 years. So that is a positive trend that we are starting to see.

Mr. COSTELLO. Thank you. Mr. Cuneo, I wonder if you were setting the priorities for fossil--the Fossil Energy Program at DOE what your priorities would be.

Mr. CUNEO. When we look at the downstream business, we would say that the first priority is on pre-competitive technologies. We are working with DOE in the area of industries of the future to try and get some pre-competitive work done in a number of areas. Those would include behavior of materials, novel approaches for removing contaminants from crude oil, such as metals, sulfur, nitrogen. Our basic position is that we would like to see DOE very actively involved with the pre-competitive work and then we believe that industry funding is adequate to take that to commercialization.

When we look at this whole question, we also go beyond DOE. I was President of the Coordinating Research Council,
which is joint between the auto and the oils, and we find
needs within EPA to step up funding for environmental models,
such as air shed modeling and things like that. In the past
few years, our joint consortium has funded some very basic
research that, in my mind, was done mostly by universities,
but would have been appropriate to have the public fund. Such
as the behavior of aromatic components in the atmosphere,
behavior of alkenes, behavior of alkanes. And we do a lot of
work to validate models as they come out. And I would think
that that ought to be a priority for EPA as they think about
their funding to step up what they do to contribute to this
broad area for society.

Mr. COSTELLO. A final question and then a comment, I
guess, for the panelists, other than Mr. Kripowicz. The
President has been criticized in his Administration for his
energy proposal, that it is too heavy on oil and not enough
in the area of alternative fuels. And I wonder if the four of
you might want to comment. If you agree with the criticism
that the Administration has received, that it is too heavy on
oil and not looking at alternative fuels. Whoever would like
to take a stab at that.

Mr. CUNEO. I would like to take a quick stab at part of
that. I think in a lot of areas what that criticism ignores
is the economic realities. The fact of life is that the
American public wants to pay a relatively low price for
energy. And when we look at some of the alternative
technologies--and I was enjoying the discussion about--that
we had in the previous Panel around solar investment. When
solar becomes the most economic choice for the investor to
put their money to get a return, that is when we will see a
lot more wind power. Until that time, what you will see is
using available, relatively clean fuels, like natural gas.
And so I think there is a lot of technology already developed
in the alternative fuel area, but in general, most of the
alternative fuels require public subsidy to get them
commercial. And in many cases, that can go on for decades.

Mr. COSTELLO. Ms. Lazenby, any other comments?

Ms. LAZENBY. I would just like to say that I think that
in the realm of enhanced oil recovery that the Administration
has made a strong point that we should increase that. And I
think that is a--that the footprint for that energy is
already there and the technology that the Department of
Energy can help us with would be very beneficial. And I think
the Administration recognizes that we need additional fossil
fuel energy and that we also need to focus on renewables. But
I don’t think he has overemphasized it in any way. It is
going to be there. It is a large part of our energy base. And
to ignore it, and to ignore how we can improve it, both in an
environmental way, is--would be the wrong thing to do. So I
think he is doing the right thing and I think working on
renewables is--should be--also be funded, but we can't ignore the facts.

Mr. COSTELLO. Any--Mr. Huffman.

Mr. HUFFMAN. Well, I guess I would add to that that the challenge that we face right now is that we have under-invested in our energy infrastructure and supply for most of the last 20 years. And part of that is because energy prices have been cheap. There has been less incentive. And we must find a balance that includes oil and gas, coal, all forms of electrical generation, including alternative fuels. And we must grow our energy base in all of those areas, keeping the proper balance with the environmental concerns, to supply the energy that the Nation needs. And that is not going to be a trivial exercise and it is going to require a national effort and all the stakeholders in energy are going to have to work together to achieve that. And that is something that has always been a challenge, but I think we have to overcome that challenge if we want to have a stable economy and society in the future.

Mr. VAN KIRK. I agree. And, furthermore, just speaking of enhanced oil recovery, many, many years ago, we started injecting fluids into reservoirs to increase recovery--water, gases, steam, chemicals, thick vicious polymers, to increase oil recovery. And one of the newer techniques that has been researched and developed and proven in recent years is CO2
injection--carbon dioxide injection for enhanced oil recovery.

Ms. LAZENBY. We are doing that right now.

Mr. VAN KIRK. And we would love to have more CO2 to put into the ground underground for improving the recovery and perhaps sequestering the CO2 underground.

Mr. COSTELLO. Mr. Chairman, I thank you and I thank our witnesses. For the record, I would like to state that our colleague on this Subcommittee, Congresswoman Sheila Jackson Lee, wanted to be here today. She is a member of this Subcommittee, but as most of you probably know, about half of her district is under water. So she is at home trying to help her constituents. But she did call and wanted us to let you know that she is sorry that she could not be with us today.

Mr. Chairman, thank you.

Chairman BARTLETT. Thank you very much. Ms. Lazenby, you mentioned that enhanced recovery could produce 60 billion barrels more oil. Was that just in this country?

Ms. LAZENBY. Yes. There--yes. There are about 350 billion barrels of oil in place that have not been recovered from existing wells. And you--the 60 billion is the percentage that we think is attainable within--with enhanced oil recovery techniques that are either in place now or could be developed with additional research and development. And it has been proven--I think we just heard this morning about a
project in California, and I have just told about mine—we can do it. And it is out of existing wells. And, for example, we are putting CO2 in addition to nitrogen into our wells now and we have already gotten good response from CO2 and nitrogen in our wells. So that is one place to put the nitrogen—I mean, the CO2 also.

So there are a lot of positive benefits to taking the resource base that exist in existing wells that have already been drilled, that are already there, that are now producing approximately—both oil and gas, approximately 1/3 of our oil and oil equivalent needs in this country. And with just a little bit of extra R&D we can really keep the—keep a good source of energy coming.

Chairman BARTLETT. These are big numbers and it is useful to put them in perspective so that you can get some idea of what they mean. In terms of oil consumption, at present use rates, and we ought to preface every statement relative to use at present use rates, because use rates are going up and—but at present use rates, that is about a 2 years’ supply for this country. And so that is a meaningful amount of oil.

Mr. VAN KIRK. Mr. Chairman—

Chairman BARTLETT. Some of you mentioned the petrochemical industry. Mr. Cuneo, you mentioned that, and, Dr. Van Kirk, you mentioned that also.
Mr. VAN KIRK. I think you might have misquoted some numbers. If you are talking about 60 billion.

Chairman BARTLETT. Yeah. That is about a 2 years' supply.

Mr. VAN KIRK. No. We consume about 2 billion in crude oil per year--or we produce about 2 billion barrels per year--we produce. We consume--

Chairman BARTLETT. Oh. I am talking about our consumption.

Mr. VAN KIRK. We consume--

Chairman BARTLETT. We consume about 20 million barrels a day; the world about 80. If you multiply that by roughly 400 days in a year, you are somewhere in the neighborhood of 30 billion barrels a year and 60 billion--

Ms. LAZENBY. He means for the country.

Chairman BARTLETT. Oh. Okay. You are right. But that is world supply.

Ms. LAZENBY. World supply. Right.

Chairman BARTLETT. Yeah. We are a fourth--that is 8 years for us and--

Mr. VAN KIRK. Right.

Chairman BARTLETT. Thank you for correcting.

Mr. VAN KIRK. You are welcome.

Chairman BARTLETT. That is 8 years for us and 2 years for the world. Thank you.

Mr. VAN KIRK. You are welcome.
Chairman BARTLETT. Okay. Thank you. Thank you. Two of you mentioned petrochemical industry. I think there is too little appreciation of how important oil and natural gas are in this petrochemical industry, which is very large, as you have pointed out. We live in a plastic world. Our clothes, our automobiles, much of our automobiles, the television in front of you there, the plastic cups here, the containers for the water, the laminate on top of the desk here--these are all made from oil. What will we do when natural gas and oil are in really short supply, essentially gone? Could we make these things from agricultural products? Mr. Cuneo.

Mr. CUNEEO. I would like to respond that, Mr. Chairman. There is technology today to make all of the products from what we call syn-gas, which is a mixture of carbon monoxide and hydrogen. Syn-gas can be made from coal. And, in fact, coal gasification does that before it converts it to electrical generation. That technology of being able to make these building blocks is commercial today. We have been producing detergents from syn-gas for years. We have been producing other components from syn-gas. So what we really need is--it is more expensive, obviously, in terms of total capital and operating costs to do it that way versus using the building blocks which occur in petroleum. But the technology is available today to continue to produce our chemical building blocks through the syn-gas and
Fisher-Trospsh type technology.

Chairman BARTLETT. Another byproduct--another product made from this is nitrogen fertilizer. Today, essentially all of the nitrogen fertilizer is made from natural gas. Before we learn how to mimic what nature does in a summer thunderstorm, we got our nitrogen fertilizer from the barnyard or from guano, from bat caves and islands where birds have nested for thousands of years. So the food we eat is, in a very real sense, petroleum and gas that powered the farm machinery that produced it and produced the nitrogen fertilizer. And, by the way, without nitrogen fertilizer, productivity of food and fiber would be drastically, drastically reduced. In a very real sense, natural gas, particularly, and oil, secondarily, aren't they really too good to burn?

Mr. CUNEO. In many ways that is true. On the other hand, there is nothing that provides the economic transportation fuel for the country with the mobility that people want, especially in vehicle systems, than petroleum. It is the most cost-effective out there today. And when you look at the overall theme that I think this Panel and the previous Panel had, this country needs a good mix of energy sources, including things like coal for stationary power generation. We have a large installed capital base in the power plant. But just imagine trying to translate that to petroleum fuels