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Before the United States Senate Energy Committee**

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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 CO2 emissions, possibly to levels we deem unacceptable. More energy means more CO2 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 CO2 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.

Pump Jack



Freeze Wall Test



Northwestern Colorado

