Written Testimony

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Introduction

Mr. Chairman and members of the Committee, I am Tony Dammer. I am an independent consultant currently working for Genie Energy Ltd. on an oil shale project in Mongolia. I recently retired from Red Leaf Resources, Inc., a small and successful oil shale technology and resource development company located in Utah. Previously I served as the Director of the Naval Petroleum and Oil Shale Reserves within the Department of Energy, retiring with 28 years of service in 2008. The office was responsible for the implementation and management of Sections 369 (h) and (i) of the Energy Policy Act of 2005 and produced all of the studies and analysis found at www.unconventionalfuels.com. Most notably, the office directed the activities of the Task Force on Strategic Unconventional Fuels which published the report America's Strategic Unconventional Fuels for the President and Congress, as directed by EPACT 05.

I thank you for the opportunity to appear today. I have worked on and off in the oil shale arena for several decades and it gives me great satisfaction to discuss some of the progress that has been made over the past several years and the opportunities that oil shale provides our country from both an energy and economic security standpoint. We should be cognizant that along with these substantial benefits, there are risks that all developing technologies face. It is my opinion that the industry as a whole has addressed those risks admirably and that the efforts of a large

number of companies, both here and abroad are performing the requisite research and development to create a safe and sustainable industry.

I have been asked to address four topics: (1) the status of oil shale exploration and production activities; (2) the development of key technologies, partnerships, and pilot activities; (3) key policy and technology challenges; and (4) recommendations on how the Federal Government could best help and enable.

Before beginning it is important to understand a few points regarding the oil shale resource. By definition, oil shale is a petroleum precursor, which is organic matter in the rock called kerogen. It is essentially an algae or marine based material that has not sustained the time and temperature to turn it into oil. Only applied heat will convert oil shale to crude oil and gas. What mother earth failed to accomplish with time, the application of man-made heat resolves. All oil shale extraction technologies, whether insitu (below ground) or exsitu (above ground), involve the application of heat to transform the kerogen to oil and gas. Kerogen oil begins to release from the rock matrix at an applied heat of about 650 degrees Fahrenheit. The intensity and duration of the application of heat to the rock has a large impact on the quality of the produced hydrocarbons.

Oil shale development has a long and tortured history, which would take hours to relate. Its development has run hot and cold over decades, in large part dependent on the availability and economics of conventional crude oil. In the United States, the Arab Oil embargo of the early 1970's initiated a resurgence of interest in oil shale, resulting in the Prototype Oil Shale Leasing Program in 1974. Four oil shale leases were awarded by the government, two in Colorado and

two in Utah, attracting $641 million in bonus payments. The Synthetic Fuels Corporation was established and Exxon and Unocal began massive oil shale development projects in Colorado. And as soon as the oil shale boom began to get traction it ended with the collapse of world oil prices brought on by massive production from Saudi Arabia. In 1982 Exxon abruptly closed its Colony project without warning in an event referred to as “Black Sunday”.

Not until almost twenty-five years later and the passage of EPACT 05 did the U.S, Government demonstrate any appreciable interest in the oil shale resource. The high price of crude oil coupled with concerns regarding energy geopolitics and increased dependence on imported oil from unfriendly or unstable sources has focused attention back to the oil shale resource.

Today a variety of countries are actively interested in developing their oil shale resources. Oil shale is one of the most prolific hydrocarbon resources on earth. Massive deposits are found in a number of countries around the globe, including Australia, Brazil, China, Estonia, Israel, Jordan, and the United States, among others. Today, only China and Estonia produce oil shale commercially and only in relatively small quantities. The high price of oil, decline in world conventional oil reserves, and increasing competition for oil resources worldwide have drawn the interest of many countries and companies to this significant source of oil as the next generation of petroleum supply. Technologies developed in the United States hold the clear advantage in developing oil shale both domestically and internationally.

There are several dozen companies engaged in oil shale research and development in the United States, in varying stages of development. Some are small: their work limited to the laboratory. Others, such as Shell, Exxon, AMSO, Red Leaf, and Shale Tech International, to

name a few, are actively testing their technologies at various stages of development in the field. The Secure Fuels from Domestic Resources report published by the U.S. DOE summarizes the technologies of 32 separate companies working in oil shale and tar sands development in U.S. Most are oil shale research and development companies and their profiles are summarized in the aforementioned report found at (www.unconventionalfuels.com).

Shell, Exxon, and AMSO have BLM oil shale RD&D leases in the Piceance Basin of Colorado. To this date, Shell and Exxon have conducted most of their research on their own fee lands but are recently moving onto their leases. All three of these technologies are insitu (below ground heating).

AMSO, which is owned jointly by TOTAL and Genie Energy, has completed their heater and production well testing and is moving forward with a pilot test of their process.

Shell, perhaps the most advanced of the oil shale companies, has successfully recovered oil, proving their heater and production technology, verifying the viability of their insitu conversion process (ICP), and their freeze wall technology to isolate groundwater.

Exxon plans to move its Electrofrac insitu process to its BLM R&D lease. Successful tests conducted at their Colony mine indicate that the technology is ready for the next phase of R&D.

On the surface (exsitu) Shale Tech International has tested the Paraho II surface retort process in Rifle, Colorado and is completing a demonstration plant for Queensland Energy Resources Ltd in Australia. On its own, Shale Tech continues to operate its own R&D center and fully equipped pilot plant in Colorado to further develop the Paraho technology.

Red Leaf Resources, Inc. has developed and piloted an in-capsule technology that involved surface mining of shale deposits with a stripping ratio of no more than 1 to 1. Rubblized shale is placed in a fully sealed and oxygen-free capsule. Convective heat is circulated through the capsule by heating pipes and the kerogen oil is released from the shale at temperature and collected in an oil and gas recovery system. Following the success of their pilot plant, Red Leaf is in the engineering design stages for a commercial demonstration facility. They are in a joint venture with TOTAL.

There are a variety of other promising companies developing oil shale technologies that are not currently on the ground. Enefit American Oil, a subsidiary of the Estonian company Eesti Energia purchased 100% of the Oil Shale Exploration Company (OSEC) and controls the largest tract of private oil shale property in Utah. Their technology is based on a redesign of their Galator surface retort that is operational in Estonia. Enefit is very active internationally and has acquired concessions in Jordan. EnShale Energy, another Utah-based oil shale company, has acquired leases in Utah and has built a pilot plant to demonstrate the feasibility of this surface process.

I have by no means covered the technical landscape regarding oil shale development and I regret that time does not allow a comprehensive review of all the technological advances that have taken place in the last five-or-so years. Suffice to say that clean, safe, and sustainable technologies are being advanced to develop the oil shale resource. The passage of the Energy Policy Act of 2005 provided impetuous for this progress.

What are the key policy and technological challenges? The technological challenges are fairly straight forward and are being addressed by the participant industries. One of the greatest concerns has been the requirement for water in a development area with scarce water resources. The industry has developed processes that minimize water use. Water uses by different technologies are in the range of 1 to 3 barrels of water per barrel of oil produced. A number of technologies are net water producers. Similarly the impact of the industry on green house gas (GHG) emissions has been an issue. Produced GHG can be captured and used for beneficial uses or sequestration, as with any industry. Further, many of the technologies produce sufficient gas to supply the energy requirements of the process. There is a great deal of natural gas developed in this region both from conventional wells as well as the oil shale processes themselves. This greatly mitigates the need for coal generated power. There is also significant opportunity to utilize solar and wind power in this region of the United States. (www.oilshaleassociation.org)

Of far greater concern than the technical challenges faced by the oil shale industry are policy and regulatory inconsistency and uncertainty. Since the passage of the Energy Policy Act of 2005, the Department of the Interior has reversed itself on its initial Programmatic Environmental Impact Statement and changes to associated Resource Development Plans (RDP). In 2008 DOI issued commercial leasing regulations only to cancel them when suits were brought challenging the PEIS and the regulations. Another PEIS was scheduled and is currently under review and new regulations are scheduled for late 2012. For companies that plan to invest hundreds of millions of dollars, if not billions, this continued uncertainly is extremely limiting.

The Energy Policy Act of 2005 was a comprehensive piece of legislation designed not only prepare for RD&D and commercial leasing regulations but also to plan for the orderly development of oil shale and tar sands in what is essentially the Green River Formation of Colorado, Utah, and Wyoming. That planning responsibility was assigned to the U.S. Department of Energy under Sections 369 (h) and (i). Section 369 (h) of the Act directed the Secretary of Energy, in cooperation with the Secretary of the Interior and Secretary of Defense along with the Governors of effected States ***"to establish a Task Force to develop a plan to accelerate the commercial development of strategic unconventional fuels and initiate partnerships with Alberta and nations with oil shale resources".*** The task force report, with recommendations, was completed and forwarded to the President and the Congress in February 2007. Section (i) of the Act directed the Office of Petroleum Reserves to **"*coordinate* the *creation and implementation of a commercial strategic fuels program."*** If those sections of the Act were implemented and the unconventional fuels development program was initiated within the DOE, uncertainty and inconsistency in policy would not exist today. Unfortunately, there is little evidence that the recommendations of the Task Force or the establishment of an unconventional fuels program has occurred. My strong recommendation would be to implement the law.

Mr. Chairman and members of the Committee – thank you once again. I would be pleased to answer any questions.

I have submitted for the record: a White Paper Economic Impact of the failure to Implement Legislative Mandates of Section 369, Energy Policy Act of 2005, by Anton Dammer and Dr. James Bunger