



**Written Testimony
of the
National Oil Shale Association**

**Presented by Gary Aho
Executive Director**

**Field Hearing on
Natural Gas and Oil Shale of the
Piceance and Uinta Basins
Colorado and Utah**

**Before the House Committee on Natural Resources
Subcommittee on Energy and Mineral Resources**

June 1, 2018

Grand Junction, Colorado



Introduction

Mr. Chairman, Congressmen, and staff members, I am Gary Aho, the Executive Director of the National Oil Shale Association and past president of Cliffs Oil Shale Corp. and Cliffs Synfuel Corp., companies with a long history developing oil shale resources in Colorado and Utah. Members of NOSA and its Board of Directors are in the audience. Thank you for the opportunity to appear here today.

National Oil Shale Association (NOSA)

NOSA is a not-for-profit educational organization that supports responsible development of oil shale to benefit the long-term domestic energy needs of the nation. NOSA's goal is to present factual information on oil shale and the issues related to its future development. Its members consist of companies, individuals and nonprofit groups who believe in the NOSA mission.

NOSA Members believe it is in the Nation's best interest to include oil shale in the "all-of-the-above" national energy policy. So far there is no evidence that it has been. Therefore, we hope the information we provide today will convince the Subcommittee that oil shale is vitally important to the Nation's long-term energy, financial and military security and that it deserves to be part of Federal government's strategic fuels program.

NOSA's National Call to Action and Recommendations are contained in a White Paper that has been distributed to the public, made available to Subcommittee Staff, and will be submitted into the record of this hearing.

NOSA's National Call To Action

- Oil shale is an important domestic resource with over 70% located on Federal lands in CO, UT and WY. This is believed to be the largest, single, untapped hydrocarbon resource in the world
- This oil shale resource could meet a critical part of the Nation's petroleum and chemical needs for well over 100 years
- Oil shale development will create thousands of high-paying, long-term jobs
- Oil shale development will generate billions of dollars in tax and royalty revenues to the Federal, State and local governments
- Oil shale development will result in improved national and economic security for the U.S. and reduce strategic dependence on foreign oil
- Oil shale can become the National Strategic Oil Shale Reserve (NSOSR), replacing much of the Strategic Petroleum Reserve that now exists



NOSA's Recommendations

- The current Administration should include oil shale in its “all-of-the-above” National Energy Policy
- The BLM should designate certain oil shale areas as Strategic, such that they are off limits to conventional oil and gas drilling. The shale oil per acre far exceeds the value of any gas that might be produced from that acreage.
- Congress should revisit the 2005 Energy Policy Act mandates, which are still part of the law
- Congress should establish an Oil Shale Advisory Board to review the 2007 Task Force Report and update to include recommendations appropriate for these time and the current domestic oil production scenario
- Oil Shale Advisory Board members would include representatives from the Departments of Energy, Defense, and Interior, EPA, industry and state and local governments
- NOSA would be engaged to Chair the Oil Shale Advisory Board and work with the Board to produce a Final Report with recommendations to Congress within 9 months
- NOSA, a non-profit, would receive a Federal grant of \$250,000 to direct the efforts of the Advisory Board, organize meetings, and produce the Final Report

NOSA believes that now is the time to develop an oil shale demonstration program to get small plants built and operational. These first-generation demonstration plants will answer technical, environmental, socioeconomic, and economic questions, important to the public and investors. By doing this in a slow, deliberate fashion, the U.S. will demonstrate to the world that we have the ability to produce fuels and chemicals from this huge oil shale resource. This demonstrated capacity should reduce the wild swings in liquid fuel costs that hurt the American economy and the wellbeing of its people. This approach allows time for a commercial oil shale industry to evolve and mature at a reasonable pace, thus avoiding the dreaded boom and bust episodes of the past.

BACKGROUND

This Remarkable Oil Shale Resource

For those unfamiliar with the oil shale terminology, historically the term “oil shale” has been used for rocks that contain a premature petroleum in a solid form known as “kerogen” that requires heating to produce oil and gas. This is not to be confused with the natural liquid oil produced from shale and other host rocks more recently by methods involving directional drilling and hydraulic fracturing. NOSA prefers to maintain the term oil shale in its historical context, although some have recently suggested we might better use the terms kerogen shale and kerogen oil.



The oil shale deposits of the western United States are believed to be the largest, single, untapped hydrocarbon resource in the world. The U.S. Geological Survey estimates the resource contains 1.1 trillion barrels. That's huge and is roughly equivalent to the world's proven oil reserves and far exceeds the proven oil reserves of the United States at 37 billion barrels. Over 70% of the richest oil shale is on federal lands managed by the BLM in the states of Colorado, Utah and Wyoming.

Research efforts over the past 50 years have demonstrated that unconventional shale oil produced from these U.S. oil shale deposits can be refined into gasoline, diesel and jet fuel, plus high-value chemicals. The U.S. military has successfully demonstrated the benefits of jet fuel and diesel produced from this shale oil. In fact, the military has looked at shale oil as a potential domestic, long-term, strategic source for a single battlefield fuel.

Historical Development Efforts

With this large domestic resource, one would think the United States should have an industry that puts this resource to beneficial use. After all, there are nations, such as Brazil, Estonia and China that have been producing oil from somewhat similar shale rock for over 50 years. The truth is that there have been periods of time when the United States did try to develop the oil shale deposits of both the western and eastern states.

The existence of the U.S. oil shale deposits has been known for over 100 years. In the eastern U.S. oil shale was processed to produce lamp oil and lubricants on a small scale before Drake's discovery of liquid oil in a well drilled in Pennsylvania in 1859. All of those small oil shale plants were shuttered as conventional oil became abundant and much less expensive.

The very large, rich deposits of western oil shale in CO, UT, and WY were discovered about 1912 and there was a land rush to the west as the nation was running out of liquid oil. Many small plants were built and excitement was rampant. Then the large west Texas oil field discoveries brought oil shale development to a halt.

Historically, the U.S. oil shale development efforts have had a history of boom and bust. There was a wave of activity during and after World Wars I and II, and another during the oil embargo of 1973-1974, which was heightened even more by the 1979 Iran-Iraq war. Then in 1980 the U.S. established the Synthetic Fuels Corp. with a major goal of getting oil shale into commercial production; a flurry of activity followed as corporations stepped up and invested billions of dollars to cooperate with the federal government in this strategic domestic program. But then the OPEC countries dropped the price of oil and the government abolished the Synthetic Fuels Corp. in 1985. Every major oil shale project died, despite the fact that billions of dollars had been invested; Unocal's project was the last to close in 1991.



Then, 20 years later Congress passed the 2005 Energy Policy Act (P.L. 109-58). Oil shale was once again attracting attention. Many of the major oil companies showed renewed interest in oil shale, encouraged by provisions of that Act. But, federal programs never materialized and the majors gave up on oil shale again, and pursued other opportunities. Here we are in 2018 with only a few small oil shale companies active and none producing commercially.

So, there have been at least five oil shale boom and bust episodes over the past 100 years. Interest in oil shale peaks when the nation's oil supplies are threatened and when oil prices skyrocket. During these boom times the Federal government developed research programs and created incentives for industry to invest in projects to produce shale oil. In each case large amounts of money and manpower were spent on oil shale programs. In every case the programs were terminated when new domestic oil deposits were discovered and/or international tensions subsided and the price of oil stabilized at a level that made the oil shale projects uneconomic.

There is no question that oil shale production is more difficult and expensive compared to conventional oil wells. The projects require long-lead-times for demonstration plants, followed by lengthy engineering, permitting and construction phases and the projects are capital intensive. In the face of uncertain future oil prices these projects represent a risky investment, especially first-generation plants.

Over the past 100 years, we have gained a vast amount knowledge about oil shale and how to process the rock and produce a premium refinery feedstock. Oil shale has been researched to the point that libraries are full of reports produced by universities, federal laboratories, and private research groups. At this point, we don't need additional basic research, we need to build modern, state-of-the-art demonstration plants and operate them for years to answer fundamental questions on the best technologies, methods to minimize environmental impacts, ways to reduce water requirements, improve safety, reduce costs, employ numerous advances in automation, and demonstrate the important petroleum and chemical products that can be produced from shale oil.

2005 Energy Policy Act (P.L. 109-58)

The 2005 Energy Policy Act (P.L. 109-58) was passed at a time when oil prices were rising and domestic supplies were dwindling.. Section 369 of the Act was devoted to encouraging the development of Strategic Unconventional Fuels, notably oil shale, oil sands, and heavy oil. Once again the Federal government encouraged private corporations to invest in oil shale, and with oil around \$100/barrel, it seemed economically viable.

Section 369 established a Task Force on Strategic Unconventional Fuels made up of representatives of the Departments of Energy, Defense, and Interior working with State and local government groups and assisted by a Technical Advisory Group. The Task Force published its final report in 2007; it was a 3-volume report titled "America's Strategic Unconventional Fuels".



The 2007 Task Force recommendations included an aggressive program to develop oil shale with a goal of producing 2.5 million barrels per day of shale oil by 2035. The recommendations also included the BLM issuing oil shale leases in the west and the Federal government providing certain incentives to minimize risk to investors and corporations that would spearhead the efforts or develop oil shale as a strategic domestic resource.

Following the passage of 2005 Energy Policy Act, industry and investors were encouraged and oil shale projects were again attracting attention. The BLM issued a few Research & Development leases in CO and UT in 2007. But, unfortunately, for the past 10 years the Federal government has not acted on the 2007 recommendations of the Task Force and most companies have lost interest and backed off on their plans for new projects.

A Nice Problem to Have

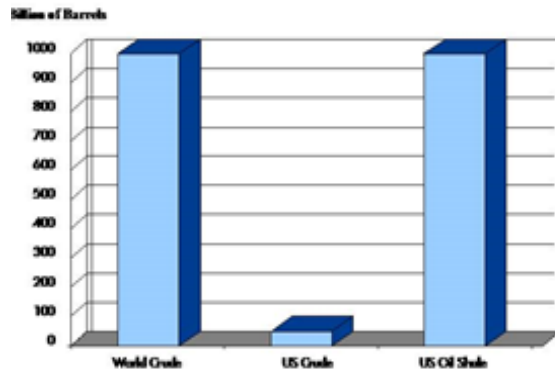
Oil shale faces a problem within the United States. Every time it appears that oil shale will be developed, there is a new discovery of domestic conventional oil and/or the world price of oil drops to a level that makes oil shale development uneconomic and too risky. The U.S. is blessed with an abundance of natural resources, including all sources of energy. Most recently, directional drilling and fracturing have worked together to vastly increase the amount of conventional oil produced from geologic formations once thought uneconomic. Today the U.S. is actually becoming nearly self-sufficient in oil, something thought impossible a few years ago.

So, while the nation is not in immediate need to develop its rich oil shale deposits and a crisis is not pending, this affords government and industry time to methodically test shale processing options and to answer many of the questions that arise every time there is a frantic approach to get an oil shale program underway. NOSA sees this as a blessing; we as a nation have time to do it right and avoid mistakes of the past.

NOSA believes the current Administration and Congress should be the catalyst for getting a commercial oil shale industry started in the U.S.

As former Utah Congressman Jim Hansen once told Gary Aho, “Gary, oil shale won’t happen in the United States until the Federal government decides it should”.

OIL SHALE RESOURCE



- Oil shale is an important domestic petroleum resource
 - 1.1 trillion barrels – exceeding U.S. reserves of conventional oil.
 - Largest, single, untapped hydrocarbon resource in the world.
 - Over 70% located on Federal lands in CO, UT and WY.
 - Could meet part of the Nation's energy needs for well over 100 years.
- A leasable mineral, but not offered for commercial leasing by BLM
 - Limited to R,D&D leasing only over past decades.
- Defense Department considers shale oil a potential domestic, long-term, strategic source of military fuel.

