

## CLIMATE CHANGE FACT SHEET

### WHAT IS THE OVER-ARCHING CLIMATE CHANGE ISSUE?

Observed changes in the environment suggest that the global climate is changing, and many experts believe some if not all of the change is resulting from human activity. In particular it is postulated that man-made emissions of greenhouse gases are at least partially responsible for the changes, and that the earth is warming at a higher than expected rate, based upon observations over the last few decades. In light of these observations and the potential impacts upon society, international conferences have been held, and the Kyoto Accord adopted by many of the world's nations. This accord calls for the reduction in emissions of greenhouse gases over the next decades, and by inference the reduction in the use of fossil fuels. Even with large improvements in energy efficiency and substantial growth in the use of renewable energy, fossil fuels will still be the major part of the energy mix by midcentury. The vast U.S. oil shale resource can play a role in filling a future domestic fuel supply gap.

### WHY IS CLIMATE CHANGE AN ISSUE FOR OIL SHALE?

The greenhouse gas of primary interest is carbon dioxide (CO<sub>2</sub>). It is produced any time something is burned, such as coal, petroleum products and natural gas. For instance, when these natural resources are burned in a power plant to produce the electricity we use in our homes, CO<sub>2</sub> is emitted. The same holds true for the production of shale oil from the vast deposits of oil shale in the world, because energy in the form of heat is needed to process the oil shale. Therefore, oil shale is not unique in its emission of greenhouse gases. All forms of fossil energy are dealing with this issue in one manner or another and to a lesser or greater extent depending upon the resource and the recovery technology.

### HOW CAN FUTURE IMPACTS BE MITIGATED?

There are a number of means of mitigating the impacts of greenhouse gas emissions from oil shale projects. They vary with the technology being employed but generally include reducing emissions from the source, capturing the greenhouse gases, disposing of them, or using the captured CO<sub>2</sub> for beneficial uses. Reducing CO<sub>2</sub> emissions at the source is accomplished by employing energy efficiency measures. Capturing CO<sub>2</sub> can be accomplished using known technologies. The isolation of carbon dioxide, known as sequestration, is practiced today where the CO<sub>2</sub> is injected into oil fields to enhance the recovery of petroleum. Alternatively, CO<sub>2</sub> may be disposed of in subsurface strata. Also, it is possible to use CO<sub>2</sub> in an insitu oil shale recovery technology.

### WHAT IS BEING DONE?

Research and planning have been carried out for the best methods to manage the greenhouse gases produced during the production of shale oil. Developers will benefit from the work going on around the world in the science and engineering being conducted in the climate change area because the same technical issues are being faced by all industries that consume fossil fuels.

### BOTTOM LINE: CLIMATE CHANGE IMPACTS FROM OIL SHALE CAN BE MITIGATED.

The technology to reduce greenhouse gas emissions exists and can be implemented. However, the cost is significant for disposing of or sequestering vast amounts of CO<sub>2</sub> and will add to the investment risk for development of the vast and strategically important U.S. oil shale resource.

NATIONAL OIL SHALE ASSOCIATION

