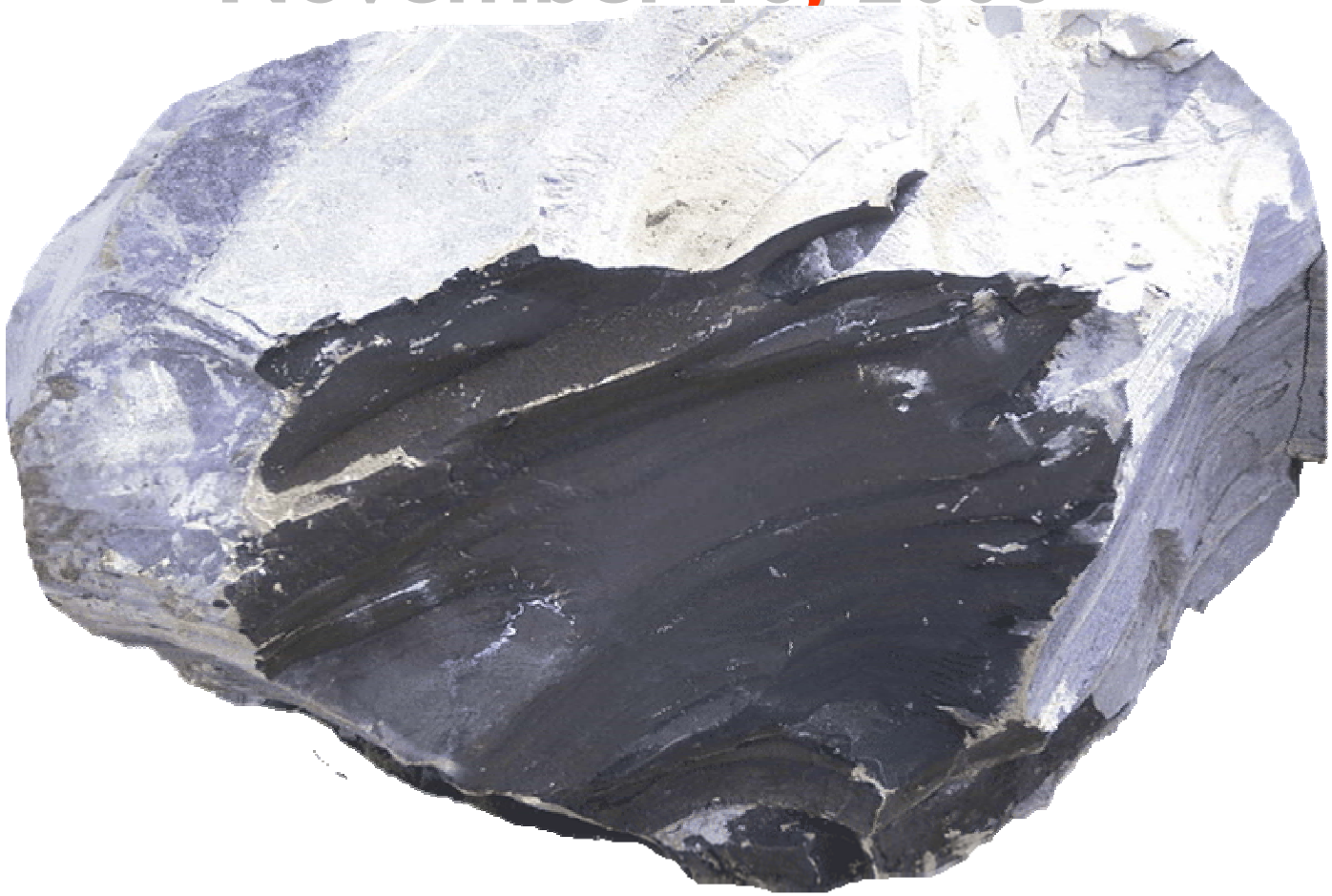
Oil Shale as an Unconventional Fuel
IOGCC Annual Meeting
November 16, 2008



Presented by: Dr. Foster L. Wade

Oil Shale & Tar Sands

Why Now?

- **Until the U.S. can better provide for its own energy needs, we will remain vulnerable to unstable supplies and rising costs.**

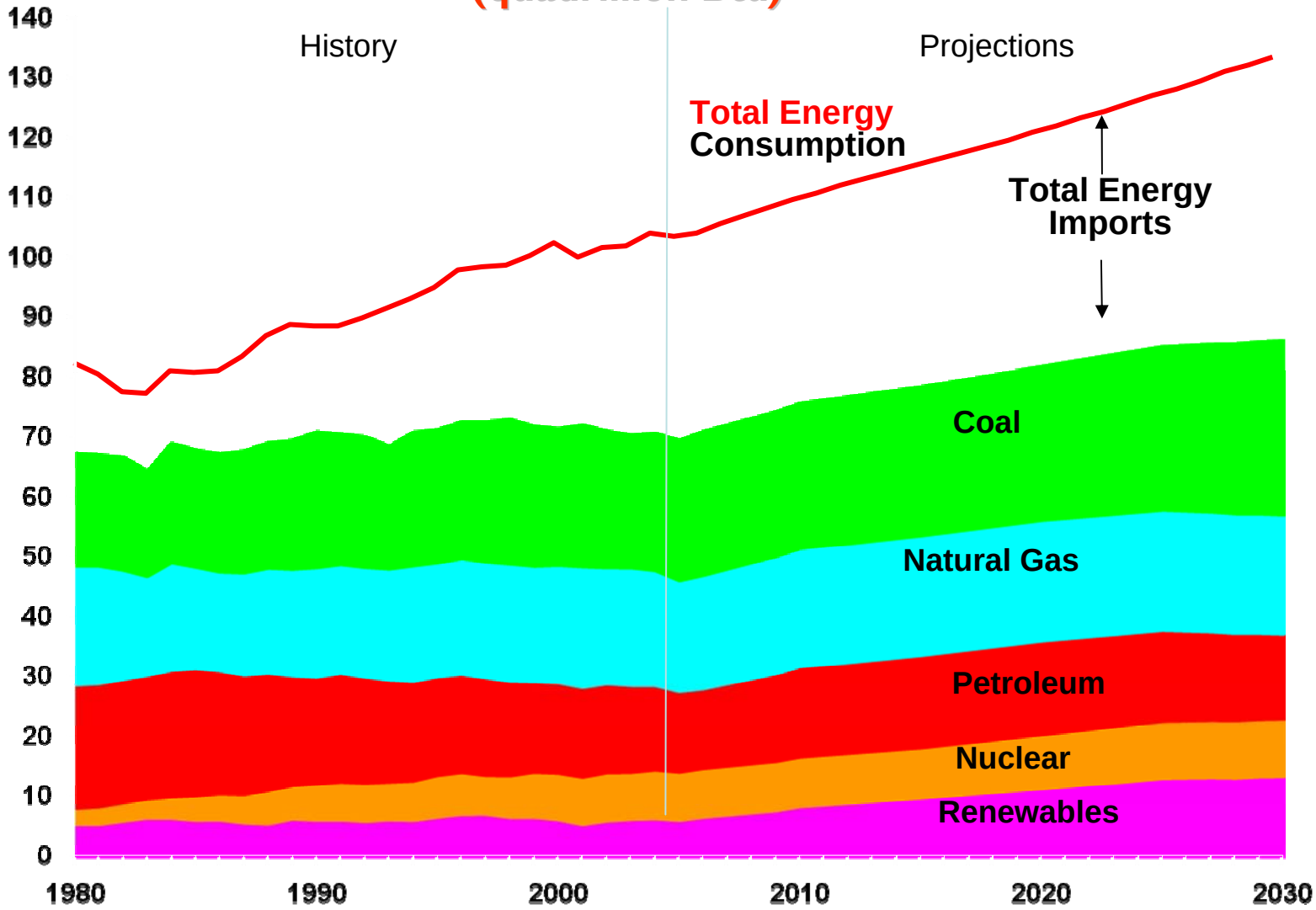
- **Households across America are struggling to deal with these additional costs and experts predict that the trend is set to continue.**

- **In looking beyond traditional energy resources to unconventional fuels, the Department of the Interior has a key role to play in the development of oil shale.**

U.S. Primary Energy Production by Fuel

1980-2030

(quadrillion Btu)



Annual Energy Outlook 2008

Oil Shale & Tar Sands

Tremendous Potential

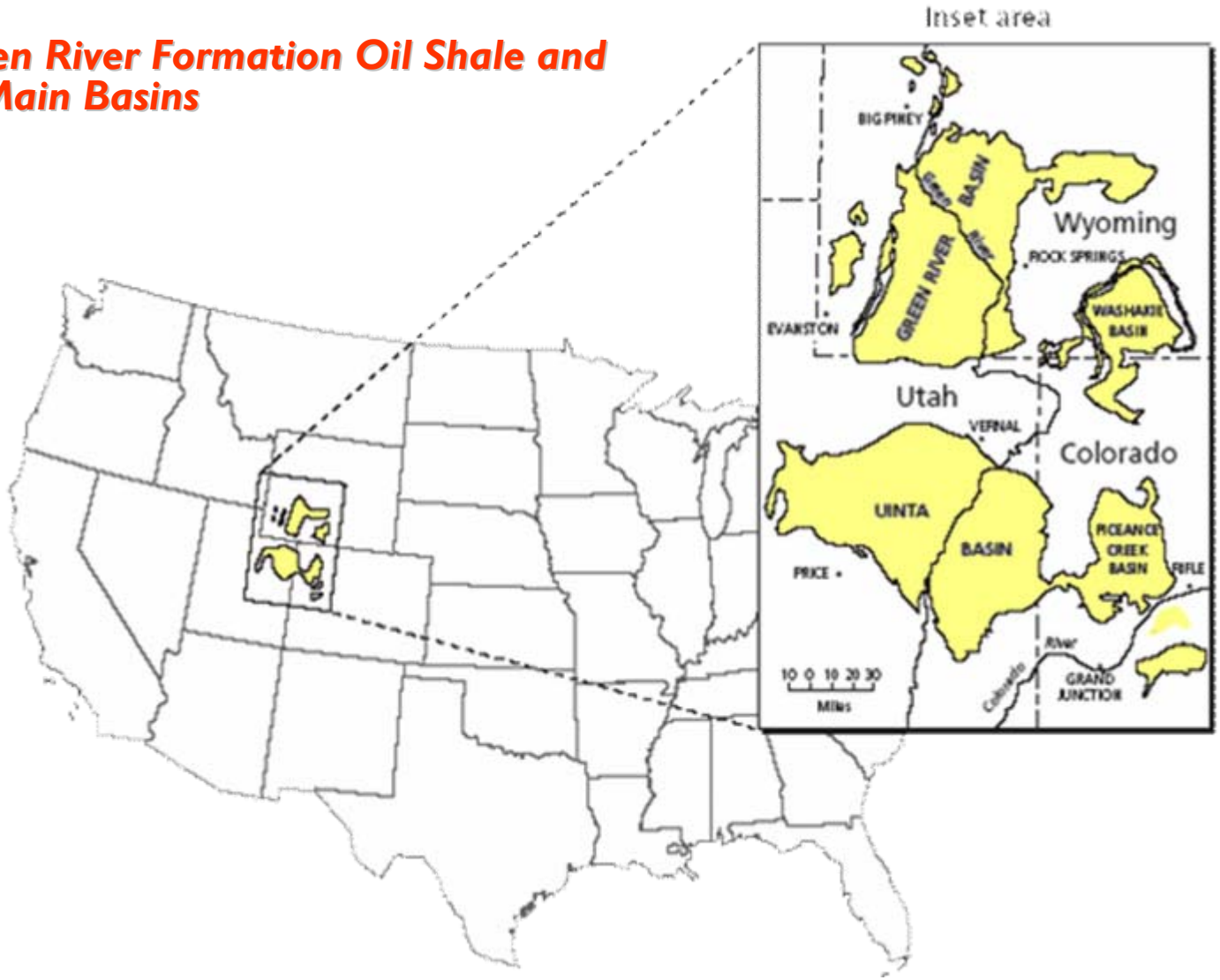
- **The U.S. Geological Survey estimates:**
  --Total U.S. oil shale resource is 2.1 trillion barrels
  --1.5 trillion barrels of which is located in the Green River Basin of Colorado, Utah, and Wyoming

- **The Strategic Unconventional Fuels Task Force estimated the recoverable resource from the Green River formation to be:**
  -- 800 billion barrels of oil
  -- Enough to replace the oil we import for more than 180 years
  --Almost three times the proven reserves of Saudi Arabia

Oil Shale

Potential 800 Billion Barrels of Oil Equivalent

Green River Formation Oil Shale and its Main Basins



Oil Shale and Tar Sands

A Careful, Considered Approach

Energy Policy Act of 2005 provides for:

- Sec. 369(c): Leasing Program for Research and Development of Oil Shale and Tar Sands
- Sec. 369(d): Programmatic Environmental Impact Statement and Commercial Leasing Program for Oil Shale and Tar Sands
- Sec. 369(e) Commencement of Commercial Leasing of Oil Shale and Tar Sands

Oil Shale and Tar Sands

Research, Development and Demonstration Leases (RD&D)

Oil Shale and Tar Sands
RD&D Leases

Assess Environmental and Commercial Viability of Oil Shale

- Grant rights to develop oil shale resources on 160-acres tracts. Initial term is 10 years, and they contain a preferential right to convert the RD&D acreage, plus adjacent acreage up to 4,960 acres, to a 20-year commercial lease once commercial production levels are achieved.
- 20 nominations for tracts in Colorado, Utah, and Wyoming
- Six proposals were selected; NEPA completed and leases issued in 2006
- Companies selected:
  - Shell (3)
  - Chevron
  - EGL Resources, Inc. (now IDT)
  - Oil Shale Exploration, LLC

Oil Shale and Tar Sands
RD&D Leases
The Six Projects

- **Five Colorado Projects**

  Propose in-situ conversion process

- **One Utah Project**

  Proposes surface retorting of oil shale

- Additional research and testing occurring on state and private lands

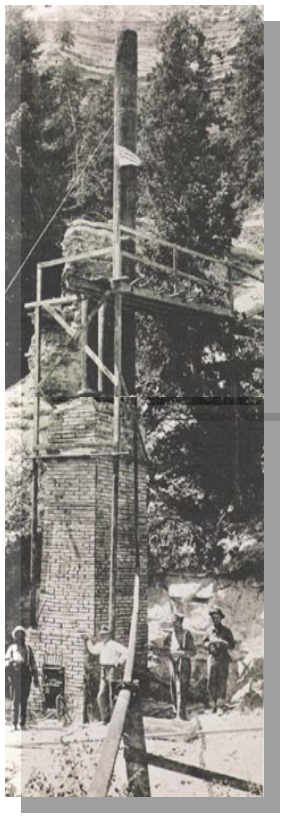
Oil Shale and Tar Sands

Programmatic Environmental Impact Statement (PEIS)

Oil Shale and Tar Sands PEIS

Final PEIS Purpose and Need

Draft published December 2007. Over 105,000 comments received. Final published September 2008.



The Purpose:

- To identify areas where oil shale and tar sands resources are present,
- To decide which areas will be open to application for commercial leasing, exploration and development,
- To amend applicable land use plans.

The Need:

- To increase the nation's domestic production of energy through development in the most geologically prospective areas.

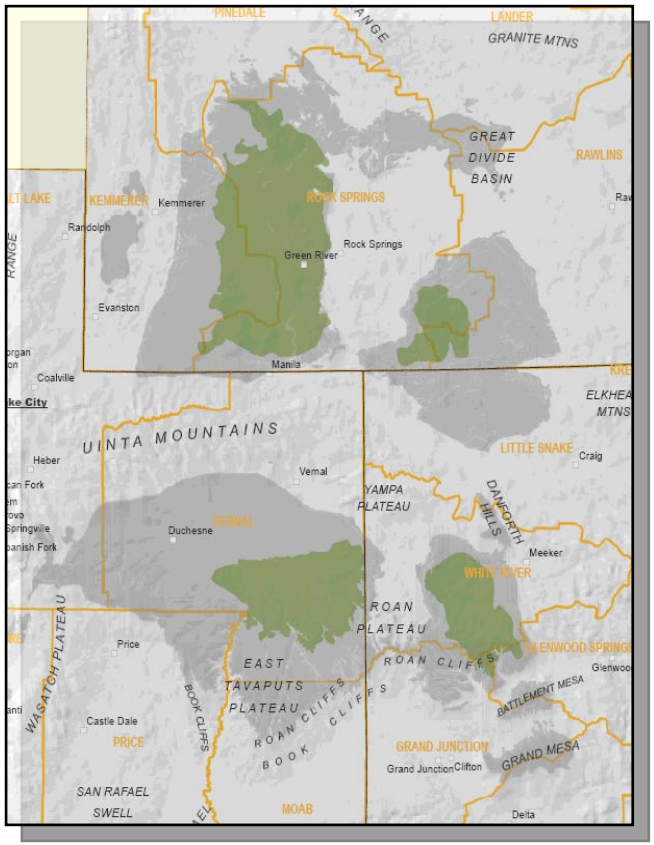
Oil Shale and Tar Sands PEIS

Oil Shale and Tar Sands Cooperating Agencies

National Park Service	Mesa County, CO
Fish and Wildlife Service	Rio Blanco, CO
Bureau of Reclamation	Garfield County, CO
Forest Service	Duchesne County, UT
State of Colorado	Uintah County, UT
State of Utah	Rifle, CO
State of Wyoming	Rangely, CO

Oil Shale and Tar Sands PEIS

Oil Shale Leasing Study Area



Maximum extent of the Green River Formation Basins (shown in gray)

- Study area focuses on the most:
  - geologically prospective oil shale resources, and
  - likely to be the first targets for development (shown in green)
- Colorado and Utah
  - yield is >25 gal/ton and thickness is >25 ft.
- Wyoming
  - yield is >15 gal/ton and thickness is >15 ft.

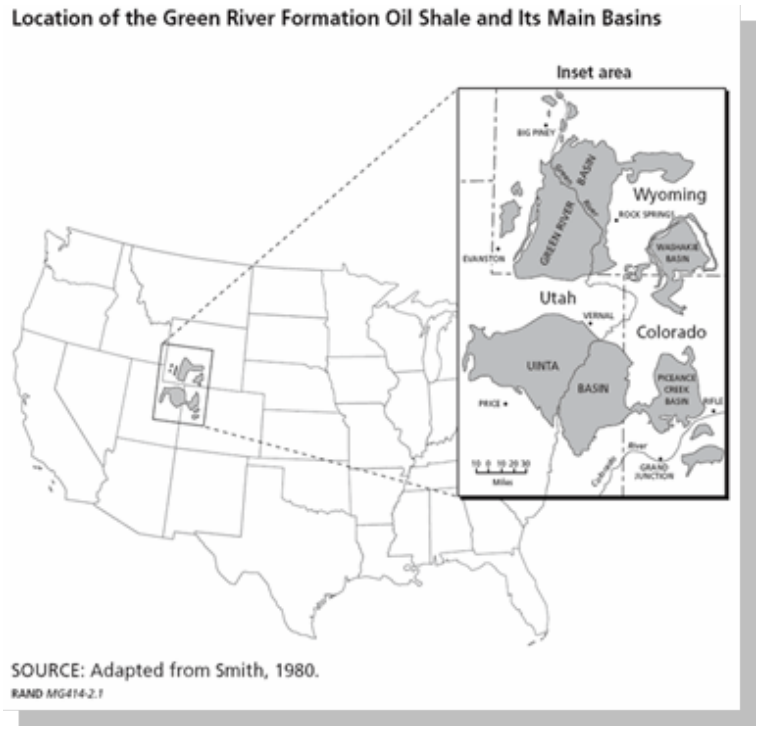
Oil Shale and Tar Sands PEIS

Scoping Issues

- Air quality
- Water quality and quantity
- Socio-economic concerns
- Ecological concerns – plants and animals
- Cumulative Impacts

Oil Shale and Tar Sands PEIS

Changes to PEIS Based on Cooperating Agency Comments



PEIS will:

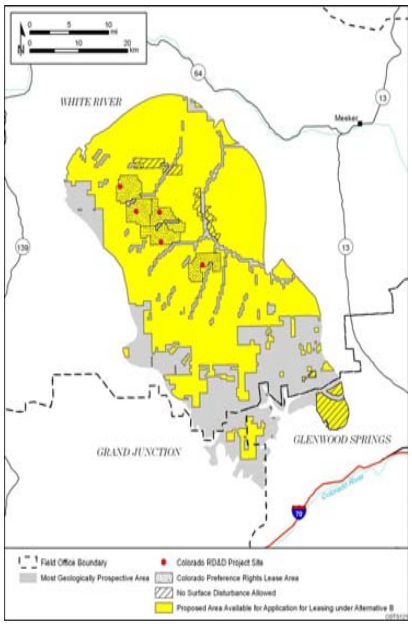
- Not be used to make leasing decisions
- Only make resource allocation decisions i.e., identify lands to be available for the opportunity to lease.

Additional NEPA will be required:

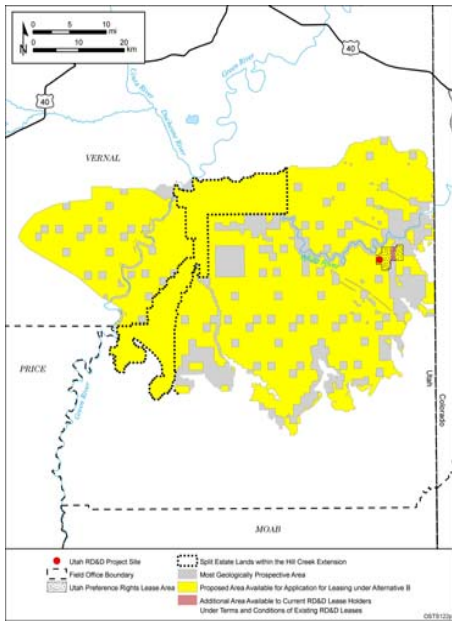
- Once an application is received,
- Prior to lease issuance,
- And, prior to plan of development approval.

Oil Shale and Tar Sands PEIS

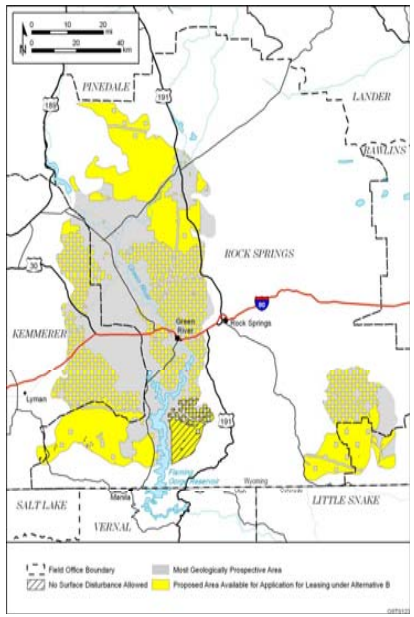
Proposed Land Use Plan Amendment



Colorado –
359,798 acres



Utah –
630,971 acres



Wyoming –
1,000,453 acres

Proposed Oil Shale Regulations

Oil Shale Regulations

- Proposed July 2008
- Provide the "rules of the road" on which investors will rely in determining whether to make future financial commitments to prospective oil shale projects
- Absent the certainty that final regulations would bring, the commercial oil shale industry may not be willing to invest the necessary dollars for research, and this vast domestic resource would remain untapped at a time when our Nation is searching for ways to further its energy security.
- Public comments closed Sept. 22, 2008

Oil Shale Regulations

Framework of Proposed Regulations

- Leasing
- NEPA
- Bonding
- Royalty, Bonus Bids, Rentals
- Diligence Milestones
- Lease Conversion from R,D&D

Oil Shale Regulations

Key Aspects of Regulations

Lease terms	20 years	(regulation)
Rental	$ 2 acre	(statutory)
Max. lease size	5,760 acres	(statutory)
Min. lease size	160 acres	(regulation)
Max. allowed acres	50,000 acres	(statutory)
Royalty Rate	3 alternatives	(regulation)
Minimum Bid	$1,000 acre	(regulation)
Bonding	Full Reclamation	(regulation)

Oil Shale Regulations

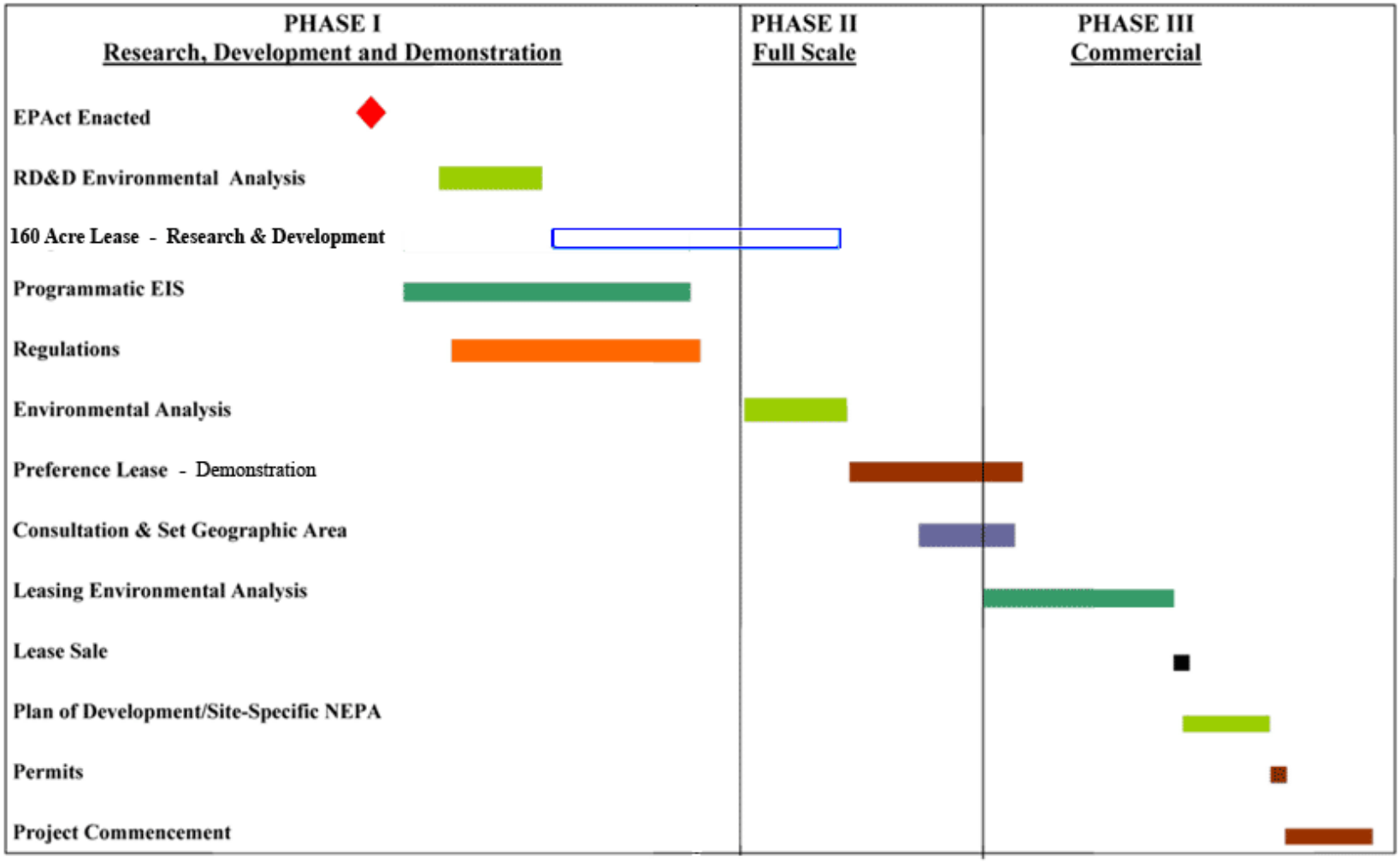
Proposed Leasing Process

- Call for expression of interest
- Comments from Governors, local governments, and Indian tribes
- Set geographic area
- Call for lease applications
- NEPA for lease area
- Hold Competitive lease sale (high bidder wins)
- Plan of Development
- Site-specific NEPA
- Obtain Permits
- Construction
- Mining Begins

Oil Shale and Tar Sands

Development Timeline

Oil Shale Development on Public Lands



BLM – 5/14/08, ed. 8/27/08

Oil Shale Regulations

Proposed Royalty Options

- Flat 5 Percent
- 5 Percent Royalty on Initial Production, With 12.5 Percent Thereafter
- Sliding Scale Royalty (Based on the Market Price of Oil)

Oil Shale Regulations

Diligence Milestones

- Submit a proposed Plan of Development (POD) within 2 years of lease issuance
- Submit a final POD within 3 years of lease issuance
- Apply for all required permits within 2 years of POD approval
- Begin installation of needed infrastructure before end of 7th lease year
- Begin production by end of 10th lease year

Oil Shale Regulations

Lease Conversion

Each of the existing 160-acre RD&D leases contains a preference right for conversion to a commercial lease of additional acreage upon demonstration of a successful method of producing oil from shale rock

(Total of 5,120 acres per lease)

Comments

- Over 75,000 comments were received
- Approximately 74,800 were letter writing campaigns
- Some comments indicated that oil shale production costs more than oil and gas to produce and that a lower rate will promote oil shale production.
- Some comments indicated that the 5% flat rate is too high. They have expressed that a 1% to 3% royalty would offset start-up cost and promote oil shale production.
- Some comments indicated that the government should impose a royalty rate higher than 5%.

The Road Ahead

In the long run, the solution is to reduce demand for oil by promoting all energy technologies here in the U.S. In the short run, the American economy will continue to rely largely on oil, which means we need to increase supply. That in turn will also reduce the upward pressure on prices.