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The Future of Mineral Development on Federal Lands in the United States

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“The Future of Mineral Development on Federal Lands in the United States”

Outline of presentation of John D. Leshy, Harry D. Sunderland Distinguished Professor, U.C. Hastings College of the Law, Natural Resources Law Center, June 7, 2007

I. Scope: I will address the energy minerals - coal, oil, gas, oil shale, geothermal, uranium - and the more valuable so-called “hardrocks” like copper, gold, silver, lead, zinc, molybdenum. Beyond my scope are the fertilizer minerals (potash, sodium, phosphate) and more ubiquitous substances like building stone, sand, gravel, and clay.

II. Context:

- A. Geology and scope of federal lands make them important national sources of many of these minerals, particularly oil, gas, and coal.
- B. The importance of federal lands for these minerals has been growing.
- C. Government coffers derive substantial revenues, some of which are shared with the states, from the energy minerals. The states (but not the federal government, which charges no royalty) derives revenues from federal hardrock mineral production through severance taxes.

III. Some mostly obvious and undisputed propositions relevant to forecasting the future for federally owned minerals:

- A. The future of federal mineral production, particularly energy minerals, is very much tied up with national energy policy.
- B. A strong consensus is emerging that national energy policy will be driven more and more by efforts to slow emissions of greenhouse gases.
- C. The picture is more murky for non-energy minerals.
- D. Globalization affects every aspect of federal mineral policy; in particular, the market for most of these minerals is now a global one.
- E. We cannot drill our way to oil and gas independence from foreign sources, especially on federal lands onshore.
- F. History teaches that technological breakthroughs, very hard to predict, may have huge effects on both supply and demand of federal minerals.
- G. Federal mineral production revenues generally leads politicians at all levels to look favorably on federal policies promoting mineral productions.
- H. Jobs tied to federal mineral production are important in some local areas, but the minerals industry has grown much more efficient user of manpower.
- I. Onshore mineral development tends to be an intense use of the land, and a big environmental disrupter.
- J. Offshore oil and gas development has proved relatively less environmentally disruptive (especially compared to tanker traffic), as industry perfected techniques to prevent blowouts and spills in the wake of the Santa Barbara oil blowout in 1969.
- K. With one major exception, the basic model for federal mineral development has remained the same for several

decades; namely, carried out by private industry under federal supervision, with the government reserving the authority to decide where and under what conditions federal minerals are developed.

IV. Building on these propositions, here are some fearlessly offered specific predictions

- A. Climate change and U.S. policies to address it are huge wild cards that could trump practically everything else that might affect future use of the energy resources of federal lands.
- B. Intensive political debates will take place over how much to expand the search for oil and gas resources, particularly gas resources, on the Outer Continental Shelf, including in “frontier” areas along the Atlantic and Pacific coasts and Alaska.
- C. The Arctic Refuge will likely continue to be a kind of “poster child” for the national conservation movement to protect some special wild areas from oil and gas development.
- D. The modern re-enactment of the late nineteenth century’s “Gilded Age” – turning the public domain over to industrial and development interests – may be ending.
- E. Onshore, the coalition of farmers, ranchers, hunters, anglers, cultural and historic preservation advocates, tribes, and conservationists which emerged to fight some of the more aggressive Bush Administration federal lands energy initiatives will likely hold together and grow more influential, at least for the next few years.
- F. More and more federal lands will continue to be put off limits to significant mineral development, by a variety of formal and informal mechanisms, and the industry (especially non-oil and gas) will be ever-more geographically concentrated.
- G. States are becoming more regulatory and more aggressive about participating in federal decision-making regarding management of federal minerals.
- H. The regulatory processes under which these minerals are developed, long criticized by both industry and environmental interests, might come under increasing scrutiny. But whether and how they might be reformed is not easy to predict.
- I. Green consumer and corporate campaigns might begin to have more influence over domestic policy.
- J. Mining Law reform is looming as a possibility..

V. Federal Mineral Development in 2027 - A Report from the Frontlines.

A. Onshore, federal coal production remains strong, still concentrated in Wyoming’s huge beds of strippable, low-sulfur coal. Federal oil and gas production continues at an ever-dwindling rate, as new technologies to wring more resource out of declining fields have failed to stem the decline. Most onshore federal petroleum production is concentrated in a few “sacrifice” areas, and some other places under stringent limitation regarding roadbuilding, directional drilling, and other measures to reduce the industry’s “footprint.”

In the meantime, a number of special places where drilling proposals were hotly disputed have been protected, either by wilderness designation or by special legislation, by executive branch withdrawals, or just by inaction on drilling proposals. Protection of some of these areas was accompanied by compensation (from public or private funds or a combination) to existing leaseholders. The coalbed methane development boom is largely over, as the supplies were exhausted in the large coalseams. In its wake were depleted aquifers and some surface pollution, a scarred landscape that is slowly healing, and some formerly booming communities gone bust.

A small but vigorous uranium mining industry is operating on federal lands in eastern Wyoming and eastern Utah,

helping fuel a rejuvenated domestic nuclear power industry. The industry was successfully operating under the Uranium Mineral Leasing Act of 2008, which had removed uranium from the old Mining Law of 1872. Congress's more general overhaul of the Mining Law didn't come until Mark Udall's presidency in 2019. In this reform, which effectively ratified a trend that had been apparent for a few decades, Congress limited the application of the Mining Law to the entire state of Nevada and a handful of other specific geographic areas in the West that had long been the scene of mining activity. Everywhere else, hardrock minerals were subject to a leasing system, and very few leases had been issued because the "cappucino cowboy" towns that now dominate the rural West rose up to defeat leasing proposals the few places they were made. Even in some of these places where the old Mining Law still applied, such as a few old copper mining towns in Arizona, a horde of retirees successfully organized to limit operations that threatened the amenities that brought them there.

Offshore, federal oil and gas production in the deepwater Gulf of Mexico continued apace, with Texas, Louisiana, Mississippi and Alabama reaping substantial revenue sharing benefits. A vigorous natural gas industry emerged off the south Atlantic coast after federal leases were issued on the OCS there in 2014. Florida was looking at the prospect of being ringed with OCS development after a deal struck in 2016 allowed the state, with federal funds derived from OCS royalties, to offer free prescription drugs to all 34 million of its senior citizens. Drilling was finally underway on the OCS off the New England coast, after leases were issued that soon after the last Kennedy left Congress in 2020. Alaska was also experiencing an offshore petroleum boom, as much of the OCS around the state was under lease, now that most of it was ice-free for much of the year. California, meanwhile, continued to successfully resist offshore leasing, having elected the former President of Greenpeace as Governor and the former Executive Directors of the Center for Biological Diversity and the Rewilding Institute as Senators. Oregon and Washington, meanwhile, were still considering whether to accept a congressional proposal to allow leasing on the OCS off their shores, in return for guaranteed federal dollars to run the hatcheries which were the sole supply of salmon in their states' rivers.

END

“The Future of Mineral Development on Federal Lands in the United States”

I. Scope: Addressed here are the energy minerals - coal, oil, gas, oil shale, geothermal, uranium - and the more valuable so-called “hardrocks” like copper, gold, silver, lead, zinc, molybdenum. Beyond the scope are the fertilizer minerals (potash, sodium, phosphate) and more ubiquitous substances like building stone, sand, gravel, and clay.

II. Context:

A. Federal lands are important national sources of many of these minerals, particularly oil, gas, and coal.

One reason is the sheer size of the federal estate. It includes about one-third of the nation’s fast lands, and most of the submerged lands off the coasts; that is, those extending three to 200 miles offshore. The federal government gave the coastal states the first three miles (three leagues in a few places) in the Submerged Lands Act of 1953.

A second reason is geology - the federal lands predominate in regions that are geologically favorable to the occurrence of certain minerals; e.g., the Rocky Mountains (hardrocks); the Northern Great Plains (coal), and the Outer Continental Shelf in the Gulf of Mexico (petroleum).

B. The importance of federal lands for these minerals has been growing. For example:

Coal production has shifted from private to federal lands quite dramatically in the past 30 years. Federal lands accounted for 10% of the nation’s domestic coal production in 1976; 20% in 1985; 30% in 1993, and nearly half today. Federal production comes mostly from nine huge strip mines located in Campbell County, Wyoming. The trend was underscored recently when Peabody, the world’s largest coal company, is divesting itself of its properties in Appalachia and concentrating its U.S. operations in Wyoming.

Oil and gas production has undergone a similar shift. Federal lands accounted for only about 10% of the nation’s crude oil production in 1959. Today it is about 33%. Federal lands accounted for about 10% of the nation’s natural gas production in 1964. Today it is approaching 40%. Federal oil and gas production has also increasingly moved offshore, to the Gulf of Mexico. The OCS now supplies about five-sixths of all the federal oil and more than two-thirds of the federal gas produced. More than twice as many federal acres are leased for oil and gas offshore as onshore.

Federal lands are also probably going to be important, perhaps predominant, sources of uranium, geothermal energy, tar sands, and oil shale, if technology and policy favors production of such resources.

The importance of federal lands for hardrock mineral production is a more complicated story. The government keeps no relevant statistics. While most hardrock production is in the western U.S. where federal lands predominate, some, perhaps much, of the land on the mine sites have passed out federal ownership, thanks to the privatization (patenting) feature of the Mining Law. When GAO surveyed mineral operators on a confidential basis back around 1990, the responses indicated that around three-quarters of the total hardrock mineral production in the twelve western states (valued at more than \$1 billion in 1990) came from non-federal land. U.S. General Accounting Office, Mineral Resources: Value of Hardrock Minerals Extracted From and Remaining on Federal Lands, GAO/RCED-92-192, August, 1992. Federal land mineral policy remains important to hardrock mineral production for other reasons. Many large hardrock mines are on a mixture of federal, state and private ownerships, often in bewilderingly complex patterns, and large modern mining operations typically need vast amounts of land for tailings piles,

processing facilities, and waste dumps, and often federal lands are the only ones available for this purpose. Finally, federal lands are important future sources. In that same report GAO estimated, based on industry assessments, that the federal lands contained about \$65 billion in hardrock mineral reserves.

C. Government coffers derive substantial revenues, some of which are shared with the states, from the energy minerals. The states (but not the federal government, which charges no royalty) derives revenues from federal hardrock mineral production through severance taxes. In FY 2006, the federal government was paid rents, bonus bids and royalties totaling nearly \$8 billion from oil and gas leases offshore, and nearly \$4.5 billion from oil, gas and coal leases onshore. [Minerals Management Service website] States take 50% (Alaska 90%) of the federal onshore oil and gas and coal revenues. Offshore, until recently there was no sharing of federal oil and gas revenues with the states, but that is changing with enactment of the 2005 Energy Policy Act (42 USC 15801) and the Gulf of Mexico Energy Security Act of 2006 (43 USC 1331).

III. Here are several mostly obvious and undisputed propositions relevant to forecasting the future for federally owned minerals:

A. The future of federal mineral production, particularly energy minerals, is very much tied up with national energy policy. Today fossil fuels are the mainstay of national energy supplies. More than one-third of the energy consumed in the U.S. is derived from oil, and about one-quarter each from natural gas and coal. If national energy policy discourages the use of coal, demand for federal coal will be dampened. If national energy policy promotes nuclear power, demand for federal uranium will increase. The price of yellowcake (processed uranium ore) has gone up tenfold to near record highs in the past couple of years. Supplies have been effected by flooding of large mines in Canada and Australia and a slowing of conversion of nuclear weapons to civilian reactor fuel. (Speculators in the uranium futures markets understood this quite a while ago, and the New York Times did a big story in late March on a uranium claim-staking “rush” on the Colorado Plateau.)

B. A strong consensus is emerging that national energy policy will be driven more and more by efforts to slow emissions of greenhouse gases. Major corporations, including some big energy companies, are climbing on board what looks increasingly like a bandwagon. Indeed, we are maybe (hopefully) on the threshold of some very fundamental changes in national energy policy to come to grips with this global problem. Over time this is likely to have dramatic effects on federal mineral production.

C. The picture is more murky for non-energy minerals. Future demand for industrial metals like copper is closely linked to overall health in the economy. It is also linked to conditions abroad, since some competitive sources of these minerals outside the U.S. are in less politically stable parts of the world. Future demand for molybdenum is linked to the health of the oil industry, which is a heavy consumer of moly-hardened steel. Future demand for gold, whose principal use is in jewelry, is harder to predict because it has always been driven by a variety of forces, especially psychological ones.

D. Globalization affects every aspect of federal mineral policy; in particular, the market for most of these minerals is now a global one. Australian policy toward uranium production, or Venezuelan or Saudi policy toward oil production, or Zambian policy toward copper production, may have as much or more to say about demand for federal minerals than federal mineral policy. Coal is the exception, as not much of it moves across U.S. borders. In this global marketplace, governmental stability and the amount of protection governments afford investment capital in mineral development ventures is an important factor. For the United States, it has always been a strongly positive factor. Canada’s Fraser Institute has for a long time annually surveyed leading mining company executives to rate many jurisdictions around the world with significant mineral deposits on their friendliness to mining (including regulatory environment, tax policy, labor issues, infrastructure, and government stability). U.S. western states usually rank very high, with Canadian provinces and Australian states. Globalization has also meant that some of these industries, such as the hardrock mining industry, is much more consolidated than it used to be. A handful of companies dominate the industry, and a relatively small number of huge mines account for most of the global production.

E. We cannot drill our way to oil and gas independence from foreign sources, especially on federal lands onshore. While the federal lands have become a steadily more important source of domestic oil production, the

percentage of U.S. oil demand met from domestic sources has gone steadily down. This has been due to a combination of rising demand and, more recently, declining production. From 1948 to 1972, U.S. oil production near doubled, from 5.5 million to 9.5 million barrels per day, but the percentage of oil the country imported more than tripled during about the same period, from less than 10% to about 33%. Today imports account for more than half of U.S. consumption. This means that, while federal lands supply about one-third of domestic production, onshore federal lands account for only about about 6% of our total domestic production, and 3% of our total consumption. With respect to natural gas, the picture is a little different. The U.S. imports very little, except from Canada (currently about 15% of total U.S. consumption), but this might change if some of the liquefied natural gas port facilities on the drawing boards are built. Of the 85% of total U.S. natural gas consumption that is produced domestically, only about 10% comes from federal lands onshore, and about 20% from the federal OCS.

F. History teaches that technological breakthroughs, very hard to predict, may have huge effects on both supply and demand of federal minerals. In the last thirty years, federal oil and gas production has shifted offshore owing to major advances in technology allowing oil and gas deposits in offshore water several thousand feet deep to be located and tapped, a remarkable achievement given that serious OCS activity did not begin until the second half of the twentieth century. Gold production from federal lands went up very dramatically when cyanide heap leach mining and the development of massive earth-moving machines enabled highly disseminated fine-particle gold to be extracted. (A comparable development occurred a century ago, when development of the froth flotation process for extracting copper and other minerals from lower grade deposits ushered in giant open-pit mining on federal land.) Perfection of techniques for extracting natural gas from coal beds (where gas was once considered a nuisance) have sparked a booming industry on federal lands in Wyoming and elsewhere, and on private lands in Texas and other places.

G. Federal mineral production revenues generally leads politicians at all levels to look favorably on federal policies promoting mineral productions. States can and do levy severance taxes on the production of federal minerals, with minimal constraints from federal law (*Commonwealth Edison v. Montana*; *Forbes v. Gracey*). As noted earlier, the federal government shares its onshore federal oil, gas and coal revenues 50-50 with the states (except Alaska gets 90%). Federal mineral revenue sharing is a significant part of Alaska's, Wyoming's, and New Mexico's state budgets.

H. Jobs tied to federal mineral production are important in some local areas, but industry has grown much more efficient users of manpower. Today the entire direct payroll of the Wyoming coal industry - with by far the biggest output in the country - numbers about 5000. In the hardrock mining industry, unit output per job went up much faster in the mining industry in the 1970s and 1980s than in other industries. The total number of mining and smelting jobs was cut in half between about 1981 and 1985 in the Mountain West and has continued to decline marginally. [See, e.g., Tom Power, *Lost Landscapes and Failed Economies*, Island Press, 1996, p. 106; Tom Power and Richard N. Barnett, *Post-Cowboy Economic: Pay and Prosperity in the New American West*, Island Press, 2001, p. 53.] Fewer jobs, no matter how paying, translates into reduced political clout locally and regionally.

I. Onshore mineral development tends to be an intense use of the land, and a big environmental disrupter. An earth-wrenching, environmentally disruptive activity, it can pose serious threats to water and air quality, fish and wildlife habitat, mountain scenery, and the like. Some environmental costs can be controlled or mitigated relatively satisfactorily, but some cannot. While some are localized, many are not. Acid mine drainage from mines that closed down decades or more than a century ago is still fouling water bodies across the West. Historic mining areas like Butte, Montana and Globe, Arizona are permanently scarred. EPA's annual Toxics Release Inventory (TRI) shows that hardrock mines release about one-quarter by weight of all toxics released by U.S. industry - the latest figures, for 2005, show the industry releasing nearly 400 million pounds of lead and more than 170 million pounds of arsenic. Only relatively recently has appreciation grown of the amount of airborne mercury (nearly 4 million pounds in 2005) produced by hardrock mines and disseminated over a wide area been appreciated. In fact, gold mining (mostly processing facilities associated with Nevada mines) accounts for about one quarter of all mercury air emissions west of Texas.

Although the petroleum industry has developed techniques (such as directional drilling) to reduce its "footprint" on the landscape, it still can be a big one. On the Pinedale Mesa in western Wyoming, one of the biggest natural gas fields in the nation, BLM is considering nearly quadrupling the authorized number of wells, which currently stand at

something more than one thousand. CBM development, being a low-grade energy source, requires a lot of land and a large number of wells for each unit of gas extracted. Overall, petroleum development, particularly CBM, may be the most important cause of wildlife habitat fragmentation and disruption in the intermountain west.

Also, mining tends to be a boom-and-bust activity, with well-known socio-economic impacts on rural economies - the Gillette syndrome. It is true, however, that mineral development directly disturbs a much smaller area of federal land (in the single or low double digits of millions of acres) than livestock grazing (found on more than a quarter of a billion federal acres), timber harvesting, motorized recreation, or many other federal land uses.

J. Offshore oil and gas development has proved relatively less environmentally disruptive (especially compared to tanker traffic), as industry perfected techniques to prevent blowouts and spills in the wake of the Santa Barbara oil blowout in 1969. The amount of oil spills from OCS exploration and production has been minuscule for a long time. Even though the offshore industry suffered major damage in some hurricanes in recent years, oil spills were minimal. Of course, OCS development can have substantial onshore impacts from concomitant industrialization, and the Louisiana Gulf Coast has suffered substantial loss of wetlands owing in part to offshore oil and gas activity (along with loss of renewing sediments as a result of Corps of Engineers re-engineering the Mississippi River).

K. With one major exception, the basic model for federal mineral development has remained the same for several decades; namely, carried out by private industry under federal supervision, with the government reserving the authority to decide where and under what conditions federal minerals are developed. A little history: After an early nineteenth century experiment with mineral leasing, U.S. mineral policy generally favored open, unrestricted exploitation, best exemplified in the “come and get it” free access policy of the Mining Law of 1872. A titanic struggle triggered by Teddy Roosevelt’s aggressive policy of “withdrawing” substantial amounts of federal mineral land in the early twentieth century culminated in enactment of the landmark Mineral Leasing Act of 1920. That law put almost all federal energy minerals (except for uranium) under a leasing system where the government (a) retains substantial control over whether and how federal minerals are developed; and (b) receives a direct financial return in the form of bonus bids, rentals, and a royalty on production. (The details of these systems vary on ordinary federal lands, acquired federal lands, and the outer continental shelf, but the basic elements are the same.)

Hardrock minerals are the exception. They remain generally subject to the Mining Law of 1872, under which the government has less control over when and how minerals are developed, and the mining companies make no direct payments to the federal treasury.

Another legacy of Theodore Roosevelt’s era is the so-called “split estate” situation found on about sixty million acres of land, mostly in the northern Great Plains and the Southwest. About a century ago the federal government began retaining both title to the minerals and the right to develop them when it disposed of federal lands. These “split-estate” lands have, predictably, sparked controversy when the federal government’s mineral policies do not accord with the wishes of the surface owner. (A mirror-image situation is found on several million acres of land in the East, where the federal government acquired land from private owners in the early part of the twentieth century to establish eastern national forests, but often failed to acquire the mineral rights. The eastern split estates have not been as controversial. Relatively little reserved private coal has been developed under federal lands.)

IV. Building on these propositions, here are some fearlessly offered specific predictions. The usual caveat applies: Prediction, as Mark Twain said, is always difficult, especially as regards the future. The inherent difficulty is compounded here by the fact that, historically, prices of minerals have fluctuated widely, leading to boom and bust cycles.

A. Climate change and U.S. policies to address it are huge wild cards that could trump practically everything else that might affect future use of the energy resources of federal lands. Some things seem fairly clear at this point:

Absent some major technological breakthrough, oil shale will never achieve commercial production - it’s simply too

carbon-rich and too energy intensive to produce.

The long-term future of coal production, another carbon-rich source of energy, is very cloudy. It depends on whether any of the various technological bets being placed on controlling its greenhouse emissions will pay off. BLM seems to be assuming at least some of them will, as it is working to put up for lease several billion more tons of federal coal in northeast Wyoming over the next few years.

Oil and gas will likely remain an important transition fuel, but substantial conservation efforts may dampen demand of the long-term.

B. Intensive political debates will take place over how much to expand the search for oil and gas resources, particularly gas resources, on the Outer Continental Shelf, including in “frontier” areas along the Atlantic and Pacific coasts and Alaska. An alliance of environmental interests and NIMBY advocates along the coasts have forged a strong bipartisan consensus that has kept most OCS areas off limits to new federal leasing for a couple of decades. The petroleum industry is seeking to change that, pushing for more OCS leasing, figuring the resource potential is greater, the technology is available to proceed into ever deeper water, and coastal state environmental concerns might be assuaged by revenue sharing and the excellence of its environmental record (far better than that of oil tankers). From an environmental standpoint, it is ironic that we’ve restricted OCS development in part to protect the fishing industry, and then stood by and allowed overfishing to basically destroy productive fishing grounds in places like George’s Bank off Massachusetts. More frequent and severe hurricanes as the climate changes may provide more of a challenge, but very little oil spilled even though the industry suffered major damage from Gulf hurricanes in recent years.

C. The Arctic Refuge will likely continue to be a kind of “poster child” for the national conservation movement to protect some special wild areas from oil and gas development.

That effort has been amazingly successful despite some close calls. Would more special places in the lower 48 have been saved if enviros had put as many resources and political capital into efforts to protect them? Or did the massive campaign to protect the Arctic create a climate where it was more acceptable for some in Congress to protect places like the Rocky Mountain Front?

D. The modern re-enactment of the late nineteenth century’s “Gilded Age” – turning the public domain over to industrial and development interests – may be ending. Its highwater mark may have come with the rollbacks of the Clinton-era hardrock mining rules, and with enactment of the unabashedly pro-development and pro-subsidy Energy Policy Act of 2005. Historians may mark the turning point as the short but fierce battle in late 2005/early 2006 over the rather brazen Pombo-Gibbons proposal to amend the Mining Law to renew patenting and liberalize its terms, which could have allowed privatization of millions of acres of federal land. The Fall 2006 elections, in which Mr. Pombo was defeated and the Democrats resumed control, promise to change public lands politics dramatically. It seems likely, for example, that Congress - driven in part by the need to raise revenue to close the budget deficit, and as part of a fundamental, climate-change-induced reexamination of national energy policy -- will reexamine financial subsidies granted to various parts of the energy industry.

E. Onshore, the coalition of farmers, ranchers, hunters, anglers, cultural and historic preservation advocates, tribes, and conservationists which emerged to fight some of the more aggressive Bush Administration federal lands energy initiatives will likely hold together and grow more influential, at least for the next few years.

This coalition has been effective in formulating campaigns to protect some special places whose names - if they’re not household words - are now at least much more familiar than they were a few short years ago, Names like Utah’s Nine Mile Canyon; New Mexico’s Otero Mesa; Colorado’s Roan Plateau and HD Mountains; and Wyoming’s Red Desert and Wyoming Range. This coalition has scored some successes. In the Rocky Mountain Front and New Mexico’s Valle Vidal, close congressional election battles helped turn normally pro-development members of Congress (Conrad Burns, Heather Wilson, Pete Domenici) into protection advocates. Elsewhere protection campaigns are picking up supporters but have not yet seriously deflected the Bush Administration’s relentless push for more leasing and development. Regional politicians have sometimes advocating protecting these places - Rep. John Salazar opposed BLM’s push to build roads and lease in roadless areas of HD Mountains in western Colorado. New Mexico Governor Bill Richardson has opposed Otero Mesa, even filing suit. The emergent coalition has turned “war on the west” rhetoric upside down.

F. More and more federal lands will continue to be put off limits to significant mineral development, by a variety of formal and informal mechanisms, and the industry (especially non-oil and gas) will be ever-more geographically concentrated. Considered against the long sweep of history, the mining industry has been excluded from more and more federal lands. National parks, national monuments, wilderness and wilderness study areas, national conservation areas and national wildlife refuges are now generally off limits to mineral activity. This has meant that increasingly, federal mineral development is more geographically concentrated; e.g., the gold industry in Nevada, the copper industry in Arizona, the coal industry in the northern Great Plains with outposts in Colorado, Utah and northern Arizona, the CBM industry in the Powder River and the San Juan basin.

G. States are becoming more regulatory and more aggressive about participating in federal decision-making regarding management of federal minerals. In the nineteenth century mining companies effectively controlled the political machinery in several western states, especially Arizona and Montana, and most states did very little regulation of mining. Many even passed industry-sponsored legislation preempting local governments from regulating mining through land use laws (changing the normal rule that land use was a prerogative of local government). This situation is beginning to change substantially, reflecting demographic and economic change in the region. Recognition is growing across the political spectrum of the amenity values of federal lands, drawing on studies like one by the Sonoran Institute that documented how western counties with more protected wilderness have healthier economies. This has made local areas more hesitant to embrace mining activities.

Today all states have regulatory programs in place that apply to federal mineral development. While they vary substantially in quality, the direction of change is to strengthen them. Nevada has begun to pay some attention to mercury emissions from hardrock mines.

States have not done such a good job in regulating the water impacts of mining on federal lands. It has long been the case that any water needed for federal mineral operations is obtained under state, not federal law. This has been a particular issue with respect to CBM development, which extracts large quantities of groundwater as a necessary byproduct, and hardrock mining, where giant open pits often require constant dewatering, drawing down regional groundwater supplies. In both cases groundwater is converted to surface water, often of lower quality. States with CBM production, most notably Wyoming, are only very slowly coming to grips with this situation. States with large hardrock mines like Nevada have done relatively little to control or seek to mitigate these impacts.

Most states are increasing demands for financial assurance for reclaiming lands and waters disturbed by mining. To some extent this is to make up for past spectacular failures (e.g., Summitville in Colorado; Zortman-Landusky in Montana), where hardrock mining companies declared bankruptcy and saddled state and federal taxpayers with large cleanup bills. States are also enacting or considering laws to protect private surface owners more in split-estate situations, and are beginning to assess state and local infrastructure costs associated with mining more realistically. (Colorado recently estimated that state and local governments will incur billions of dollars in energy-impact costs over the next couple of decades.)

Offshore, states do not regulate activities on OCS lands under federal jurisdiction, but they do have nearly plenary authority over the onshore impacts of OCS development, and Louisiana is leading a charge for revenue-sharing from federal leases.

H. The regulatory processes under which these minerals are developed, long criticized by both industry and environmental interests, might come under increasing scrutiny. But whether and how they might be reformed is not easy to predict.

Federal decisionmaking regarding development of federal minerals tends to be channeled through familiar federal processes like NEPA and, where applicable, the ESA. Also, federal land and resource planning processes used by the Bureau of Land Management and the U.S. Forest Service help guide the extent to which federal lands are made available for mineral activities. A considerable body of opinion across the political spectrum holds that these processes have not worked well in the context of mineral development, being cumbersome and too often producing little substantive improvement. But there is no consensus on how to improve them. Environmental interests tend to take the position that these processes have not worked because they are, as the old joke goes, like Christianity - they

haven't failed so much as they haven't really been tried. They favor more concentrated attention on the big environmental and policy issues, tightening pollution control and best practices standards, and enhancing litigation opportunities. Industry tends to favor streamlining, using more devices like "categorical exclusions" and looking less at big-picture issues, and reducing litigation opportunities. So far the result has been stalemate. Perhaps global warming will provide the catalyst to break through that gridlock.

I. Green consumer and corporate campaigns might begin to have more influence over domestic policy. E.g., Tiffany - no dirty gold..

J. Mining Law reform. I can't resist the temptation to say a few words about my favorite hobby horse. A genuine case can be made that it is coming under increasing stress. The House is going to renew pressure for reform by considering a comprehensive reform proposal later this session. Issues on the table are predictability, bonding, reclamation, cleanup \$\$, royalty. Political stars might line up. What effect this would have on federal mineral development is hard to say. (Gold production on federal land boomed at the very time that the industry was complaining the loudest about emerging environmental restrictions.)

V. Federal Mineral Development in 2027 - A Report from the Frontlines.

A. Onshore, federal coal production remains strong, still concentrated in Wyoming's huge beds of strippable, low-sulfur coal. Federal oil and gas production continues at an ever-dwindling rate, as new technologies to wring more resource out of declining fields have failed to stem the decline. Most onshore federal petroleum production is concentrated in a few "sacrifice" areas, and some other places under stringent limitation regarding roadbuilding, directional drilling, and other measures to reduce the industry's "footprint."

In the meantime, a number of special places where drilling proposals were hotly disputed have been protected, either by wilderness designation or by special legislation, by executive branch withdrawals, or just by inaction on drilling proposals. Protection of some of these areas was accompanied by compensation (from public or private funds or a combination) to existing leaseholders. The coalbed methane development boom is largely over, as the supplies were exhausted in the large coal seams. In its wake were depleted aquifers and some surface pollution, a scarred landscape that is slowly healing, and some formerly booming communities gone bust.

A small but vigorous uranium mining industry is operating on federal lands in eastern Wyoming and eastern Utah, helping fuel a rejuvenated domestic nuclear power industry. The industry was successfully operating under the Uranium Mineral Leasing Act of 2008, which had removed uranium from the old Mining Law of 1872. Congress's more general overhaul of the Mining Law didn't come until Mark Udall's presidency in 2019. In this reform, which effectively ratified a trend that had been apparent for a few decades, Congress limited the application of the Mining Law to the entire state of Nevada and a handful of other specific geographic areas in the West that had long been the scene of mining activity. Everywhere else, hardrock minerals were subject to a leasing system, and very few leases had been issued because the "cappuccino cowboy" towns that now dominate the rural West rose up to defeat leasing proposals the few places they were made. Even in some of these places where the old Mining Law still applied, such as a few old copper mining towns in Arizona, a horde of retirees successfully organized to limit operations that threatened the amenities that brought them there.

Offshore, federal oil and gas production in the deepwater Gulf of Mexico continued apace, with Texas, Louisiana, Mississippi and Alabama reaping substantial revenue sharing benefits. A vigorous natural gas industry emerged off the south Atlantic coast after federal leases were issued on the OCS there in 2014. Florida was looking at the prospect of being ringed with OCS development after a deal struck in 2016 allowed the state, with federal funds derived from OCS royalties, to offer free prescription drugs to all 34 million of its senior citizens. Drilling was finally underway on the OCS off the New England coast, after leases were issued that soon after the last Kennedy left Congress in 2020. Alaska was also experiencing an offshore petroleum boom, as much of the OCS around the state was under lease, now that most of it was ice-free for much of the year. California, meanwhile, continued to successfully resist offshore leasing, having elected the former President of Greenpeace as Governor and the former Executive Directors of the Center for Biological Diversity and the Rewilding Institute as Senators. Oregon and Washington, meanwhile, were still considering whether to accept a congressional proposal to allow leasing on the

OCS off their shores, in return for guaranteed federal dollars to run the hatcheries which were the sole supply of salmon in their states' rivers.

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