

Public Interest Comment
on the Department of the Interior's
Proposed Initiative to Revise and Update Regulations Governing
Hardrock Mining Operations (43 CFR 3809)¹

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of regulations and their impacts on society. As part of its mission, RSP produces careful and independent analyses of agency rule making proposals from the perspective of the public interest. Thus, the program's comments on the Bureau of Land Management's proposed revisions to its hardrock mining operations rules do not represent the views of any particular affected party or special interest group, but are designed to represent the interests of American citizens.

I. Background

The federal government owns almost one-half of the land in the western states. Most of this land is administered by the Bureau of Land Management (BLM) in the Department of the Interior and the Forest Service in the Department of Agriculture. These lands constitute a significant, and often dominant, source of U.S. hardrock mineral potential and production. Although hardrock mining has declined in relative importance in the U.S. economy, in absolute terms mineral production in the western states remains robust. Arizona is the leading producer of non-coal minerals in the U.S., accounting for almost 20 percent of world copper production. In addition, Nevada is a primary reason why U.S. gold production has more than doubled since 1980, and is the second largest producer of gold in the world. These states have heavy federal land holdings. More than 40 percent of the land in Arizona and 85 percent of the land in Nevada is federally owned.

Salient characteristics of mineral exploration and development projects are long time horizons, high uncertainty, and rarity of exploration success. A mineral development sequence consists of several stages: (1) identification of promising areas and preliminary exploration work; (2) a feasibility study to evaluate the commercial viability of the site; and (3) development of infrastructure, the mine site, and processing facilities. Preliminary exploration work typically has minimal environmental impacts, while large-scale excavation and mineral processing can have both short and long-term environmental effects. Thus, environmental regulation of mining covers a broad range of mineral exploration and development activities. Private decisions to explore and develop are a function of variables such as land availability, quality of ore grades, market prices, technology, capital access, availability of substitutes for mined materials, financial market regulations, and tax provisions, as well as elements of the environmental permitting process and surface management regulations.

Because many mineral deposits are on land that is federally owned, federal and state laws and regulations play an important role throughout the mineral exploration and development

¹Prepared by David Gerard, Research Associate, Political Economy Research Center (PERC) and Adjunct Assistant Professor, Department of Agricultural Economics and Economics, Montana State University.

processes. The rights to explore for and to mine hardrock minerals on federal lands are allocated through the terms of the 1872 Mining Law. The Mining Law allows United States citizens and firms to explore for minerals and stake mining claims on federal lands without authorization from any government agency. This provision is known as self-initiation or free access. Claimants maintain their rights by paying an annual \$100 holding fee for each claim (the maximum claim size is approximately 20 acres). If a site contains a deposit that can be profitably marketed, claimants enjoy the “right to mine,” regardless of any alternative use, potential use, or non-use value of the land. The federal government does not assess royalty taxes assessed on the minerals taken from BLM and Forest Service lands.

The Mining Law, however, has no environmental provisions. Instead, environmental protection is handled through a combination of land management regulations (BLM and Forest Service have separate regulations), federal environmental statutes, and the laws and regulations of the state where the mining activity is located. BLM’s current reform proposals are confined to surface management regulations, and do not extend to revisions of the 1872 Mining Law.

A. Environmental Impacts and Surface Management Regulations

The nature of mining invariably leads to environmental disruptions, and mining has the potential for long-term environmental impacts. Potential environmental impacts include soil erosion and stream sedimentation, generation of mounds of waste material, heavy metal contamination of soil and water, and acid generation.

Until the 1960s, there were no federal or state statutes or regulations governing hardrock mining. This began to change, however, with the enactment of federal statutes, including the Wilderness Act, the National Environmental Policy Act (NEPA), the Clean Water Act, the Clean Air Act, and the Endangered Species Act. These statutes did not target hardrock mining, but mine operations were subject to their provisions. State environmental protection laws, including some mining specific laws, also began to emerge during this period.

In addition, the BLM and the Forest Service also enacted surface management regulations specifically addressing the environmental impacts of mining. In 1974 the Forest Service enacted surface management regulations, and in 1976 the Federal Land Policy Management Act (FLPMA) directed the Secretary of the Interior to take actions to “prevent unnecessary or undue degradation” of the public lands. Following FLPMA, BLM enacted the “3809” regulations in 1981. Although there have been some revisions, the original 3809 regulations remain largely intact.

BLM has been considering regulatory changes on and off since 1991. In 1999 the agency opened a comment period, completed a Draft Environmental Impact Statement (EIS), and published a final rule. According to the BLM, the changes in the 3809 regulations constitute a major federal action, and therefore the National Environmental Policy Act (NEPA) requires the preparation of an EIS describing the likely impacts.

BLM never implemented its final rule, however. Instead, Congress directed the National Academy of Sciences (NAS) to examine the adequacy of current state and federal regulations. Congress also passed legislation prohibiting the Department of Interior from issuing a final rule

until after a 120-day public comment period following the issuance of the NAS report. The NAS report was completed in October, 1999.

The major conclusions of the NAS study were that the existing framework was generally effective, but that some changes were needed to fill gaps between state and federal regulations. The Department of Interior is now revising its proposed rule in accordance with the NAS recommendations, as well as soliciting additional public comment.

B. Casual Use, Notice of Intent, and Plan of Operations

The primary goals of surface management regulations are to ensure that environmental impacts and safety hazards are minimized during operations, and that site reclamation is completed once mineral development concludes. A major distributional objective is that these tasks be completed — or at least paid for — by the operator.

There are three classifications for operations on BLM land: *Casual Use*, *Notice of Intent*, and *Plan of Operations*. Regulations differ according to how an operation is classified. Casual Use applies to projects that disturb fewer than five acres and that do not use mechanized earthmoving equipment. In such cases, the operator is not required to notify BLM of the activity, and thus Casual Use operations are unregulated.

An operator must file a Notice of Intent with BLM for activities that disturb fewer than five acres in a single year, but involve more substantial disturbances (e.g., drilling and road building). An operator can maintain Notice-level status even if more than five acres are disturbed over the course of two or more years. For an operation that disturbs more than five acres in a single year, the operator must submit a Plan of Operations to the BLM. All Plans are required to include the completion of an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). If, based on these analyses, BLM finds that the operation will not cause a significant environmental impact, the operator is allowed to proceed.

The threshold between a Notice and a Plan of Operations is a major focus of debate surrounding the 3809 revisions, with the BLM's preferred alternative including a shift in this threshold from five acres per year, to five acres cumulatively.² The reason for this focus is that Plan-level operations must undertake an EA at an estimated cost of \$80,000 (USDI, 1998, 45). This can increase expenditures up to 38 percent for some exploration ventures.

Table 1 categorizes the number and type of activities conducted on BLM land in 1997. In terms of the number of operations, small-scale exploration accounts for more than half of the activity. The average size of these operations is two and a half acres. Exploration activity has different effects than mining and milling operations, and these are likely to be substantially different than large-scale operations.

² See Section III, A. for a more detailed explanation.

Table 1: Mining Activities on BLM Land, 1997

	Notices of Intent				Plans of Operation		
	Number	Acres	Average Acres		Number	Acres	Average Acres
Exploration	3,915	9,555	2.4		269	13,422	49.9
Strip Mining	102	278	2.7		22	4,790	217.7
Open Pit	556	1,048	1.9		330	101,564	307.8
Placer	1,317	3,472	2.6		232	1,724	7.4
Underground	260	200	0.8		46	6,182	134.4
Mill Sites	66	436	6.6		33	6,115	185.3
Total	6,216	14,989	2.4		932	133,797	143.6

Note: An operator must file a *Notice of Intent* for activities such as drilling and road building that disturb less than five acres in a single year. An operator must submit a *Plan of Operations* when the activities disturb more than five acres in a single year.

Source: USDI, 1999, 86-87

C. Alternatives Considered

The Draft EIS evaluates four management options:

- maintain existing regulations
- proposed regulations
- delegate authority to states
- maximum protection based on prescriptive design requirements

The Department of the Interior and the BLM have expressed little interest in ceding management authority to the states, and the extensive federal control based on prescriptive design requirements option was expressly dismissed by the NAS study. As a result, the likely outcome will be some compromise between the proposed regulations – which are preferred by BLM – and the status quo.

These alternatives are designed to address five key areas:

1. the relationship and coordination between state and federal agencies,
2. the threshold level between Notice and Plan-level operations,
3. appropriate performance standards,
4. financial assurances for reclamation, and
5. regulation enforcement and penalties for noncompliance.

This comment examines the benefits and costs of the proposed regulations and then focuses on two of the key areas BLM addresses: (1) the threshold level used to distinguish between Notice and Plan-level operations; and (2) financial assurances for reclamation.

II. Interior’s Cost-Benefit Analysis: Estimates and Revised Estimates

In 1998, the Department of Interior completed a cost-benefit analysis of the proposed regulations (USDI, 1998). The first two columns of Table 2 show Interior’s estimated effects range from a net loss of \$9.6 million to a net gain of \$16.9 million over a ten-year period. Interior calculates this range by taking the upper bound estimate for discounted cost and subtracting the upper bound estimate for discounted benefits reported in Table 2; the lower-bound estimate is calculated in the same manner.³

From these results Interior concludes that it is “reasonable to assume that the benefits associated with the proposed regulation are at least equal to the costs” (USDI, 1998, 68). As we will see, Interior’s own numbers suggest that the true effect of the proposed regulations would likely be a substantial net loss, even if Interior’s underlying assumptions are otherwise correct.

Table 2 : Interior Cost-Benefit Analysis and Adjustments (million\$)

	Interior estimates discounting costs at 15% and benefits at 3%		Interior estimates revised to include all mineral commodities and new BLM administrative costs		Revised estimates discounting costs and benefits at 7% (All mineral commodities and BLM costs included)	
	low	high	low	high	low	high
Costs	\$50.5	\$373.7	\$60.7	\$448.7	\$101.8	\$653.2
BLM Costs	—	—	12.1	18.1	16.9	25.3
Total Costs	50.5	373.7	72.8	466.8	118.7	678.5
Total Benefits	67.4	364.1	67.4	364.1	55.5	299.8
Net Benefits	\$16.9	-\$9.6	-\$5.4	-\$102.4	-\$63.2	-\$378.7

Note: Interior’s cost-benefit comparison on page 67 omits production of silver, copper, and other commodities, as well as BLM administrative costs. In addition, the BLM estimates are generated using a 3% discount rate for benefits, and a 15% discount rate for costs.

Source: USDI, 1998 and author’s adjustments

³ Interior’s approach understates the breadth of the range of estimated net benefits. In fact, the upper bound implicit in its benefit and cost estimates is a net gain of \$313.6 million (upper bound benefits minus lower bound costs), while the lower bound is a net cost of \$306.3 million (lower bound benefits minus upper bound costs). For ease of comparison, we have followed Interior’s approach to calculating the range, although this means that our estimates also report a narrower range than the cost and benefit calculations suggest.

A. Annual Costs and Benefits

Interior correctly assumes that the proposed regulations will increase producer costs, and consequently reduce mineral output. In addition to the lost output, the proposed regulations will substantially increase BLM's administrative costs, as it will have to conduct more inspections and process more Plans of Operations. BLM's annual administrative costs are currently \$9,850,000. It estimates an annual increase of between \$2.4 and \$3.6 million or a 24 to 37 percent increase (USDI, 1998, 50).

Given these factors, Interior generates two different cost estimates:

- The first approach is based on the decrease in mineral production (i.e., lower producer surplus associated with a shift in the supply curve). The approach yields a range of annual costs of \$12.1 million to \$89.4 million (USDI, 1998, 37). The present value cost estimates presented in Table 2 are based on this approach (though the reported present value estimates only include costs associated with an annual decrease in gold production, which it estimates at \$10.1 to \$74.5 million per year).
- The second approach estimates costs as the sum of increased production costs and BLM's increased administrative costs. The estimate of annual costs is \$41 million. A range of plus or minus 20 percent of this point estimate elicits annual costs of \$33 to \$49 million (USDI, 1998, 51).

Benefits are estimated as the “avoided costs of potential future environmental damages or benefits associated with higher levels of environmental quality.” These benefits include improvements in water and air quality, fish and wildlife habitat, wetland and riparian areas, recreation and non-use values (USDI, 1998, 53).

- Interior does not report a point estimate for the annual benefits; but summing the annual numbers gives annual benefits ranging from \$6.14 million to \$41.1 million.

On an annualized basis, the upper bound of the first annual cost estimate (\$89.4 million) is more than double the upper bound estimate of the annual benefits (\$41.1 million). The same is also true for the lower bound estimates (annual costs are \$12.1 million; annual benefits are \$6.14 million). Yet, by discounting costs and benefits *at different rates*, Interior estimates that net benefits range from a net loss of \$9.6 million to a *net gain* of \$16.9 million over a ten-year period.

We correct for this erroneous discounting procedure and other omissions to produce a more realistic estimate of net benefits in the next section.

B. Omissions and Methodological Flaws

Interior reports estimated annual costs of \$12.1 million to \$89.4 million, which is the estimated range of lost output of gold, copper, silver, and other mineral commodities. The 10-year discounted estimate reported in Table 2, however, omits the reduction in production of silver, copper, and other mineral commodities. Instead, Interior only includes the estimated loss in gold

production of \$10.1 million to \$74.5 million. The net present value of this range discounted at 15 percent over ten years is, indeed, \$50.5 to \$373.7 million. However, discounting the range \$12.1 million to \$89.4 million at a 15 percent over ten years yields \$60.7 million to \$443.7 million.

In addition, Interior fails to include the substantial expected increases in BLM's administrative costs. It is not clear why the administrative costs are not included in this estimate, as there is no reason to believe that additional administrative costs are not real costs associated with the new regulations. After all mineral commodities are included and BLM's administrative costs are added, the range moves to net losses of \$5.4 million to \$102.4 million (compared to BLM's initial estimated range of a net gain of \$16.9 million to a net loss of \$9.6 million).

Even with this adjustment, these figures grossly overstate the results of any standard cost-benefit analysis because of the use of two different discount rates — one for costs, one for benefits. Employing separate discount rates for costs and benefits is not a valid approach for cost-benefit analysis. It is not accepted (or even acknowledged) by the economics and accounting professions, nor by the Office of Management and Budget.

Specifically, Interior applies a 3 percent discount rate for benefits and a 15 percent discount rate for costs. The rationale for the choice of a 15 percent rate is that it “approximates the opportunity cost of capital faced by hardrock mining firms” (USDI, 1998, 34). The Office of Management and Budget, however, directs federal agencies to use a 7 percent rate because “this rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years” (USOMB, 1992). Interior also discounts BLM administrative expenses at 15 percent without justification (USDI, 1998, 51). Not surprisingly, the choice of a high discount rate deflates the costs associated with the action; whereas the choice of the low discount rate inflates the benefits.

C. Revised Estimates

Re-estimating costs and benefits using OMB's recommended discount rate of 7 percent gives a much different picture of the costs and benefits of the proposed rule. The final columns in Table 2 reports these estimates using the 7 percent rate for both costs and benefits over a ten-year period.

The adjustment changes the results to net losses ranging from \$63.2 million to as much as \$378.7 million. (Again, we follow the Interior method by taking the difference between the upper bound estimates for cost and the upper bound estimate for discounted benefits, and repeat the process for the lower-bound estimates.) These estimates use the same numbers and assumptions that Interior uses in its analysis. The three changes are (1) the choice of *the same discount rate* for costs and benefits, (2) the addition of forgone production of mineral commodities other than gold, and (3) the inclusion of the BLM administrative costs on the cost side of the ledger. Because the estimated annual costs exceed the estimated annual benefits, the result that the proposed regulations will result in net losses is not sensitive to the choice of a discount rate.

D. Cost-Benefit Conclusions

The central conclusion from this section is that Interior's cost-benefit analysis is severely flawed. In annual terms, Interior's best estimate of costs is only equal to its *upper bound* estimate of annual benefits (both are \$41 million). Yet, Interior reports that the rule would produce net benefits. After correcting for Interior's omission of mineral commodities other than gold, its omission of increased BLM administrative expenses, and its incorrect discounting method, expected net losses range from \$63.2 million to \$378.7 million.

III. Regulatory Compliance Costs versus Site Reclamation Costs

These numbers show that the proposed regulations fail a cost-benefit test, and that Interior and the states should consider lower-cost alternatives to the present BLM proposals. One of the key areas where more thoughtful policy is needed is at the threshold level between a Notice and a Plan.

A. The Proposed Rule Would Increase the Number of Operations Classified as Plan-Level Operations

The 3809 revisions require a Plan whenever there is a cumulative disturbance of more than five acres, as opposed to the existing requirement for a Plan when more than five acres are disturbed in any single year. In addition, for operations that disturb fewer than five acres, the proposed regulations offer two alternatives for triggering designation as a Plan-level, as opposed to Notice-level, operation. The first is equivalent to the trigger implied by the Forest Service plan. The Forest Service evaluates projects on a case-by-case basis and requires Plans for operations that are likely to have "significant impacts." The second is a bright-line alternative that requires a Plan if the operation involves chemical processing or is located in certain designated sensitive areas (e.g., wilderness study areas and national monuments).

As a result of the proposed changes, BLM estimates that 20 percent of current Notice-level operations would be required to file Plans, thereby incurring much higher costs (USDI, 1998, 40). In 1997 there were 1,073 Notices reviewed, down from a peak of 2,451 Notices reviewed in 1993. This suggests that 200-500 small operations would be designated as Plan-level operations under the proposed rule.

B. Regulatory Compliance Costs and Benefits

Filing a Plan of Operations triggers the requirement to complete an Environmental Assessment (EA). As noted above, the cost of completing an EA averages \$80,000. BLM estimates that more than 75 percent of the \$37 million per year in increased regulatory compliance costs are associated with the costs of converting Notices of Intent to Plans of Operations (USDI, 1998, 52). Overall, BLM estimates that exploration costs in some cases will increase up to 38 percent, primarily as a result of the costs associated with the new EA requirements. BLM has separate mine models for cost increases at placer operations (2.9 percent), open pit (5.6 percent), and strip mining operations (7.9 percent) (USDI, 1998, 45).

It appears that the costs of the proposed regulations will have the most pronounced effect on operations at the threshold of Notice and a Plan – typically preliminary exploration projects. However, operations that disturb more than five acres in a year are unaffected because these operators already must complete an environmental assessment or an environmental impact statement.

It is important to examine these costs in the context of the expected benefit of the requirement. Under a worst-case scenario, where an operator abandons an unreclaimed site, the cleanup is left to the land agency, and site reclamation costs serve as a proxy for the benefit of reclaiming abandoned sites. However, this is an imperfect proxy because in some cases, the value of reclamation might be considerably higher than the reclamation cost. In other cases, the cost of reclaiming a site exceeds the value of the land even in pristine condition.

For small sites, the expected costs of the EA will typically exceed expected reclamation costs by a factor of four or more.

Reclamation of sites on national forests provide one set of reclamation costs. Between 1991 and 1994, the Forest Service spent \$2 million cleaning up 295 sites. The Forest Service reclaimed the first 146 sites at an average cost of \$4,788 per site, and estimates the cost of reclaiming the remaining 149 sites to be \$8,725 (USDA, 1996, 31). This is substantially less than the \$80,000 estimated to complete an Environmental Assessment.

The Mineral Policy Center, a vocal advocate of reform of current mining regulations and the self-proclaimed industry watchdog, has estimated cleanup costs at abandoned mine sites across the United States. Table 3 shows the Mineral Policy Center numerical estimates and reclamation costs for five categories of abandoned sites.⁴ Thirty-five percent of the sites are characterized as *Benign* with negligible cleanup costs. The *Landscape Disturbance* category contains another 42 percent of the sites, and these sites have an average reclamation cost of \$4,400, which is consistent with the Forest Service cleanup costs just cited. The *Safety Hazard* category contains another 21 percent of the sites with an average reclamation cost of \$19,500. Thus, the first three categories contain 96 percent of all abandoned mine sites, and the expected reclamation costs for all of these sites are below \$20,000, with an average cost of \$6,059.⁵

The remaining four percent of abandoned mines on the Mineral Policy Center's list have substantially higher reclamation costs. However, these sites would not typically be the kinds of sites affected by the proposal, as operating mines typically cover far more than five acres. Most sites in Montana with severe ground or surface water contamination, for instance, were mined for several decades. The Superfund sites are also extremely costly to remediate. A review of mine sites on the federal Superfund list shows large-scale excavation — often open-pit mines — and extensive mineral processing facilities.

⁴ Most of these sites were abandoned before the enactment of surface management regulations by the Forest Service in 1974 and the BLM in 1981.

⁵ These figures are not adjusted for inflation. Consumer prices increased 16 percent from 1992 to 1998. If reclamation costs increased at the same rate, a \$6,000 reclamation project in 1992 would cost \$6,960 in 1998.

Thus, for the small operations that would be designated as Plan-level operations under the proposal, the cost of conducting an EA (\$80,000) is likely to exceed possible avoided reclamation costs by a factor of 10 or more.

Table 3: Mineral Policy Center Estimates of Abandoned Mine Cleanup Costs

Category	Number of sites	Percentage of total sites	Site characteristics	Average cleanup cost per site (thousand\$)
Benign	194,500	34.88%	no safety hazards or water quality threats	\$0
Landscape Disturbance	231,900	41.59%	waste piles, poor vegetation, severe erosion	\$4.4
Safety Hazard	116,300	20.86%	shafts, adits, collapsed or unstable ground	\$19.5
Surface Water Contamination	14,400	2.58%	acid discharge, heavy metal contamination of surface water	\$1,000-3,000
Groundwater Contamination	500	0.09%	acid discharge, heavy metal contamination of groundwater	\$7,500-12,500
Superfund	52	0.01%	extreme nastiness	\$250,000-\$350,000
Total	557,652			

Note: the estimates are for 32 western states, whereas the 3809 regulations apply almost exclusively to 12 western states. The Mineral Policy Center estimates total cleanup costs at \$33 to \$72 billion; whereas, the now defunct Bureau of Mines estimated cleanup costs at \$4 to \$35.3 billion (USGAO, 1996, 16).

Source: Lyon, Hilliard, and Bethell (1993, 29-31)

C. Rethinking Environmental Assessments for all Operations Covering More than Five Acres

A central motivation for reform of the 3809 regulations, as well as a central insight of the NAS study, is that a bright-line, five-acre rule is not always the appropriate means for determining whether an operation is likely to be benign (i.e., Notice level) or more serious (i.e., Plan level). On the one hand, some operations that disturb fewer than five acres may have substantial potential for hazards such as soil erosion or contamination from toxic chemicals. This is especially true for small mining and mineral processing operations. In such cases, we recommend that the operator post a surety bond or some other form of financial assurance regardless of the number of acres disturbed.

On the other hand, not all operations that disturb more than five acres necessarily warrant an EA or an EIS. Interior's costs and benefits comparisons prepared for this rule suggest that expenditures far outweigh the attendant environmental benefits (as measured).

The EA is used to compile information on whether the operation will have significant environmental impacts. BLM uses the results of the EA to determine whether a Plan of Operations will be approved or rejected. Once the operator completes the EA, the costs cannot be recovered. Thus, the EA may provide information on the likely environmental impacts, but it provides no incentive for firms to reclaim the site – the site operator incurs the cost of the EA whether or not the site is reclaimed. In other words, the EA becomes a sunk cost, and therefore provides no positive incentive to reclaim sites.

The EA requirement will, however, be a significant deterrent to proceeding with exploration or development work. BLM estimates that the requirement will increase exploration expenditures by up to 38 percent.

Unlike an EA, financial assurances provide positive incentives to reclaim. BLM (or a state agency) will often require miners to post a bond that is released only if the site is reclaimed. If the site is not reclaimed, the agency can use the proceeds from the forfeited bond to finance the completion of the reclamation. Such assurances are likely to provide superior environmental performance at a lower cost than expanded requirements to conduct EAs.

D. Costs of Converting Notices to Plans are Excessive

Interior justifies the proposed regulatory changes with examples of environmental consequences of large-scale mining operations. Yet, a substantial divergence exists between the nature of the stated problem and the focus of the regulatory revisions. Although high-profile cases are cited as justification for the new rules, most additional regulatory compliance costs would be borne by operations covering approximately five acres. Moreover, costs and benefits diverge substantially at these sites.

- The Department of the Interior estimates the average cost of completing an EA is \$80,000.
- The cost of the EA is excessive relative to the types of impact observed at actual mine sites. Forest Service reclamation projects show the average remediation cost at an abandoned mine site is typically less than \$10,000. The Mineral Policy Center estimates that 96 percent of abandoned mine sites have reclamation costs less than \$20,000.
- Once an EA is completed, it is a sunk cost, and therefore provides no positive incentive to reclaim sites.
- More than 70 percent of the regulatory compliance costs are related to forcing small operators to complete EAs.

IV. Evaluating the Effectiveness of Current Bonding Requirements

One tenet of the proposed rules is that mine operators should be financially responsible (liable) for reclamation of the mine site. In exchange for development rights on public lands, mining firms must comply with environmental regulations and reclamation requirements. The operating permit includes a reclamation plan and cost estimate, as well as a financial assurance of site

reclamation. Reclamation requirements apply whether the operation is a rudimentary surface scratching that can be addressed with a handful of grass seed, or a multi-million dollar cleanup of a mine site that operated for a decade or more.

A continuing concern is that the firm will abandon a project without completing the reclamation requirement. Although the BLM has made the 3809 regulations a priority, there has been no attempt to survey land to assess environmental harms. Nor is there a persuasive argument that comprehensive reform of the regulations would mitigate these harms. This section reviews the available evidence.

There are several important facts germane to the evaluation of the effectiveness of the reclamation requirements:

- BLM enacted the 3809 regulations in 1981. Thus, there were no reclamation requirements prior to that time. (The Forest Service enacted regulations in 1974).
- Financial assurances are required for Plan-level operations.
- Financial assurances are not required for Notice-level operations.

A. BLM Record

There have been several evaluations of the effectiveness of the surface management regulations. The first was a 1986 General Accounting Office (GAO) report that found a poor record of ensuring reclamation on BLM land. Even after BLM promulgated the 3809 regulations in 1981, the agency only required bonds for operators that had a record of noncompliance.

The GAO audit identified 556 operations in ten states and found that only one operator was required to furnish a bond (USGAO, 1986,29). Consequently, there was a low rate of reclaimed sites. A review of 246 inactive or abandoned sites found that 96 sites (39 percent) went unreclaimed. The hazards included rusting mining equipment, trenches, a cyanide leaching pond, and several unreclaimed roads (USGAO, 1986, 26). These results demonstrate that a major reason why BLM regulations were ineffective may be because the agency failed to enforce the financial assurance requirements.

The study also surveyed 28 unreclaimed sites and found that 24 of these were Notice-level operations. That is, these sites would not have been required to post a bond even if BLM had enforced its regulations (USGAO, 1986, 29). It is an open question whether requiring surety bonds for the Notice and Plan level operations would have resulted in higher rates of compliance.

More recently, a 1992 Inspector General report of the Department of Interior found an abysmal reclamation record. The BLM protested that the report fails to “indicate whether the investigation was limited to sites disturbed by mining activities authorized pursuant to the surface management regulations (i.e., post-1981 sites) and whether the recommendations apply to post-1981 sites only” (USDI, 1992, 21). Because BLM had no reclamation requirements before 1981, it is not clear that the unreclaimed sites reflect poorly on the BLM record or not.

B. Forest Service Record

A 1987 GAO assessment of the Forest Service bonding program showed limited success at promoting site reclamation. The Forest Service required financial guarantees for 214 of the 336 operations evaluated for five national forests in Nevada, Idaho, Montana, and California. (USGAO, 1987, 12). Operations were discontinued at 57 of the 214 sites where the Forest Service required a bond. Of these sites, one had created no disturbance, 28 sites had been reclaimed by the operator, 18 were in the process of being reclaimed, and six sites were inactive but not abandoned. Of the remaining four cases, the Forest Service used the proceeds from forfeited bonds to reclaim three sites. The bond amounts were \$6,000, \$400, and \$3,585. The Forest Service also allowed a \$9,700 guarantee to lapse, and the agency was stuck with the cleanup bill (USGAO, 1987,12).

The success rate at promoting site reclamation was lower at the 19 sites where the Forest Service did not secure financial guarantees. Nine of these sites posed no significant disturbance, in six cases the operators had reclaimed the site even without the bond, and four sites were unreclaimed (USGAO, 1987, 16). The GAO concluded that the financial guarantees, when required (and not allowed to lapse, of course), were an effective tool for promoting reclamation.

More recently, the USDA Inspector General audited the Forest Service's handling of abandoned mines. The Inspector General found that "the percent of active sites that become problems when abandoned are small, [but] the resulting reclamation costs can be large" (USDA, 1996, 32). For the period 1991 to 1994, operators failed to reclaim 295 sites. The Forest Service subsequently retained \$860,000 in bond forfeitures, and spent \$699,000 reclaiming 146 sites. The estimated cost of reclaiming the remaining 149 sites was \$1.3 million (USDA, 1996, 31). Thus, for the three to four year period, the Forest Service was left with \$1.14 million in unfunded liabilities. All of this illustrates a failure to price risk accurately not a failure of surety bonds as such.

C. Lack of Information

These audits provide some idea of the mixed record of successes and failures of current reclamation requirements. Apparently, when financial assurances are required, operators generally shoulder the cleanup expense. In some cases, however, bond defaults do not cover the cleanup costs, and the administrative agencies are left with the expensive cleanups. The record is even more spotty where no financial guarantee is required.

It would be interesting to know the characteristics of the sites that are reclaimed and those unreclaimed. These characteristics would include: year of initial permit, size of the company, the duration of the permit, the type of minerals (gold, silver, copper, iron, molybdenum), type of operation (exploration drilling, placer mining, underground, open pit), annual output, number of acres permitted, number of acres bonded, type and size of financial assurance (reclamation bond, cash), price of mineral at time of permit issuance, price of mineral at time of release/forfeiture, violations or fines assessed during period.

Surprisingly, neither Interior nor the EPA — both advocates of greater federal control over mining regulations — have completed an inventory or a systematic analysis of reclamation performance across the western states. Compiling such information would be a crucial first step

for (1) determining whether states were passing costs onto federal agencies; and (2) fashioning regulations that address problems with the current system.

D. Evidence from Montana

Information for reclamation bonds that were released or forfeited between 1978 and 1996 is available in Montana from the Department of Environmental Quality (DEQ).⁶ Of the 28 hardrock operations, 13 had full bond releases, seven partial releases, and eight bonds were forfeited.⁷ According to DEQ personnel, the proceeds from the forfeitures were generally sufficient to reclaim the sites.

This is consistent with a legislative audit of Montana's mining enforcement, which, though critical in many areas, found no problems with bond releases (Montana Office of the Legislative Auditor, 1994, 20). Thus, current bonding rules, at least in Montana, appear to be somewhat effective at promoting site reclamation at small sites.⁸

E. Greater Reliance on Financial Assurances Justified for Notice and Plan-Level operations

This section points to three major conclusions regarding financial assurances:

- A major reason why the BLM regulations have been ineffective is that the agency did not attempt to apply or enforce financial assurance requirements.
- Bonding has been a reasonably effective means of promoting site reclamation where the requirements are enforced.
- Failure to require financial assurances at Notice-level operations represents a regulatory gap. However, an EA is unlikely to fill this gap or promote site reclamation.
- There has been no attempt to survey the effectiveness of state bonding programs.

V. Conclusions and Recommendations

Interior's economic analysis in support of this proposal cost-benefit analysis reports that annualized costs of the proposal are likely to be twice the annual benefits. Yet, by using creative discounting, it suggests that in present value terms, it is "reasonable to assume that the benefits

⁶ I obtained this information during a visit to the DEQ in January, 1999. I thank Bob Winegar for his assistance.

⁷ A number of sites had multiple bond release dates. This can be either because the initial reclamation was not sufficient, or because the bond amount is reduced in proportion to the completion of on-site reclamation.

⁸ The bond amounts for these sites, however, were relatively small — the largest being just over \$100,000. There are currently ten mines in Montana with bonds in excess of \$1 million, including a cyanide operation at the Golden Sunlight mine that has posted a bond of \$51.7 million. The effectiveness of Montana's bonding will be tested as these sites shut, and the preliminary indications are mixed. The bond at Zortman-Landusky is expected to cover 80 to 100 percent of the total cleanup cost. In addition, a surety provider recently reimbursed the state for \$6.5 million at the Beal Mountain Mine and \$3.8 million at Basin Creek after bankruptcy of the parent company, and these are expected to facilitate a complete cleanup.

associated with the proposed regulation are at least equal to the costs” (USDI, 1998, 68). After correcting for the omissions and methodological flaws, we predict the rule would result in *net losses* ranging from \$63.2 million to \$378.7 million.

The principal motivation for revising the 3809 regulations has been the environmental impacts of large mining operations. For instance, to coincide with the release of the NAS report, the Mineral Policy Center issued a report titled *Six Mines, Six Mishaps*. All six of these examples pertain to large mine sites.

Yet, there is a substantial divergence between the nature of the stated problem and the focus of the regulatory revisions. Although high-profile cases are cited as justification for the new rules, most additional regulatory compliance costs would be borne by operations that cover approximately 5 acres. For these sites, reclamation costs are typically less than \$10,000, while the costs of converting a Notice to a Plan average more than \$80,000.

BLM proposes to increase the use of EAs to determine whether the operation will have significant environmental impacts. It appears, however, that cost of predicting these impacts greatly exceeds reclamation costs at abandoned sites. Analysis from various sources indicates that the benefits of requiring an EA (a proxy is reclamation costs, which are typically far below \$20,000) are unlikely to justify costs of an EA (an average of \$80,000).

Although the EA requires a substantial expenditure of resources, it does not promote site reclamation. The EA is a fixed cost, and as such once the operator incurs the cost, there is no additional incentive to reclaim the site -- the site operator incurs the cost of the EA whether or not the site is reclaimed. The EA requirement will, however, be a significant deterrent to proceeding with exploration or development work. BLM estimates that the requirement will increase exploration expenditures 38 percent. The end result will be less US mineral production, lost exports, lost mining jobs, and increased costs for users of US mineral products.

An alternative would be to require financial assurances, perhaps even in excess of expected reclamation requirements. Posting a surety bond entails much smaller expenditure of resources. (Premiums range from ½ to 15 percent of the amount of a surety bond, hence a \$2000 bond might cost the operator \$200). The surety also provides a positive incentive to reclaim the site because failure to reclaim the site leaves the surety provider (and therefore the operator) liable for the cleanup. Failure to reclaim the site leads to bond forfeiture, and funding for the agency to complete the reclamation work. This suggests that requiring a reclamation bond (at or above expected cleanup costs) of \$20,000 would be a more cost-effective way of promoting responsible mining.

In addition, Interior should consider relaxing its EA requirement at other Plan-level operations. As mineral development process proceeds, a full-scale Environmental Impact Statement will be required of all operators. NAS views this as the spine of the environmental regulatory process, and, of course, it is a costly endeavor.

Appendix I
RSP Checklist
BLM Hardrock Mining Section 3809 Rules

Element	Agency Approach	RSP Comments
1. Has the agency identified a significant market failure?	Mining operations on federal lands often have serious short and long-term environmental impacts despite stringent state and federal statutes and regulations. Fair	The proposed rule is justified by individual anecdotes, rather than a systemic problem. As a result it does not address real problems and is unlikely to motivate real reforms.
2. Has the agency identified an appropriate federal role?	The regulations cover operations on federal lands, and therefore federal regulation may be appropriate. Fair	BLM has not evaluated the effectiveness of state programs, and therefore the agency has no basis for evaluating whether a greater federal role is appropriate.
3. Has the agency examined alternative approaches?	The preamble presents four broad approaches. Unsatisfactory	The agency does not present sufficient data to adequately evaluate these alternatives. Furthermore, it has neglected to consider alternative approaches that could achieve better environmental results at lower cost. Since environmental analyses (EAs) impose the most significant cost (and disincentive to operate), BLM should consider the relative impacts of different thresholds for triggering EAs. It should also examine fully more market-based solutions, such as a greater reliance on financial assurance mechanisms to ensure adequate remediation of closed mine sites.

Element	Agency Approach	RSP Comments
4. Does the agency attempt to maximize net benefits?	<p>BLM’s benefit-cost analysis produces a range of net benefits, from negative to positive. However it is based on unsupported assumptions.</p> <p>Unsatisfactory</p>	<p>Simply including omitted costs and correcting BLM’s discounting procedure (to make it the same for costs and benefits), while leaving its underlying assumptions unchanged, reveals that the proposed action will result in net losses of \$63.2 to \$378.7 million over a ten-year period.</p>
5. Does the proposal have a strong scientific or technical basis?	<p>BLM’s proposed conditions which trigger an Environmental Analysis for an operation are not based on solid evidence.</p> <p>Unsatisfactory</p>	<p>A National Academy of Sciences (NAS) study reveals that the BLM has little information about mining activities under its jurisdiction. It does not support key proposed decisions with information about the resulting environmental impacts or costs.</p>
6. Are distributional effects clearly understood?	<p>Distributional impacts are not carefully explored.</p> <p>Unsatisfactory</p>	<p>The proposed revisions will disproportionately affect small mining operations in the short run, as preliminary exploration costs may increase up to 38 percent in some cases. In the long term, reduction in exploration may have substantial impacts on large domestic producers. The errors in the BLM cost-benefit analysis suggest that distributional impacts from the proposed regulation are not understood.</p>
7. Are individual choices and property impacts understood?	<p>The proposal does not address these issues.</p> <p>Unsatisfactory</p>	<p>A major effect of the proposed revisions would be an increase in the number of EAs that operators must prepare. Yet, an EA provides no incentives for proper land management or remediation. Instead, BLM should require financial assurance bonds, which will align individual incentives with social goals, by holding operators financially responsible if the site is not closed properly.</p>

REFERENCES

- Anderson, Terry L. and Peter J. Hill (1996) *Environmental Federalism: Thinking Smaller*. PERC Policy Series PS-8. Bozeman, MT: Political Economy Research Center.
- Arizona State Mine Inspector (1999) "Abandoned and Inactive Mine Survey," Pamphlet.
- Committee on Surface Mining and Reclamation (1979) *Surface Mining of Non-coal Minerals: A Study of Mineral Mining from the Perspective of the Surface Mining Control and Reclamation Act of 1977*. Washington, DC: National Academy of Sciences.
- Gerard, David (1997) *The Mining Law of 1872: Digging a Little Deeper*. PERC Policy Series PS-11. Bozeman, MT: Political Economy Research Center.
- Higgs, Robert (1986) *Crisis and Leviathan: Critical Episodes in the Growth of American Government*. New York: Oxford University Press.
- Hughes, Jonathan R.T. (1991) *The Governmental Habit Redux: Economic Controls from Colonial Times to the Present*. Princeton, NJ: Princeton University Press.
- McElfish, James M. Jr., Susan P. Bass, Tobie Bernstein, Elizabeth Sheldon (1996) *Hard Rock Mining: State Approaches to Environmental Protection*. Washington, DC: Environmental Law Institute.
- Montana Department of State Lands, Hard Rock Bureau (1994) *Responses to the Office of the Legislative Auditor*. Montana. Hard Rock Bureau.
- Montana Office of the Legislative Auditor (1994) *Hard rock mining regulation, Reclamation Division, Department of State Lands : performance audit report*. Office of the Legislative Auditor. Montana. Legislature. Office of the Legislative Auditor.
- National Research Council (1999) *Hardrock Mining on Federal Lands*. Washington, D.C.: National Academy Press.
- Revesz, Richard L. (1997) "Federalism and Environmental Regulation: A Normative Critique." In *The New Federalism: Can the States be Trusted?*, ed. John A. Ferejohn and Barry R. Weingast. Stanford, CA: Hoover Institution Press.
- United States Department of Agriculture, Office of the Inspector General (1996) *Forest Service Management of Hazardous Material at Active and Abandoned Mines*. Audit Report No. 08601-1-At. Atlanta: USDA.
- United States Department of Interior, Office of Inspector General (1992) *Hardrock mining site reclamation, Bureau of Land Management*. Report No. 92-I-636.

United States Department of Interior (1998) *Benefit-Cost Analysis/Unfunded Mandates Reform Act Analysis and Initial Small Business Regulatory Flexibility Act Analysis. Proposed DOI Rulemaking Subpart 3809 — Surface Management.*

United States Department of Interior, Bureau of Land Management (1999) *Surface Management Regulations for Locatable Mineral Operations (43 CFR 3809) Draft Environmental Impact Statement.* Washington, DC:

United States Environmental Protection Agency, Office of Inspector General (1997) *EPA Can do more to help minimize hardrock mining liabilities.*

United States General Accounting Office (1986) *Public Lands: Interior should ensure against abuses from hardrock mining.*

United States General Accounting Office (1987) *Federal Land Management: Financial Guarantees Encourage Reclamation of National Forest System Lands.*

United States General Accounting Office (1988a) *Surface Mining: Cost and Availability of Reclamation Bonds.*

United States General Accounting Office (1988b) *Federal Land Management: An Assessment of Hardrock Mining Damage.*

United States General Accounting Office (1996) *Federal Land Management: Information on Efforts to Inventory Abandoned Hard Rock Mines.*

United States House of Representative, Committee on Resources (1998) *Report 105-569, Abuse of Power: The Hardrock Bonding Rule. Together with Dissenting Views*

United States Office of Management and Budget (1992) Circular No. A-94 Revised (Transmittal Memo No. 64) *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.*

United States Office of Management and Budget (1996) *Economic Analysis of Federal Regulations Under Executive Order 12866*