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General Accounting Office  
Washington, D.C. 20548



Resources, Community, and  
Economic Development Division

B-277779

September 9, 1997

The Honorable Frank H. Murkowski  
Chairman, Committee on Energy  
and Natural Resources  
United States Senate

The Honorable Don Young  
Chairman, Committee on Resources  
House of Representatives

Subject: Federal Land Management: Estimates of Value and Economic  
Effects of the New World Mine Project

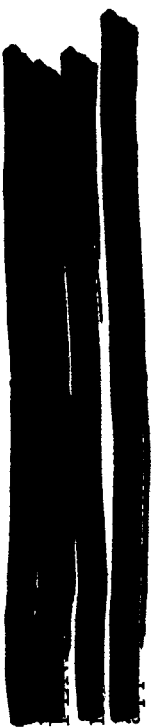
In November 1990, Crown Butte Mines, Inc., applied for a permit to construct and operate a gold, silver, and copper mine in the New World mining district in Montana, approximately 3 miles northeast of Yellowstone National Park. Strong opposition to the proposed New World project arose, in part because of its proximity to Yellowstone National Park. Opponents were concerned that the mine would threaten the park's water quality and other resources. Some were also concerned about the effects of increased population on the area's economy.

Facing the prospect of delays in obtaining the permit, environmental litigation, and public opposition, Crown Butte agreed to a property exchange with the federal government on August 12, 1996, and suspended its application for a permit. Specifically, Crown Butte agreed to exchange its property and mineral interests in the New World mining district for up to \$65 million in federal assets. In addition, Crown Butte agreed to place \$22.5 million in an escrow account to fund environmental response and restoration actions in the district. To respond to your interest in the value of the mineral resources associated with the New World mine and the effects of the mine on jobs, payrolls, and taxes, had development occurred, we obtained estimates of these values and effects and report them here. However, we did not evaluate the

GAO/RCED-97-232R New World Mine Project

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reasonableness of the methodology and assumptions on which these estimates are based.

In summary, we found that estimates of the mineral values varied widely, reflecting differences in the methods of computation as well as differences in assumptions about such things as the size and grades of ore reserves, discount rates, the future price of minerals, and the options for disposing of tailings from the mine. The lowest estimate we obtained ranged from minus \$4.2 million to \$56.7 million in net present value, and the highest estimate was almost \$900 million in gross resource value, not discounted to a net present value. A preliminary assessment of the range of possible property values is currently under way. Forest Service officials expect this assessment to be completed in the fall of 1997.

The mine would provide as many as 321 direct jobs and up to 145 indirect jobs during the project's development, according to a draft environmental impact statement (EIS) begun by the Forest Service and Montana's Department of Environmental Quality.<sup>1</sup> The total payroll during the peak year of construction was estimated in the draft EIS to be \$10.3 million. The draft EIS also estimated that the mine's operation would provide 175 direct jobs and 87 indirect jobs, with a total annual payroll of about \$7.5 million. A separate estimate, provided by the author of an article appearing in the Northwest Mining Association Bulletin, projected that salaries and wages would total \$347 million over the life of the mine.<sup>2</sup> Crown Butte estimated that federal, state, and local taxes would have totaled over \$3 million annually had the mine been developed.

## BACKGROUND

Crown Butte's 10- to 15-year mining operation was to include an underground mine, a mill, a tailings impoundment, and a camp for workers. The proposed mine site is on private and Forest Service-managed lands, and several permits from federal and state agencies would have been required for the operation.

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<sup>1</sup>In 1993, Montana's Department of Environmental Quality and the U.S. Department of Agriculture jointly initiated the EIS, as required by state and federal environmental protection laws. The EIS, which was initiated in response to the company's request to mine, has not been completed because it was suspended when the company suspended its application for a permit.

<sup>2</sup>Otto Schumacher, "Creating New Wealth," Northwest Mining Association Bulletin, Vol. 102, No. 4 (May 1997).

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While the mine would have been located in Montana, it was expected to create employment in both Montana and Wyoming and would thus have affected the economies in both states.

The property exchange agreement between Crown Butte and the federal government provides that Crown Butte will trade all real property in the New World mining district to which it holds title, or in which it has an interest, for federal assets valued up to \$65 million. This property includes Crown Butte's mineral rights in the Gallatin National Forest and property that it has leased and has promised to acquire from a private landowner in the district. The \$65 million price is the maximum value of the government's payment and is contingent upon the resources being valued for at least that amount. According to Forest Service officials, a preliminary assessment of the range of potential property values, based on several alternative mining operations, is under way. The review, which is scheduled to be submitted to the Forest Service for review and acceptance this fall, is expected to be completed in late November 1997.

A third party to this agreement is a coalition of environmental groups, collectively referred to in the agreement as the Greater Yellowstone Coalition. The Coalition opposes the mine and has sued Crown Butte for violations of the federal Clean Water Act. In exchange for Crown Butte's agreement not to mine and to devote \$22.5 million to environmental response and restoration in the district, the Coalition has agreed to settle its legal action against Crown Butte and not to pursue legal action against the federal government for certain environmental effects of mining in the district.

Under the agreement, Crown Butte had a right to terminate the agreement if it was not satisfied with the government's progress in identifying exchange property by August 12, 1997; this deadline has been extended for 60 days. Although the original agreement provided for an exchange of Crown Butte's district property for federal assets, the property will now be exchanged for up to \$65 million in cash if such an exchange is approved by the Congress.

#### ESTIMATES OF THE VALUE OF THE MINERAL RESOURCES VARIED WIDELY

The estimated values of the mineral resources at the New World project varied widely, depending upon the method of computation and the assumptions used in the calculations. The lowest estimate ranged from minus \$4.2 million to \$56.7 million in net present value. The highest estimate approached

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\$900 million in gross resource value (which is not discounted to a present value). Specific information about the estimated values is presented in enclosure I.

Federal appraisal standards define fair market value as the amount for which a property would be sold—for cash or its equivalent—by a willing and knowledgeable seller to a willing and knowledgeable buyer.<sup>3</sup> The standards provide for several methods of determining fair market value, including analyses of comparable sales or prior sales of the identical property. In the absence of reliable and comparable market prices, the standards provide for estimating the value of a resource on the basis of the present value of the future income anticipated from production, including sources such as royalties. Simply put, this method values the estimated future income stream from a project and adjusts this income stream to its value today by using a discount rate. Such a discount rate reflects the earning power of the money over time and the risk associated with this earning. The choice of a discount rate is a key factor in determining net present value—in effect, the lower the discount rate, the higher the net present value of an asset.

The estimated values that we obtained varied depending upon the assumptions used for discount rates, commodity prices, the size and grades of ore reserves, and the options for disposing of tailings from the mine. For example, discount rates—a key assumption used in net present value analysis—varied from a low of 6.2 percent to a high of 15 percent, and the estimated ore reserves ranged from almost 8 million tons to 11 million tons.<sup>4</sup>

The lowest estimate we obtained ranged from minus \$4.2 million to \$56.7 million. This analysis, which was prepared for the Greater Yellowstone Coalition, was based on discount rates of 10 and 15 percent, project delays ranging from 0 to 3 years, and different scenarios for disposing of mine tailings. The highest estimate we obtained was for almost \$900 million and

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<sup>3</sup>Uniform Appraisal Standards for Federal Land Acquisitions, Interagency Land Acquisition Conference (1992).

<sup>4</sup>According to the draft EIS, up to 11 million tons of ore would have been mined and processed from two deposits in the New World mining district. Assuming average ore grades, the draft EIS estimated that Crown Butte could have extracted up to 2.3 million troy ounces of gold, 11.5 million troy ounces of silver, and 80,000 tons of copper over the life of the mine. There are 12 troy ounces in a pound.

was cited in an article published in the Northwest Mining Association Bulletin in May 1997. This estimate, which does not use net present value analysis, reflects the gross market value of the minerals expected to be produced and refined over the life of the mine. According to the article's author, this amount reflects the value or new wealth that the project might generate from new costs and cash flows from such things as salaries, taxes, purchases, and royalties.

ESTIMATES OF THE EFFECT OF  
THE NEW WORLD PROJECT ON JOBS,  
PAYROLLS, AND TAXES VARIED

According to the draft EIS, the mine would provide 321 direct jobs during the peak year of the mine's development and 175 direct jobs during the mine's operation. The mine would also generate a maximum of 145 indirect jobs during the development of the mine and 87 indirect jobs during its operation. The total payroll during the peak year of development would be about \$10.3 million, while the total annual payroll during operation would be about \$7.5 million. The author of the article in the Northwest Mining Association Bulletin estimated that salaries and wages would total \$347 million over the life of the mine. Specific information about employment and payroll estimates is presented in enclosures II and III.

Although the direct jobs would be in Montana during the mine's operation, some of the jobs associated with the mine and with the construction of a power line needed for its operation would probably be held by Wyoming residents.<sup>5</sup> A study of the economic effects of the mine on Park County, Wyoming, prepared by Western Economic Services for Crown Butte, assumed that 50 to 80 percent of the 175 direct mining jobs (88 to 140 jobs) would have been filled largely from the existing work force in Park County, Wyoming; the average annual salary for these jobs was assumed to be \$38,000.<sup>6</sup> An appendix to that study, prepared at the University of Wyoming, estimated that at full production, the mine would annually bring into the county \$3.2 million to \$4.2 million in direct payroll.

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<sup>5</sup>This would affect Wyoming's economy through such things as indirect employment and increased sales taxes and personal income taxes.

<sup>6</sup>Western Economic Services, The Economy of Park County, Wyoming: With and Without the New World Project (June 1993).

Crown Butte estimated the effect of the proposed mine on federal, state, and local taxes. Annually, according to its estimate, federal income taxes would total \$1,197,000 and state and local taxes would total \$1,836,403. According to the author of the article in the Northwest Mining Association Bulletin, over the life of the mine, federal taxes would total almost \$59 million and state and local taxes would total about \$44 million. Specific information about tax revenue estimates is presented in enclosure IV.

### AGENCY COMMENTS

We provided the Department of Agriculture's Forest Service and the Department of the Interior with a draft of this report for review and comment. Both the Forest Service and Interior provided written comments, in which they included technical clarifications. We have incorporated those clarifications where appropriate. In addition, the Forest Service commented that in general the report accurately portrays the socioeconomic effects of the New World mine project as proposed to the Forest Service but appears deficient because it does not report on the socioeconomic effects of implementing the agreement requiring Crown Butte to spend \$22.5 million on environmental restoration and response. We do not include such a discussion because the objective of our report was to provide information on various estimates of the economic effects of the proposed mine, had it been developed, rather than estimates of the effects of implementing the agreement. We have incorporated this clarification into our scope and methodology section.

### SCOPE AND METHODOLOGY

To obtain estimates of the value of the mineral resources and of the effects of the proposed project on potential employment and annual payrolls and taxes, we contacted federal, state, and local government officials; representatives of the mining company and of the mining industry; and environmental groups. Specifically, we sought these estimates from (1) Forest Service officials at headquarters in Washington, D.C.; at the regional office in Missoula, Montana; and at the Gallatin National Forest in Bozeman, Montana; (2) Bureau of Land Management officials at headquarters; and (3) National Park Service officials at Yellowstone National Park and in Denver, Colorado. We also contacted officials at Montana's Department of Environmental Quality and the Governor's Office; officials of Park County, Montana, and Park County, Wyoming; a vice president of Crown Butte Mines, Inc.; the author of an article appearing in the Northwest Mining Association Bulletin in May 1997; and representatives of the Greater Yellowstone Coalition and associated

environmental groups. We contacted officials at the Department of Justice and the Council on Environmental Quality to ascertain whether they could provide other valuation or economic estimates.

From our contacts with the above sources, we obtained estimates of resource values from (1) a 1995 draft analysis prepared for the Greater Yellowstone Coalition, (2) a 1995 estimate by the National Park Service, (3) a 1996 estimate by the Bureau of Mines, and (4) a May 1997 estimate published in an article in the Northwest Mining Association Bulletin.

For each of the resource value estimates we obtained, we reported some of the key assumptions and computation methods identified. We did not ascertain the appropriateness or reasonableness of the assumptions and methodologies. Similarly, we reported the employment, payroll, and tax estimates as reported to us; we did not verify the assumptions or the methodologies used to compute them. We did not address other potential economic and social effects of the proposed project, such as the estimated impact of increased population on the surrounding area and on the infrastructure of Park County, Wyoming, nor did we address the socioeconomic effects that might occur with the agreement's implementation.

We obtained projections of employment and annual payrolls associated with the proposed project for Montana and Wyoming from the preliminary draft environmental impact statement. In addition, estimates of employment and annual payrolls for Wyoming were provided by an economic report commissioned by Crown Butte. We also obtained an estimate of the total payroll (over the life of the mine) from the author of the article in the May 1997 Northwest Mining Association Bulletin.

Projected federal, state, and local annual tax estimates were provided by Crown Butte. Estimates of total taxes (over the life of the mine) were provided by Crown Butte, by the Bureau of Mines, and by the author of the May 1997 article in the Northwest Mining Association Bulletin.

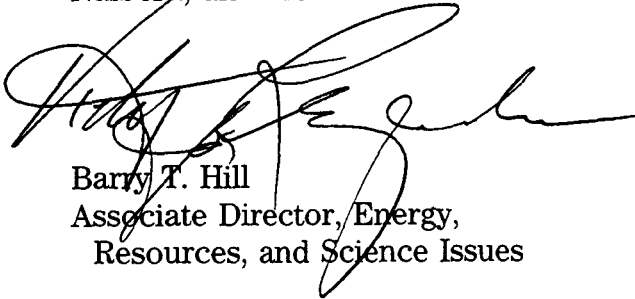
We performed our review from May through August 1997 in accordance with generally accepted government auditing standards.

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As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report for 7 days. At that time, we will make copies available to the Secretaries of the Interior and of Agriculture and to other interested parties. We will also make copies available to others upon request.

If you or your staff have any questions, please call me at (202) 512-9775. Major contributors to this report were Jennifer Duncan, Diane Lund, Sue Naiberk, and Victor S. Rezendes.

A handwritten signature in black ink, appearing to read "Barry T. Hill", written over the typed name and title.

Barry T. Hill  
Associate Director, Energy,  
Resources, and Science Issues



ESTIMATES OF VALUE OF THE NEW WORLD MINE PROJECT AND ASSUMPTIONS AND METHODOLOGIES USED

Estimate of value and assumptions and methodologies used	Draft analysis for Greater Yellowstone Coalition, 1995 <sup>a</sup>	National Park Service's economic analysis, 1995 <sup>b</sup>	Bureau of Mines' economic analysis, 1996 <sup>c</sup>	Northwest Mining Association Bulletin author's estimate, 1997 <sup>d</sup>
Range of value (in millions of dollars)	-\$4.2 to \$56.7 <sup>e</sup>	(a) \$39.0 (comparable sales) <sup>f</sup> (b) \$10.2 (present value of royalty income) <sup>g</sup> (c) \$20.0 (present value of project income) <sup>h</sup>	\$80.5 to \$202.1	\$890.1
Methodology used	Net present value	Various	Net present value <sup>i</sup>	Computation of gross resource value <sup>j</sup>
Assumed price <sup>k</sup>	Gold: \$350.00 to \$390.65 Silver: \$5.00 to \$5.70 Copper: \$1.00 to \$1.35	Gold: \$350.00 to \$390.65 Silver: \$5.00 to \$5.70 Copper: \$1.00 to \$1.35	Gold: \$380.00 to \$400.00 Silver: \$5.00 to \$5.50 Copper: \$1.05 to \$1.19	Gold: \$380.00 Silver: \$5.00 Copper: \$1.05
Discount rate	10 and 15 percent	Various <sup>l</sup>	6.2 and 7.6 percent <sup>m</sup>	Not addressed
Estimated ore reserve	Almost 8 million tons	8 to 11 million tons	11 million tons	Almost 11 million tons
Mine life	19 years	17 to 23 years	20 years	23 years
Other variables explicitly addressed in analysis	Project delay, tailings disposal options, financing options <sup>n</sup>	Per-ounce value in-place (for comparable sales approach), royalty rate (for royalty income approach), tailings disposal options	Ore grade	Ore grade

<sup>a</sup>W. Thomas Goerold, Ph.D., Draft Financial Analysis of the Proposed New World Project. With a Preliminary Calculation of Potential Buyout Prices, prepared for Greater Yellowstone Coalition (May 1995); and subsequent correspondence updating the analysis to reflect the effects of an additional option for disposing of mine tailings.

<sup>b</sup>New World Mine Buyout Cost Estimate, briefing statement prepared by the National Park Service (July 1995).

## ENCLOSURE I

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<sup>2</sup>Letter from Bureau of Mines to Gallatin National Forest (Feb. 2, 1996).

<sup>3</sup>Otto Schumacher, "Creating New Wealth," Northwest Mining Association Bulletin, Vol. 102, No. 4 (May 1997), and subsequent correspondence.

<sup>4</sup>In beginning-of-year 1995 dollars.

<sup>5</sup>Based on data for corporate acquisitions of gold mine properties outside Alaska between 1992 and 1994, which show values averaging \$21.04 per ounce of gold in-place.

<sup>6</sup>Assumes a royalty equal to 5 percent of gross income.

<sup>7</sup>Reflects an average of eight equity financing scenarios and base commodity prices.

<sup>8</sup>Computed using APEX, a computer software package designed for economic evaluations of mining projects.

<sup>9</sup>Costs and cash flow are distributed to the economy through salaries, taxes, purchases, royalties, interest on debt, and profit.

<sup>10</sup>Gold and silver are presented in troy ounces; copper is presented in pounds.

<sup>11</sup>Fifteen percent was used for the present value of royalty income; the present value of project income was computed using various discount rates.

<sup>12</sup>According to the study, these discount rates were based on two estimates of the cost of capital for Hemlo Gold Mines, Inc., the majority stockholder of Crown Butte Resources, Ltd., of which Crown Butte Mines, Inc., was a wholly owned subsidiary. Hemlo Gold Mines, Inc., has since merged with Battle Mountain Gold.

<sup>13</sup>Variables include a 0-, 3-, or 6-year project delay; on-site, partial off-site, and total off-site options for disposing of tailings; and leveraged or unleveraged financing.

ESTIMATES OF DIRECT AND INDIRECT EMPLOYMENT ASSOCIATED WITH THE PROPOSED NEW WORLD PROJECT

Employment	Draft EIS' estimate				Western Economic Services' report, 1993		
	Development <sup>a</sup>		Operation		Western Economic Services' estimate	University of Wyoming's estimate <sup>b</sup>	
	Montana	Wyoming	Montana	Wyoming		Park County, Wyoming	Wyoming <sup>c</sup>
Direct	121	200	69	106	88 to 140 <sup>d</sup>	87 to 112	87 to 112
Indirect	63	82	41	46	189 to 238 <sup>e</sup>	92 to 101	135 to 145
<b>Total</b>	<b>184</b>	<b>282</b>	<b>110</b>	<b>152</b>	<b>277 to 378</b>	<b>179 to 213</b>	<b>222 to 257</b>

<sup>a</sup>Direct employment is assumed to be in Montana, with some employees living in Wyoming; during the construction of a power line needed for the mine's operation, employment is assumed to be in Wyoming. Development estimates are for the peak year of the mine's development (year 2).

<sup>b</sup>These figures are for 1996, the year the study projected that the mine would be at full production. The figures include employment for the construction of the power line.

<sup>c</sup>These estimates include the estimates for Park County, Wyoming.

<sup>d</sup>Assumes that 50 to 80 percent of the 175 direct jobs would be filled largely from the existing work force in Park County, Wyoming.

<sup>e</sup>Employment in Wyoming created from the indirect impact of new income flowing into the county by the year 2010.

ESTIMATES OF PAYROLL ASSOCIATED WITH THE PROPOSED NEW WORLD PROJECT

Dollars in millions

Payroll	Annual payroll							Payroll over the life of the mine	
	Draft EIS' estimate				Western Economic Services' report, 1993				
	Development <sup>a</sup>				Western Economic Services' estimate	University of Wyoming's estimate	Northwest Mining Association Bulletin author's estimate		
	Montana	Wyoming	Total	Operation					
	Montana	Wyoming	Montana	Wyoming	Total	Park County, Wyoming	Wyoming	Total	
Direct	\$3.2	\$5.3	\$8.5	\$2.5	\$3.9	\$6.4	\$3.3 to \$5.3 <sup>b</sup>	\$3.2 to \$4.2	\$347.3
Indirect	0.8	1.0	1.8	0.5 <sup>c</sup>	0.6 <sup>c</sup>	1.1	Not specified	Not specified	Not specified
<b>Total</b>	<b>\$4.0</b>	<b>\$6.3</b>	<b>\$10.3</b>	<b>\$3.0</b>	<b>\$4.5</b>	<b>\$7.5</b>	<b>\$3.3 to \$5.3</b>	<b>\$3.2 to \$4.2</b>	<b>\$347.3</b>

<sup>a</sup>These figures are for the peak year of employment (project year 2) and include employment for the construction of a power line needed for the mine's operation.

<sup>b</sup>Assumes that 50 to 80 percent of the 175 direct jobs would be filled largely from the existing Park County work force; the annual salary for these jobs is assumed to be, on average, \$38,000 (at full operation, assumed in report to occur in 1996).

<sup>c</sup>According to the draft EIS, average annual income for indirect workers is assumed to be \$12,000 per year.

ESTIMATES OF TAX REVENUES ASSOCIATED WITH THE PROPOSED NEW WORLD PROJECT

Tax revenue	Annual		Total (over the life of the mine)	
	Crown Butte's estimate <sup>a</sup>	Crown Butte's estimate <sup>a,b</sup>	Bureau of Mines' estimate <sup>c</sup>	Northwest Mining Association Bulletin author's estimate
Federal income	\$1,197,000	\$17,955,000	Not addressed	\$58,772,112
State				
Income	432,250	6,483,750	\$12,000,000	12,159,007
Metal mines	704,000 <sup>d</sup>	10,560,000	24,000,000 <sup>e</sup>	24,456,320
Property	700,153 <sup>f</sup>	10,502,295	Not separately addressed	7,597,235
County	Included with state tax amounts	Included with state tax amounts	8,000,000	Not separately addressed
<b>Total</b>	<b>\$3,033,403</b>	<b>\$45,501,045</b>	<b>\$44,000,000</b>	<b>\$102,984,674</b>

<sup>a</sup>In 1995 dollars.

<sup>b</sup>Assumes a 15-year life for the mine and does not discount to present value.

<sup>c</sup>Assumes a 20-year life for the mine and does not discount to present value.

<sup>d</sup>Of this amount, \$176,000 (25 percent) would be distributed to Park County, Montana, annually.

<sup>e</sup>Includes Montana Metal Mines License tax and Class II property tax.

<sup>f</sup>Includes tax on the gross value of production and other property. Of this total, Crown Butte estimates that \$302,833 would be distributed annually to the county government and local schools.

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