



U.S. v. WALTER B. FREEMAN

179 IBLA 341

Decided August 11, 2010



United States Department of the Interior
Office of Hearings and Appeals
Interior Board of Land Appeals
801 N. Quincy St., Suite 300
Arlington, VA 22203

U.S. v. WALTER B. FREEMAN

IBLA 2009-201

Decided August 11, 2010

Appeal from a decision of Administrative Law Judge Harvey C. Sweitzer declaring 161 placer and association placer mining claims null and void. ORMC Serial Nos. between 020205 through 020397, and 144710 through 144717; Contest No. OR 48970 A.

Affirmed.

1. Mining Claims: Discovery: Generally--Mining Claims: Determination of Validity--Mining Claims: Lode Claims

The test of whether a mining claim is supported by a discovery is objective and is framed in terms of what a prudent person would do knowing all the facts. A discovery has been made when minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a paying mine. A mineral deposit will be considered valuable where there is a reasonable likelihood that the value of the deposit exceeds the costs of extracting, transporting, processing, and marketing it. A claimant must show, as an objective matter and as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed.

2. Mining Claims: Discovery: Generally--Mining Claims: Determination of Validity--Mining Claims: Lode Claims

When the Government challenges the validity of a mining claim by alleging a lack of discovery of a valuable mineral deposit, it bears the initial burden of going forward to

establish a *prima facie* case in support of that charge. The Government presents such a case when a mineral examiner testifies that he has examined a claim and found the mineral values insufficient to support a finding of discovery, whereupon the burden shifts to the claimant, who has the ultimate burden of persuasion to overcome that case by a preponderance of the evidence on the issues raised.

APPEARANCES: Richard M. Stephens, Esq., Bellevue, Washington, for appellant; Bradley Grenham, Esq., and Brian Perron, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Portland, Oregon, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE PRICE

Walter B. Freeman has appealed the March 27, 2009, decision of Administrative Law Judge (ALJ) Harvey C. Sweitzer declaring 161 placer and association placer mining claims generally known as the Nicore Claims Group¹ null and void for lack of a discovery of a valuable mineral deposit, following 25 days of hearing in a mining contest initiated by the Government.² The minerals at issue are nickel, cobalt, chromium, and iron occurring in surface deposits called “laterites” or “nickel laterites,” the most valuable of which is the nickel. The laterite or laterite ore on the Nicore claims appears to be loose, brick red- or chocolate-colored soil carrying rocks and boulders.³

¹ The individual claims are known by various names. See Decision at 1. For convenience, we will refer to them as the Nicore claims or Nicore Group claims. The claims identified in the contest complaint are ORMC Nos. 020205 through 020653, and 144710 through 144717. The complete list appears in Table 3-1 in the Mineral Report, Government’s Ex. 1, beginning at 3-3. The claims cover 4,968 acres in T. 40 S., Rs. 8, 9, 10 W., in Josephine and Curry Counties, Willamette Meridian. *Id.* at 3-1. Most are located within the boundaries of the Siskiyou National Forest administered by the Forest Service, U.S. Department of Agriculture.

² The hearing took place between Mar. 14 and June 1, 2007.

³ The host rock for laterite is peridotite. The laterite soils formed as the peridotite was invaded by water over a long period of time. Peridotite contains nickel in amounts that cannot be extracted profitably, but as the peridotite is weathered away by water, the nickel is transported into the ground and precipitates out of solution. Other components are transported by the water, leaving nickel-enriched laterite soil. Mineral Report, Ex. 1 at 5-2 to 5-13. Residual laterite deposits and transported deposits are found within the claims. The former are formed as the peridotite is

(continued...)

BACKGROUND

The claims in the Nicore Group were located by various persons between 1940 and 1992. Freeman apparently now owns title to all the claims at issue. His efforts to develop the claims have failed to date, as did those of his predecessor in interest, Inspiration Development Corporation (IDC). Decision at 12-13. On September 9, 1992, Freeman applied for a patent for 151 of the claims (OR-48970).⁴ That application has not been processed because Congress imposed a moratorium on the processing of patent applications as of October 1, 1994. See Department of the Interior and Related Agencies Appropriations Act of 1995, Pub. L. No. 103-332, 108 Stat. 2499 (1994).

On December 17, 1992, Freeman submitted a Plan of Operations (PoO) to the Forest Service.⁵ The PoO was denied on October 11, 2000. On January 22, 2001, Freeman filed suit in the U.S. Court of Claims alleging a taking of the Nicore claims. On October 10, 2001, the Court of Claims stayed its proceedings and remanded the case to the Department to determine the validity of the Nicore Group claims. The parties agreed that October 1994, the effective date of Congress' patent moratorium, and October 2000, the date the PoO was denied, would be the dates used to

³ (...continued)

weathered in place and the nickel concentrates in the ground underneath, while the latter are laterite deposits that have been carried from one place to another by natural forces and occurrences. Decision at 14 n.10; *see also* Section 5, Mineral Report, Government's Ex. 1.

⁴ The contest complaint included 10 other claims Freeman owned in addition to the 151 for which he sought patent. Decision at 1 n.2.

⁵ To very briefly describe the proposed mining process, the laterite soil is dug up using an excavator or front end loader. It then will be screened to separate the minus-1 inch fraction for further processing. Approximately 54,794 tons of raw laterite with a moisture content of approximately 27 percent would be mined each year to produce 40,000 tons of dry laterite ore. The ore would be initially dried, and then fed into a kiln to be roasted for additional drying, after which the ore is referred to as calcine. The calcine is continuously fed into an electric arc furnace (EAF), at approximately 120 tons of calcine per day, and slag and metal are periodically tapped from the EAF. The molten metal can be granulated or formed into shapes, and once cooled, it is ready for sale. Decision at 10-12. "[N]ickel smelting is an energy intensive process with high fixed costs and . . . because of these circumstances, nickel smelting operations generally process large volumes of ore to benefit from economies of scale. Tr. 305-06, 935-36, 1671-72, 2963; Exs. 1 at 5-22 to 5-23; 3 at 78; 141 at 7; 142 at 12; 144 at 107-109." Decision at 13.

determine validity. *See* Exs. 101 at 5-6; 105 at 2-3; and 106 at 2 (correspondence between counsel in September and November 2003).⁶

BLM commenced the mineral examination. It contracted with Western Mine Engineering (WME) to produce two reports, which are the basis of the Government's Mineral Report (Ex. 1) issued on January 31, 2005. One WME report, styled Addendum I, "Nicore Laterite Ore Processing," is dated October 2004, and includes the economic analysis for the October 1994 marketability date (Ex. 2 or WME Report) as a separate section. The other report is dated June 22, 2004, and is styled Addendum II, "Economic Analysis of the Nicore Project, Josephine County, Oregon," and contains the economic analysis for the marketability date October 2000 prepared by the Center for Advanced Mineral & Metallurgical Processing, Montana Tech of the University of Montana (Ex. 3 or CAMMP Report). Ex. 2 at 1-1; *see also* Decision at 7. For sampling data, both parties rely heavily on exploration work conducted by IDC, when it leased or owned interests in the subject claims from 1971 to 1982. *Id.* at 8. IDC's exploration activity consisted of geologic mapping, seismic testing, rotary drilling, and excavation and sampling of several hundred backhoe trenches, which produced 1,217 ore samples and assays. *Id.* at 8, 9.

Those assay results were set forth in a report prepared by Superior Western Corporation (SWC) for IDC (IDC Report) (Ex. 31), and shown on 11 maps of the claims as well (Ex. 148). The Government checked and verified the accuracy of IDC's work by sampling 77 of the original pits IDC had excavated. A total of 130 check samples were collected and assayed. Mineral Report, Ex. 1 at 8-11 and Table 8-2. The Government's assay results for iron and nickel were quite similar to IDC's assay results. *Id.* For nickel, the Government's results on average were 1.2 percent lower than IDC's, while the Government's results for iron on average were 0.4 percent higher. *Id.*; Decision at 9. The two sets of assay results were markedly different for chrome. *Id.* Accordingly, the Government accepted IDC's assays for nickel and iron for purposes of calculating those resource reserves, but rejected the assay data for chrome. The Government also rejected IDC's bulk density calculations, which calculations are used to determine the total ore available by multiplying the estimated density by the estimated volume. Decision at 9.

BLM concluded that none of the Nicore Group claims contained minerals of sufficient quality or quantity to constitute a discovery, that the minerals could not have been marketed at a profit, and that the land embraced by such claims was nonmineral in character. Mineral Report, Ex. 1 at 1-9. It therefore issued a contest complaint challenging the validity of the claims on March 16, 2005.

⁶ The Government's exhibits are numbered. Freeman's exhibits are also numbered, but preceded with an "F."

By order dated August 10, 2007, Judge Sweitzer determined that he lacked jurisdiction to adjudicate the validity of the claims based on the alleged takings dates, and that the validity of the claims as of the date of the hearing had not been raised. An interlocutory appeal was taken pursuant to 43 C.F.R. § 4.28. In the meantime, the hearing in this matter was held, during which the parties proceeded on the basis of the October 1994 and October 2000 marketability dates to which they stipulated. More than 400 exhibits were submitted, and the hearing generated 3,400 pages of transcript. Post-hearing briefing was detailed, comprehensive, and voluminous.

By order dated May 7, 2008, this Board reversed Judge Sweitzer's August 10, 2007, order in part, holding that in a mining contest an administrative law judge has the jurisdiction and authority to determine claim validity as of the dates of the alleged takings. *United States v. Freeman*, 174 IBLA 290, 295 (2008). We also affirmed in part, holding that adjudication of a mining claim contest is confined to the issues stated in the contest complaint. *Id.* at 297.

During post-hearing briefing, Freeman conceded the invalidity of 50 claims, and by order dated August 21, 2008, those claims were declared null and void. Judge Sweitzer ultimately concluded that Freeman had not made a discovery on the remaining 111 claims, and this appeal followed.

THE ADMINISTRATIVE LAW JUDGE'S DECISION

Before delving into specific arguments and the evidence adduced at the hearing, Judge Sweitzer first offered "several general observations about recurring themes" in the contest of importance to our consideration of the merits.

Entire Expenditure

Noting Freeman's argument that the "discovery does not require evidence of mineralization sufficient to warrant the immediate expenditure of the entire cost of developing mine," and that "discovery does not require a person to commit to spending the entire cost of developing a mine," the ALJ acknowledged the literal correctness of Freeman's assertions, but stated that such assertions "do not lend themselves to a balanced characterization of the requirements for discovery." Decision at 16. He stated that while discovery does not require mineralization "sufficient to warrant the entire immediate expense of building a paying mine to the extent that a prudent person would not begin incurring finance charges on borrowed capital before it was necessary to do so," nevertheless a paying mine is one that "recoup[s] all of the claimants' expenditures" – that is, "the total cost of building a paying mine, i.e., extracting, processing, and marketing the minerals contained therein." *Id.*, quoting *United States v. Collord*, 128 IBLA 266, 304 (1994) (Burski, A.J., concurring in the result), *aff'd in relevant part, rev'd in part*,

Civ. No. 94-0432-S-EJL (D. Idaho Sept. 28, 1994), *aff'd*, 154 F.3d 933 (9th Cir. 1998).

Judge Sweitzer similarly agreed that discovery does not require a claimant to “demonstrate the ability or intent to actually make that expenditure” by submitting an affidavit attesting that the money to develop the mine will be spent, for example, but a discovery is not demonstrated by showing that a prudent person “would only be justified in paying for additional testing or analysis or constructing a portion of a proposed mine.” Decision at 16-17.

Exploration Versus Development

Freeman argued that work on the contested claims had progressed beyond the exploration stage and into development, presumably to support an inference that if work on the claims is in the development stage, it is because a discovery has been made. *Id.* at 17. The ALJ explained that *exploration* “typically refers to sampling or evaluating a claim to determine whether it contains a valuable mineral deposit.” *Id.* In contrast, *development* “typically refers to mining ore and building a mine.” *Id.* He declared Freeman’s contention that “further expenditures for engineering, design, and testing” is properly considered to be evidence of a discovery to be incorrect. Citing *United States v. Feesor*, 130 IBLA 146, 208 (1994), and *United States v. New Mexico Mines Inc.*, 3 IBLA 101, 106 (1971), the ALJ reiterated that what is required is that, “as of the marketability date, there must be a reasonable prospect of success in developing a paying mine, not just mineralization sufficient to justify exploratory or development expenditures without a reasonable prospect of success at that time.” Decision at 18.

The Prudent Man and Profit

Judge Sweitzer agreed that the prudent person standard does not require proof of profitability to a degree of economic certainty. *Id.* at 19, citing *United States v. Collord*, 128 IBLA at 321 (Byrnes, A.J., concurring in part and dissenting in part). He stated that the prudent person standard is an objective standard, and thus a mining claimant cannot prevail upon a showing of “personal willingness to take an unreasonable risk, or to accept meager returns.” Decision at 19, and cases cited.

Responsibility of the Government Mineral Examiner

Judge Sweitzer rejected Freeman’s repeated assertion that the Government failed to perform “analysis, research, sampling, and testing that would have been beneficial to his case,” an allegation that did not include Freeman’s additional charge of bias, which the ALJ treated separately. *Id.* at 19-20. The Judge explained that the burden of establishing the existence of a valuable mineral deposit belongs not to the

Government, “but is part of the ultimate burden of proof borne by the mining claimant.” *Id.* at 20, citing *United States v. Zerwekh*, 9 IBLA 172, 176 (1973). Accordingly,

[i]t is incumbent upon the mining claimant to keep discovery points available for inspection by a Government mineral examiner. *United States v. Timms*, 36 IBLA 316, 318 (1978). The claimant assumes the risk that the mineral examiner will be unable to verify the discovery of an alleged mineral deposit when the claimant fails to identify discovery points and keep them open for sampling. [*United States v.*] *Bechthold*, 25 IBLA [77, 85 (1976)].

Decision at 20. We find no error in Judge Sweitzer’s view and disposition of these recurrent themes, and consider them no further.

THE PARTIES’ ARGUMENTS ON APPEAL

Given the voluminous record, the extraordinarily lengthy decision, and extensive post-hearing and appellate pleadings before us, and the unavoidable necessity of considering specific contentions as part of our analysis, we briefly summarize the parties’ arguments. Freeman summarizes his position on appeal as follows:

The question as to whether Mr. Freeman has discovered a valuable mineral deposit as used in 30 U.S.C. § 23 (2000) boils down to whether Judge Sweitzer’s estimate of revenues are the highest that a reasonably prudent person could estimate and whether his estimate of costs are the lowest costs that are prudent. Mr. Freeman explains in his Statement of Reasons that one can reasonably estimate the development of a profitable mine by using revenue estimates that are more realistic, by reasonably anticipated cost savings, by using the largely undisputed potential to upgrade the ore, or any combination of the above approaches. Hence, the Board is asked to determine that either Judge Sweitzer’s revenue estimates are too low or his cost estimates are too high, or both. As the evidence demonstrates, a prudent person would seek to develop these claims as Mr. Freeman has done.

Statement of Reasons (SOR) at 3-4. Freeman invokes the Board’s *de novo* review authority and moves it to make its own findings of fact. *Id.* at 3.

BLM at points seems to challenge certain assumptions that inured to Freeman’s benefit, yet it also correctly emphasizes that those assumptions do not constitute

rulings on the merits in Freeman's favor. BLM thus argues for affirmance of Judge Sweitzer's ruling declaring the Nicore claims void by reason of lack of a discovery.

APPLICABLE LAW

[1] The Board recently restated the legal principles applicable to discovery as follows:

The test of whether a mining claim is supported by a discovery is objective and is framed in terms of what a "prudent person" would do knowing all the facts. A discovery has been made when "minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a paying mine." *Castle v. Womble*, 19 L.D. 455, 457 (1894). This test was approved by the Supreme Court in *Chrisman v. Miller*, 197 U.S. 313, 322 (1905). The Board has noted that "the best evidence of what a prudent man would do in the same or very nearly the same circumstances is what miners have or have not done over a period of years." *United States v. Martinez*, 49 IBLA 360, 371, 87 I.D. 386, 392 (1980), citing *United States v. Wichner*, 35 IBLA 240 (1978); see also *United States v. Willsie*, 152 IBLA 241, 264 (2000).

The Supreme Court adopted a refinement of the test of discovery to include a "marketability" rule in *United States v. Coleman*, 390 U.S. 599, 600, 602-03 (1968). The "prudent-man test and the marketability test are not distinct standards, but are complementary in that the latter is a refinement of the former." *Id.* at 603. The Board has reconciled the notion of profitability articulated in *Coleman* with the lesser standard of a "reasonable prospect of success" adopted by the Supreme Court in *Chrisman v. Miller*, 197 U.S. at 322. Discovery requires a showing of a reasonable prospect that the deposit can be mined, removed, and marketed at a profit. *United States v. New York Mines, Inc.*, 105 IBLA 171, 182, 95 I.D. 223, 229-30 (1989). "[A] mineral deposit will be considered valuable where there is a reasonable likelihood that the value of the deposit exceeds the costs of extracting, transporting, processing, and marketing it." *United States v. Clouser*, [144 IBLA 110, 113 (1998)] (citations omitted); see *United States v. Winkley*, 160 IBLA 126, 142 (2003). A claimant must show, as an objective matter and "as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed." *American*

Colloid Co., 162 IBLA 158, 171 (2004), quoting *In re Pacific Coast Molybdenum*, 75 IBLA 16, 29, 90 I.D. 352, 360 (1983).

United States v. Alla Lu Rannells, 175 IBLA 363, 367 (2008), quoting *United States v. Martinek*, 166 IBLA 347, 351-52 (2005); see also *United States v. Miller*, 165 IBLA 342, 354-56 (2005).

Each of the contested claims must be supported by a discovery of a valuable mineral deposit and, thus, there must be an actual exposure within the boundaries of each claim. *United States v. E. K. Lehmann & Associates of Montana, Inc. (Lehmann)*, 161 IBLA 40, 89 (2004), and cases cited, *aff'd*, *Ernest K. Lehman & Associates of Montana, Inc. v. Salazar*, 602 F. Supp.2d 146, 150 (D.C.D.C. 2009), *aff'd* 2010 WL 2203266 (C.A.D.C. May 24, 2010).

[2] When the Government challenges the validity of a mining claim by alleging a lack of discovery of a valuable mineral deposit, it bears the initial burden of going forward to establish a *prima facie* case in support of that charge. The Government presents such a case when a mineral examiner “testifies that he has examined a claim and found the mineral values insufficient to support a finding of discovery.” *United States v. Boucher*, 147 IBLA 236, 248 (1999), citing *United States v. Dresselhaus*, 81 IBLA 252, 257 (1984). The Government has presented a *prima facie* case when evidence provided in its case-in-chief “is completely adequate to support the Government’s contest of the claim and . . . no further proof is needed to nullify the claim.” *United States v. Martinek*, 166 IBLA at 404, quoting *United States v. Bunkowski*, 51 IBLA 102, 119, 79 I.D. 43, 51 (1972). The claimant has the ultimate burden of persuasion to overcome that case by a preponderance of the evidence on the issues raised. *United States v. Gillette*, 104 IBLA 269, 274 (1988).

ANALYSIS AND DISCUSSION

I. The Government Established a Prima Facie Case

Judge Sweitzer determined that the Government had presented a *prima facie* case through the testimony and reports of witnesses, including that of certified Mineral Examiners, and concluded Freeman had not found as of October 1994 or October 2000

minerals of sufficient quality and quantity as to justify a person of ordinary prudence in further expenditures with a reasonable prospect of success in developing a paying mine. See, e.g., Tr. at 516-17. Because they have sufficient training and experience to qualify as expert witnesses and because their analyses are well-reasoned and amply

supported by probative evidence, their conclusions suffice to establish a prima facie case.

Their analyses showed that operating costs alone would have exceeded revenues from mining the Nicore claims by an estimated \$89,454,079 in October 2000 and \$63,460,737 in October 1994. Ex. 1 at 17-3 to 17-4. Under their analyses, Mr. Freeman would lose money on each ton of ore mined, without consideration of the substantial capital costs.

These analyses were based upon producing an iron-nickel alloy (ferronickel) which the Government's experts deemed to be the product that a reasonable person would produce for sale from the Nicore ore. In the Mineral Report, they considered Mr. Freeman's proposal to use a process he describes as Direct Alloy Reduction Technology (DART) to produce stainless steel instead of ferronickel, but they reasonably concluded that the DART process relied on undeveloped technology that is too theoretical and unproven to be subject to economic analysis for purposes of determining the validity of the Nicore claims.

Additionally, the experts understood the DART process to require purchasing metal from outside suppliers to add to the metal in the ore from the Nicore claims. Accordingly, they reasonably concluded that the DART process is a value added process that could not be used to establish the validity of the Nicore claims. . . .

The economic analysis developed by Mr. Freeman at hearing, and in post-hearing briefing, is not of a stainless steel product but, instead, an iron-chrome-nickel alloy he calls "master metal" or "master alloy." Tr. at 2224-25; CBOM [Contestee's Brief on the Merits] at 52. In the Mineral Report, the Government concluded that no market existed for master metal and that the chrome resource required to manufacture the master metal was only inferred. Ex. 1 at 12-16 to 12-27. However, subsequent to drafting the Mineral Report, the Government did analyze the costs and revenue associated with smelting the iron-chrome-nickel alloy or master metal proposed by Mr. Freeman and presented its evidence regarding master metal during its case-in-chief.

Decision at 20-22.

The Government presented expert testimony to the effect that although the smelting process for Freeman's hypothetical master metal and ferronickel are similar,

smelting chrome to make a master metal requires “more aggressive smelting to draw the chrome (as well as some additional nickel and significantly more iron) from the ore,” which “requires more energy and more chemical input than smelting the ore to make ferronickel.” *Id.* at 22. Mining to produce the hypothetical master metal would have been costlier and more unprofitable than producing ferronickel in October 1994 or October 2000. Judge Sweitzer determined that the Government had made a *prima facie* showing that the claims were not supported by a discovery at either point in time, regardless of the product. *Id.* Accordingly, the burden of persuasion shifted to Freeman, and we turn to the question of whether he succeeded in overcoming the Government’s case.

II. Freeman Failed to Overcome the Government’s Prima Facie Case

We open by noting circumstances that clearly bear upon the merits of Freeman’s appeal. First, the determination that the Nicore Group claims did not contain a discovery in October 2000 or in October 1994 rests on an analysis of operating costs alone; because the operating costs far exceeded expected revenues, even under Freeman’s mining scenarios, Judge Sweitzer did not reach the issue of capital costs, which certainly must be included in any showing that a deposit can be mined, removed, and marketed at a profit. *See* Decision at 80, 82. Second, Judge Sweitzer assumed a number of key points that directly and substantially benefitted Freeman, and even given the benefit of such assumptions, operating costs still far exceeded revenues.⁷ Third, Freeman altered his model of the proposed mining operation more than once in response to issues that emerged during the hearing, and even with those modifications, Judge Sweitzer’s conclusion that operating costs exceeded revenues was unchanged. With those circumstances in mind, we now consider the contentions presented in Freeman’s SOR.

A. Cutoff Grade

The *cutoff grade* is the minimum mineral content of the ore on the ground necessary to yield revenue sufficient to pay for the operating costs of mining, processing, and marketing the ore, plus a portion of the capital costs. Decision at 30, citing Tr. 336; *see also* Tr. 335. There is an inverse relationship between the size of an ore reserve and the selected cutoff grade; thus, the higher the cutoff grade, the smaller the ore reserve can be and yield sufficient revenue, and the lower the cutoff grade, the larger the ore reserve must be to yield sufficient revenue. *Id.*, citing

⁷ On appeal, Freeman argues that the Judge’s assumptions were correct. *See, e.g.*, SOR at 94-95. Judge Sweitzer invoked certain assumptions *arguendo* only; by that device he expressly avoided the necessity of finding the underlying lesser facts required to establish the larger fact he assumed for purposes of advancing his analysis. We accept such assumptions for the same limited purpose.

Tr. 1661-62. In other words, as the cutoff grade is lowered, the required resource tonnage increases. Tr. 336-37. According to Otto Schumacher, a member of the mineral examination team who is a registered professional engineer with a mining certification, the Government selected a 1 percent cutoff grade for two principal reasons. The Government first considered world-wide nickel production, explaining that the data showed that 1 percent or so “is really the floor of anything we had seen anywhere, and this really from operations that are benefitting from a great deal more economy of scale than [Freeman’s proposed operation].” Tr. 337. Second, the Government completed resource estimates at a number of cutoff grades. *Id.* A cutoff grade above 1 percent eliminated the “majority of the resource that’s on the ground” and eliminated adequate tonnage to support a reasonable mining operation. Tr. 337-38.

Judge Sweiter determined that the Government’s 1 percent cutoff grade was reasonable because (1) ore below the 1 percent grade was too widely dispersed to be mined; (2) evidence of ore above 1 percent cutoff grade was based on an inadequate number of samples; (3) if the cutoff grade was increased, the ore reserve would decrease “substantially,” yet if the cutoff grade were decreased to 0.8 percent, the ore reserve would not increase substantially; and (4) nickel smelters around the world are not smelting nickel ore that is below 1 percent cutoff grade. Decision at 31, citing Tr. 337; WME Report, Ex. 2 at 2-32. Thus, the 1 percent cutoff grade “keeps the average nickel grade as high as possible without reducing the recoverable tonnage to an unreasonably small amount. WME Report, Ex. 2 at 2-32.⁸ Using the 1 percent figure, the Government determined that the operating costs of \$6.50 per pound of nickel in 2000 and \$5.00 per pound in 1994 exceeded the value of the nickel in the claims and, accordingly, that analyzing other cutoff grades was “futile.” *Id.*; Tr. 338-39; WME Report, Ex. 2, Table 7-25 at 7-41.

Freeman called Nick Michael, an engineer with SRK Consulting who is qualified to offer an expert opinion in the case. In support of the validity of the Nicore claims, Michael prepared two reports critiquing the Mineral Report (Ex. 1), Addendum I to the Mineral Report, the WME Report (Ex. 2), and Addendum II, the CAMMP Report (Ex. 3). Michael’s reports admittedly were “based upon a brief examination” of the BLM report and the Addenda, as evidenced by the disclaimer to

⁸ The Government calculated cutoff grade as follows:

<u>Cutoff Grade (% nickel)</u>	<u>Recoverable Resource (dry tons)</u>
1.2	327,666
1.0	1,151,059
0.8	1,432,174
0.6	3,584,674
0.4	6,246,264

WME Report, Ex. 2 at 2-32.

the effect that his comments and conclusions were “preliminary” only. *See* Exs. 141 at 1; F-16 at 1. Noting that cutoff grade can fluctuate if operating costs are reduced or metals prices increase, Michael simply declared the Government’s 1 percent cutoff grade to be “arbitrary.” Exs. 141 at 8; F-16 at 7. He noted that the then-current price for nickel was \$12.17 per pound (as of July 14, 2006), assumed the correctness of BLM’s operating cost figure of \$140.38 per dry ton and a price of \$12.00 per pound of nickel, and concluded that cutoff grade would be significantly lower at 0.64 percent, so that more of the ore resource could be economically processed. Ex. F-16 at 7.

The ALJ was not persuaded, and neither are we. While it is true that a \$12.00 price would lower the cutoff grade, for reasons to be discussed more fully below, Michael could not properly rely on a 2006 nickel price of \$12.00 per pound. His testimony does not otherwise establish or suggest error in any of the premises that led Judge Sweitzer to determine that the Government’s 1 percent cutoff grade was reasonable, or his conclusion that \$12.00 per pound was not a price a person of ordinary prudence would have expected to receive in 1994 or 2000. Decision at 31.

Moreover, even assuming that Michael’s opinion clearly demonstrated a weakness in the Government’s *prima facie* case, the ALJ properly held that such a showing does not carry Freeman’s burden to demonstrate that he could have mined the Nicore claims at a profit. *Id.* at 31, citing *United States v. Rosenberger*, 71 IBLA 195, 201 (1983) (“To prevail, the contestee . . . must do so on the strength of a preponderance of her own countervailing evidence rather than upon any perceived weakness in the Government’s *prima facie* case”).

B. Economic Analysis Per Ton of Calcine or Per Ton of Dry Ore

Freeman notes that the ALJ expressed costs and revenues per ton of calcine, whereas Freeman expressed such data in dry tons.⁹ SOR at 18. The removal of moisture results in a higher nickel grade per ton. Although he acknowledges that the ore would be placed in a kiln and roasted until both the free moisture and the chemically bound moisture were “driven off” before smelting (*i.e.*, calcined), and that the ore “is never at a state” where the free moisture has been removed and the chemically bound moisture is retained, Freeman incongruously states that he appropriately evaluates smelting costs and revenues on the basis of dry tons. *Id.* He questions whether Judge Sweitzer correctly assumed that the Government’s figures were calculated per ton of calcine. *Id.* at 19.

⁹ *Dry tons* are those in which only the free moisture has been removed. In contrast, *calcine* is ore that has been relieved of its chemically bound moisture as a result of roasting in a kiln.

BLM responds that Judge Sweitzer used *dry ore* and *calcine* interchangeably in referring to ore that had been prepared to go into the kiln, *i.e.*, ore from which the free moisture has been removed. Answer at 21. BLM counters that notwithstanding the mistaken usage, the ALJ properly and correctly performed the cost and revenue analysis on the basis of *dry ore*, consistent with the parties' usage and calculations. Indeed, Judge Sweitzer used Freeman's figures from Ex. F-296 without altering them and, as Freeman acknowledges, his own calculations were based on dry tons. *Id.*, citing Decision at 36-37. BLM cites other examples that confirm its assertions. Accordingly, no reversible error is demonstrated by the fact that Judge Sweitzer used the two terms as if they were synonymous where the record shows that no one misunderstood his intended context or usage.

C. Nickel Prices

The Government estimated nickel prices of \$2.93 per pound in October 2000 and \$3.00 per pound in October 1994. WME Report, Ex. 2 at 8-1 to 8-2. These prices represented a range of historic prices calculated by averaging the average price for the month of each marketability date; the average price for the 36 months preceding the marketability dates; and the average futures prices for the 36 months following the marketability dates. Decision at 27, citing Tr. 511. This method is consistent with published BLM policy. 65 Fed. Reg. 41,724 (July 6, 2000). This 6-year average is used when spot market commodity prices and futures commodity prices are reported on major public trading exchanges, such as the London Metals Exchange (LME), the New York Commodities Exchange, and the Chicago Board of Trade. The policy establishes an objective, uniform means of determining the market value of a commodity that, in theory, takes into account anomalous dips and spikes in commodity prices.

Freeman argues here, as he did before Judge Sweitzer after the hearing, that it was error to use a 6-year average as provided in BLM's pricing policy. More specifically, he argues that, by its terms, the pricing policy does not apply; that it cannot bind the parties; that it is inconsistent with the prudent man standard; and that "there is no evidence to support the policy." SOR at 22-23. Freeman notes that the policy identified three circumstances establishing marketability dates: the date of the withdrawal of lands embracing mining claims, the filing of a patent application, and for all other situations, the date of the mineral examination. 65 Fed. Reg. at 41,725. Judge Sweitzer ruled that the policy "guides how to select a marketability date, not how to price a commodity as of the selected marketability date." Decision at 28. Noting that the parties had selected the dates of the alleged takings as the marketability dates, he concluded that the guidance under "General Policy" was applicable: "To determine the mineral commodity price to use on any specific marketability date, the mineral examiner will use [a 6-year pricing method]." *Id.*

We must dismiss Freeman's arguments. By its terms, the plain language of the policy unmistakably addresses marketability dates in addition to those established by the date of a withdrawal or by the date of a patent application. More fundamentally, the parties stipulated that the marketability dates would be the dates of the alleged takings, and the extensive hearing and briefing proceeded on that basis. Freeman used the 6-year averaging method to demonstrate the validity of his claims, and he predicated his economic analysis on that data, using a price of \$3.18 per pound for nickel. Freeman Economic Analysis (the "Green Book"), Ex. F-1, Table II, Appendix A at A-3;¹⁰ *see also* Decision at 30 n.14, citing CBOM at 83. It is therefore far too late to now contend that different dates should have been selected.

Freeman nonetheless now argues that "the BLM pricing policy cannot apply to [him] because doing so would wrongfully elevate a nonbinding 'policy statement,' to the status of a 'binding, substantive agency rule,'" to establish error in using it for any purpose in this matter. SOR at 26. We agree that the policy is not a binding agency rule and does not have the force of law, as it was not promulgated in accordance with the Administrative Procedure Act, 5 U.S.C. §§ 552-559 (2006). However, we do not agree that using it in this case is tantamount to equating it to a substantive agency rule. The question is whether Freeman has demonstrated that using 6 years and 1 month of averaged, widely reported, public market prices as a method of reliably and predictably determining price is unreasonable or arbitrary and capricious.

Freeman attempts to make this showing by maintaining that the 6-year averaging method runs afoul of the prudent man standard, arguing that "[i]n contrast to the policy, prudent people may look further back or further forward." *Id.* at 29.¹¹ He does so to lay a foundation for including the unusually high prices that occurred after the marketability date and after the relevant 6-year averaging period, because in the Spring of 2007, when the hearing commenced, nickel prices had spiked to an all-time record high of \$21 per pound. Before Judge Sweitzer, Freeman contended that the occurrence of the price spike "proves that a person who chose to develop the claims in 1994 or 2000 'would have obviously been prudent.'" Decision at 26, citing CBOM at 10; Contestant's Reply Brief at 1. The ALJ properly rejected that argument, stating that hindsight could not be used to evaluate prices in validity determinations, and that Freeman could not assert "higher prices ranging from \$3.52 to \$21.00 per pound based largely on post-marketability-date price trends and the 2007 nickel price

¹⁰ A copy of the Green Book was also admitted in evidence as Government's Ex. 146.

¹¹ Freeman suggests other approaches to determining relevant prices as part of his argument that he reasonably anticipates profit from his proposed mining and smelting operation. *See* SOR at 131-33. We will address Freeman's alternative pricing methods in connection with his profit argument below. Here, we deal only with the question of whether the pricing policy is inherently flawed or unreliable.

spike, without the necessary showing that the higher prices could have been reasonably anticipated on the marketability dates.” Decision at 27. During the hearing, Freeman relied on a nickel price of \$3.18 per pound during the period 1994 to 2000 based on the Government’s 6-year average, and he premised his economic analysis on that price, not the possibility of a record spike in nickel prices at some unforeseen date in the future. See Freeman Economic Analysis, Ex. F-1 at 5 and Appendix F.¹²

Freeman now asserts that he “did not make his decision to develop the nickel mine based on any particular price, on any particular date,” and that his decision was instead based upon anticipated demand for stainless steel in the developing world, notably in China. SOR at 32. BLM acknowledges that in October 2000, analysts were predicting increased demand for nickel in expanding markets, but argues that they were also predicting an increased supply of nickel sufficient to meet the demand, which would restrain price growth. Answer at 27-28. Freeman did not address this point in his SOR.

Instead, he challenges the ALJ’s reliance on the nickel price predictions of CRU International in October 2000 (Ex. 61 at 1); the Australian Bureau of Agricultural and Resource Economics in February-March 2000 (Ex. 56 at 308); Jim Lennon, Macquarie Bank Group, London, England, in July 1999 (Ex. 52 at 4, 6); Highbeam Research, reporting Rothschild & Sons’ prediction in October 1999 (Ex. 53); and Andrew Mitchell, an analyst with Brook Hunt, in June 2001 (Ex. 64). SOR at 34, citing Decision at 29-30. These forecasts generally indicated average prices well below \$3.00 per pound of nickel for the period 2000 to 2003. Freeman maintains that Judge Sweitzer accorded these forecasts too much weight, because they are short term, while the life of the mine was expected to be 30 years, and they

¹² Christopher Plummer, a metals industry analyst, was called as a witness for Freeman. He acknowledged that the 2007 bubble in the nickel market would burst, leading to a market correction. Tr. 3193. He stated that “most forecasts” predicted that the correction would result in prices in the range of \$5-10, a level he characterized as “significantly higher” than the previous trend average of \$2-4 per pound before 2003 or 2004. *Id.* He identified other analysts who shared his view of likely prices when 2007 prices collapsed. However, on cross-examination, it developed that in 1998, Plummer had prepared a forecast for Williams Specialty Steel for September 1998 through 2010, which projected cash prices at a low of \$1.71 (LME) to a peak price of \$4.39 per pound. Tr. 2076. Looking at prices in individual years within that 12-year period, Plummer had predicted an average low of \$3.32 per pound, an average medium price of \$3.52, and an average high of \$3.96 per pound. *Id.* at 2077. Further, Plummer acknowledged his deposition statement that “some of these predictions tend to be biased,” explaining that “it’s in the interest of a producer or seller to be – have the highest prices projected.” *Id.* at 2079.

are not the only forecasts that could be consulted. SOR at 34.¹³ He states that none of those forecasters testified at the hearing, but as BLM notes, Freeman did not object to admitting the reports in evidence, and several were authored by CRU. CRU formerly employed Plummer, and Plummer recommended Lennon. Answer at 28.

Our review of the evidence regarding nickel price predictions confirms Judge Sweitzer's conclusion that the weight of the evidence on the topic of nickel prices in the relevant 6-year period does not support a nickel price above \$4.00 a pound.¹⁴ In any event, the issue is whether, as of October 1994 and October 2000, the laterite ore was *then* presently marketable, considering historic price and cost factors *then* available, and assuming that they would continue. See *In re Pacific Coast Molybdenum*, 75 IBLA at 29, 90 I.D. at 360. We agree with the Judge that a prudent person would not decide whether to expend time and money to develop a paying mine based on the possibility of a record nickel market bubble in the future, but would instead look at past prices and assume that they would continue. None of Freeman's other arguments demonstrates any flaw or error in the method or use of a 6-year average that would cause us to reject it as unreasonable or unfair.¹⁵

¹³ Freeman cites Exs. 63 (CRU April 2001 *Nickel Quarterly Industry and Quarterly Outlook*) and 65 (January/February 2000 *Strategic Report*, Metals Economics Group) as examples of "far more optimistic" forecasts that the ALJ should have found more persuasive than those identified above. Freeman correctly states that these forecasts respectively predicted recovery of world economies and long-term growth in stainless steel production. However, Table I in Ex. 63 contains CRU's price forecast for 1998 through 2005, and these reflect a base case cash price range of \$2.10 to \$3.92; a high case cash price range of \$2.10 to \$4.25; and a low case cash price range of \$2.10 to \$3.92 per pound. Ex. 63 at unp. 2. Metals Economics Group's summary of five forecasts similarly predicted an average of \$4.15 for 2000 and \$3.00 for 2001 (Macquarie Bank Group); \$4.10 for 2000 and \$3.75 for 2001 (Prudential Bache International); \$3.90 for 2000 and \$3.40 for 2001 (SBC Warburg Dillon Read); \$3.65 for 2000 and \$3.85 for 2001 (Brandeis (Brokers) Ltd.); and \$3.65 for 2000 and \$3.20 for 2001 (T. Hoare & Company). Ex. 65 at 28-29. Thus, even these purportedly "far more optimistic" forecasts would not support Freeman's argument that a prudent person in 1994 or 2000 would have anticipated nickel prices of \$21.00 per pound.

¹⁴ We so hold, bearing in mind that a range in price predictions among analysts is to be expected and, according to Plummer, is both "very common" and "very healthy." Tr. 3194-95.

¹⁵ Freeman also questions Judge Sweitzer's conclusion that post-hearing nickel prices cannot be used in hindsight to evaluate prices for validity determinations. SOR at 42. He distinguishes the instant appeal from proceedings where the marketability date is
(continued...)

D. Quantity and Quality of Resource Reserves

The Government estimated 1,329,715 tons of dry nickel laterite ore on the Nicore Group claims at or above the 1 percent cutoff grade, averaging 1.17 percent nickel. It estimates recoverable reserves of 1,151,059 tons of ore at or above the 1 percent cutoff grade. WME Report, Ex. 2 at 2-32. Based on IDC's data, Freeman contends there are 15,801,500 tons of "proven, probable/geologic ore" at or above 0.4 percent cutoff grade. Freeman Economic Analysis, Ex. F-1 at 2. He also contends there are 26,856,500 tons at or above 0.4 percent "estimated probable/geologic ore." *Id.*, Appendix at A-2.

The Government identified several deficiencies in IDC's estimate of resources. Although IDC properly excavated trenches to expose subsurface material for sampling, it did not excavate to bedrock at all sample sites; instead, sample depth was limited by the reach of the excavator. The failure to reach bedrock resulted in "a measure of uncertainty regarding laterite grade, quantity and characteristics at depth." WME Report, Ex. 2 at 2-13. Jennifer B. Leinart, a registered professional geologist who is employed by WME, testified that IDC's 250-foot sample grid spacing was too large to justify the inferences it drew about laterite resources. Such spacing is just barely adequate to identify an "Indicated Resource," but is not adequate to determine a "Measured Resource," and so is "not adequate to justify the Proven Reserve classification applied by [IDC] to some of the resources." *Id.* In Leinart's opinion, the sampling grid was "barely adequate for doing a resource analysis." Tr. 2721-22. To classify a resource as a Proven Reserve also requires a demonstration of technical and economic viability in addition to geologic certainty." WME Report, Ex. 2 at 2-13. WME was unable to locate the data supporting IDC's boulder factor determination. IDC's sampling program called for scalping off material in the +6" size, where Freeman proposed to scalp off +1", so that the amount of material in the +1" to +6" range is not known. In response, BLM generated limited

¹⁵ (...continued)

the date of the hearing, when predictions of future prices cannot be verified. Here, the hearing occurred years after the respective marketability dates and 6 years of actual pricing data were then available to test whether "expectations of higher prices would have been prudent or not." *Id.* at 42-43. This line of argument is essentially another way of abandoning the marketability dates the parties agreed upon and invoking hindsight because, as it happens, prices eventually reached record highs. We seriously doubt Freeman would raise the argument if post-hearing prices had reached record lows. More important, as BLM notes in its Answer at 34, Freeman urges us to allow him to consider increased prices without considering increased mining, processing, energy, and capital costs. Freeman cannot rely upon hindsight to demonstrate that a belief or hope that prices would one day rise dramatically was prudent in 1994 or 2000.

data in order to proceed with its analysis. *Id.* Instead of site-specific tests, IDC relied on reports prepared by the Oregon Department of Geology and Mineral Industries to arrive at a general density factor, which it then generally applied to the Nicore Group. However, laterite deposits “exhibit highly variable in-situ densities from deposit to deposit and area to area.” *Id.* at 2-14. The correct density factor is important because “the calculated resource amount is directly proportional to the density factor applied.” *Id.* IDC apparently paid little or no attention to geologic environments in estimating resources, each of which has its own characteristics affecting density, moisture content, coarse material content, and average grade. *Id.* BLM performed *in-situ* testing of densities. Its revised resource estimate recognized variations and accounted for the geologic environments. Lastly, BLM rejected IDC’s chromium assay data in favor of its own assay results based on improved chromium assay procedures. *Id.* at 2-16.

With respect to Freeman’s assertion that the Nicore claims contain 26,856,500 tons at or above 0.4 percent estimated probable/geologic ore, Judge Sweitzer determined that the estimate was in part based on the assumption that the claims have similar values. Decision at 32.¹⁶ The record supports his conclusion. For example, Freeman relied on a single sample from the Ace 15 claim, coupled with visual evidence of laterization and geologic inference. Tr. 2290-91, 2357-58, 2371-73. Dr. Terry Maley, the lead Mineral Examiner for BLM, stated that geologic continuity cannot be based on a single sample. Tr. 2614. Clearly, geologic inference cannot be used to establish the existence of a valuable mineral deposit within the claim where there is no exposure of a vein or other mineralized ore body within the boundaries of a claim. *United States v. Miller*, 165 IBLA 342, 355 (2005).

Robert D. Newman, who has a degree in geological engineering with a mining option, testified on Freeman’s behalf. Newman visited the claims only once and only briefly, and he collected no samples. Tr. 2439-40. He had had no experience in determining whether a company should go forward with a mining project, he was unable to state the sample spacing that would be appropriate to invoke geologic inference in estimating the nickel resource on the claims, and he has no experience in modeling operating costs for nickel laterites or marketing laterite material. Tr. 2444-46, 2450, 2454. His testimony belied Freeman’s assertion that Freeman and Geoffrey Garcia, a registered professional geologist working on Freeman’s behalf, Tr. 2280, had systematically sampled the claims. *See* Tr. 2494-96. In addition, Newman insisted that the first inch or two of topsoil was an adequate growth medium for

¹⁶ IDC also included an estimate of 5,600,000 tons of “potential geologic reserves” in addition to the resources it characterized as “probable” and “possible.” The details underlying this estimate were not set forth in SWC’s Report, and the Mineral Examiners were unable to locate any data supporting IDC’s determination. WME Report, Ex. 2 at 2-6.

vegetation, and that the upper 1 foot of material on the claims was properly included in his estimate of the recoverable resource. Tr. 2441-42. Freeman appeared to agree. Tr. 3148. Maley testified that topsoil is not ore. Tr. 2614. Leinart agreed with Maley, noting that topsoil is to be conserved and used for reclamation. Tr. 2715-20. Moreover, Freeman admitted that he claimed ore reserves on unsampled claims, but chose not to sample those claims, stating that alleged Forest Service threats convinced him it would be futile. Tr. 2274-76.

The ALJ rejected Freeman's estimates on five specific grounds. He concluded that Freeman's estimates were based at least in part on visual indicators: red surface soil, lack of vegetation, and the presence of iron pellets, *id.*, citing Tr. 2035-36, but a prudent person would not rely upon such visual indicators to identify a laterite deposit, *id.*, citing Tr. 621, 638-39, 779, 952, 1012, 1571, 1694, 2507, 2570-71, 2654, 2669, 2672, 3307; Ex. 1 at 5-19 to 5-20. We agree that the cited testimony supports the conclusion that a prudent person would not reasonably rely upon visual indicators, despite Freeman's and Newman's testimony to the contrary. Indeed, on cross-examination, Newman admitted that stomping the foot is not a reliable indication of anything. Tr. 2439.

Second, Freeman relied on X-ray fluorescence (XRF), also referred to by the manufacturer's name as the Niton Analyzer, but failed to establish that the device had been calibrated using an assayed sample, a necessary step that ensures accurate data. Decision at 32. Leinart went to Niton's website and confirmed the proper procedure for a "quantitative" analysis using XRF. Tr. 3304. Garcia apparently did not follow that protocol, *id.*, and Freeman did not know what steps were necessary to calibrate the Niton Analyzer properly, or what Garcia did with a sample to test it. Tr. 3281. Freeman clarified that he had not taken a sample from the claims to calibrate the machine; instead the distributor purportedly pre-calibrated the instrument. Freeman took "a known sample" for test reading, and Garcia collected and delivered samples from the claims to the distributor. Tr. 3142. However, the difficulty, as Leinart testified, is that Niton, the manufacturer, is not a laboratory and neither is its distributor and, in any event, it is customary to send check samples to an independent laboratory. Tr. 3304. In these circumstances, the ALJ properly rejected reliance on XRF as a means of quantifying resource reserves.

Third, Judge Sweitzer was not persuaded that Freeman had shown that he could profitably mine and process the ore at the 1 percent cutoff grade, and certainly not at 0.4 percent, therefore concluding that the tonnage of ore below 1 percent was not relevant. *Id.* at 33. For reasons that will appear below, we agree that the record demonstrates that Freeman could not profitably mine and process the ore at the 1 percent cutoff grade, such that the ALJ correctly declared a 0.4 percent cutoff grade immaterial.

Fourth, in his post-hearing brief, Freeman represented that he would rely on the Government's estimate of 1,329,715 dry tons of ore at or above 1 percent cutoff grade to prove claim validity. *Id.*, citing CBOM at 54.

In fact, Freeman predicated his economic analysis on smelting ore with a 1.34 percent nickel content, which translates to a 1.2 percent cutoff grade.¹⁷ See Tr. 2178-79 and Mineral Report, Ex. 1, Table 9-1g at 9-49. The Nicore claims contain only 505,322 tons of laterite at 1.34 percent nickel, and Freeman admits it. Tr. 2179. Freeman would process the 1.34 percent grade first, and hold lower grade ore for processing when nickel prices were higher, planning to upgrade lower quality ore to a higher nickel content. *Id.* Judge Sweitzer rejected these premises because Freeman failed to offer a viable plan for profitably smelting ore upgraded to 1.40 percent nickel.

With respect to nickel and iron, in his SOR Freeman recounts some of the facts of the Government's comparison of IDC's and WME's estimates and the Government's conclusion that the variance was less than 5 percent. He acknowledges that, given the minor degree of variance between the two, they accurately estimated nickel and iron in the residual environment. SOR at 52. As there is no dispute about the Government's resource calculations, we accept them as Judge Sweitzer did.

Citing the Decision at 31, Freeman expresses surprise that Judge Sweitzer determined that decreasing the cutoff grade to 0.8 percent would not increase ore tonnage substantially, suggesting that there would be more resources at the lower cutoff grade, but without specifically alleging error. *Id.* However, at the hearing

¹⁷ In Ex. F-296 at 11, Freeman's economic analysis was based on a 1.2 percent nickel cutoff, even though only 61 samples in 48 trenches (or 6 percent of a total of 748 trenches) were at or above 1.2 percent nickel content. Leinart explained that Ex. G-178, a revised version of the map included in the Mineral Report as Plate 9-1, shows in green all the trenches that are below 1.2 percent cutoff grade, and all those above 1.2 percent are shown in red, although the exact grade of each trench is not depicted. Tr. 2726-27. The green areas vastly exceed the red areas. Ex. G-178 also shows that some of the green areas were outside claim boundaries, and that some of the red areas extended into more than one claim, including claims from which no sample had been taken. Tr. 2728-29. As Leinart correctly stated, the depiction of overlapping areas does not establish that a physical exposure of a valuable mineral deposit exists on the claims or that a discovery has been made. Tr. 2729-30. Other areas were colored a dark red, indicating trenches in which the material contained a combination of nickel grades both above and below 1.2 percent cutoff, so that the higher grade material would be diluted in the absence of the extra expense and effort of a rigorous grade control program. Tr. 2732-33. Despite these obvious disparities, Freeman's economic analysis assumed a 1.2 percent cutoff.

Freeman's cost and revenue analysis was based on ore that averaged 1.34 percent nickel content, not 0.8 percent. In the absence of a specific allegation of error, we will not infer one.

With respect to chromium, Freeman urges the Board to conclude that the evidence shows that the Nicore claims contain at least 2.6 percent chromium oxide. *Id.* at 53. He acknowledges that IDC had significant problems with its sampling for this mineral, but avers that such problems were corrected and eliminated, the necessary predicate for the argument that the record establishes a chromium resource.

BLM disputes the propriety of performing regression analysis using iron to predict the presence of chromium on the claims, especially for claims where there are no chromium assays or sampling data. Specifically, BLM rejects the assumption that there is a predictable relationship between chrome and iron. Because iron will occur in olivine and enstatite without chromite, the assertion that the occurrence of chrome can properly be based only on the presence of iron is error. *Id.* at 46, citing Tr. 2658; *see also* Tr. 2619-20. Given these facts, Maley dismissed the suggestion that regression analysis is properly performed based on an assumed relationship between iron and chromium on the Nicore claims as "pure pseudoscience." Tr. 2620; *see also* Tr. 258, 1081-82, 3297-3303.

Leinart similarly testified that employing regression analysis to predict a chromium resource based on a pairing of iron and chrome was not appropriate because iron associates with many other minerals found in the claim area. Tr. 3300. Freeman would minimize her testimony as the testimony of one not experienced with regression analysis. SOR at 60. He argues that his testimony to the effect that there is a relationship between iron and chromium is supported by Ex. F-309, Bulletin No. 52, *Chromite in Southwestern Oregon*, issued by Oregon's Department of Geology and Mineral Industries and authored by geologist Len Ramp (1961), and should have been received more favorably than Maley's testimony, *id.* at 61-64, and that it is undisputed that the claims contain fine-grained chromite with high iron content, *id.* at 64.¹⁸

Freeman claims every BLM check demonstrated a "consistent" grade of chromium in that BLM's chromium oxide values were higher than IDC's, *id.* at 64-65, and that a prudent person would estimate a chromium resource based on Newman's testimony to the effect that geologic inference is appropriately invoked in these

¹⁸ Maley stated that the size of the chromite grain was irrelevant. Tr. 2627. Leinart testified that Freeman had not provided any assay data supporting his contention that the chromite on the claims is fine-grained. Tr. 3301. Like Maley, she also discounted the importance of grain size. *Id.*

circumstances, *id.* at 67-70. Freeman argues that the IDC Report acknowledging the assay problems is best understood as an issue of understating the amount of chrome contained within the claims.

As an initial matter, we cannot agree that the record establishes that IDC eliminated its chromium sampling problems. To the contrary, according to IDC, “a great deal of effort [was expended] trying to solve the problem of law assays and lack of reproducibility of assay results.” IDC Report, Ex. 31 at 33-34. While the IDC report states that “the problem was brought under control” very late in the sampling program, *id.*, we are not persuaded that the development of a “marginally satisfactory result for chromium assaying,” *id.* at 34, coupled with the representation that “the worst assay problems were solved,” *id.* at 35, demonstrates that IDC was finally able to reliably determine the chromium content of the Nicore claims. Government witnesses Leinart and Otto L. Schumacher, an engineer with a mining certification, testified that they could not discern which assays IDC concluded were acceptable and which were not. Tr. 1117, 2756.

Freeman argues that IDC’s selection of 127 samples to subject to regression analysis should be viewed as evidence of which assays IDC found acceptable, further inferring that “IDC trusted their chromium sampling enough to base their regression on it.” SOR at 59. We do not draw the same inference in light of the record as a whole on the subject of IDC’s sampling program. IDC was never able to reproduce its assay results. WME Report, Ex. 2 at 2-4. As the IDC Report explains, SWC applied regression analysis using the iron content as the independent variable simply because it had no other choice in light of the “rather small time frame for which chromium assays are available due to the early assay troubles.” IDC Report, Ex. 31 at 34. IDC did not assay all of its samples, and of those it did, approximately 60 percent of the assay results are missing from the sampling data. Mineral Report, Ex. 1 at 9-14; *see also* Tr. 593, 2619. Although the Government performed check assays on 10 percent of IDC’s 1,217 assays to assess the accuracy and reliability of the sampling, Freeman cannot rely on those check assays to negate or bolster deficiencies in the data he relies on to demonstrate a discovery, particularly when they constitute such a small percentage of the total and are widely distributed throughout the Nicore Group claim area.

Nor do we find Newman’s testimony as compelling as Freeman does. Newman assumed that the assay results were mis-reported. He converted the chromium oxide average of 2.48 percent shown in the Mineral Report, Ex.1, Appendix A at 1, to chromium, resulting in an average of 1.73 percent, and concluded that BLM’s check sampling and IDC’s assays were “amazingly consistent.” Tr. 2398-99. In her testimony, Leinart countered that IDC had reported assays for chromium oxide, not chromium. Tr. 2682-83. She based her conclusion on the fact that IDC’s work included a formula for converting chromium oxide to chromium, reasoning that no

such conversion would have been necessary if IDC had reported chromium as Newman suggested. *Id.* Leinart explained that the Government did not accept IDC's chromium assays because IDC had not accepted them and because there were too few samples (250 out of a total of 1,217). Tr. 2679.

The foregoing provides a sufficient basis for rejecting Freeman's assertions with respect to the alleged chromium resource, but it is not necessary to go further with the issue because Judge Sweitzer assumed *arguendo* that Freeman had demonstrated the presence of chrome on the Nicore claims, and in the quantities he asserts, and nonetheless concluded that he had failed to show a discovery, Decision at 10, a point that Freeman does not acknowledge in his SOR.

The question is whether Judge Sweitzer correctly concluded that the economics of the mining operation Freeman proposed were such that a profitable operation was not possible, and accordingly, we move on to consider Freeman's arguments regarding operating costs.

E. Operating Costs

Freeman initially presented his mining and processing plan and cost-revenue analysis in Ex. F-1 (the Green Book). Costs were taken from the Green Book to prepare Ex. F-296, a flip chart exhibit introduced at the hearing. Well into the hearing, Freeman presented mining and processing plan and cost-revenue analysis as Ex. F-316. Ex. F-316 contains project cost elements contained in the Green Book and Ex. F-296, and new elements as well. Freeman argues that Judge Sweitzer wrongly required an "engineered level of detail" at the hearing and erroneously characterized the technologies Freeman planned to use as unproven or undeveloped. SOR at 77. We set the stage for the discussion of specific elements of Freeman's operating costs by quoting Judge Sweitzer's brief explanation of a nickel laterite smelting process:

In a typical nickel laterite smelting operation, ore is fed into a calcining kiln. A reducing agent (reductant) is sometimes added as the ore is fed into a kiln. Reductant is fixed carbon. Fixed carbon causes metal in the ore to separate from its host rock; this process is called reduction. The reduction process often begins in the calcining kiln and is then completed in the next phase of the process when the calcined ore is fed into the EAF for smelting. Typically, the calcining kiln is heated by a fossil fuel (oil, coal, or natural gas) and the reductant added to the ore is also from a fossil fuel source.

In his F-316 plan, Mr. Freeman proposes to (1) use wood waste as the sole fuel for the calcining kiln, (2) simultaneously calcine the laterite ore and pyrolize (i.e., turn into charcoal) the wood waste in the

calcining kiln, and (3) then use the pyrolyzed wood waste as a reductant in the EAF.

Decision at 51.

1. Solar/Air Drying the Laterite Material to Reduce Costs

Nickel laterite smelters dry ore in a dryer before feeding it to the calciner kiln. Tr. 720. Neither Freeman nor the Government included capital and operating costs for a dryer, although the Government included fuel costs for moisture removal in the kiln. See Ex. F-1 at 16; WME Report, Ex. 2 at 4-7. Freeman proposes to dry the laterite material by solar/air drying and so avoid the additional cost and expense of operating a dryer. He argues that air drying ore is not novel, and that Dr. Roland A. Bergman, an expert witness for the Government with extensive credentials and experience in metallurgical engineering applied to nickel laterites, has no experience with air drying or with the laterite material found on the Nicore claims. SOR at 80. He argues that the free moisture in the material can be reduced from 27 to 20 percent with air drying. *Id.* at 82.

Bergman calculated a moisture content of 27 percent, after adjusting it from 31 percent. Tr. 2886, 2923. Freeman testified that a May 2003 sample stored in a BLM shed in Medford, Oregon, had 2 percent free moisture by the time it was shipped to the Albany Research Center, U.S. Bureau of Mines, Department of the Interior, and, based on that phenomenon, he “believes” he can reliably and predictably achieve a 20 percent free moisture content by air drying, which would reduce fuel oil consumption from the 143 pounds Bergman estimated to 112 pounds. Tr. 3270-71. Freeman recalled that the tin storage shed was probably “pretty warm in there” and that the 2000-pound sample was stored “over the summer,” Tr. 1942. He testified that he would require an area to lay the material out to dry in a “pretty thin” layer using the plant’s front-end feeder loader, the material would be raked up and turned on a daily basis and, after “a few days,” it would be stored in a facility or under a tarp. Tr. 1942-43; see also Ex. F-1 at 16. He did not otherwise identify or explain what he would or could do to ensure that he consistently achieved the 20 percent moisture content for more than 54 tons of material or the costs associated with that activity. Bergman testified earlier that Freeman had not provided any information to the Mineral Examiners regarding how he proposed to air-dry the laterite. Tr. 2820-21.

Freeman admitted that he had not identified places where air drying might take place. Tr. 1942. The Government called Dr. Walter Curlook. Curlook is an engineer who, among other positions he has held, was president of Inco, the second largest nickel producer in the world. He has had vast experience with nickel laterites and nickel production and smelting, and has patented nickel recovery processes. He

characterized the results that could be obtained from air drying as “very marginal.” Decision at 50-51, citing Ex. 144 (Curlook Deposition) at 137. Indeed, in Curlook’s opinion, a reduction of 2 or 3 percent moisture after several weeks of drying “would be an achievement.” Ex. 144, Curlook’s Aug. 29, 2006, Report (Curlook Report), at 4. More to the point, Curlook rejected Freeman’s idea of air drying the Nicore material in lieu of conventional kiln drying, simply because Freeman had not demonstrated that he could achieve any “meaningful degree of moisture elimination in this manner.” *Id.* Curlook explained that adequate drying is necessary to the screening step, and that drying is not eliminated from the nickel recovery process: if the material is not dried in a drying kiln for the requisite period of time before it enters the calciner, then it will be dried in an extended calcining phase. Ex. 144, Curlook Deposition at 138-39. He was not familiar with any mining operation that has attempted the air drying Freeman proposes in lieu of a dryer. *Id.*; Curlook Report at 4.

Freeman contends that Curlook’s testimony is not entitled to weight because Curlook claims no expertise related to air drying mineral material, he has no experience with southern Oregon laterites, and he failed to acknowledge that the laterite processing operation in Yabulu, Australia, does air-dry its material. SOR at 80. In its Answer, BLM rightly responds that Freeman has not shown that air drying is practical in southern Oregon or provided for the labor and equipment costs that would be required even to attempt the effort. As BLM notes, Freeman proposes to mine 54,794 tons of material during the summer so that the plant can run all year, so that the material “cannot simultaneously be in-the-ground and on a drying pad.” Answer at 49. Noting that there is precipitation every month of the year, *id.*, BLM maintains Freeman has not accounted for the swell factor in estimating the size of the pad or area that would be required, Answer at 52, citing Ex. 2, Appendix B, and that he errs in assuming that a layer of laterite material 1-foot deep will adequately dry in 6 days, and compounds that error when he doubles the depth of the layer to 2 feet without also doubling the assumed number of drying days. As to the evidence concerning the Yabulu operation, BLM correctly states that air drying was added to avoid installing a fourth ore dryer. No detailed information regarding this aspect of the process was provided, but it appears the air drying is only a small part of the drying phase, since it is clear that the three dryers were not taken out of service. See Ex. F-32, International Laterite Nickel Symposium 2004 at 617.

Moreover, we agree that Freeman’s plan to use the plant loader to turn the laterite material is not well-founded, because it is not reasonable or practical to assume that a single loader can deliver to the drying area(s) sufficient tonnages of material to accumulate a 1-year smelter feed supply, regularly turn 54 tons of drying laterite material, deliver it for storage, blend the material, deliver and feed 148 tons to the kiln, move the slag to the disposal area, and handle the finished product on a daily basis. In contrast, the Government modeled two front-end loaders; one would

be assigned to handle smelter feed tasks, while the other would handle slag disposal. In any event, Freeman did not include the extra fuel or operating costs for using the loader in the air drying activity he proposes. Nor do we find adequate support for Freeman's assumption that he can dry the material to 20 percent moisture content in 6 days based on the moisture content of the ton of laterite material that was stored in a warm tin shed for a summer, conditions that, on the face of it, are markedly different from those under which Freeman proposes to dry 54 tons of the material. Under the circumstances, Freeman has not shown, by a preponderance of the evidence, that air drying is a feasible method of reducing his kiln costs.

Freeman states that even if air drying is not feasible, he nonetheless can achieve a 7 percent reduction in moisture, which amounts to 140 pounds of water per ton of laterite material (2000 pounds x 0.07). He further states that it requires 1,000 BTUs to remove 1 pound of water, and that there are 8,000 BTUs in a pound of wood, so that 17.5 pounds of additional wood,¹⁹ at \$.09 per dry ton (\$.005/lb) is all that is required to obtain the 140,000 BTUs needed to remove 140 pounds of water from each ton of material. SOR at 82.

BLM properly responds that Freeman's calculation is not correct. BLM notes that with a moisture content of 27 percent, 2,740 pounds of wet material is required to produce 2,000 dry pounds of ore ($2,000 \div 0.73$), meaning that 740 pounds of water must be removed in the kiln. If the material has a moisture content of 20 percent, 2,500 pounds of wet material is required to produce 2,000 dry pounds of ore ($2,000 \div 0.80$), so that 500 pounds of water must be removed in the kiln. Accordingly, a 7 percent reduction in moisture (27 to 20 percent) results in 500 pounds of water, not 140 pounds. Answer at 53 n.16. In addition, Freeman's calculation assumes that the kiln is 100 percent thermally efficient, but this assumption is not supported by the record. Bergman testified that a kiln is only 75 percent efficient. Tr. 2804. Thus, additional BTUs are required to offset that 25 percent inefficiency. Lastly, BLM argues that Freeman's price of \$.005 per pound of wood waste is not supported in the record.²⁰

We cannot quarrel with BLM's logic or its view of the evidence on which it relies to support its reasoning. Freeman acknowledged that he had used the figure of 4,000 BTUs in Ex. F-146, that he had also used 5,000 BTUs and, after visiting the

¹⁹ Freeman had originally asserted that a pound of wood produces 4,000 BTUs. See Ex. F-146 at 17.

²⁰ Freeman testified that he could purchase wood waste consisting of sawdust and bark at \$10 per ton, based on the oral quote of the deceased former owner of the Rough and Ready Mill, but he did not produce a written quote from the current owners of the mill. See Tr. 2134-35, 3287-88.

U.S. Forestry Products Laboratory website, ultimately settled on 8,000 BTUs, which formed the basis of Robert L. Braddock's calculations. Tr. 3272. Braddock holds a degree in metallurgical engineering. However, the BTU figures and Braddock's calculations relate to "bone-dry" wood. Tr. 3272, 3371. Braddock acknowledged that the wood Freeman proposed to use would be wet wood that either had to be dried out or fed into the kiln wet, explaining that the latter option required 1,260 pounds of wet wood to produce 630 pounds of bone-dry wood, assuming a 50 percent moisture content. *Id.* at 3381-82. Freeman included the cost of 575 pounds of wood waste, *id.* at 2137-38, and nothing for building and operating a means of drying the wood, *see* Exs. F-146 at 17, F-316 at 1. That figure was later increased by 10 percent as a contingency, which was based on Braddock's assertion that wood contains 40 percent carbon and on controlling the kiln temperature to ensure the wood is pyrolyzed. Tr. 3344-46.

Clearly, Freeman significantly under-calculated the volume of water to be removed in the kiln, even putting aside his shifting views on the number of BTUs that are required to remove a pound of water. Nothing in the record establishes that a kiln can achieve a 100 percent thermal efficiency, and Freeman does not contend otherwise on appeal. Freeman therefore must plan for additional BTUs to account for the inability to achieve 100 percent kiln efficiency, so that BLM correctly states that an adjustment is necessary. We are persuaded that Freeman has not preponderated on the question of whether he can plausibly achieve a 7 percent reduction in moisture in the circumstances that he proposes to reduce his operating costs.

2. Calcining Costs

a. Calcining at a Lower Temperature

Freeman contends that the ore can be calcined at a temperature of 1,200° Fahrenheit (F) (648.88° Celsius (C)), even if it does contain some moisture. *SOR* at 82-88. Though he acknowledges that 1,200°F is a lower temperature than that used in ferronickel plants, he argues that he can achieve a 90 percent reduction of the chemically bound moisture. *Id.* at 88-89.²¹ This line of argument in turn

²¹ Freeman offers extensive argument regarding his estimate of the amount of carbon available from pyrolyzed wood waste. *Id.* at 91-93. However, as Freeman admits, Judge Sweitzer accepted *arguendo* Braddock's testimony to the effect that pyrolyzed wood contains 40 percent carbon, and that 630 pounds of wood per ton of ore is required to produce the amount of *stoichiometric* carbon needed to reduce the ore to the master alloy Freeman envisions – that is, the amount of carbon required to reduce all of the iron, nickel, and chrome oxides in the laterite material. *Id.* at 90-91. The ALJ so assumed despite the fact that Braddock admitted that he knew of no operating

(continued...)

depends on the viability of using wood waste as a reductant, addressed *infra*. Judge Sweitzer found that Freeman's proposal to use wood waste as the sole fuel for the calcining kiln or simultaneously calcine the laterite ore and pyrolize the wood waste in the calcining kiln was not realistic or feasible "because temperatures of 1,200°F or below are required to successfully pyrolize wood waste, while temperatures greater than 1,200°F are required to effectively and safely calcine laterite ore." Decision at 51.

Bergman testified that calcining at 1,200°F is not appropriate because too much bound moisture would remain in the laterite ore. The hottest calcine saves the amount of electrical energy required by the EAF: every 100°C (212°F) of the calcine temperature saves 50Kw of electric energy in the furnace. Tr. 682-83. He further explained that burning fuel in a standard boiler is 30 to 32 percent fuel efficient, whereas burning fuel directly in a kiln is 70 percent efficient. *Id.* at 683. Accordingly, the best practice is to dry the material as much as possible in the kiln before feeding it to the EAF. *Id.* Bergman testified that the bound moisture must be removed before feeding the calcine to an EAF because even a small amount bound moisture – as little as 1 or 2 percent – will render the electrode unstable, so that it begins to "dance." *Id.* at 685. Second, heating the laterite ore to 1,000°C (1,832°F) and evaporating it involves a waste of electrical energy. *Id.* Third, there is a risk of violent steam explosions inside and outside the furnace, posing a serious risk to persons and property. *Id.* at 685-87. Curlook agreed that dehydration represents a significant matter of safety. Ex. 144, Curlook Deposition at 210-12, Curlook Report at 4-5.

Although Freeman contends he can calcine the laterite material at 1,200°F, the Government introduced other relevant evidence bearing on the issue. Ex. 142 is an industrial survey of 13 nickel laterite smelting operations around the world, titled *JOM [Journal of Metals] World Nonferrous Smelter Survey* (April 2006). All 13 operations employ separate drying equipment, and all but one shows calcine discharge temperatures of between 750°C (1,382°F) and 1,250°C (2,282°F), with most falling between 800°C (1,472°F) and 900°C (1,652°F). The exception is P.T. Inco in Solawesi, Indonesia, at 700°C (1,292°F). Ex. 142 at 14-20. As the decision notes, however, "[t]emperatures above 700°C [1,292°F] are required to fully eliminate crystalline water." Decision at 52, citing Ex. 142 at 13.

In contrast, Freeman argues that when Hanna operated the smelter at Riddle (Oregon) to produce ferronickel, it "did not calcine to remove **all** moisture," and neither did Glenbrook when it took the plant over to produce ferronickel. SOR at 84. He relies on a May 1997 draft report published by Rothschild Australia Ltd. in

²¹ (...continued)

nickel smelter that uses the process he described. Tr. 3375.

connection with Glenbrook's initial public offering which, among other things, states: "During calcining all the free moisture and most of the LOI (loss on ignition) will be removed by heating the ore to about 1200°F." Ex. F-35, Appendix I at iii.²² As noted by Judge Sweitzer, however, other evidence of Glenbrook's calcining temperature conflicted with the May 1997 draft report, a fact Freeman acknowledged. SOR at 85. He counters by explaining that different temperatures are used to serve different economic reasons — *i.e.*, to save electric costs at the furnace, a reduced moisture content is advisable; to save on reductant costs, a lower temperature is indicated. SOR at 85. He also emphasizes the absence of "explosions" when Glenbrook and Hanna were operating the Riddle smelter. *Id.*

We think Freeman's argument that he can calcine the laterite material at only 1,200°F is put to rest by examining Ralph H. Nafziger's batch smelt tests on Oregon laterite to test the feasibility of producing the master alloy, conducted at the Albany Research Center in cooperation with Freeman. Nafziger conducted only five batch smelting tests. The test ore for all five tests was dried to about 150°C (302°F) to 200°C (392°F) for 16 hours. For the last three tests, the dried ore was heated to 900°C (1,652°F) for 2 hours before the reductant and flux were added. In the first two tests, "the charge mixture erupted from the furnace occasionally," due to the structural water in the ore. Appendix J to Ex. F-146, at unpaginated p. 5. With the addition of coke breeze as a flux, the eruptions were "less pronounced." *Id.* On the other hand, for the final three tests, "[h]eating the ore to 900°C resulted in decreased spattering." *Id.* Later, Nafziger, William K. O'Connor, and Howard F. Davis, Jr., attempted a pilot-scale production of a master alloy using southern Oregon laterite, again in cooperation with Freeman. As O'Connor later concluded, those tests "demonstrated that it was necessary to roast the ore prior to smelting to avoid furnace eruptions," and accordingly roasted the ore at 900°C. Appendix K to Ex. F-146, at 7.

We agree with Judge Sweitzer and BLM that O'Connor's work does not show that calcining at lower temperatures is safe or feasible. That study analyzes a hypothetical smelter plant feed that did not include actually calcining any ore. Bergman testified that calcining at lower temperatures is not modern practice and not advisable. Tr. 2805. While Curlook acknowledged that a "partial elimination" of water might occur at 650°C (1,202°F) and that an operator might achieve a "continuous safe operation," it was also his testimony that accident or mishap was equally possible. Ex. 144, Curlook Deposition at 146. Noting that "the water you drive off electric furnaces chews away at electrodes" and increases costs, Curlook stated that safety was the "biggest problem." *Id.* at 147. Finally, BLM compellingly argues that Glenbrook spent \$25 million to refurbish the Riddle smelter, Tr. 1997-98,

²² Curlook was highly skeptical of the manner in which LOI was used by Freeman and his witnesses. See Ex. 144, Curlook Deposition at 143.

2013, and that it calcined the ore to about 1,541°F (slightly more than 838°C). BLM further states that Hanna used kilns and hearth furnaces to calcine ore before it was fed to the furnace, and also that it reduced the ore outside the EAF using the so-called “Ugine process.” Answer at 57-58. We conclude that the Hanna smelting process does not establish that ore can be safely calcined at 1,200°F.

Freeman’s reliance on the final report of a feasibility study for the proposed Fenix ferronickel project to maintain that he can calcine laterite at 1,200°F misses the mark. That feasibility report states that the ore was calcined at 700 to 800°C (1,292° to 1,472°F) to complete the removal of bound moisture. The ore would leave the kiln at 900°C (1,652°F), which is a slight decrease in temperature from the maximum achieved during calcining. Ex. F-315 at 7-42.

Judge Sweitzer thoroughly reviewed the testimony and documentary evidence bearing upon the question of the requisite calcine temperature and explained his reasons for weighing the evidence as he did. Decision at 51-57. He ruled that “a person of ordinary prudence would not make further expenditures of his labor and means to develop the Nicore claims with a reasonable expectation of developing a paying mine based on a processing plan which hinged on calcining laterite ore to a temperature less than 1,292°F (700° C).” We find no reason to disagree.

b. Use of Wood Waste and Pyrolization to Reduce Operating Costs

In his decision, Judge Sweitzer stated that no smelter uses only wood waste as kiln fuel. Decision at 57. Freeman relies on Braddock’s testimony, though he admittedly has no experience in processing nickel laterites. Tr. 1445. Braddock testified that Codemin, a smelter in Brazil, uses eucalyptus wood as the sole kiln fuel, Tr. 3373-76, but he could not state whether it still used only wood, having read an article about the facility at some point in the last 4 to 10 years, Tr. 3375-76. However, Braddock acknowledged that some amount of pilot fuel oil would also be necessary. *Id.* at 57-58, citing Tr. 1419, 1444, 3356, 3373. The record establishes that Codemin more recently uses fuel oil and wood and, as of 2006, was using 114 pounds of fuel oil and 396 pounds of wood chips per ton of dry ore calcined at its facility. Decision at 57, citing Ex. 142 at 14.

Freeman’s plan to use only wood waste as kiln fuel and for pyrolization to produce the carbon reductant faces one significant complication Braddock described: To successfully pyrolize the wood waste in the calcining kiln, the wood must be heated in oxygen-starved conditions held at “about” 1,200°F. Tr. 1416, 1446, 1946, 1948, 3349. To efficiently and safely calcine the nickel laterite ore, however, the kiln must be heated to a minimum of 1,292°F. (700°C). Ex. F-146, Appendix K at 7; Tr. 2805. Braddock hypothesized that it might be possible to heat the kiln to 1,400°F

(760°C) and still achieve pyrolyzation, but he was not certain, Tr. 3350, 3381, and he had previously testified that he did not know, Tr. 1443.

Freeman urges four points on appeal: use of wood waste as a reductant is reasonable; his estimate of the amount of carbon needed to produce his master alloy is reasonable; his estimate of the amount of carbon available in wood waste is reasonable; and use of wood waste as the sole fuel is reasonable. SOR at 90-93. Freeman erroneously suggests that the ALJ determined that use of wood waste is novel, and that the Judge accepted Braddock's testimony to the effect that the carbon available upon pyrolyzation of wood is 40 percent and that the estimate of 630 pounds of wood waste was reasonable. The Judge did not declare the use of wood waste novel; he observed that Freeman's plan to use *only* wood waste was contrary to his witness' testimony that even at the one facility of which he was aware, wood was not the sole kiln fuel, and that supplemental "stabilizing" fuel was required and "typical" of "most of these processes." Tr. 1444. This was consistent with Bergman's testimony. Further, Braddock was asked a series of questions about the process from which he projected a savings of \$500,000 using only wood for fuel and operating the calcining kiln at 1,200°F. His responses are revealing:

- Q.** And your assumption of saving \$500,000 by using wood or coal is based on running the calciner at 1,200 degrees Fahrenheit; is that right?
- A.** No. The front end of the unit that acts as the, if you will, pyrolyzer, carbonizer. What happens at the back end, I don't know. But you do need to run the wood through that zone if that activity has to occur at 1,200 degrees tops. What happens downstream of that as everything heats up, I don't know what you need to do.
- Q.** Do you know if using wood chips would achieve the correct temperature of a nickel laterite calciner?
- A.** I don't know.
- Q.** Do you know if operating a calciner at 1,200 degrees Fahrenheit would eliminate free and chemically bound moisture in nickel laterite ore?
- A.** I do not know.

Tr. 1445-46.

Nor is it correct to assert that the ALJ accepted Braddock's estimate of the amount of fixed carbon available upon pyrolyzation. The Judge stated the substance of Braddock's testimony on this point, *see* Decision at 63, but that is not the same as ruling that wood is composed of 40 percent usable fixed carbon to confirm Freeman's estimate of 630 pounds of wood waste or his reductant cost of \$2.88 per DST. Bergman agreed that the total carbon content of wood may be 40 percent, but only 9 percent is present as fixed carbon; the rest is volatile compounds that will escape when the wood is heated, so that a large part of the carbon will be consumed as fuel. Tr. 2840-41. Bergman estimated that approximately 15 percent of the stoichiometric carbon would burn off in the heating process. Tr. at 2840. Accounting for the percentage of burn-off, he determined that 266 pounds of stoichiometric carbon was needed. *Id.* Therefore, based on a content of 9 percent fixed carbon, 2,952 pounds of wood would be required for every ton of ore, not the 575 pounds Freeman calculated. Tr. at 2841-42. He further testified that such volumes of wood in the kiln would result in a "no-go" operation — if not flames literally bursting from the kiln — because the expulsion of the volatiles produces increased gas velocity and increased dust volumes. Tr. at 2842. The kiln offgas amounts to 15 to 30 percent of the kiln feed. Tr. at 2917-18.

Responding to Freeman's assertion that Codemin was using wood in its kiln, Bergman noted that Codemin is making ferronickel, not the master alloy Freeman posits, and that Freeman's direct alloy process would require much more reductant than Codemin's ferronickel process because it would require a reduction of "nearly all of the iron, in addition to the nickel and some of the chromium, . . . a much, much tougher reduction job." *Id.* at 2843. While Braddock was able to describe the process of pyrolyzation, Tr. 3347-48, his experience with pyrolyzing wood was in the context of producing "gaseous hydrocarbon from wood or from the char that wood would leave." Tr. 3343. He admitted that he has no experience in processing nickel laterite. Tr. 1445.

Finding Braddock's testimony "vague and equivocal," the ALJ had ample reason to hold that a person of ordinary prudence would not be justified in concluding that it is possible to pyrolyze wood waste at temperatures greater than 1,200°F and, consequently, Freeman's plan to use wood waste as the sole calcining fuel and simultaneously calcine the laterite ore in the kiln is not reasonable. He properly found that "[a] person of ordinary prudence would not rely upon these processes because their feasibility is too speculative." Decision at 59.

3. Estimates for Electrical Power Consumption

In preparing its estimate, the Government contacted the local power supplier, PacifiCorp., and received a noninterruptible supply rate quote. As stated, Judge Sweitzer assumed without deciding that Freeman correctly estimated that his plant

would require 650 kWh to smelt his master alloy, that it would cost \$.032 per kWh, and that in 2001, but not in 1994, he would have been able to contract with an IPP for interruptible power. Decision at 34. Applying the first assumption, the ALJ concluded that Freeman would save \$5 per ton of ore smelted, for a total \$5,800,000 over the 29-year projected life of the mine (40,000 tons/yr x 5 = \$200,000/yr x 29). Although the ALJ assumed Freeman would have been able to contract with an IPP, citing Tr. 1732, he found Freeman had failed to demonstrate that it would be cost-effective to purchase interruptible power. The ALJ noted that he had not analyzed certain necessary costs, including the cost of purchasing a back-up electrical generator. In addition, the Judge found that Freeman had not performed a cost-benefit analysis, without which “the record does not provide a reasonable basis for concluding that Mr. Freeman could have achieved cost savings by purchasing interruptible power.” Decision at 35 n.15.

Freeman states that his estimate of 650 kWh to make his master alloy is between Bergman’s estimate of 718 kWh and the estimate of 600 kWh offered by another expert witness for the Government, Dr. Corby G. Anderson, who holds degrees in chemical and metallurgical engineering, at \$.039 per kWh. Relying on Braddock’s testimony, Freeman contends he could have purchased electricity from an IPP at the rate of \$.032 per kWh. SOR at 96-97. He further contends that in October 2000 a “reasonable person” properly could base an estimate on the IPP rate, because in October 2000, the relevant Oregon statute provided that retail consumers of electricity other than residential consumers would be allowed direct access to IPPs not later than October 1, 2001, even though the statute was changed to postpone that date. *Id.* at 97-98.

We do not view the record on this matter in the way Freeman argues it. First, although Freeman now relies on an average of Bergman’s and Anderson’s estimates, he originally estimated that 850 kWh per ton of ore, at \$.22 per kWh, would be required to run the entire plant. He cited several sources for the estimate, including the opinion of his expert, Howard K. Davis, Jr., who died before the hearing commenced, and Glenbrook’s actual average usage of 950 kWh for the smelter and ancillary equipment. Ex. F-246 (Freeman Economic Analysis) at 18; Appendix O to Ex. 246 (May 1997 Draft Glenbrook Information Memorandum prepared by Rothschild Australia Ltd.), Sec. 4.3. Second, although a consumer receives some notice of an impending interruption, Braddock testified that what advance notice is to be provided is a matter of negotiation, and that a consumer’s discount rate is reduced according to the advanced notification to be given. Tr. 1429. Neither party quantified the effect of a diminished discount. Third, we agree with BLM that Braddock did not adequately establish the basis for a rate of \$.032 per kWh. His testimony was based on his recollection of what rates might have been in 2000, and he acknowledged that he had no documentation supporting that rate. Tr. 1406-08. However, he testified that the rate would be a negotiated rate. Tr. at 1439.

Moreover, no such rate was available, because an IPP could not have entered into a contract and set a rate for interruptible power before 2002. Tr. 2998-99; 3037-38; 3059-61; 3396-99; Exs. 183, 189.

Both parties also offer arguments regarding the use of interruptible power to supply a smelter. Freeman criticizes the Decision on the ground that an interruptible power supply involves far less frequent interruptions of shorter duration than the Judge and the Government posited and, in any event, it is recognized that there will be periods in the course of the year when the smelter would be offline for longer than a power interruption would last. SOR at 100-02. He argues that the negative consequences of a power interruption envisioned by Bergman will not transpire, because the interruptions will be of short duration. *Id.* at 102. BLM views the Decision as a ruling that “interruptible power would not be prudent,” citing the Decision at 34. Answer at 77. BLM points to facts of record supporting its characterization of the ALJ’s ruling at 34 of the Decision.

We think both parties’ arguments are a little off the mark for different reasons. Freeman does not dispute Bergman’s testimony regarding the consequences of interrupting a smelter operation. Instead, his arguments are intended to convince us that the opportunities for the negative impacts and risks of interrupting the power supply in an active smelting operation enumerated by Bergman are few and unlikely because he would be notified sufficiently in advance of an impending interruption to shut down in a safe and orderly fashion. He further states that such interruptions are weather-related predictable events that occur only once a year and only for an hour or two. SOR at 99-100.

In responding to Freeman’s perception of the risks of using an interruptible power supply, BLM appears to overlook the rationale stated in the Decision. Although the ALJ assumed *arguendo* that in 2000 Freeman could have expected to purchase interruptible power, he rejected Freeman’s projected savings because he had failed to include certain costs, notably the cost for a back-up generator, and he had failed to perform a cost-benefit analysis. In so ruling, Judge Sweitzer implicitly acknowledged that one would not prudently assume that power interruptions would only occur under the circumstances Freeman posits, safely, and only for a short time, or that such interruptions are properly equated to regularly scheduled periods of downtime for maintenance, repairs, and so forth. The Judge recognized that there are risks, and costs associated with such risks, that directly affect safety and productivity, and that Freeman had failed to present appropriate analysis demonstrating that he could achieve the cost savings he projected by purchasing interruptible power. More importantly, the ALJ concluded that the projected cost savings from purchasing an interruptible power supply, even coupled with other

adjustments,²³ simply did not “eliminate the losses that a person of ordinary prudence would expect from developing the Nicore claims.” Decision at 34. Freeman has not shown error in the Decision.

4. Lime Estimates

Lime is a flux, an ingredient added in the smelting process to maintain the slag in a molten state by reducing its melting point to just above the melting point of the metal so that the heavier metal reports to the bottom of the furnace and the slag remains on top. Assuming *arguendo* that a master alloy can be produced, relying on Bergman’s testimony, the Government contends that 500 pounds of lime is required. Tr. 2843-44; Ex. 180 at 3; Ex. 181 at 3. Relying on O’Connor’s work at the Albany Research Center and his hypothesis that a 6 percent lime influx was adequate, Freeman contends only 146 pounds of lime is needed. Tr. 2138; Ex. F-296 at 3. Judge Sweitzer averaged the two to reach a figure of 323 pounds, but he did so “for the sake of erring in Mr. Freeman’s favor,” after expressly finding that Bergman’s expertise and credibility warranted modeling processing costs using 500 pounds of flux per ton of calcine, rather than Mr. Freeman’s proposed 146 pounds of flux per ton of calcine. Decision at 64.

Allan R. Young, a BLM mining engineer and member of the mineral examination team, testified that the price of metallurgical grade lime delivered in 2007 was \$114.10 per DST, a figure based on quoted prices from suppliers, which is “approximately six cents per ton delivered to O’Brien [Oregon].” His personal experience in operating a processing plant in Nevada in the mid-1980s, when he purchased metallurgical grade lime at \$.05 per pound, tended to confirm the correctness of the approximately \$.06 per pound figure quoted by the suppliers. Tr. 3101-02. Using Freeman’s correction factor of .7 to ascertain the cost in 2000, he testified that the cost of lime is \$30 per DST ($\$120/\text{DST delivered FOB Portland} + \$20/\text{DST delivered FOB O’Brien} = \$163/\text{DST} \times .7 = \$114.10/\text{DST} \div 2000 \text{ pounds} = \$.05705$ rounded up to \$.06/pound $\times 500 \text{ pounds} = \$30/\text{pound}$). *Id.*

Freeman first argues that the Government wrongly rounded the price of lime up from \$.057 cents per pound to \$.06 per pound. Had the ALJ used \$.057, he contends, the cost for 323 pounds of lime would be \$18.43/pound instead of \$19.38/pound, or \$.95 less. SOR at 104. Second, Freeman maintains that

²³ The ALJ held that Freeman had demonstrated some cost savings as a result of outsourcing some clerical activities. In addition, a typographic error resulted in an overstatement of the Government’s estimate of the amount of kiln refractory (lining) that would be consumed or expended per ton of ore smelted by \$5.96 per ton of ore processed. At 40,000 tons per year, this amounts to an annual savings of \$238,400 or \$6,913,600 over the 29-year life of the project.

Bergman's testimony is entitled to no weight because Bergman's estimate of the lime changed in the course of the hearing, it was based on a "black box formula which cannot be reviewed," and he has no experience with smelting "this ore." *Id.* Freeman points to certain errors in the course of Bergman's testimony that supposedly demonstrate his lack of credibility.

BLM does not agree that averaging the lime volumes urged by the parties produces a realistic lime consumption figure, and therefore it also challenges the correctness of the \$19.38/DST Judge Sweitzer assigned to the cost of lime, arguing that the true cost is \$30/DST. Answer at 81. Additionally, BLM notes that Freeman has changed his bases for calculating lime costs five times in an effort to reduce those costs.

Freeman does not object to using an average to determine the amount of lime that his proposed smelting operation would require, although Judge Sweitzer expressly determined that using 500 pounds of flux per ton of calcine was more reasonable than Freeman's proposed 146 pounds of flux. Instead, Freeman complains that it was error not to use the arithmetically correct price of \$18.43 per pound for metallurgical grade lime.²⁴

Viewed as a whole, the record clearly shows that 500 pounds of flux is more realistic than 146 pounds of lime, because it is undisputed that the batch tests O'Connor conducted at the Albany Research Center were less than Freeman might have hoped for: using 21-22 percent lime flux, the slag failed to move from the crucible to the melting test; using 20 percent lime, some refractory attack occurred, an indication that the melting point was too low. Tr. 2845. Bergman used a 25 percent addition of lime and a melting point of 1,650°C, resulting in a "reasonable slag similar to the slags that have been used by Nafziger, and Nafziger and O'Connor. So I think this looks like a good slag mix." *Id.* Therefore, averaging Freeman's and Bergman's estimate reduces the amount of flux and therefore must lead to the same unsatisfactory results O'Connor encountered.

It is true Bergman misspoke in the course of the hearing, and he went on to correct his testimony regarding the proper phase diagram to use to determine the amount of flux, the inadvertent reversal of the colors in his diagram key, and the units measured by hatch marks in the phase diagram. In this, Freeman perceives proof that Bergman lacks expertise or essential experience with the laterite material

²⁴ We recognize that Freeman seeks to enhance the advantage to him of using the lower, averaged estimate of the amount of lime flux his proposed operation requires, but this is not an argument that impresses. In this case, using the actual price to the third place instead of rounding the price up to two places makes no appreciable difference to the overall economic analysis or the conclusion that follows from it.

found on the Nicore Group claims sufficient to compel us to disregard his testimony in its entirety. *See* SOR at 105-110. The critical point is that none of Freeman's allegations on appeal changes the batch test results at Albany Research Center, and our reading of the record does not otherwise support rejection of Bergman's testimony.

Freeman counters that he could more economically obtain local limestone at \$1.87/DST and avoid the cost of purchasing chemical grade limestone. He calculates that a pound of fuel oil produces 20,000 BTUs and it takes 2,000 BTUs to calcine limestone, so that one pound of fuel oil produces 10 pounds of lime. Using WME's fuel oil price of \$.11 per pound, the cost of calcining local limestone into lime onsite is \$1.61 per pound (146 lbs. x \$.11) for a total cost of \$3.48/DST (\$1.87 + \$1.61/DST), thus saving \$15.90/DST of the ALJ's estimate of \$19.38. SOR at 111.

BLM responds that Freeman improperly raises the question of locally purchasing limestone for the first time on appeal, but nonetheless argues that Freeman has mis-calculated fuel oil requirements and failed to include and document other costs. Answer at 85-86.

Braddock testified that 2,000 BTUs per pound (or 4 million BTUs per ton) of limestone at a temperature of 1,800°F (982.22°C) appears to be adequate to calcine limestone. Tr. 3361, 3364. Bergman testified that the range is 4 to 7 million BTUs per ton of limestone at a temperature of 1,800° to 2,300°F (982.22° to 1,260°C) to decompose the limestone effectively. Tr. 2948-49. However, Freeman proposes a smelting operation that literally would be the smallest in the world, Tr. 2956-57, and he could not achieve the economies of scale available to larger plants, Tr. 2963. We agree with BLM's conclusion that Freeman's plant therefore likely would require more than the minimum 4 million BTUs per ton. BLM argues 7 million BTUs per ton of limestone, or 3,500 BTUs per pound of lime, more probably would be required to account for the inability to achieve economies of scale. Answer at 85. Additionally, BLM notes that the Mineral Report states that a pound of No. 2 fuel oil produces approximately 19,000 BTUs, so that a pound of fuel oil produces enough energy to produce 5.4 pounds of lime (19,000 ÷ 3,500); therefore, 92.6 pounds of fuel oil is required to produce 500 pounds of lime (500 ÷ 5.4). *Id.*

We are not convinced that Freeman has adequately estimated the cost of calcining local limestone to produce the necessary flux. To the contrary, we think it clear that Freeman has under-stated the BTUs per ton of limestone that his smelting operation would require. We need not determine to what degree it is under-stated because although Freeman testified that he had "calculated the use of a separate kiln to produce lime from the limestone," he did not provide the capital or labor costs of the lime calcining kiln. Tr. 3258; *see also* Tr. 3258-65; Exs. F-296, 316.

E. Estimates of Plant Labor Costs

The Government contends Freeman's smelting operation requires 32 employees at a total cost of \$40.21 per ton of calcined laterite material processed. Freeman counters that he can operate with 17 employees at a cost of \$20.88 per ton of calcined ore. Both parties modeled a processing plant that operates three shifts on a 24-hour basis, 7 days a week, resulting in four operating crews so that employees have some time off from the job.²⁵ Judge Sweitzer carefully considered all the witnesses' testimony in light of their respective credentials, training, and experience with nickel smelting operations, succinctly explaining that "[a] key factor in evaluating the parties' conflicting estimates is the disparity in the qualifications of the witnesses testifying about those estimates. The Government's witnesses are generally much better qualified than Mr. Freeman and his witnesses and hence the Government's estimates are generally more credible." Decision at 66. In contrast, with the exception of Nick Michael, none of Freeman's witnesses had any experience with nickel smelting operations, including Freeman himself, and Michael generally agreed with the Government's modeling of personnel costs. The testimony of Freeman's witness, Richard D. Meyers, who holds a degree in metallurgical engineering and has extensive business experience in stainless steel manufacturing and not nickel smelting, plainly did not outweigh the testimony of the other witnesses.

Judge Sweitzer ruled as follows. He sustained the Government's costs for the position of plant manager (\$120,000 + 30 percent wage burden = \$156,000 per annum), finding that the cost was properly based on metal-mining, industry specific survey data for the western United States. Decision at 71. He agreed that the positions of metallurgic engineer and chief chemist were necessary, finding that it was not reasonable to require one person to cover both functions. *Id.* at 72. The ALJ ruled that four laboratory technicians are required, and that Freeman had not demonstrated that their responsibilities can be effectively outsourced or reduced significantly by other means in light of the need to continually test various elements of a smelting operation. *Id.* at 74. He likewise ruled that a full-time human resources employee and a full-time environmental employee are necessary. *Id.* at 75.

²⁵ The parties' contentions with respect to labor costs are set forth in a Table that appears at pp. 70-71 of the Decision. As summarized in the Decision, the differences between the parties' labor costs are as follows: (1) Freeman would pay a lower salary for the plant manager; (2) he would combine the two positions of metallurgic engineer and chief chemist into one position; and (3) he would omit three laboratory technicians, one environmental position, one human resources position, four shift supervisors, two accounting and payroll positions, and one procurement position the Government included. Decision at 65.

Specifically citing the weight of the evidence and the expertise of Anderson and Bergman, the ALJ held that four shift supervisors are necessary as modeled by the Government. *Id.* at 76. Judge Sweitzer eliminated one of the two accounting and payroll positions the Government included, noting that Freeman had shown that the function could be outsourced for \$60 per pay period. *Id.* at 77. He similarly eliminated the one procurement position the Government included, and one of the two secretarial positions. *Id.* However, he was persuaded by both parties' witnesses that an additional mechanic and electrician should be added to provide coverage for the fourth shift. *Id.* at 78. Those rulings and related costs are summarized in a Table that appears in the Decision at 78-79, and they result in \$18.99 in additional labor costs.²⁶

On appeal, Freeman takes issue with the Judge's conclusions, arguing that Freeman's estimate of required plant labor is reasonable and that Freeman properly relied on the testimony of Meyers. Although Freeman endeavors to cast doubt on the ALJ's assessment of the witnesses, our own thorough review of the transcript and record readily confirms Judge Sweitzer's weighing of the witnesses' credentials and their testimony.²⁷ Lastly, with respect to six additional costs identified in Ex. F-316, without citing any page in the Decision, Freeman claims such costs were "accepted by Judge Sweitzer without question," and urges the Board to do so as well. SOR at 127. These include additional costs for the electrode; electrical needs apart from the furnace, such as lights and motors; refractory; sundries, such as tools and supplies;

²⁶ Judge Sweitzer properly rejected Freeman's contentions with respect to the Government's failure to conduct time-labor studies. Citing *U.S. v. Rosenberger*, 71 IBLA 195, 201 (1983), he ruled that Freeman could not prevail by asserting weaknesses in the Government's case when he had not submitted any time-labor studies of his own. Decision at 79. In any event, the Government conducted equipment studies, which dictated the operators' time. Tr. 3063.

²⁷ In particular, Freeman strives to show reason why Anderson's testimony should have been rejected in its entirety, alleging that he lacked any credibility. SOR at 113-14. We have scrutinized the testimony cited in n.37 of the SOR and cannot agree that it demonstrates a basis for discarding Anderson's testimony or for overturning Judge Sweitzer's assessment of his credibility. Anderson adequately explained that his report (CAMMP Report, Ex. 3 at 67) was merely an illustration expressed in dry metric tonnes using a range of power consumption rates, and that he did not use the illustration as a basis for calculating the furnace energy requirements provided to WME. Tr. 1368-74. Nor are we persuaded that Anderson's frank admission that he could not recall which of the references he listed in his report was the source of the specific data contained in a given Table without looking at them demonstrates that he was not credible.

permit and bond; general and administrative (G&A) items; and property taxes. Ex. F-316 at 6.

BLM challenges Freeman's claim that Judge Sweitzer accepted the six additional cost items. Citing the Decision at 80, BLM states that the Judge only "assumed these costs for purposes of analysis but noted that these are 'unrealistic assumptions' in Mr. Freeman's favor." Answer at 111. BLM argues, moreover, that standard cost-estimating procedures are calculated as percentages of the overall cost estimate. *See, e.g.*, Tr. 2991, 3012, 3014, 3028. Because Freeman's cost estimates are "so flawed," any percentage calculation is likewise flawed, and these include sundries, G&A, and property taxes. Answer at 112.

As the absence of even one citation to the Decision, evidence or testimony in Freeman's SOR perhaps demonstrates, Judge Sweitzer did not rule on the six cost items discussed by Freeman, and he did not purport to "accept" them as established costs other than for argument's sake. Nor do we. Judge Sweitzer summarized the forgoing adjustments in the following Table:

<u>Revised 2000 Operating Cost Summary Per Ton of Calcine</u>	
Expenses	Total Per ton of Calcine
Consumables	Wood @ \$3.15, Oil @ \$4.95, Lime @ \$19.38, kWh @ \$20.80= \$48.28
Operating	Original \$68.40 + Additional Labor Cost \$18.99 = \$87.39
	\$135.67

Decision at 80.

Using the Government's October 2000 nickel price of \$2.93 and Freeman's prices for iron and chrome, *see* Ex. F-316 at 11, Freeman's total revenue per ton of calcine would have been an estimated \$110.87 in October 2000. Had he begun processing Nicore ore with a 1.34-percent nickel content in 2000, he would have lost an estimated \$24.80 ($\$110.87 - \$135.67 = (\$24.80)$) for every ton of calcine processed, exclusive of capital costs. Judge Sweitzer thus concluded that Freeman had not demonstrated that he located a valuable mineral deposit on any of the Nicore claims as of the October 2000 marketability date.

F. Estimates of Anticipated Revenues

1. Metal Recovery Rate

Freeman argues that his 97 percent recovery rate for nickel, 90 percent rate for iron, and 80 percent rate for chrome are reasonable, were supported by the Government's witnesses, and were accepted by Judge Sweitzer. SOR at 128-31. Proffering "more realistic prices" coupled with the average nickel grade of 1.17 percent calculated by WME, and the foregoing recovery rates, Freeman maintains he can turn a profit from the proposed mining and smelting operation. *Id.* at 131-33. BLM replies that Freeman's assertions are without merit. Again, we must agree with BLM.

It is clear that Freeman has not accurately characterized the testimony on the subject of metal recovery rates to which he refers. Anderson did not assert a 100 percent nickel recovery rate in producing the master alloy; to the contrary, he stated "we estimated five-percent dust loss, and ultimately the nickel recovery was about 92 percent to the ferronickel product of that quality," assuming complete utilization of the reductant and perfect separation of the metal from the slag, "giving the Nicore the benefit of the doubt." Tr. 484-85. The CAMMP Report assumed a 95 percent recovery in producing a stainless steel alloy with a 5 percent dust loss. Ex. 3 at 104. Bergman estimated 95 percent nickel recovery, but noted that experience suggested that 93 to 95 percent was more realistic. Tr. 2853-54. He estimated a 65 percent recovery for chrome, apparently relying on a 15 to 30 percent loss of the kiln feed in the kiln offgas. Tr. 2917-18, 2854. Bergman noted, moreover, that there are always losses from mine to product due to dust, spills, and other events. Tr. 2853.

Freeman refers to Ex. 143, the April 2006 Journal of Metals *World Nonferrous Smelter Survey, Part III: Nickel: Laterite* (JOM) to discredit Bergman's testimony that a 15 to 30 percent loss can be expected. Survey results from 13 smelters around the world are reported. Freeman points to the dust losses reported by Falconbridge Dominicana (3 percent), PT Aneka Tambang (8 percent), and Larco (6.7 percent). JOM at 14-20. He ignores others that are within the 15 to 30 percent range, such as Loma de Niquel (15 percent), Codemin (20 percent), and Hachinohe (25 percent). *Id.* It seems to us that the reported nickel recovery rates are far more revealing: Falconbridge Dominicana (91.2 percent), PT Aneka Tambang (96 percent), Larco (88-89 percent), Loma de Niquel (not reported), Codemin (87.5 percent), and Hachinohe (97 percent). *Id.* Regardless of the dust loss rates reported, it is clear that Freeman's 97 percent recovery rate is extremely ambitious: of the 13 smelters, only 2 reported a nickel recovery at or above 97 percent, and 8 reported less than a 95 percent recovery rate (2 did not report any rate). Those data confirm that Bergman's use of a 95 percent recovery rate was indeed generous, and afforded

Freeman the benefit of yet another doubt. Nonetheless, even using the Government's nickel price and Freeman's iron and chrome prices (*see* Ex. F-316), and assuming ore containing 1.34 percent nickel, Judge Sweitzer found that Freeman would have lost "an estimated \$24.80 ($\$110.87 - \$135.67 = (\$24.80)$) for every ton of calcine processed, exclusive of capital costs." Decision at 80. He therefore found that Freeman had failed to demonstrate a discovery of a valuable mineral deposit on any of the Nicore claims as of the October 2000 marketability date. *Id.*

Judge Sweitzer similarly concluded that Freeman had failed to demonstrate a discovery of a valuable mineral deposit on any of the Nicore claims as of the 1994 marketability date. Freeman used the Government's nickel price of \$3.00 per pound, an iron price of \$0.071 per pound, and a chrome price of \$0.369 per pound. To arrive at 1994 operating costs, Freeman multiplied his total 2000 operating costs by a factor of 0.84. Decision at 81, citing CBOM at 91. The cost factor was derived from cost adjustment factors developed by the Government. *See* WME Report, Ex. 2, Addendum at 2-27.

The ALJ held that a prudent person would not rely on an "across-the-board" application of the 0.84 adjustment factor because the actual cost of purchasing uninterrupted electricity had been established in the hearing, and a prudent person would rely on the actual cost of electricity. Decision at 81, citing WME Report, Ex. 2, Addendum at 19. The actual cost of electricity in 1994 was \$0.037 per kWh. Accepting *arguendo* Freeman's figure of 650 kWh per ton, the ALJ calculated a 1994 cost of \$24.05 per ton of calcine ($650 \text{ kWh} \times \$0.037 \text{ per kWh} = \24.05). However, the Judge adjusted costs because Freeman did not separately calculate a 1994 electricity cost:

First, the electricity cost for 2000 of \$20.80 per ton must be subtracted from the total 2000 operating costs of \$135.67 per ton. The resulting figure of \$114.87 per ton must then be multiplied by Mr. Freeman's .84 cost adjustment factor to calculate the total 1994 operating cost of \$96.49 per ton, exclusive of the electricity cost. Finally, adding to this figure the estimated electricity cost of \$24.05 per ton for 1994 results in an estimated total 1994 operating cost of \$120.54 per ton of calcine processed.

Decision at 81. Assuming without deciding that the metal recoveries would be as claimed by Freeman in Exs. F-296 and F-316 (25.99 pounds of nickel, 576.22 pounds of iron, and 24 pounds of chrome), the ALJ used the Government's nickel price of \$3.00 per pound, Freeman's iron and chrome prices as asserted in his brief on the merits (\$0.071 per pound for iron and \$0.37 per pound for chrome), and calculated Freeman's 1994 revenue per ton of calcine as follows:

Nickel	25.99 lbs	@ \$3.00	= \$ 77.97
Iron	576.22 lbs	@ \$0.071	= \$ 40.91
Chrome	24.00 lbs	@ \$0.37	= \$ <u>8.88</u>
Total			\$ 127.76
less 10-percent buyer discount			- \$ <u>12.78</u>
Total Revenue			\$ 114.98

Decision at 81-82. Again considering operating costs alone, Freeman would have lost an estimated \$5.56 ($\$114.98 - \$120.54 = (\$5.56)$) for every ton of calcine processed in 1994. Freeman thus failed to demonstrate a discovery of a valuable mineral deposit on any of the Nicore claims as of the October 1994 marketability date. *Id.* at 82.

2. Anticipated Profits

Freeman urges the Board to use “more realistic prices” to find that his anticipated profits are reasonable. SOR at 131. He offers three examples of how this might be accomplished using a 20-year, 30-year, and 80-year average of nickel prices, coupled with a 12-year average of iron prices “prior to 2000,” and a 15-year average of chromium prices “to 2000.” *Id.* at 131-33. In the alternative, he suggests that we average 1994 and 2000 costs as calculated by Judge Sweitzer. *Id.* at 133.

BLM responds that Freeman has actually adjusted historic (*nominal*) nickel prices for inflation without disclosing it, so that the prices shown in his examples in fact are modern (*real*) prices. If the nominal prices are used, the 20-year average is not \$4.00 per pound, but \$3.09 per pound; the 30-year average is not \$5.26, it is \$2.67 per pound; and the 80-year average is not \$4.50, but \$1.32 per pound. Answer at 118, citing <http://minerals.usgs.gov/ds/2005/140>. BLM notes that nickel prices fluctuate and, according to a July 7, 1999, article authored by Jim Lennon, a senior commodities analyst at the Macquarie Bank Group in London, Plummer (Freeman’s witness) recommended, nickel prices have been on a “steady declining trend in real terms.” Ex. 52 at 1.

We decline to entertain hypothetical profits based on “more realistic prices.” As discussed above, Freeman actually relied upon the price of \$3.18 per pound of nickel established by applying the BLM 6-year pricing policy, and he premised his economic analyses on that price. The contest proceeded on that basis, briefing has proceeded on that basis, and we have already determined that the pricing policy constitutes a reasonable means of assessing metal prices that minimizes anomalous spikes and dips. It is now too late to offer different pricing constructs in an effort to create the appearance of a profitable mining and smelting operation where the evidence overwhelmingly demonstrates that the opposite is true.

3. Ore Upgrading

Freeman proposed to upgrade the ore to increase the nickel content of the Nicore ore up to 1.40 percent. Judge Sweitzer ruled as follows:

. . . Even assuming that this is possible, Nicore ore at a 1.40-percent nickel content would only yield an additional 1.17 pounds of nickel per ton of calcine processed (1.40 percent X 2000 lbs x 97-percent recovery rate = 27.16 lbs of nickel versus 25.99 lbs of nickel at 1.34-percent).

This 1.17 pounds of nickel would result in additional revenue of \$3.16 per ton of calcine processed in 1994, and \$3.08 of additional revenue in 2000 (1994: (\$3.00 x 1.17 = \$3.51) minus 10-percent discount of \$0.35 = \$3.16) (2000: (\$2.93 x 1.17 = \$3.42) minus 10-percent discount of \$0.34 = \$3.08). Accordingly, even if Mr. Freeman could upgrade his ore to a 1.40-percent-nickel content without any additional costs, he would still lose, based on operating costs alone, an estimated \$2.40 per ton of calcine processed in 1994 and \$21.72 per ton of calcine processed in 2000.

Decision at 82.

Freeman urges the following line of argument regarding his upgrading proposal: He offered to demonstrate his method of upgrading and the Mineral Examiners were “not interested,” and Schumacher “simply assumed upgrading would not work,” SOR at 136; certain Government witnesses acknowledged that it is possible to upgrade ore by removing the nickel-rich rinds from boulders, *id.*; O’Connor’s report “makes several references to ore upgrading,” *id.*; Freeman’s ore upgrading process is not novel, *id.* at 137; Appendix B to Freeman’s Green Book (Ex. F-1) shows an upgrade from 0.49 percent to 0.68 percent, a 41 percent increase, which is significant, *id.*; a 40 percent upgrade would bring the average grade to 1.11 percent nickel, which can be done at a cost of \$2.10 per ton; therefore, Freeman has demonstrated he has much more tonnage at the estimated price range or, when prices are low, he can still profitably mine the resource, SOR at 137.

The record does not support the assertion that the Mineral Examiners refused to consider Freeman’s upgrading proposal. To the contrary, the Government team looked at the data from one or two samples Freeman provided to support his upgrading claims. These had been run through a cement mixer used like a trommel. However, IDC had run 45 samples through a trommel and found that it was not possible to upgrade the nickel. Dennis Krasowski, one of the Mineral Examiners, testified that it was those results that persuaded the mineral examination team that there was no need to witness the cement mixer in action. Tr. 978-79. Schumacher

testified that IDC's results showed that the potential upgrade was less than five-hundredths of one percent of nickel, which is within the range of error for assays. Tr. 1123. He dismissed the data as showing "simply the effect of screening." Tr. 1270. Part of the Government's information was provided by Boies Hall, who had performed 50 of IDC's tests, and he likewise was of the opinion that one could not expect to upgrade the ore by trommeling. Tr. 1124. Indeed, of the data for six sites shown on Ex. 148, Plate 12, two were not usable. Two of the four usable data actually decreased the grade of the nickel, while the other two showed an increase of five-hundredths of one percent. Tr. 1122-23. In addition, Krasowski and Schumacher shared the opinion that there was no greater nickel value in the rinds of boulders than the surrounding environment. Tr. 979, 1124. Under the circumstances, Judge Sweitzer's conclusion that it is not possible to upgrade the ore is sustained.

III. Reconsideration of the Board's Decision

Freeman moves the Board to reconsider its ruling on the interlocutory appeal in *United States v. Freeman*, 174 IBLA 290. He pursues the same arguments we considered and rejected in the interlocutory appeal. That fact alone justifies denying reconsideration. *Donna Jeanette Ong*, 166 IBLA 65, 66 (2005). However, under 43 C.F.R. § 4.403, a petition for reconsideration shall be filed within 60 days after the date of a decision. The request for reconsideration therefore is untimely and is rejected on that basis.²⁸

V. Additional Argument

With 151 pages, Freeman concluded his arguments in support of his appeal. However, he attached more than 50 pages in four appendices, none of which appear to have been cited in the SOR, directed to the following topics: mining capital costs (Appendix 1), mining and hauling operating costs (Appendix 2), processing plant capital costs (Appendix 3), and discovery in the transported environments (Appendix 4). The appendices reflect a mixed bag of arguments and assertions more appropriate to post-hearing briefing to the ALJ, designed to erode specific rulings or witness credibility. BLM responded with more than 30 pages of opposing argument.

The Government's case included both operating and capital costs. Judge Sweitzer found it unnecessary to go into capital costs in his Decision because the labor and consumables so overwhelmingly demonstrated lack of a discovery and, in

²⁸ Even if the petition for reconsideration were timely, we would hold the parties to the 1994 and 2000 marketability dates. That is so, because absent claims supported by a valid discovery on the date of the alleged takings, there could be no property or interest that could be taken. Freeman expressly recognized as much, and on that basis stipulated to the 1994 and 2000 dates.

these circumstances, we find no error in forgoing a discussion of the considerable evidence adduced on the subject of capital costs. Freeman argues for a more favorable interpretation of that evidence, but to overcome the Government's prima facie case, he must demonstrate that each claim in the Nicore Group can carry its proportionate share of such capital costs. *United States v. Wigglesworth*, 178 IBLA 51, 59 (2009), applying *United States v. Collord*, 128 IBLA 266. Freeman has not made that showing, instead generally maintaining that a discovery of a valuable mineral deposit of the quality and quantity sufficient to cover capital costs is exposed in both the residual and transported environments. SOR, Appendix 4 at 200-206.²⁹

²⁹ In pursuing this argument, Freeman attempts to revive numerous issues on which he did not prevail. In truth, he offers an elaborate construct of facts and law to invoke geologic inference to prove a discovery on certain claims in the absence of any sampling and to validate Garcia's samples. His creation rests upon a mis-reading of Board precedent. *Schlosser v. Pierce*, 92 IBLA 109 (1986), a private mining contest, does not stand for the proposition that "the law is clear that claims can be considered together to support a discovery." SOR, Appendix 4 at 206. *Schlosser* rejected the assertion that each claim must be capable of independently supporting a paying mine to be valid, but quite clearly affirmed long-standing precedent holding that each claim in a group must contain valuable mineral within its limits, reiterating that there is no "theory of bulk validation" by which a discovery on one claim is imputed to every other claim in a group. 92 IBLA 128. *Schlosser* acknowledges that in contests involving low-grade material, mining claims may be considered together for purposes of mining and developing them jointly. *Id.* at 130. *Schlosser* also confirmed that each claim must bear its proportionate share of the costs for developing a mine. *Id.* at 131-132, citing *In Re Pacific Coast Molybdenum Co.*, 75 IBLA 16, 90 I.D. 352.

Nor does *Lehmann*, 161 IBLA 40, establish "that there need not be a certain value in the discovery on specific claims, especially when there is more detailed evidence of sufficient quantity and quality of material in adjacent claims." SOR, Appendix 4 at 207. The Board declined to elevate use of a cutoff grade to a rule of law. 161 IBLA 93. Noting that whether a discovery has been made is a question of fact, the Board also unequivocally acknowledged that cutoff grade is an appropriate and useful tool for determining the requisite facts of an alleged discovery. *Id.* Here, as in *Lehmann*, there are ample facts of record, derived only in part from the parties' use of a cutoff grade, that support Judge Sweitzer's rejection of geologic inference to establish a discovery, as shown above. *Lehmann*, 602 F. Supp.2d at 155-56. Freeman's characterization of *Lehmann* as authority for invoking geologic inference in the circumstances of this appeal simply cannot be sustained. As the Board there stated, "[a]n 'inference of the presence of valuable minerals, drawn from the proved existence of mineral deposits outside the limits of the claim or from the geology of the area, is not sufficient and cannot be substituted for the actual exposure of the mineral deposit within these limits under the mining laws.'" 161 IBLA 92-93, and

(continued...)

VI. Conclusion

In the appendices, as in his SOR, Freeman asks us to find that Judge Sweitzer simply misconstrued and misapprehended the evidence, and that he wrongly judged the witnesses' credibility and the proper weight to be accorded their testimony, *see* Decision at 83-88, such that we should reverse the decision and conclude that Freeman overcame the Government's *prima facie* case by a preponderance of the evidence.

He asks us to compound unrealistic expectations by accepting as fact the many assumptions that bolstered his case, notwithstanding that they are subject to question, not supported in, or are contradicted by the hearing record: (1) the Nicore Group claims have similar values; (2) the claims were adequately and properly sampled by IDC; (3) the claims contain a chromium resource; (4) a master alloy can be produced; (5) only 630 pounds of wood waste are required to produce the required carbon per ton of ore; (6) Freeman's operation would require 650 kWh; (7) electricity costs \$.032/kWh; (8) Freeman could have contracted with an IPP for interruptible power in 2000; (9) only 323 pounds of lime as a reductant was adequate; (10) certain additional costs identified by Freeman are valid; (11) the appropriate metals recovery rate is 97 percent; (12) Freeman can recover the amounts of nickel, iron, and chrome shown in Ex. F-296; and (13) the laterite ore can be upgraded. He asks, moreover, that we accept his evidence for some purposes when it suits his case, such as IDC's use of XRF analysis to confirm alleged chromium values, and ignore the same evidence when it does not, such as IDC's (and Hall's) conclusion that the laterite cannot be upgraded. The prudent man test requires the claimant to show a prudent person would develop a mine; it is not enough that a claimant is willing to do so if the evidence shows that a prudent person would not. *United States v. Foresyth*, 100 IBLA 185, 210, 95 I.D. 453, 467 (1988), and cases cited.

Exercising our *de novo* review authority, we have carefully examined the record and evidence and we find no reason to disturb Judge Sweitzer's findings or result. To adopt a wholly different view of the record as Freeman advocates would be to construct a case that leaps well beyond the facts established in the hearing and contrary to applicable law. The Decision is affirmed.

²⁹ (...continued)
cases cited.

All arguments not expressly addressed in this opinion have been considered and rejected as without an adequate basis in fact or law.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 C.F.R. § 4.1, the decision appealed from is affirmed.

_____/s/_____
T. Britt Price
Administrative Judge

I concur:

_____/s/_____
James F. Roberts
Administrative Judge