

To: Doug Haywood, Project Manager
BLM Las Cruces District Office
BLM_NM_LCDO_Comments@blm.gov

From: Max Yeh

Ex 6
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Date: March 1, 2016

Re: Comments on *Copper Flat Copper Mine: Draft Environmental Impact Statement, 2015.*

CC: David J. Ennis, NMMMD

david.ennis@state.nm.us

Chris Eustice, NMMMD

chris.eustice@state.nm.us

Brad Reid, NMED

brad.reid@state.nm.us

Mike Johnson, NMOSE

mike.johnson@state.nm.us

Douglas Rappuhn, NMOSE

doug.rappuhn@state.nm.us

David Henney, SOLV

dave.henney@solvllc.com

Melanie Goodman, Field Representative, US Senator Tom Udall

melanie_goodman@tomudall.senate.gov

Dara Parker, Field Representative, US Senator Martin Heinrich

dara_Parker@heinrich.senate.gov

Dan Lorimier, Sierra Club

daniel.lorimier@sierraclub.org

Beth Bardwell, Audubon Society

bbardwell@audubon.org

Allyson Siwik, GRIP

grip@gilaresources.info

Dear Mr. Haywood,

As you know I am a long-time resident of Ex 6 [REDACTED] near the proposed Copper Flat Mine Project, and I have been researching the various impacts of the possible reopening of the mine since its proposal 4 or 5 years ago. I am a retired professor of languages and literature, but I also have a degree in Physics and many years of formal training in Chemistry. I do not pretend to expertise in any of the many fields that are required to comment thoroughly on the DEIS, but I have sufficient training and passive knowledge of many topics in the DEIS to allow a reasonable understanding of the complex issues.

Attached to this letter are the following Comments:

1. Can and Will.....p. 4.
2. Water in the DEIS.....p. 9.
3. The Socioeconomic Section (3.22) gets a D..... p. 16.
4. Partial Pit Backfill Alternative..... p. 32.
5. The John I. Hallett Placer Mining Heritage Site, Gold Dust, New Mexico... p. 38.

In this cover letter, I want to address some very general issues. At places in the DEIS there are suggestions that reclamation only needs to restore the site to a condition at which the present proposed project begins. For example, the DEIS does not consider reclamation necessary under a No Action Alternative. But in all the regulations I have read, the NEPA, the CEQ pronouncements, the Forty Questions, the mining regulations under Title 43, the EIS regulations in Title 40, it is suggested that reclamation is intended to restore the site to its natural, original condition, because otherwise, we would be in a continual state of decline as one mitigation after another falls short of complete reclamation. This is certainly what the phrase “cumulative impact” suggests. As you know the present condition of the site is not environmentally friendly with an open and polluted pitlake, unreclaimed pit walls, and a plume of pollution entering the groundwater at the former tailings impoundment. First, one would hope that BLM will require the next reclamation to do better and restore to a better than polluted condition. Second, although I know that BLM does not have funds to restore the situation at Copper Flat on its own, why cannot BLM require the present land owners to restore the site, at least to end pollution, if it does not mine? Is this not the responsibility of landowners generally? And, even if the BLM has no executive powers of enforcement, the EIS, itself, can be a locus of negotiation between the landowner/applicant and the BLM trying to manage its lands properly.

Another issue I want to broach generally is why there is not an alternative to the proposed action which is environmentally less damaging, what is called in “Forty Questions” an “environmentally preferable alternative.” BLM need not chose that alternative, but normally BLM would have to give good reason not to. In this DEIS, there is not even the option of that alternative. Why is that choice not presented to the decision makers?

I have noticed that every time an environmentally sound alternative is suggested, such as my suggestion during the scoping session that the mine use dry stack tailings both to prevent risk of groundwater pollution and to save water, both essential issues, the answer given is that it costs NMCC too much. This was also the answer given by Solv when I asked about reclaiming the pit and the pitlake. These issues of cost need to be considered, but they are more important to NMCC than to BLM who must balance NMCC’s needs with its own need to protect the land. One would expect, therefore, that the cost estimates would need to be scrutinized and criticized by BLM to make sure that these costs are real and that they are really unreasonable. I do not see this reflected in the DEIS. After all, BLM is not the guarantor of large profits for NMCC. It must only see that the conditions for mining are reasonable. Both dry stack tailings and reclamation of the pit are reasonable demands embraced at other mines by other regulators.

The main difficulty with Copper Flat, as I mention in my Comment “Can and Will,” is that the ore grade is marginally low. That means more intense mining, greater impact, greater use of water, smaller profit, etc. The people who have made money from Copper Flat have not been the miners. They have been the land owner Mr. Lotspeich who put the package of claims together beginning in the 1950s, sells it when prices go up and buys it back when it is worthless, and the hydrologists who have made half a dozen studies to support mining applications, and the lawyers. The BLM and we the public are simply captives of this ongoing speculation in a marginal piece of mineral rights.

Can and Will

The whole DEIS is flawed because the study does not apply a “can and will” test on the proposed action in order to determine the proper objects of analysis for the impact study.

A. A “can and will” test derives from western water law and refers to the requirement in permitting situations where an applicant for water rights must show that she “can and will” carry out the proposed project for water use. [15 C.R.S. 1990 §37-92-305 (9)(b).] It is a statutorily required administrative method to ensure efficient and expeditious consideration of applications so that time and money are not wasted by the state for frivolous projects that are not feasible. *Mutatis mutandi*, the EIS, a costly and time intensive process, needs to consider if the proposed mining action at Copper Flat “can and will” be carried out before it can determine the reasonably foreseeable impacts. The BLM is charged to determine if NMCC’s proposed plan of operation is “possible.” [Said in the 12/16/2015 Hillsboro Public Hearing.] However, the DEIS shows no indication of a “can and will” test.

B. A “can and will” test must consider:

1. Copper Flat Mine is, at best, a marginal mine.

a. As a porphyry copper mine it has characteristically low grade ore, and because its geological formation did not go through an enrichment phase, its ore is even lower than many other porphyry copper mines.

b. Quintana mined Copper Flat at 0.31% copper ore, compared to Chino’s 0.52%; that is, Copper Flat ore is 40% less rich than the ore at Chino. [Copper Flat grade ore calculated from Themac’s figures for Quintana production; ore quality at Chino taken from V. T. McLemore, New Mexico, USGS 2008 Yearbook.] NMCC’s Final Feasibility Study projects an average ore grade of 0.25% copper. [See below “Water in the DEIS”]

c. As a result, more dirt is moved, more ore processed, resulting in a more costly operation with more use of energy and water. The impact is a much greater disturbance of the natural environment of the lands in the Copper Flat Project which comes at a greater cost of production of ore.

d. Therefore, the operation is more sensitive to the fluctuation of copper prices. It is rumored that sensitivity to copper prices is what put the Quintana operation out of business in the 1980s just before the price began to rise again.

2. Themac, moreover, is a marginal company.

a. It has no assets other than Copper Flat. It has never developed a mine. It has never operated a mine.

b. It functions entirely on loans that carry a very high interest rate (20%) at a time of generally low interest rates. [Themac Resources website.] This rate is higher than that carried by Quintana in the 1980s during a time of high interest rates. [Jack Bailey Deposition, OSE file LRG 04652 A 468788 1935178.]

c. It is listed on a stock market for venture stocks (TSX Venture) where it is classified as a Tier Two company, the most risky category, and its shares are hovering around \$0.01 Canadian. [Toronto Stock Exchange Venture website.]

d. In the June, 2015, audit, Themac had a Current Assets of 0 and a Current Liability of \$56 million (Canadian dollars) resulting in a negative working capital of \$56 million. [Toronto Stock Exchange Venture website] In most recent years Themac's annual audit carried an auditor's warning that the company was at risk of failure. [Themac Resources website.] The most recent financial statement shows the company running out of cash resources sometime in 2016. [Themac Resources website.] Canadian media lists the company as a "zombie" company. [Tony Simon, "Here's why there are 600 zombie companies on the TSX/TSXV," posted on CEO.CA, February 25, 2015, Schedule A.]

C. To gauge Copper Flat's dependency on copper price fluctuation we look at Quintana's experience as an indicator.

1. Quintana occupied Copper Flat from 1975 to 1987, for 12 years, with 2 shutdowns of 3 and 5 years durations because of low copper prices.

2. Quintana actually mined for only 3 months out of 12 years and then had to abandon its project.

3. ¼ of a year of actual mining in 12 years gives us 1 cumulative year of mining every 48 years.

4. And 10 cumulative years of mining in 480 years.

5. BLM's preferred Alternative 2 (12 cumulative years of mining) would take almost 600 years.

6. The Proposed Action's 16 years would take about 800 years cumulatively.

D. But even worse, shutdowns due to copper price fluctuations are not the only threat to operations in a "can and will" test.

E. Copper Flat has been owned by at least 9 companies in 40 years, and none could operate except for Quintana. Most of the others chose for undeterminable reasons not even to attempt to operate. Only Alta Gold and Themac have gotten to the permitting stage, and Alta Gold went bankrupt. [Documented in OSE file LRG 4652.] All this failed effort

occurred during very high copper prices; so, we can assume that a host of other impediments have operated to prevent mining during these last 40 years.

- F. Copper Flat was mined 3 months in 40 years, and that **rate of mining** shows how very sensitive mining at Copper Flat is to copper price fluctuations and to a wide range of other fluctuating conditions that have prevented operation. The 40 year period is a long enough period of time to encompass a sufficiently wide spectrum of economic situations which Themac might reasonably expect to encounter. Therefore, this **rate of mining** is a sufficient historical basis for reasonably estimating the likelihood of a future operational rate:
1. At this rate of mining, it would take 160 years for the mine to run a cumulative total of 1 year.
 2. For 10 cumulative years of mining to happen would take 1,600 years.
 3. The BLM preferred Alternative 2 of 12 years would take roughly 1,900 years to accomplish.
 4. Themac's Proposed Action of 16 years would take about 2,500 years to complete.
- G. For evaluating the impacts of mining the DEIS assumes operation will be continuous for 11, 12, or 16 years. This assumption is patently so improbable as to be unreal. Since much of the DEIS is formulated on that substantially improbable foundation, much of the analysis is misapplied. It should be noted that in presenting the Proposed Action and the Alternatives, the DEIS acknowledges the discontinuous time frame of mining by labeling the durational periods as "operational time." We hope that this temporal ambiguity resulted from a lack of coordination in the DEIS and is not a camouflage.
1. If you take this "can and will" test into consideration, the effect on the environmental impacts is striking:
 - a. The production water will mostly stay in the ground and be used hardly at all except during short bursts of activity. Much of the aquifer study with its prediction of water balance return in 100 years would not apply. None of the hydrographs project a reasonably probable future groundwater reality; though they show the vaguely possible maximum impact. Evaporation off the pitlake could be very large accumulatively.
 - b. However, since in order to even begin operations, Themac must have water rights for over 7,000 af/year, this much water rights (the right to use water) would not ever be available for other uses in Sierra County much less in the whole Lower Rio Grande water basin down to El Paso. As long as Themac has these rights, all economic and social development in the County will be stopped at present levels. Truth or Consequences and Hillsboro have unused water rights up to the extent of their 40 year plans, but beyond that there will be no more rights available. The major economic consequence of mine operation is the catastrophe that there will be **no development ever** in Sierra County because of the lack of water rights even if the water is there in the ground. The entire

analysis of socio-economic impact is simply wrong. See my “The Socioeconomic Section Gets a D.”

c. Forget 300 jobs for 12 years. Most of the time in the next thousand years there will be 1 part time job for a caretaker who will be panning for gold and taking mineral samples in order to keep alive the many small mining claims that make up the Copper Flat mine site. And, that job is at present already taken. All the IMPLAN computer modeling of the collateral economic impact on Sierra County are wrongly based on the cumulative operational time spans as if they were continuous time and thus are all highly unreliable as reasonable estimates of a foreseeable impact.

d. Practically speaking the mine will never close, and thus there will be no reclamation. The pit will continue to be in violation of water balance issues relative to groundwater. The pit will continue to be a pollution problem. The tailings area, which is seeping pollution into the groundwater right now as we speak, will continue to do so. Soil erosion will continue in the open, unreclaimed pit area. Wildlife habitat will continue to degrade. The pit area will remain barren of vegetative cover.

e. But, as the mine over the coming centuries every now and then exposes new materials to oxidation, the sulfate levels and metal levels and particulate levels of pollution will increase from the pit area.

f. BLM is charged with the management of our lands, but permitting the Proposed Action or Alternatives 1 or 2, permanently prevents other uses of this land, as miners who have claims near the site and have been locked out of their claims by Themac can testify. This obstruction to true land management has social and economic effects which are also ignored in the socio-economic section of the DEIS, which seems to concentrate on the dollar benefits of hypothetical jobs rather than the action's costs.

H. These and other major cumulative, consequential and collateral impacts are unexamined in the DEIS because it assumes that operation can and will be continuously sustained and then the area reclaimed. Impacts must be the effects of actual, expected (not hypothetical) mine operations, including the reasonably forewarned long periods of environmentally degrading inactivity.

I. Since the BLM needs to take into account the maximum impact for the various issues of Chapter 3, it needs to consider in a revised DEIS that some issues would involve the possibility of 11, 12 or 16 years of continuous mining (for example, water use), but for other issues the maximum impacts are more severe because of permanent non-closure and non-reclamation (for example, the catastrophic impact of no more future economic and social development because of the lack of water rights in the county).

J. Once we take into consideration the possible, even probable, durations of the Proposed Action and the two Alternatives, the differences among them are very slight. In fact, there are not real alternatives offered in this DEIS. A permit to mine simply degenerates into an almost permanent occupation of Copper Flat with a catastrophic economic impact on Sierra County and

an almost permanent and continual degradation of land, water, and wildlife habitat. The strange fact that NMCC proposed the Proposed Action and yet prefers not its own proposal but one of the other alternatives substantiates the minimal real-life difference between the choices offered the decision maker and the public.

K. Although federal mining regulations (43 CFR 3809.424) allow BLM to enforce a closure after 5 years of inactivity, enforced abandonment and final reclamation are not a fail-safe measure which might obviate BLM's obligation to anticipate reasonably all the contingencies of the Proposed Action and its so-called Alternatives. It is easy to use a rate of production of 3 months of operation every 5 years to calculate real time spans in centuries for the completion of the mining plans without ever requiring enforced closure and reclamation.

L. The probable rate of production at Copper Flat can be calculated in a way more sophisticated than the method used in C, F, and K above, and during scoping a stochastic study using Fibonacci numbers was requested of BLM to estimate the probability of the project's failure. In so far as this probability study was ignored, the present DEIS violates the Council on Environmental Quality's regulations for scoping.

M. The BLM may respond by saying that Themac has done 3 feasibility studies, including a "definitive" one in 2013. However, it is clear that a "can and will" test is different from a mining feasibility study, the needs and aims of BLM being different from the aims and needs of a mining company, though there may be overlapping interests. Whereas, the BLM needs to protect the environment while managing the land effectively, Themac is interested in investments. It can be seen clearly that the final feasibility study on which the highly intensive and supposedly short term of operation of Alternative 2 is based, aims to please investors who want to get a return on investment as fast as possible. Surely, this is not BLM's intent. What, then, are BLM's reasons for echoing NMCC's preference? Is BLM claiming that its preferred alternative is also the "environmentally preferred alternative" in spite of statements to the contrary?

N. The DEIS notes (2-87) that BLM can eliminate an alternative when "it is ...economically infeasible (consider whether implementation ... is likely given past and current practice; this does not require cost-benefit analysis or speculation about an applicant's costs and profits)." That is to say, BLM's determination of "feasibility" does not require consideration of NMCC's determination of feasibility ("applicant's costs and profits"). Furthermore, BLM can eliminate an alternative when "its implementation is remote or speculative." Thus there are NEPA provisions for eliminating all the proposals, when the past of Copper Flat is considered.

O. A Proposed Action that has no expectation of fulfillment is hardly a proposal. Alternative Actions that are only figments of imagination are no alternatives. An EIS that has no basis on a reasonable projection of reality cannot be a study of environmental impacts. "Oh, how long, Lord," *Psalm 13*.

Water in the DEIS

*Water, water, everywhere
Nor any drop to drink.*
S.T. Coleridge,
“Rime of the Ancient Mariner”

I. Introduction

NMCC’s need for water is absolute. No water, no mining, not the Proposed Action or the two Alternatives. Yet, the DEIS’s analysis of water availability and the consequences of using that water is severely constrained by self-imposed limits. Scoping comments produced 105 comments on water (1-12, 1-13), the single most important issue for people living in the region. Yet, the study deliberately ignores the most important impacts that could result from the mine’s water use because they are defined as subjects not of concern to BLM or too large for the EIS to address. The DEIS, thus, fails to encompass the large ramifications of water use in a desert environment, which, after all, is the purpose of the EIS.

Although water in New Mexico is governed by state laws and administered by the State Engineer (OSE), so that it may seem water is not within BLM’s purview, nonetheless, the BLM is required when considering an application for permit to mine to ensure compliance with applicable state laws. In addition, the OSE is officially a “cooperating agency” (1-8). The DEIS, then, has the opportunity to offer the public and the decision-makers a thorough study of the water issue.

II. Water Availability and Water Rights

NMCC’s modeling of the local aquifers gives assurance that the physical amount of water is sufficient for NMCC’s needs, even under the accelerated mining Alternative 2. Yet, the DEIS says (2-84) that Alternative 2 will consume 6,105 acre feet of water every year, and it also says (1-11) that NMCC has the legal rights to only 888.783 acre feet of water a year.¹ At this time, therefore, there is not enough legally available water to mine. This fact is a serious impediment to passing a “can and will” test which should precede the trouble and expense of an EIS. See my comment “Can and Will.”

The EIS disposes of this problem in a few paragraphs in section 1.6.3, which concludes with the erroneous claim: “The OSE will ultimately approve the availability of adequate water rights in accordance with the ongoing process described above.” But the OSE cannot approve

¹ The OSE’s offer of 888.783 af/a rights refers to groundwater rights. It does not cover the 304 af/a drainage water NMCC proposes to use (Table 2-11), which is surface water that NMCC does not have rights for, nor does NMCC claim to have those rights. Whether OSE will allow this extraction of public waters is debatable.

beforehand these water rights, and the BLM cannot guarantee such approval. NMCC's "ongoing process" to obtain enough water to mine is fraught with difficulties unacknowledged and un-analyzed by BLM.

NMCC's claims to 7,376 af/a are no longer only a matter of appeal before the OSE Hearing Unit (as stated on 1-11) but are being challenged by the State of New Mexico, through the OSE, in court in the Lower Rio Grande Adjudication. All of its claims are being challenged, so that the rights to 888.783 af/a may be lost. Nothing is certain.

The possibility of leasing or purchasing water rights involves a complex and costly transfer process which can include, and in this case, probably will include a public hearing where issues of physical availability, impairment, conservation, and public welfare will be decided. While NMCC may be able to prove physical availability, the modeling of the aquifer used in this DEIS shows that NMCC's water use will result in significant impairment to the Rio Grande River. For all of BLM's discussion of NMCC's conservation plans, the fact that all of NMCC's used water will be eventually evaporated into the air rather than flow into the aquifer as effluent means that all the water is not conserved but consumed totally thus violating the requirement to conserve water in the basin through adequate effluent release. The statement (3-305) that "[s]ome water used for processing and smaller mining-related uses ... is not renewable and represents an irreversible use of resources" is completely wrong. All water used at the mine becomes, relative to the availability of water in the basin, not renewable and represents an irreversible use of resources. The removal of this much water, roughly ¼ of groundwater used yearly in the county, will certainly bring up issues of public welfare in that the water is totally displaced from its local social and economic possibilities, leaving a wasteland in its wake.

Water marketing is not well developed in New Mexico. See Jeremy Oat and Laura Paskus, "Water Marketing in New Mexico," *Water Matters!*, 27, uttoncenter.unm.edu. Not only is water in this large quantity not always available, but when it is, the price can be very high, sometimes \$10,000 to \$15,000 per af/a. Can and will NMCC pay \$70,000,000 to \$100,000,000 to mine, more than the value of its claimed assets? See Themac 2015 Balance Sheets on the TSXV website, where Themac is shown to have a working capital (the difference between current assets and current liabilities) of negative \$56 million. Has BLM considered this?

Therefore, at this time when BLM must decide on the alternatives the DEIS offers, there is a certainty that the mine does not have enough water rights to operate, and there is a reasonable likelihood that it will not have enough water to operate in the future. The EIS process should not go forward until this problem is addressed and a reasonably realizable solution offered.

III. Consequential, Collateral, and Cumulative Impacts on Regional Water Balance

Sierra County is and has been an area of deficit water use; that is, the area needs more water than it has. Citing the 2003 Socorro-Sierra Regional Water Plan, the 2006 Sierra County Comprehensive Plan states,

The estimated water supply available to the two-county region, and the projected demand in the region were compared in the Regional Water Plan to determine a “water budget,” an accounting of inflows and depletions in the water system. Full satisfaction of all human and natural (evaporation, for example) demands would result in a net water deficit of about 77,900 acre-feet per year. Moreover, the water budget represents only the average annual budget—actual supplies vary from year to year. The Regional Water Plan determined that supply would fall short of meeting demand by 194,000 acre-feet in a low-flow year (calculated as the 10th percentile year, or year with annual flow lower than 90% of all annual flows measured over the long-term).

The DEIS nowhere acknowledges or takes into consideration this deficit condition as a baseline for water in the county. The mine’s water use, especially because the mine will produce no effluent, will increase that deficit. The loss is in perpetuity and irretrievable. The ability of this region to endure drought might be severely reduced even by small, permanent reductions of flows. In light of recent projections of frequent and prolonged droughts, reversing mistaken climatic ideas that were based on the last century’s uncharacteristically abundant precipitation, the judgments in this DEIS of the effects of small reductions of flows may need to be changed. See Toby R. Ault, *et als*, “Assessing the Risk of Persistent Drought Using Climate Model Simulations and Paleoclimate Data,” *American Meteorological Society Journal of Climate*, 27 (15 October 2014), 7527-7549.

For example, the lowering of flows in the Percha Box or in Animas Creek are said to be inconsequential, but given the water balance deficit and increased likelihood of prolonged drought, vegetation and wildlife might be seriously affected. The Sycamore trees of Animas Creek are said to be safe. Yet, anyone who has seen the way these trees grow splayed out from around a dead central trunk understands that these trees at one time died back during a drought and survive through suckers. Given the overuse of water anyway, a small decline of groundwater flow resulting from mine operation could kill the trees permanently in a severe drought. BLM’s analysis of water impact seems based on average flow rates, whereas desert ecosystems depend on critical, i.e., low flow rates. The effect of new climatic understanding, the effect of global warming, the effect of a continuing and worsening overuse of water in the area—are simply not figured into the DEIS analysis of water use impacts.

The concept of water balance in the region is left out entirely. The only use of that concept in the DEIS are the calculations of water quantity for the mine’s purposes and to show that after 100 years the Palomas basin will return to balance. Not seeing the mine’s use of water in the context of regional water balance seriously jeopardizes the long term future of the area. Continuing deficit use seems unstoppable if ignored in this way, and the irretrievable impact is a slow drying out of the region and a decline of life of all kinds.

IV. Water Rights

Already in 1982, the year Quintana mined Copper Flat for 3 months, the state perceived the region's deficit water use and declared the Lower Rio Grande a basin in order to regulate water use by controlling water rights. Since then, the OSE has administered water from Elephant Butte Dam to the Texas border as a fully appropriated basin, meaning that new water rights in this region were and still are restricted. All water in the basin is already spoken for. Yet, in the DEIS we find BLM proposing a major new use of water as if there were no scarcity of water, no difficulty for NMCC to acquire new water and new water rights, no dilemma for the OSE to simply add to the over-abundance of "paper" water which the Lower Rio Grande Adjudication struggles to reduce. What are the consequences of the BLM's actions on the State's efforts to manage its water problem rationally?

It should be made reasonably clear in the DEIS that the Proposed Action and the two Alternatives are proposals for consuming a large amount of a limited and dwindling natural resource, that using this water is an exercise of new water rights, so that the consequence of mining is also the consequence of creating new water rights. This creation has immense conflictual impacts. Consider that the reduction of flow in the Rio Grande River violates interstate and international agreements about the river water. If NMCC manages to get water rights, enough to operate the mine, it will need also enough water rights to off-set its damage to the river. Putting that flow back into the river will reduce water elsewhere. The result is a shifting of water distribution in ways not here calculated though they should be. And, there will be a net reduction of water available to satisfy needs, both human and natural, in the county. Correspondingly, there will be a net reduction of water rights available for use in the basin. This reduction of water rights significantly affects the socioeconomic life of the region in ways that can be catastrophic, yet the subject is ignored in the DEIS. See my comment "The Socioeconomic Section Gets a D."

While the subject of water rights is large and complex and while BLM might not want to touch the subject with a ten-foot pole, it is, nevertheless, of paramount importance to a study of the environmental impact of the proposal. The water rights for this project are being decided in New Mexico's District Court at present, but even more pertinent is that these water rights are part of a case pending in the United States Supreme Court: *Texas v. New Mexico and Colorado*.

Let the Fight Begin- TX v. NM



Discussing WaterRights, A Western Pastime

In 2014, the Department of Interior entered the suit as plaintiff joining Texas in asking that New Mexico prevent wells near the Rio Grande River, such as NMCC's production wells, from disturbing the flow of the Rio Grande River and reducing deliveries to Mexico, Texas, the Elephant Butte Irrigation District, and El Paso. While one branch of the Department of Interior, the Bureau of Reclamation, is seeking such redress, another branch, the BLM, is proposing exercising a large water right drawing hitherto unused water from the sources of the Rio Grande. Can such consequential, collateral, and cumulative impacts simply be ruled out of bounds in an EIS which is meant to be the basis of rational decision-making?

V. NMCC's Water Use

Given the scarcity of water, its non-renewable nature, and the difficult legal issue of water rights, the BLM should care that the DEIS treats with accuracy the issue of how much water NMCC needs to mine Copper Flat. Section 2.1.7 Water Supply deals with that subject, and it begins with the statement, "...Copper Flat mine would implement best management practices (BMPs) to conserve this valuable resource." The declaration is typical in Chapter 2 in that many sentences use this verbal auxiliary "would" to indicate that what is proposed is NMCC's intent and not BLM's requirement. NMCC intends to use BMPs, but it is not required by BLM to do so. In that respect, the whole section is understood to be NMCC's projections of water use without BLM's intervention, and this uncritical adoption of NMCC's MPO results in a fatal flaw in the discussion of water quantity.

Table 2-9 claims that "[a]verage water used to process 1 ton of material" will be 633 gallons. Upon this single unreferenced and unquestioned claim, all of the discussions of water use in all the mining alternatives are based, as are all of the projections in the aquifer study, and all analyses of the impact of water use. We intend here to look more closely at what this quantity means. Is it sparing, or is it extravagant? Reasonable or ridiculous?

In the Proposed Action, mining 17,500 tons of ore a day will result in 6.39 million tons of ore a year. Using the 633 gallons processing water per ton of ore means that the 6.39 million tons of ore will require, on the average and in one year, 12,400 acre feet or 4.04×10^9 gallons of processing water.

How much copper will be extracted from this ore? The 2013 *Definitive Feasibility Study of Copper Flat* is summarized online by Themac on its webpage. It claims that Proven and Probable Mineral Reserves will total 113 million tons of ore at a grade of 0.30% copper and Measured and Indicated Mineral Resources will total 305 million tons of ore at an average grade of 0.23%. The ore body, then, has an average grade of about 0.25%.

Therefore, 6.39 million tons of ore a year on the average during production will produce 16,000 tons/year or 32 million pounds of copper a year [6.39 million tons/year x 0.25%]. Since this copper is produced by using 4.04×10^9 gallons of water, NMCC on the average will be using 126 gallons of process water to produce 1 pound of copper.

Of this 126 gallons/lb cu use, some part is reclaimed water and some of it is new water. Using Table 2-10, the amount consumed yearly is 4,274 af and the total used is 13,370 af; that is, 4274/13370 or 32% is the portion of water used at the mine that is completely consumed on the yearly average and must be replaced by new water. Therefore, of the 126 gallons of process water used to produce 1 pound of copper, 32% or 40.3 gallons must be new water. NMCC projects a water usage rate of **40.3** gallons/lb. cu.

Below is a survey of water usage at large Arizona copper mines taken from Dr. Madan M. Singh, Director of Arizona Department of Mining and Mineral Resources, "Water Consumption at Copper Mines in Arizona," Special Report 29, December, 2010:

Water Use (Gallons) per Pound of Copper

Mine	2004	2005	2006	2007	2008	Average
Bagdad	24.0	23.8	23.4	23.9	23.8	23.8
Miami	64.0	53.6	66.9	61.9	65.2	62.3
Mission	27.3	36.4	24.1	24.1	26.8	25.0
Morenci	4.5	4.6	5.3	5.8	6.5	5.4
Ray	18.5	18.8	23.1	18.6	24.0	20.6
Sierrita	55.7	58.5	53.8	58.0	47.1	54.6
Silver Bell	7.9	6.3	7.2	6.3	5.6	6.7

Projected Use

Rosemont	7.4
Safford (Dos Pobres)	7.5

A comparison with NMCC's 40.3 gallons shows us that unlike the newer mines (Rosemont and Safford) and unlike Morenci where extensive water saving methods were instituted, Copper Flat will use water in the order of magnitude of Miami, an exhausted mine using older technology, and Sierrita, which has about the same very low ore grade as Copper Flat. The 633 gallons/ton figure is clearly excessive.

These numbers do not indicate any best management practices. With BMP one would expect a number similar to Morenci, Silver Bell, Rosemont, or Safford. Indeed, Dr. Singh says,

Fresh water consumption at the concentrator plant is around 200 gallons/ton of ore [a bit higher at Copper Flat]. If recirculation is maximized, leaks are avoided, the water use may be optimized to about 90 gallons/ton of material, as has been shown to be possible in some plants in Chile.

That is to say, BLM should want NMCC to use less than half or even a third of the water it claims it needs. This is a cavalier treatment of a supremely important issue in this study of environmental impacts.

BLM should note that NMCC is participating in updating the state wide regional water plans, and it seems to have self-reported its water needs as only 2,000 af/a. See *Socorro-Sierra*

Regional Water Plan (January 29, 2016, draft), Table 6-5, Projected Water Demand, for year 2020.

VI. Water and the Mining Alternatives

The DEIS's Proposed Action, upon which is based the previous discussion of water use, is a fictional construct. Every time the DEIS says that NMCC "would" do something, it does not mean that NMCC intends to do it, because NMCC is actually proposing Alternative 2. In fact, NMCC intends, if permitted, not to do it. Since water use under Alternative 2 is much greater than in the Proposed Action, BLM's concern for water conservancy and mining's impact on water in the basin seems minimal. The BLM has not proposed a mining alternative which lessens the extravagant water use. In terms of the single most important issue for permitting mining, the extraordinary increase of water use locally and the consequential depletion of water supply, the DEIS offers decision-makers only a choice between extravagant, more extravagant, and most extravagant water use. And among these choices, BLM, following NMCC, prefers the most extravagant choice, the one with the greatest environmental impact upon a scarce and valuable non-renewable resource.

Why does BLM favor this extreme choice? The DEIS says that increasing the intensity of mining increases efficiency. This is surely true since the equipment will be used maximally. But efficiency is here measured in terms of NMCC's cost analysis. Efficiency equals greater profits for NMCC. The NEPA does not mandate such a consideration in an EIS. In the NEPA process, the BLM's focus should rest on impacts upon the human and natural environment, in this case on the unwarranted and inefficient use of water according the NMCC's plan of operations.

If BLM is to offer a choice of mining alternatives, it must offer an alternative with less use of water, and it should prefer that choice unless good reason is given in the EIS not to choose a less detrimental alternative, one which attempts to prevent damaging effects on the water environment.

The Socioeconomic Section (3.22) gets a D

I. Introduction.

The Draft Environmental Impact Study [“DEIS”] analyzes the socioeconomic impact of the proposed mining action without recognizing the fundamental social and economic value of water. It does not apply an interdisciplinary approach that brings together physical nature and human life. The Council for Environmental Quality mandates that approach under the NEPA when drafting an Environmental Impact Study [“EIS”]. Instead of following this required approach, the DEIS substitutes a pro-mining bias for objectivity. This substitution promotes a completely inaccurate narrative of the socioeconomic situation of Sierra County. It misinterprets data, makes unsupported claims, and it presents false facts.

II. Mistakes, Misinterpretations, and Myth

Section 3.22.1.5.3.2 *Continuing Education* uses numbers derived from U.S. Census Bureau data erroneously, negligently, and irresponsibly. The DEIS cites these numbers in the text and in Table 3-68. The source for these numbers is given under the Table: “U.S. Census Bureau, 2006-2010.” Apparently, the reference is to the American Community Survey’s intercensal 5-year estimates for 2010. Below is the portion of that document the DEIS used for the Hillsboro CDP:²

	Estimate	Estimate MOE	% Estimate	% Estimate MOE
EDUCATIONAL ATTAINMENT				
Population 25 years and over	183	+/-222	183	(X)
Less than 9th grade	143	+/-190	78.1%	+/-23.5
9th to 12th grade, no diploma	25	+/-38	13.7%	+/-28.9
High school graduate (includes equivalency)	15	+/-25	8.2%	+/-6.7
Some college, no degree	0	+/-127	0.0%	+/-18.4
Associate's degree	0	+/-127	0.0%	+/-18.4
Bachelor's degree	0	+/-127	0.0%	+/-18.4
Graduate or professional degree	0	+/-127	0.0%	+/-18.4
Percent high school graduate or higher	(X)	(X)	8.2%	+/-6.7
Percent bachelor's degree or higher	(X)	(X)	0.0%	+/-18.4

² American Community Survey, 5-year Estimate, 2006-2010, Selected Social Characteristics in the United States (DP02),



Adobe Acrobat
Document

Hillsboro CDP, New Mexico:

For the Hillsboro CDP (Census Defined Place), the 5-year estimates are based on a very small sampling, resulting in very large Margins of Error (MOE), as can be seen in the USCB document. Thus, the DEIS claims (3-250), “About 78.1 percent of the total population in the Hillsboro CDP has less than a ninth-grade education.” However, the USCB document shows that the estimate of 143 has a MOE of +/-190, effectively making that estimate meaningless.³ Furthermore, the DEIS prefers to use the percentage estimate which has itself an additional, non-statistical MOE of 23.5%.

Similarly wrong are all the numbers in Table 3-68 on the educational levels in the Hillsboro CDP, in Sierra County and in the state of New Mexico. The Table shows High School Graduates in the Hillsboro CDP at 8.2% (or 15), but the USCB estimated 15+/-25. Even if this wide MOE does not render the estimate meaningless, the estimate refers to people with the maximum educational “attainment” of a high school degree; it is not the number of “High School Graduates,” as the Table indicates. The DEIS says Hillsboro CDP has 0% people with Bachelor’s Degrees, but the USCB estimated 0+/-127 people with BA degrees. The USCB declines (X) to give an estimate of the number of people in the Hillsboro CDP who have high school or higher attainment in education, that is, the total number of high school graduates in the area. USCB statistics for Sierra County also differ radically from the numbers given in the Table: 83.9% high school graduation and above compared to 37.3% in the Table (the estimated percentage for those with only high school degrees) and 21.1% instead of the Table’s 16.8% for bachelor’s degree and higher.⁴ Not only are USCB’s estimates completely misunderstood and misused, but the DEIS does not even use available current (2014) estimates or cite the actual 2010 census count which shows Hillsboro CDP with a total population of 124 (compared to the Table’s 183 persons above the age of 25).

These egregious mistakes show a serious ignorance of statistics and an astonishing negligence in reading USCB’s explanations of its use of data. Significantly, the DEIS compounds these errors by relying upon this lack of understanding to conclude that “[t]he relatively low levels of educational attainment and technical skills in Sierra County have provided challenges to attracting employers to the area” (3-250). There is no evidence from prospective employers that the low educational levels of prospective employees prevented these potential employers from moving to Sierra County. Furthermore, a brief glance at Table 3-68, if it is creditable at all, shows that Sierra County’s high school graduation percentage is markedly higher (by 37%) than the rest of New Mexico. Considering the actual USCB figures, 84% high school graduates in Sierra County and 83.6% in New Mexico, the factual basis for such a statement is entirely absent. More importantly, however, the study’s own evidence indicates an entirely different story.

Yet, the notion that Sierra County’s poor economic status results from the low capacity of its poor residents forms the cornerstone of this study’s narrative: because citizens of Sierra County are uneducated bumpkins, businesses will not come here. Life in Sierra County is

³ The USCB defines its Margin of Error as a 90% chance that the correct estimate is between the lower and upper limits of error. In this case, there is a 90% chance that the number of Hillsboro CDP residents with less than 9th-grade education is between 0 and 333.

⁴ American Community Survey, 5-year Estimate, 2006-2010, Selected Social Characteristics in the United States (DP02), Sierra County, New Mexico

hopeless. And now the mine is coming to bring desperately needed jobs and so will brighten the whole County: a completely false narrative of the County's economic and social condition.

III. The Actual Socio-economic Situation in Sierra County and the Basis for This Situation

What follows is a more realistic description as an alternative to this myth. It is one based upon the statistics presented by the DEIS itself. Unemployment rate has been historically low in Sierra County. In 2010, it was 6.8% (3-239) at a time when the national rate was 9.6% (a comparison ignored in the DEIS), thus significantly lower, perhaps one of the lowest in the country at the time. Thus, the county does not, statistically speaking, desperately need jobs. The most probable reason companies choose not to move to the county is because there is no evidence of a local employable workforce. One can conclude that from the fact that during the construction of the Spaceport, only 10% of the workforce was local (3-242).

Tables 3-58 and 3-59 show the workforce and the actual employment growing in the 2000-2010 decade in Sierra County, again by a wide margin above similar growths in the state. The economy, in fact, is growing at a very healthy rate. Table 3-61 shows a per capita personal income increase of 63.2% for the decade, almost double that of New Mexico. It is true that the workforce grew faster than the employment (by 133) but this difference is accounted for by ten years of resident children growing into adulthood and joining the labor force.

The reason the county employment situation is not dire, as the study claims, is because Sierra County has been historically a retirement area for working class people. It has a high percentage of older workers preparing for retirement, retired people, and people living on other types of fixed incomes, disability pay for example. Table 3-55 shows the distribution of population by age. Sierra County shows an abnormal distribution curve, an upside-down pyramid, just the opposite of the normal curve we see in New Mexico. The distribution for Truth or Consequences, where most the jobs are, is more normal, but still quite distinct from that of NM. Overall, in the county, the older population far exceeds those of working age.

The county's income level (Table 3-61) is totally commensurate with the high density of fixed low-income residents, and the whole social and economic structure of the county is determined and conditioned by that fact. People move to Sierra County primarily because housing (among other things) is cheap (see Table 3-57). Their low income level, typical for fixed income groups among the working class, fits the low demands on their income.

There is a suggestion in the study and repeated in the DEIS Hearing in Truth or Consequences (December 17, 2015) that the county is experiencing an outward migration. Within the false narrative the study proposes, that fact becomes a sign of the need for jobs and development. It is true that there are a few local anecdotes of the young leaving home because they cannot find jobs. Significantly, the number of such "outward migrants searching for employment" is in reality so insignificant as not to appear within the statistics. Young people leave to go to college and find jobs elsewhere. It is a historical trend and a condition of life in

small town America that cannot and perhaps should not be reversed. Perhaps, some vocal parents are anxious to keep their children from leaving home and experiencing the larger world, but that personal preference should not affect the EIS. In fact, there is absolutely no evidence of a significant “outward migration.” Between 2000 and 2010, the county lost 1,282 people (Table 3-53). But in the same decade over 2,000 people died in the county (Table 3-56 shows 705 deaths in three years, or 2,350 in 10 years). Since deaths outnumbered births by 1,353 (because the population of Sierra County is older), the population loss does not provide any evidence at all to support “outward migration” and the need for new sources of local employment in order to retain residents.

The sole evidence for “out-migration” took place in 2012-2013. That was when New Mexico Copper Company [THEMAC] cut back on its exploration operations at the mine and at the same time Spaceport America finished construction. If the “out-migration” is a detriment to the county’s social and economic wellbeing, what happened in 2012-2013 foreshadows the future of Sierra County if NMCC’s Copper Flat Project is permitted to commence mining operations. Every job NMCC creates in Sierra County will result in a corresponding loss of work and unemployment 12 years later (or sooner if the mine shuts down early). The reality—in contrast to the fantasy spun in the socio-economic section of the DEIS—is that an exodus from the county will be the consequential impact on employment (and tax revenues) for the county under the Proposed Action or either of the proposed Alternatives. If “out-migration” were a real problem, having a mine in Sierra County, rather than solving that problem, merely pushes it off into the future. If the duration of mining operations is intermittent, as one may reasonably expect based upon NMCC’s own representations, then job-loss, unemployment, out-migration will occur repeatedly with a consequential undermining of the stability of employment, economic growth and revenue for Sierra County. Rather than promoting such a “boom and bust” future for Sierra County, the Bureau of Land Management is charged to protect the citizens of this County and the State of New Mexico from such an outcome.

Of course, job creation is welcome—but Sierra County is not in the desperate situation that the study depicts in order to project the alleged benefits a mining operation will bring. Sierra County is on a steady and sustainable growth curve that is severely threatened by the massive impact upon County infrastructure (roads, bridges, electric power sources and lines, houses, schools, hospitals, emergency workers) from the sudden introduction of a thousand new workers and their families for mine construction and operations.

The first primary impact upon the local economy will be on housing. Any increased demand for housing in the present environment will raise costs. This inflation benefits landowners, but is detrimental to fixed income renters, who make up a large part of the population in the County.

The rosy picture painted in DEIS Section 3.22.2.1.4 is based, as is so much of this study, on questionable data. The number of people needing housing is reduced drastically by accepting NMCC’s “anticipation” that it can hire 70% of its workforce “locally.” The figures the study cites on the small percentage of local workers at the Spaceport project, the low unemployment rate, etc. all indicate that if NMCC succeeds in its plan, it will rely on massive “cross-overs,” i.e., people who drop one job to take another. That, in fact, is yet another negative economic and

social impact completely neglected in the DEIS. If NMCC does not have a reasonably long-term success, the inflow to the county will be much larger than the DEIS's estimation of 120-270 individuals during operation (assuming the unrealistic durations of operation proposed).

Given that an adequate EIS under the Council on Environmental Quality guidelines must estimate the maximum reasonable direct, consequent, and cumulative impacts of the proposed action, inflow should be calculated at 100% of the mine's labor force. Using the total labor force of 270 for Alternative 2 (Table 2-26), and the family size of 3.13 (p. 3-263), the maximum possible increase in county population is 845 (or a 7% increase). This substantial increase in population with the consequent increase in cash flow in the county is a red flag for inflation in cost of living. This will have a serious deleterious impact upon persons living on fixed incomes and persons whose disabilities make them permanently unemployed. Moreover, the County will be forced to deal with these adverse direct, consequent and cumulative socio-economic impacts upon a very large segment of the population of Sierra County who will lose their homes with a consequent loss of revenues to the County at the same time as the County will need to deal with the impacts of homelessness, increased need for social services, and the undermining of the property tax base which supports local schools.

Given the BLM's promotion of an inaccurate and false description of social and economic conditions in Sierra County, this DEIS leaves unanalyzed potential adverse economic impacts on Sierra County from the NMCC mining project. This failure violates the NEPA and, if uncorrected, would profit a foreign enterprise at the expense of the human welfare of citizens of the United States.

IV. Seeing the Future with IMPLAN

IMPLAN is a non-survey computer program for estimating economic impacts within a geographical/economic region. Instead of surveying what businesses and other economic agents in a geographical area actually do on the ground, it utilizes an enormous compilation of economic data from each area, in units as small as a county or a zip code area. Using this historical data it generates for any desired area an Input/Output (I/O) economic model of all economic transactions (an exchange of values: money for commodities or services) following the flow of money so that each transaction is at once an output and an input from one agent to another, or on a higher level, from one industry to another. It creates this model on the basis of the standard categories of industries (440) and adds the government and households as additional agents of transactions. Using the relative proportions of these exchanges between agents within an industry and also the relative proportions of these exchanges among the different industries, IMPLAN can estimate the effects of an economic change within one agent upon the whole economic system modeled. The resulting impacts are not exact, being based on estimates, and they are not predictive of the future economy, only the hypothetical impact within a historically modeled economy given a hypothetical change in a given economic agency: "IMPLAN doesn't make any projections into the future; IMPLAN estimates the economic impact activities by looking backwards through the economy to see what goods and services support an economic

change based on how the economy has performed in the past (Scott Lindall, CEO of MIG, “Introduction to IMPLAN v 3,” training video, Implan.com website).

Since the BLM participated in developing this computer modelling program in the 1980s, the way IMPLAN is described, used, and interpreted in the present DEIS is disappointing. For example, the program, adapted to the region and altered to accommodate copper mining, apparently predicted that \$15.9 million would be spent into the local economy in 2014, etc. (3-258). However, Themac’s cash flow for the past 5 years does not indicate where this money could have come from.⁵ Did the predicted expenditures actually take place? Is there evidence in 2014 from the tax records that the county increased its economy by that amount? That is, where is the verification of this computation that would give confidence in the accuracy of the modelling?

The economic impact tables generated by IMPLAN show very large numbers, for example, Table 3-82, where we see that for Alternative 2 NMCC is expected to create 3,440 Direct Effect jobs and a combined Total Effect of 5,218 jobs. A reader-- a member of the public or a decision maker-- might be impressed with that expansion of job opportunities in a county the size of Sierra County (with a population of 12,000).

However, IMPLAN operates on a yearly basis because it uses a balanced accounting principle. The I/O model is also called an I/O account. Thus a certain input of capital by NMCC in any given year will produce value that results in a certain number of hirings that year. To arrive at the fabulous figure of 3,440 jobs, BLM ran the computer for each of 12 years. Each year the number of employees NMCC expected to have was entered into IMPLAN (the average was 287), and all the numbers entered were summed to give 3,440. Thus 3,440 jobs are really 287 jobs multiplied 12 times, and they are not even IMPLAN’s calculation but the data BLM entered. IMPLAN’s “employment” counts *job years* not jobs. While any economist would understand the need to use a time dependent notion of employment, the DEIS consistently misleads by confusing “jobs” with “job years” resulting in misstatements like “Alternative 2 would create almost 1,300 more direct jobs than would the Proposed Action; and almost 1,900 more direct, indirect, and induced jobs overall” (3-269). These claims are like thinking that a plumbing job that is estimated to need 10 man hours to complete will require a 10-man workforce. In addition to making IMPLAN numbers into smoke and mirrors, statements like the one just cited turn IMPLAN’s I/O model into a crystal ball.

A further problem with the use of IMPLAN in the DEIS is the time frame used for the study. The DEIS acknowledges (3-257) that copper mining is subject to copper price variations, but it refuses to take them into consideration. Thus it inputs into IMPLAN the completely improbable time frames of the Proposed Action and the two Alternatives. See my comment “Can and Will” for a discussion of that improbability. The resulting model calculated by IMPLAN can only be as improbable as the assumption that the mine can and will operate for 16, 11, or 12 years continuously. The last sentence of 3.22.2.3.5 says it all: “... the economic impacts of copper mining are still tied to the global price of copper and the potential interruption

⁵ See Themac Resources Group (MAC), Cash Flow, on the TSXV Exchange website, http://web.tmxmoney.com/financials.php?qm_symbol=MAC&type=CashFlow&rtype=A

or termination of copper mining still exists; the magnitude of any potential collapse would therefore also be more severe” (3-270). The sentence is quietly hidden away at the end of the section on Direct Taxes, and its truth has generated no economic impact analysis.

The fact that IMPLAN estimates impact annually shows how distorting was BLM’s decision to use a continuous time frame. If one thinks of mining as intermittent-- let us say for an example, that Alternative 2 runs every other year for 24 years-- then every year of positive employment is followed by a massive layoff. NMCC spends into the economy a certain sum the first year to hire 287 employees. The next year it withdraws that amount from the economy by reducing its expenditures by the same amount. Employment will that year fall by 287 jobs. Over 24 years, if we sum up job years, we will have in Sierra County a net employment of 0 job years, which are 0 jobs. Value Added to Sierra County’s economy will probably be negative.

The impression that IMPLAN is misused and its results misinterpreted or misrepresented grows as one becomes familiar with the program through the company’s (MIG) website, its Instruction Manual, the USDA’s “Guidelines for Economic Impact Analysis with IMPLAN” (Technical Note 200-ECN-2, 12/5/2014; USDA wrote and developed the original IMPLAN programs in the 1970s), and other publically available academic explanations of IMPLAN. As with all computer modeling software, accuracy or even proper functioning depends on boundary conditions. The DEIS gives an account of “leakage” (3-257) but does not seem to recognize its significance. “Leakage” is the amount of economic value that leaves the region under study. Eventually, all of the value inputted into the region will leak out through the boundary (“Eventually these leakages would stop the cycle,” 3-257). It is the cycling and recycling of economic value within the boundaries of the study which generate the “multipliers,” the induced impacts (that is, the collateral effects of an insertion of value by the mine’s activities into the region’s economy).

Sierra County’s economy occupies a very low rung on the ladder of manufactured value. It does not produce many things that are wanted elsewhere. Instead, Sierra County’s money goes up the production ladder in exchange for things that others produce elsewhere. Sierra County is a consumer economy. It imports everything: clothes, food, most building materials, furniture, appliances, tools, cars and trucks, many kinds of medical services, education, etc. The principal exports are agricultural products and money. “Leakage,” therefore, is very great, a veritable open pipeline, and so the cycling of value stops very quickly. One must assume that IMPLAN compensates for this situation in its algorithms. However, in the DEIS the BLM customized IMPLAN to fit the copper mining situation (3-259) and has used “national per-worker values for the copper mining industry.”

Nationally, a great deal of cycling and recycling take place before values created by the workers leak out of the national boundaries. Applying such “multipliers” to Sierra County misuses the IMPLAN model. The statement applying the general notion of multipliers to Sierra County is a fantasy (3-260): “local retailers... recycle money within the local economy,” No, Sierra County retailers mostly must buy goods from outside the county. Sierra County exports cash, and that is one of the problems with its economy. Of course, a small part of County expenditures pay for wages that are spent in the county, but the larger part disappears almost

instantly. Unwittingly, the DEIS states the error of its own methodology: “Purchases by NMCC and its employees outside of Sierra County are not represented here” (3-260).

This boundary problem with applying IMPLAN is exacerbated when one considers that most of NMCC’s employees will be coming from outside the county (see Part VII, below). Will these workers drive 2 hours to work, work 8 hours, and look forward to driving another hour to go to Truth or Consequences to shop before the now 3 hour return drive over the mountains back to Silver City? Under the BLM’s assumptions, on weekends, these Silver City residents will eschew Silver City merchants and drive over the mountains to shop in Truth or Consequences--the only place to shop in Sierra County. This fantasy is based on the erroneous assumption that 70% of the workers will live in Sierra County (3-260), whereas, NMCC clearly states (and BLM repeats) that 70% of the workers will commute 2 hours from 73 miles away. NMCC and BLM both say that is “local” yet refrain from saying that this is from within Sierra County, because they know that it is not. Only one locus of population exists 73 miles from Hillsboro and takes 2 hours to drive that distance: Silver City--which is outside Sierra County. Perhaps in Silver City the statement that “[t]here is a larger multiplier effect associated with the consumer spending of workers directly supported by mining operations” (3-260) actually applies. It certainly does not apply to Sierra County. This highlights another deficiency in the DEIS: it fails to take account of the larger cumulative impacts of the project by failing to address the direct, consequent and cumulative impacts of the Copper Flat Project upon areas in New Mexico outside Sierra County--and that applies to all reasonable environmental impacts, not just the socio-economic ones.

Central to the boundary problem is DEIS’s selective application of the fundamental economic principle of circulation. This principle is invoked correctly in explaining the recycling value behind the notion of multipliers, even though the multipliers actually used seem exaggerated for Sierra County. But the circulation of value in the larger economy is either neglected or deliberately ignored. NMCC expects to input a large amount of capital into Sierra County (Tables 3-71, 3-78, 3-81). The reader might imagine that like water poured into a half-full glass, the amount of water (value) in the glass (Sierra County) is increased. IMPLAN is used to show that the pouring creates ripples and disturbances and activity in the glass. But following the principle of circulation, the authors should but do not consider where the input value comes from. It must be extracted from the larger economy, thus diminishing it. NMCC is not “creating” jobs because it did not “create” the initial value that pays for those jobs. There is simply a transfer of already created value and hypothetical jobs. IMPLAN cannot estimate whether that transfer is socially beneficial or detrimental.

Imagine a bath tub of water (the larger economy) at the bottom of which is the shot glass of Sierra County. NMCC dips a ladle of water out of the tub and pours it back into the tub, aiming at the submerged shot glass. The DEIS seems to claim that the water and the ripples all go into the glass, but it gives no evidence of it. Copper mining is an international business. The mill and its equipment that Quintana installed at Copper Flat in 1981 were sold and moved in 1986 to Papua New Guinea. Themac (NMCC) is a Canadian company, founded and owned almost entirely by an Australian family. NMCC plans on shipping the copper concentrate to Germany or Mexico for processing. The DEIS with all its fudging of boundaries in applying IMPLAN gives no assurance that the County’s natural resources of copper and water, forever irreparably and irretrievably lost to the County (in spite of the statement on 3-305 that the copper

itself can be recycled and thus not lost) is a fair exchange for the ladle of water NMCC plans to pour back into the larger economy. This is a question of environmental justice not faced in the DEIS: that mining by the Proposed Action or by either Alternative might result in an unbalanced flow of value upwards and outwards, leaving Sierra County with no natural resources, relatively small economic benefits, and many potential problems, while the money flowed out of the region and out of the country.

BLM's ambiguity on boundaries is reflected in the confusion in customizing IMPLAN to fit the chosen region of impact, that is, Sierra County. Because copper mining is not an industry that IMPLAN recognizes in its database on Sierra County, the new industry algorithms are derived from national figures, and NMCC's expenditures of \$1.5 billion for Alternative 2 during operation (Table 3-81) are entered into IMPLAN and should result in a 1 to 1 Direct Effect shown in Table 3-82 (with taxes discounted).⁶ Table 3-72 defines "Direct Impact" as "[t]he set of expenditures applied to the predictive model (i.e., I/O multipliers) for impact analysis (i.e., a \$10 million dollar order is a \$10 million dollar direct effect)." What can NMCC buy in Sierra County for \$10 million? The text acknowledges that most of NMCC's expenditures, like most its employees, will be out of County, yet these total expenditures for goods and for labor are entered into IMPLAN to be multiplied by multipliers to produce the "Indirect Effects" and the "Induced Effects." NMCC will import into Sierra County (using a foreign trade analogy built into IMPLAN) production materials of great value bought outside the region, and it will consume those supplies in producing copper ore concentrate. The value of that concentrate is shipped out of the County, exported as an output (an important IMPLAN category missing in the DEIS tables explaining IMPLAN results). Tables 3-75 and 3-79 show all of NMCC's costs besides taxes and "Labor Income" as "Value Added." But this is not value added to the County economy. It is the value of the copper concentrate with the workers' compensation taken out. It is the profit that goes out of the County along with the most of the costs of production that is spent elsewhere to buy supplies to import. The DEIS gives the impression that the boundary condition is transgressed. The reader cannot tell if this is a confusion in using IMPLAN or a confusion in explaining IMPLAN.

Table 3-72 further defines "Indirect Effects" as "[e]xpenditures within the study region on supplies, services, labor, and taxes" (emphasis added). This definition causes confusion. Are the 192 job years in Table 3-75, (only 11.3 actual jobs) the mine labor that NMCC intends to buy "within the study region" (as the definition says) or are they the non-mine job years IMPLAN estimates will be created out of the 2,165 job years that NMCC intends to buy, even though most of these are filled by employees from out of the study area? A similar confusion exists in the indirect employment numbers for the operational phases of Alternative 1 (168 job years or 15.3 jobs) and Alternative 2 (273 job years or 24.8 jobs).

If the indirect jobs are in fact generated by IMPLAN, there is a further problem. In the normal, uncustomized use of IMPLAN, the Indirect Effects are those that result from

⁶ In fact, the "Economic Activity" directly resulting from the \$1.5 billion expenditures is listed as \$1.7 billion in the Table. There are other discrepancies. The impact table for the operational phase of the Proposed Action (Table 3-75) shows 2,165 job years or 127 jobs on average, 75% of the workforce projected in Table 2-7, presumably Sierra County's portion of the workforce. But Tables 3-79 and 3-82, the impact tables for Alternatives 1 and 2, show a workforce over 100% of projections in Tables 2-18 and 2-26. No explanation is given for these different treatments nor for the shift in language from "Value Added" (Tables 3-75 and 3-79) to "Economic Activity" (Table 3-83).

transactions between the industry studied and all the other industries in the area. Since, these transfers do not exist for copper mining in Sierra County they must be projected by using a national average, or they must be based on vague claims of intention.

Lastly, in Table 3-75 the “Employment” for “Induced Effect” is given as 985 job years, and that is defined in Table 3-72 as “[m]oney that is respent in the ROI as a result of spending from the indirect effect.” 11.3 workers are going to spend in 17 years their total income of about \$7 million to generate \$55 million worth of additional value for the County? It sounds like magic. That would suggest a multiplier factor of 8, a very extraordinary multiplier which normally is between 1.5 and 2.5. Rather it is more likely that the Induced Effect is the result of Direct as well as Indirect Effects, and BLM simply did not understand IMPLAN.⁷ If it is that, then the 985 is based on employee spending outside the region and so inapplicable. It’s a mess either way.

The very small economic region that is Sierra County coupled with the introduction of a new industry gives IMPLAN, a data driven program, very little to work with statistically. As an example of the problem, imagine an economic region of study which has only a steel plant in it. Try modeling the effect of building a screw factory next door. All the workers commute. There are no stores. All value that is imported into the region is exported except for the physical plants. The only impact depends entirely on whether the screw factory buys its production material (steel) from the steel plant or imports it from outside the region. IMPLAN, not being based on economic surveys of the region, cannot know how much the new plant will buy from the old one and will have to use some national data to estimate it. The results would be totally unconvincing.

To evaluate properly the impacts of the Copper Flat Project, an alternative calculation is necessary. It must be based on the dollar value of water, that is, based on potable water having a necessary social and economic value measurable in dollars and cents.

V. Water Rights, Copper Flat Mine, and Sierra County’s Economic Growth

Three facts about water will determine the long term economic future of Sierra County:

1. Water belongs to the people of New Mexico.
2. One gets the right to use water by putting it to a beneficial use, then that is perfected by continuous beneficial use and becomes a private property right, to sell or to pass on to others.
3. Beginning in 1982 the people in Sierra County and Doña Ana County claimed more rights than there was water, so except for special set-asides, there’s been a freeze on

⁷ In this regard, the weaknesses in the use of models such as IMPLAN are starkly highlighted: models do not produce an economy--real people acting day-to-day in the real world do. Not only are such models susceptible to GIGO (“garbage-in-garbage-out”), but the way in which such models are interpreted are also susceptible to GIGO--and that is what is happening here with the BLM’s use of IMPLAN.

granting water rights in this region. Water rights are limited, and one cannot use more water than one has rights to.

Whatever Sierra County may choose to do, the economic future is limited by these facts. The social and economic prospects of the people in this county are water dependent and also water rights dependent. Economic growth is limited, a fundamental fact unmentioned in this presumably thorough socioeconomic study.

Now there is a new “fact.” NMCC claims to have discovered a new geological source of water. See 3.6. Modestly called “inferred paleochannel” on Fig. 3-9, it is aggressively entered as a quantified parameter into the computer modeling program in Table 3-18, and it brazenly appears in Figure 3-12 as a geological feature even though its straight north-south swath looks rather unnatural. The so called Palomas Graben could supply a great deal of water, over 7,000 acre feet a year--or over 2 billion gallons a year (2,000,000,000 gpy). NMCC wants the rights for all of it.

If that water is there, it belongs by law to the people of Sierra County, to use in the future for economic and social well-being, for development. Anyone could get rights to that water by using it beneficially. It is the future of Sierra County beyond the limitations Sierra County and the entire Lower Rio Grande Basin and Outlying Areas now live within.

The County in general is competing with NMCC and all other potential claimants for the rights to use this water. That should be clear to everyone, even if NMCC and BLM are careful not to say it in the DEIS, which is a major omission from that document.

The BLM says mining will bring the county 300 jobs for 12 years if NMCC gets the rights to that water. To a computer running IMPLAN, multiplying the actual jobs by the number of years and then by another “multiplier” as money circulates around and around the region, 300 jobs seem like economic development. However, given the 3 facts about water and water rights above, the trade seems more like economic stagnation.

Even though jobs are much more than dollars and cents, they have been turned into numbers in this DEIS. Here is a different conversion:

A gallon of water costs about \$1 at Walmart. So 2 billion gallons a year is \$2,000,000,000 every year, a market value. That is the value of the county’s possible future economic growth if it uses the water properly. That value would pay for 20,000 permanent jobs with salaries of \$100,000 per year. If someone puts up a water bottling company, that would be the gross profit every year. If the county doesn’t manage its water asset properly, let us say if the county gets only 1/10th of that value out of the water, the water value yearly would be \$200,000,000 or enough to pay for 2,000 permanent jobs paying annual salaries of \$100,000 each. Enter that into IMPLAN and see how much it comes up with after multiplying by multipliers and an infinite number of years. Should the county give this future economic growth to NMCC in exchange for the promise of 300 jobs paying much less and lasting only 12 years? That is the basic cumulative socioeconomic question the study on impact must address because the impact of one is the negation of the other, yet that comparison is completely avoided in this study.

Since economic growth, like life itself, is not just talk and desire, but is founded on water, a possible 2,000 permanent slow growth jobs in Sierra County is better for a developing economy than a possible boom and bust 300 jobs for 12 years.

In addition, the water used at the mine is not allowed back into the ground to refill the aquifer, unlike the water we all use. NMCC will permanently deplete the groundwater and thus harm the economic possibilities of other users, which surely is another negative impact of mining whichever alternative is chosen and, again, one not considered in this DEIS.

As soon as NMCC starts hiring and mining, Sierra County is doomed to perpetual economic and social stagnation because operation will indicate that NMCC has ownership of the water rights that are so important to Sierra County. Subsequently, whenever copper prices are high enough to warrant mining, NMCC will provide a few dozen local workers jobs. At other times, when copper prices do not warrant mining, there will be no jobs and no water either because NMCC, not Sierra County, will have the right to use the water and have a future.

VI. Sins of Omission

In spite of some excellent sentences on the problem of the volatility of mine hiring concluding Section 3.22.2.1.6 Community Cohesion and Quality of Life (3-266), those observations are not developed into a systematic and coherent economic and social analysis. Similarly, the study acknowledges (3-280) that mining's bust and boom economies generally produce alcoholism, drug addiction, and domestic violence, yet the study seems blasé about the needs for additional law enforcement, therapeutic services, social service, increased health services costs, and increased costs for special education services (as it is well known that these kinds of problems within domestic households are a direct cause of developmental disabilities in children which interfere with their abilities to function in the public school system) (3-263 and 3-264). Over and over again, negative impacts are described as vague, soft, interpretational possibilities or even said to be "controversial" (3-266) while the positive impacts are stated without prevarication in hard terms of cash, despite the patent fact from NMCC's own admissions that it plans to go in and out of business as copper prices dictate. Thus, the social and economic costs of the Proposed Action and the Alternatives are never projected in numerical details and dollar values in a way comparable to the projections of dollar benefits and jobs by IMPLAN. All these costs could be, but are not, put into a cost analysis so that the public can weigh the benefits against the costs. This is a specific and fatal failing of the DEIS: in terms of the socioeconomic analysis there is no adequate development of the complete direct, consequential and cumulative socioeconomic impacts of the Copper Flat Project--just the soft-peddling of the downside and extoling of the possible upside.

In a document of such extraordinary length (3 times the CEQ suggested limit on EISs for large, complex projects), this DEIS has a startling lack of specifics and details. For example, in speaking of the impact on housing (3-263), we see no consideration of types of housing that might be needed: temporary places like motels, RV parks, short-term rentals during the

construction phase as distinguished from more permanent housing during the operational phase. We see no consideration of prices relative to workers' salaries to determine if economically housing is possible. Or, relative to impacts on the school system (3-264), there seems no breakdown of incoming children by age groups, no estimate of the dollar costs to the schools for the influx of students, and since the influx is expected to over-burden the physical plant, no estimate of how much capital improvements for expanded capacity will cost (the study saying rather naively that new tax moneys would pay for the costs—really?). Similarly, impacts on the health system are not projected in quantifiable terms (hospital beds, etc.).

Even a fairly simple impact which the study acknowledges, (3-224) the necessary repavement of Hwy 152, is ignored as a cost to the public in the socioeconomic study. How does one explain these omissions?

The most significant omission, given the study's deliberately narrow focus on the economic benefits of jobs, is the BLM's refusal to even consider the significance of copper mining's instability. Mentioned as a fact in many places in this socioeconomic study and in the section on environmental justice, that fact still is ignored in projecting mining's impact. The probability that the NMCC will operate continuously for 11, 12, or 16 years is almost nil. See the analysis in our comment on the DEIS "Can and Will." Its operation will be intermittent, causing repeated crashes of the economy, throwing people out of work repeatedly, increasing the county's unemployment, weighing heavily on the welfare system over and over again, until NMCC, like 9 mining companies before it at Copper Flat, either abandons the project or falls into bankruptcy, both of which will have serious social repercussions for Sierra County, not to mention the counties that are home to the workers.

Such social impacts will be accompanied by unpaid bills and rents and other negative economic effects. Bankruptcy will mean that creditors, local businesses that sell services and materials to NMCC, will be unable to collect what is due them and be forced into losses, which also have a multiplier effect. Indeed, IMPLAN can be used to model the negative impacts of a negative economic action, and given the accepted fact that NMCC will most likely end in a negative economic action and that there probably will be several such negative events before final abandonment or bankruptcy, such a study would seem required in a global study of cumulative, consequential, and collateral impacts like the EIS.

VII. "Bait and Switch"?

The public is led to believe throughout the socioeconomic impact study in the DEIS that the area of impact is Sierra County. All the description of the present economic and social status focusses on Sierra County, and in the description of future impacts, all the economic benefits are applied to Sierra County, jobs, indirect jobs, induced jobs, and the moneys that flow from such activities. The Region of Impact is defined as Sierra County (3-255). When socioeconomic data outside the ROI is presented, the writers of the study insist that the ROI is Sierra County: "It should be noted that although Figure 3050 and Table 3087 present census data for a geographic

area within [*sic*, in fact the Figure and Table show data outside the ROI for comparison with the ROI!] the ROI is still defined as Sierra County” (3-277).

However, BLM states that workers in the construction phase of operations will “typically commute up to 2 hours one way for a job, or an average of 73 miles and maximum of 115 miles one way” (3-263, with a reference citation which is not in the Bibliography). That average radius perfectly includes Silver City (Grant County), Deming (Luna County) and Las Cruces (Doña Ana County), and the maximum radius extends the area to Socorro (Socorro County). See any map of New Mexico with county demarcations, conveniently or inconveniently missing in this study. The mileage and the time of driving specifically identify the Silver City area. Moreover, “NMCC anticipates hiring over 70 percent of the workforce from communities within a 75-mile radius of the mine; some employees would commute from counties adjacent to Sierra County” (3-263), which includes Silver City, Deming, Las Cruces, so that the plural “counties” refers specifically to Grant, Luna, and Doña Ana Counties. Clearly, 70% of the workforce during either construction or operation will not be from Sierra County nor are they expected to be, and both NMCC and BLM know that.

The study carefully avoids directly stating the discrepancy between focusing on economic benefits to Sierra County and knowing that the economic impact will probably go elsewhere by using the word “local” suggestively: “NMCC anticipates hiring over 70 percent of the workforce from local communities” (3-257), where the word “local” deliberately suggests Sierra County because the word is weighted that way in the text. [“...direct and indirect impacts to the local (Sierra County) and State economies in terms of employment,” 3-257]. A lie is thereby avoided but the desired effect is achieved. When the study must actually speak of the fine economic benefits to Sierra County directly, it sets the benefits into a hypothetical frame: “If 70 percent of the Copper Flat employees live in Sierra County, the total wages and salaries would represent a maximum of 7.5 percent of total employee compensation in Sierra County...,” (3-260). Again, an untruth is avoided.

The economic impact of all those dollars will, therefore, not happen in Sierra County. Indeed, since 30% of the workforce will be from beyond Silver City and Las Cruces and Socorro and a large part of the other 70% will be coming from outside Sierra County, one might reasonably expect the economic impact projected by IMPLAN to be mostly dispersed beyond the ROI. The positive economic and social benefits of mining Copper Flat will not accrue to Sierra County. There is not the slightest evidence for the truth of statements like “Workers in Sierra County would experience a roughly \$230 million increase in labor income...or an average of \$13.5 million a year” (3-260).

It is likely that during construction more qualified workers will be found locally than during operation. If only 10% of the construction workers at the Spaceport came from Sierra County, it seems reasonable to assume that same percentage at Copper Flat. Operational workers at the mine from Sierra County, then, would be less than that, thus numbering in the teens for the Proposed Action and possibly as few as 20 for Alternative 2. BLM claims that NMCC will mitigate the problem by training, but, of course, the man power is simply not there to train. Meanwhile, the DEIS speaks of “employment” in the thousands. And, people are swayed. Thus,

at the EIS Hearing on Copper Flats held in Truth or Consequences, December 17, 2015, someone spoke favoring mine permitting because of the creation of a “thousand jobs.”

The study ignores all the negative impacts on Sierra County and instead applies all the supposed benefits in the larger region to Sierra County, baiting the local population with these benefits, while knowing full well that most of those hypothetical benefits will go elsewhere.

This process seems simply a classic Bait and Switch confidence game. The operation of a Bait and Switch on the people of Sierra County, its officials, and administrators violates NEPA’s own terms for environmental justice. And it is shameful.

VIII. Elephant in the Room

Equally shameful is the Houdini trick of hiding an elephant in plain sight. Kevin Maloney, founder and owner of Themac Resources (NMCC), created his wealth building and managing “company towns” for workers at remote mining sites in Australia. He sold his company, The MAC Services, in 2010, but retained a position in the new company. The MAC Services has since consolidated and changed its name to CIVEO, which handles temporary accommodations in Australia, the USA, and Canada.⁸ These company towns are fully serviced RV parks, with fully provided living quarters, food service, entertainment, bar, pizza parlor, gymnasium, store, etc. The likely possibility of NMCC using such a service was mentioned in the scoping sessions and has generated a short reply in the DEIS (3-263):

Current plans do not exist to develop nearby temporary housing. NMCC plans to keep the public and relevant parties informed about timing related to project milestones, and to rely on the market to fill the need.

A Copper Flat Village, then, remains a possibility, and that possibility confounds the implications of whatever numbers a properly run IMPLAN program might estimate. Direct effect in-county jobs might come close to 100% of NMCC hiring,⁹ but all or most in-county indirect and induced moneys will go to Themac and CIVEO and out of the county. The indirect and induced jobs created will be filled by locals, but they will be minimum wage jobs.¹⁰ Local merchants, RV parks, bars, restaurants, etc. will be cut off by a new competitor in the County. Yet, IMPLAN will show a lot of economic activity taking place in the county because Copper Flat Village will, indeed, be in Sierra County.

IX. Conclusion

⁸ <http://civeo.com/lodges-villages/australia/kambalda-village/>.

⁹ BLM already seems to think 100% of workers will be in-county residents for Alternatives 1 and 2: see footnote 1 above.

¹⁰ In Table 3-82, Impacts of Operational Phase for Alternative 2, Induced Effect jobs are paying \$27,000 a year, salary and benefits, Indirect Effect jobs are paying salary and benefits of \$35,000 a year, while Direct Effect jobs, mining jobs, are calculated at \$106,000 a year.

The present socioeconomic section of the DEIS does not present an informed basis for a decision on permitting the mining of Copper Flat. It fails to present accurate facts. It misinterprets social and economic facts. It narrates a false description of the economic and social life of Sierra County. It fails to project the reasonable foreseeable impacts on the community. It omits many pertinent parameters of the socioeconomic effects of mining. It misuses computer modelling. It is biased. It gives the impression of deception. Before an irretrievable commitment of resources is made in the project, these faults of analysis must be remedied and the combined, cumulative impact on the socioeconomic life of Sierra County objectively studied.

Partial Pit Backfill Alternative

Backfill Pit Lake

At end of proposed action the surface of the pit lake will be at 4,900 feet above sea level and 200 ft deep (3-31), making the floor of the pit lake 4,700 feet or 700 feet lower than the present pit lake floor. The surface will be 35 to 50 feet lower than the present pit lake (3-21).

The DEIS discusses the possibility of rapidly filling the pit bottom with water in order to lessen acidification of the pit lake by submersion of the lower pit surfaces to prevent oxidation of exposed sulfites. The water needed for this rapid immersion is estimated to be about 2,800 acre feet, which is 122 million cubic feet [$2800 \text{ af} \times 43560 \text{ cu. ft/af} = 122 \times 10^6 \text{ cu. ft.}$], the assumed volume of the pit lake.

If the waste rock pile is composed of crystalline rock with a density of about 2.75 g/cc (or 172 lb/cu. ft., the density of granite or dolomite), the volume of rock needed to backfill the pit lake volume would weigh 21 million tons.

Under Alternative 2, NMCC has the trucking capacity to haul at least 45,000 tons per day (30,000 tons of ore and 15,000 tons of waste rock and low grade ore under Alternative 2).

It will take about 466 days (16 months) to haul the 21 million tons of waste rock and backfill the pit to just below the groundwater level. It will take less time if some backfilling can be done during mining and even less if a more intense reclamation is performed. Then there is soil cover.

Argument

Such an alternative is today common practice. For over 35 years all coal mines have been required to backfill under the Surface Mining Control and Reclamation Act. Since 2003 California requires all metallic mine pits to be backfilled and reclaimed to the original natural conditions. See the California State Mining and Geology Board's *Report on Backfilling of Open-Pit Metallic Mines in California, 2007-02*. The Environmental Impact Study for the proposed Rosemont Mine in Arizona has a 3-year Partial Backfill Alternative. Many studies of backfilling on the internet give technical information on water sealing backfills or using lined pits as waste dumps for partial fillings or the necessary modeling that allows predictions of the impacts to groundwater. See, for example, J.V. Parshley, R.J. Bowell, and J. Ackerman, "Reclamation and Closure of Summer Camp Pit Lake, Nevada: A Case Study," 7th International Conference on Acid Rock Drainage, March, 2006 and published by American Society of Mining and Reclamation, with its thorough, comparative analysis of various alternatives for pit lake reclamation.

Backfilling the pit is also the preferred reclamation under Federal mining laws. A Plan of Operation must include plans for “[m]ine reclamation, including information on the feasibility of pit backfilling that details economic, environmental, and safety factors” [43 CFR 3809.401(b)(3)(iii)]. If the NMCC MPO does not give such details, the BLM should include such in its EIS.

There are, of course, site specific technical considerations, but these are within the purview of the EIS and should be taken up in a supplement. Here we suggest generally some issues of costs, mitigation, regulations, and comparative impacts on the environment.

Backfilling the pit lake may seem an expensive operation, but flooding the pit by 7 months of continuous pumping of well water (3-34), is also costly since 3.8 million tons of water has to be raised well over 1,500 feet and transported 8 miles. Should the cost of backfilling exceed the cost of pumping water, it will still be far less than the economic value of the water which will be permanently removed from the aquifer. Truth or Consequences, Williamsburg, and Hillsboro together use less than 2,000 af of water a year. The 2,800 af used to fill the pit lake represents lost revenues worth over \$100 million (in 2007 Truth or Consequences retail revenue was \$65 million and its accommodation and food services revenue was \$12 million [USBC Quickfacts]). Water is not free although water right holders treat it as such. The question for BLM then might be to select between a small cost to NMCC as opposed to a large cost to the public. We think the BLM should place primacy on the public welfare. Beyond the question of the cost of water, BLM needs to consider that in addition to the water usage, flooding and leaving a pit lake leads to the possibility of perpetual management of the pit lake water. That water will tend to increase in acidity over time because of run-off from the pit walls and concentration by evaporation, and therefore the pit lake may need chemical treatment regularly.

Further, the use of water in this manner might violate New Mexico water law (which requires conservation of water) since it does not promote general economic welfare. It is not even clear that such a use of water is within the state’s understanding of “beneficial use,” the defining factor in determining water rights in New Mexico. There are cases where certain uses of water in mining, for example the use of water to transport sand and gravel, have been ruled by the courts to be wasteful and thus not a beneficial use and thus falling outside the right to use water. Since backfilling the pit lake with waste rock is a viable alternative to flooding the pit, the OSE or the courts might consider the water not beneficially used.

Backfilling has the advantage of mitigating all pit lake impacts resulting from a big open body of polluted water below groundwater level, possibly polluting the aquifer, causing a danger to man and beast and needing perpetual fencing and maintenance. The projected future pit lake has many problems, many stemming from the fact that its characteristics are based on the characteristics of the present pit lake which are themselves not certain.

First, the geology of the pit lake is uncertain because it is fractured crystalline rock which is crossed by several faults. See P.G. Dunn’s two separate articles, “Development Geology of the Copper Flat Porphyry Copper Deposit,” in *Mining Engineering Handbook* (SME, 1992) and “Geology of the Copper Flat Porphyry Copper Deposit,” in *Advances in the Geology of Porphyry Copper Deposits* (Univ. of Arizona Press, 1982). This geology makes the hydrology around the

pit lake equally uncertain, especially relative to the question of saturation, which is essential in analyzing the problem of solute transport. Dunn reported the presence of slush and breccia in one of the faults, so that water seems to have been locally saturated in places which are now either unsaturated or devoid of water, since more recent studies have found no water in the faults [personal communication from M.A. Jones]. It seems, then, that the heterogeneous, anisotropic hydrostratigraphy results in possible compartmentalized presence of water.

Given this geology, the number of wells near the present pit lake (five according to Figure 3-19) seems inadequate to establish the present pit lake as an “evaporative sink,” especially since the wells are located at the outer edge of the pit and not very close to the pit lake (certainly more than 75 feet which is required for monitoring wells near other impoundments). Moreover, monitoring at these wells seems to have been done only once: “Measurements of monitoring well water levels presented in the baseline report (Intera 2012) show that groundwater was flowing into the pit lake in fall of 2011” (p. 3-21). This single set of measurements cannot support the following conclusion: “In general, it is thought that groundwater flows into the pit lake throughout the year and is subsequently evaporated, creating an evaporative sink or “terminal lake” (p. 3-21). Note further that these conclusions are being drawn from data gathered during extreme drought, which means the precipitation and run-offs are minimal relative to evaporation.

The designation of the pit lake as an evaporative sink where inflow into the lake is entirely evaporated out, so that no water is lost into the groundwater is entirely dependent on setting the inflow (whose quantity is entirely conjectural) to equal the evaporation minus the average precipitation and run-off. Thus, the groundwater inflow into the pit lake is variously given through the text as around 22 or sometimes 24 gpm. Ignored is the Quintana estimate of 50-75 gpm (p. 2-9), which is three times as much water and would mean that pit lake water is sometimes flowing into groundwater, so that the pit lake is not an evaporative sink but in a “flow-through” situation. Even if the lower inflow number is viable for the present pit lake, it seems unreasonable applied to a body of water many times the size of the present pit lake.

The issue here is pollution, and it seems too simplistic an account of what might be happening underground to imagine that pollution from the pit lake is not entering groundwater. Even if the pit lake were an evaporative sink, at moments, such as during a heavy downpour, the level of the lake would rise above the balanced level resulting in a general, though temporary, pressure gradient out of the pit. If that is possible, then the 22 gpm inflow rate is simply an overall average and doesn't indicate the absence of bi-directional communication between groundwater and the pit lake.

Further, chemical solute transport is not necessarily only a matter of water flow. Especially in unsaturated conditions and especially in fractured rock, solute transport is dependent on complex electromagnetic molecular forces both between the solute chemicals and the water molecules and between the solute chemicals and the chemical makeup of the material through which the solute travels, that is, surface tension forces. This is to say that Darcy's equation in which non-gravitational forces are summed up in the constants of conductivity may be inadequate to describe what happens in either an unsaturated situation (vadose zone) or in fractured rocks.

If these problems exist in the hydrologic characterization of the present pit lake, projecting this characterization onto the future pit lake, whose bottom is 700 feet lower, where the geology is more uncertain, gives little that can be used to base decisions on. The ground will have gone through more than a decade of blasting that surely will have created myriad fractures. How deep these will penetrate into the rock is entirely uncertain.

The DEIS states that

NMAC 20.6.7.33(D) requires that the pit lakes in which evaporation from the surface of the open pit water body is expected to exceed the water inflow shall be considered hydrologic evaporative sinks.... [p. 3-22]

This statement is wrong. The new copper mining regulations (NMAC 20.6.7) do not “require” the designation of the pit lake under the given conditions be an evaporative sink. The regulations stipulate such a designation only within a defined “area of hydrologic containment” which is delineated by “a monitor well network installation plan” [NMAC 20.6.7.28.B (4)]. The wells used for monitoring do not satisfy the requirements for this network of monitoring wells. The wells used seem to be old monitoring wells installed by Quintana. They do not apply to these new regulations. And, if applicable, it is unclear whether the terminology is being applied to the present or future pit lake, the two being confused throughout this paragraph which ends by claiming that NMAC 20.6.2.3103 water quality standards do not apply to the present pit lake when the discussion has been about the future pit lake.

The new copper mining regulations imagine the area of hydrologic containment at the pit as an artificial method of achieving a natural evaporative sink. Should the monitoring wells network show that pollution is reaching groundwater, pumping wells surrounding the pit would pump the water back into the pit area thus achieving the effect of an evaporative sink. This artificial “evaporative sink” may violate federal Water Pollution Control Act standards, and since BLM is invoking the terms of the new copper mining rule, it should discuss the topic thoroughly, including whether an artificial evaporative sink which allows pollution of groundwater but contains that pollution is permissible under federal law.

It is true that if the future pit lake were an evaporative sink, it might, initially prevent pit lake pollution entering the groundwater, but over time, the lake will increase its acidity until the concentration will itself force a transport into groundwater. Does that eventuality mean that NMCC’s reclamation will have to go on permanently, that electricity and pumps and wells would have to be on hand to pump the polluted groundwater back into the pit lake forever?

It is also true that if the future pit lake were an evaporative sink, backfilling it with waste rock might create a “flow-through” (as defined by NMAC 20.6.7.33) since the evaporation would be greatly reduced. However, this can be prevented by a partial backfilling that leaves a shallow pit lake with a large evaporative surface. In fact, a very shallow marshland with the proper plantings would remove sulfate ions and neutralize the acidity through a microbial/chemical process. Whether an actual flow-through would be created depends on

climatic conditions, and these must take into consideration the effects of climate change in this locality.

Apart from the issue of pollution, the future pit lake will result in another harmful impact which is much more certain. As an evaporative sink, it will be a permanent drain of water from both surface water (because it captures precipitation that normally would feed the surface water system) and groundwater (since the pit opens up the aquifer to evaporation). The amount of water thus removed from New Mexico's water resource reasonably will be much more than the 22 gpm inflow rate into the present pit lake since the future pit lake will be 700 feet deeper into the aquifer and present a much larger evaporative surface. This irretrievable and irreversible waste of water should not be condoned by the BLM and should not be allowed by the OSE, especially when there is a viable alternative.

The problems with the pit lake have simply not been thoroughly studied nor has the future pit lake been properly modeled for this DEIS. Therefore, insufficient data have been gathered to consider the viability of a partial backfill alternative. What has been done seems based on rules of thumb and a propensity to take risks rather than conservatively assessing them.

The pit lake is not the only difficult problem. In the reclamation, the pit walls are left with slopes too steep to hold vegetation; thus the pit might not be reclaimed leaving it an erosion hazard. With the bottom of the pit raised, the pit walls could be contoured to a reasonable slope that will hold vegetation and prevent soil erosion. Again, this alternative requires some simple calculations, but they need to be done. The advantage of reclaiming the pit walls in this way for plant life, wildlife and humans is obvious.

Another difficult problem which backfilling the pit lake partially solves is the enormous piles of acid producing waste rock challenging the natural Animas hills in size. Using some of this material certainly would reduce their impacts on the environment. This procedure is suggested by the DEIS itself:

Although the majority of the exposed highwalls are expected to contain rocks with relatively low potential for acid generation...several rock units have relative higher potential to generate acid...exposures of these rock units that remain...may be mitigated by selective excavation using cast blasting or other approaches and placement into the base of the pit. [p. 3-35]

When a private individual has a septic tank or a leach field installed, he is not left at the end of the project with big dirt piles and large holes in the ground. No property owner would allow such practices, and BLM as manager of public lands should also not condone leaving the piles and the holes while dealing only with problems of pollution. Backfilling is not even "best practice management," but is standard practice in all the professions except metal mining. Reclamation by BLM standards means returning the land to something more than "open space" but to some functional and usable and preferably initial condition, a beneficial habitat for man and beast. The land should be left in a condition for alternate uses beneficial for the society.

Backfilling the pit lake is a requirement of NM mining laws

The Natural Resources and Wildlife Non-Coal Mining New Mining Operations issued by the NM Mining Commission states at 19.10.1.7.I.3 NMAC, “*Impoundment* means a basin constructed for the retention of water or sediment, but does not include impoundments for process solutions or tailings.” The pit lake, therefore, is an impoundment. And, “When no longer required, impoundments shall be graded to achieve positive drainage...”(19.10.6.603.C.6.b NMAC). There are 3 exceptions to this general requirement, but the normal procedure is to backfill and contour for drainage.

Further, 19.10.6.603.C.4 NMAC specifies that preferably “reclamation shall result in a hydrologic balance similar to pre-mining conditions” which might not be achievable without backfilling the pit lake. We think “pre-mining” means before mining not before this round of mining. Any other reading would allow repeatedly increasing degradation of the land, which cannot be the meaning of “reclamation.”

Conclusion

It is clear, therefore, that backfilling the pit lake should be seriously considered in the proposed action and in either of the alternatives because it is the preferred method of reclamation, because it is feasible, because it will lessen environmental impact, and because state regulations, which in this case are more strict than the federal rules, require it.

The John I. Hallett Placer Mining Heritage Site, Gold Dust, New Mexico

John I. Hallett owned and operated a placer operation located within the Copper Flat area of potential effect between 1931 and 1943. He functioned as the John I. Hallett Construction Company and also as the Placer Syndicate Mining Company.¹¹

Hallett's operation was the single most productive placer mine in New Mexico during the whole 20th century. See, P.G. Dunn, "Development geology of the Copper Flat porphyry copper deposit, Case study," in *SME Mining Engineering Handbook*: Littleton, Colo., Society for Mining, Metallurgy, and Exploration, Inc., 1992, citing M.G. Johnson, "Placer Gold Deposits of New Mexico," Bulletin 1348, USGS, 1972. Describing Quintana's preparation for mining Copper Flat in 1982, Dunn writes:

The third phase was the most extensive aspect of the nonmineral program, and involved a placer evaluation of the tailings area. BLM was particularly interested in this phase because the area coincided with a pre-World War II gold operation that had been the most productive placer in the state during this century (Johnson, 1972). The examination was directed by a consultant recommended by BLM.

That Dunn and Johnson were speaking of the Hallett operation is confirmed by state mining records.

From E.H. Wells and T. P. Wootton, *Gold Mining and Gold Deposits in New Mexico*, Circular No. 5, New Mexico School of Mines, State Bureau of Mines and Mineral Resources, April, 1932 (rev. 1940):

In recent years considerable attention has been directed to placers in the Hillsboro district by several companies, the successful of which has been the John I. Hallett Construction Co. Since 1934, this company has been the chief producer of the district. The company operates two draglines and recovers the gold in a Coulter-Ainlay four-bowl plant [centrifugal separator] mounted on wheels. Water is obtained from wells.

And, Chas. W. Henderson and A.J. Martin, "Gold, Silver, Copper, Lead, and Zinc in New Mexico: Mine Report" in *Mineral Yearbook*, 1940, p. 402: "In yardage handled at placer mines,

¹¹ John Hallett is identified as the Placer Syndicate Mining Company in an affidavit by James McCants dated November 9, 1983, in reference to the Greer Windmill Well, LRG 4562-S-4, on file with the NM Office of the State Engineer Declaration file LRG 4562 152711.

the John I. Hallett Construction Co. in the Hillsboro district Sierra County ranked first....” That year Sierra County produce 2,000 oz. of gold compared to second place Santa Fe County’s 700 oz. John Hallett probably accounted for at least half of that.

Hallett accomplished this in spite of the scarcity of water in the area noted by Wells and Wootton:

The total amount of gold in these gravels is undoubtedly large, but most of the ground is low grade. Here, again, the water situation is serious. Several wells have been drilled and at least one was dug. Little information is at hand as to the quantity of water.

According to G.T. Harley (*Geology and Ore Deposits of Sierra County*, 1934), the workings at the Gold Dust placers, south of the Luxemburg placers, at the head of Grayback Gulch, in the Copper Flat APE, were carried out by the Placer Syndicate, that is, John Hallett. The company “constructed a 4,000,000 gallon reservoir between Dutch and Grayback gulches, and has installed a 5/8 yard portable shovel, a washing and treating machine mounted on a tractor and consisting of a trammel, four 36-inch Ainaly bowls, and a stacker belt, with a capacity of 1,000 cubic yards a day.” (p. 168, Harley)

The reservoir and dam apparently were used by Quintana for their tailings storage area because the wells that Hallett used, presently identified in the NMOSE files as LRG 4562 S-4 through LRG 4562 S-8, are all grouped just below and to the side of the existing tailings dam. We know this because of the affidavits of Bill Hall (1909-1990), who worked for Hallett when he was in his 20s.¹²

The five low production wells were pumped continuously into the reservoir thus allowing the maximum amount of water for a continuous operation. It was a resourceful and clever solution to an apparently insoluble problem.

The physical elements of Hallett’s operation are still in place, but the Proposed Action and the Alternatives all intend to bulldoze the whole area in an expansion of the tailings area. The dam and at least 3 of the wells will be destroyed. Thus, BLM is proposing to demolish the single most important historical site for placer mining in the state. Since the dam and the wells are earthworks and immovable objects, the only mitigation that would preserve these cultural resources is to change the TSF plans.

Although the DEIS recognizes the importance of mining to the area’s historical culture (3-168), its discussion and dismissal of a historical district (because the “district” encompasses an area larger than the APE and thus is beyond the requirements of the NEPA) is completely wrong. Although load mining of significance was conducted outside the APE, the John I. Hallett

¹² Bill Hall’s affidavits identifying the 5 wells Hallett used are found in the NMOSE files for LRG 4652-S-4 through 4652-S-8, formerly known respectively as Greer Windmill, McCravey-Grayback, McCravey-Dutch Gulch, Irwin Well (South), and GWQ-7 (North). The file numbers, respectively, are LRG 4652: 152711, 152714, 152715, 152719, and 152722. The locations of these wells relative to the former tailings impoundment can be seen on the map Figure A 3-2, Water Quality Tailings Impoundment STIFF Diagram, *Copper Flat Project, Draft Environmental Impact Statement*, BLM, February, 1996.

site is the most important placer site in New Mexico, and it is located at the very center of the APE and thus within the auspices of the EIS.

Under NHPA, a federal agency must make a reasonable and good faith effort to identify historic properties, *36 C.F.R. § 800.4(b)*; determine whether identified properties are eligible for listing on the National Register based on criteria in *36 C.F.R. § 60.4*; assess the effects of the undertaking on any eligible historic properties found, *36 C.F.R. §§ 800.4(c), 800.5, 800.9(a)*; determine whether the effect will be adverse, *36 C.F.R. §§ 800.5(c), 800.9(b)*; and avoid or mitigate any adverse effects, *36 C.F.R. §§ 800.8(e), 800.9(c)*. The BLM must confer with the State Historic Preservation Officer ("SHPO") and seek the approval of the Advisory Council on Historic Preservation ("Council").

Conclusion: BLM must determine the suitability of the John I. Hallett Placer Mining Heritage Site in Gold Dust, NM for designation as a National Historical Site before irreparable and irretrievable damage is done to the site and part of the culture of New Mexico mining disappears under NMCC's tailings pond. Furthermore, if the site is to be preserved, it must be properly reclaimed since the area is polluting groundwater from the tailings covered and left on site by Quintana in 1987. A long series of correspondence between NM Environment Department, the BLM, and various owners of the Copper Flat mine site, including NMCC, documents and details the plume of pollution at the site. Mitigation is essential as is preservation.