

INTERIOR BOARD OF LAND APPEALS

Great Basin Mine Watch, et al.

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GREAT BASIN MINE WATCH ET AL.

IBLA 2000-82

Decided January 26, 2004

Appeal from an environmental assessment and a record of decision issued by the Winnemucca, Nevada, Field Office, Bureau of Land Management, analyzing and approving an amended plan of operations for the closure and reclamation of the Wind Mountain Mine leach pads. NV-020-00-03.

Affirmed.

1. Environmental Quality: Environmental Statements--Federal Land Policy and Management Act of 1976: Plan of Operations--National Environmental Policy Act of 1969: Environmental Statements

BLM's approval of a closure and reclamation plan for a mine based on an EA and FONSI will be affirmed if the record establishes that BLM took a "hard look" at the proposed action, carefully reviewed environmental problems, identified all relevant areas of environmental concern, and made a convincing case that the environmental impacts are insignificant or that any such impact will be reduced to insignificance by the adoption of appropriate mitigation measures. A party challenging BLM's decision has the burden of demonstrating with objective proof that the decision is premised on a clear error of law or demonstrable error of fact, or that the analysis failed to consider a substantial environmental question of material significance to the proposed action. Mere differences of opinion provide no basis for reversal.

2. Environmental Quality: Environmental Statements--Federal Land Policy and Management Act of 1976: Plan of Operations--National Environmental Policy Act of 1969: Environmental Statements

An EA must include a brief discussion of alternatives as mandated by section 102(2)(E) of NEPA, 42 U.S.C. § 4332(2)(E) (2000), which requires that every Federal agency "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." Appropriate alternatives include reasonable and feasible alternatives to the proposed action which will accomplish its intended purpose with lesser or no impact.

3. Environmental Quality: Environmental Statements--Indians: Trust Responsibility--National Environmental Policy Act of 1969: Environmental Statements

BLM's approval of a mine closure and reclamation plan based on an EA does not violate the Federal Government's trust responsibility to an Indian Tribe where BLM formally consulted with the Tribe, explained the rationale for its decision, and concluded that tribal assets would not be at risk of contamination even if some groundwater migration did occur because the Tribe's reservation was located upgradient from the flow of any potential groundwater in the area.

4. Federal Land Policy and Management Act of 1976: Plan of Operations--Federal Land Policy and Management Act of 1976: Surface Management--Mining Claims: Plan of Operations

A finding that approval of a mine closure and reclamation plan will not cause unnecessary or undue degradation of public lands will be affirmed where the appellant has not shown that BLM failed to adequately consider the effects of operations on other resources and land uses, including those resources and uses outside the area of operations; neglected to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas; or failed to comply with applicable environmental protection statutes and regulations thereunder, and where the record demonstrates that the project, with the mandated stipulations, will not cause unnecessary or undue degradation of the public lands.

APPEARANCES: Tom Meyers and Glenn C. Miller, Reno, Nevada, for Great Basin Mine Watch; Wes Williams, Jr., Esq., Fallon, Nevada, for the Pyramid Lake Paiute Tribe; Steven J. Christiansen, Esq., Daniel A. Jensen, Esq., and David C. Reymann, Esq., Salt Lake City, Utah, for Wind Mountain Mining, Inc.; Terry A. Reed, Field Manager, Winnemucca Field Office, Bureau of Land Management, U.S. Department of the Interior, Winnemucca, Nevada, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE HEMMER

Great Basin Mine Watch (GBMW) and the Pyramid Lake Paiute Tribe (the Tribe) have separately appealed the November 15, 1999, environmental assessment (EA) (NV-020-00-03) and the November 24, 1999, record of decision (ROD) based on that EA, issued by the Winnemucca, Nevada, Field Office, Bureau of Land Management (BLM), analyzing and approving an amendment to the plan of operations for the Wind Mountain Mine. The amendment, entitled "Wind Mountain Mine Revised Closure and Reclamation Plan for Heap Leach Pads" (Revised Closure Plan), which was initially submitted by Wind Mountain Mining, Inc. (Wind Mountain), in March 1998 and subsequently revised in response to comments and suggestions by BLM, delineates the closure and reclamation of the mine's two heap leach pads. By order dated January 18, 2001, the Board denied GBMW's and the Tribe's requests for a stay of BLM's decision pending appeal and Wind Mountain's motions to dismiss the appeals.

BACKGROUND

The Wind Mountain Mine is located on unpatented mining claims on the northwest flank of the Lake Range, at the northeast edge of the San Emidio Desert, within secs. 27, 28, 33, and 34, T. 30 N., R. 23 E., and secs. 3 and 4, T. 29 N., R. 23 E., Mount Diablo Meridian, Washoe County, Nevada, about 75 miles northeast of Reno, Nevada, and 12 miles south of Gerlach, Nevada. See EA at 1; Revised Closure Plan at 1. BLM approved the original plan of operations for a cyanide heap leaching operation at the mine in December 1988. Active mining took place from January 1989 to January 1992. The mine was operated as a conventional loader and truck open pit operation. During the active mining period, approximately 24,000,000 tons of crushed and run-of-mine ore was mined from the Wind and Breeze Pits and loaded onto two leach pads. The processing facility consisted of the two leach pads, five process solution ponds with a total capacity of 8,100,000 gallons, and a 3,375,000-gallon overflow pond. (EA at 1; Revised Closure Plan at 2.) The last cyanide applied to the heaps was added on June 26, 1994. (BLM 3809 Compliance Inspection Report, Dec. 14, 1998, at 3.)

After active mining ceased, Wind Mountain developed and implemented closure plans for the mine. Pursuant to the 1994 Final Permanent Closure Plan, the

leach pads were rinsed, first with make-up water and later with the approximately 49 million gallons of remaining rinsate which was evaporated by applying it to both leach pads using sprayers. Residual metals were recovered this way for about 4 years, ending in June 1997. The rinsing initially reduced the weak acid dissociable (WAD) cyanide concentrations in the waters from the leach pads to below 0.2 mg/l for certain sections of the pads, although the levels later increased to about 0.37 mg/l. See EA at 1, 3; Revised Closure Plan at 2. ^{1/} Application of solution to the pads was discontinued and all rinsate was collected in the solution ponds for evaporation in December 1997. The heaps have been draining since that time. Nonetheless, pumps and pipelines remained in place, ready to pump remaining solution back to the pads should that solution exceed the capacity of the solution ponds or an extreme storm event occur. (Revised Closure Plan at 2.)

The Revised Closure Plan was submitted to address the closure and reclamation of the two leach pads and associated solution control facilities. (Revised Closure Plan at 1.) It describes the preferred method for disposal of the final leach pad rinse waters, permanent closure and reclamation of the leach pads, and the steps to be taken to accomplish the closure and reclamation. It concludes that the proposed methods for closure and reclamation would not adversely affect the environment or waters of Nevada. Id. Final closure and reclamation under the Revised Closure Plan would be initiated when the combined seepage from the two heap leach pads is approximately 20 gpm with seepage in excess of that amount being evaporated in the Pad 2 Preg Pond. (EA at 3.) The proposed closure and reclamation activities include construction of leach fields to receive draindown solution from the two pads; regrading and revegetation of the one-acre of additional surface disturbance associated with the leach fields; burial of solution pipe; reclamation of the solution ponds and burial of sludge; discharge of draindown solution to the leach fields; and installation and oversight of downgradient monitoring wells. Id. at 3; Revised Closure Plan at 3; see also Nov. 24, 1999, decision entitled "Mine Plan of Operations Amendment Approved" (Approval Decision) at 1.

On May 21, 1999, the Nevada Department of Environmental Protection (NDEP) concurred with the installation of two leach fields. NDEP's approval was conditioned on Wind Mountain's installation of dozing tanks in the leach field systems and retention of an evaporation pond for at least one year. NDEP stated that

^{1/} Other closure activities undertaken pursuant to the 1994 closure plan included: evaluation of bioremediation technologies for stabilization of the heap during the rinse period through bench- and pilot-scale tests; completion of spray evaporation of final rinse water onto the pad surfaces by December 1997; grading of all rock dumps and most of the leach pads before August 1999; and demolition and removal from the property of all buildings except for a laboratory. (EA at 3.)

maximum flow rates into each field were limited to 10 gpm, with excessive flow diverted into the evaporation pond and spray evaporated until total flow rates for both leach fields dropped below 20 gpm for a minimum of 3 consecutive months. (May 21, 1999, NDEP Concurrence, attached as Ex. C to Wind Mountain's Memorandum in Opposition to Appellants' Stay Requests (Wind Mountain Stay Opposition), at 1.)

BLM issued an EA for the Revised Closure Plan (NV-020-99-20) on June 24, 1999, and provided a 30-day public comment period. On June 30, 1999, prior to the closure of the public comment period, BLM issued a finding of no significant impact (FONSI), record of decision, and decision approving the Revised Closure Plan.^{2/} The June 30, 1999, decision approved "solution pipe burial in the heap leach pads; pond sludge disposal and final solution pond closure and reclamation; construction of leach fields to accommodate long term heap draindown and discharge of heap effluent to those leach fields," for a total of approximately one acre of new surface disturbance, subject to various mitigation measures and stipulations. (June 30, 1999, decision at 1-3.) BLM reserved "the right to amend the Decision if any significant issues or comments are received during the 30-day comment period which ends July 23, 1999." Id. at 2.

BLM received comments on the EA from the Toiyabe Chapter of the Sierra Club, GBMW and the Tribe. Rather than presenting specific challenges to alleged errors in the EA, GBMW's comments constituted general queries into information that it believed might be pertinent, and statements of its own suppositions of facts. See GBMW July 22, 1999, Comment Letter at 1-3. GBMW stated it was difficult to "determine the depth of soil to bedrock" and asked for a "better description of the layers beneath the facilities." (GBMW comments at 1.) GBMW "questioned" the seepage values, stating that "[w]e suspect that rinsing never adequately saturated the seeps" and "we expect that draindown occurred quickly." GBMW agreed that after 4 years the heaps "have been rinsed moderately clean, but it is very questionable whether the cleansing has been consistent throughout the heap." Id. at 2. Based on its various suppositions, GBMW "suggest[ed] that the design should be for up to 15 gpm from each heap." Id. GBMW questioned BLM's use of storm rates and stated "I would guess that the 100-year, 24-hour storm is much higher. Id. at 3. GBMW agreed that the "total mass of soils may be sufficient to attenuate constituents in the final draindown seepage water" but that "preferential flow and fractures * * * may prevent [this]." Id. Finally, GBMW claimed that the EA did not provide for monitoring and that the site appeared to require perpetual maintenance. Id.

^{2/} This EA was a revised EA; the draft was prepared in November 1998. It is not clear from the record why BLM effectuated the decision prior to closure of the public comment period.

The Tribe's comments questioned the effectiveness of soil attenuation of toxic constituents as a method of reclamation and BLM's characterization of the hydrology in the area given the "two faults" lying on either side of the leach pads. The Tribe also alleged that the project might affect Tribal resources and that BLM had failed to consult with it during the environmental assessment process and had breached its trust responsibility to the Tribe. See Tribe's July 22, 1999, Comment Letter at 1-2.

After reviewing the comment letters, BLM determined that they raised significant issues warranting further study and analysis. Accordingly, BLM issued an amended decision on September 2, 1999, stating:

The Decision of June 30, 1999 is amended as follows:

1. All aspects of the June 30, 1999 Decision as well as the stipulations and mitigation measures shall remain in effect, unless they are specifically superseded in this Amended Decision or subsequent decisions.
2. The operator shall not discharge heap effluent into the leach fields unless it receives authorization, in writing, from the BLM to do so. This supersedes the original June 30 Decision which approved discharge of the heap effluent into the leach fields subject to Stipulations #5 and #7. Those two Stipulations are also superseded.
3. Sludges from all six ponds shall be analyzed for TCLP metals using the TCLP procedure. * * *
4. The EA for the Heap Leach Closure Plan will be revised (modified, amended, or re-written) depending on the nature of the responses that emerge as a result of the answers to the comment letters, or any new information or data NDEP or BLM may require during the approval and permitting process. The issues raised in the public comments to the original EA will be responded to and incorporated into the revised EA if warranted. Improved presentation of the data will be provided and the analysis will be strengthened. A Decision will be issued after the revised EA is finalized.
5. From this point onward the BLM approval process will proceed synchronously with NDEP permitting process. BLM is anticipating that NDEP will provide a clarification regarding the status of the Water Pollution Control Permit for the Heap Leach Closure Plan. BLM is considering waiting until the Water Pollution Control Permit is issued

prior to BLM authorizing discharge of heap effluent into the leach fields.

6. If during the synchronous approval and permitting process any new technical data are required by either agency these data will be incorporated into the revised EA.

7. The monitoring plan that was submitted by the operator on August 19, 1999, in compliance with Stipulation #7 of the June 30 Decision is not approved. BLM will continue to review the monitoring plan and it is anticipated that the data supporting the monitoring plan and the monitoring plan itself will be incorporated into the revised EA.

8. BLM will consult with the Pyramid Lake Paiute Tribe.

(Sept. 2, 1999, Amended Decision at 1-2.)

BLM met with the Tribe on October 13, 1999 (Notes from meeting, Oct. 13, 1999), and gathered and analyzed additional data about the Revised Closure Plan and its potential impacts in site visits and meetings documented in the record. BLM and NDEP sent letters to the commenters about their concerns. BLM issued the expanded, revised EA (NV-020-00-03) for the Revised Closure Plan on November 15, 1999.

The EA described the proposed action, which included the construction of leach fields to manage residual seepage generated from the heap leach pads, noting that use of that method for disposal of rinsate and draindown from leach pads was consistent with NDEP and BLM guidelines. The EA explained the rationale for selecting leach fields as the preferred method for the Wind Mountain leach pads:

- Long-term seepage from the pad will be minimal (approximately 1 to 1.5 gpm per pad, based upon UNSAT2 model predictions);
- No ground water has been encountered in the mine pits or exploration bores at the site. Previous work at the site has indicated that there is no known groundwater to a depth of at least 600 feet beneath the planned leach field areas.
- A fault system runs north-south along the western extent of the heap leach facilities. Groundwater levels to the west of this Fall Line Fault Zone (FLFZ) are approximately 60 feet below the ground surface; on the east, groundwater has not been

encountered to depths of 600 feet. This indicates that there is very little groundwater flow in the bedrock across the FLFZ.

- There are no critical groundwater resources in the vicinity of the mine. The production wells for the mine were located west of the FLFZ and produced non-potable, hydrothermal water with temperatures around 200°F, [total dissolved solids (TDS)] of around 4,000 mg/L and concentrations of chloride, fluoride, iron, and manganese in excess of the Nevada [Maximum Contaminant Levels (MCLs)].
- Once installed, leach fields require very little long-term maintenance.

(EA at 4.)

The EA elaborated on the factors underlying the design of the leach fields. Because this analysis is critical to the issues raised in this appeal, we quote significant portions of this discussion:

The leach fields are designed to handle current residual drain-down flows, and will provide excess capacity as seepage rates decrease over time. The closure plan was developed based upon a drain-down rate of 20 gpm, 10 gpm from each pad. The combined draindown rate has been less than 20 gpm since July 1, 1999 (Figure 2-5). Once vegetation is established on the heaps, the model predicts that the combined draindown rate will decrease to 5 gpm after 6 months and to 2.5 gpm after 2 years (Figure 2-3). The model also predicts the long term combined flow rate to be 2-3 gpm and the maximum draindown rate in a 100-year wet year is predicted to be less than 4 gpm (Figure 2-4).

Given the maximum discharge of 10 gpm to each leach field, the leach fields were sized considering the hydraulic conductivity of the underlying alluvium and bedrock. The leach fields are sized to allow full infiltration of the maximum draindown rate, without pooling or backing up at the surface. A total of 13 test trenches were excavated in the proposed leach field areas (Figure 2-1). Detailed geologic logging and field infiltration tests were performed, and indicated the permeabilities of the surficial soils (i.e., soil/alluvium and pluvial lakeshore sediments) range from 1-3.5 ft/day. The leach field design conservatively assumes that the infiltration rate into the alluvium is an order of magnitude less, i.e., 0.25 ft/day (10^{-4} cm/sec). For the

maximum discharge rate of 10 gpm from each leach field, an area of 8,000 ft² is required to transmit the draindown through the alluvium to the bedrock.

Bedrock below the native soils has been argillically altered and contains layers with over 50% clay content. Permeabilities determined for three samples of bedrock believed to be typical of the leach pad and leach field areas, and collected from depths of 13 to 22 feet beneath Leach Pad 1 and the south waste rock dump were 3×10^{-3} , 1.5×10^{-5} , and 1.9×10^{-6} cm/sec. The higher value was determined for gravel and coarse sand, and is probably not representative of the bulk materials underlying the leach fields. The average of the two lower field permeability values (8.45×10^{-6} cm/sec) was used as the bedrock permeability to evaluate design of the leach fields.

At the maximum design discharge rate of 10 gpm for each leach field, an area of approximately 80,000-150,000 ft² is required to transmit the draindown vertically downward within the bedrock (depending on the hydraulic gradient assumed). Therefore, at the maximum draindown rate of 10 gpm per field, water would infiltrate into the alluvium and spread out above the bedrock surface until an area of 80,000-150,000 ft² became saturated. At the long-term seepage rate of 1 gpm per pad, the area of bedrock surface required to transmit the seepage will be 8,000-15,000 ft².

The leach field design also takes attenuation into consideration. The current and predicted water chemistry contains several parameters in excess of Nevada [MCLs] (Table 2-1). Column percolation tests for attenuation of heap leach effluent were performed on native soil samples and waste rock at McClelland Laboratories in Sparks, Nevada.

Waste rock used in the column attenuation test was considered to be the same rock type as the bedrock located in the leach field area and therefore having the same potential for attenuation. The results of the attenuation test for the bedrock show that arsenic, mercury, and zinc were attenuated to below detection limits * * * in the column test effluent. For other parameters, the attenuation test indicates removal efficiencies of 44.8% of chloride, 72.5% of iron, 65.1% of nitrate, 72.3% of selenium, 38.0% of silver, 59.6% of sulfate, and 55.0% of TDS after 6 pore volumes of rinsate were applied to the columns at an influent flow rate of 0.002 gpm/ft².

The tests conducted for native soils show that arsenic, mercury, and zinc were attenuated to below detection limits * * * in the column test effluent. For other parameters, the attenuation test indicates removal efficiencies of 18.5% for fluoride, 63.2% for iron, 24.5% for nitrate, 46.1% for selenium, 13.5% for silver, 32.4% for sulfate, and 12.1% for TDS after 6 pore volumes of rinsate were applied to the columns at an influent flow rate of 0.00125 gpm/ft².

Given the relatively high concentrations of selenium (approximately 5 mg/L) relative to the MCL (0.05 mg/L), this constituent was chosen as a “benchmark” to evaluate attenuation. The results of the column attenuation test work indicate that 46.1% of the contained selenium were attenuated at influent rates of 0.00125 gpm/ft² and 0.002 gpm/ft² respectively and that the rate of attenuation was approximately 5.8 gpm/ton. For the total predicted mass of selenium discharging from the heap, approximately 1.8 x 10⁷ft³ (9 x 10⁶ft³ for each pad) of alluvium and bedrock material are required to attenuate selenium. Given as estimated travel distance to groundwater of approximately 600 feet, this translates to a total combined surface area of about 30,000 ft² or 15,000 ft² per pad.

Based upon the influent concentrations (Table 2-1) and attenuation efficiencies (listed above) for other parameters, it is expected that this volume of rock will be sufficient to attenuate other constituents to background and/or MCL concentrations.

* * * * *

For the total draindown for infiltration from two heaps, the area required for attenuation (30,000 ft²) is equal to the area required for infiltration of the long-term seepage into bedrock through two leach fields. To facilitate dispersion over 30,000 ft² each of two leach fields has been sized to include 3 parallel dispersion lines at 30 feet centers, extending 175 feet. In actuality, the volume of alluvium and bedrock available for attenuation will be an order of magnitude greater than the required 1.8 x 10⁷ ft³, since the initial draindown will be dispersed over a larger area of bedrock (160,000-300,000 ft²) underlying two leach fields.

Thus, the leach fields have been sized to provide excess capacity for infiltration into the alluvium. Infiltration into bedrock will occur over an area that will provide excess attenuation volume compared

with the nominal volume required for attenuation of the benchmark parameter selenium.

The leach fields are located to provide gravity flow from the heap leach pads, and as close to the low point of each heap leach pad as possible where suitable conditions exist to maximize the area of bedrock upgradient of the FLFZ that would be available for infiltration (Figure 2-1).

The typical leach field would consist of parallel trenches separated by a distance of approximately 30 feet (Figure 2-5). The actual length of each trench would be 2 to 3 feet across at its base and 5 feet deep as shown in Figure 2-6. * * *

To ensure equal distribution of the long-term seepage throughout the field and avoid concentration of the infiltration in a small area, a dosing tank will be installed at each field to periodically discharge a predetermined volume of water to the field.

* * * [C]losure of Pad 2 Preg Pond will be delayed for a minimum of one year so that any seepage in excess of 20 gpm would be directed to the pond for storage and evaporation. This provides a mechanism to prevent exceeding the capacity of the leach fields in the event of extreme precipitation inputs to the leach pads prior to establishment of vegetation on the pad surfaces. At the end of one year following initial discharge into the leach field the need for keeping the pond open shall be evaluated.

(EA at 4-7.)

The EA's description of the proposed action also outlined the environmental protection measures and the monitoring plan incorporated into the Revised Closure Plan. (EA at 12-16.) The requirements set forth in the monitoring plan included monitoring the draindown rate from each pad, the total flow to each leach field, and the draindown water chemistry from each pad; visual inspections of the buried launders, the conveyance system to the leach fields, the leach fields themselves, the vegetation on the surface of the pads, and the conditions down gradient of the leach fields; and installation of two monitoring wells. *Id.* at 12. The wells would be installed down slope from the leach fields to determine any crossing of water from the infiltration fields beyond the FLFZ and, if so, to provide data to discern any possible impacts to groundwater resources west of the FLFZ from that water. *Id.* at 14. The EA noted that if NDEP found that impacts were occurring to groundwater on the west side of the FLFZ, Wind Mountain would be required to develop and submit

for NDEP approval and possible further environmental analysis an action plan to avoid further impacts. Potential actions could include reducing the volume of heap leach effluent by diverting part or all of the draindown to the LP2 Preg Pond for evaporation, increasing the size of the leach fields to expand the surface area available for infiltration and attenuation, and placing additional soil cover on the heap leach pads to reduce infiltration of precipitation and draindown discharge. Id. at 15.

The EA identified several alternatives to the proposed action: evaporation cells; deep well injection; treatment of draindown solution; covering the heaps with growth media; and no action. (EA at 16-18.) The EA also discussed the affected environment, including geology, water quality, soils, vegetation, noxious weeds, wildlife, special status species, cultural resources, visual resources, and Native American concerns such as the effect of the proposed action on groundwater and the project's potential to adversely affect Tribal resources. Id. at 19-30. It analyzed the environmental consequences of the proposed action and each alternative on the affected environment, specifically finding that no adverse impacts to surface and groundwater resources were expected as a result of the project and that, based on the analysis and monitoring procedures set forth in the EA, no adverse impacts to Tribal resources were anticipated. Id. at 31-38.

The EA concluded that discharges to the leach fields were not expected to impact groundwater resources, echoing its previously stated rationale for selecting leach fields as the preferred method for closure of the leach pad. Compare EA at 33 with EA at 4. The EA's discussion also noted that "[g]iven the average measured permeability of bedrock east of the FLFZ (8.45×10^{-6} cm/sec), it would take approximately ten years for the residual seepage from the heaps to reach a depth of 100 feet and approximately 70 years to reach a depth of 600 feet." (EA at 33.)

The EA explained its analysis of the impacts to water quality:

As infiltration water moves through the alluvium and bedrock, attenuation will occur. As described in Section 2.1.2, based on the available permeability information for the alluvium and bedrock, the water infiltrating from each leach field, at a rate of 10 gpm, will spread laterally within the alluvium until a saturated area of about 150,000 ft² per leach field occurs at the bedrock surface. Downward percolation through the bedrock will occur over this area (see Section 2.1). Assuming a depth to groundwater of about 600 ft, it can be calculated that the downward percolating water will flow through a volume of rock of about 9.0×10^7 ft³ for each leach field (1.8×10^8 ft³ for both leach fields). Considering the argillic nature of the bedrock, and the fact that downward percolation will occur under unsaturated or

variably saturated conditions, it is likely that contact of the percolating water with the rock mass will be good. The actual flow path will be controlled by the presence and degree of healing of the various sets of microfractures. Given the prevailing conditions, it is considered unlikely that any significant proportion of the flow would occur within discrete zones.

Based on the predicted water chemistry and the observed concentrations for Pad 1 (Table 2-1), as described in Section 2.1, it can be estimated that 18 million cubic feet of rock will be required to attenuate selenium and other parameters to background groundwater concentrations and/or the MCL's. The data from the test work therefore show that there is an excess of rock of at least an order of magnitude for attenuation of most constituents that will discharge from the pads.

Following active draindown and establishment of surface vegetation on the surface of the pads, it is predicted that the long term discharge rate to both leach fields combined will drop to 2-3 gpm. The total mass released in the first 100 years would therefore be about 7,000 tons TDS, about 1,100 tons sulfate, about 2,800 tons chloride, about 45 tons nitrate, about 3 tons selenium, and about 1.5 tons boron.

(EA at 33-34.) The EA also discussed the cumulative impacts of the proposed action and alternatives and the mitigation and monitoring requirements incorporated into the Revised Closure Plan. *Id.* at 39-41.

As to water quality issues, the EA explained that its underlying analysis of environmental groundwater consequences of the proposed action and alternative was based on the UNSAT2 and WGEN models. (EA at 31-32, Appendices A and B.) Appendix A, entitled "Leach Pad Water Balance," described the approach taken for estimating the water balance of the heaps, including utilization of a numerical model of unsaturated flow (UNSAT2) to calculate volumetric water flux into and out of the heaps. The description explained that, after heap leach closure and reclamation, the water balance would be controlled by hydraulic properties of the ore material, local precipitation, and local evaporation, that the UNSAT2 model relied on data from WGEN, a widely accepted synthetic weather generator, to approximate post-heap closure and reclamation atmospheric variables; and that the hydraulic parameters of the ore material were estimated based on site-specific field testing, previous experience with similar materials, and comparisons of simulated short draindown characteristics with discharge observed by mine personnel. *See* EA, App. A at 1.1. The second appendix, Appendix B, explained the UNSAT2 methodology in greater detail.

BLM issued the ROD and FONSI for the Revised Closure Plan on November 24, 1999. In the ROD, BLM decided to authorize Wind Mountain to proceed with the Revised Closure Plan because mining and reclamation were consistent with existing land use plans; the EA revealed no conditions sufficient to warrant disapproval of the amendment to the plan of operations; the Revised Closure Plan would not impact any threatened or endangered species or significant cultural sites; and the Revised Closure Plan, EA, and attached stipulations and mitigating measures sufficiently mitigated the impacts described in the EA. (ROD at 1.) The referenced mitigating measures and stipulations relevant to this appeal included:

5. * * * Final locations of the monitoring wells will be subject to BLM approval.

6. The monitoring wells shall be in place prior to discharge of heap effluent to the leach fields.

7. [Wind Mountain] shall install counters on the dosing tanks prior to discharging heap effluent into the leach fields. * * *.

8. [Wind Mountain] shall install the pipelines and dosing tanks in such a manner that no more than 10 gallons per minute of heap effluent is discharged into each leach field.

9. [Wind Mountain] shall install all flow and volume monitoring devices on the pipelines and dosing tanks in such a manner that, during site inspections, agency personnel can easily measure the flow rates from the heap leach pads and the volume discharge to the leach fields.

* * * * *

13. The monitoring plan shall be evaluated on a yearly basis and shall remain in effect for a minimum of 5 years. BLM will review the monitoring reports throughout this period and for longer if the monitoring period extends beyond 5 years. If BLM determines there may be long term monitoring and maintenance costs associated with the Wind Mountain Mine, BLM will consider incorporating those costs into future bond adjustments.

* * * * *

15. BLM shall receive copies of all monitoring reports, quarterly reports, and analytical results.

16. Future changes or modifications to the Revised Closure Plan must be submitted to BLM for review and, if necessary, approval by BLM.

17. [Wind Mountain] shall comply will all mitigating measures identified in the [EA] as well as those contained herein.

18. No work is authorized under this plan until [Wind Mountain] has complied with other state, federal and local regulations and has obtained the necessary permits.

19. All new disturbances associated with this plan amendment and the heap leach pads shall be graded, topsoil placed, and revegetated according to the standards set forth in the reclamation plan of the Wind Mountain Mine Plan of Operations, approved by BLM on September 1, 1992.

(ROD at 2-4.)

The FONSI accompanying the ROD determined that, based on the analysis in the EA, the quality of the human environment would not be significantly impacted by the decision to authorize the proposed action. It therefore concluded that an environmental impact statement (EIS) pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4332(2)(C) (2000), was not required. (FONSI at 1.)

Contemporaneously with issuance of the ROD and FONSI, BLM approved the Revised Closure Plan as an amendment to the plan of operations for the Wind Mountain Mine. The Approval Decision, which by its own terms expressly superseded the June 30, 1999, decision and the September 2, 1999, amended decision, specifically authorized

solution pipe burial in the heap leach pads; pond sludge disposal and final solution pond closure and reclamation; construction of leach fields to accommodate long term heap draindown and discharge of heap effluent to those leach fields; installation of downgradient monitoring wells; and a monitoring plan. Approximately one acre of new disturbance is expected as a result of these proposed activities.

The long term discharge to each leach field is expected to be 1 to 1.5 gpm. No more than 10 gpm of heap leach effluent shall be discharged to each leach field. The Pad 2 Preg pond will be kept open a minimum of one year, following initiation of discharge to the leach

fields, to receive and evaporate heap solutions in excess of 10 gpm per leach field.

(Approval Decision at 1-2.) BLM's approval of the Revised Closure Plan was subject to the listed stipulations and mitigation measures which track those incorporated into the ROD. (Approval Decision at 2-4.)

On appeal, both GBMW and the Tribe argue that the ROD and EA violate NEPA by failing adequately to address the Revised Closure Plan's possible impacts on groundwater. GBMW further alleges that BLM violated NEPA by failing adequately to consider the alternative of fully capping the heaps. The Tribe avers that BLM's decision conflicts with the Federal government's trust responsibility to the Tribe and fails to prevent unnecessary or undue degradation of public lands as required by the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. § 1732(b) (2000).

NEPA ARGUMENTS

GBMW asserts that the EA contains conclusions based on erroneous modeling, hydrologic analysis, assumptions, and data gathering which render it legally deficient as an environmental disclosure document. GBMW prefaces the arguments in its statement of reasons for appeal (GBMW SOR) with a challenge to BLM's analysis of draindown amounts. GBMW calculates the total volume of water remaining in the heaps as 575,000,000 gallons, 369,000,000 gallons of which are drainable. It provides its computations of the contaminants remaining in the rinsate to be drained from the heaps, *i.e.*, 11,700 tons of chloride, 200 tons of nitrate/nitrite, 11.6 tons of selenium, 4236 tons of sulfate, 0.20 tons of thallium, 29,300 tons of TDS, and .40 tons of WAD cyanide, which, it avers, far exceed Nevada MCLs. *See* GBMW SOR at 2-4 and notes 2-4. GBMW submits that the Revised Closure Plan does not use the requisite "high quality" data, insufficiently discloses significant impacts, and wrongly assumes that the leachate from the heaps will be reduced to 1 gpm. GBMW contends that the Plan's design defects stem from its failure to sufficiently

consider high rainfall years when infiltration will be greater than predicted; heterogeneities in the heap which will allow contaminant releases during high flow years or 24-hour precipitation amounts; fractures, faults, and heterogeneities in the unsaturated soil beneath the leach field which will allow contaminant laden leachate to reach the groundwater, and horizontal clay layers that will cause leachate from the leach fields to move horizontally rather than vertically.

(GBMW SOR at 6.) GBMW details these several charges individually.

With respect to precipitation, GBMW avers that the EA underestimates high precipitation years because it ignores high snowmelt years and relies on the WGEN model, which GBMW claims inaccurately simulates annual precipitation in northern Nevada. GBMW avers that the most important precipitation rates are the 24-hour events, which the model estimates as 0.94 inches, dramatically lower than the highest 24-hour precipitation events recorded at Reno, Elko, and Ely of 2.37, 4.13, and 2.87 inches, respectively. GBMW speculates that 2.37 inches of precipitation over 24 hours would create 5,100 gpm of flow that would inundate the leach fields and likely cause an overflow of contaminated rinsate onto the surface. GBMW adds that even if such drainage occurred over several days, the rate would still far exceed the 10 gpm capacity of the fields. (GBMW SOR at 7.)

GBMW challenges the EA's analysis of the quality and mobility of the rinsate. GBMW claims that BLM's predictions fail to acknowledge that large amounts of contaminants will remain in the heaps. GBMW questions BLM's assumptions about the characteristics of both the heaps and the vadose zone beneath the leach fields and above any potential groundwater. GBMW contests BLM's forecast of draindown rates in Appendix A, because BLM's assumption that only 25 acres of heap was rinsed at any given time, resulting in the conclusion that draindown of 2000 gpm will rapidly decrease to 100 gpm, allegedly underestimates the volume of water remaining in the heaps. (GBMW SOR at 8.)

GBMW insists that BLM's one-dimensional model failed to consider two important factors in designing the leach fields, heterogeneities and spatial variabilities in the heaps. (GBMW SOR at 7-9.) GBMW states that heterogeneities caused by randomly occurring large and small rocks, clay pockets that capture and hold water, and differing saturation levels affect hydraulic parameters such as vertical conductivity. GBMW points out that BLM itself acknowledged that the vertical conductivity calculated by the three tests it performed could be inaccurate due to these factors but nevertheless accepted an average of those three values as the basis for its analysis. GBMW also complains that, despite the fact that unsaturated hydraulic conductivity varies substantially with changing moisture levels, BLM's model assumes constant moisture levels across the heaps. *Id.* at 8-9.

GBMW cites a recent defense of a dissertation entitled "Experimental and Theoretical Studies on Leach Pad Hydraulics and Transport Behavior During Rinsing," in which the author questioned the accuracy of rinsate modeling. According to GBMW the author found that heterogeneities caused flow to be uneven across the heaps, leaving parts of the heaps with much higher contaminant concentrations than would be expected from the reported averages. Given these uncertainties in the calculations of draindown underlying the design of the leach fields, GBMW insists that BLM should request additional analysis before approving the Revised Closure Plan. (GBMW SOR at 9-10.)

GBMW contends that worse problems arise from the modeling of the flow of the rinsate from the leach fields into the ground because the natural soils and underlying bedrock are inherently more variable than the crushed rock forming the heaps. GBMW avers that variation in the size gradation of affected soils ranging from coarse gravel to fine gravel to sand, with attending fluctuations in hydraulic parameters such as “porosity,” “soil suction head wetting,” and “saturated hydraulic conductivity,” affects infiltration rates. (GBMW SOR at 10-11.) GBMW asserts that BLM’s analysis fails to consider the distribution of the parameters across the field. Id. at 11. GBMW maintains that BLM also ignores the effects of preferential flow, including macropore flow and fingered flow, and fractures in the bedrock, and that the combination of preferential flow, fracture flow, and saturation of the vadose zone “virtually guarantees” groundwater contamination. Id. at 11-13.

Given the EA’s acknowledgment of the presence of clay in association with the bedrock, GBMW questions BLM’s failure to discuss the presence or possibility of horizontal layers that would impede the predicted vertical flow and cause horizontal flow instead. According to GBMW, horizontal layers of impermeable clay could cause the contaminated leachate to flow laterally and eventually reach the fault bounding the site to the west, thus ensuring groundwater contamination. (GBMW SOR at 13.)

GBMW discounts BLM’s monitoring requirement, averring that by the time contaminants are detected offsite, it will be too late to rectify the situation because the flow will be on its way to the groundwater. (GBMW SOR at 13.) GBMW argues that BLM failed to adequately consider the alternative of capping the heaps with an impermeable clay layer to prevent seepage which, according to GBMW, would require 12-24 inches of clay instead of the 6 inches analyzed by BLM. GBMW discounts BLM’s choice to reject this alternative because it would require disturbance of about 15 to 20 acres of new borrow areas and because the 6-inch cap would reduce infiltration only by 50 to 75 percent. GBMW asserts that leach fields will disturb equivalent acreage and that additional topsoil could be imported from offsite. GBMW speculates that the only reason for not requiring capping is the cost. Id. at 14-15.

GBMW concludes that BLM ignored potential groundwater and soil surface contamination and violated NEPA’s fundamental commitment to prevent or eliminate damage to the environment. (GBMW SOR at 14.)^{3/} GBMW requests that the ROD be withdrawn, that BLM issue an EA with detailed consideration of the alternative of capping the heaps, and that BLM adequately consider the uncertainties of flow in the vadose zone and in fractures in the bedrock. (GBMW SOR at 1.)

^{3/} In a supplemental SOR (GBMW SSOR), GBMW asserts that groundwater textbooks emphasize that the science of hydrology is rife with uncertainty. (GBMW SSOR at 4.)

The Tribe argues that BLM violated NEPA by failing to gather sufficient information to adequately analyze the impact of heap effluent discharge on groundwater. The Tribe avers that the fractured rock system, numerous faults, and sheer zones affecting groundwater and storage, which underlie the project area, are extremely difficult to characterize without drilling because of the lack of continuity and that, absent such drilling in the infiltration fields, information critical to evaluating groundwater impacts is missing. According to the Tribe, information from production wells on the west side of the FLFZ and exploratory drill hole data do not suffice; rather a regional groundwater flow study is needed to determine the direction, speed, and ultimate destination of the contaminant migration from the mine and to form the basis for monitoring plans currently grounded on uncertain calculations. The Tribe also asserts that BLM ignored the effect of irrigation pumping in the San Emidio Desert Valley on contaminant movement and that monitoring contamination after discharge neither prevents contamination from occurring nor substitutes for the duty to gather sufficient information about the affected environment before approving a project. (Tribe SOR at 3-5.)

The Tribe maintains that the intentional discharge of metal laden heap effluents into the ground guarantees groundwater contamination and complains that BLM neither disclosed nor discussed the foreseeable impacts of the likely influx of metal contaminants on water resources on both sides of the FLFZ, including impacts to the Tribe's fisheries and/or other Tribal resources. The Tribe asserts that the 20 gpm of heap effluent authorized to be discharged is toxic, exceeds water quality standards for mercury, selenium, arsenic, silver, and other metals, and contains high concentrations of salts. The Tribe submits that the lack of definitive knowledge about the depth and quality of groundwater beneath the leach fields precludes any determination of the extent of the impacts to that water. The Tribe asserts that the column attenuation tests for toxic metals, upon which the FONSI was premised, are inherently flawed due to the tests' failure to replicate the conditions in situ. Even if the attenuation testing was conducted according to standard procedures authorized by the State, the Tribe nevertheless contends that the test data are only as good as the samples collected and that the EA provides no way to determine whether proper sampling was performed. The Tribe contends that BLM must prepare an EIS thoroughly examining these issues before deciding whether to approve the Revised Closure Plan. (Tribe SOR at 5-7.)

In its Answer and Opposition to Stay, Wind Mountain argues that GBMW's SOR must be rejected because it reiterates issues raised in comments on the EA and represents disagreement with BLM's conclusions insufficient to discredit those findings. (Wind Mountain Answer at 2-3.) Wind Mountain submits that BLM fully considered and incorporated GBMW's comments into the final version of the EA and that GBMW's dissatisfaction with BLM's ultimate conclusion provides no ground for reversing BLM. *Id.* at 3-4.

Wind Mountain counters each argument raised by GBMW. With respect to GBMW's allegation that BLM neglected to account for high levels of precipitation, Wind Mountain avers that BLM relied on site-specific data and factored in mitigating elements such as evaporation effects, excess infiltration capacity, vegetative cover, and overflow pond retention. (Wind Mountain Stay Opposition at 11 and n.11, citing EA at 4-6, 7, 22, 31-32, and Appendix A.) Wind Mountain discounts GBMW's contention that precipitation levels may be higher than estimated by BLM, pointing out that the precipitation data GBMW cites reflect conditions in cities between 75 and 200 miles from the project site, while the EA relies on empirical, site-specific modeling, citing the EA at 31-32 and Appendix A. Wind Mountain further asserts that GBMW ignores the storage capacity of the heaps modeled in Appendices A and B and the multiple safeguards incorporated into the leach field design to accommodate higher than expected precipitation, all of which clearly evince that BLM knew of the potential for excess precipitation and required measures to manage such a contingency. (Wind Mountain Answer at 6-7.)

Wind Mountain asserts that the EA also discussed GBMW's contention that drainage from the heaps might exceed the levels assumed by BLM, citing the EA at 4-6, 31-32, and Appendix B, the last of which provides a detailed analysis of the heap drainage modeling used by BLM. According to Wind Mountain, GBMW ignores the facts that the heaps have been freely draining since June 1997 when formal leaching ceased and that much of the water present in the heaps at that time has already drained and evaporated in the ponds and during spraying operations. (Wind Mountain Stay Opposition at 12, citing EA at 1-2, 3.) Wind Mountain submits that the cyclical application of fluid to the heaps at the mine resulted in only 25 acres of the heaps being saturated at the end of fluid recirculation, with the remaining acres fully drained. For this reason, Wind Mountain avers that the sampling of heap materials and the modeling of the fluid dynamics of the system set forth in Appendices A and B to the EA indicate that the average saturation levels of the heaps (4% moisture) are well below GBMW's full saturation estimates and speculations. (Wind Mountain Answer at 5-6.)

Wind Mountain counters GBMW's argument that heterogeneities may affect drainage estimates by pointing out that not only does the EA provide a detailed response to this issue at page 7 and Appendices A and B, but also that empirical evidence during the last two years in which the heaps have been freely draining supports BLM's conclusion that draindown will be less than the maximum capacity of the leach fields. (Wind Mountain Stay Opposition at 13, citing EA at 31-32.) Wind Mountain submits that the EA also evaluated GBMW's concerns that heterogeneities and fractures in the soil and bedrock beneath the leach fields might conduct water to nearby groundwater and cause contamination, and that horizontal clay layers might exist beneath the leach fields and cause horizontal migration of discharged water, citing the EA at 4-5, 33, 34, and Appendix A. Wind Mountain notes that this

analysis, which relied on modeling and data more specific than the generic treatises cited by GBMW, demonstrates that the flow of discharged water would be downward rather than in discrete zones across fractures. Wind Mountain adds that GBMW also ignored the contingency measures set up in the EA at 13-16, including the monitoring system, to determine whether horizontal migration is occurring and to prevent any substantial impact to groundwater. (Wind Mountain Stay Opposition at 13-14.) Wind Mountain contends that BLM was fully aware of the potential for heterogenous flow, acknowledged the limitations of the one-dimensional model it utilized, compensated for any potential inaccuracies in its drainage analysis by conservatively estimating flow patterns with a one-dimensional model as documented in both Appendix A at paragraph 1.5 and in Appendix B, and required safeguards in the event unanticipated circumstances arose. (Wind Mountain Answer at 7-8.)

With respect to the alternative of fully capping the heaps to reduce precipitation flow, Wind Mountain notes that the EA at 17 and 38 comprehensively discussed this alternative, and concluded that, not only would requiring a more extensive cap create an additional environmental disturbance, but also that it was unnecessary given the degree of permeability on the heaps that could be maintained with partial caps of growth media without any adverse environmental effects. Wind Mountain contends that GBMW's preference for a full cap and disagreement with BLM's ultimate rejection of that alternative do not suffice to establish error in BLM's decision. (Wind Mountain Stay Opposition at 14-15, 18-19; Wind Mountain Answer at 4.)

Wind Mountain submits that GBMW failed to respond to three crucial BLM findings underpinning the conclusion that approving the Revised Closure Plan would not create significant impacts to groundwater: 1) the lack of groundwater to a depth of at least 600 feet beneath the project site which effectively refutes GBMW's hypothetical cross-fault migration, citing the EA at 33; 2) the current non-potability of water west of the FLFZ and natural concentrations of chemicals and contaminants exceeding Nevada MCLs documented in the EA at 33 which negate any possible cross-fault migration's adverse effects on present or reasonably projected uses of that water; and 3) the system of monitoring wells across the fault zone which will enable BLM to promptly respond to any unanticipated cross-fault migration of discharge, citing the EA at 13-16. (Wind Mountain Answer at 9; see also Wind Mountain Stay Opposition at 20-21.) Wind Mountain notes that, based on an independent evaluation which included reviewing and responding to comparable comments from GBMW and the Tribe, NDEP has confirmed BLM's determination that the Revised Closure Plan is environmentally acceptable. (Wind Mountain Stay Opposition at 22.)

For the same reasons, Wind Mountain refutes the Tribe's arguments. The Tribe's supposition that faults and fractures in the bedrock might conduct groundwater towards the reservation and its claim that BLM's attenuation tests are

flawed fail, Wind Mountain avers, because BLM extensively considered and rejected the likelihood of horizontal or discrete migration, concluding that all site-specific evidence indicated downward flow and full dissipation and that the reservation's location upgradient from the flow of any potential groundwater in the area negated any risk of contamination even if some groundwater migration occurred. (Wind Mountain Stay Opposition at 15-16, citing EA at 22, 33-34, and Appendix B.)

BLM argues that neither appellant has demonstrated the existence of any significant adverse environmental impact warranting preparation of an EIS. (BLM Answer at 2.) BLM contends that it considered all the issues raised on appeal when they were first presented as comments on the EA and that appellants simply disagree with BLM's data, analysis, conclusions, and subsequent decision without demonstrating a clear error of law, fact, or procedure. (BLM Stay Response at 1.) BLM challenges GBMW's calculation of the volume of solution and the resulting amount of contaminants remaining in the heaps. BLM states that GBMW's speculations that the heaps were fully saturated not only is misleading and contrary to what actually occurred, but also is indefensible because the heaps would be geologically unstable at the point of saturation. (BLM Stay Response at 1-2.) BLM explains that the heaps were actually rinsed in 25-acre "leach/rinse cycle areas" which reduced the active leach area to 25 acres, not the 143 acres used in GBMW's water balance computation, and that BLM's modeling replicated existing field conditions as closely as possible by using the 25-acre active leach area as the basis for its water balance analysis. (BLM Answer at 3.) Because GBMW based its arguments on an entirely hypothetical water balance, BLM submits that those arguments are baseless. Id.

BLM states that potential groundwater contamination was the primary impact of concern throughout the EA process (BLM Stay Request at 4), and that its decision to proceed with the project was based on the presence of the FLFZ as a significant hydraulic barrier and the lack of a receiving aquifer beneath the leach fields because of the FLFZ, two conditions unrefuted by either GBMW or the Tribe. (BLM Answer at 2, citing EA at sections 3.2 and 4.1.2.).^{4/} BLM points out that its decision to proceed was "impact sensitive," rather than "volume sensitive," and that lack of a significant impact negates the import of the admitted uncertainties of predictions of the rate of flow. (BLM Answer at 2.) BLM adds that the leach fields were designed to prevent the lateral flow of effluent over the top of the FLFZ through the alluvial deposits and

^{4/} Admitting that its chosen approach relied on widely accepted technical practices and assumptions, BLM asserts that it did not rely on the computer-generated predictions to determine the level of impact significance for the proposal but, given the inherent errors associated with predictive computer models due to the theoretical impossibility of replicating the natural heterogeneity in the geological environment, only used the UNSAT2 model as a tool to assist in the decision-making process. (BLM Stay Response at 3-4.)

that the installation of monitoring wells both downgradient from the points of discharge and upgradient from the FLFZ further safeguards against effluent flow across the FLFZ. (BLM Stay Response at 4.)

As to the Tribe's contention that BLM failed to ascertain regional groundwater patterns, BLM points out that section 3.2 of the EA states that the available data indicate an overall northward groundwater gradient which, according to BLM, means that water would flow away from Tribal lands, and that section 4.1.2 of the EA concludes that discharges to the leach field would not impact groundwater resources. The Tribe's complaint that impacts to its resources, including its fishery, from groundwater contamination caused by the discharge of heap effluent into the ground are foreseeable fails, BLM submits, because the EA has shown that solutions are not expected to cross the FLFZ and because, even if they did, the regional flow of groundwater to the north away from Tribal lands and the monitoring program designed to detect solution accumulation in the FLFZ, render it highly unlikely that groundwater would become contaminated and migrate 10 miles southward through the San Emidio Desert and then another 10 miles through a mountain range to affect the Tribal fishery at Pyramid Lake. (BLM Answer at 4-5.)

BLM avers that it gathered sufficient information to adequately analyze the impact of heap effluent on groundwater. BLM points out that it utilized data from exploration holes and production wells to characterize depth to water on both sides of the FLFZ; provided the chemistry of the mine's production wells situated on the west side of the FLFZ, and of irrigation wells and geothermal fluids in the EA at 24, Table 3-1; discussed the effect on hydrology of the FLFZ as a major hydraulic barrier in the EA at section 3.2; and based the proposed test drilling for siting the downgradient monitoring wells partially on two structural lineaments crossing the project site. (BLM Answer at 4.) BLM adds that, rather than relying solely on data from production wells on the west side of the FLFZ, as the Tribe mistakenly assumes, the EA at 4 clarifies that BLM also dug 13 test trenches in the locations of the leach fields to characterize the soils below the infiltration fields. (BLM Answer at 4.)

In any event, BLM notes that it does not have a direct role in enforcing water quality requirements, pointing out that NDEP is the State agency with that regulatory authority. BLM reports that NDEP was concurrently working on a renewal of the water pollution control permit for the Wind Mountain Mine and that the renewal would need to be finalized before NDEP would allow Wind Mountain to discharge heap effluent into the leach fields. (BLM Stay Response at 4; BLM Answer at 5.)

Wind Mountain filed a supplemental brief updating the status of the renewal of its water pollution control permit. Wind Mountain states that, after independently reevaluating the Revised Closure Plan's potential to degrade groundwater and reviewing appellants' allegations, NDEP found that the plan had no potential to

degrade groundwater and renewed Wind Mountain's water pollution control permit on March 23, 2000. Although GBMW and the Tribe appealed NDEP's renewal decision, Wind Mountain notes that the Nevada Environmental Commission (NEC) rejected their arguments and upheld the closure plan, finding that no critical groundwater resources exist in the vicinity of the mine. Wind Mountain asserts that NEC discounted appellants' contentions that effluent could migrate across the FLFZ to impact water on the other side, concluding that even if such migration were to occur, the groundwater across the fault zone was already "non-potable, hydrothermal water with high temperatures and high [TDS], chloride, fluoride, iron, and manganese." (Wind Mountain Supplemental Brief at 4, quoting NEC decision.) According to Wind Mountain, NEC assumed that potable water occurred at a depth of 601 feet but nevertheless determined that the Revised Closure Plan posed no risk to the hypothetical groundwater reserve because the site analysis, empirical studies, and assumptions for the plan were accurate and conservative for the site, the system of monitoring wells ensured that mined areas would not release contaminants having the potential to degrade the waters of the State, and the plan therefore adequately protected the waters of the State from degradation. *Id.* Wind Mountain relies on the independent confirmation of its position by NEC, an agency with both expertise and experience in evaluating potential groundwater risks, as support for the FONSI and ROD and our rejection of GBMW's and the Tribe's appeals. *Id.* at 5. The Tribe submitted a brief response to Wind Mountain's supplemental brief, arguing that NEC's decision does not address any issues relating to BLM's duties under NEPA, FLPMA, and the Federal Government's trust responsibility to the Tribe and thus is not dispositive of this appeal. (Tribe Response at 2.)

[1] We recently addressed a BLM decision to approve an action based on an EA and FONSI in Great Basin Mine Watch, 159 IBLA 324, 352-53 (2003), in which we stated that a decision

will generally be affirmed if BLM has taken a "hard look" at the proposed action, identified relevant areas of environmental concern, and made a convincing case that the environmental impacts are insignificant or that any such impact will be reduced to insignificance by the adoption of appropriate mitigation measures. Southern Utah Wilderness Alliance, 159 IBLA 220, 234-35 (2003); Southern Utah Wilderness Alliance, 158 IBLA 212, 219 (2003); Colorado Environmental Commission, 142 IBLA 49, 52 (1997); Owen Severance, 118 IBLA 381, 385 (1991). We will ordinarily uphold a BLM determination that a proposed project, with appropriate mitigation measures, will not have a significant impact on the quality of the human environment if the record establishes that a careful review of environmental problems has been made, all relevant environmental concerns have been identified, and the final determination is

reasonable. Southern Utah Wilderness Alliance, 159 IBLA at 235; The Ecology Center, Inc., 140 IBLA 269, 271 (1997); Blue Mountains Biodiversity Project, 139 IBLA 258, 265-66 (1997). A party challenging BLM's decision has the burden of demonstrating with objective proof that the decision is premised on a clear error of law or demonstrable error of fact, or that the analysis failed to consider a substantial environmental question of material significance to the proposed action. Great Basin Mine Watch, 159 IBLA at 353; Southern Utah Wilderness Alliance, 158 IBLA at 219-20; The Ecology Center, 140 IBLA at 271. Mere differences of opinion provide no basis for reversal. Rocky Mountain Trails Association, 156 IBLA 64, 71 (2001).

Likewise, in Great Basin Mine Watch, 160 IBLA 87, 93 (2003), we rejected GBMW's challenge to a mine closure plan for its failure to identify a sound course of environmental action. We stated that the

particular context in which this appeal arises affects our determination of whether GBMW has met its burden. BLM approved a plan of operations for a heap leach mine decades ago, and subsequently approved various amendments to it. The mine has been operating for 17 years and must be closed. It was incumbent upon GBMW to explain how, in BLM's consideration of the closure plan and subsequent adoption of alternatives to mitigate adverse impacts of closure, a different and better outcome could have pertained had BLM followed GBMW's reasoning, notwithstanding the delay in closing a site with pre-existing environmental consequences that would be occasioned by the Board's accepting GBMW's argument and reversing the BLM decision.

Neither GBMW nor the Tribe has convinced us that BLM failed to take the requisite hard look at the Revised Closure Plan's potential impacts to groundwater. GBMW's challenge to the adequacy of the scientific assumptions, hydrologic analysis, data gathering, and modeling underlying the EA and ROD fails to withstand scrutiny. The critical flaw permeating GBMW's objections to BLM's analysis stems from its refusal to acknowledge and credit the site-specific information underlying BLM's assessment and the dearth of any such site-specific data supporting its claims. For example, GBMW's calculations of both the volume of rinsate remaining in the heaps and the amount of contaminants contained in that rinsate fail to acknowledge that the active leach area was limited to 25 acres at the end of the rinsing phase. GBMW erroneously assumes without justification in fact that the entire 143-acre leach pad area was completely saturated. GBMW's objection to precipitation rates used by BLM similarly disregards the fact that the analysis utilized site specific precipitation data. See, e.g., EA at 31-32, Appendix A at 2; see also Final Closure Plan at I (explaining that the 5.98-inch mean annual precipitation rate at the mine is anomalously low

because of local shadow effects). GBMW also fails to acknowledge that BLM considered the possibility that precipitation could exceed the predicted levels, factored in mitigating elements such as evaporation and vegetative cover, and required the retention of the Pad 2 Preg pond as an overflow pond and sufficient leach field sizing to provide excess infiltration capacity. See EA at 4-6, 7, 22, 31-32.

GBMW's assertions that BLM ignored heterogeneities in the heaps which would allow contaminant releases to occur during high flow periods; fractures, faults, and heterogeneities in the unsaturated soil beneath the leach fields which would allow contaminant laden leachate to reach groundwater; and horizontal clay layers that would cause leachate from the fields to move horizontally from the fields rather than vertically, when developing its predicted drainage flow, similarly fail. As both Wind Mountain and BLM point out, BLM utilized site-specific data, acknowledged the limitations of one-dimensional models, and compensated for those shortcomings by adopting the most conservative approach whenever uncertainty existed. See, e.g., EA at 31, Appendix A at 1, 2, 6, 19; Appendix B at 2. Empirical data from other heap leach pads in northern Nevada confirm the modeled rate, providing further support for the sufficiency of BLM's analysis. See EA at 32. As the court in Chemical Manufactures Association v. EPA, 28 F.3d 1259, 1264-65 (D.C. Cir. 1994), noted, "[t]hat the model does not fit every application perfectly is no criticism; a model is meant to simplify reality in order to make it tractable. * * * Hence the normal criterion by which to evaluate a model is not the accuracy of the assumptions from which it proceeds but the utility of the results it produces." GBMW's objections to BLM's conclusions are speculative and do not establish error in BLM's analysis.

The Tribe's challenge to the sufficiency of the groundwater information gathered by BLM fails because BLM based its characterization of the affected subsurface not just on data from the west side of the FLFZ and two exploratory wells on the east side of that zone, as the Tribe alleges, but also on information gleaned from 13 test trenches excavated in the proposed leach field areas. See EA at 4. The EA at 4 also recognizes that, while data from groundwater wells in the San Emidio Desert indicate an overall northward groundwater gradient, irrigation pumping might have a significant influence on regional groundwater patterns, thus refuting the Tribe's assertion that BLM ignored the effects of irrigation on contaminant movement. Nonetheless, the Tribe's argument regarding irrigation does not undercut BLM's finding regarding the northward gradient.

The record controverts GBMW's and the Tribe's contentions that approval of the Revised Closure Plan essentially guarantees groundwater contamination. BLM based its conclusion that no such contamination would occur on the un rebutted facts that no groundwater has been encountered at least 600 feet below the planned leach field areas on the east side of the FLFZ; that the existence of groundwater at a depth of 60 feet on the west side of the FLFZ indicates that there is very little groundwater

flow in the bedrock across the FLFZ; and that no critical groundwater resources exist in the vicinity of the mine because the water produced from the production wells on the west side of the FLFZ was non-potable, geothermal water containing high concentrations of TDS and other elements in excess of Nevada MCLs. See EA at 4. BLM also designed and imposed monitoring and mitigation requirements to prevent excess discharge into the leach fields (e.g., excess infiltration capacity and retention of an overflow pond) and to ensure that any possible, unanticipated cross-fault migration of contaminants would be swiftly discovered and rectified. See EA at 6-7, 13-16.

Both NDEP and NEC, the Nevada state agencies charged with protecting the quality of the State's groundwater, rejected GBMW's and the Tribe's arguments in the context of renewing Wind Mountain's water pollution control permit, finding that approval of the Revised Closure Plan would not contaminate and degrade State waters. While not dispositive, the Board generally defers to the interpretation of relevant state statutes and regulations adopted by state officials or agencies charged with the administration of the program involved, in the absence of any contrary State court decisions adjudicating the question. See Western Shoshone Defense Project, 160 IBLA 32, 52 (2003); Office of Surface Mining Reclamation and Enforcement v. Thompson Brothers Coal Co., 148 IBLA 148, 158 (1999). Thus, we find that GBMW and the Tribe have failed to meet their burden of showing error in BLM's decision.^{5/}

[2] GBMW also asserts that BLM erred in failing to adequately consider the alternative of fully capping the heaps. An EA must include a brief discussion of alternatives as mandated by section 102(2)(E) of NEPA, 42 U.S.C. § 4332(2)(E) (2000); see 40 CFR 1508.9(b); 516 DM 3.4(A). Section 102(2)(E) of NEPA requires, independent of the necessity to file a formal EIS, that every Federal agency "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E) (2000); see also 40 CFR 1501.2(c), 1508.9(b); City of Aurora v. Hunt, 749 F.2d 1457, 1466 (10th Cir. 1984); Great Basin Mine Watch, 159 IBLA at 354; Southern Utah Wilderness Alliance, 159 IBLA at 240-41; Larry Thompson, 151 IBLA 208, 219 (1999). The requirement that appropriate alternatives be studied applies to the preparation of an EA even if no EIS is found to be warranted. Southern Utah Wilderness Alliance, 159 IBLA at 240-41, citing Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228-29 (9th Cir. 1988), cert. denied, 489 U.S. 1066 (1989). "Such alternatives should include reasonable alternatives to a proposed action, which will accomplish the intended purpose, are

^{5/} Because the Tribe has not demonstrated that the Revised Closure Plan will have a significant impact on the quality of the human environment, we reject its contention that BLM was required to prepare an EIS in accordance with 42 U.S.C. § 4332(2)(C) (2000) before approving the plan.

technically and economically feasible, and yet have a lesser impact. 40 CFR 1500.2(e)." Southern Utah Wilderness Alliance, 158 IBLA at 217, citing Headwaters, Inc. v. BLM, 914 F.2d 1174, 1180-81 (9th Cir. 1990); City of Aurora v. Hunt, 749 F.2d at 1466-67; Sierra Club Uncompahgre Group, 152 IBLA 371, 378-79 (2000); Defenders of Wildlife, 152 IBLA 1, 9 (2000); Larry Thompson, 151 IBLA at 219-20; see also 43 CFR 1501.2, 1502.14, 1508.9. Mere disagreement or difference of opinion as to the proper alternative does not establish error in BLM's choice of alternatives. Blue Mountains Biodiversity Project, 139 IBLA at 267.

Sections 2.2.4 and 4.24 of the EA discuss the alternative of fully capping the heaps. (EA at 17-18, 38.) The EA states that placing a 6-inch layer of growth material over the entire surface of both leach pads instead of just half would require the disturbance of an additional 15-20 acres of new borrow areas. Since experience with closure of other heap leach pads indicated that a 6-inch thick layer of growth material would reduce the infiltration rate by 50-75% in the areas where the growth media was applied, the EA determined that applying growth media to the entire surface of the heaps would reduce infiltration to about 0.5-1.0 gpm lower than the 1.25-2.25 gpm attained if growth media were only placed over half the pad area. The EA therefore determined that application of the additional growth media would provide only a marginal decrease in the long term flow rate from the heap leach pads. (EA at 17-18.) In addressing the environmental consequences of this alternative, the EA concluded that "the additional site disturbance required for full application of growth material is not justified by the marginal reduction in the long term flow rate." (EA at 38.) GBMW has presented nothing undermining BLM's analysis of this alternative, and its mere disagreement or difference of opinion as to the proper alternative does not suffice to establish error in BLM's choice of alternatives. Western Shoshone Defense Project, 160 IBLA at 53; Blue Mountains Biodiversity Project, 139 IBLA at 267. Accordingly, we reject GBMW's contention that BLM failed to adequately consider the alternative of fully capping the heaps.

TRIBAL TRUST ARGUMENTS

The Tribe argues that BLM's decision violates the Federal Government's trust obligations to the Tribe. The Tribe avers that BLM neither mentioned nor fulfilled its duty to preserve and protect Tribal interests when making decisions that may affect those interests, which, the Tribe asserts, is a separate, enforceable fiduciary duty, complementary to BLM's obligations under NEPA and FLPMA. According to the Tribe, BLM failed to address impacts to Indian trust assets or analyze the project's consistency with its trust responsibility. The Tribe insists that at a minimum BLM must disclose these duties in the EA and discuss impacts from the proposed action in terms of those duties, neither of which it did here. Nor, the Tribe submits, despite Departmental directives requiring BLM to ensure that any anticipated effects on Indian trust resources are specifically addressed in an EA, did BLM clearly explain

how the decision would be consistent with the Department's trust responsibility. The Tribe maintains that its reservation and many resources relied upon by Tribal members are intimately connected to the area affected by the Revised Closure Plan and that BLM's failure to gather adequate data and disclose impacts to water quality and quantity, fisheries, wildlife, and cultural resources therefore violate its trust obligation to protect the Tribe's interests in making decisions on the use of public lands. (Tribe SOR at 7-9.)

Wind Mountain contests the Tribe's assertion that BLM violated its trust responsibility to the Tribe, pointing out that BLM formally consulted with the Tribe and explained the rationale for its decision and the potential effects of the decision on Tribal assets. Wind Mountain stresses that no Tribal resource would be at risk of contamination even if some groundwater migration did occur because the Tribe's reservation is located upgradient from the flow of any potential groundwater in the area. (Wind Mountain Stay Opposition at 16, citing EA at 22, 29, 36-37.)

BLM avers that all available information and general groundwater principles indicate that Tribal land and resources are upgradient from the mine site and unlikely to be affected by conditions at the mine. BLM notes that the EA discussed the lack of impacts to Tribal resources at sections 3.9 and 4.19. BLM points out that, despite the lack of adverse impact to Tribal resources, it nevertheless consulted with the Tribe because of the Tribe's expressed concerns. BLM therefore contends that it fully met its trust obligation. (BLM Stay Response at 4; BLM Answer at 4.)

[3] The Federal Government's general duty to deal with Indian Tribes according to the "most exacting fiduciary standards" is well enshrined. Seminole Nation v. United States, 316 U.S. 286, 297 (1942). This trust relationship and consequent fiduciary duty generally arise from specific directives appearing in a treaty, statute, agreement, or other indication that the United States intended to act as a trustee in its particular dealings with an Indian tribe. See National Wildlife Federation, 140 IBLA 85, 102 (1997), and cases cited. No such treaties, statutes, agreements, or other indications of intent to act as a trustee have been called to our attention here. In addition to these specific mandates, Government actions have been held to be subject to a general trust responsibility. Island Mountain Protectors, 144 IBLA 168, 184 (1998); see United States v. Mitchell, 463 U.S. 206, 225 (1983); Nance v. EPA, 645 F.2d 701, 710-11 (9th Cir. 1981); The Havasupai Tribe v. United States, 752 F. Supp. 1471, 1486 (D. Ariz. 1990), aff'd, 943 F.2d 32 (9th Cir. 1991), cert. denied, 503 U.S. 959 (1992); see also F. Cohen, Handbook of Federal Indian Law, Ch. 3, § C2c (1982 ed.). The Tribe and BLM agree that BLM has a trust responsibility to consider and protect Tribal resources and that "a federal agency's trust obligation to a tribe extends to actions it takes off a reservation which uniquely impact tribal members or property on a reservation." Northern Cheyenne v. Hodel,

12 Indian L. Rep. 3065, 3071 (D. Mont. 1985), 851 F.2d 1152 (9th Cir. 1988) (review of injunction); Island Mountain Protectors, 144 IBLA at 184.

The Tribe has not shown that BLM failed to fulfill its trust responsibility here. After receipt of the Tribe's comments on the initial June 1999 EA for the Revised Closure Plan, BLM initiated formal consultation with the Tribe, meeting with Tribal leaders on October 13, 1999, to discuss the Tribe's concerns. BLM took the Tribe's concerns into account in the revised November 1999 EA, specifically finding that, in light of the analysis and monitoring procedures adopted in the EA, no adverse impacts to Tribal resources were anticipated. See EA at 29, 36-37. Although the Tribe speculates that groundwater contamination caused by the discharge of heap effluent into the ground might somehow reach Tribal land and impact Tribal resources, it has not shown how, given the regional groundwater flow to the north away from Tribal lands and resources and the monitoring program designed to detect solution accumulation in the FLZ, any groundwater "would become contaminated and migrate 10 miles southward through the San Emidio Desert, then another 10 miles through a mountain range to affect the Tribal fishery resources at Pyramid Lake, all prior to being detected in the monitoring wells." (BLM Answer at 4.) The Tribe has not convinced us that BLM erred in concluding that approval of the Revised Closure Plan would not impact Tribal resources and trust assets. We find no merit in its contention that BLM violated its trust responsibilities in approving the plan.

FLPMA ARGUMENTS

Finally, the Tribe alleges that BLM violated its duty under FLPMA to prevent unnecessary or undue degradation to public lands by neglecting to adequately consider the effects of the Revised Closure Plan on other resources and land uses and by failing to comply with applicable environmental protection statutes and regulations in approving the mine discharge. Specifically, the Tribe contends that BLM failed sufficiently to consider the effects of heap effluent discharge on groundwater within and outside the immediate discharge area; neglected to propose, initiate, and complete reasonable mitigation measures; and omitted the necessary preliminary steps of identifying and assessing impacts to affected resources. The Tribe further submits that BLM's lack of compliance with NEPA in approving the Revised Closure Plan also violates its duty to protect the public land from unnecessary or undue degradation. (Tribe SOR at 9-10.)

Wind Mountain contends that the Tribe's allegation that BLM violated its FLPMA duty to prevent unnecessary or undue degradation to public lands fails because the EA properly concluded, based on extensive site-specific data and analysis, that there would be no adverse environmental effects from leach field operations and thus no unnecessary or undue degradation. (Wind Mountain Stay Opposition at 19-20.) BLM asserts that the extensive efforts it made to address heap

effluent management at the mine closure through the NEPA process, the comprehensive environmental protection measures and monitoring plan set forth in the EA at sections 2.1.3 and 2.1.4, the thorough discussions of other resources in the EA, and the extensive mitigation measures and best management practices addressed throughout the EA amply support its position that it fulfilled its FLPMA duty to prevent unnecessary or undue degradation of the public lands. (BLM Answer at 4-5.)

[4] The regulations at 43 CFR Subpart 3809 (2000) implement the Secretary's statutory duty under section 302(b) of FLPMA, 43 U.S.C. § 1732(b) (2000), to manage public lands to prevent unnecessary or undue degradation. See 43 CFR 3809.0-1 (2000).^{6/} The rules define unnecessary or undue degradation as

surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations. Failure to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas[,] or creation of a nuisance may constitute unnecessary or undue degradation. Failure to comply with applicable environmental protection statutes and regulations thereunder will constitute unnecessary or undue degradation.

43 CFR 3809.0-5(k) (2000); see 43 CFR 3809.2-2 (2000); Great Basin Mine Watch, 159 IBLA at 347; Legal and Safety Employer Research Inc., 154 IBLA 167, 174 (2001); Island Mountain Protectors, 144 IBLA at 202. The provisions of section 302(b) of FLPMA, like those of NEPA, require BLM to consider the nature and extent of surface disturbance resulting from a proposed operation and environmental impacts on resources and lands outside the area of operations. Legal and Safety Employer Research Inc., 154 IBLA at 175, citing Kendall's Concerned Area Residents, 129 IBLA 130, 140-41 (1994); Nez Perce Tribal Executive Committee, 120 IBLA 34, 36 (1991); see Sierra Club v. Hodel, 848 F.2d 1068, 1091 (10th Cir. 1988).

The EA concluded that the proposed action would not degrade receiving waters because:

^{6/} On Nov. 21, 2000, BLM amended the regulations in 43 CFR Subpart 3809, effective Jan. 20, 2001. See 65 FR 69998. BLM again amended 43 CFR Subpart 3809 with publication of final rulemaking in the Federal Register on Oct. 30, 2001, effective Dec. 31, 2001. See 66 FR 54834. Citations to 43 CFR Subpart 3809 in this decision refer to provisions in effect before the Nov. 21, 2000, amendments.

- Based on the results of the column tests and the depth to ground water, there is an excess of material in the native soils beneath the leach fields for attenuating all constituents in the seepage to below Nevada MCLs.
- The data from drilling shows that this Proposed Action would not impact the shallow groundwater on the west side of the FLFZ.

(EA at 39.) As noted above, NDEP and NEC also concluded that the Revised Closure Plan would not degrade State waters.

The Tribe's challenge to this conclusion rests on its NEPA arguments. Our rejection of those NEPA challenges and determination that BLM fully complied with NEPA mandate rejection of the FLPMA claims as well. Specifically, we find that the Tribe has not shown that BLM neglected to identify and assess impacts to affected resources, including the effects of heap effluent discharge on groundwater within and outside the immediate discharge area, or failed to propose, initiate, and complete, reasonable mitigation measures. To the contrary, as discussed in detail above, BLM comprehensively studied the affected environment, evaluated the potential adverse effects of discharging heap effluent into the ground through the leach fields, and established a detailed monitoring program to detect any unanticipated groundwater contamination. The Tribe has not demonstrated that BLM violated any applicable environmental protection statutes and regulations. We conclude that BLM fulfilled its FLPMA duty to prevent unnecessary or undue degradation of the public lands.

To the extent not specifically addressed herein, GBMW's and the Tribe's arguments have been considered and rejected.

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

Lisa Hemmer
Administrative Judge

I concur:

Bruce R. Harris
Deputy Chief Administrative Judge