Institute for Energy Economics and Financial Analysis

Effects of Mining Activity in Black Mesa's N-Aquifer Go Unacknowledged

OSMRE's Standards of Reclamation Failed to Hold Peabody Accountable for Environmental Impact

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Key Findings

The U.S. Department of the Interior has failed to hold Peabody Western Coal Company responsible for the effects of its decades-long mining activities in the Black Mesa region of Arizona.

Despite the recent release of reclamation bonds, neither Peabody nor OSMRE have addressed the critical issue of Peabody's overuse of groundwater in the region.

The validity of the data produced by the USGS and Peabody is questionable, and the DOI should require the completion of a valid, unbiased hydrological study of the Black Mesa.

OSMRE decisions may have been fair decades ago—when the impact of climate change was not so severe—but the standards and expectations of reclamation plans made in the 1990s are unsuitable for the reality of 2023.

Executive Summary

The U.S. Department of the Interior (DOI) has an obligation to hold coal companies accountable for the environmental damage caused by their mining activities. Despite that obligation, its Office of Surface Mining Reclamation and Enforcement (OSMRE) has begun releasing bonds that were an incentive for Peabody to adequately restore the land damaged by their mining activity in the Black Mesa region of the Navajo Nation. The release disregards the fact that OSMRE has been on notice for decades about the material damage to Peabody's use of water from the Navajo Aquifer (N-Aquifer) in the Black Mesa region.

Peabody used hundreds of thousands of gallons of water daily from one of the only potable sources of water in the Black Mesa region, which is located in the Four Corners desert region of Arizona and is on reservation land for both the Navajo and Hopi tribes (See Figure 1). Peabody's mines operated for almost five decades on tribal lands, depleting scarce water sources, yet OSMRE did not include water use or aquifer depletion in its considerations of environmental damages caused by Peabody.[1] The oversight demonstrates a flaw in OSMRE's criteria for environmental reclamation and a failure on the part of the DOI to hold Peabody accountable and uphold its trust responsibilities to the Navajo and Hopi tribes in Black Mesa.

Figure 1: Map of Affected Areas on Navajo and Hopi Reservation Land

Source: IEEFA.

[1] National Research Defense Council. After the Local Coal Mine Shuts Down, These Navajo and Hopi Communities Seek a Just Transition. October 20, 2020.

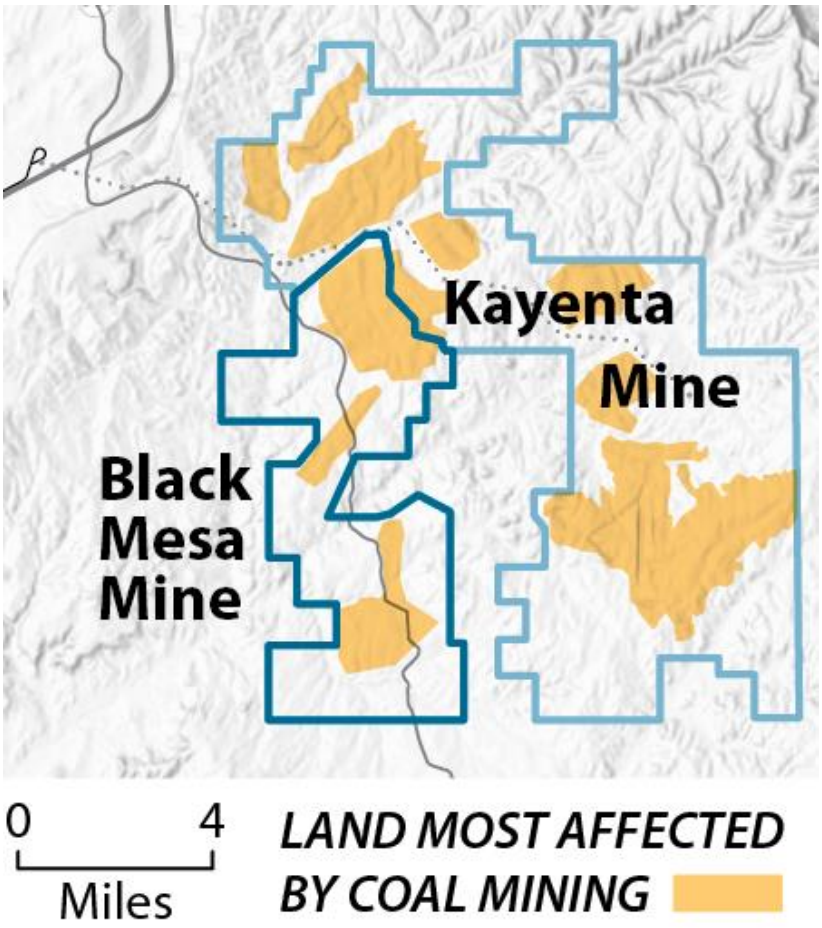
Introduction

The Office of Surface Mining Reclamation and Enforcement (OSMRE), part of the Department of the Interior (DOI), has failed to hold Peabody Western Coal Company responsible for the effects of its decades-long mining activities in the Black Mesa region of Arizona. OSMRE was established in 1977 by the Surface Mining Control and Regulation Act (SMCRA). A key part of OSMRE's mission statement is to ensure "that the land is restored to beneficial use following mining."[2] Coal communities across the country depend on OSMRE to protect their interests by holding coal companies accountable for reclaiming land damaged during mining operations. This is often accomplished by requiring mining companies to post bonds with OSMRE, which are returned to the companies only after they have reclaimed the land to standards set by SMCRA. But the standards set by SMCRA fail to account for regionally specific needs and also do not consider the effects of climate change. The recent release of Peabody bonds also shows a willingness on the part of OSMRE to overlook certain failures to meet the standards that are set, as demonstrated by the evidence presented to OSMRE employees by citizens of the Forest Lake Chapter of the Navajo Nation who live in the affected areas. As a result, OSMRE is failing to uphold its responsibilities to the coal communities on the Navajo and Hopi reservations.

Peabody Western Coal Company operated two mines for decades in the Black Mesa region: The Black Mesa mine, which opened in 1965 and was open until 2005, and the Kayenta mine, which opened in 1973 and operated until 2019 (See Figure 2). The mines produced an average of 14 million tons of coal per year and pumped billions of gallons of groundwater from the Navajo Aquifer (N-Aquifer), one of the only potable sources of water in Black Mesa.

[2] Office of Surface Mining Reclamation and Enforcement. Mission Statement.

Figure 2: Map of Kayenta and Black Mesa Mines



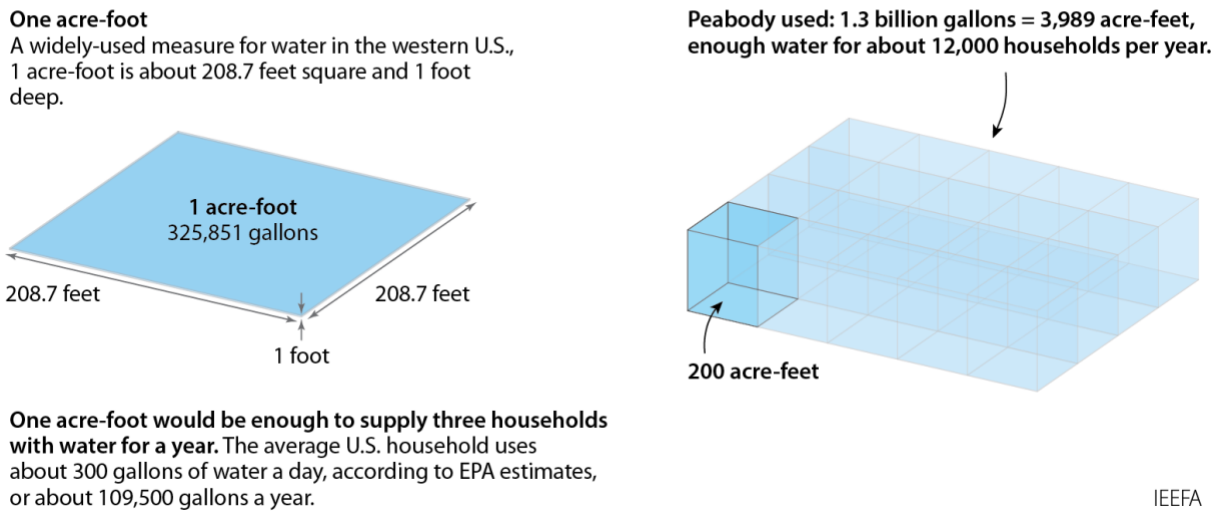
Source: IEEFA.

Peabody pulverized the coal that was mined at Black Mesa and then made a slurry that was pumped almost 300 miles away to a power plant in Nevada, using 1.3 billion gallons of scarce water annually.[3] In 2021, the Arizona Department of Water Resources found that an average of 3.5 homes can be served every year by a single acre-foot of water.[4] One acre-foot is approximately 325,851 gallons of water, meaning Peabody used about the amount of water that could supply 14,000 households in a year (See Figure 3).

[3] Cultural Survival. The Black Mesa Controversy. May 7, 2010.
[4] Arizona Department of Water Resources. How Many Homes In Arizona, On Average, Share An Acre-Foot of Water Each Year? April 19, 2021.

Figure 3: How Much Are 1.3 Gillion Gallons, the Water Peabody Used Each Year?

Peabody Energy drained vast amounts of water from an underground aquifer to support their coal mining operations at its Black Mesa and Kayenta coal mines in Arizona, consuming about 1.3 billion gallons a year. That's enough to meet the water needs of almost 12,000 households, or more than one-quarter of the 41,800 households in the Navajo Nation in 2021.



Source: IEEFA.

Water Overuse, Not Just Water Quality, Should Have Been Taken Into Consideration Before Releasing Bonds

Peabody has pushed for OSMRE to release its reclamation bonds, and OSMRE recently approved the return of two of the three sets of bonds it holds. The total surety bonds held for the mines is $178.6 million.[5] But neither Peabody nor OSMRE has addressed the critical issue of Peabody's overuse of groundwater in the region. The release of the bonds ($12.7 million in Phase I bonds and $4.6 million in Phase II bonds) totaling $17.3 million constitutes an approval by the federal government of Peabody's reclamation efforts at the former mines—that is, restoring the land for an approved use.[6, 7] In this case, the lands are intended to be grazing areas for livestock. However, livestock need potable water as much as the communities that raise them. And damage to the N-Aquifer also means damage to the herds, since depleted groundwater levels prevent livestock from finding natural springs. Consequently, hydrological impacts and material damage to the N-Aquifer cannot be meaningfully separated from reclamation in Black Mesa, but OSMRE has not acknowledged the damage. Peabody cannot recover the remainder of the bonds until a minimum of ten years has elapsed since the release of the Phase II bonds; the Phase III bonds are conditional

[5] Office of Surface Mining Reclamation and Enforcement. Peabody Bond Release Decision Document. 19 December 2022
[6] *Ibid.*
[7] *Ibid.*

on—among other things—the survival of the flora planted during the reclamation process for a period of ten years, without human assistance.

> **By focusing only on water quality and omitting issues regarding water use, OSMRE has rendered its oversight ineffective and failed in its mission to protect coal communities.**

OSMRE disregards the impact of Peabody's excessive use of water from the N-Aquifer in public meetings and in its reports. The agency also has refused to consider the region-specific aspects of reclamation in Black Mesa. The N-Aquifer is one of the only potable sources of water in the arid Arizona desert and provides water for Indigenous communities that face unique challenges. The communities hold strong cultural and material connections to the land. Damage to the N-Aquifer threatens the ability of the Navajo and Hopi communities to continue to live on their ancestral lands as access to water becomes scarcer.

The office's only nod to water issues in connection with the bond release concerned water quality, not water use. OSMRE remarked that Peabody's mining had a minimal effect on the quality of the water in the N-Aquifer.[8] However, water use in the desert is just as important of a factor in reclamation as water quality. By focusing only on water quality and omitting issues regarding water use, OSMRE has rendered its oversight ineffective and failed in its mission to protect coal communities.

OSMRE Knew That Peabody's Flow Model Was Inherently Flawed but Relied on It Anyway

A 2006 report from the Natural Resources Defense Council (NRDC) examined four criteria set by the Cumulative Hydrologic Impact Assessment (CHIA) required by OSMRE. It found that Peabody had failed to prevent material damage to the N-Aquifer and the overall hydrological balance of the area.[9] The NRDC conducted a technical review of the flow model Peabody developed (and used to justify its water usage) in cooperation with the United States Geological Survey (USGS) and OSMRE. The study concluded that the model "is inadequate to address all relevant consequences of mining on the hydrologic balance (and associated, existing CHIA criteria)" and "is otherwise flawed in important ways that destroy its utility and credibility."[10,11] Flaws include the model's reliance on the assumption that there will be a continuous supply of water to replace the amount used by Peabody—another

[8] United States Department of the Interior. Fact Sheet about the N-Aquifer. September 22, 2022.
[9] National Resources Defense Council. Drawdown: An Update on Groundwater Mining on Black Mesa. March 19, 2006.
[10] U.S. Department of the Interior. Fact Sheet about the N-Aquifer. September 22, 2022.
[11] National Resources Defense Council. Drawdown: An Update on Groundwater Mining on Black Mesa. March 19, 2006.

case of OSMRE's failure to acknowledge the unique impact that water use has on the communities in the Black Mesa region.

A 2010 study by Daniel Higgins, an advisor to the Black Mesa Trust on water resource management issues, found that OSMRE released a new hydrological assessment for the region in 2008 that changed the criteria for material damage.[12] The new CHIA essentially alleviated the burden on Peabody to meet the standards of the previous assessment by removing "[t]hose criteria expressing the declining trends identified in this [audit]" and revising the remaining criteria to give Peabody "insurmountable damage thresholds."[13] It also added that Peabody's own modeling would be used instead of monitoring data to determine if the coal miner met the new criteria, effectively removing oversight from the review process.[14] Higgins found the accuracy of the flow model put forward by Peabody was "highly questionable" because it was missing multiple data points due to unknown conditions—since a full hydrological survey of the area has never been completed—and because the model introduced geological formations that do not actually exist.[15]

When looking at the predictions in a 1990 environmental impact statement (EIS) issued by OSMRE for a permit application, Higgins found that "the mine's effects were underestimated; the municipalities effects were overestimated; the linear relationship between water-level and spring discharge was not accurately represented; and … wells that were predicted to recover to 1985 water-levels (expected by 2009) had no recovery."[16,17] Higgins found that most N-Aquifer wells continue to decline despite water withdrawals having been reduced by more than 70% several years earlier.[18]

In 2011, Higgins submitted public comments on Peabody's permit renewal application for the Kayenta mine, noting that "despite the declining trends in the monitoring data, and despite the evidence of mine-related impacts in prior public comments (July 2011), OSM[RE] maintains that all declining trends are the result of either tribal community withdrawals or recent drought conditions."[19] In 2008, OSMRE eliminated all of the material damage criteria for the specific mine-related effects that had been identified in the public comments, giving Peabody a free pass on future and existing damages related to material damage of the aquifer, and making it possible for the remaining $161 million in bonds to be returned without Peabody ever having to address the damage it caused to the N-Aquifer.[20]

[12] Black Mesa Trust. Circle of Advisors.
[13] Daniel Higgins. The Black Mesa Case Study: A Postaudit and Pathology of Coal-Energy Groundwater Exploitation in the Hopi and Dine Lands, 1968-2008. 2010.
[14] *Ibid.*
[15] *Ibid.*
[16] Office of Surface Mining Reclamation and Enforcement. Proposed Permit Application, Black Mesa-Kayenta Mine, Navajo and Hopi Indian Reservations, Arizona. May 17, 1990.
[17] Daniel Higgins. The Black Mesa Case Study: A Postaudit and Pathology of Coal-Energy Groundwater Exploitation in the Hopi and Dine Lands, 1968-2008. 2010.
[18] *Ibid.*
[19] Daniel Higgins. Comments on Peabody Western Coal Company's Permit Renewal For the Kayenta Coal Mine. October 2011.
[20] *Ibid.*

The comments in 2011 by OSMRE only repeated the pattern of shielding Peabody from accountability by ignoring previous public comments and excusing Peabody's impact on the aquifer by blaming the decline on drought conditions or use by tribal communities—30% of which do not have access to water. The 2008 change in standards was made without a full hydrological study of the aquifer or consistently monitoring water levels. Drought and community water use were used as scapegoats; the effects of Peabody's mining operations were ignored. The Higgins study indicated that declining water levels in the area had "a strong, statistically significant relationship with the rate of Peabody's groundwater withdrawals" while neither community use nor droughts had a statistically significant relationship to the affected springs.[21] Reclamation involves restoring land back to its original use; OSMRE's blaming of communities for declining water levels effectively ignores the Interior Department's responsibility to the Navajo and Hopi nations—the right to continue living in their ancestral homeland. Without a complete hydrological study, communities in the area cannot plan for the future because they are uncertain about their most precious resource.[22]

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OSMRE Did Not Consider the Unique Conditions of the Region—or the Indigenous Communities Living There

For the Navajo and Hopi, water is not just important to sustaining their lives and cattle, but also their culture. The lack of water in the region threatens the cultures of the Indigenous people. The unique role of water in Indigenous cultures is an important aspect that OSMRE has ignored. Nicole Horseherder, executive director of Tó Nizhóní Áni, a Diné-led nonprofit, observed:

> "Years ago, on Black Mesa, our livestock drank from springs and seeps across the plateau. Water appeared in the mornings, and our animals grazed the native grasses that had sustained them for generations. Today, my family still lives and works on Black Mesa, raising sheep and horses, but the seeps and springs have all dried up. We haul water from community wells. It's dangerous, costly, and time-consuming to haul all your water needs from 30 miles away."[23]

Approximately 30% of Navajo do not have access to reliable drinking water, and 1 in 3 Navajo households do not have a sink or toilet in their homes. Navajo are 67 times more likely than other

[21] Daniel Higgins. The Black Mesa Case Study: A Postaudit and Pathology of Coal-Energy Groundwater Exploitation in the Hopi and Dine Lands, 1968-2008. 2010, p. 14.
[22] Office of Surface Mining Reclamation and Enforcement. About OSMRE.
[23] Tó Nizhóní Áni. Navajo, U.S. Officials Must Defend Restoration of Black Mesa Before It's Too Late. March 18, 2022.

Americans to live without running water or a toilet.[24] In a region that typically only receives between seven and 11 inches of rainfall annually, water holds an even greater significance, especially when the impacts of global climate change make it uncertain if the area will continue to receive even that much precipitation to recharge its groundwater supply. In 2020, NRDC reported "[t]he dropping aquifer has made many wells useless, forcing families to drive miles to congested community water stations. The aquifer's decline poses health risks for Indigenous communities already staggered by the COVID-19 pandemic."[25]

Clearly, cultural issues hold even more weight as they blend into the material issues regarding water access for the communities who live in the Black Mesa region. Communities cannot plan for the future without knowing what resources are available. Without community planning, economic growth and sufficiency are not viable. Younger generations leave to find opportunities, small businesses fail or can never get off the ground, and companies have no reason to set up in the area unless the communities undervalue themselves, thus perpetuating the cycle of poverty for communities already disadvantaged by historical inequities.

During the public meeting called by OSMRE in September 2022, several tribal citizens made it clear that—regardless of Peabody's claims—they knew the aquifer had been affected because they could see it in the land. Natural springs were dried up and places where water used to be available year-round were no longer available.[26, 27, 28]

Many comments were made by tribal citizens regarding the reclamation itself, centered around the seeds from the Midwest being planted in the Arizona desert that require more water to survive—a resource that the region does not have to spare.[29] "The grasses are turning black after only a few weeks," said one citizen, "and we're told by Peabody that they just got a 'bad batch' of seeds."[30]

"We're told it takes time," said one tribal citizen, when commenting on the unsuitability of the plants in the reclaimed areas, "but what if it doesn't take and Peabody has been released from liability?"[31] There is a long history, he pointed out to the OSMRE employees present, of corporations abandoning their duties to Indian nations.[32] "We want to not be left with unusable land."[33]

For the Phase III bonds—which constitute a significant portion of the collateral posted by Peabody—to be released, the vegetation planted during the initial phases of reclamation must be able to survive without assistance for a period of at least 10 years.[34] As such, Peabody would still be liable for the

[24] Navajo Nation Department of Water Resources. About DWR - Executive Summary.
[25] National Resources Defense Council. After the Local Coal Mine Shuts Down, These Navajo and Hopi Communities Seek a Just Transition. October 20, 2020.
[26] Tó Nizhóní Áni. OSMRE Public Meeting. September 2022. 00:40:07
[27] *Ibid.* 00:53:54
[28] *Ibid.* 01:25:27
[29] *Ibid.* 00:58:00
[30] *Ibid.* 01:17:00
[31] *Ibid.* 00:14:30
[32] *Ibid.* 00:17:25
[33] *Ibid.* 00:26:32
[34] *Ibid.* 00:07:39

land for those 10 years. However, with Peabody having already filed for bankruptcy once, tribal citizens are concerned that Peabody's liabilities will be mitigated by subsequent bankruptcy. If Peabody decides forfeiting the remaining bonds is more cost-effective than restoring the land, the burden will fall on the local communities—the tribal nations whose reservation lands were impacted—to remedy the damage. The money from the Phase III bond would be available to finance the remaining reclamation at that point, but it would still leave the tribe responsible for the logistics of fixing the mess Peabody left behind, leaving the community without the use of the land for an indeterminate amount of time.

Conclusion

The DOI has a trust responsibility to the Indigenous communities of the United States. Once the reclamation bonds have been released, the government loses its leverage to compel additional cleanup activity, and any oversights on its part become the burden of the Indigenous communities of the region. Despite that, OSMRE only requires proof that coal companies have not contaminated local water supplies without considering the broader impacts of massive water overuse in arid landscapes and the distinct circumstances of the affected tribal communities therein. OSMRE released part of Peabody's bonds without addressing the material damage caused by the company's violation of OSMRE-established standards, setting a precedent that indicates that such violations are inconsequential and have no repercussions.

The validity of the data produced by the USGS and Peabody is questionable. The DOI should require the completion of an unbiased hydrological study of the Black Mesa to establish safeguards that prevent corporations from taking further advantage of tribal communities, especially before releasing the remaining bonds.

The partial release of Peabody's bonds despite the company's violations of CHIA criteria and without consideration of the effects of its operations sets a precedent of allowing coal companies to abuse the resources of communities with little accountability. DOI leadership should review the policies and procedures of OSMRE and adjust its methods accordingly by calling for new environmental impact assessments that consider the worsening effects of climate change—effects exacerbated by coal companies such as Peabody. OSMRE decisions may have been fair when the effects of climate change were not so apparent and widespread, but the standards and expectations of reclamation plans made in the 1990s are unsuitable for the reality of 2023. The DOI should ensure that coal companies are held accountable for their actual impacts on the environment and local communities.

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