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Attn: Navajo AUM Quivira Comments

May 22, 2024

Dear Mr. Larsen:

On behalf of the Red Water Pond Road Community Association's and Eastern Navajo Diné Against Uranium Mining's (collectively "Community"), please find below Community's comments on the U.S. Environmental Protection Agency's ("EPA") Final Engineering Evaluation/Cost Analysis for the Quivira Mine Complex ("EE/CA") in the Coyote Canyon, Pinedale and Standing Rock Chapters of the Navajo Nation. The Community supports EPA's recommended alternative, Alternative 3, with their suggested modifications. Alternative 3 entails removing Quivira Mine waste out of the Red Water Pond Road and Pipeline Road communities and transporting it to the Red Rock Landfill property. This alternative not only honors the Community's long held desire to have mine waste removed from their community and off the Navajo Nation,<sup>1</sup> but also protects public health for communities in the region.

#### I. General Comments

Community submits the following as comments on general matters that may touch on all or most of the considered alternatives. First, Community recommends that EPA

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<sup>1</sup> Some Navajo Nation officials have stated that the Navajo Nation or Navajo allottees own the subsurface estate at the Red Rock Landfill property. However, no person or entity has produced any documentation that credibly suggests that the Navajo Nation or any Navajo allottees have subsurface rights.

apply the two picocuries per gram (“pCi/g”) soil remediation goal to the entire Quivira Mine complex, not just those parts of the mine complex that are on Navajo Nation land. EPA proposes a soil remediation goal of 5.4 pCi/g for United Nuclear Corporation (“UNC”) lands where the Kerr-McGee evaporation ponds were located. Allowing a remediation goal on private land that is adjacent to Navajo Nation lands that is more than twice as high as the Navajo Nation lands remediation goal is technically indefensible. While the UNC lands may be fenced to restrict public access, they are not sheltered from weather. Wind and water are likely to carry more contaminated soil to adjacent lands, making the 2 pCi/g remediation standard meaningless on those adjacent lands.

Second, Community agrees with EPA’s position that it should not consider high-pressure slurry ablation as a remediation method at this time.<sup>2</sup> While ablation may be a feasible remediation sometime in the future, there are currently too many technical and legal uncertainties to allow that technology as a remediation method. Until federal and Navajo Nation regulatory agencies resolve those uncertainties, Community cannot support using ablation to remediate Quivira waste.

Third, EPA suggests that transporting Quivira waste for disposal at the White Mesa Mill in Blanding, Utah, may be a viable disposal alternative in the future.<sup>3</sup> Community unequivocally opposes this alternative either now or in the future. The White Mesa Mill has an abysmal record of protecting public health and the environment.<sup>4</sup> Moreover, the White Mesa Mill is located within the traditional homelands of the Ute Mountain Ute Tribe. Community is unwilling to subject another Native community ravaged by the uranium exploitation industry to additional insult by transporting Quivira mine waste to the White Mesa Mill for processing.

Additionally, transporting Quivira waste to the White Mesa Mill may subject the EPA or EPA contractor to the Navajo Nation Radioactive Materials Transportation Act, 18 N.N.C. § 1304, *et seq.* (“RMTA”). That statute provides that as a general matter, the Navajo Nation opposes transportation of radioactive materials over or on Navajo Nation lands, except for the purpose of transporting waste from historic uranium

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<sup>2</sup> EE/CA at 59.

<sup>3</sup> EE/CA at 6-62.

<sup>4</sup> See, e.g., Mimiaga, James, “EPA: Uranium Waste Pond at White Mesa, Utah out of Compliance,” *The Durango Herald* (April 13, 2022), available at: <https://www.durangoherald.com/articles/white-mesa-mill-violates-clean-air-act-epa-says/>.

production off Navajo Nation lands for disposal.<sup>5</sup> While transporting Quivira mine waste to White Mesa Mill might initially appear to be exempted from the RMTA, a closer reading reveals that waste going to the White Mesa Mill is likely subject to that statute. Important to that determination are the definitions of “products” and “activities”. “Products” are defined to include “radioactive products other than those used for medical purposes.”<sup>6</sup> “Activities” include processing “products.”<sup>7</sup>

While transporting “radioactive products other than those used for medical purposes”, such as mine waste, may not be illegal when those products are being transported for disposal that would not be the case if EPA transported Quivira mine waste to White Mesa mill. In that case, EPA would be transporting the “product” for processing<sup>8</sup> at White Mesa Mill, an “activity” under the RMTA, which would be prohibited pursuant to §§ 1307.A and 1307.E, without the required Navajo Nation permits. Moreover, EPA should not consider any alternative, no matter how casually, that is contrary to Navajo Nation policy. Transporting Quivira mine waste to White Mesa mill is clearly contrary to Navajo Nation policy.

Fourth, EPA proposes drilling an onsite water well to support construction activities.<sup>9</sup> Community does not oppose locating a water well onsite; however, if EPA chooses to drill and use an onsite water well for construction, Community recommends that the water well remain for community use after remediation is complete. The EPA should make every effort to complete the well in a formation that allows the community the benefit of long-term beneficial uses.

Further, EPA could have made a more thorough and accurate comparison among the proposed alternatives with respect to public health implications if it had assessed existing health conditions in the affected communities. There is no discussion or summary of existing health conditions either in the immediate area around the Quivira CR1 and CR1E mine sites (i.e., Red Water Pond Road Community and Pipeline Road Community) or more broadly in this area of McKinley County.<sup>10</sup> Several studies have

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<sup>5</sup> 18 N.N.C. § 1306.A.

<sup>6</sup> *Id.* at § 1305.3

<sup>7</sup> *Id.* at § 1305.1

<sup>8</sup> As the last remaining operational commercial uranium mill in the United States, it would be absurd to think that White Mesa’s operator would forego extracting residual uranium and other valuable minerals from the Quivira mine waste.

<sup>9</sup> EE/CA at 66.

<sup>10</sup> *Id.* at pp. 17-18.

documented increased incidence and mortality from kidney, stomach and biliary cancers (Navajo Epidemiology Center, 2023) across the Navajo Nation, and higher rates of cancers and kidney disease in McKinley County. Studies emerging from the DiNEH Project Kidney Health Study conducted by the University of New Mexico (“UNM”), the Southwest Research and Information Project (“SRIC”) and other collaborators between 2004 and 2012 found associations between proximity to waste sites and prevalence of chronic metabolic diseases, including hypertension, kidney disease and autoimmunity.<sup>11</sup> Women’s exposures to elevated concentrations of environmental metals were observed to influence adverse birth outcomes, leading to development of Navajo Birth Cohort Study (“NBCS”).<sup>12</sup> Later, metals in urine and blood samples provided by participants in NBCS were associated with body burdens significantly higher than U.S. adults as measured by the triennial National Health and Nutrition Examination Survey (“NHANES”) (UNM and SRIC data files), and with pre-term births and inflammatory agents.<sup>13</sup>

Based on self-reported health data by participants in the DiNEH Project, Harmon *et al.* found that people who live near abandoned mines had a worsening cardiovascular profile and evidence of elevated circulating inflammatory biomarkers.

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<sup>11</sup> Hund L, Bedrick EJ, Miller C, Huerta G, Nez T, Ramone S, Shuey C, Cajero M, Lewis JL. *A Bayesian framework for estimating disease risk due to exposure to uranium mine and mill waste on the Navajo Nation.* J. R. Statist. Soc. A, January 2015; Harmon ME, Lewis J, Miller C, Hoover J, Ali AS, Shuey C, Cajero M, Lucas S, Pacheco B, Erdei E, Ramone S, Nez T, Gonzales M, Campen MJ. *Residential Proximity to Abandoned Uranium Mines and Serum Inflammatory Potential in Chronically Exposed Navajo Communities.* J Exposure Sci Environ Epidemiol (January 25, 2017); Harmon ME, Lewis J, Miller C, Hoover J, Ali AS, Shuey C, Cajero M, Lucas S, Pacheco B, Erdei E, Ramone S, Nez T, Campen MJ, Gonzales M. *Arsenic association with circulating oxidized low-density lipoprotein in a Native American community.* Journal of Toxicology and Environmental Health, Part A; Erdei E, Shuey C, Pacheco B, Cajero M, Lewis J, Rubin RL. *Elevated autoimmunity in residents living near abandoned uranium mine sites on the Navajo Nation.* 99 Journal of Autoimmunity 15-23 (2019); Erdei E, Shuey C, Miller C, Hoover J, Cajero M, Lewis J. *Metal mixture exposures and multiplexed autoantibody screening in Navajo communities exposed to uranium mine wastes.* 6 J Trans Autoimmunity 100201 (2023).

<sup>12</sup> Lewis J, Gonzales M, Burnette C, Benally M, Seanez P, Shuey C, Nez H, Nez C, Nez S. *Environmental Exposures to Metals in Native Communities and Implications for Child Development: Basis for the Navajo Birth Cohort Study,* 1 J Social Work in Disability & Rehabilitation 25 (July 2015).

<sup>13</sup> Hoover J, Erdei E, Nash J, Gonzales M. *A Review of Metal Exposure Studies Conducted in the Rural Southwestern and Mountain West Region of the United States.,* Current Epidemiology Reports (2019); Hoover JH, Coker ES, Erdei E, Luo L, Begay D, MacKenzie D, NBCS Study Team, Lewis J., *Preterm Birth and Metal Mixture Exposure among Pregnant Women from the Navajo Birth Cohort Study,* 131(12) Environmental Health Perspectives 127014 (Dec. 18, 2023); González, N.T.; Ong, J.; Luo, L.; MacKenzie, D., *Chronic Community Exposure to Environmental Metal Mixtures Is Associated with Selected Cytokines in the Navajo Birth Cohort Study (NBCS),* 19 Int. J. Environ. Res. Public Health 14939 (2022).

Unpublished self-reported disease patterns among DiNEH Project participants living in 20 chapters of the Eastern Agency had a higher prevalence of diabetes II, kidney disease, high blood pressure and stroke than adults in the U.S., based on the Center for Disease Control and Prevention’s NHANES survey during the period 2009-2011 – the same time period of blood and urine collections among DiNEH Project participants (N=267). (See, Figure 1, below.)

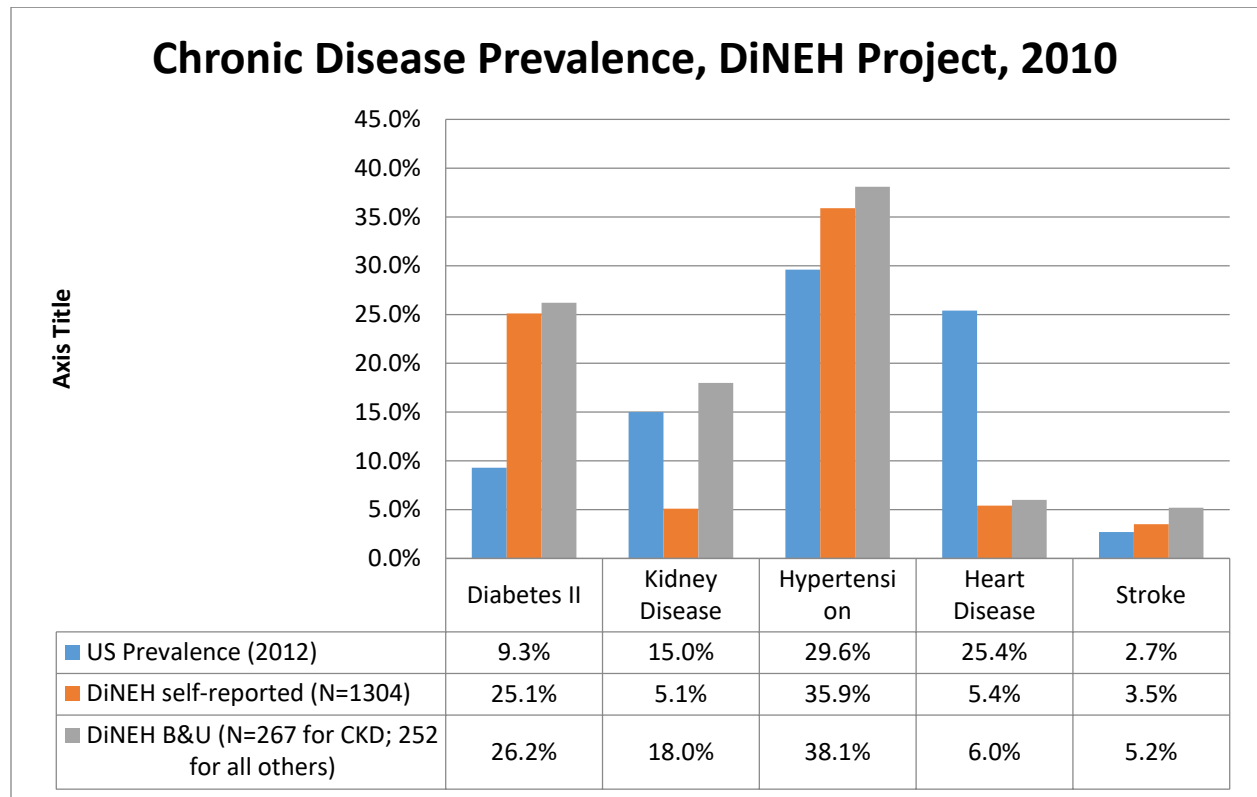


Figure 1

Some residents of Red Water Pond Road Community and Pipeline Road Community were participants in these studies. Community members have frequently testified about their own health problems, which they attribute to chronic exposures to mine wastes surrounding their communities. Among the health problems they have cited were various cancers, pulmonary fibrosis, asthma and kidney disease. Some of these residents also had occupational exposures. Of the more than 50 local residents, at least six worked for Kerr McGee/Quivira or United Nuclear Corp.

No finer assessment of health conditions in uranium-impacted communities in the Eastern Navajo Agency, specifically the Red Water Pond Road and Pipeline Road communities, has ever been done. However, this should not cause EPA to ignore historic and current health conditions in the communities impacted by the Quivira

Mine, Northeast Church Rock Mine, and UNC mill tailings impoundment. Data from vital statistics repositories, cancer registries, published population-based studies, and unpublished prevalence information are relevant to the question of whether leaving the Quivira Mine wastes in their present locations is protective of public health – it is not. Accordingly, the cap-in-place alternative (Alternative 2) cannot be considered protective and should not be implemented.

Finally, EPA cites the Clean Air Act for limitations on release of radon, specifically 40 CFR 61.222(a). The text states:

These requirements are applicable to nonoperational uranium mill tailings piles. The site's waste to be disposed of is not uranium mill tailings. These requirements have been determined to be relevant and appropriate to the design of the engineered cover to be constructed in Alternative 2, which consists of onsite containment of the contaminated soil and uranium waste rock.<sup>14</sup>

This passage, however, gives Community and the public no information about whether a radon-emanation rate will be applied to the cover if Alternative 2 is selected. Neither is there an ambient radon level provided as a point of comparison.

## II. Community Supports EPA's Recommended Alternative (Alternative 3), with Modifications.

Because Alternative 3 is the only realistic<sup>15</sup> alternative that protects public health, Community supports this alternative with modifications. As a preliminary matter, Community appreciates EPA listening to Red Water Pond Road community's and Pipeline Road community's concerns about capping the Quivira mine waste in place and honoring their wishes to remove the waste for disposal outside the Navajo Nation. As Community will explain further, Alternative 3 not only protects the Red Water Pond Road and Pipeline Road communities, it presents a lower overall risk to current and future generations and to natural resources.

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<sup>14</sup> EE/CA, Table 6b.

<sup>15</sup> While Alternative 4 proposes transporting mine waste to a low-level radioactive waste facility in Texas or a Resource Conservation and Recovery Act licensed facility in Colorado, Community does not consider this alternative realistic because of the economic and logistical barriers. Community urges EPA to continue to consider off site removal and disposal for mine waste in uranium-impacted communities. However, Community strongly urges EPA to forego considering off-site disposal alternatives that are facially unrealistic because of cost and instead used its limited resources to seriously consider those alternatives that will meet cost and administrative criteria.

Community urges EPA to consider the following comments that Community believes will improve Alternative 3 if EPA ultimately implements that alternative.

A. *EPA Should Consider Additional Transportation Route Alternatives.*

EPA's recommended transportation route from the Quivira Mine complex to the Red Rock Landfill Property is to take Pipeline Road to New Mexico State Highway 566, proceed south on Highway 566 to Interstate 40, take Interstate 40 east to the Thoreau exit and then proceed north on New Mexico State Highway 371 through Thoreau to the landfill property.<sup>16</sup> In order to avoid transporting waste through Thoreau, Community suggests two additional alternative transportation routes, as noted in Figure 2, below.

Community recommends routing trucks on Interstate 40 to the Prewitt exit east of Thoreau then proceed north on New Mexico State Highway 122 and County Road 19. At Escalante Power Plant Road, proceed west to the eastern access to Red Rock Landfill property. EPA appears to have rejected this option because of the risks associated with an at grade railroad crossing.<sup>17</sup> Additionally, Tetra Tech, which authored the EE/CA, expressed concern over transporting waste adjacent to a school in Prewitt.<sup>18</sup> However, the recommended transportation route runs directly adjacent to the St. Bonaventure School and Thoreau Elementary School in addition to many other businesses and residences along Highway 371. The risks associated with Community's suggested transportation route appear much smaller compared to the recommended route.

Alternatively, Community urges EPA to reconsider discarding transporting waste by rail to the landfill property.<sup>19</sup> As illustrated in Figure 2, both the Powerplant rail spur and the El Segundo Mine rail spur would get waste close to the landfill property while avoiding transport through Thoreau.

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<sup>16</sup> EE/CA at 86 and Fig. 37.

<sup>17</sup> EE/CA at 63 – 64.

<sup>18</sup> Memo from Matt Udell, Tetra Tech to Kenyon Larson at 3 (Feb. 12, 2024).

<sup>19</sup> EE/CA at 63.



## Alternate routes to Red Rock Landfill

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**Red:** Alternate truck route – I-40 to Prewitt (Exit 63), north to NM 122, right on NM 122 to County Road 19, left (north) to Escalante power plant road, left on power plant road to eastern ingress to RRL

**Blue:** Using BNSF main railroad line to ① power plant spur or ② El Segundo Mine spur.

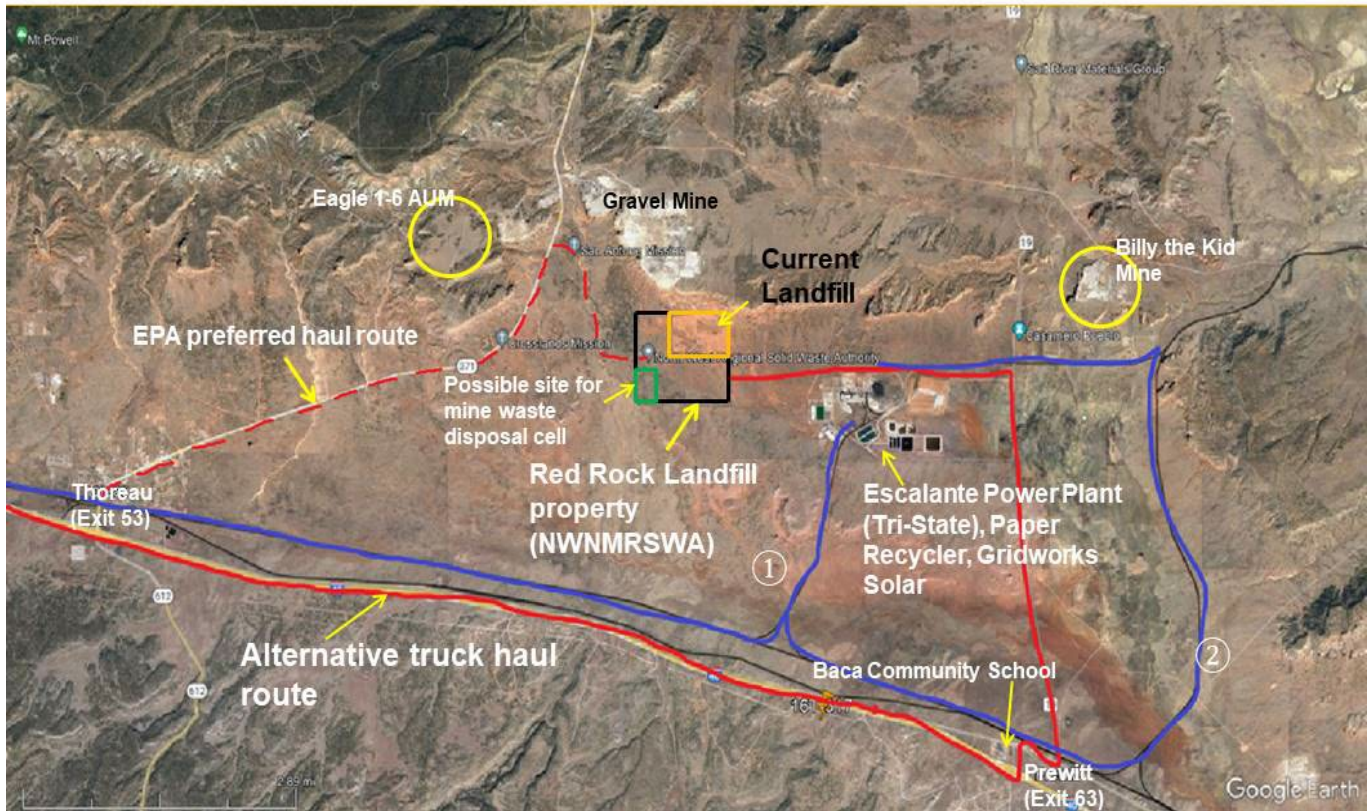


Figure 2

In sum, Community believes EPA should reconsider alternative transportation routes to the Red Rock Landfill property to avoid hauling waste through Thoreau.

### B. *EPA Should Consider Traffic Mitigation Measures to Reduce Risk.*

In addition to reconsidering transportation routes to bypass Thoreau, Community urges EPA to consider traffic mitigation measures to further reduce risks associated with waste transport.

Community suggests electronic traffic mitigation to the north and south of the intersection of Highway 566 and Challenger Road on the north end of Churchrock. Challenger Road is a main entry into the village of Churchrock and the primary route to the Churchrock Chapter House. Additionally, the Catherine A. Miller Elementary School sits at this intersection, which generates traffic during the school year. An



electronic traffic information sign or a conventional sign with flashing lights would alert drivers of when congestion from school traffic is present. Alternatively, EPA could limit hours that mine waste is hauled along 566 to avoid school related traffic. Typically, school traffic is heaviest between 7:30 and 9:00 a.m. and 2:30 and 3:30 p.m.

Additionally, Community suggests an electronic traffic information sign just to the east of Highway 566 and the frontage road. This sign could serve to warn east and west bound traffic of haul trucks exiting 566. It could also serve as a public information system about important community functions and weather conditions.

Further, Community recommends additional lighting along Highway 566 within the Village of Churchrock. Highway 566 can experience frequent pedestrian traffic crossing the highway, especially during special events at Red Rocks State Park. Additionally lighting could mitigate risk of pedestrian/haul truck interactions, particularly during the winter months.

Finally, EPA should adopt best management practices to ensure that mine waste is hauled safely across the entire haul route. Specifically, the Community recommends that each haul truck (1) be washed down prior to leaving the mine site, (2) surveyed for radiation levels, (3) securely covered such that no mine materials can escape during normal operations, and (4) properly placarded to meet federal, state and tribal standards. The Community also recommends that hauling be limited to low-traffic frequency hours and interrupted during adverse weather conditions (e.g., heavy snow, heavy downpours, high winds). Hauling on weekends, with advance notice to communities along the haul route, would make up for time lost during weekdays when traffic and weather conditions limit transport.

### III. EPA Should Eliminate Alternative 2 from Consideration.

While Community is grateful that EPA's recommended alternative is Alternative 3, we vigorously disagree that Alternative 2 is a reasonable alternative deserving consideration. Community therefore urges EPA to eliminate Alternative 2 from consideration.

#### A. *EPA has not Provided a Sufficient Technical Basis in its EE/CA for the Public to Comment on Alternative 2.*

Perhaps the most obvious reason why EPA should eliminate Alternative 2 from consideration is that there is not a sufficient technical basis in the EE/CA for

Community or the public to meaningfully evaluate this alternative. Alternative 2 proposes consolidating the Quivira mine waste in a canyon, located approximately 2100 feet east of Red Water Pond Road Community and immediately west of Pipeline Road, and covering the waste with an evapotranspiration (“ET”) cover.<sup>20</sup> EPA may also consolidate and cover all or some of the waste in a portion of the CR-1 site, located mere yards from the Red Water Pond Road Community.<sup>21</sup>

The technical gaps in the EE/CA concerning Alternative 2 are numerous. First, the EE/CA gives no indication that it refers to any guidance or research to guide its decision. Without any indication of what guidance, technical documents or research EPA relied upon for its assertions that an ET cover on an unlined, above-grade mine waste pile would protect public health and the environment, Community and the public have no basis to determine whether those reference materials (if indeed there are any) are appropriate in the current case.

Second, in evaluating Alternative 2, Community relied upon the U.S. Nuclear Regulatory Commission’s (“NRC”) *Basis for Technical Guidance to Evaluate Evapotranspiration Covers*, NUREG/CR-7297 (2022) (“ET Guidance”). That document provides a framework for evaluating evapotranspiration cover efficacy. The EPA’s analysis of Alternative 2 in the EE/CA falls short of the requirements in the NRC’s ET Guidance.

For example, the EPA does not specify whether the proposed ET covers in Alternative 2 would be monolithic or capillary covers. This distinction is important in evaluating the ET cover’s durability.<sup>22</sup>

Alternative 2 also fails to specify whether EPA will require irrigation to establish vegetation on the ET cover. If irrigation is not required, EPA should assess whether annual average precipitation will be sufficient to establish a self-renewing vegetative cover on the cover materials. If irrigation will be required, Alternative 2 fails to specify a water source for the irrigation, how long irrigation will be required, and whether

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<sup>20</sup> EE/CA at Fig. 33.

<sup>21</sup> *Id.*

<sup>22</sup> Caldwell, Todd, *et al.*, *Evapotranspiration Covers at Uranium Mill Tailings Sites*, 21(5) *Vadose Zone Journal* 20222 (2022).

irrigation will be required to re-establish vegetation in the event of a vegetation die-off. This level of specificity is what the ET Guidance demands.<sup>23</sup>

Moreover, for an ET cover to be an effective radon barrier, it requires adequate moisture.<sup>24</sup> Indeed, maintaining moisture content in the ET cover long-term is “critical” to reducing radon fluxes.<sup>25</sup> EPA provides no information about how it will ensure consistent moisture levels for an effective radon barrier. In fact, the underlying concept of why ET covers are said to work in arid environments is that the aridity of the region will desiccate or evaporate moisture falling on the covers before it reaches the mine waste just below the cover. ET covers are expected to have low-moisture content, which may not lessen radon emissions. Further, when there is less moisture, as in arid climates such as New Mexico’s, the ET cover’s water storage layer should be thicker.<sup>26</sup> EPA provides no technical information to justify its proposal to use a 36-inch soil cover for Alternative 2.

The ET Guidance additionally indicates that shallow-rooted invasive plant species can affect ET efficacy.<sup>27</sup> For example, cheatgrass, a common invasive species in New Mexico, is shallow rooted and could lead to a less effective ET cover.<sup>28</sup> Nevertheless, the EE/CA makes no mention of EPA’s plan to control invasive species or burrowing animals to ensure ET cover integrity and durability.

More generally, EPA provides no analysis of how climate change might affect the ET cover. If drought conditions persist or worsen, which is likely in New Mexico,<sup>29</sup> maintaining adequate ET cover moisture will become critical. Further, increasingly extreme and frequent flooding events and higher winds could also compromise the ET cover. Finally, as ecosystems change in response to climate change, invasive plant and

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<sup>23</sup> NUREG/CR-7297 at 4-2.

<sup>24</sup> *Id.* at § 4.4.

<sup>25</sup> *Id.* at 7-7.

<sup>26</sup> *Id.* at 4-8.

<sup>27</sup> *Id.* at 7-4. The NRC also notes that invasive vegetation root intrusion and intrusion from burrowing animals can increase percolation, desiccate soils and create preferential pathways, which can accelerate erosion, water infiltration and radon releases.

<sup>28</sup> *See,*

[https://www.montana.edu/extension/invasiveplants/documents/publications/extension\\_publications/Cheatgrass\\_MT200811AG.pdf](https://www.montana.edu/extension/invasiveplants/documents/publications/extension_publications/Cheatgrass_MT200811AG.pdf).

<sup>29</sup> *See, e.g.,* [https://crt-climate-explorer.nemac.org/climate\\_graphs/?city=McKinley%2BCounty%2C+NM&county=McKinley%2BCounty&area-id=35031&fips=35031&zoom=7&lat=35.71524720000001&lon=-108.2377519&id=days\\_dry\\_days](https://crt-climate-explorer.nemac.org/climate_graphs/?city=McKinley%2BCounty%2C+NM&county=McKinley%2BCounty&area-id=35031&fips=35031&zoom=7&lat=35.71524720000001&lon=-108.2377519&id=days_dry_days).

animal species ranges will also likely change, potentially making the ET cover more vulnerable to intrusions. EPA should have discussed the implications of climate change on the ET cover to give Community and the public the opportunity to comment on these important matters.

Finally, EPA's choice of an ET cover may not be technically justifiable at all. The NRC ET Guidance indicates that ET covers may improve cover design life over the long term, but concedes there are currently no data to support that conclusion. Conventional radon covers designed to last a minimum of 200 years on uranium mill tailings piles begin declining in effectiveness in as little as twenty years.<sup>30</sup> There is no reason to believe that ET covers will fare any better over the long-term.<sup>31</sup>

Furthermore, EPA provides no operational information or data to evaluate ET cover performance in the Southwest. Evaluation of an ET cover that was placed on the TseTah mine waste site in the Four Corners Area was performed by a team from Lawrence Livermore Laboratory between 2013 and 2016.<sup>32</sup>

In 2009, the U.S. Forest Service prepared an EE/CA on remediation alternatives for the San Mateo Mine, located five miles west of the village of San Mateo in Cibola County. The Forest Service said the preferred alternative "is to consolidate the waste rock piles and place them in an on-site repository. A geomembrane would be placed above the waste rock in the repository and would be covered with clean soil, re-vegetated, and armored with rock." Neither the EE/CA, the administrative record, nor any post closure monitoring data for this project is available on the USFS website.<sup>33</sup>

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<sup>30</sup> See, e.g., Fuhmann, Mark, *et al.*, *Radon Fluxes at Four Uranium Mill Tailings Disposal Sites After About 20 Years of Service*, 237 *Jnl. Of Env'tl Radioactivity* 106719 (2021) In this study, out of four sites sampled, Bluewater mill tailings near Grants, New Mexico had the highest Radon fluxes. The Bluewater tailings cover revealed preferential pathways for radon emissions due to vegetation roots and ant burrowing. Ponding caused by subsidence proved to be the most effective Radon barrier, but water percolation through the tailings pile could result in groundwater contamination.

<sup>31</sup> *Id.* The Bluewater mill tailings cover is covered with rock armor and does not have planted vegetation (see Fig. 1 in the *Journal of Environmental Radioactivity* for illustration of cover designs for each of the sampled sites). However, the Falls City, Texas site has a cover design much like EPA has proposed for ET covers for mine waste elsewhere in New Mexico, and had the second highest Radon Fluxes of the four sites sampled.

<sup>32</sup> <https://www.llnl.gov/article/39026/lab-partners-navajo-nation-uranium-mine-project>. It is notable that the mine waste from the TseTah mine was placed in a subgradient lined cell.

<sup>33</sup> See, [https://www.fs.usda.gov/detail/cibola/news-events?cid=FSBDEV3\\_065960](https://www.fs.usda.gov/detail/cibola/news-events?cid=FSBDEV3_065960).

Given the significant uncertainty surrounding how EPA might design, construct, monitor and maintain an ET for waste capped in place and the EPA's failure to provide any technical information regarding its decision to consider cap in place, EPA should withdraw Alternative 2 from consideration.

B. *EPA Should Designate Additional 10 C.F.R. Part 40 Appendix A Criteria as Relevant and Appropriate.*

In Table 6b of the EE/CA, EPA outlines the applicable or relevant and appropriate requirements ("ARAR") for actions proposed by each alternative. EPA determined that certain criteria in 10 C.F.R. Part 40 Appendix A, which implement the Uranium Mill Tailings Radiation Control Act ("UMTRCA"), are relevant and appropriate to Alternative 2.<sup>34</sup> Community agrees that EPA should apply the Appendix A criteria it designated as relevant and appropriate to Alternative 2. However, Community urges EPA to designate Criteria 2 and 3 as relevant and appropriate, because doing so would create a more thorough and fair framework for comparing alternatives.

Criterion 2 mandates centralizing waste disposal to avoid proliferating radioactive burial sites and reducing perpetual monitoring and maintenance obligations. EPA should designate this as a relevant and appropriate criterion because consolidating the dispersed sites in the Red Water Pond Road and Pipeline Road communities, along with communities throughout the Eastern Agency, is more protective of public health and the environment than simply capping the waste in place. Moreover, because earthen caps inevitably erode or are otherwise compromised, each site capped in place will require perpetual monitoring and maintenance. The communities where these sites are located, at least on the Navajo Nation, are typically rural, often remote and not easily accessible. The administrative burden on any governmental agency responsible for perpetual monitoring and maintenance would be significant. A direr scenario would occur if monitoring and maintenance fell, either intentionally or by neglect, on the communities in which the capped waste is located.

Using Criterion 2 as a relevant and appropriate standard creates a more realistic and fairer comparison between Alternative 2 and Alternative 3. As explained above, Alternative 2 would not meet Criterion 2's requirements. In contrast, Criterion 3 would.

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<sup>34</sup> EPA designates Criteria 1, 4, 6(1), 6(3), 6(5) and 6(7) as relevant and appropriate to Alternative 2.

Moreover, Alternative 3 represents a more holistic solution to site proliferation regionally, while Alternative 2 perpetuates the problem.

In addition to designating Criterion 2 as relevant and appropriate, Community urges EPA to designate Criterion 3 as relevant and appropriate. Criterion 3 mandates serious consideration of what the Nuclear Regulatory Commission calls the “prime option” for waste disposal – placement below grade. EPA is not proposing a below-grade design for Alternative 2; in fact, a drawing in the EE/CA (Figure 34) that lacks detail about the ET cover nonetheless shows that wastes would generally be piled on top of the landscape, not in or below ground surface.

In this case, there was no consideration of placement below grade for Alternative 2, even though below grade placement would address the significant issues with erosion and intrusion that Alternative 2 presents. In contrast, Alternative 3 would satisfy this criterion. Designating Criterion 2 as relevant and appropriate would make comparison of the alternatives much more realistic and fair.

Finally, Community notes that Alternative 3 is the only alternative that can meaningfully meet Criterion 6(7), which EPA has designated as relevant and appropriate. Criterion 6(7) provides:

The licensee shall also address the nonradiological hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that disposal areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control, minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere (emphasis added).

In this case, capping the waste in place as proposed in Alternative 2 not only does not minimize the need for further maintenance, but virtually guarantees it. Indeed, EPA concedes “any onsite repository will be maintained in perpetuity.”<sup>35</sup> Further, Alternative 2 will place waste above grade in an unlined and unmonitored facility, with

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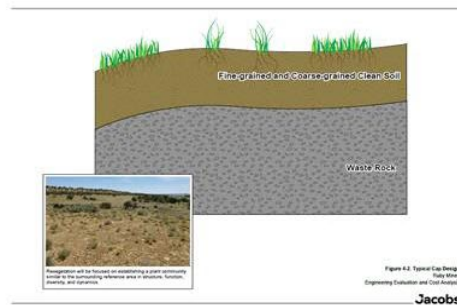
<sup>35</sup> EE/CA at 80.



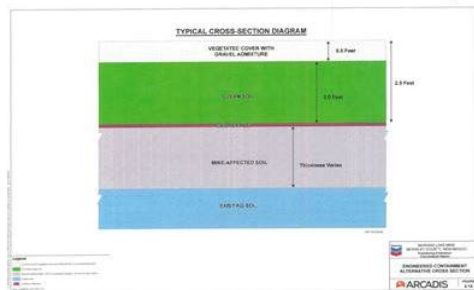
a cover that is susceptible to erosion and intrusion, thus making releases to waters or the atmosphere likely. Whether those releases are minimized will be dependent on how well the capped waste is monitored. As explained above, there are significant barriers to adequate monitoring and maintenance associated with Alternative 2, so releases are unlikely to be minimized.

**“Typical” evapotranspiration (ET) cover diagrams**

**Ruby Mines  
EE/CA, Fig. 4-14**



**Mariano Lake  
EE/CA, Fig. 4-14**



**Tailings cover design, Pinon Ridge Mill, Montrose Co., Colorado (2008)**

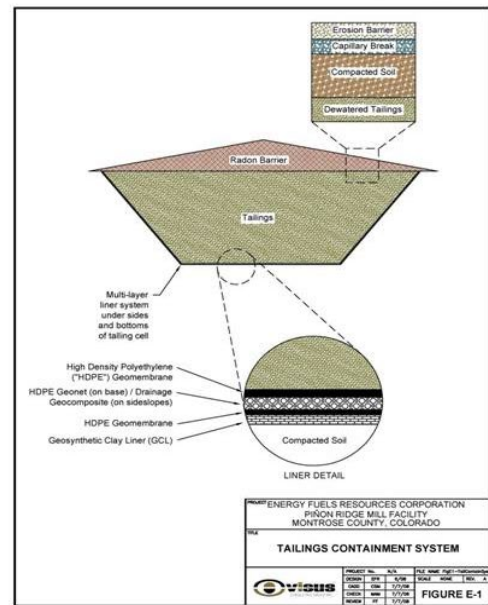


Figure 3

Community cannot meaningfully evaluate any ET cover that EPA might construct because EPA has provided only generalized technical information, as explained in Section II.A, above. However, Community assumes an ET cover cell for the Quivira waste will be similar to ET covers EPA has recently proposed for other nearby mine waste sites. The proposed ET covers at the Ruby and Mariano Lake Mines appear on the left side of Figure 3, above. Comparing those designs with the design on the right side of Figure 3, which reflects comprehensive compliance with the NRC’s Appendix A criteria, it is clear that complying more comprehensively with the Appendix A criteria results in a more robust waste containment system. Moreover, the waste disposal method EPA describes in Alternative 3 would more closely resemble the design on the right of Figure 2, resulting in a safer and more durable disposal option.

C. *Alternative 2 is Unlikely to Protect Public Health.*

The paucity of data demonstrated in Section II.A, above, notwithstanding, it is unlikely that Alternative 2 will protect public health in the long term. It is plausible that Alternative 2 will not protect public health during even a relatively short period.

As demonstrated in both Sections II. A and B, above, Alternative 2 will require significant monitoring and maintenance to insure that vegetation establishes on the ET cover. That maintenance would include: insuring soil moisture levels are adequate to sustain vegetation, insuring that invasive plant and animal species do not negatively affect ET cover efficacy, insuring that native animal species do not negatively affect ET cover integrity, and steps to adapt to climate change. EPA has given no indication of who will take responsibility for monitoring and maintaining waste that is capped in place or how EPA or another entity will fund monitoring and maintenance. Nor is there any indication of contingency plans in the event that budget cuts or other financial shortfalls to insure that the ET cover will be continuously monitored and maintained. In short, there are too many scientific and engineering variables and data gaps for EPA to conclude that Alternative 2 protects public health either in the long-term or short-term.

D. *Alternative 2 is Bad Policy.*

Finally, because Alternative 2 is bad policy, EPA should withdraw it from consideration. By capping the mine waste in place, the EPA is effectively withdrawing significant areas of land in the Red Water Pond Road and Pipeline Road communities from most, if not all, productive uses. While EPA asserts the ET cover could support grazing, but not irrigated agriculture or building development,<sup>36</sup> EPA presents no analysis of whether livestock would have any effect on ET cover integrity or durability. EPA likewise provides no analysis of whether consuming livestock that has grazed on ET cover vegetation would be safe.<sup>37</sup> Therefore, Community cannot reasonably rely on even that productive use for land where mine waste will be buried. Thus, if EPA implements Alternative 2, it will continue the repugnant historic policy of taking Native lands for the benefit of non-Native corporations.<sup>38</sup> In the twenty-first century, federal

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<sup>36</sup> EE/CA at 73.

<sup>37</sup> Caldwell *et. al.*, n. 19, *supra*. The authors note that vegetative covers can uptake radionuclides potentially making them bioavailable.

<sup>38</sup> See, *Cohen's Handbook of Federal Indian Law* at § 1.04, Newton, Nell J., et al. (eds.) (2005).

agencies should surely no longer tolerate, much less actively contemplate, such a racist and invidious policy. EPA should withdraw Alternative 2 from consideration.<sup>39</sup>

#### IV. EPA Should Work with Community to Rebuild Public Trust and Harmony.

It is to state the obvious that there is very little trust in Native communities for the federal government and its agencies. The reasons for that distrust are equally obvious and we will not repeat them here. However, because of that distrust, some communities within the Navajo Nation have become susceptible to misinformation about the nature of Quivira mine waste and the comparative risks of each of EPA's proposed disposal alternatives. Consequently, an unintended consequence of the EE/CA process has been that Diné communities are now in conflict.

In the interest of restoring harmony among Diné communities, EPA and Navajo Nation leaders should explore peacemaking processes consistent with the Navajo Nation EPA's Guidance.<sup>40</sup> Peacemaking in this case would require significant coordination with the Navajo Nation Office of the President and Vice-President and the Speaker of the Navajo Nation Council. Avoidance of the disharmony, however, will likely result in further adverse outcomes for Diné communities in the future.

Finally, Community acknowledges it is not within the scope of the EPA's EE/CA to evaluate holistic solutions to the intractable problem of historic uranium mine waste within the Navajo Nation. However, Community nevertheless urges EPA to use the opportunities the Quivira mine waste disposal process offers to begin a dialog between frontline communities, the Navajo Nation government, New Mexico government and other federal agencies to work together toward a solution. For example, EPA could take a leadership role in convening a series of intergovernmental/community working groups to identify potential sites for one or more regional uranium mine waste disposal facilities. These working groups could identify technical, legal and transportation challenges and work to resolve them. In short, Community sees this moment as an opportunity to move away from capping mine waste in place as the default uranium

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<sup>39</sup> Community recognizes that a minority of abandoned uranium mines may be appropriate sites for cap in place disposal. However, those sites would be a very small minority and therefore EPA should rely on cap in place disposal only rarely. The vast majority of waste should be disposed in subgradient, lined and monitored facilities.

<sup>40</sup> Navajo Nation EPA, *Guidance for the Uniform Application of Fundamental Law of the Diné to AUM Cleanup Activities* at 7.

mine waste disposal policy and toward a policy that is protective of public health and the environment.

V. Conclusion

Community appreciates this opportunity to comment on the EE/CA for Quivira Mine waste disposal. Community urges EPA to adopt and implement its recommended alternative, Alternative 3, and incorporate Community's recommendations. Doing so would not only protect public health, the environment and Diné cultural integrity, but would also be an important first step to establishing rigorously engineered, below-grade and diligently monitored sites outside the Navajo Nation as the preferred alternative for most uranium mine waste sites in the Navajo Nation.

Sincerely,



Eric Jantz  
Legal Director  
New Mexico Environmental Law Center