



September 9, 2009

Mr. Andrew Bain  
Project Manager  
U.S. Environmental Protection Agency  
75 Hawthorne Street  
San Francisco, CA 94105

Dear Mr. Bain:

**RE: Northeast Church Rock Mine Site—Engineering Evaluation/Cost Analysis Review**

On June 9, 2009, the U.S. Environmental Protection Agency (EPA) announced the public release of its engineering evaluation and cost analysis (EE/CA) for the North East Church Rock (NECR) mine site. Originally, comments on the EE/CA were due by July 13 but EPA subsequently extended the public comment period until Sept. 9, 2009. The National Mining Association (NMA) appreciates the opportunity to submit comments on the EE/CA. NMA's members are producers of most of America's coal, metals, industrial and agricultural minerals; manufacturers of mining and mineral processing machinery and supplies; transporters; financial and engineering firms; and other businesses related to mining. NMA members have a strong interest in assuring that standards and remedies for mine cleanup protect the environment but also cost-effective.

The North East Church Rock (NECR) mine site represents the first mine under the Abandoned Uranium Mines (AUM) program EPA established to address the more than 500 mines it identified on the Navajo Nation. However, the process used by EPA to develop, evaluate, and ultimately select a remedy for the NECR mine site may impact remediation of the hundreds of other AUMs that exhibit similar characteristics found at the NECR mine site, such as large volumes of wastes, types of contaminants, the impact on environmental media, land use conditions, physical and geologic settings, and the remoteness of the mine locations. As described more fully in the comments below, EPA has used simplifying assumptions in its process that result in a remedy proposal that may address tribal preferences but at the same time are inconsistent with how remedial decisions are made elsewhere within the United States.

The Engineering Evaluation/Cost Analysis (EE/CA) for the NECR mine site should establish action levels consistent with current and reasonably likely future land uses at the site; this approach is followed at Superfund sites all across the country. For NECR, this means a determination of the proposed action level based on the Principal Threat Waste (PTW) and the distinctly different future land uses for the areas of concern at the mine site. By establishing these specific action levels, the volume and area requiring remediation should then be re-established, and a broad range of technologies and remediation alternatives could be re-proposed. One glaring weakness in EPA's EE/CA process is the lack of presumptive remedies. The NECR site is typical of many sites where onsite containment technologies can be the most appropriate remedy because of the volume and the impracticable nature of treating the waste. These alternatives could then be fully evaluated and compared to offsite disposal alternatives pursuant to EPA's guidance.

As indicated by the comments presented below, EPA's EE/CA for the NECR mine site has failed to fully evaluate all potential remedial alternatives in accordance with EPA guidance. Specifically, the EE/CA:

- Fails to evaluate several significant distinctions among the limited alternatives. Instead, the EE/CA merely states that all of the remedial alternatives, with the exception of the "No Action" alternative, are essentially equal in terms of effectiveness and implementability.
- Fails to provide the public with a specific explanation as to how EPA selected its preferred remedy or ranked the various alternatives according to EPA's evaluation criteria.
- Appears to grant undue weight to the community acceptance factor, which EPA seems to have elevated above threshold and primary balancing factors in selecting the preferred remedy.
- Fails to address the obvious question – if all remedial options are essentially equivalent in terms of effectiveness and implementability, what is the benefit gained by the incremental cost of the more expensive alternatives?

It is these last two observations that are the most disconcerting for the NECR site as well as the entire AUM program. If all alternatives start with removal as the basis for providing site-specific protection for future land uses, and there are no engineering differences between consolidation and containment among the various alternatives, then the only possible difference in long-term effectiveness is the location of the consolidated and capped material. The EE/CA does not articulate, outside of community acceptance, that there is any calculated benefit associated with increasingly remote locations to dispose/contain the removed materials.

More importantly, the EE/CA does not advance other cost effective remedial options such as underground disposal, capping in place, or similar presumptive remedies. As such, the basic tenet of selecting the most cost-effective protective remedy does not seem to apply to AUMs.

The following comments address issues that are relevant to the NECR mine site as well as other AUMs where EPA may be required to perform a similar EE/CA in the future. The comments identify areas and approaches that EPA should adopt prior to selecting a preferred remedy at the NECR mine site and future AUM mine sites.

### **Comments on EPA's Overall Approach on Identification of Remedy Alternatives**

- 1. EPA should follow recommended practices and industry standards to accurately reflect background conditions at mine sites. The proper establishment of background concentrations is critical to determining the cleanup level, which in turn represents the foundation for the entire EE/CA.**

The Proposed Action Level proposed in the NECR EE/CA for radium (Ra)-226 may not accurately reflect background conditions for Ra-226. The Proposed Action Level for Ra-226 is 2.24 pCi/g, which is based on the mean background level (1.0 pCi/g) plus the EPA residential preliminary remediation goal (PRG) for a 1E-04 risk level (1.24 pCi/g). However, the recommended practice and industry standard for comparing individual sample results to a background level is to use the upper-bound background level (e.g., upper tolerance limit) rather than the mean.

In the *Final Removal Site Evaluation Report (RSE)*, October 2007, the entire background evaluation was based on a single area, approximately 500 feet square, located in an arroyo. The arroyo represents only a small portion of a potential exposure area and is not representative of the physical and geological characteristics of the area. A single area such as this also does not represent the natural variability that must be accounted for when determining background levels for comparison with the conditions at the mine site.

As noted in the RSE, the site background value of 1.0 pCi/g is below the range of soil background concentrations determined for other sites within the region. In fact, according to the RSE, the following soil background values have been used at nearby mine sites: (1) the adjacent Quivera Mines is approximately 4.5 pCi/g; (2) the Homestake Mining Company Mill Site received an EPA-approved background value of 5.5 pCi/g; and (3) the Bluewater Mill Site received an NRC-approved background value of 1.9 pCi/g. Throughout the Colorado Plateau, the average background concentration of Ra-226 is 2 pCi/g.

Considering the statistical method used, the lack of variability due to the selection of a small, single reference area, and the regional background values of other sites, it appears that EPA may have underestimated background concentrations of Ra-226 by a factor of two to five times the actual conditions. EPA's insufficient evaluation of proper background levels has resulted in an underestimation of actual background conditions, an overly conservative cleanup

level, and a remedy potentially more extensive than needed to meet the Remedial Action Objectives.

The consideration of a more thorough review of background conditions becomes critically important for the remaining AUM sites located throughout the Colorado Plateau.

- 2. Human Health Risk Assessments (HHRA) should evaluate potential exposure scenarios at the specific mine site so that they are realistic and consistent with future land uses. Those scenarios should then be used to determine what data could be useful to refine the assessment. In the EE/CA, EPA should provide sufficient details and results from the HHRA and explain how EPA's selected remedy addresses or incorporates the cleanup goals consistent with future land uses.**

Although no sufficient details or results from the NECR HHRA were included in the EE/CA, it appears that a range of exposure scenarios for the NECR mine site were evaluated in the *Removal Site Evaluation Report for NECR*, dated October 2007, including livestock grazing as the future land use at the site. It is possible that additional data associated with this exposure pathway, supporting the calculation of a specific soil cleanup goal for RA-226 for this future land use, would have resulted in a different cleanup goal.

- 3. For both NECR and other AUM sites, where livestock grazing is a future land use, EPA should evaluate the actual areas where livestock are likely to graze to establish more realistic exposure point concentrations. These more realistic exposure point concentrations would result in more accurate estimates of the actual risks associated with the livestock grazing land use scenario.**

The exposure areas evaluated in the NECR HHRA for the livestock grazing scenario were individual and relatively small operational areas of the mine. Using small exposure areas likely resulted in non-representative exposure point concentrations, which likely overestimated the actual risks associated with the livestock grazing scenario.

- 4. Under the livestock grazing scenario, meat ingestion is the exposure route that contributes most to the risk estimate. Therefore, EPA should use site-specific data to reduce the considerable uncertainties associated with this exposure route and the potential to overestimate associated risks.**

As stated in the NECR HHRA, assumptions were made concerning the fodder/soil uptake factor of 0.1 for the exposure scenario. The value selected for the HHRA is in the middle of literature-based estimates for the fodder/soil uptake factor, which ranges from 0.0011 to 6.5, a range of approximately 5 orders of magnitude. The use of a generic fodder/soil uptake factor does not consider site-

specific conditions (e.g., soil type and plant type) that could influence the uptake of Ra-226 into plants. Site-specific plant tissue data would help determine the appropriate uptake factor that should be used for the NECR mine site. Other assumptions that are used in the HHRA for the meat ingestion exposure route include the uptake of Ra-226 from plants to animal tissue (based on a literature value, not site-specific data) and the meat ingestion rate (based on the 95<sup>th</sup> percentile meat ingestion rate for Native Americans). EPA should perform a sensitivity analysis of the impact of these assumptions on the overall risk estimates for the livestock grazing scenario to establish an appropriate site-specific cleanup goal.

**5. As part of an EE/CA, EPA should adequately present other viable technologies or remedial alternatives, including onsite remediation options, to properly evaluate and compare the potential remedial alternatives. EPA should evaluate alternatives other than essentially "dig and haul" solutions, where the only differentiator is the design or location of the waste repository.**

The NECR EE/CA fails to present or evaluate remedial alternatives other than "dig and haul" solutions. Section 3.5.1 of the Alternative Summary states, "The main difference between Alternative 3 and 4 is that a liner is used underneath the mine waste pile in Alternative 4." The EE/CA also concludes that Alternative 4 and EPA's preferred Alternative 5 have the same design (cap and liner). Therefore, it would seem that the only substantial difference between the two alternatives is the location of the waste repository and whether that location is adjacent to Navajo lands.

Examples of other viable alternatives that could be used at the NECR mine site or other AUM sites, either as a separate alternative or as a component of another alternative, include the following:

- Using underground workings at the existing mine site. While this option may not be cost-effective at NECR, it should be considered and screened out on a site-specific basis because it may be applicable to other AUM sites.
- Selectively re-contour waste onsite to remove it from drainages, followed by capping.
- Conduct further characterization and risk assessment and segregate waste to reduce the volume placed in a lined repository, while consolidating and capping lower-level waste.
- Evaluate the potential for waste re-processing at existing licensed facilities.
- Use institutional controls to prevent exposure.

**Comments on EPA's Overall Remedy Selection Approach**

- 1. If the containment technologies at an onsite repository are comparable to those at a licensed offsite disposal facility, EPA should not require the disposal to an offsite facility. Despite the historical**

**impact of uranium mining on the Navajo Nation, EPA should prefer an onsite remedy when the long-term residual risks for the onsite and offsite remedies are comparable and the offsite transfer could increase the short-term risk to human health and the environment on the Navajo Nation.**

Under the *EPA Policy for the Administration of Environmental Programs on Indian Reservations*, the fundamental objective of EPA is to protect human health and the environment on the reservations. Other potential remedial alternatives exist that are capable of achieving, at the location of the waste repository, equivalent protection of human health and the environment and long-term residual risks by using similar caps and liners employed in the preferred Alternative. In fact, EPA has recognized that there are cost and capacity issues for offsite disposal in its *Health and Environmental Impacts of Uranium Contamination of the Navajo Nation 5-Year Plan*. Likewise, EPA has developed presumptive remedies that accelerate cleanup at a site where onsite containment technologies were determined to be the most appropriate remedy because of the volume and the impracticable nature of treating the waste. The NECR mine site, along with the other AUMs, demonstrates a need for a presumptive onsite containment remedy. With an AUM presumptive remedy in place, cleanup of these many sites could be accelerated.

The mining industry is aware of the historical impact of uranium mining on the Navajo Nation. However, EPA should not disregard its fundamental objective based on community acceptance alone. A complete evaluation of EPA's preferred alternative would recognize the potential to expose the Navajo Nation to additional risks to human health and environment that would not occur if EPA adopts an onsite remedial alternative.

**2. In evaluating remedial alternatives, EPA should not place undue emphasis on perceived community attitudes to determine the preferred remedy, especially when that emphasis does not comply with EPA guidance.**

The NECR EE/CA does not appear consistent with EPA's guidance in at least two respects: (1) in selecting Alternative 5 as the preferred remedy, the EE/CA appears to place undue emphasis on community acceptance, to the neglect of the more compelling shortcomings of Alternative 5; and (2) the lack of sufficient analysis and explanation in the EE/CA does not enable informed community acceptance of the preferred alternative.

In comparing other alternatives, the EE/CA concluded that Alternative 5 had potentially higher short-term implementation impacts, more administrative implementability issues, and significantly higher costs, not to mention several uncertainties discussed elsewhere in these comments. These negative considerations should have disqualified Alternative 5 as the preferred remedy, unless it was superior to the other alternatives under other, more important, criteria. However, the EE/CA states explicitly that Alternative 5 was not superior

to the other alternatives. Specifically, the EE/CA concluded that Alternative 5 merely was comparable – not superior – to the other alternatives (other than No Action) for protecting human health and the environment; long-term effectiveness; reducing toxicity, mobility, and volume; short-term effectiveness; and implementability.

The EE/CA appears to inappropriately promote the community acceptance criterion beyond other criteria noted above for which Alternative 5 was inferior and which are threshold and primary balancing factors. These deficiencies in the EE/CA's approach to evaluating the various alternatives (threshold versus primary balancing versus secondary balancing factors) create a particularly compelling case for revision and a new round of public notice and comment.

**3. Under the Short-term Effectiveness criteria, EPA should evaluate alternatives according to current EPA guidance, including the sustainability initiative. A sustainability evaluation for each remedial alternative in an EE/CA would assist EPA in comparing the overall environmental impacts of the alternatives. Such an evaluation seems essential prior to selecting a preferred remedy.**

In the NECR EE/CA, EPA failed to recognize or evaluate EPA's own sustainability initiatives. EPA has strongly advocated in *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, that remedies should "use natural resources and energy efficiently, reduce negative impacts on the environment, minimize or eliminate pollution at its source, and reduce waste to the greatest extent possible..." (EPA, 2008, page 1). Therefore, the EE/CA should evaluate the greenhouse gas emissions associated with offsite disposal and the potential for re-processing PTW and other materials. Likewise, the EE/CA should account for life-cycle impacts, identify collateral impacts, and present the net environmental benefits of each remedial alternative with respect to nonrenewable natural resource consumption, nonrecycled waste generation, and nonrenewable energy consumption.

**4. In terms of Short-Term Effectiveness, EPA should adequately evaluate the significant differences among the remedial alternatives proposed in the EE/CA.**

The EE/CA fails to address the unacceptable risks that the local community and workers could be subject to under the alternatives currently addressed in the EE/CA. Given the large number of loads under Alternative 2 that are necessary to transport the waste offsite, the considerable driving distance, and the up-to 9-year time frame necessary to complete the remediation, there are likely substantial risks facing the local community and workers. These risks could arise from increased traffic accidents, the generation of dust and noise, or the potential for accidental releases to the environment.

EPA does not acknowledge that Alternative 3 is estimated to require the shortest time to achieve the Remediation Action Goal and presents the least short-term risks to the community and the environment. Alternative 4 also offers less short-term risk than Alternative 5 when considering the haul distances and the potentially significant time frame necessary for the additional coordination that will be required to receive the NRC approval to either reopen the existing repository, or build a new one at the UNC Mill Site. If the alternatives were compared in a detailed evaluation, Alternative 5 should actually present an increased short-term risk over Alternatives 3 and 4 and would not offer significant advantage when compared to these Alternatives.

**5. There are substantial uncertainties associated with the Preferred Alternative. These uncertainties, if realized, significantly increase the cost of the Preferred Alternative and, in turn, would substantially change the comparison of the Preferred Alternative against a range of other potential alternatives.**

The NECR EE/CA has failed to adequately evaluate or address issues that could significantly alter the costs associated with EPA's preferred Alternative. For example, if the NRC and DOE do not re-open the repository cells, a new repository would be constructed at the UNC Mill Site. However, the cost to construct a new repository at the Mill Site was not included in the cost estimate of EPA's preferred Alternative. The cost of constructing a new NRC-licensed disposal cell with a capacity of approximately 900,000 cubic yards could range between \$30 to \$40 million for the construction alone. Likewise, the cost of meeting substantive permitting requirements and long-term operations and maintenance (O&M) costs for the new disposal cell would be considerable and should be addressed in the cost estimate. These potential costs would significantly alter how EPA would compare the costs of implementing its preferred alternative and the other alternatives addressed in the EE/CA.

NMA appreciates the opportunity to submit comments on the EE/CA. If you have any questions regarding these comments, please contact me at (202)463-2627 or [ksweeney@nma.org](mailto:ksweeney@nma.org).

Sincerely,



Katie Sweeney  
General Counsel