Memo: EPA National Remedy Review Board

From: Multicultural Alliance for a Safe Environment

Date: 3/10/21

Re: Homestake Mill Superfund Site

The community near the Homestake Mill has been destroyed over 45 years of failed clean-up efforts. The mill first started operations in 1958 and the community was notified in 1975 that their drinking wells were contaminated with selenium. EPA's 2014 Human Health Risk Assessment found that residents of the subdivisions next to the Homestake site face excess cancer risks 18 times higher than EPA's generally acceptable risk. This serious risk has been exacerbated by years of remediation failure. If domestic water sources beneath the subdivisions are used, that risk rises to 22 times the highest acceptable risk for radionuclides in water. EPA should have initiated comprehensive health and epidemiological studies to assist the exposed residents in pinpointing the cause of their cancers and to establish the liability of the responsible parties. Instead, Homestake is working to buy out the surrounding homeowners, whose lifestyle and culture have been devastated by the many years of failed cleanup efforts and who will now be left to relocate and solve future health issues on their own. https://www.abqjournal.com/223831/nm-homeowners-say-decadeslong-cleanup-too-slow.html

The Multicultural Alliance for a Safe Environment (MASE) and the Bluewater Valley Downstream Alliance (BVDA) hired two independent technical experts to examine background groundwater quality and groundwater protection standards provided by Homestake Barrick Gold (HBG) as the basis for its cleanup plans. The new proposed background groundwater values presented to EPA, the Nuclear Regulatory Commission and the New Mexico Environment Department proved that the HBG groundwater protection standards in place were incorrect. Currently, the agencies are revising their expectations, thanks to the independent scientific work that was paid for by our communities.

HBG is now asking to walk away from their legal obligation to clean up their site. HBG has made clear its intentions to seek a Technical Impracticability Waiver with the EPA and Alternative Concentration Limits with the Nuclear Regulatory Commission (NRC). Simultaneously, they have continued their efforts to purchase private property surrounding the site -- all showing their lack of commitment to do what is right.

Yet, even while there are fewer and fewer people living in the vicinity of the site, the legacy of contamination threatens future generations. This is environmental injustice and a grave threat to New Mexico's water resources.

For all these reasons, as set forth in more detail below, it is premature to grant a Technical Impracticability waiver.

I. Human health and the environment must be protected from a legacy of Homestake Mill uranium contamination.

Protecting human health and the environment is the ultimate goal of groundwater remediation efforts at the Homestake Mining Company Superfund Site. *See EPA Guidance for Evaluating the Technical Impracticability of Groundwater Restoration (EPA TI Waiver Guidance), Section 1.1.*

- Alternative Groundwater Protection Standards (GWPS) were approved for the Superfund Site in 2006. The alternative site standards relieved Homestake Barrick Gold, the owner of the Site, from cleaning up groundwater at the site to drinking water quality.
- Importantly, as recently as December of 2019, Homestake Barrick Gold proposed in its Groundwater Corrective Action Program (GCAP) that 10 more years of remediation efforts at full capacity was the best way forward. *See 12/19 HBG GCAP*.

The site will not be properly addressed until background water quality is established, sufficient modeling is developed, and remediation efforts are fully and effectively implemented.

- NMED and EPA are currently working to assess background water quality, prompted by the scientific studies that MASE and BVDA provided.
- EPA agrees that HBG needs to revise its conceptual model to incorporate the potential for tailings "rebound" (increasing concentrations) and NMED/EPA's reassessment of background groundwater quality. *EPA Fourth Five-Year Review, 2016.*
- EPA has yet to issue a Record of Decision (ROD) for Operating Unit 1 (OU1) on groundwater and Operating Unit 2 (OU2) on long-term stabilization, even though the site has been on the National Priorities List for almost 40 years.

NRC approved Homestake's 1989 Corrective Action Plan (CAP) for groundwater (updated in 2006, 2012, 2019 and 2020), which originally set out to dewater its large tailings pile (LTP) in order to remove this area as a continuing source of groundwater contamination.

- After dewatering the tailings in 1999, Homestake initiated flushing of the LTP with fresh water from the San Andres-Glorieta (SAG) aquifer from 2000-2015.
- The integrity of HBG's SAG wells had not been assessed when MASE first raised the issue during a public hearing on the renewal of Homestake's discharge permit DP-200 in 2014.
- A well integrity assessment was finally conducted, resulting in the replacement and abandonment of several SAG wells. Since then, elevated Constituents of Concern (COCs) in several SAG wells have come to light.

Then, in an about face, in the summer of 2020, Homestake Barrick Gold made public its goal of seeking a Technical Impracticability (TI) waiver from the EPA and Alternate Concentration Limits from the NRC. Allowing HBG to walk away before clean-up is complete would leave a legacy of air, soil and water contamination in New Mexico that will burden future generations. This is unacceptable to the impacted communities.

- The techniques tried have not been completed in the manner promised or approved. A clean-up of the Homestake Mill contamination based on the best available science and technology has never been attempted. The community has long called for the removal of the large tailings pile. *See* https://cvnmef.org/in-the-news/homestake-site-haunts-residents/ Their voice rings more and more true as the groundwater contamination caused by the tailings has increased over the decades.

- If the tailings piles are not removed, HBG should optimize its cleanup strategy by implementing its Reverse Osmosis (RO) improvements and zeolite upgrades to treat more water, especially off-site plumes; use treated water in lieu of fresh water; and remedy SAG aquifer well contamination. EPA agrees that these improvements will improve the protectiveness of Homestake's remedy. *EPA Fourth Five-Year Review, 2016*

II. Contamination at the site has grown, not decreased, during HBG's "clean-up"

Groundwater contamination was first detected in the shallow alluvial aquifer beneath the Homestake site. Since then, contamination has spread to the Upper Chinle, the Middle Chinle, the Lower Chinle, and we believe, the SAG aquifer.

- The original hydraulic barrier placed south of the LTP in the early 1980s pushed a contamination plume further south of the original contamination footprint.

- Since 2000 Homestake has enlarged its original footprint with many hundreds of wells on the site, and a flushing program that also pushed contamination past site boundaries.

- HBG did significant collateral damage by flushing the LTP with clean water from the SAG aquifer and implementing a collection/injection program, which mobilized the uranium and other contaminants rather than drying and containing the source of contamination within the large tailings pile through dewatering.

- HBG's groundwater model should now be revised to reflect the following changes in operating conditions: discontinuation of land application; active flushing of the tailings with SAG water; increased operating capacity of the water treatment systems; plume movement beyond Homestake's licensed boundary and down gradient into the SAG aquifer.

- The timeframe for groundwater restoration can then be updated to include the additional time needed for groundwater restoration outside the facility's licensed boundary and down gradient of the source areas.

As a property owner and MASE member told EPA:

"When I bought my property at 3021 Hwy 605 in January 2001 I talked to local people about the area but mainly relied on the EPA web site which gave a description of the super fund site. There were maps and graphs and calculations and descriptions of the site. It stated that the alluvial aquifer was contaminated but that the other Chinle's weren't and that the cleanup-remediation would be complete in 2003. We are all aware of the many attempts to restore our

water quality and the failure of those attempts. They waited about 10 year to start addressing the problem after discovering contamination. They sprayed water in the air for 10 more years, they created a hydraulic dam to contain the spread, they set up an RO plant to treat the water along with the evaporation ponds, they sprayed water for irrigation, and now have tried newer methods only to watch them fail. All the while the problems get worse and more complicated. We have gone through "evaluations," "examinations," and "calculations", so many times that our heads are dizzy and tired. The approach has been cosmetic and never getting at the true source of the problem. That is, the tailings piles are leaking. You have a hole in the bucket and until that is addressed it will continue to spread and all other cosmetic methods and numerous calculations will fail. We can't just continue to "look" at the problem. The pile must be moved to a state of the arts facility that would be double lined, monitored and have the ability to retrieve the leakage and process or extract harmful elements before releasing any water back into the aquifers. It is an enormous project-concept to correct an enormously, grossly negligent problem. It only gets worse the longer you put off the inevitable. To continue stalling or to abandon this mess would clearly be criminal negligence. I hope and pray you will do the right thing."

III. Inadequate system design and operation is not a reason to grant a Technical Impracticability Waiver

"Failure to achieve desired cleanup standards resulting from inadequate system design or operation is not considered by EPA to be a sufficient justification for a determination of technical impracticability of groundwater cleanup." *EPA TI Waiver Guidance, Section 1.1*

Our communities can cite a litany of actions by HBG over the years since reclamation began in 1977 that have contributed to the spread of groundwater contamination from HBG's uranium mill tailings into the alluvium and deeper bedrock aquifers of the Chinle Formation, and possibly into the SAG Aquifer. HBG used a variety of tested and untested experimental groundwater treatments that HBG repeatedly assured our community would clean up our water supplies within 10 years, then 25 years, then 35 years or more.

HBG's so-called "upgrades" and "improvements" have done nothing to stop contaminant plumes in the alluvial and Chinle aquifers from moving offsite. Even as HBG buys out property owners adjacent to the site, the plumes will continue moving further down gradient to the SAG aquifer, or downstream to the Rio San Jose and all the communities who depend on these fresh water sources to meet their needs now and into the future. Homestake activities did not comply with its permits and license.

1. <u>Massive Collection/ Injection well network has increased the problem:</u>

- The 2010 supplemental remedial system evaluation by the Army Corps of Engineers cited the need for improved management of injection volumes and rates into impacted aquifers. Community stakeholders and their technical experts have repeatedly raised concerns about well integrity.

- The source of the contamination in HBG's SAG wells remains undetermined. Total Dissolved Solids (TDS) numbers are rising in SAG wells - this is still unexplained. The SAG aquifer supplies the only alternative water source for the five subdivisions and is the sole municipal water supply source for the downstream communities of Milan and Grants.
- HBG's injection wells and infiltration lines have diluted contaminant concentrations in nearby monitoring wells, making it difficult to effectively or accurately assess contaminant trends.
- A comprehensive well integrity survey of ALL Homestake wells should be undertaken to eliminate the potential for any well to become a conduit for contamination.
- SAG water usage should be minimized and replaced with treated water.
- Long-term monitoring of HBG's SAG wells for COCs must continue.
- Rising Total Dissolved Solids levels must be explained.

2. <u>Flushing added to groundwater contamination</u>:

- Over 22 million tons of unlined tailings disposal atop the ancestral San Mateo Creek bed channel has created a pathway for contaminant transport off-site.
- In 2000, HBG began using freshwater from the SAG aquifer to flush the large tailings pile until it terminated the flushing program in 2015. Actual rebound conditions from the re-saturated LTP must now be monitored and incorporated into its groundwater model.
- Over the course of fifteen years, HBG has pumped SAG wells of questionable integrity for its flushing program that may have provided direct pathways for contamination of the SAG aquifer.
- At a 9/29/20 public meeting with EPA Region 6, EPA stated that saturation of the LTP remains a concern – they are still seeing rebound. EPA reported we should know more once we see a November 2020 report. MASE has yet to see that report.

3. <u>Reverse Osmosis has not operated properly or at capacity:</u>

- The expanded and upgraded Reverse Osmosis (RO) facility is still only operating at 25% capacity.
- HBG has used freshwater from the SAG Aquifer for 21 years to dilute its RO treated water in order to meet its NRC approved Groundwater Protection Standards for re-injection.
- HBG says it has doubled its RO treatment capacity and plans to significantly expand RO treatment after relining Evaporation Pond 1, which has been postponed until 2022.
- HBG expects its expanded RO system to treat up to 900 gpm of contaminated groundwater on an average annual basis. The system has three runs, but only two operate at a time at 600 gpm. It has never approached full capacity. *HBG 12/19 Groundwater Corrective Action Program.*

- Significantly more RO treatment is required to treat the high volumes of water necessary to truly remediate this site.

4. Zeolite system has not operated at full capacity as promised:

- HBG's zeolite treatment systems constructed on top of the LTP are used to treat off-site groundwaters where uranium is the only constituent that exceeds the GWPS. Zeolite treatment was first tested at bench scale in 2007 followed by additional pilot tests.
- A full-scale zeolite treatment system with a maximum treatment capacity of 300 gpm was constructed in 2012 followed by a system with a maximum capacity of 1,200 gpm in 2015. *HBG 12/19 Groundwater Corrective Action Program*
- The zeolite treatment systems are expected to treat up to 1,200 gpm of contaminated groundwater on an annual average basis under this CAP. Again, this system has never operated at capacity.
- HBG intends to use zeolite treated water to maintain its hydraulic barrier in lieu of SAG water. *EPA Fourth Five-Year Review, 2016*
- After approximately 216,000 gallons of zeolite extraction water was accidentally released onto the ground surface on August 26, 2020, HBG identified corrective actions to prevent this type of incident in the future. These additional corrective actions include updating standard operating procedures specific to the zeolite water treatment operation and additional personnel training.

5. Land Application Program was illegal:

- HBG operated a Land Application project that used contaminated groundwater on irrigation plots from 2000 until 2012, in violation of their NRC license.
- Conducting land application of groundwater that exceeded groundwater protection standards for the site has resulted in increased contamination over the years.

IV. The tailings piles must be moved and isolated with liners and barrier caps.

The re-saturated Homestake Tailings Piles will continue to seep in perpetuity. This is critical as it means contaminant concentrations will continue to percolate into the impacted aquifers and push plumes downstream and downgradient, threatening community and regional water supplies. Because the western portion of the Large Tailings Pile covers the ancestral San Mateo Creek, seepage from the tailings can be transported via the Creek into the Rio San Jose, or "waters of the United States." The unlined tailings currently sit on 80-90 feet of alluvium.

The tailings piles must be moved and encapsulated into lined impoundments with leak detection and redundancy/fail-safe systems before they are finally covered with a radon barrier that also prevents the infiltration of precipitation and storm water.

Until the tailings piles are moved, the source of contamination will continue to spread.

During the EPA's Remedial System Evaluation, the option to move the Large Tailings Pile to an off-site regional waste repository was briefly considered. The option was viewed as too expensive and unsafe to removal workers. However, two options that were not considered at that time include: 1) creating a waste repository in the Ambrosia Lake area—making the truck and shovel removal less expensive; and 2) removal via slurry to a nearby site owned by Homestake, or, again, to a nearby repository.

V. EPA has not meaningfully engaged the impacted community in this process.

While EPA completed a ROD on OU 3 – concerning radon – within a few years of the site being placed on the NPL, EPA neglected to complete a ROD on OU1 and OU 2. EPA has now begun steps towards a ROD on OU1 and OU2, almost 40 years later, but has failed to engage stakeholders in a meaningful way.

EPA has provided us with limited information about its Remedial Investigation (RI) and Feasibility Study (FS) determinations. Our communities were not given any opportunity to participate or comment on the RI or the settlement agreement and planning for the FS. We expressed our concerns in a December 3, 2020 letter to EPA.

EPA recognizes that because "TI decisions may affect the potential future uses of groundwater, interest in TI ARAR waivers may be high. Therefore, it is EPA' s intent to coordinate and consult with States and the public regarding TI ARAR waiver issues as early as possible in the remedy decision process." EPA TI Waiver Guidance, Section 6.1.1. We therefore expect that the EPA will ensure a much more vigorous and meaningful community involvement going forward.

At a 9/30/20 public meeting, EPA told us that they would meet with us before the end of the year once they received numbers on background. That didn't happen. EPA also told us that they would share the TI Evaluation report with us. That hasn't happened.

We need more opportunities for community involvement in selecting a remedy that protects our health and environment.

VI. Cost plays a subordinate role to protectiveness.

We understand that the EPA can grant a Technical Impracticability waiver if … "compliance with the [ARAR] is technically impracticable from an engineering perspective." 40 CFR 300.320(f)(ii)(C)(3) and 42 U.S.C. 9621(d)(4)(C). According to the EPA, the use of the term "engineering perspective" implies that a TI determination should primarily focus on the technical capability of achieving the cleanup level, with cost playing a subordinate role. The NCP Preamble states that TI determinations should be based on: "...engineering feasibility and reliability, with cost generally not a major factor unless compliance would be inordinately costly." EPA TI Waiver Guidance Sec. 4.1.1

The role of cost, however, is subordinate to that of ensuring protectiveness. The point at which the cost of ARAR compliance becomes inordinate must be determined based on the particular circumstances of the site. As with long restoration timeframes, relatively high restoration costs may be appropriate in certain cases, depending on the nature of the contamination problem

and considerations such as the current and likely future use of the groundwater. “Compliance with ARARs is not subject to a cost-benefit analysis,” and cost is subordinate to protectiveness. *EPA TI Waiver Guidance, Section 4.4.5*

HBG should be required to maximize and optimize the remedies it has chosen to implement at the site. EPA thinks that recent improvements and upgrades to HBG’s remedial systems will increase the protectiveness of the remedy. *EPA Fourth Five-Year Review, 2016.*

VII. Any remedy selected must be protective of human health and the environment.

Regardless of whether ARARs are waived at the site, the alternative remedy still must satisfy the two threshold remedy selection criteria: 1) protect human health and the environment; and 2) comply with all ARARs that have not been waived. *EPA TI Waiver Guidance, Section 5.2.1*

EPA's general expectations are to prevent further migration of the contaminated groundwater plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction measures as appropriate. *NCP §300.430(a)(l)(iii)(F).* These expectations should be evaluated along with the nine remedy selection criteria to determine the most appropriate remedial strategy for the site.

EPA Region 6 has noted that the remedy for the Homestake Superfund site was protective for the short-term in 2016, but that long-term protectiveness of the remedy required completion of EPA’s CERCLA equivalency review, re-assessment of background groundwater quality for the alluvial and Chinle aquifers, and the issuance of RODs for OU1 and OU2. The timeframe for groundwater restoration for areas outside the facility’s licensed boundary needs updating, and the source of elevated uranium in Homestake’s SAG wells should be investigated to determine if pumping from the SAG wells is drawing site contamination into the deeper regional aquifer.

It is instructive to note that New Mexico Water Quality Control Commission regulations (20.6.24103 NMAC) must be met outside Homestake’s site boundary and that EPA’s Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions (OSWER9355.0-129, November 2013) counsels that groundwater remediation levels should be met throughout the contaminant plume (not just at compliance locations).

Because HBG has been acting under a 1989 GCAP for over 30 years in the absence of a ROD for groundwater cleanup, it is premature to consider the approval of alternative remedies or waivers until the CERCLA process for this Superfund site has been carried out. HBG must first demonstrate substantial compliance with its approved or revised GCAP, in conformity with EPA RODs on Operating Units 1 and 2.

Any remedial measures that fall short of attaining approved background levels at the site will not be protective of our regional groundwater supplies, including the SAG aquifer, the last remaining freshwater supply source available to meet our and the region’s domestic and municipal needs now and into the future.

The remedies selected must have long-term effectiveness in reducing the toxicity, mobility, and volume of contaminants from the large and small tailings piles into our surface water and groundwater supplies.

Community, State and Tribal acceptance of the remedies selected must also be considered.

NMED/EPA must follow through with a defensible reassessment of background groundwater quality that does not attempt to grandfather in water quality impacts from Homestake's milling or reclamation operations.

An ecological risk assessment should be performed due to Homestake's expanded footprint and off-site impacts over the last five years.

The remedy selected must curtail releases from and permanently isolate the sources of contamination in the tailings piles in order to protect the health and sustainability of our communities.

VIII. It is premature to grant a Technical Impracticability Waiver.

As recently as December of 2019, HBG proposed to do corrective action for another 10 years that would significantly reduce groundwater contamination. *See December 2019 GCAP.* Indeed, HBG's 12/19 GCAP proposed continued groundwater collection, treatment, and injection within the alluvial and Chinle Aquifers for approximately 10 years to contain the constituent plumes in the alluvial and Chinle Aquifers to within its licensed boundary. HBG proposed remedial actions so that COC concentrations on-site and off-site would be reduced to less than the site GWPS. *See Id., Section 9 CORRECTIVE ACTION PROGRAM.* In that corrective action program, HBG stated:

- Approximately 300 gpm of fresh groundwater would be extracted from the SAG Aquifer wells Deep #1R and Deep #2R and used to mix with treated waters and injected for hydraulic control.
- Groundwater monitoring results would be used to evaluate the performance and effectiveness of the groundwater collection and injection system.
- The proposed groundwater collection and injections system would be operated dynamically so that pumping and injection rates will vary as groundwater plume extents and COC concentrations are reduced.
- Some COCs may not be reduced to meet the GWPS in some areas. HMC also acknowledged that LTP seepage to groundwater will continue following corrective action and that groundwater at and beyond the point of compliance (POC) would exceed the GWPS in the future.

If, as HBG states, it is unable to control contaminant plumes from the site, especially into the SAG aquifer, or to meet GWPS within a reasonable timeframe, then the tailings must be removed and isolated. The source of contamination in HBG's SAG wells must be determined and continued treatment of the alluvial and Chinle plumes should continue.

IX. EPA must abide by the Superfund CERCLA process to protect our communities and our land and water.

Historical waste and contamination from uranium mills in the United States, and more specifically within the San Mateo Creek Basin, have resulted in a persistent and unwanted legacy for future generations of residents. Our future generations need clean water to drink, clean air to breathe, and clean soil to till. We all need to be surrounded by healthy ecosystems to survive and prosper. Clean air, water and soil form the core of our national security, which in turn preserves the health of regional ecosystems throughout the country for future generations. Without healthy ecosystems, all life forms will wither and die.

We are now at a crossroads. One road will allow Homestake Barrick Gold to leave behind spreading plumes of contaminants that are seeping from Homestake's tailings piles. The plumes will move downstream into the Rio San Jose through the alluvial aquifer and downgradient into the last remaining source of clean water in the San Mateo Creek Basin - the SAG aquifer. This cannot be allowed to happen, as it will be difficult to maintain enforceable Institutional Controls beyond HBG's site boundaries.

EPA must abide by the Superfund CERCLA process. EPA must reassess background groundwater quality and establish long overdue ARARs for the Homestake Superfund site with community involvement. The Remedial Investigation and Feasibility Study equivalency review that will form the foundation for its ROD on OU1 (long-term groundwater contamination from the tailings) and OU2 (long-term tailings stabilization, surface reclamation, and site closure) must be completed. Removal of the tailings should be reconsidered as the only remedy that can eliminate the sources of contamination after 44 years of attempted cleanup. Treatment of the existing alluvial and Chinle plumes should continue.

Affected community members and local residents cannot be left out of this process. We must have a voice in how to protect the places where we live, work and pray. After 45 years of struggle, it is past time for HBG to be held accountable for its toxic legacy. After decades of profit, Homestake Barrick Gold must ensure a livable landscape and clean water for future generations.