



Electronic Transmission

July 10, 2024

Sherry Burt-Kested
Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

RE: Pre-Feasibility Study (Pre-FS) Remedial Action Criteria, Lampbright Investigation Unit (LIU)

Dear Sherry Burt-Kested:

The purpose of this letter is to notify Freeport-McMoRan, Inc., Chino Mines Company (Chino), of the selection of the Pre-Feasibility Study (Pre-FS) Remedial Action Criteria (RAC) for the Lampbright Investigation Unit (LIU). According to the Chino Administrative Order of Consent (AOC), Statement of Work, Appendix Z, Section 2.6, the New Mexico Environment Department (NMED) shall issue the Pre-FS RAC, to be used by Chino to develop the FS within sixty (60) days of issuance of the final Health and Environmental Risk Assessment (HERA). This timeframe was not met due to the following events listed below.

The HERA was not completed as described in the Chino AOC, Statement of Work, Appendix A, Section 2.5. However, two (2) separate risk assessments were conducted by 2 different risk assessors, directed by NMED. NewFields Boulder, LLC (NewFields) completed and submitted a draft Ecological Risk Assessment (ERA) in March 2013. A revised ERA was submitted by Formation Environmental LLC (Formation) in May 2018 and conditionally approved by NMED in February 2019. Chino reviewed and commented on both the draft and revised versions of the ERA. The results of the ERA for LIU were presented to the Community Working Group (CWG) in May 2019. Neptune and Company, Inc. completed a two-tiered Human Health Risk Assessment (HHRA) which was finalized in November 2012. The HHRA was presented to the CWG in January 2013.

During the completion of the ERA and HHRAs, NMED solicited reviews and expert opinions on the reports from the United States Environmental Protection Agency (USEPA), the United States Fish and Wildlife Service (USFWS), and the New Mexico Department of Game and Fish (NMGF).

Chino requested a copy of the draft Pre-FS RAC letter from NMED during a teleconference on December 5, 2022, to allow their review and to allow potential comments on the letter prior to the public release of the letter. NMED has obliged this request and worked in a cooperative manner with FMI during this process.

Results of the ERA

The ERA evaluated the potential for risk to terrestrial and aquatic receptors following the risk assessment process described in the Sitewide Ecological Risk Assessment (Sitewide ERA) which was completed in November 2005. The Sitewide ERA provided a set of risk-based tools for the completion of the IU-specific ERAs at the Site. These tools were used to streamline the LIU ERA.

The LIU ERA assessed risk to the following:

- Plant Community within the LIU as Wildlife Habitat
- Terrestrial Wildlife
- Aquatic Receptors

Risks to the plant community and terrestrial wildlife were assessed primarily from surface soil and the potential for uptake of site-related chemicals into biotic tissues from the soils.

For the plant community, the LIU ERA concluded that LIU plant communities have not been adversely affected by chemical contaminants from Chino mining operations to the extent that wildlife habitat function was significantly degraded. Some potential for effect was observed at several locations, but those effects were not expected to be distinguishable from those found in adjacent naturally mineralized reference area soils.

For terrestrial wildlife, the LIU ERA concluded that risks from exposure to COPCs released from LIU sources appear to be low. As with plants, some limited potential for risk were observed, but were indistinguishable from those found in adjacent naturally mineralized reference area soils.

Risks to the aquatic receptors were assessed from exposure to surface water and sediment. Exceedances of the acute and chronic New Mexico Ambient Water Quality Criteria (NMWQC) were limited. The most notable exception was zinc in Tributary 2 where the acute NMWQC was exceeded in all available samples at a single location. No known anthropogenic source of zinc is present at that location (LBT-11). As a result, risk could not be conclusively considered to be low within Tributary 2 based on the currently available data due to the consistently elevated zinc concentrations at LBT-11. Several cadmium concentrations in Tributary 2 also exceeded the chronic NMWQC. Risks from zinc in Tributary 1 were concluded to be low.

For sediments, the LIU ERA concluded that risks to aquatic life from sediment exposure appear to be lower than those predicted for the other IUs at the Site; however, copper concentrations in sediment exceeded the probably effects concentration (PEC) (149 mg/kg) at 6 locations (three locations within Tributary 1, two locations within Tributary 2A and one location in Tributary 2). The quality of aquatic habitat or the permanence of the water at the locations where the PECs were exceeded has not been formally characterized making the prediction of risk at these locations uncertain. However, the ERA concluded that given the small number of PEC exceedances observed, widespread risks to the aquatic community from exposure to COPCs in sediment is expected to be low within the LIU drainages. If the PEC exceedances correspond with areas of persistent benthic habitat, risk in those areas may be higher than predicted elsewhere.

The primary risk-based concern related to the aquatic receptors in the LIU was the consistent exceedance of water quality benchmarks for the federally endangered Chiricahua Leopard Frog (CLF). In 2007, the USFWS included Lampbright Draw and its tributaries within Recovery Unit 8 as part of their final species recovery plan for the CLF. The recovery unit also included Martin and Rustler canyons within the STSIU

and other drainages in HWCIU and indicates that populations of the frog were present at numerous locations within Lampbright Draw and its tributaries until the late 1990s and possibly later (USFWS 2007). The recovery plan also indicates that small populations within the STSIU and perhaps the HWIU were possibly present in 2007, but that the populations in LIU are likely to be extinct due to chytridiomycosis, caused by infection from a pathogenic fungus. The final critical habitat designation was published in the March 20, 2012, Federal Register (USFWS 2012), indicating the presence of one critical habitat unit within the Chino Mines Investigation Unit (in the STSIU) at Ash and Bolton Springs where the frog is expected to be currently found. To the east of the LIU, a critical habitat was also established along the Mimbres River, outside of the Chino Mines Investigation Unit. No critical habitat was defined within the LIU, presumably because of the extinction caused by chytridiomycosis in the late 1990s.

In the habitat designation, USFWS provided guidance on the likelihood of dispersal by the CLF:

“Chiricahua leopard frogs are reasonably likely to disperse 1.0 mile (mi) (1.6 kilometers (km)) overland, 3.0 mi (4.8 km) along ephemeral or intermittent drainages (water existing only briefly), and 5.0 mi (8.0 km) along perennial water courses (water present at all times of the year), or some combination thereof not to exceed 5.0 mi (8.0 km).” (USFWS 2007).

The Southwest Endangered Species Act Team (SESAT) developed a document for aiding in the assessment of effects to the CLF (SESAT 2008). In that document, SESAT notes that accurately identifying whether habitat for the CLF occurs within the project area where the CLF is likely to occur is a critical step in potentially identifying whether effects to the frog are possible. This includes the use of the dispersal potential discussed by USFWS (2007) and a good identification of habitats within that potential dispersal area is needed to make a determination of the potential presence or absence of the frog. The habitats to be considered are further defined as ‘suitable’ or ‘marginal’. Further determinations of whether the habitat is occupied, likely to be occupied, or unoccupied should also be considered.

An unoccupied habitat is defined as: “Sites that support all of the constituent elements necessary for Chiricahua leopard frogs, but where surveys have determined the species is not currently present. The lack of individuals or populations in the habitat is assumed to be the result of reduced numbers or distribution of the species such that some habitat areas are unused. It is expected that these areas would be used if species numbers, or distribution were greater. Site occupancy can also change due to immigration and colonization, which may occur anytime during the warmer months (and is most likely to occur during the summer monsoons). If extant populations occur within reasonable dispersal distance of a site under assessment supporting suitable habitat, colonization is likely to occur and surveys more than once a year as part of project planning or effects analysis may be warranted to assess presence/absence.”

The LIU ERA concluded that based on the available guidance and the unknown presence/absence of suitable or marginal unoccupied habitats within the LIU, with known former populations in LIU drainages, dispersal of the CLF into the LIU from areas where the frog was historically observed was determined to be unlikely but could not be entirely dismissed in either Tributary 1 or Tributary 2 or in Lampbright Draw.

As part of the process of the finalization of the ERA, NMED indicated that the uncertainties in the ERA related to the presence/absence of the federally endangered as well as the documentation of potential habitats for the frog within the LIU were a limiting factor in the decision-making process for the LIU. To address these uncertainties, in September 2019, Chino submitted a Workplan for the survey of the LIU and adjacent drainages to attempt to determine the presence of CLF within the drainages and to

document the habitat within the drainages. NMED approved the Workplan, and the study was completed in late September 2019 by Chino's contractor BIOME and was attended by representatives from Chino, NMED and Formation. A draft of the findings of the survey was submitted to NMED for review in February 2020 and a final version of the survey findings was approved by NMED on September 10, 2020, which provided a final completion date for the LIU ERA. The CLF survey concluded:

1. No CLF of any life stage were observed within any of the available habitats surveyed. Although the previous surveys that detected CLF in West Fork identified tadpoles (Jennings 1998), the current surveys were unable to identify CLF presence.
2. Although there are potentially suitable and marginal habitats within the LIU, these sites are extremely limited to small, isolated pools that are subject to complete drying and have limited aquatic vegetation development for egg-laying. These habitats do not provide stability for all life stages of CLF and should therefore be considered marginal.
3. Rustler Canyon contains potential habitat but is currently unoccupied and potentially suitable CLF habitat found within Rustler Canyon is located nearly 4 miles of ephemeral drainage from the LIU. These distances are beyond the criteria set by the 1-3-5 Rule for dry terrestrial, intermittent, or perennial aquatic habitats.
4. Given the current absence of CLF populations and existing hydrological conditions of West Lampbright, Tributary 1 and Tributary 2 and 2A, the potential for CLF to occur in the LIU is extremely limited.

Results of the HHRA

The LIU HHRA followed a two-tiered approach. The screening-level Tier I assessment assessed maximum detected concentrations of Constituents of Interest (COIs) in exposure equations that included conservative exposure and chemical toxicity assumptions. The HHRA assessed concentrations for soil ingestion, dermal contact and inhalation of dust when soil samples are collected from the 0-1" interval. This Tier I assessment identified Constituents of Potential Concern (COPCs) carried forward to the Tier II HHRA, which included refined assumptions.

Based upon the Tier I screening of COIs, COPCs evaluated in the Tier II HHRA include aluminum, arsenic, hexavalent chromium (CrVI), cobalt, and manganese. Comparisons of LIU site concentrations of these COPCs with concentrations at the LIU reference area plus an area used in a previous HHRA reveal little statistical differences between impacted areas and relatively non-impacted areas.

The Tier II HHRA found that the only potential issue from a human health perspective may be nervous system effects related to manganese concentrations in soils in a future construction scenario. However, this is likely due to highly conservative assumptions regarding the quantity of dust generated by vehicle traffic on unpaved roads used in the exposure assessment. Manganese site concentrations do not appear to be elevated above the LIU reference data, and marginally elevated above the STSIU/ERA reference data. It was, therefore, determined that preliminary remediation goals for the protection of human health were not required for the LIU.

Pre-FS RAC Selection

Since the HHRA concluded that risks were within acceptable levels for human receptors, no Pre-FS RACs are required to address human health concerns. The following sections discuss risk-based Pre-FS RACs for addressing potentially unacceptable ecological risks.

Terrestrial Upland Soils

Because risks in both the final ERA and HHRA were determined to be low for all chemicals, NMED has determined that no Pre-FS RACs specific to the LIU soils are required to complete the FS.

Based on precedent set in the Smelter and Tailings Soil Investigation Unit (STSIU), NMED notes that the copper Pre-FS RAC for STSIU soils (1,600 mg/kg) which was based on risks to small ground-feeding birds is applicable for use in the LIU and should be considered in the FS process. However, since no copper concentrations were measured in the LIU Remedial Investigation or other sampling events as summarized in the LIU ERA that were in excess of the STSIU Pre-FS RAC, it is unlikely that the 95UCL of the area-weighted average concentration of copper in surface soils (0-6 inch) within exposure units in the LIU has been exceeded.

In addition, in the STSIU NMED selected the Pre-FS RAC for the protection of habitat alterations due to effects from copper uptake, as measured via cupric ion activity (pCu^{2+}), where pCu^{2+} is < 5 and copper is > 327 mg/kg. The Pre-FS RAC for vegetation is also applicable to the LIU and should be considered in the FS process. As with the STSIU Pre-FS RAC for small ground-feeding birds, the LIU ERA indicated that those conditions are unlikely to be encountered within the LIU.

Surface Water Quality

NMED selected the Pre-FS RAC based upon the State of New Mexico Standards for Interstate and Intrastate Surface Waters §20.6.4.900 NMAC Target Risk for aquatic life. The Pre-FS RAC for all constituents of concern are in §20.6.4.900 NMAC, including all approaches and tools listed in the Regulations which provide options for site-specific application.

NMED notes that these criteria will be addressed by DP-376 or DP 1340 Sitewide Abatement as per Stage 1 investigations:

- Golder, 2007b. Stage 1 Task 1 Addendum: Assessment of Available Data and Work Plans for Vadose Zone and Surface Water Investigations. February 15, 2007.
- Golder, 2009c. Task 1 Addendum: Surface Water and Vadose Zone Investigations, Characterization of Intermittent Baseflow along Lampbright Tributary 1. August 27, 2009.
- Golder, 2010. Tributary 2 Corrective Action Monitoring Report.

Additional consideration of risks specific to the CLF are not required to be considered as a Pre-FS RAC based on the results of the 2020 survey. However, if CLF are encountered within the LIU or adjacent tributaries in the future, additional consideration of CLF risks will be required for protection of this endangered species.

Sediments

For sediments, the LIU ERA concluded that risks to aquatic life from sediment exposure were potentially associated with copper concentrations in sediment exceeded the probably effects concentration (PEC) (149 mg/kg) at 6 locations (three locations within Tributary 1, two locations within Tributary 2A and one location in Tributary 2). These data reflect post-removal data from within Tributary 2.

As noted above, the quality of aquatic habitat or the permanence of the water at the locations where the PECs were exceeded has not been formally characterized making the prediction of risk at these locations uncertain. That said, some of the locations identified in the ERA fall under the current operational footprint. Specifically, four locations with copper detected in sediment above the PEC are now within the operational boundary or are within a proposed but currently unpermitted expansion of the operational boundary, as follows:

Tributary 1

- 2214, 721 milligrams per kilogram (mg/kg)
- 2215, 260 mg/kg
- 376-05-04, 295 mg/kg

These samples are within the footprint of a proposed stockpile known as the Kessel Stockpile. Should the stockpile be permitted and constructed, the samples would then fall within the operational boundaries of the active mine under DP 376. If the proposed stockpile is not completed, the samples would remain within the AOC boundaries.

Tributary 2 and 2A

- 2202, 183 mg/kg; Tributary 2A

This location has been excavated and subsumed in the Lampbright Far East Containment Area under DP 376.

There is one location in Tributary 2A (2206; 164 mg/kg) and one location in Tributary 2 (T2S10; 199 mg/kg) which had copper concentrations that exceeded the PEC that continue to lie outside of the current and/or proposed operational boundary.

The NMED is not electing to identify a Pre-FS RAC for sediments at this time, but requests that Chino provide a description in the FS of the aquatic habitat at each of the Tributary 2 and 2A locations where the copper PEC was exceeded. If the PEC exceedance corresponds with area of persistent benthic habitat, risk in those areas may be higher than predicted elsewhere within the LIU and should be discussed in the FS.

Groundwater Quality

In development of the LIU Pre-FS RAC, NMED discovered a data gap in the Remedial Investigation report. For LIU, drainage sediment sample results exceed the NMED Dilution Attenuation Factors (DAF) developed to protect groundwater for arsenic. Although this potential impact was not included in the Conceptual Site Model or in the risk assessments, Chino investigated this potential pathway under an approved

workplan for STSIU dated October 20, 2010. Under this workplan, samples were analyzed using 1) the Synthetic Precipitation Leaching Process and 2) Acid-base Accounting and the results compared to Ground Water Quality Standards (WQCC Standards and MCLs) to determine if this potential pathway may impact groundwater and if potential remedial alternatives should be developed in the FS. Additional samples, including LIU drainages, were collected from all the drainages that exceeded the DAF 1 as listed in NMED's Technical Background Document for Development of Soil Screening Levels, Revision, 5. 0 (August 2009) or background concentrations for the following constituents of potential concern (COPC): arsenic, barium, cadmium, copper, iron, molybdenum and selenium.

NMED approved the April 19, 2011, Groundwater Quality Pre-FS RAC for Drainage Sediments Report under the STSIU on May 9, 2011. NMED concluded in the approval letter that there is no potential for groundwater contamination from drainage of sediments that initially exceeded NMED's Dilution Attenuation Factors. NMED approved this Report for STSIU and acknowledges that the data is applicable to LIU and, therefore, potential leaching of drainage sediments to groundwater will not need to be pursued in the LIU Feasibility Study. Additional information is also provided the DP 1340 Stage 1 Sitewide Abatement Study, Appendix A-2, submitted March 30, 2016.

No additional Pre-FS RAC have been selected by NMED for the use in the LIU FS process.

In finalizing pre-FS RAC for the STSIU, NMED documented that: *"Chino is concerned that new information may not be incorporated into the process for establishing final cleanup goals and selection of remedial alternatives. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process provides an avenue to incorporate new information into the FS process, but Chino is concerned that the AOC does not provide the same ability as it does not specifically state this in the Statement of Work. However, Section II.A of the AOC states "The objective of the Parties in entering into this AOC is to protect the public health and welfare and the environment at the Investigation Area through a Remedial Investigation, Feasibility Study, and the development, design and implementation of a Remedial Action plan or plans for the Investigation Units consistent with the National Contingency Plan (NCP) [emphasis]." Therefore, since the FS and Record of Decision (ROD) will be completed consistent with the NCP, new information can be used to refine RACs and selection of alternatives. This is supported by the NCP in §300.430(e)(2)(i) which states "Establish remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals are developed based on readily available information, such as chemical-specific ARARs or other reliable information. Preliminary remediation goals should be modified, as necessary, as more information becomes available during the RI/FS. Final remediation goals will be determined when the remedy is selected. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment." It must be noted that NMED's Pre-FS RACs are equivalent to preliminary remediation goals referred to in the NCP. Chino may raise new information that is relevant to a determination of final RAC and may invoke dispute resolution based on such new information if warranted."* NMED's documentation of the Pre-FS RAC for the STSIU is also applicable to the LIU.

The Pre-FS RACs shown in Table 1 should be used to develop potential remedial alternatives in the FS. Chino shall commence the FS tasks within sixty (60) days of receiving this letter as stated in the AOC, SOW, Section 2.7. Chino shall submit the draft FS within one hundred twenty (120) days of receiving this letter. As stated in the AOC, Article XIV. A, Chino may request an extension of the due date. As indicated in the AOC, final RAC levels will be developed and established in the Decision Document for the site and will be based on information from the RI and FS, results of soil and biotic monitoring, or other factors.

Sherry Burt-Kested, Freeport-McMoRan Chino Mines Company
Pre-Feasibility Study Remedial Action Criteria LIU
July 10, 2024

NMED appreciates the input that Chino has provided during the Pre-FS RAC process. If you have any questions please contact David Mercer, Chino AOC Project Manager, at (505) 372-8545 or Joseph Fox, Mining Environmental Compliance Section Program Manager at (505) 660-9060.

Sincerely,



John Rhoderick, Director
Water Protection Division

JK:JR:JB:JF:DM

cc: Justin Ball, NMED (via email: justin.ball@env.nm.gov)
Joseph Fox, NMED (via email: joseph.fox@env.nm.gov)
Petra Sanchez, USEPA (via email: sanchez.petra@epa.gov)
David Mercer, NMED (via email: david.mercer1@env.nm.gov)
Mike Steward, Freeport-McMoRan Inc. (via email: msteward@fmi.com)
Pam Pinson, Freeport-McMoRan Inc. (via email: ppinson@fmi.com)
D.J. Ennis, Mining and Minerals Division, (via email: david.ennis@emnrd.nm.gov)
Jodie Mamuscia, USFWS (via email: Jodie_Mamuscia@fws.gov)
Ronald Kellermueller, NMDGF (via email: Ronald.kellermueller@dgf.nm.gov)
Gila Resources Information Project (via email: grip@gilaresouces.info)
Joe Allen, Formation, Inc. (via email: jallen@formation.com)

Table 1 - Pre-FS Remediation Action Criteria (RAC) for the Lampbright Investigation Unit (LIU)

Media	Constituent of Concern	Pre-FS RAC	Notes
Surface Soils (0-6")	Copper	1,600 mg/kg	Pre-FS RAC identified for the STSIU for the protection of small ground-feeding birds.
	pCu ²⁺	≥ 5	Pre-FS RAC identified for the STSIU for the protection of terrestrial vegetation as wildlife habitat. Applicable in locations where surface soil copper (0-6") is greater than 327 mg/kg.
Surface Water	All	New Mexico Standards for Interstate and Intrastate Surface Waters §20.6.4.900 NMAC Target Risk for aquatic life	NMED notes that these criteria will be addressed by the Site discharge permits and DP 1340 Sitewide Abatement
Sediment	<i>No Pre-FS RAC Selected</i>		
Ground Water	<i>No Pre--FS RAC Selected.</i> NMED notes that these criteria will be addressed by the Site discharge permits and DP 1340 Sitewide Abatement		