RESPONSE TO WITHDRAWAL APPLICATION

ATTACHMENT 4.2

TWIN METALS MINNESOTA PROJECT

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TABLE OF CONTENTS

I. REVIEW OF STATEMENTS IN WITHDRAWAL APPLICATION

The U.S. Forest Service ("USFS") presents information about potential adverse mining impacts in Section 7 of its application to the Department of Interior Bureau of Land Management ("BLM") to withdraw 225,378 acres of land from new mineral leasing in the Rainy River Watershed near the Boundary Waters Canoe Area Wilderness ("BWCAW") for 20 years (the "Withdrawal Application"). The potential adverse impacts identified in the Withdrawal Application fall into three major categories: water quality related impacts, climate change, and health risks. Within Section 7 of the Withdrawal Application, several reports or scientific studies are referenced as evidence that mining in the Rainy River watershed would lead to irreversible degradation of the wilderness ecosystem in the BWCAW and surrounding Superior National Forest.

While these studies may be generally regarded as credible sources of sound scientific information, their citation in the Withdrawal Application does not form a basis that environmental impacts are expected, but rather that the potential for impacts exist if high enough levels of water or air pollution were to occur. The Withdrawal Application has not substantiated the amount of increased loading or emissions that may occur from mining projects in the proposed withdrawal area and thus inaccurately imply the level of impacts that may be reasonably expected. Many of the studies cited in the Withdrawal Application simply describe the underlying processes leading to environmental impacts and assume certain levels of water or air pollution exist; it is important to recognize that stringent environmental regulations are in place to prevent the kinds of adverse environmental impacts described in the Withdrawal Application. Agencies should assess the impacts from future mining projects that would comply with environmental regulations.

A modern mining project that has completed environmental review and received all permitting approvals could not produce the level of loading and emissions implied in the Withdrawal Application to achieve the described environmental and health impacts.

Any analysis to inform decision making on the proposed withdrawal must assess whether mining projects that comply with environmental regulations would lead to levels of pollution that could cause the adverse impacts described the Withdrawal Application and cited studies. The TMM Project is an example of a modern mining project that is designed to eliminate, reduce, and then mitigate potential emission sources to be protective of the environment and not have negative environmental impacts that have plagued historical mining projects prior to modern environmental standards.

The Withdrawal Application contains blanket assumptions that all mining projects proposed in the Rainy River Watershed would have similar adverse environmental impacts, but the mining project proposed by Twin Metals Minnesota (the "Project") provides actual data and analyses demonstrating that the potential adverse impacts described in the Withdrawal Application would not occur in every mining project. The following review and response to statements made in the Withdrawal Application

about water quality, climate change, and health risk impacts is informed by site-specific impact analysis and TMM Project information.

II. MINING IMPACTS MUST BE ASSESSED ON A CASE-BY-CASE BASIS

Mining is inherently a project- and site-specific activity because every project is tied to a specific ore body. Every mine is in a unique climatological, hydrological, and geological setting. For the same deposit type, sulfide mineralogy and concentrations, and thus acid rock drainage ("ARD") potential, can be highly variable. Therefore, it is important to assess, design, and plan mining projects on a site-by-site basis. Mines are custom designed based on their environmental setting and regulatory environment. Mines also use customized mineral processing reflecting the site's particular geology and mineralogy to produce the desired end products.

The Withdrawal Application should not attempt to use studies from other mining projects or geographies as a basis to determine the potential adverse impacts of mining in the Rainy River Watershed because doing so would not properly consider project- and site-specific factors. More importantly, project- and site-specific details must be considered in their entirety to determine a specific project's environmental impacts because of the interdependency of these impacts and the complexity of mining projects.

Environmental impacts from mining can only be accurately estimated by considering:

- Regional climate, hydrology, and hydrogeology, as these are key to predicting environmental performance,
- Site-specific geology, as it is a requirement for accurate water quality predictions, and
- Project specific engineering, technology, and design, which are necessary to understand how the environment would be protected and to estimate potential environmental impacts.

III. AGENCIES MUST CONSIDER THE PROPOSED TMM PROJECT IN THEIR EVALUATION

In order for the BLM and USFS to fairly study the potential adverse impacts of mining in the proposed withdrawal area, they must analyze the Twin Metals mine plan. The TMM Project is the only proposed mine within the proposed withdrawal area, and the project must be considered as it can provide insight into whether mining can be done safely in this region.

Modern mining projects can eliminate or mitigate many of the impacts that serve as the basis for the proposed withdrawal. If the BLM or USFS elect to study any additional mining or exploration activity, it must be considered a

“permittable” activity and thus can only consider impacts that meet the strict state and federal environmental standards that are already in place.

The TMM Project is an example of a modern mining project that will not increase loadings or emissions to a level resulting in the impacts described in the Withdrawal Application. If environmental studies and modeling predict significant impacts as described in the Withdrawal Application, the project would not receive permits. Utilizing the existing environmental review and permitting processes to evaluate a project- and site-specific activity, that considers only “permittable” projects, is the most appropriate way to ensure the environment is protected.

IV. WATER QUALITY-RELATED IMPACTS FOR MODERN MINING PROJECTS ARE OVER OVERSTATED IN THE WITHDRAWAL APPLICATION

The assertion that sulfide mining in the Rainy River Watershed could result in changes to water quality that would harm water-based resources employs catastrophic thinking in characterizing potential impacts, and draws faulty conclusions from a single report provided as evidence of sulfate-driven water quality impacts, as exhibited in the following excerpts:

- *Potential impacts from mining could alter water quality and thus degrade key components of the wilderness ecosystem such as habitat for wildlife (lynx, moose, loons), fish (walleye, lake trout, and other game fish), and wild rice, and have negative impacts on the recreation economy and native culture and food systems.* [Withdrawal Application, page 3]

- *Any development of these mineral resources could ultimately result in the creation of permanently stored waste materials and other conditions upstream of the BWCAW and the MPA with the potential to generate and release fugitive dust, tailings, and effluent with elevated levels of acidity, metals, and other potential contaminants. These impacts, and any potential failure of required mitigation measures, containment facilities, or remediation efforts at mine sites and their related facilities located upstream of the BWCAW and the MPA could lead to irreversible degradation of this key water-based wilderness resource and jeopardize the purposes for the designation of the BWCAW and the MPA specified by Sec. 2 of the BWCAW Act (Pub. L. 95-495, 92 Stat. 1649).* [Withdrawal Application, page 3]

- *The potential sulfide ore mining in this area has the potential to elevate sulfate levels in downstream waters (Miller 2002, USEPA 2014) and change the balance of the wilderness ecosystem and its associated subsistence lifestyle forever.* [Withdrawal Application, page 4]

A. Faulty basis for sulfate-driven changes to water quality

The Withdrawal Application references two reports to characterize the potential for sulfate-influenced changes to water quality (Miller 2002) and (USEPA 2014).

The (Miller 2002) report "Geology and Mineral Potential of the Duluth Complex and Related Rocks of Northeastern Minnesota" describes mineral deposits in the proposed withdrawal area and does not describe potential sulfate-driven mining impacts.

- *This report provides a general description of the Duluth Complex and related rocks as portrayed on map M-119, and assesses this geology in terms of the potential for non-ferrous mineral deposits.* [Miller 2002, page 3]

The (USEPA 2014) report provides an ecological risk assessment for potential mining in Alaska's Bristol Bay which is fundamentally different than an EIS prepared in the context of NEPA. The (USEPA 2014) report is the only reference provided as evidence of sulfate-driven changes to water quality from mining. There is no basis to suggest that future mining in the proposed withdrawal area would have impacts like those described in Bristol Bay assessment (USEPA 2014), especially considering differences in their environmental, climatological, geological settings.

The drivers of environmental impacts (acid-generating potential, trace elements and their mobilities, mining and ore processing methods, and waste disposal practices) considered in the Bristol Bay assessment (USEPA 2014) may be relevant to other sulfide-mining projects, but the USFS and BLM cannot assume the environmental impacts described in that specific assessment are representative of the impacts from potential sulfide ore mining in the Rainy River Watershed generally or the TMM Project specifically. Again, as described in Section II, the environmental impacts from mining must be assessed using project- and site-specific information.

The first driver, "acid-generating potential", of the Bristol Bay project is not analogous to the TMM Project because the TMM Project does not involve a porphyry deposit. This is a critical distinction because unlike a porphyry deposit, the South Kawishiwi intrusion within the Duluth Complex (the intrusion associated with the TMM Project), has very sharp margins between sulfide bearing ore material and the non-sulfide bearing rock above and below the deposit. This sharp contact allows more 'surgical' mining methods that reduce waste rock production and tailings production, both which combine to drastically reduce the acid generating potential of the Project. Additionally, unlike a porphyry copper deposit, which is characterized by large volumes of material with uneconomical sulfide mineralization, the Duluth Complex is host to almost entirely economical sulfide mineralization, meaning all the sulfide ore material mined will be processed with almost no sulfide minerals remaining in the tails.

For the second driver, "trace elements and their mobilities", the primary concern raised in the Bristol Bay assessment was that "a good deal of uncertainty exists because the humidity cell tests used to predict water chemistry represent a small sample of the ore body." However, because of the work TMM has completed within the materials characterization program, there is little uncertainty about trace elements and their mobilities for the TMM Project. These positive results from the materials characterization program test work, combined with TMM's thoughtful approach to Project design, have eliminated the risk associated with trace elements

and their mobilities. More detailed information on the materials characterization program and TMM's Project design can be found in Section VI.C.1 of the TMM Comment Letter.

The third and fourth drivers—"mining and ore processing" and "waste disposal methods"—assumed in the Bristol Bay analysis are also not analogous to the TMM Project because the Bristol Bay analysis assumed an open pit mine, significant waste rock stockpiling, and a conventional slurry tails dam, all of which present significant potential for ARD generation and seepage (both contributing to sulfate loading) compared to TMM's underground mine, zero above ground waste rock stockpiles, and a dry stack tailings facility. Additional discussion of how these design considerations have reduced the potential for ARD and associated sulfate loading can be found in Section VI.C.1 of the TMM Comment Letter. The TMM Project would not lead to a change in sulfate loading sufficient to harm water-based resources.

For these reasons, it is unreasonable to assume that all proposed mining projects in the Rainy River Watershed would lead to a change in sulfate loading sufficient to harm water-based resources both upstream and within the BWCAW.

The faulty assumption that impacts in the proposed withdrawal area would be similar to those described in the Bristol Bay assessment (USEPA 2014) could easily be avoided by reviewing the substantial body of information regarding geology and geochemistry that TMM has already provided to state and federal regulators.

The TMM Project is an example of modern mining that avoids potential water quality impacts described in the Withdrawal Application. The TMM Project has developed a responsible water management plan in coordination with responsible design choices that results in no discharge process water. The small footprint, coupled with maximizing reuse of water, results in the project being a net consumer of water.

B. Potential to harm other water-based resources inaccurately assumes increased loading and emissions

Other adverse impacts to water-based resources described in the Withdrawal Application are contingent on the faulty assumption that all proposed mining projects in the Rainy River Watershed would lead to a change in sulfate loading sufficient to harm water-based resources, including:

- *If sulfate loading increases, evidence suggests that it would diminish the yield and ability to harvest wild rice and possibly present risks to food security.* [Withdrawal Application, page 4]

- *Higher concentrations of sulfide can be toxic to roots and inhibit plant growth (Myrbo et. al. 2017a,*[1] *Ng et. al. 2017, Pastor et. al. 2017,*[2] *Pollman et. al. 2017*[3]*).* [Withdrawal Application, page 4]

- *The scientific literature indicates elevated sulfate causes long-term declines in fish abundance, species number, and genetic diversity, and may facilitate the establishment of invasive species (Jennings et. al. 2008, Daniel et al 2014).* [Withdrawal Application, page 4]

- *As a result, the potential downstream effects from [moved from next page] mining include sulfide impacts to wild rice production, an important economic and tribal commodity (Johnson et al. 2019).* [Withdrawal Application, page 4-5]

- *Sulfates also result in the production of methylmercury, the toxic form of mercury that bio- accumulates in fish (Coleman et al. 2015, Myrbo et. al. 2017b*[4]*).* [Withdrawal Application, page 5]

Several of the studies listed above were reviewed in more detail to support comments submitted by Twin Metals on the Minnesota Division of Natural Resource's administrative review of siting rules for nonferrous mines. (see FN1-4)

As described Section A above and Section VI.C.1 of the TMM Comment Letter, **the TMM Project would not lead to a change in sulfate loading sufficient to harm water-based resources and would not cause the adverse impacts listed above**.

V. APPLICATION INAPPROPRIATELY CONNECTS MINING TO CLIMATE CHANGE BY FAILING TO ACKNOWLEDGE ADDITIONAL DESIGN CONSIDERATIONS

The Withdrawal Application also describes how climate change may exacerbate potential adverse mining impacts.

TMM recognizes the broad acceptance among the scientific community that future climate trends include rising temperatures and increased precipitation as described in the Withdrawal Application in the excerpt below.

- *The Fourth National Climate Assessment (USGCRP, 2018) reveals that the average temperature in the contiguous United States has increased by 1.2°F (0.7°C) relative to the beginning of the last century. Temperature is expected to rise over the next few decades, regardless of emissions, by an estimated average annual temperature of 2.5°F (1.4°C). The upper Midwest has experienced the greatest rate of change in rising temperatures across the*

[1] See TMM Comment Letter Attachment 1.B at 23, Table B2.2.3 (Jan. 18, 2021).
[2] *Id.* at 28, Table B2.2.8.
[3] *Id.* at 24, Table B2.2.4.
[4] *Id.* at 22, Table B2.2.2.

> *nation and significant increases in major storm events. Temperature has risen 2.0°F since the beginning of the last century. Since 2000, the number of very heavy rains (6 inches or more in a day) have been 2-3 times more frequent than in the 20th century (Runkle et. al, 2017).* [Withdrawal Application, page 5]

However, the Withdrawal Application takes this generally accepted consensus on climate change and inappropriately assumes all mining projects would have impacts that could be exacerbated by climate change, as explained below.

A. Larger storm events can be managed with design based on climate change predictions

The Withdrawal Application contends that climate change will cause larger storms and increased runoff that will result in breaches of sulfate-rich mine water:

- *Breaches or leakage of sulfate rich mine waters can have dramatic impacts on the production of the form of the toxic metal mercury which accumulates in the aquatic food chain, especially in fish. Also, the increased likelihood of larger storms, due to climate change, increases runoff and the potential for breaches of contaminated water to impact water supplies (Saniewska et al. 2014, Thomson and Rose 2011).* [Withdrawal Application, page 5]

The TMM Project's footprint is 1/10th the size of a typical open pit project for the same metal production. **The TMM Project's smaller footprint significantly reduces risks associated with water management across the site and allows design of resilient stormwater systems to manage the larger storm events that are driven by climate change.**

TMM considered future climate trends in developing the Project design and will continue to consider how future climate trends may influence Project impacts. As an example, the TMM Project includes water storage ponds designed to accommodate the more frequent and intense rain events predicted to occur because of climate change. More specifically, the process water storage ponds are double lined with leak detection and designed to store the 72-hour probable maximum precipitation (inclusive of climate change) in addition to the operating volume of the pond.

B. Bioaccumulation of mercury in aquatic species due to climate change is independent of additional mining activity

The Withdrawal Application also suggests that rising temperatures from climate change will increase bioaccumulation of mercury in aquatic species:

- *Climate change increases the risk of bioaccumulation of toxic mercury in the aquatic food chain (Ghandi et al. 2014).* [Withdrawal Application, page 5]
- *Climate change related to rising temperatures is increasing the overall availability and accumulation of forms of mercury in northern Minnesota*

> *wetlands (Pierce et al. 2019) which are connected to downstream aquatic food chains (Monson, B.A.).* [Withdrawal Application, page 5]

Unfortunately, climate change effects like rising temperatures and increased precipitation are likely to occur whether or not the TMM Project or any other nonferrous mining activity proceeds in the Rainy River Watershed. The most direct impact the TMM Project could have on mercury bioaccumulation in fish is from sulfide deposition from fugitive dust emissions. Importantly, TMM Project fugitive dust emissions are anticipated to be low enough that sulfide deposition would result in no measurable change in fish tissue mercury content. The TMM Project would use conveyors in the underground mine to transport ore to the surface which allows for fugitive dust to settle out before it is exhausted from the mine, reducing the fugitive dust emitted compared to an open pit mine.

As shown in the excerpts below, the (Ghandi et al. 2014) study indicates increased temperatures from climate change may be <u>one</u> potential factor leading to increased mercury bioaccumulation in fish in Canada, but also describes other location-dependent contributing factors like mercury deposition from sources outside of Canada or local geochemistry:

- *Increased temperatures <u>may have</u> raised fish mercury levels by remobilizing mercury in soil and sediments, accelerating the conversion of divalent mercury to more biologically available methylmercury, and uptake into fish.*[47] (Ghandi et al. 2014) (Emphasis added)

- *However, trans-boundary flows of mercury are increasing and now account for >95% of mercury deposition in Canada.*[8] *It is estimated that the greatest contributions of mercury deposition in Canada are from sources in China (42%) and the U.S. (17%) (Environment Canada, unpublished data). Similarly, only 25−32% of mercury deposited over the continental U.S. originates from North American anthropogenic sources, while Asian anthropogenic emissions contribute 5−36% and natural emissions contribute 6−59%.*[42] (Ghandi et al. 2014)

- *Although it is logical to expect declines in fish mercury levels in response to reduced emissions in North America and lower atmospheric concentrations in recent years, other factors such as climate change,*[58] *invasive species,*[35,60] *local geochemistry, and possible increases in mercury emissions from other regions*[43,61] *may affect the response time and magnitude. This hypothesis is supported by differences observed in fish mercury trends for Lakes Erie and Ontario, where changes in food web structure due to invasive species, more prolonged anoxia, and possibly other local factors may have affected fish mercury trends.*[18,62] (Ghandi et al. 2014)

The Withdrawal Application overstates the level of certainty regarding the impact that climate change and rising temperatures may have on mercury bioaccumulation and neglects to acknowledge other contributing factors identified in the (Ghandi et al. 2014) study.

The (Monson B.A. 2009) study monitored mercury concentrations in fish from Minnesota lakes and found similar trends (downward trend before the mid-1990s and an upward trend thereafter) as the (Ghandi et al. 2014) study:

- *Despite the plausible mechanisms for increased bioavailability caused by changing climate, there is no evidence of an explicit trend shift in the factors associated with changing climate that, by themselves, could explain the trend reversal of SPFHg*. [standardized predator fish mercury concentrations] (Monson B.A. 2009) (Emphasis added)

- *Causes of the trend reversal may include delayed responses and additive effects from multiple factors. Changes in mercury deposition and climate could combine to give the observed trend reversal of mercury concentrations in fish*. (Monson B.A. 2009)

Again, the Withdrawal Application has failed to acknowledge other contributing factors leading to increased mercury bioaccumulation and the (Monson B.A. 2009) study states that climate change and rising temperatures cannot by themselves explain the upward trend in fish mercury concentrations after the mid-1990s.

Also, as described Section IV.A above and Section VI.C.1 of the TMM Comment Letter, **the TMM Project would not lead to a change in sulfate loading sufficient to alter the bioaccumulation of mercury in aquatic species**, and the Withdrawal Application overstates the evidence suggesting climate change and increasing temperatures would exacerbate this impact.

C. Modern mine design eliminates risk of acid drainage and changes to water quality that would reduce the resilience of forests and watersheds

The Withdrawal Application also suggests that impacts exacerbated by climate change would reduce the resilience of forests and watersheds in the following excerpt:

- *Although the primary footprint of the proposed mines would be outside the BWCAW, there are critical linkages between aquatic and terrestrial ecosystems that are highly dependent on chemistry of water flowing through them. Large scale mining activity at the top of the watershed can cause many effects in the primary and secondary footprint related to water flow and chemistry (including aerial deposition) that will affect everything lower in the watershed. Given the high level of linkages between aquatic and terrestrial components of the ecosystem in the BWCAW, these effects will also extend into terrestrial vegetation and could cause an ecological cascade of effects to vegetation, wildlife, and rare species of plants and animals within the BWCAW wilderness. The expected extremes in precipitation and temperature due to warming climate are likely to exacerbate mining impacts, and reduce the resilience of forests and watersheds to disturbance caused by mining.*[10] [Withdrawal Application, page 10, FN10 (citing Frelich 2019)]

The purpose of the (Frelich 2019)[5] paper is to scope potential impacts from copper-nickel exploration and mining in sulfide ores in the BWCAW: and does not describe estimated impacts from a real, or even a hypothetical, mining project. Most of the potential copper-nickel mining impacts identified in the (Frelich 2019) paper depend upon the presence of acid mine drainage and increased sulfate loading. Again, as described in Section VI.C.1 of the Comment Letter and Section IV.A above, **the TMM Project would not lead to a change in sulfate loading sufficient to harm water-based resources and would not cause the adverse impacts contemplated in the (Frelich 2019) paper.**

The (Frelich 2019) paper also states:

- *The importance, duration, reversibility, magnitude, and size of impacts are important to consider, with items such as traffic, noise, air pollution, barrier effects, riparian and terrestrial fragmentation and habitat loss [16]. The effects in the secondary footprint gradually decline with distance from mines and the associated infrastructure, and the various types of impacts should always be defined in terms of ecological impacts judged to be significant and the distance and spatial pattern within which those effects are estimated to occur.* (Frelich 2019, page 3 of 18) (Emphasis added)

- *Although all the impacts identified here are expected to occur, the magnitude that may occur is unknown unless further ground-based analyses are carried out. In addition, little is said here about mitigation and reclamation—specifics of these issues should be addressed in an **environmental impact statement**.* (Frelich 2019, page 5 of 18) (Emphasis added)

These statements highlight the importance of using project- and site-specific information to assess environmental effects from mining projects. The author acknowledges that the magnitude of impacts is "unknown" and that effects "gradually decline with distance from mines." The author also suggests defining impacts based on significance, describing the "distance and spatial pattern within those effects are estimated to occur", and that the details of mitigation and reclamation should be addressed in an environmental impact statement. Twin Metals should be allowed to proceed through existing state and federal environmental review so that any potentially significant environmental effects can be identified and thoroughly evaluated in an environmental impact statement.

Additionally, the potential for water-mediated impacts identified in the (Frelich 2019) paper appear to be based on a single study (see citation 88 in Frelich 2019, citing Myers 2016), which seriously overestimates acid mine drainage risks. The (Myers 2016)[6] paper describes a reconnaissance-level hydrology model useful for preliminary siting or general planning purposes but inappropriate for site-specific assessments. The (Myers 2016) hydrology model also incorporated unrealistic and improbable scenarios for spillage and mining-related parameter concentrations.

[5] *Id.* at 21, Table B2.2.1.
[6] *Id.* at 7, Table B2.1.5.

VI. POTENTIAL HEALTH RISKS ARE OVERSTATED AND RELIANT UPON INCREASED LOADINGS OR EMISSIONS

The Withdrawal Application identifies potential health risks assuming specific hazardous pollutants would be released to air and water:

- *As a final example, it is well documented that hardrock mining like that which is proposed adjacent to the BWCAW poses risks to public health from other changes to air and water. Six out of ten of the World Health Organization's identified chemicals of major public health concern are known to be released from hardrock mining. Arsenic, asbestos, cadmium, lead, particulate air pollution, and mercury could pose health risks such as cancer to workers and communities downstream and downwind of mining operations. A loss of a feeling of mental well-being due to the increased economic and emotional burden on families and individuals could arise from compromised health conditions due to toxic pollution of the region's air and water (Onello et. al. 2016). [Withdrawal Application, page 6]*

The Withdrawal Application incorrectly states that "it is well documented that hardrock mining like that which is proposed adjacent to the BWCAW poses risks to public health from other changes to air and water." The Withdrawal Application does not refer to any health impact assessments for an actual mining project—located in the proposed withdrawal area or elsewhere.

The (Onello et al. 2016)[7] paper identifies pollutants with potential health effects that could be emitted or released from sulfide mining activities but does not provide any estimates of health effects. The authors suggest current regulations do not require evaluating health effects and state:

- *With these laws in mind, physicians might assume existing regulations will protect human health. The current mandated evaluations of mining proposals do address air and water quality impacts and toxin discharges. Yet the laws do not require a comprehensive, long-range examination of potential effects on health. For example, environmental reviews may scientifically model the amount of mercury that may be released into surface and ground water, but they do not answer questions about the potential effects on human health of that mercury as it accumulates in food sources. The short- and long-term effects on human health should be considered in present and future sulfide mining proposals. (Onello et al. 2016, page 54)*

In fact, a mining project's potential health risks from pollutants with known carcinogenic or non-cancer health effects must be evaluated to satisfy environmental review and permitting requirements. Importantly, **the TMM Project would not exceed applicable standards or health risk thresholds.**

[7] *Id.* at 42, Table B2.4.2.

Furthermore, health impact assessments require a considerable amount of detailed information including hazardous pollutant release rates and characteristics, and localized data to characterize exposure pathways and potential receptors – all of which are highly dependent on project- and site-specific details. Project design choices can be made that eliminate or reduce the release of hazardous pollutants and thereby alter potential health risks. It would be unreasonable to attempt to assess health risks from sulfide mining across the proposed withdrawal area based on a hypothetical collection of mining projects because of the high level of detailed information needed and because pollutant releases can and do vary significantly between mining projects based on geology, mine design, engineering controls, and the mitigation techniques in use. Therefore, health impacts can only be accurately assessed using project- and site-specific information for the same reasons environmental impacts must be assessed this way, as previously described in Section I.

Simply stating that arsenic, asbestos, cadmium, lead, particulate matter, and mercury "are known to be released from hardrock mining" without referencing any scientific reports or studies characterizing or quantifying such releases does not provide the context needed to inform whether sulfide mining in the proposed withdrawal area is likely to “pose health risks such as cancer to workers and communities downstream and downwind of mining operations.” (Withdrawal Application, page 6). Additionally, the Withdrawal Application ignores the fact that any proposed mining project that posed unacceptable health risks would not advance through existing environmental review and permitting processes.