Data Submitted (UTC 11): 10/13/2020 6:00:00 AM
First name: Stuart
Last name: Sanderson
Organization: Society for Mining Metallurgy & Exploration, Inc.
Title: Consultant
Comments: Attached are the comments of the Society for Mining Metallurgy & Exploration, Inc. (SME) on the draft Environmental Impact Statement for the Stibnite Gold project, along with two additional articles and studies also submitted as attachments. They include the following: 1. SME Technical Briefing Paper on Critical Minerals and 2. United States Geological Survey Report on Antimony. The comments themselves include hyperlinks to several additional scientific studies cited therein, including those listed as attachments in the letter itself.

This letter represents the comments of the Society for Mining Metallurgy & Exploration, Inc. (SME or Society) on the August 2020 Draft Environmental Impact Statement (DEIS) prepared for Midas Gold Idaho Inc.[rsquo]s (Midas) proposed Stibnite Gold Project located in Valley County, Idaho. If Midas receives the necessary authorizations and permits to conduct mining operations within the Payette and Boise National Forests, this project would become the Nation[rsquo]s only domestic producer of antimony, a critical and strategic mineral on which the United States is currently and completely reliant on imports, mostly from China. In the conduct of mining, the company also proposes to remedy environmental and wildlife issues associated with legacy mining that took place prior to the era of modern mining regulation. SME supports both objectives, as outlined in these comments.

SME is a professional society (nonprofit 501(c) (3) corporation) whose more than 15,000 members represents professionals serving the minerals industry in more than 100 countries. Its members include engineers, geologists, metallurgists, educators, students, and researchers. The Society also advances the worldwide mining and underground construction community through information exchange, education and professional development. In supporting responsible mining, SME seeks to educate lawmakers, policymakers, and the general public on the complex technical issues associated with mineral development; through technical briefing papers, studies, scientific and engineering articles.

Our comments follow.

Antimony (Stibnite) is a Critical Mineral as Defined by Executive Order 13817 [ndash] Dependence on Mineral Imports is a National Emergency

As set forth in Alternative 2 of the Draft EIS, the Stibnite Gold Project proposes, in addition to mining gold, to become the country[rsquo]s only domestic antimony mine. Domestic production of antimony would offset the Nation[rsquo]s current reliance on foreign countries (mainly China) for this important critical mineral that has numerous defense, energy, safety and aerospace applications. These uses include flame retardants; ammunition; munitions; and specialized metals, ceramics, glass, and plastic products. Antimony is also used to construct nuclear shielding in submarines and other warships, and in camouflage and night vision equipment, all essential to our national defense. Antimony is also used in the aerospace industry for composite materials that are essential to the emerging new generation of civilian and military planes and widely used in battery-electric vehicles, wind turbines and solar panels, primary sources of carbon-free energy.

Citing the U.S. dependence on China for 80% of critical minerals needs and vulnerability in critical supply chains, President Trump on September 30 issued Executive Order 13953 declaring a national emergency to expand domestic mining of such minerals, in part using the Defense Production Act. The President also ordered federal agencies to reduce unnecessary delays in permitting actions. The recent action is designed to more swiftly implement the prior 2017 Executive Order on critical minerals, as detailed below. See, 85 FR 62539 (October 5, 2020).

That prior Executive Order 13817 defines critical minerals as follows: [ldquo]A critical mineral is a mineral (1) identified to be a nonfuel mineral or mineral material essential to the economic and national security of the United States, (2) from a supply chain that is vulnerable to disruption, and (3) that serves an essential function in the manufacturing of a product, the absence of which would have substantial consequences for the U.S. economy or national security.[rdquo] (Emphasis supplied) 82 FR 60835 (December 26, 2017). Given the nation[rsquo]s growing reliance on foreign supply chains, some of which are in countries whose interests are adverse to the United States, the President directed the Secretary of the Interior to publish a list of such minerals in aid of the development of a strategy to address the matter. The Secretary subsequently published a list of 35 critical minerals. That list includes antimony. 83 FR 23295 (May 18, 2018).

The importance of critical minerals like antimony is also reflected in the attached SME Technical Briefing Paper entitled [ldquo]Critical and Strategic Minerals Importance to the U.S. Economy (January 2020).[rdquo] https://www.smenet.org/about-sme/government- affairs/advocacy/technical-briefing-papers/critical-and-strategic-minerals-importance-to-the. As noted in that report, the U.S. is import reliant (imports are greater than 50% of annual consumption) on 31 of those 35 minerals and relies 100% on imports of 14 of those minerals. According to the United States Geological Survey (USGS), [ldquo]in 2019, no marketable antimony was mined in the United States.[rdquo] Primary antimony metal and oxide were produced by one company in Montana using imported feedstock. Secondary antimony production was derived mostly from antimonial lead recovered from spent lead-acid batteries. See, U.S. Geological Survey, Mineral Commodities Summaries 2020 at 22. https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf.

The U.S. is completely import reliant on several nations, with China accounting for the bulk of U.S. imports at 52%. Id. at 22. Given this growing import reliance on China especially, SME [ldquo]supports a streamlined U.S. permitting process for critical and strategic minerals and the study of options to remove impediments to the timely issuance of such permits.[rdquo]

The SME paper also lists the following specific critical needs for this commodity: Defense, carbon-free energy, electronics, and telecommunications. To that one may add safety applications in flame retardants for a variety of products, as follows:

Antimony in the form of antimony trioxide (Sb2 O3) is used in the United States mainly as a flame retardant in adhesives, paints, papers, plastics, and sealants. Antimony trioxide is also used as a fire-retardant backing on rubber and textile upholstery, typically with bromine or chlorine based halogenated compounds (European Flame Retardants Association, 2006). Major markets for flame retardants include electronics, plastics, and fabrics used in making children[rsquo]s clothing, aircraft and automobile seat covers, and bedding.

See, Schulz, K.J., DeYoung, J.H., Jr., Seal, R.R., II, and Bradley, D.C., eds., 2017, Critical mineral resources of the United States-Economic and environmental geology and prospects for future supply: U.S. Geological Survey Professional Paper 1802, 797 p., Chapter C: Antimony, https://pubs.er.usgs.gov/publication/pp1802C at C3.

Also, according to the report, [ldquo]Antimony [also] has more uses of a direct military character than other members of the strategic group and probably more important uses than any of the others except mercury.[rdquo] Id. at C3. The report details these uses as follows:

Antimony is a hardening agent in metals used in ball bearings, bullets capable of penetrating armor plate, and lead shot. It helps to strengthen cable sheaths, chemical pumps, foils, plumbing fixtures and pipes, roofing sheets, and tank linings. During World War II, the fireproofing compound antimony trichloride (SbCl3) saved the lives of many American troops when it was applied to tents and vehicle covers.

While the report also suggests that substitutes may be available for antimony used in lead acid batteries and fire retardants, [ldquo]such substitutes could make changes in production techniques and factory equipment necessary, however, and these substitutes have their own critical supply issues or could be more expensive to use.[rdquo] It also acknowledges that the availability of these substitute products may be impacted by market manipulation. Finally, the report mentions nothing about the availability of substitute products for other military applications. Nor does it change the fact that antimony is one of 35 critical minerals.

World events and possible military conflicts over China[rsquo]s expansion in the Pacific would also render supply chains vulnerable. Given China[rsquo]s dominance in the production of antimony, it is vital that the U.S. develop its own secure domestic sources of this critical and strategic mineral.

The Stibnite Gold Project merits USFS consideration as it proposes to mine a combined gold and antimony ore deposit, given the absence of sufficient antimony deposits anywhere in the United States to warrant production of that mineral alone. The USGS mentions the Midas Gold project in its report and further states:

Post-World War II evaluation of domestic mined resources concluded that [ldquo]the United States has no deposits, from which the ore is mined principally for antimony, that are large enough or rich enough to compete with foreign sources in normal times[rdquo] (Shaum and others, 1948, p. 53). This situation has not changed since that report was completed. If the United States could no longer import antimony in quantities to meet its needs, then additional domestic production may be obtainable from base- and precious-metal deposits and from areas of identified base-metal, gold, silver, and tungsten mineralization (Miller, 1973).

Schulz, et al., at C9.

See also, M.T. Nassar et al., Byproduct Metals are Technologically Essential but have Problematic Supply (2015), which shows that antimony is produced as a byproduct of gold. https://advances.sciencemag.org/content/1/3/e1400180. The Interior Secretary noted the importance of gold and critical minerals, as follows:

The Department of the Interior recognizes the economic significance and indispensable nature of other minerals that are produced domestically in large quantities such as copper, zinc, molybdenum, gold, silver, and industrial minerals such as phosphate, sand, gravel, and aggregate. Given current levels of domestic production, the U.S. is not highly reliant on imports for these minerals and typically has a combination of domestic reserves and reliable foreign sources adequate to meet foreseeable domestic consumption requirements. While these minerals do not currently meet the definition of critical, they are similar to critical minerals in that they are indispensable to a modern society for the purposes of national security, technology, infrastructure, and energy production (both fossil fuels and renewables).

83 FR at 23296. (Emphasis supplied).

A combined gold and antimony project, properly designed, well operated and subject to adequate regulatory oversight, would result in the combined benefit of producing a mineral that is indispensable to modern society and one that is critical to our nation[rsquo]s defense and economic needs.

Restoration and Remediation of Legacy Mine Sites is Clearly Preferable to a [ldquo]No Action[rdquo] Scenario

Modern mining plays a substantial role in the cleanup and remediation of abandoned or legacy mine sites, i.e., those sites mined for their resources prior to the enactment of comprehensive present day environmental and safety regulations. Midas Gold[rsquo]s Plan of Restoration and Operations (PRO) includes a significant remediation component to address numerous legacy environmental problems created during pre-regulation mining activities dating back to the 1890s. The PRO would only involve the use of private-sector resources to clean up the site.

Although the company has outlined what the project is, the Forest Service should also recognize what it is not. The activities outlined in the PRO demonstrate clearly that the Stibnite Gold Project is not a Good Samaritan project. The company seeks no liability relief for its operations and is agreeing to comply with the water quality and other environmental standards applicable to all other new mines. Thus, without expending public revenues, the company[rsquo]s proposed Alternative 2 would upon approval and successful implementation avoid the addition of the Stibnite Mine to the list of problematic Abandoned Mine Land (AML) sites at old, pre-regulation mines.

Continuation of the status quo through a [ldquo]no action[rdquo] Alternative 5 would, in the near to medium term, result in the persistence of environmental problems at the site for many years. Remediation would then only be accomplished through the expenditure of federal and/or state revenues, while leaving an important, critical resource untouched and unmined. It is unlikely there will ever be sufficient public-sector funding available to clean up the site. Thus, reclamation of legacy sites is best obtained by mining companies during the course of mining, because mining companies have the incentive, the technical knowledge and equipment to perform that reclamation on site.

Modern Mining Laws Ensure Provide Adequate Environmental Protections as a Condition to Approval of Mining Projects

As mentioned above, the company[rsquo]s proposal deserves respectful consideration and would be governed by all the environmental, safety and water quality regulations applicable to any mining operations. Those regulations are more than adequate to address any environmental impacts associated with the Stibnite project and have for many years, as the National Academy of Sciences outlined in a 1999 report.

Responding to a Congressional request, the National Research Council[rsquo]s National Academy of Sciences ([ldquo]NAS[rdquo]) published a study in 1999 entitled [ldquo]Hardrock Mining on Federal Lands.[rdquo] The key finding of the NAS Study was that the federal and state laws and regulations for hardrock mining work together to provide comprehensive environmental protection:

The overall structure of the federal and state laws and regulations that provide mining-related environmental protection is complicated but generally effective. The structure reflects regulatory responses to geographical differences in mineral distribution among the states, as well as the diversity of site-specific environmental conditions. BLM and Forest Service should continue to base their permitting decisions on the site-specific evaluation process provided by NEPA [National Environmental Policy Act}}. The two land management agencies should continue to use comprehensive performance-based standards rather than using rigid, technically prescriptive standards. The agencies should regularly update technical and policy guidance documents to clarify how statutes and regulations should be interpreted and enforced. (NAS Study at 5)

The study also noted that Hardrock mining operations in the United States are regulated by a complex set of federal and state laws and regulations intended to protect the environment.[rdquo] (NAS Study at 3.)

In 1974, the Forest Service enacted surface management regulations to protect the environment at hardrock mineral exploration and mining projects on National Forest System lands. The Forest Service[rsquo]s 36 CFR Part 228 Subpart A regulations govern proposed mining projects like Midas Gold Idaho[rsquo]s proposed Stibnite gold and antimony mine. These Forest Service regulations provide comprehensive environmental protection and require mine operators to: (1) minimize adverse environmental impacts whenever possible; and (2) provide substantial financial assurance (reclamation bonds) to guarantee that mines will be reclaimed when mining is completed.

As outlined above, the Forest Service[rsquo]s regulations governing the approval of plans of operation are robust, as are the laws of the state of Idaho where the project will be located. According to a 2017 study, no fewer than three regulatory programs govern the design, operation and closure of Idaho mines. These regulatory requirements apply to all lands in the state regardless of ownership. And they regulate mining activity from inception to and beyond the conclusion of mining, ensuring that the operator develops and complies with reclamation and closure plans for the site. See, EPA[ndash]HQ[ndash]SFUND[ndash]2015[ndash]0781[ndash]2794 at Appendix A; 83 FR 7556, 7567, fn. 96 (February 21, 2018).

The Idaho requirements applicable to tailings are stringent, as detailed in the report excerpt below:

The Tailings Impoundment Structure Rules establish specific and stringent criteria governing the structural design of the embankment to provide long-term stability that apply to tailings dams built in conjunction with both surface and underground mines. Mine tailings impoundments must be certified by the [Idaho Department of Water Resources] IDWR before tailings can be deposited in the impoundment and re-certified every two years. Under the tailings Impoundment Structure Rules Idaho operators must provide IDWR with financial assurance that covers [ldquo]the active life of the tailings disposal site[hellip]to provide a means by which the tailings impoundment can be placed in a safe maintenance condition if abandoned by the owner without conforming to an abandonment plan approved by the Director.

Review at 59 (some citations in the report are omitted).

Notwithstanding the major tailings dam failures at mines located in Canada, Brazil and other countries, the record in Idaho is different. The state has not experienced a tailings dam failure during the era of modern mining regulation, a period spanning more than thirty years. See, Chronology of Major Tailings Dam Failures Since 1960, Wise Uranium Project. https://www.wise-uranium.org/mdaf.html. In light of the well-publicized tailings dam incidents in other parts of the world, it is important to understand the distinctions between those failures and the current project.

The three most common methods of construction for tailings dams are the upstream, centerline and downstream methods. Dry stack tailings technology is another developing dewatering technology used at various mines throughout the world. At the outset, there is not a universal, one-size-fits-all design for a tailings management facility. Tailings facilities must be designed based upon the findings from a comprehensive and detailed analysis of the site-specific conditions. Each site is dependent upon unique geologic conditions that govern not only the mineral deposit, but the location and construction of the tailings facility. Each method, properly designed, managed and subject to appropriate regulatory oversight, can be designed, constructed, operated, and closed safely and effectively providing due consideration is given to site-specific conditions, terrain, and other factors.

The recent Brumadinho and Fund[atilde]o tailings failures in Brazil and the Mount Polley failure in facility in Canada utilized either upstream or centerline embankment construction methods, wherein successive lifts of the embankment are constructed on top of or adjacent to previously deposited tailings to form a portion of the embankment structure. This approach relies on the strength of the tailings for geotechnical stability. In addition, none of these facilities included an internal low permeability liner system to contain and control seepage from the tailings deposit.

The Stibnite Gold Project TSF does not involve using the upstream construction method or require a ring dike around any portion of the perimeter of the impoundment. The embankments for both proposed alternative sites (e.g., the Meadow Creek and EFSFSR locations) would be built using the downstream construction method in which each successive raise of the embankment will be built on solid ground downstream of the starter embankment, or on previously-placed compacted rockfill [ndash] not tailings. This approach is very similar to construction of water storage reservoirs, which have a very good track record for safe operation.

The Boise State University Department of Civil Engineering evaluated the various technologies in a study of a proposed mine in Southern Idaho, concluding that, with the use of the downstream tailings construction method, [ldquo]the possibility of catastrophic failure in the lifetime of the dam is negligible,[rdquo] for the reasons outlined below:

Although this is the most expensive method of dam construction, the downstream method ensures that the reservoir capacity is large enough to hold all the waste material. The downstream method consists of adding several additional dams, built on top of one another by using the previous dam as the base. Upstream slope of the dam is built by the settling of fine particles out of the waste slurry, and the downstream slope being constructed from uncontaminated waste from mining operations. The centerline of the dam moves downstream with each consecutive addition to the dam.

Robbins, Thomas and Chittoori, Bhaskar C.S. (2017) [ldquo]Geotechnical Evaluations of a Tailings Dam for Use by a Molybdenum and Copper Mine Project in Southern Idaho at 3.

https://scholarworks.boisestate.edu/civileng_facpubs/98/.

Another study notes the cost advantages of the upstream construction method, but also warns of slope stability issues in comparing upstream vs. downstream construction:

The tailings dam raised with upstream construction method require less volume of mechanically placed fill material[hellip]for raising of perimeter dikes, and are therefore economical in cost as compared to the tailings dams raised with the downstream and centerline construction methods. Therefore, many tailings dams are raised with the upstream construction method. However, in an upstream tailings dam, stability problems may occur due to (i) quick rate of raising, (ii) hydraulic fracturing and internal erosion, (iii) static/seismic liquefaction of tailings, and (iv.) excessive settlements and horizontal deformations[hellip]

Zardari, M., Stability of Tailings Dams, Focus on Numeric Modeling at 1 (2011).

http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A991436&dswid=-900.

Alternatives 2 and 3 of the draft EIS discuss the construction of a downstream tailings storage facility. Regardless of the type of structure to be built, proper design and continuous monitoring, subject to appropriate regulatory oversight, are needed. Any problems, if detected, must be addressed and resolved expeditiously to protect the environment, as well as the safety and health of the mine workforce and the public. A recent study concludes that the tailings dam failures at Mt. Polley and Fundao in Brazil were not so much the result of the method of construction used, but of the failure to act expeditiously to resolve problems as they arose:

Hence, these outcomes were not attributable to the methods themselves, but failure to implement their findings[hellip]The operative failure modes were recognized but not acted upon in ways to sufficiently mitigate their risks. In this sense, they represent less failures of risk assessment than of risk management[hellip]The Mount Polley dam was raised repeatedly without confirming the intended absence of soft foundation clay. The Fundao dam continued to be raised despite increasing saturation never anticipated in the original concept for mitigating liquefaction risk[hellip]Slope oversteepening for Mount Polley and Fundao were rationalized as temporary despite becoming permanent in both cases.

Vick, S., Dam Safety Risk- From Deviance to Diligence at 27 (2017);

https://ascelibrary.org/doi/10.1061/9780784480694.002.

These studies clearly demonstrate that ensuring the safety of tailings storage facility and avoidance of a catastrophic failure depends on successful risk management throughout the construction, mining and reclamation phases. This requires vigilance and oversight both by the operator as well as the regulatory authority, regardless of the type of TSF construction method used. Doing the job right in the first place and responding in a timely manner to any potential hazards before they arise is as important, for example, as routine maintenance of aircraft used in civil aviation.

Conclusion

SME supports the role of the private sector in site remediation. Inaction at this site, as represented by the No Action Alternative, is not an acceptable outcome because it would forgo this special opportunity to improve the environment, create significant economic opportunity for the region, and reduce the country[rsquo]s reliance on foreign sources of the critical mineral antimony. As mentioned at the outset, SME [ldquo]supports a streamlined U.S. permitting process for critical and strategic minerals and the study of options to remove impediments to the timely issuance of such permits.[rdquo] SME[rsquo]s comments also highlight the measures needed to ensure the safe construction and operation of tailings storage facilities, regardless of the type of structure approved by the regulatory authority. The studies cited herein represent the scientific expertise within SME[rsquo]s membership. Thus, SME urges the swift completion of the environmental review of this significant project.

Attachments:

REFERENCE SUBMITED: 1. SME Technical Briefing Paper :[ldquo]Critical and Strategic Minerals Importance to the U.S. Economy (January 2020).[rdquo]

REFERENCE CITED BUT NOT SUBMITED: 2. Economic and environmental geology and prospects for future supply: U.S. Geological Survey Professional Paper

REFERENCE SUBMITED: 3. Zardari, M., Stability of Tailings Dams, Focus on Numeric Modeling at 1 (2011)

REFERENCE CITED BUT NOT SUBMITED: 4. Vick, S., Dam Safety Risk- From Deviance to Diligence at 27 (2017)

REFERENCE SUBMITED: US DOI and USGS 2017. Professional Paper 1803-C. Antimony: Chapter C of Critical Mineral Resources of the United States [ndash] Economic and Environmental Geology and Prospects for Future Supply