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April 19th, 2026

Via Hermosa Mine Project EIS WEB Portal and email

Kerwin S. Dewberry

Forest Supervisor, Coronado National Forest

ATTN: Hermosa Critical Minerals Project

300 West Congress Street

Tucson, AZ 85701

Re: Comments on the Final Environmental Impact Statement (FEIS) as released by the US Forest Service (USFS), concerning a Plan of Operations (PoO) submitted by Australian mining company South32 (S32) for the extraction and processing of minerals at the Hermosa Mine site near the Town of Patagonia, Santa Cruz County, Arizona.

Dear Mr. Dewberry,

Thanks for forwarding the USFS proposed Final Environmental Impact Statement (FEIS) and supporting reports together with the USFS Comments Analysis and Response Report (CARR) concerning the USFS Draft Environmental Impact Statement (DEIS) for the Hermosa Mine near Patagonia, Arizona.

I (Commentor) am a private citizen, retired from the semiconductor technology industry R&D in the Phoenix metro area. I moved to rural Sonoita 13 years ago but because of water, air and industrial traffic concerns, my location changed recently to Marana. Ever since intentions and environmental consequences of S32's Hermosa Mine became clear, comments on air and water permitting by the Arizona Department of Environmental Quality (ADEQ), have been submitted to verify that at least rules were interpreted correctly and recognized scientific principles were applied. As comments and even appeal transcripts of the Office of Administrative Hearings (OAH) readily demonstrate, serious flaws in the underlying arguments to grant air and water permits by ADEQ were discovered, presented but as will be summarized below, inadequately responded to. To submit comments on the EIS now seems to be the last opportunity to accept ownership of the impacts such flaws can have on public health and the environment. Such a "hard look" is a main NEPA requirement to start with.

Therefore, not only references will be made to the CARR but also to the earlier granted ADEQ Aquifer Protection Permit (APP) and Air Quality Permit (AQP) documents. To create the necessary context, the ADEQ Responsiveness Summary to Public Comments (RSPC), released following public comments on ADEQ's Draft AQP, is also referenced as needed. Where useful, links are provided to third party documents, but no links are provided to any of the documentation released by an agency, assuming straightforward access is provided.

Because of the limited response time available, comments to the FEIS only cover the subjects that are expected to have substantial impacts:

1. ADEQ and USFS emission and dispersion determinations are flawed
2. Metal mobilization is changing ADEQ's Aquifer Protection Permit
3. A Probability of Failure of the Hermosa Mine Tailings Storage Facilities is missing

PERSPECTIVE OF ENVIRONMENTAL IMPACTS

Already submitted comments on the DEIS substantially focused on emission and permit compliance accountability practices encountered during the preceding ADEQ granting, comment and appeal processes. Those issues were only partly resolved when USFS adopted ADEQ's final permitting data to identify environmental impacts of its proposed "Alternative" operational scenarios, which then partly or completely transferred to the FEIS as well. Unfortunately the FEIS falls short in adequately analyzed impacts to start with but flawed emission deductions only add to the extent of such impacts.

ADEQ and USFS accountability issues are extensively reviewed below in the Chapter called "Environmental Impact Issues", each topic having an "Action" defined to further assess, reduce or eliminate environmental impacts related to existing or new air and water quality threats to the environment, which includes humans.

Because of the central role toxic metals play in the environment and in the comments below, a short review on lead (Pb) and manganese (Mn) is provided next.

<u>Lead</u>

When it comes to air pollution, focus in this and previous document is on Pb compounds because, (1) Pb is a main product of the so-called Taylor deposit and expected to be emitted in large quantities due to on-site crushing and purification to higher concentrations, (2) because Pb is the only metal present in chemical compounds regulated with a National Ambient Air Quality Standard (NAAQS) under the US Environmental Protection Agency (EPA), and (3) because Pb is a persistent pollutant in our environment. Moreover, it has been shown that there is no clear exposure threshold for the development of adverse neurological and cognitive health impacts whether it is inhaled via air exposure or ingested via atmospheric deposition on soils or dissolved - or suspended in surface - or underground water.

Manganese

Mn will be extracted from the Clark deposit and has similar, if not more concerning health impact credentials as Pb. Clark ores contain a substantial fraction of Pb as well. When S32 finally decides to fund this part of its Hermosa Mine, Mn compounds will be emitted at even higher rates (up to 4X, or nearly 7 tpy for the FEIS Preferred Alternative 3a), partly due to a higher grade ore and due to aboveground crushing operations.

Purification will be done at a "distal" location within Santa Cruz County and will add hundreds of trucks per day to what is already needed for the Taylor Mine operations, carrying manganese oxide ore on public roads as well as hazardous feed, product (manganese sulphate) and waste chemicals too and from this still undisclosed location. Nevertheless, Mn are not regulated under NAAQS and EPA exposure response studies were "de-prioritized" in 2019 under the first Trump administration, for some reason.

Separate permitting actions are announced for the distal Mn processing facility but NEPA requires inclusion of any related future environmental impacts. Emissions from this facility may increase Mn compound emissions above the Title V threshold of 10 tpy that applies to any Hazardous Air Pollutant (HAP) on the EPA list. Exceeding 10 tpy would introduce much more stringent control, monitoring and reporting obligations. The FEIS must therefore include the distal Mn processing facility as a future source of emissions.

ENVIRONMENTAL IMPACT ISSUES

1. ADEQ Changes from Draft to Final Air Quality Permit and USFS Changes from Draft to Final EIS

A. ADEQ's Incomplete Air Permit Re-Evaluation for Pb Compounds

Pb Compound Emission Rates

To determine environmental impacts of air pollution resulting from Hermosa Mine operations, USFS confirms it adopted the methodology and modeling parameters of the already granted AQP-Plan I of ADEQ. With those USFS developed alternative scenarios for the DEIS and select a Preferred one for the FEIS following public comments.

As emphasized extensively already in comments on the DEIS, there is a large contribution of aboveground - and much more so of underground haul road emissions to the facility-wide emission of Particulate Materials (PM) from which Pb compound emissions are calculated. The Pb fraction numbers needed to do that for the ADEQ Draft AQP, were contested and appealed as markedly non-site-specific and much too low. ADEQ actually used only one Pb fraction number, 24.5 ppm, for any road limiting the facility-wide Pb compound emission rate to only 1.00 tpy (ton per year) which essentially represents all other, non-road emission sources.

In its RSPC, page 36, ADEQ goes to great lengths to explain how it changed to 102.5 ppm as Pb fraction for aboveground roads, still only contributing 0.0045 tpy, by using publicly available

information provided by the Commentor. As excuse ADEQ stated as excuse that this 2019 report "..was not previously known to ADEQ during the review and processing of the South32 permit application (…which took place in 2023)".
ADEQ continued saying that the facility-wide emission rate of Pb compounds now is 1.75 tpy but one has to proceed to page 50 to find out how the additional 0.75 tpy must be accounted for. On that page, Chapter IV: Significant Changes Made to the Air Quality Permit, ADEQ states that:

Changes were made to the PTE (Potential to Emit) tables in the TSD (Technical Support Document) to reflect the public comments. The USGS "Scientific Investigations Report 2019–5077" report was used to re-estimate the metal HAPs emissions from the aboveground road traffic. The metal HAPs emissions from underground road traffic were also re-evaluated using the metal HAPs mass fraction of rock to be more conservative.

The RSPC does not bother to explain which mass fractions were used "to re-estimate the metal HAP emissions from aboveground road traffic" but from the spreadsheets made available by ADEQ for this permit, it indeed are those listed as (waste) "rock" and when substituted one does obtained a total of about 0.73 tpy for underground road emissions. That is close enough to confirm a total of 1.75 tpy as a facility-wide number for Pb compounds and conclude that aboveground road emissions represent a crucially important source.

Dispersed Pb Compound Concentrations

Despite a 75% increase in emission rate of Pb compounds, page 50 of the RSPC states that "applicable requirements were not changed or modeling outcomes adversely affected" and page 37:

The revised PTE does not fundamentally change the permit status. The revised modeled results indicate that the lead ambient values remain well below the National Ambient Air Quality Standards (NAAQS) and do not cause a meaningful change in ambient conditions

None of the quoted wording explicitly refers to a concentration of lead at the so-called Ambient Air Boundary where the NAAQS values must be met. Technically a 75% increase in emission rate must lead to the same increase in dispersed concentrations from which a compliance or exceedance of NAAQS can be determined. Table 1 below shows this extrapolation where the Commentor arrives at an exceedance score of 8% rather than an unchanged compliance score of -36% as claimed by ADEQ. A emission-to-concentration conversion factor is available from the ADEQ Draft AQP numbers and application to any other scenario is appropriate when besides emission rate, all dispersion variables remain unchanged, which is the case.

Table 1: NAAQS Pb Compliance vs ADEQ Air Permit and USFS Mining Scenarios

	Agency			Commentor		
	Emission Rate, tpy	Concentration, µgram/m^3	NAAQS Compliance Score	Emission Rate, tpy	Concentration, µgram/m^3	NAAQS Compliance Score
ADEQ Draft Air Permit, Plan I	1.00	0.090	-37%	1.75	0.158	8%
ADEQ Final Air Permit, Plan I	1.75	0.091	-36%	1.75	0.158	8%
USFS DEIS Alternatives						
Alt 1	1.04	0.09	-37%	1.79	0.161	11%
Alt 2	1.25	0.12	-17%	2.00	0.180	23%
Alt 3	1.25	0.12	-17%	2.00	0.180	23%
USFS FEIS Alternatives						
Alt 1	1.32	0.10	-30%	1.32	0.119	-17%
Alt 2	1.93	0.14	-3%	1.93	0.174	19%
Alt 3a	1.92	0.14	-3%	1.92	0.173	19%

NAAQS Value	0.150	µgram/m3
Background Concentration	0.005	µgram/m3
All Roads Emmssion Rate	0.75	µgram/m3
Emission Rate to Concentration Conversion	0.090	

Consultation of the two folders named “Underground Taylor- and Clark Roads Emissions” in ADEQ’s spreadsheets shows that ADEQ still used the Pb fraction of the Draft AQP (24.5 ppm) and apparently took those emission rates as input for modeling dispersed concentrations and concluded on a NAAQS compliance. Environmental impacts cannot be determined without a correct compliance score.

Action: ADEQ’s Final AQP must be terminated and re-applied for using site-specific Pb fractions for underground road emissions to enable a correct NAAQS compliance determination and an adequate impact analysis.

B. USFS Applied Incorrect ADEQ Pb Metal Fraction Numbers for all DEIS Alternatives

Except for “Alternative 1-No Action (Alt 1)”, the two alternative scenarios USFS offers in its DEIS do not mitigate environmental impacts allowed by the ADEQ Final AQP. Only Alt1 does mitigate impacts because it proposes the Taylor Mine to operate at 50% of the intended extraction rate and for 10 years instead of the intended 30 years. A possible reason for doing is that the current Tailings Storage Facility (TSF1) would run out of capacity before the capacity expansion with TSF2 in Alt 2 and Alt 3, can be realized. Alt 2 and 3 are therefore expansion applications, not alternatives, in contrast to what NEPA rules prescribe. Note that underground road emissions are not affected by any of the proposed alternative scenarios.

The supporting Trinity Consultants 2025a, Rev 1 (January 2025) report offers some detailed emission and dispersion calculation results, but editable spreadsheets were not made available. The Trinity report presents summary lists of emission source categories in Table 6 through Table 12, each with a corresponding emission rate for NAAQS regulated compounds. Like in the DEIS document itself, the facility-wide (total) Pb compound emission is presented as a rounded value of “1” tpy for all alternatives, suggesting there is no or little change in emission rate of Pb

compounds between any of the alternatives. Moreover, there is a discrepancy between the actual totals presented in the just mentioned tables vs the totals presented in the spreadsheets.

Nevertheless, the tables show that when TSF2 is included, the total emission rate for Pb compounds for TSFs increases from 0.07 tpy to 0.24 tpy, a change that is masked by using rounded numbers. The CARR simply responds stating it "reviewed EPA rounding conventions but found no change in results". The public, however, deserves more transparency on key variables to Hermosa's Pb compound emissions than it can obtain from rounded, one digit numbers.

Table 1 above includes the DEIS emission rate and dispersed concentration numbers of Pb compounds for all three Alternatives as found in the appendix of the Trinity report. As expected when road emissions are not correctly accounted for, there is a NAAQS compliance that changes to non-compliance when the same numbers are applied as used in the corrected Final AQP of ADEQ. Environmental impacts cannot be determined without a correct compliance score.

Action: For all its Alternative scenarios, USFS must use the Pb HAP emission rate of ADEQ's Final AQP and re-assess environmental impacts accordingly.

C. The USFS Significantly Increased Pb Compound Emissions in the FEIS

The FEIS concludes that Alt2 with added external power supply and direct discharge at two additional locations, would constitute its "Preferred Alternative/Selected Alternative (….Alt3a)" for the Hermosa Mine EIS. In the corresponding report of Trinity Consultants 2025a, Rev 2 (October 2025), Table 7 through Table 13 list emission source categories with emission rates in various metrics and mining phases which can be compared with the same tables shown in the earlier mentioned Trinity report that applies to the DEIS. Copies of the line items for underground roads, as well as the facility-wide (total) emission rate, are highlighted for both DEIS and FEIS in Table 2 below.

Table 2: Comparison DEIS vs FEIS Annual Emission Rates of Underground Haul Roads

DEIS, Trinity, Rev 1 Jan 2025, Alt 3, Table 12, Operations

Emissions Activity	Modeled?	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Pb (tpy)	NO_x (tpy)	CO (tpy)	SO_2 (tpy)	VOC (tpy)
Underground Taylor Roads	Yes	77.04	19.88	1.99	0.0019	--	--	--	--
Underground Clark Roads	Yes	81.39	21.00	2.10	0.0020	--	--	--	--
Temporary/Interim Reclamation[7]	No[4]	32.42	7.38	2.01	<0.0001	--	--	--	--
Total		**1,047**	**297**	**44**	**1**	**140**	**181**	**6**	**18**

FEIS, Trinity, Rev 2 Oct 2025, Alt 3a, Table 13, Operations

Emissions Activity	Modeled?	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Pb (tpy)	NO_x (tpy)	CO (tpy)	SO_2 (tpy)	VOC (tpy)
Underground Taylor Road Travel	Yes	77.04	19.88	1.99	0.27	--	--	--	--
Underground Clark Road Travel	Yes	81.39	21.00	2.10	0.46	--	--	--	--
Total		**1,050**	**299**	**47**	**2**	**81**	**158**	**5**	**43**

Table 2 show a distinct increase of Pb compound emissions, more than two orders of magnitude. This contrasts sharply with the assurance made on page 4 of the CARR that as far as emission calculation methodology is concerned, "no changes have been made for the FEIS". That may be correct for the methodology but calculation outcomes also dependent on the inputs used, a detail not mentioned. The "emissions calculations approved by ADEQ and EPA" also seems to refer only to the 2024 ADEQ Final AQP, not to the DEIS/FEIS.

To complete the overview, Table 1 also includes the numbers for all three FEIS alternatives. By correcting the numbers the same way as done for ADEQ and DEIS, it is clear that again compliances change into exceedances except for Alt 1 which represents a 50% reduction of output of the Taylor Mine which leads to noticeable reduction in emission for haul roads, material drops and wind erosion of TSF1.

The CARR did not respond on comments concerning NAAQS exceedances other than on page 4 where it is stated that Alt 3a does not include "Project components that would result in NAAQS exceedances". There is no explanation what that means in any document. The recommendation to consult the "Record of Decision and updated AQ report for further clarification" does not deliver more information on how a 2X increase in emissions still meets NAAQS compliance with a number essentially equal to the NAAQS value (within rounding). Environmental impacts cannot be determined without a correct compliance score.

Action: The USFS must re-issue the FEIS and identify the changes made to emission rate allocations compared to the DEIS, account for the claimed NAAQS compliance and determine related environmental impacts in case of non-compliance.

D. Additional Impact Actions on Related Air Pollution Issues

i. **NAAQS Compliance Still Has Impacts**: Common numerator of all the above on Pb compound emissions is that even when the NAAQS of Pb compounds, currently being 0.150 µgram/m^3, is not exceeded, the increase from background concentration as determined to be at 0.005 µgram/m^3, is a whopping 30X. The FEIS makes no attempt to correlate this increase with an increase in the risk of developing adverse health effects, nor any impact on associated societal costs. The risk at concentrations below NAAQS is not zero, as recently shown for PM2.5. The FEIS compliance tables for PM2.5 show that the annual emission rate has increased by 2X once the NAAQS limit has been reached which represents about a 16% increase in the risk to contract Parkinson Disease.
Risk vs exposure response curves are known for Pb compounds too and should be added to any impact review as well. Since the corresponding change in emission rate is known, EPA models that correlate emission rates with societal costs of premature deaths and morbidity must be used to compare societal costs versus benefits. The FEIS does not analyze any environmental impacts for exposure below - or above NAAQS values.

Action: The FEIS must determine the impact of societal costs for any exposure of Pb compounds or other HAP compounds

ii. **Accumulation Has Impacts:** Emission rates are determined for the maximum output year 2029, which is a conservative choice. Not conservative is to neglect any accumulation during

the decades of operations which violates EIS impact assessment requirements as well (40 CFR 1502.14, 1502.16).
Accumulation of airborne particles via atmospheric deposition on exposed water and soil is a well-studied subject, especially for Pb compounds. For instance, accumulation of Pb compounds in sediments of lakes located hundreds of miles away from the source was determined by the Western Airborne Contaminants Assessment Project and referenced by the EPA.
As shown in Figure 1, only a relatively small time lag was observed between emission and deposition, covering the industrial revolution more than a century ago, the use of leaded gasoline and eventually the impact of regulations. Nevertheless, Pb accumulated to concentrations that today would exceed standards of 100 ppm for soil.

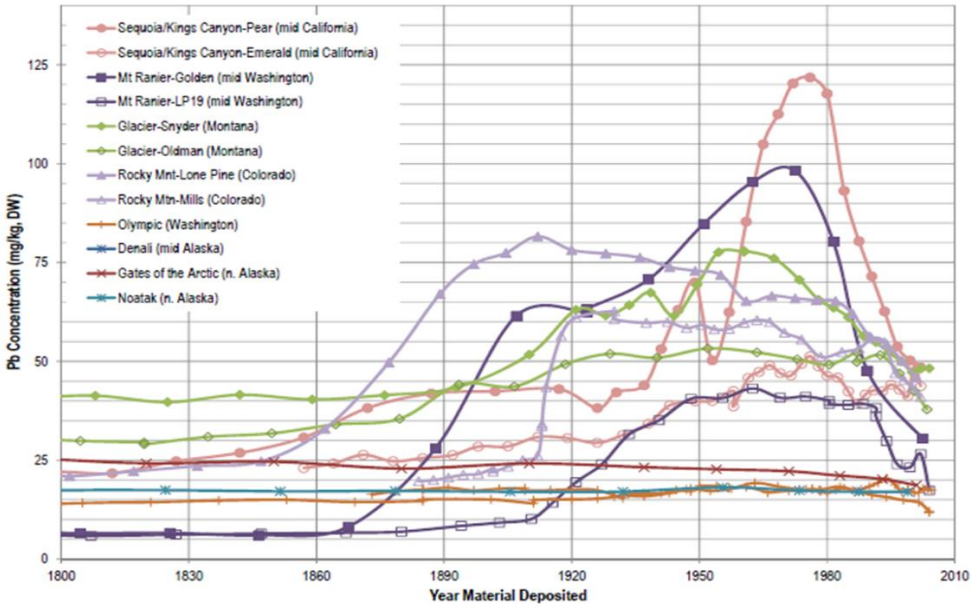


Figure 1: Temporal Pb Concentration in Sediments of Remote Lakes

Other states already have analyzed the contribution of atmospheric deposition to the loading of stream water with toxic metals in runoff precipitation water. It has been found that under arid climate conditions, most metal loading in runoff water originates from dry deposition, accumulated during dry weather. Measured air concentrations responsible for the reported deposition rates are more than 10X lower than what the Hermosa Mine will be allowed to produce. Deposition assessment requires wet weather measurements which ADEQ never included in its so-called Total Maximum Daily Load (TMDL) reporting on watersheds in the Patagonia Mountains.

With the debunked claim in the CARR, page 23, that “the impacts to soil and vegetation from dust deposition are unlikely to be significant”, the FEIS must have available a comprehensive “wet weather” TMDL for all watersheds in the Patagonia Mountains that are impaired already. Tetra Tech is the company that developed wet weather TMDLs for other states and appears to be contracted by ADEQ for the next TMDL as well, making inclusion straightforward but so far only runoff modeling sems to be part of the first TMDL after more than 23 years. Corresponding load allocations must show how much emissions from the

Hermosa Mine impact the TMDL for Pb compounds. Ater all, “once metals are deposited on land under the jurisdiction of a permittee, they are within a permittee’s control and responsibility”.

Action: Accumulation of metal compounds via atmospheric deposition must be quantified in the FEIS and include all pathways the corresponding environmental impacts.

iii. **Emission Control Variability Has Impacts:** All above - and underground road emission rate calculations include a 90% control factor because of the intended 24x7 water or chemical spraying. Since pollutant concentrations are close to NAAQS, the FEIS must include the expected variation of this control factor is and determine the surplus of emissions accordingly. The environmental impacts may be substantial because of the large contribution of dust emissions from unpaved roads and because the control factor is very high. Disclosure of mitigation measures is a NEPA requirement, 40 CFR 1502.14(e) and 1502.16(a)(7).

Action: The variability of dust control measures of unpaved roads must be taken into account to quantify the effect of not maintaining regulated limits on environmental impacts.

iv. **The Choice of Silt % Has Impacts**: In case of unpaved roads like present at the Hermosa site above - and underground, the dust emission rate from traffic is almost directly proportional to the silt % of the road surface. There is no written explanation why ADEQ, and also USFS, used 5.1 % other than verbal remarks that it was used “successfully” before. As with several emission parameters, S32 used the USGS AP-42 reference guide which only covers “Western Surface Coal Mines” from which “aboveground plant roads” was selected, not haul roads.

Recent geotechnical analysis results in S32’s own APP Significant Amendment application show for on-site test pits average silt % values that are at least 3X higher, a number that would increase any unpaved road emission rate by 2.7X. Data on test pits used in this application go as far back as 2017 while the APP was filed in 2021.
No matter the exact value for silt %, its sensitivity to the emission rate is similar as that of Pb fractions of the same road material and should be assessed with the same scrutiny. The FEIS does not contemplate the risks of this variability but must substitute a “best available, site-specific” value. EPA downgrades the reliability of pollution estimations when not using parameters obtained from on-site measurements and one may wonder how the selection of 5.1% would rate knowing alternatives were available since 2017.

Action: The FEIS must consider site-specific values for the silt % of unpaved roads and determine the effect on environmental impacts.

2. Impact of the USFS Reversal on ADEQ’s Metal Mobilization Omissions

A. ADEQ’s Omission of Material Facts on Metal Mobilization Has FEIS Impacts

During more than 20 years, ADEQ never complied with the required 5 year recurrence of its initial 2003 TMDL assessments of any watershed in the Patagonia Mountains. ADEQ

nevertheless claims today that the stretch of Harshaw Creek downstream from S32's wastewater discharge point is not on the EPA 303[d] list of impaired waters …. while the decision to do so is ADEQ's. Altogether, these facts invalidate ADEQ's repeated statements that any discharge water will "likely not cause mobilization of naturally or anthropogenically leached metal compounds and cause or contribute to an exceedance of water quality standards".

In the CARR on page 43, USFS points to the ephemeral nature of involved streams inhibiting metal transport. However, it is well known that most transport will take place during summer and winter monsoon storms which easily reach Sonoita Creek and even the Santa Cruz River; There is no "continuous water flow connection" needed as dedicated studies have shown repeatedly (see below). The claim that separation to groundwater would warrant "no water quality impacts to Santa Cruz River", is debunked by the emergence of surface water in an ephemeral stream like Harshaw Creek or Sonoita Creek every time when groundwater flow is hampered by underground rock barriers.

Consequently, ADEQ accepted that in the section "Site-Specific Factor" of the 2021 Significant Amendment of the APP application that applies to wastewater discharging, was responded to as " N/A or … Not Applicable (?)". That response qualified a permit granting under the guidance of ADEQ's more general "Prescriptive" rules as listed in ADEQ's Best Available Demonstrated Control Technology (BADCT) manual. More demanding rules of ADEQ's "Individual" BADCT apply when there are Site-Specific Factors that require "tailored solutions". This manual is more than 20 years old, never updated and thus most probably does not provide "best available" solutions in the first place.

Among "Individual" solutions is the approval of an "Aquifer Loading Plan" when there is a threat of metal mobilization that potentially affects the quality of aquifer water used as a source for drinking water. By claiming the absence of metal mobilization, S32 was granted an APP based on a Prescriptive BADCT and exempted from submitting an Aquifer Loading Plan or any measure that actually monitors metal mobilization in the discharge channel of Harshaw Creek at a suitable "Point of Compliance". Such monitoring would greatly improve the chance of escalating, irreversible environmental impacts, like an otherwise unnoticed leakage from tailings storage facilities, a frequently reported failure that warrants installation of an actual POC that can be monitored and maintained in perpetuity (failing in-situ monitors can in many case not be replaced).

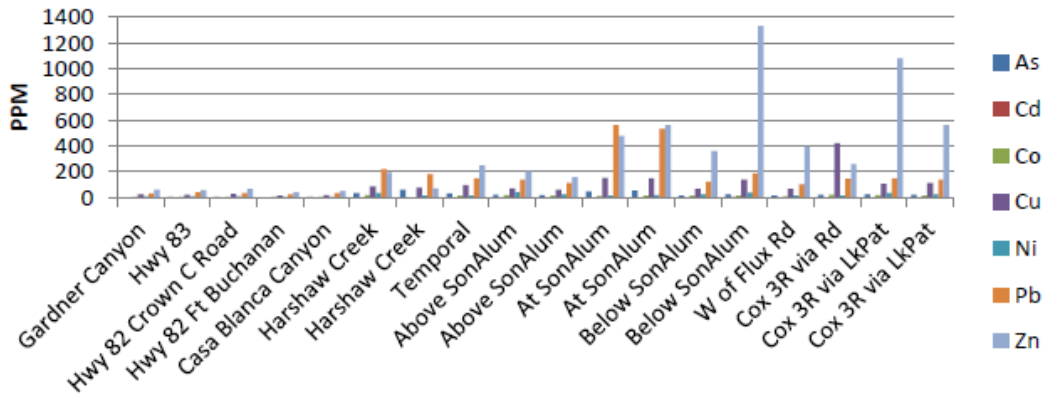


Figure 2: Metal Concentrations in Sediments along Sonoita Creek from Sonoita (left) to Lake Patagonia (right).

During the OAH appeal of this APP, proof of metal mobilization and subsequent bioaccumulation in vegetation across the Patagonia Mountains was presented by referring to a 2012 University of Arizona thesis study, in which sharp increases of metal concentration in sediments of Sonoita Creek were found at all confluences with tributaries having watersheds in the Patagonia Mountains, including specifically Harshaw Creek (see Figure 2). An independent 2019 study of the Red Mountain area by USGS on the same subject confirmed the presence of metal mobilization and bioaccumulation, following up on a 2007 USGS publication in which the Patagonia Mountains were selected as an example in the US on how the pathway of mobilized metals can impact the food chain. All this information was ignored in the APP application by which ADEQ omitted material facts that it "should have had knowledge off at the time the application was submitted", ACC R-18-2-321(C2).

Action: The FEIS must determine environmental impacts of natural and anthropogenic metal mobilization in the Patagonia Mountains and include an Aquifer Loading Plan and an actual Point of Compliance in Harshaw Creek in a re-submitted APP to mitigate the furtherance of such impacts.

B. The Impacts of USFS's Metal Plumes

ADEQ's publicly ignoring metal mobilization came to a surprising end when the DEIS included a report (GSI Environmental 2025a) that modeled the leaching of antimony from exposed mineralized rock due to flooding of mine tunnels with groundwater when dewatering ceases at the end of mine life. It concludes that "all models consistently show that antimony is predicted at concentrations above AWQS", "due primarily to mining activities". The CARR on page 41 adds that "antimony is the most mobile and posed the greatest risk of impacting water quality".

The FEIS added the mobilization of arsenic and lead which show that modeling can provide crucial metal mobilization information that was never included in the APP application as a "Site-Specific Factor". This conclusion may prompt a request to re-open the ADEQ APP to update it accordingly with, for instance, 3-dimensional contour plots of metal plumes, sensitivity analysis on parameters used to model chemical exchange reactions and plume mobility, information that is missing in the DEIS and FEIS.

In this context it is important to realize that in 2017 ADEQ approved a "Voluntary Remediation Program" (VRP) as a mandatory effort to obtain an APP for the re-start the Hermosa Mine when still under ownership of mine entrepreneur Arizona Minerals Inc. (AMI). Antimony was already found to be a very mobile metalloid, that leached from waste rock storage piles into nearby soils during more than a century of unregulated mining., There are no reports available that show the results of this remediation effort other than that it was "completed" in 2018, upon which S32 acquired AMI. In sharp contrast, the CARR on page 23 states that "There are no available data specific to soil contamination at the Project site" essentially omitting material facts important in the assessment of environmental impacts.

Nevertheless, it would be conservative to assume that the Hermosa Mine site still has high antimony levels and that any place, above - or underground, where water and air have access to

mineralized rock, or soils weathered from such rock, antimony leachates would be the first to be detected. That became reality recently where antimony was found at levels exceeding limits of ground- and discharge water. One does not have to wait till the end of mine life to find numerous places, above – or underground, where even today leaching of metals can take place as part of Hermosa's normal mine workings and end up in surface - and groundwater.

Only when pumping can capture enough leachates, the impact of leachate infiltration into groundwater may be managed adequately. There is no information in the FEIS that quantitatively estimates how effectively leachate containing water will be removed, treated and discharged in Harshaw Creek. Without this information, the true impact of metal mobilization remains part of the "known unknowns" of the Hermosa Mine, which is an unacceptable status quo. S32 monitors the chemical content of pump water entering the treatment plant but does not share this data.

The plume, however, shows a serious AWQS exceedance and no matter what is claimed about the location, extent and stability in time, the underlying mobilization of metals warrants an assessment of environmental impacts at any moment during life of mine, not only after mine closure. That is not stipulated by the FEIS but the earlier mentioned Aquifer Loading Plan will have to use any findings on metal mobilization which also may have to be included in an updated APP. That will fit in well with the need to quantify metal mobilization across the whole spectrum of mining activities.

Action: USFS must undertake a comprehensive impact study on the impacts of historic and forecasted mining-induced metal mobilization and halt the EIS until the probability of safe mine operations can be adequately established and properly reviewed.

3. Ignoring the TSF Probability of Failure Has Impacts

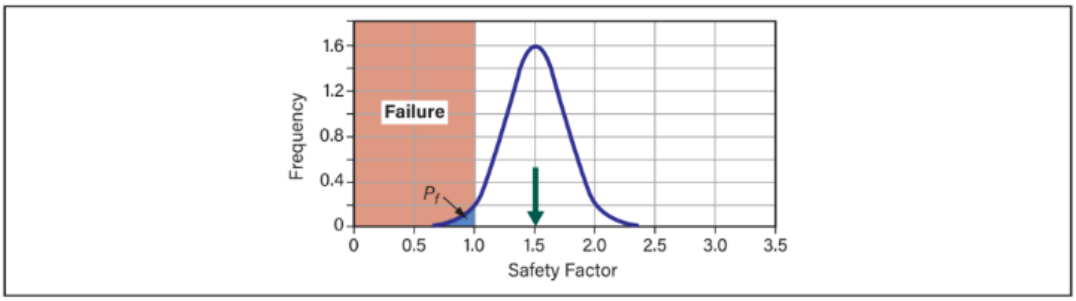
Tailing storage facilities rank as the most unsafe industrial structures known to mankind. The main environmental impact result of a tailing storage facility (TSF) failure is loss of life and damage downstream due to tailings release and subsequent mud flows. Upon failure mudflows will fill valley bottoms and spread tailing across floodplains and because of the fine-grained nature of tailings, mobilization of toxic metals can be expected to continue for centuries with limited remediation opportunities. Such impacts are the most severe on any scale and woefully underexposed in the FEIS.

The proposed, supposedly safer, dry stacking storage construction methods have not been practiced long enough to obtain reliable safety statistics. However, a dry tailings stack can be considered performing a similar function as a dam of a conventional wet storage facility and thus prone to the same failure risks that apply to dams holding tailings slurries. As much as it is clear that a second TSF increases risk of failure, any failure is a cumulation of events that unavoidably take place during the lifetime of a TSF all due to construction and oversight variabilities that appear to qualify as "unforeseen" in courtrooms too many times.

Hence estimating only a single value for a so-called Factor of Safety (FOS) of a select number of parameters, without a histogram of variability, is not sufficient to cover the reality that events have a finite probability to take place concurrently, increasing the risk of failure. That probability

of failure (POF) must be determined in the EIS and the consequences properly modeled in terms of, eg, reach of the mud flow and expected time and costs to remediate, if feasible at all.

Such a modeling, which has precedents at other proposed mining projects, is missing in the DEIS and FEIS. The CARR response on page 14 says that indeed "a POF can provide more information regarding uncertainties from various parameters considered in slope stability analysis". At the same time USFS claims that "adherence to ADEQ (BADCT) prescriptive standards and international industry guidance", is a "commonly accepted" method of dealing with TSF failure risks assessments. This qualification is not acceptable in view of the impacts TSF failures have and the critiques current regulations have received over the past decades. The principles of a POF vs a FOS are explained graphically in Figure 3 below as obtained from this link.



Source: Laccase-Höeg and Höeg 2019

FIGURE 27.2 Probability of failure based on small variability of factor of safety

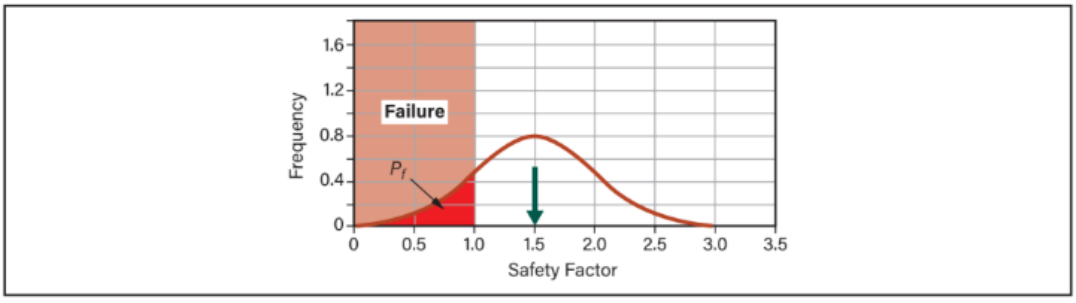


Figure 3: Probability of Failure for two different histograms of a single Factor of Safety

Therefore, without including a histogram of construction parameter variability and determining the chance oversight failure and external events like floods and earthquakes can and will occur concurrently, the public lacks a transparent "integrated" risk of TSF failure. Just in 2017, the Patagonia area experienced a 1,000 year flood event while all modeling concerning flood control, has used a 100 year flood intensity.

The equivalent "Risk of Failure" is extensively reviewed in a recent UN publication called Global Industry Standard on Tailings Management, in which it is recommended to classify the risk on "catastrophic failure" according cumulative impacts of failure modes that include floods, earthquakes, etc..

Action: USFS must disclose an integral Probability of Failure of the Hermosa Mine tailings piles and present the impacts of life lost, costs to public health and costs of environmental remediations can be adequately determined and properly reviewed..

SUMMARY

1. In its Final Air Quality Permit, ADEQ used the suggested, site-specific Pb fractions to increase Pb compound emissions by 75% but failed to account for a corresponding exceedance of NAAQS.
2. USFS corrected its DEIS for the same reason, showing a factor of nearly two increase in Pb compound emissions in the FEIS for its Preferred Alternative, with a claimed NAAQS compliance that cannot be accounted for so that underestimated impacts must be re-evaluated.
3. Both ADEQ and USFS did not use site-specific silt % values to obtain haul road emissions that would significantly increase air concentrations of NAAQS regulated pollutants for which environmental impacts must be re-assessed accordingly.
4. Even below NAAQS regulated air concentrations, any exposure increase due to Hermosa Mine emissions does have public health impacts, the effect of which on societal costs must be compared to any benefits.
5. Emission control measures are claimed to be effective as high as 90% causing emissions to be very sensitive to variabilities thereof and for which the risk on increased environmental impacts must be assessed.
6. New evidence on metal mobilization eventually disclosed in the USFS DEIS and more extensively also in FEIS warrants a much wider investigation of metal mobilization as a Site-Specific Factor that may cause a termination of ADEQ's APP and with that, a hold on a FEIS approval.
7. The current FEIS must include a transparent deduction of the Probability of Failure for existing and significantly expanded tailings storage facilities so that the risks of collapse and subsequent environmental impacts for a to be agreed upon time in the future, can be properly assessed.
8. Considering the above, the only lawful alternative scenario the EPA can accept now is the No-Action one (Alt1).