Patagonia Area Resource Alliance
Arizona Mining Reform Coalition # Borderlands Restoration Network
Calabasas Alliance # Center for Biological Diversity # Cienega Watershed Partnership
Dark Sky International, Southern Arizona Chapter # Defenders of Wildlife # Earthworks
Friends of Santa Cruz River # Friends of Sonoita Creek # Save the Scenic Santa Ritas
Sierra Club Grand Canyon Chapter # Sky Island Alliance # Tucson Audubon Society
Wildlife Corridors LLC

June 10, 2024

Kerwin S. Dewberry, Forest Supervisor
Coronado National Forest
ATTN: Hermosa Critical Minerals Project
300 West Congress Street
Tucson, AZ, 85701

Via: (i) https://cara.fs2c.usda.gov/Public//CommentInput?Project=65668 and (ii) USPS CM/RRR

Re: Proposed Draft Environmental Impact Statement for the Proposed Hermosa Critical Minerals Project

Dear Supervisor Dewberry:

Pursuant to the Forest Service's scoping letter of May 10, 2024, please accept these comments from the Patagonia Area Resource Alliance (PARA), Arizona Mining Reform Coalition, Borderlands Restoration Network, Calabasas Alliance, Center for Biological Diversity, Cienega Watershed Partnership, Dark Sky International Southern Arizona Chapter, Defenders of Wildlife, Earthworks, Friends of Santa Cruz River, Friends of Sonoita Creek, Save the Scenic Santa Ritas, Sierra Club Grand Canyon Chapter, Sky Island Alliance, Tucson Audubon Society, and Wildlife Corridors LLC regarding the proposed Hermosa Critical Minerals Project (Project or Mine) and the proposed Draft EIS (DEIS). These comments adopt and incorporate into the record all previous comments submitted by these groups. Please include all of these commenting groups in any future email, internet, or other public notices involving this Project.

Overall, the DEIS must fully analyze all reasonable alternatives to the project as a whole as well as each major project activity/facility, all direct, indirect, and cumulative impacts from the project, analyze all baseline conditions of all potentially affected resources, develop a credible mitigation plan, fully consult with all potentially affected Tribes and indigenous communities, and ensure compliance with all federal and state environmental and public land legal requirements. Under NEPA, all of the project's activities and impacts must be fully analyzed, including all related activities on private land (i.e., the agency's duties under NEPA are not limited to only those activities occurring on public land).

Due to the limited information provided by the U.S. Forest Service (USFS) regarding the Project, it is difficult for the public to adequately comment at this time. We reserve the right to submit additional comments as the NEPA and agency review process continues. At a minimum, all of the following issues and questions must be fully analyzed and answered in the DEIS.

Water Issues

Protecting our water is important for all the life forms that live here and rely on this precious desert resource. The mine's planned dewatering of up to 6.5 million gallons of water PER DAY plus whatever number it will consume will severely, irreparably, and adversely affect the watershed. And the foreign mine company's plan to backfill all tunnels with paste backfill (waste rock and concrete) creates another major concern about significant changes to the hydrogeology of the region. Under its Organic Act, the agency must "secur[e] favorable conditions of water flows," and under its mining regulations "maintain and protect fisheries and wildlife which may be affected by the operations." The DEIS must fully analyze all impacts to water, water flows, species and habitat, and ensure that these requirements are met.

There is a legal action against the ADEQ regarding the Aquifer Protection Permit. The legal action is in reference to the Arizona Department of Environmental Quality (ADEQ) not requiring a Point of Compliance well or wells in Harshaw Creek between the South32 Hermosa discharge point and the aquifer which is the sole source of water for the Town of Patagonia. There is a concern that existing contamination in the Harshaw Creek Watershed, due to naturally occurring contamination and contamination associated with historic mining operations, will be mobilized by the discharge from South32 Hermosa and will impact water quality for well users in the Harshaw Creek and Sonoita Creek Watersheds including wells in and near the Town of Patagonia. There is also a concern that limits of arsenic, lead and sulfate in the discharge exceed drinking water standards and those contaminants will require the treatment of the groundwater for municipal use. There is also a concern that there is no drinking water standard for concentration of manganese so it is not regulated by ADEQ. All of these issues must be fully analyzed.

The entire mining site, its various facilities, infrastructure, and conveyances all present potential sources of aquifer contamination. The DEIS should evaluate potential impacts from, but not limited to, the following scenarios:

Leaky tailings liners, failure of tailing storage facilities, and overflow due to stormwater.

Transportation of untreated, mine-impacted water in conveyances or pipes which could breach and release pollutants into the aquifers in a number of ways, including through ground movement, extreme temperatures, clogging and corrosion from acid-generating rock.

Lack of a holding pond at WTP2 which could result in the inability to halt ongoing dewatering and mining and contaminants or even clean water released from Outfall 2 into Harshaw Creek could create a feedback mechanism where acidic water then remobilized metals that were sequestered in Harshaw Creek or were sequestered within the aquifer.

Specific comments to the ADEQ response to comments for the APP (August 4, 2021) include the following:

In ADEQ response to comments it was indicated, "Enforceable DLs at the WTP2 outfall ensures that the discharge will not cause or contribute to a violation of AWQS at the POC, or any other location along Harshaw Creek."

- o This statement is not supported by a study as there is existing contamination in Harshaw Creek and there is a concern that contamination will be mobilized by South32 Hermosa discharge to Harshaw Creek.

- o A Point of Compliance without a well does not provide data to evaluate impacts to human health and the environment from South32's Hermosa discharges.

In ADEQ's response to comments it was indicated, "The POC is designated at or near the downgradient edge of the PMA, which is defined as the limit projected in the horizontal plane of the area where pollutants are or will be placed. AMI, now referred to as South32, provided an evaluation of the DIA in the original application which ADEQ reviewed and found acceptable. The demonstration was based on the expected discharge rate and information on the hydrogeology and stream morphology on Harshaw Creek." This evaluation South32 Hermosa presented to the ADEQ was not shared with the public for review and comment and as a result of ADEQ review, a POC well in Harshaw Creek was not installed and no samples from the Harshaw Creek stream bed aquifer were collected for compliance purposes. Water quality samples may indicate that Harshaw Creek water quality is impaired. Water quality samples collected at the POC are important to understand impacts to Waters of the US, public health, and the environment.

In ADEQ's response to comments it was indicated, "Enforceable DLs at the WTP2 outfall ensures that the discharge will not cause or contribute to a violation of AWQS at the POC, or any other location along Harshaw Creek." This statement is not supported by a study reviewed by the public. There is a concern that existing contamination in the Harshaw Creek watershed will be mobilized by South32 Hermosa discharge. This is also a concern since the frequency of water quality monitoring of the discharge is not adequate to protect human health and the environment.

Renewal of AZPDES Permit No. AZ0026387 has not been issued to South32 Hermosa by the ADEQ and ADEQ is currently reviewing comments to the Draft AZPDES permit. The ADEQ response to the public comments period for the draft AZPDES permit started January 11, 2024, and after more than four months, responses to comments from the ADEQ were still not completed as of May 29, 2024. The draft AZPDES permit and public comments should be reviewed in the DEIS to understand if the discharges and permit are compliant with the Clean Water Act and if the discharge will impact Waters of the US and human health and the environment. Impacts to human health and the environment can't be completely evaluated until the discharge limits have been issued by the ADEQ. There are legal issues regarding discharge to Harshaw Creek. Portions of Harshaw Creek are currently impaired and there is legal disagreement if the portion of the creek where discharge will occur is impaired. A Total Maximum Daily Load (TMDLs) study for Harshaw Creek has not been completed in over 20 years, which should be completed before project approval. The Hermosa Project has "new sources" of

discharge as defined in the Clean Water Act and because of these new sources, the permit cannot be issued until ADEQ updates the TMDLs for Alum Gulch and Harshaw Creek. Additionally, concentrations of such metals as boron and barium need to be monitored and total and dissolved metals must be reported. Effluent Limitation monitoring frequency needs to be increased to at least monthly and the use of measured effluent hardness to calculate these permit limits is necessary in determining the relevant concentration limits for the permit, not influent hardness which does not reflect actual chemistry of the discharge. The discharges, and draft AZPDES permit, likely violate the Clean Water Act and the public has been waiting for responses from the ADEQ to address these concerns.

Spring Ecosystem Impacts: Through spring surveys, the Sky Island Alliance (SIA) has identified a diversity of springs types, and plants and animals supported by springs ecosystems in the Cienega Creek and Sonoita Creek Watersheds. Springs are places where groundwater is exposed, and often flows from the Earth's surface. These waters are derived from underground aquifers or water tables, sometimes traveling long distances over long periods of time before they reach the surface. It is known that springs in arid ecosystems occupy a small fraction of the landscape and yet support disproportionately high levels of productivity, endemism and biodiversity. Springs function as "keystone ecosystems" having enormous effects on surrounding landscapes, biota, and economies 24 and play a crucial role in providing refugia for migratory birds, reptiles and amphibians. Impacts to all spring ecosystems in the project area must be analyzed in the DEIS. There are hundreds of springs and seeps in the Patagonia mountains, all of which could be negatively affected by a drop in the water table, even by less than a one-foot drop in the water table. These springs are presented on the following website page: https://skyislandalliance.org/our-work/science/spring-seeker/map/. The water pumped by South32 Hermosa isn't being used by the mine, but is being discharged into Harshaw Creek and a few other nearby creeks at a rate that may inundate other spring sites and wash away seedlings and other plants. These changes, and other changes to the hydrogeology of the area that impact water sources which support habitat and species, as a result of South32 Hermosa activities, must be addressed in the DEIS.

Impacts to All Water Sources: The DEIS must assess the direct, indirect, and cumulative impacts to all water resources, watersheds, wetlands (including spring wetlands), and associated habitats that may be impacted by this project. The heavy use of dirt roads proposed for this project is likely to impact the Harshaw Creek watershed, including the Municipal Watershed for the Town of Patagonia. All streams are pathways for the movement of water, nutrients, and sediment throughout the watershed, including intermittent and ephemeral streams, which comprise a large portion of the stream network within watersheds. These features have greater relative moisture than the surrounding area, often stored in ground, and when they erode and down cut, gullies can form. This leads to soil loss and the surrounding water tables getting deeper.

Road construction and increased use of dirt roads is known to exacerbate erosion and increase sedimentation into waterways and drainages, which can greatly impact the health of the watershed. This is because exposed soil surfaces such as dirt roads and trails concentrate runoff, resulting in higher erosion rates and soil loss. The amount of motorized use on a road is related to the erosion and sediment yield, with the greatest amount of erosion found on the most intensely used roads. Areas adjacent to roads are also prone to instability from loss of vegetation, concentrated runoff from compacted road surfaces, and disturbance from use. Wind can also mobilize soil off the bare surfaces of roads and adjacent areas. These and other impacts caused by the construction and increased

use of dirt roads are well known to pose a significant threat to watershed health.

The spring wetlands that are within or near the project area are likely to experience impacts from the greatly increased traffic and human activities associated with this Project. Human activities have greatly reduced the ecological integrity of many wetland, riparian and springs ecosystems through competing exploitative uses, including mining, groundwater pumping, diversions, fuel wood harvest, recreation, livestock grazing, and wildlife management. Land-use change may alter the processes for recharge to an aquifer. Reduction of the water-table elevation or well-drilling may allow inflow of lower-quality groundwater into an aquifer. In addition, pollution of percolating surface water or groundwater may reduce the quality of an aquifer's water. Extraction of groundwater from the aquifer may partially or wholly dewater individual springs or entire complexes of springs resulting in fragmentation of habitat, increasing isolation of springs ecosystems, and interruption of biogeographic processes at microsite-regional spatial scales in perpetuity.

Groundwater Management Comments: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 1.3.2 on page 1-3 states, "The primary products from the Project—manganese and zinc—are both identified by the U.S. Geological Survey as critical minerals and are needed for meeting the country's bold decarbonization targets."

Why are lead and silver not mentioned in the PoO? Are lead and silver critical minerals? What will be the benefit of lead extraction as most of the lead in the US is recycled? Will this additional lead on the market impact the exposure of the public to additional lead poisoning in the US or other countries? How critical is the mining of silver to maintain the operation of South32 Hermosa?

Why does this entire section fail to mention dewatering 6.5 million gallons per day and the associated short- and long-term local and downstream impacts?

Section 1.3.2.6 on page 1-5 states, "Groundwater management (GWM) is necessary to reduce hydrostatic pressures to allow underground exploration and mining. GWM wells are on South32 Hermosa private land and proposed on NFS land," and, "Water Treatment Plant 2 (WTP2), anticipated to be operational in late 2023, is authorized to discharge up to 4,500 gpm to Harshaw Creek.

4,500 gpm is approximately 6.5 million gallons per day (MGD) which is equivalent to 7,239.67 acre feet of water per year. At $521 per acre foot, the value of the water pumped by South32 Hermosa is calculated to be $3,771,868 per year.
https://www.desertsun.com/story/opinion/2023/06/08/colorado-river-deal-forever-changes-the-price-of-water-in-the-west/70295273007/

How is the public being reimbursed for use of this public water by South32 Hermosa to maintain operations?

Dewatering 6.5 million gallons per day (MGD), amounts to approximately 2 MGD more than the current daily total use by Nogales and Rio Rico.

Why is there no mention in the PoO of the temporary groundwater mound that will be created by continual additional ~10 CFS accumulation, nor of the associated downstream flooding risk(s)?

Why are the predicted results from the NewFields models (regional and mine) not shown, presented or discussed in the PoO?

Will dewatering impact public and private water wells in the Patagonia area by increasing and then lowering the water table?

Will dewatering create a groundwater mound somewhere downstream?

What are the long-term impacts or changes in the geomorphology, hydrology, water flows and supplies, recharge, and ecosystem conditions in the areas affected by dewatering and mining?

The DEIS must evaluate moving the point of dewatering discharge from upper Harshaw Creek to a gravity flow pipe lay outlet discharge in upper Sonoita Creek which would mitigate the direct impacts of groundwater mounding flood risks in Patagonia, and would also help to slowly return some percentage of recharge to also mitigate the eventual long-term drying of the entire area, as shown in Newfield's "Area of influence". Tomas Good, South32 Hermosa Hydrologist, agreed that was an "Excellent idea" but said that it would require more permitting.

Section 2.3.1 on page 2-17 states, "Groundwater management is necessary to reduce hydrostatic pressures to allow the development of underground infrastructure and ultimately to allow excavation for exploration and mining from both private land and NFS land. Groundwater management initially from private land is anticipated to yield up to 4,500 gpm which would be treated by WTP2 before authorized discharge to Harshaw Creek."

Why is the necessity for groundwater management not discussed in the PoO? Has it been demonstrated that South32 Hermosa needs to reduce hydrostatic pressures to the extent proposed for development? Can mining be limited to reduce impacts to water levels on public land? Are there mining methods that do not require reducing hydrostatic pressures to develop the mine? Can the aquifer surrounding underground operations be frozen or filled with a sealant material to provide a hydrologic boundary to allow pumping inside the boundary not to impact water levels outside the boundary? Can pumping be reduced to reduce water level impacts?

Nearby residents rely on the water in the Harshaw Creek aquifer as their sole source of drinking water and there are residential homes with domestic wells located near the banks of Harshaw Creek.

Harshaw Creek aquifer feeds into the Sonoita Creek aquifer which is the sole source of drinking water aquifer for the Town of Patagonia which includes residential homes, businesses and schools, which all must be analyzed.

Further, other people and entities located along the banks of Harshaw Creek and in the town of Patagonia are entirely reliant on wells for drinking water, livestock, irrigation, and other municipal

purposes.

How much will surface water flow in Harshaw Creek increase due to discharge by the South32 Hermosa? How much will flooding in Harshaw Creek increase due to discharge by the South32 Hermosa? What will be the impacts of increased surface water flow to the habitat of the Harshaw Creek Watershed? What will be the impacts of increased surface water flow to groundwater in the Harshaw Creek aquifers?

There will initially be increased flooding risks through Harshaw and Sonoita Creeks, including Town of Patagonia, and eventually pumping will dry-up the mountain, both creeks and potentially Town of Patagonia potable wells.

How will the discharge impact FEMA and the associated flood insurance requirements? Will South32, Santa Cruz County and/or the US Forest Service install flood control measures to mitigate flooding? Will flood control structure designs be shared with the Town of Patagonia for comment prior to being finalized?

What can we expect regarding impacts to Harshaw Creek and Harshaw Creek Road as dewatering commences? Will stream morphology change? Will creek crossings damage public roads? When traveling on public roads, will there be increased risk of accidents or death when crossing Harshaw Creek when it is filled with discharge from South32 Hermosa? Will residences along Harshaw Creek be cut off from road access where discharge in Harshaw Creek flows across driveways? What are public safety issues associated with flowing water in public and private roadways?

What will be the impacts to surface water quality and groundwater quality from the mobilization of existing contamination in the Harshaw Creek Watershed?

What will be the changes in the groundwater balances for the Harshaw Creek Watershed, the Patagonia Municipal Watersheds and in the Cienega Creek Groundwater Basin as a result of pumping by South32 Hermosa? For the above question, will an impact analysis and mitigation analysis be conducted over the estimated timing for all stages of the mine?

What will be the water level and water quality impacts to the Sonoita Creek Aquifer, to the Town of Patagonia wells and other wells in and near Patagonia over the estimated timing for all stages of the mine due to discharge by South32 Hermosa? Could the cone of depression associated with South32 Hermosa impact water levels of wells in the area outside the Town of Patagonia such as in Harshaw Creek, Red Rock Canyon, Alum Gulch, and Flux Canyon?

Considering the potential impacts and so many unknowns associated with South32 Hermosa, funding and authority of a third party expert to oversee all dewatering activities (e.g.: all monitoring and modeling, design of modeling for off-site impacts, etc.) should be appointed. Why has an independent third party not been engaged to review modeling or oversee all dewatering activities?

Is there protection of the well owners from dewatering activities with an agreed upon compensation for well owners from impacts of mine activities that were identified through the impact prediction

modeling with uncertainty?

Within the Harshaw Creek watershed, downstream of the mine, there are water quality issues in drinking water wells due to existing contamination which must be analyzed. Why does South32 rely on domestic drinking water wells to monitor water quality in Harshaw Creek and not install and collect samples from a monitoring well network? Why has South32 not shared with the public a summary of statistical data or a report (not individual private well data) regarding water quality and water levels in wells along Harshaw Creek so the public can better understand the impacts to Waters of the US, human health and the environment?

Will there be a plume of contamination in the groundwater emanating from Harshaw Creek due to discharge by South32 Hermosa which can mobilize existing contamination including sulfate? Will there be a plume of contamination in the groundwater emanating from Harshaw Creek due to discharge by South32 Hermosa which exceeds drinking water standards for lead and arsenic?

South32 Hermosa has multiple sources of pollution that could impact nearby surface waters by discharge from Outfall 001 and Outfall 002 and those discharges are a new source of effluent.

Several wells in and near the Town of Patagonia already indicate elevated levels of sulfate, some of which exceed the Secondary Drinking Water Standard level of 250 mg/L. The Town's wells are presently used without treatment except for disinfection and that additional sulfate loading would push these wells above the Secondary Drinking Water Standard levels and begin to impair the quality of existing drinking water. These are issues in a drinking water system in southern Arizona due to sulfate exceeding the Secondary Drinking Water Standard level due to mining activities.

Given the importance of the Patagonia Mountains and the existence of immense biodiversity in this region, the depletion of the aquifer will almost certainly harm or even destroy numerous springs and seeps, and other surface water features, at a time when the existence of these critical water resources and the habitat they support are already under pressure from drought and climate change. Mine dewatering and depressurization will permanently remove water from these aquifers which are an important part of the function and health of this important and biodiverse ecosystem. Will South32 permit and install animal drinkers (guzzlers) to supplement the loss of animal waters due to dewatering activities? Many species, such as bats, rely on open water for drinking, have dwindling food sources and are affected by nighttime lighting. The DEIS must fully analyze these issues and prevent such adverse impacts.

Will dewatering activities impact public and private water wells in and around the Patagonia area by lowering or increasing the water table? Are any dewatering or contamination impacts expected to affect the San Rafael Valley?

How long will water levels impacted by pumping by South32 Hermosa take to recover in South32 Hermosa and in the aquifer surrounding South32 Hermosa? How long will it take for existing perennial springs to recover? What is the anticipated water quality beneath South32 Hermosa once water levels recover? Will future water quality parameters be better or worse than before pumping by South32 Hermosa?

If the drought continues through the life of mine, combined with dewatering, what impact will this have on the aquifer(s) of Santa Cruz County, specifically aquifers in the Sonoita Creek Watershed and Cienega Creek Groundwater Basin? Section 2.3.1 on page 2-17 states, "Most wells would be anticipated to be drilled to approximately 2,000 to 3,000 feet."

South32 has claimed the wells would be installed to 5,000 feet at panel meetings. The elevation of the mine site is at about 5,200' AMSL, the Town of Patagonia's elevation is about 4,058" AMSL and dewatering will result in water levels several thousand feet deeper than the water level in the Sonoita Creek Aquifer. Section 2.3.1 on page 2-17 states, "Infrastructure necessary to support the GWM wells include… pipelines to convey pumped water…"

How will leaks from this pipeline be identified and monitored to prevent discharges which exceed limits in the Aquifer Protection Permit?

How will leaks from this pipeline be remediated?

How will traffic accidents be prevented which would damage the pipelines?

Will valves be installed or controls taken to prevent continuous discharge after a major breach to prevent the volume of the upstream pipeline (including discharge from other wells) and the volume in storage at the treatment plant from discharging out the breach?

What will be the impacts of pumping the GMW wells to springs and shallow groundwater which supports habitat for threatened species? Section 2.3.1 on page 2-18 states, "Other early activities that could occur on NFS lands before other Plan Operations begin include the installation of monitoring wells to satisfy state permitting requirements, as well as TARs needed to access the monitoring wells. Installation of monitoring wells would not occur before approval of this PoO by the Forest Service, but likely would occur before construction of TSF2, and could serve as long-term monitoring locations or points of compliance in accordance with state permitting requirements."

Why is the number and location of the monitoring wells not presented in the PoO? What are the depths and diameters of these monitoring wells? What permit or permit requirements is this statement referring to? Section 2.3.1 on page 2-18 states, "Depending on the size and anticipated discharge rates from the well, this early development discharge (turbid water) may be stored at the drill site or hauled to South32 Hermosa private land."

How will this discharge be characterized before disposal to prevent discharge of contamination which exceeds the limits in the Aquifer Protection Permit?

How will the solids associated with turbidity be characterized and disposed of?

Will contaminated water and or solids be stored at the drill site, how will this area be monitored to identify leaks and how will the drill site be remediated? Section 2.3.1 on page 2-18 states, "Typically, later development water would be discharged into a local drainage with erosional support in place to dissipate discharge energy. Once development is complete, aquifer testing is performed (also

discharging to a local drainage) to determine optimal flow rates and identify aquifer response to pumping."

How will this discharge be characterized and monitored before disposal to prevent discharge of contamination which exceeds the limits in the Aquifer Protection Permit and AZPDES Permit?

What measures will be taken to prevent the mobilization of existing contamination by the discharge to protect Waters of the US and human health and the environment?

TMDL studies should be completed on the receiving water bodies to determine if contamination in the discharge exceeds limits to surface water. Section 2.3.2.1 on page 2-19 states, "Fuel will be delivered underground via vertical pipes placed in a borehole or the Main Shaft on South32 Hermosa private land."

South32 Hermosa has claimed that all underground equipment will be electric. What underground equipment will be using fuel delivered underground. Is it required to use fuel underground? Will fuel be used in any drilling fluids for drilling operations? Section 2.6, Table 2-10 on page 2-88 states, "South32 Hermosa has been issued an AZPDES permit for point-source discharges from WTP1 and WTP2 (Permit No. AZ0026387)." Alum Gulch is impaired, and the Arizona AZPDES permit to discharge has not been issued and discharge to Alum Gulch will likely result in the release of contamination to Waters of the US and impact human health and the environment.

Section 2.5.1, on page 2-32 states, "Mining of the sulfide and oxide portions of the orebody will take place concurrently. Mining of the sulfide portion of the orebody is anticipated to take up to ~30 years. Mining of the oxide portion of the orebody is expected to take up to ~70 years."

What is the anticipated duration of dewatering activities as mining is expected to take up to ~70 years? Does this estimation include mining of the Peake Deposit? What are the long-term impacts of dewatering activities on the habitat of the Patagonia Mountains? Will the current habitat be lost forever, if not, how long will it take for the current habitat to return? Section 2.5.2, on page 2-33 states, "Typical underground blasting operations happen on average twice per day."

What permanent effects will this have on the local fractured rock geology and hydraulic conductivities? What short-term and permanent effects will this have on habitat and wildlife? Section 2.5.5.1, starting on page 2-42, discusses the water balance for South32 Hermosa and is detailed on Table 2-2 page 2-46.

Why is the use of water for exploration drilling not included in the water balance for the project as the PoO indicates roughly 1,000 to 14,400 gallons of water would be used per shift per rig?

Why does the PoO show discharges from WTP2 to Harshaw Creek or RIBs as 3,555 GPM, whereas elsewhere it is stated as 4,500 GPM?

Why is the water balance in the hydrological cycle not discussed in the PoO as it is important to understand to protect Waters of the US and the environment?

What will be the impacts to springs, seeps, habitats which rely on shallow groundwater and biodiversity in the Patagonia Mountains if more water flows out of the watersheds than is received?

The DEIS should provide a hydrological water cycle balances for each of the sub-basins in the Patagonia Municipal Watershed with particular focus on Harshaw Creek and Middle Sonoita Creek Watersheds which includes but is not limited to the inputs of water from precipitation, outflow of water by discharge to Harshaw Creek by South 32 and outflow due to transpiration.

Why is water hauled to South32 Hermosa for potable use not included in Table 2-2 as it is an important part of understanding the water balance?

Why is it noted in Table 2-2 that, "The rate of zero discharge after closure refers to discharge from the Project site. There may still be flow from TSF2 after closure, but it is anticipated that flow would fall to a level that can be passively treated through evaporation instead of active treatment at WTP2 and subsequent discharge to Harshaw Creek or the RIBs," when passive treatment will decrease flow volumes and increase residual contamination? Section 2.5.5.1 on page 2-42 states, "The overall water cycle and water balance for South32 Hermosa involves multiple uses, sources, and recycling loops (Figure 2-18). To the extent practicable, water is captured for reuse and management to maximize recycling and minimize the need for raw water input consistent with South32 Hermosa's commitment to water sustainability."

This is a misleading statement as the pumping and discharge of 6.48 million gallons of water per day is required to sustain South32 Hermosa operations.

Section 2.5.5.1 on page 2-43 states, "WTP2 is anticipated to initially treat up to 4,500 gpm, although this rate is expected to be reduced to about 3,200 gpm. Initially more water is pumped and treated because there is more groundwater available to pump from rock units with higher permeabilities and more storage (this allows for higher pumping rates), and there are fewer site uses of the pumped water, either from demand or consumptive losses. The pumping rates become lower as groundwater is removed from storage and pumping approaches a new equilibrium between pumping and groundwater recharge."

This statement is misleading as no information is provided in the PoO or to the public to evaluate these claims.

Why is there no mention of potential downstream mobilization of residual contaminants in Harshaw Creek from historic mining in the PoO? Section 2.5.5.1 on page 2-43 states, "Potable water hauled to the Project by truck. The exact source is not known at this time, but potable water will not be sourced from or treated at the Project. Water will be sourced from a licensed and permitted facility."

What is the source of potable water for South32 Hermosa? How much potable water will be used by South32 Hermosa? What will be the impact to other users of that water system and what will be the water level impacts where potable water for South32 Hermosa is pumped? Section 2.5.5.1 on page 2-43 states, "Discharge of treated water from WTP1 to Alum Gulch, which would in part recharge

regional groundwater via natural channels."

Comments for the draft AZPDES permit currently being reviewed by the ADEQ. Section 2.5.5.1 on page 2-43 states, "Discharge of treated water from WTP2 to Harshaw Creek, which would in part recharge regional groundwater via natural channels."

Portions of Harshaw Creek are impaired and there is legal disagreement if the portion of the creek where discharge will occur is impaired. Will discharge to Harshaw Creek result in the release of contamination to Waters of the US and impact human health and the environment?

How much of this discharge will be recharged to the bedrock aquifer, recharged to the Sonoita Creek aquifer and how much will be removed from the water balance by evapotranspiration?

ADEQ has not completed a TMDL study of Harshaw Creek as required by federal law to determine limits to the discharge.

Comments for the draft AZPDES permit are currently being reviewed and have extended beyond the period the ADEQ indicated it would take to review.

Section 3.1 on page 3-1 states, "Environmental criteria included such factors as drainages and aquatic features, watershed area, habitat including endangered species concerns, air quality, and cultural resources."

Did the environmental criteria include the presence of existing contamination in Harshaw Creek and the potential for mobilization of contamination into the Town of Patagonia aquifer?

Did the criteria include the presence of threatened species such as the Mexican Spotted Owl and Yellow-billed Cuckoo? Did the criteria include the threats to habitat for biodiversity from springs and shallow groundwater which will likely be significantly reduced or eliminated by South32 Hermosa pumping? Did the criteria include the threats to habitat for other threatened and endangered species such as the Jaguar?

Based on the potential for increased flooding, does South32 Hermosa and the Forest Service recognize the potential loss of archaeological artifacts and native dwelling sites along Sonoita Creek due to activities by South32 Hermosa? Section 3.1 on page 3-2 states, "The Project will require far less water than most mines today, and South32 Hermosa is working with the community to explore beneficial reuse of the groundwater that needs to be relocated away from the orebody for safety, including recharge to the aquifer using RIBs to offset the effects of drawdown in the aquifer and potential impacts to groundwater-dependent ecosystems."

This statement in the PoO includes several misleading statements to the public as to the impacts from South32 Hermosa on the environment.

South32 Hermosa will have to dewater the mountain to access the ore and is permitted to pump and discharge 6.48 million gallons per day which is more than six times the groundwater usage in the

Cienega Creek Groundwater Basin in 2006. This pumping is necessary for the mine to exist. Based on these facts, the statement that, "The Project will require far less water than most mines today," is misleading because the project is requesting to pump and discharge 6.48 million gallons per day and this dewatering volume is not considered in South32 Hermosa's calculation comparing itself to other mines.

Pumping is not limited and the RIBs allow for the discharge of pumped water in excess to that permitted to be discharged to Harshaw Creek. South32 Hermosa is not required to report pumping that will impact groundwater management of the watershed which is the sole source of water for the Town of Patagonia and many others in the area, which the agency should analyze and require.

A South32 advisory panel was created by the mine to interact with the public, however the panel was not successful in having their questions and concerns answered by South32. South32 has sponsored the panel for years but has now changed the charter of the panel to exclude some current members and community members with expertise to share on how to provide beneficial use of the pumped water.

Considering that South32 will mine the Peake Prospect, will additional dewatering be necessary as portions of the Peake Prospect lies below the Taylor deposits? Are the RIBS designed to handle the additional pumping to mine the Peake Prospect?

Use of RIBS will likely result in additional drawdown impacts as more water can be pumped than is permitted to be discharged to Harshaw Creek.

Section 3.4 on page 3-6 states, "The Project has been designed with the recognition that water is a valuable shared resource that requires integrated and effective management to ensure its availability and suitability for shared use."

This sentence in the PoO includes several misleading statements regarding impacts from South32 Hermosa on water availability and water quality to the Town of Patagonia and area residents.

South32 Hermosa will have to dewater the mountain to access the ore and is permitted to pump and discharge 6.48 million gallons per day which is more than 6x the groundwater usage in the Cienega Creek Groundwater Basin in 2006. A groundwater model was requested by the Town of Patagonia in 2020 to evaluate groundwater impacts from South32 Hermosa to manage their groundwater resource and that neither South32 or the Forest Service has provided a groundwater model any other help to evaluate water impacts from South32 Hermosa to the Town of Patagonia. Based on these facts, the statement that, "water is a valuable shared resource that requires integrated and effective management to ensure its availability," is a misleading statement.

Based on existing contamination in Harshaw Creek and discharge limits which exceed drinking water standards for lead and arsenic, it is anticipated there will be a plume of contamination emanating from Harshaw Creek due to discharge by South32 Hermosa. How does this support the statement that effective management will ensure "suitability for shared use"?

The panel was not successful in having their questions and concerns answered by South32 and there is

no clarity or demonstrated shared values as a result of panel discussions. Section 3.4 on page 3-6 states, "South32 Hermosa has collected site-specific baseline data on water resources near the Project since 2012. Water resources field data include: measurement of groundwater levels and groundwater chemistry." This important "baseline" data should be publicly available as it sets the "starting point" of existing conditions, to compare with future monitoring data and isotope studies and results should be included.

Site-specific baseline data has been requested by the public including by the advisory panel to South32 Hermosa but data such as water levels, water quality and groundwater chemistry has not been shared with the panel or the public.

From the panel website, "The advisory panel to South32 Hermosa is an independent, multi-interest group of community leaders with diverse perspectives and strong networks. Together, we work to represent the best interests of our community throughout the development of South32's Hermosa Project. We aim to raise community questions and concerns surrounding the development of the project, and to gain clarity on behalf of our neighbors while ensuring that shared value is brought to Southern Arizona." This panel was not successful in having their questions and concerns answered by South32 and there is no clarity or demonstrated shared values as a result of panel discussions. South32 sponsored the panel and has now changed the charter of the panel to exclude some current members and this indicates the panel is not independent but ultimately controlled by South32 as a propaganda tool.

It is important for the public to understand the site-specific baseline data to better understand the impact South32 Hermosa will have on Water of the US and human health and the environment. The public has formally been requesting site-specific baseline data for years to better understand the South32 Hermosa project without response. Why has the Forest Service and South32 refused to share baseline data so the public can evaluate the impacts to human health and the environment? Section 3.4.1 on page 3-6 states, "The ADEQ has designated a portion of Harshaw Creek as impaired for copper and pH, but this reach of Harshaw Creek is roughly 0.25 mile upstream of the discharge point for WTP2. None of the drainages downstream from WTP2 (Harshaw Creek) are designated as impaired. The portion of Alum Gulch receiving water from WTP1 is designated as impaired for cadmium, copper, lead, zinc, and pH."

There is a legal issue regarding the location along Harshaw Creek where the creek goes from impaired (upstream of the mine on private land) to not impaired (determined to be immediately downstream of the mine on private land).

A TMDL study is being conducted in Harshaw Creek and that study may indicate a portion of Harshaw Creek downstream of the mine is impaired. Section 3.4.2 on page 3-6 states, "Consolidated rock is predominant throughout most of the Patagonia Mountains and surrounding mountain ranges. Alluvium is present as narrow deposits along canyons and in stream valleys. Regionally, basin fill and alluvium are found in thick, wide deposits in the Santa Cruz River Basin, San Rafael Valley, and Sonoita Creek Basin."

Fractured bedrock is predominant, which has vastly different hydraulic conductivities than consolidated rock and that locally, in Harshaw Creek and portions of Sonoita Creek in the area, this

alluvium is the source of drinking water? Section 2.5.5.1 on page 2-43 states, "The quantity of water pumped from South32 Hermosa private land is anticipated to be sufficient to satisfy the non-potable consumptive needs of the Project".

The quantity of water pumped from South32 Hermosa is unlimited and will dewater the mountain which will likely eliminate or reduce springs and shallow groundwater which support habitat for threatened species, reduce or eliminate mountain front and mountain block recharge to the aquifer which is the sole source of water for the Town of Patagonia, and may drawdown water levels in the aquifer in the area of the town, South32 Hermosa and in the Town of Patagonia.

What groundwater model or water budget by the US Forest Service or South32 show water level impacts from pumping by South32 Hermosa? Section 2.5.5.1 on page 2-44 states, "Note that zero discharge does not mean zero flow, rather it means that rates of flow from TSF2 fall to a level that can be passively treated instead of actively treated at WTP2. The flow able to be passively treated is currently estimated as less than 25 gpm (see Section 2.5.5.2). However, the water treatment capability would not be dismantled/removed until the ability to passively treat flows has been demonstrated in practice, which may extend beyond this time frame."

This statement is misleading as the prior passive treatment system did not work and the statement that active treatment may extend beyond the a 5- to 10- time frame seems arbitrary and a permanent active treatment system may be required to adequately protect the release of contamination to Waters of the US and to protect human health and the Environment. Section 2.5.5.2.1 on page 2-47 states, "Two water treatment plants have been constructed on South32 Hermosa private land. Both plants require permits from ADEQ under the APP and AZPDES programs to treat specific water sources to levels at or below the applicable water quality standards. These permits have been issued to South32 Hermosa by ADEQ."

- The APP is currently being contested in Arizona Superior Court because it does not adequately protect human health and the environment by not requiring point of compliance wells.
- The ADEQ is currently reviewing comments to the Draft AZPDES permit, the AZPDES permit has not been issued to South32 Hermosa by the ADEQ.

The above statement by South32 is misleading the public as to the status of the permitting process. Impacts to human health and the environment can't be completely evaluated until the discharge limits have been issued by the ADEQ.

Why is the SWPPP describing specific BMPs, their locations, and timeframes not included in the PoO as Appendix B is not a specific SWPPP? Section 2.5.5.2.1 on page 2-47 states, "WTP2 effluent can be routed to the operations, discharged to Harshaw Creek through Outfall 2 in accordance with AZPDES and APP permits, or recharged in the RIBs."

- Permitting for recharge to the RIBS by the ADEQ has not been made public.
- Based on the current status of the draft AZPDES and APP permits, making the statement that discharge to the RIBS will be permitted is misleading the public and impacts to human health and the environment can't be completely evaluated until the discharge limits have been issued by the ADEQ. Section 2.5.5.2.2 on page 2-50 states, "A typical passive treatment system would utilize an evaporation cell."

- How will the evaporation cells be monitored and maintained to prevent discharges to the aquifer, soil and air which may impact human health and the environment.
- Will the solids left over from evaporation be contaminated?
- How will the solids be collected, disposed and prevented from discharging into the environment including dust generated during maintenance? Section 2.5.5.2.2 on page 2-50 states, "As cited above, until an effective passive treatment approach can be demonstrated, active treatment of underdrain flows would continue."
- What are the criteria to determine if effective passive treatment can be demonstrated?
- Will this passive treatment system be able to handle potential large-scale precipitation events which are anticipated to be larger in the future due to climate change?
- How much contamination will be released and what will be the impacts in the event of a failure of the passive treatment system during a large-scale precipitation or earthquake event? Section 3.1 on page 3-2 states, "The Project is being designed to eliminate the need for perpetual water treatment beyond the life of the mine."
- This statement is misleading to the public based on statements in the PoO. Section 2.5.5.1 on page 2-44 states, "However, the water treatment capability would not be dismantled/removed until the ability to passively treat flows has been demonstrated in practice, which may extend beyond this time frame."
- This statement seems misleading as the prior passive treatment system did not work and the statement that an active treatment may extend beyond a 5- to 10- time frame seems arbitrary. Why is it not stated in the PoO that a permanent active treatment system may be required to adequately protect the release of contamination to Waters of the US and to protect human health and the environment? Section 3.1 on page 3-2 states, "Consistent with the South32 Sustainability Policy, Project processes were designed to maximize metallurgical recoveries of desired metals while minimizing impacts to the environment, including water and reagent use as well as tailings management including reuse."
- What are the costs of environmental impacts and impacts to human health used to evaluate the South32 Hermosa project, including increased cost of health care and premature death associated with the South32 Hermosa project? What are the anticipated financial returns from the South32 Hermosa project? How does the South32 Sustainability Policy balance impacts and financial returns? In general, which groups benefit from the financial returns? What percentage of the overall financial return is each group estimated to receive?
- Why is the South32 Sustainability Policy not discussed in the PoO? Section 3.4.2 on page 3-7 states, "Discharges from operations will be controlled to meet strict water quality standards set by the AZPDES permit and APP permit. For both WTP1 and WTP2, regular sampling, operational controls, maintenance, and housekeeping ensure that discharges from the Project will not exceed any regulatory standard."
- AZPDES Permit No. AZ0026387 has not been issued to South32 Hermosa by the ADEQ and the ADEQ is currently reviewing comments on the Draft AZPDES permit. The Forest Service cannot issue any approvals or complete its analysis, with full public review, until all required local, state, and federal permits have been issued.
- Discharges at Outfalls 1 and 2 are permitted to exceed drinking water standards for lead and arsenic and the monitoring frequency in the draft permit is not regular enough to characterize the discharge in a manner which protects human health and the environment. Section 3.4.3 on page 3-8 states, "To ensure long-term protection of water quality, post-closure activities on both South32 Hermosa

private land and NFS land are anticipated to include monitoring of reclamation success and site stability, as well as hydrologic monitoring (water levels and water quality sampling), as required under applicable permits.

- How long after closure will South32 be required to conduct hydrologic monitoring?

TSF2 Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS: Section 2.4.1.5 on page 2-31 states, "In addition to the 26 exploration drill pads shown on Figure 2-1, there would be an additional set of drill pads (approximately 17 total) within the footprint of the future TSF2 and the TSF2 UDCP disturbance. These exploration boreholes would be advanced prior to construction of TSF2 and the TSF2 UDCP for the purposes of geotechnical investigation and, if necessary, to further verify the presence of valuable minerals in conjunction with other provided information." And "If the exploration drilling in the area of TSF2/TSF2 UDCP revealed non-mineral characteristics, mill site claims would be located prior to construction and operation of TSF2 and TSF2 UDCP."

- How will sediment controls and resulting runoff, track out and dust be monitored and maintained in the area of TSF2 and the TSF2 UDCP disturbance to prevent soil and contamination from entering Waters of the US, impacting air quality, soil condition, and the respiratory health of the impacted population? Where is the mitigation of these human health impacts addressed?
- What are the criteria to determine if there are valuable mineral or non-mineral characteristics beneath the area of TSF2 and the TSF2 UDCP disturbance? Will the results of the mineral exploration beneath TSF2 and the TSF2 UDCP disturbance be made public to review?
- If valuable minerals are not present beneath TSF2 and the TSF2 UDCP disturbance, how will the design of TSF2 and the TSF2 UDCP differ from the design presented in the PoO if it needs to be located on a mill site claim? What is the potential footprint of a mill site within a mill site claim? Is the footprint of a mill site claim with a mill site less than the footprint of TSF2 shown in the PoO?
- Why are the plans for a potential mill site to be located within TSF2 not provided or discussed in the PoO as review of an additional mill site is necessary for the public to better understand the impacts to Waters of the US, human health and the environment?
- Can South32 Hermosa be operated without TSF2 and the TSF2 UDCP disturbance? Will determination of the valuable mineral or non-mineral characteristic of TSF2 and the TSF2 UDCP disturbance be required prior to start of operations? Will determination of a mill site claim be required prior to start of operations?
- What will be the additional air emissions from the potential mill site on a mill site claim? Have additional mill site emissions been evaluated in the draft or updated ADEQ Air Quality permit? Will the ADEQ allow for an additional mill site considering air quality permit limitations? Have additional mill site discharges to the aquifer been evaluated in the ADEQ Aquifer Protection Permit? Will the ADEQ allow for an additional mill site to be amended to the permit? Section 2.5.7.1 on page 2-54 states, "Note that the description of TSF2 is an initial design, subject to further engineering and permitting refinements and site-specific geotechnical drilling confirmations."
- Why in the PoO is it not discussed where tailings from the Peake Prospect will be stored as the Peake Prospect is planned to be mined by South32 Hermosa?
- This statement misleads the public of what may be the impacts from TSF2 to Waters of the US, human health and the environment. How can the potential impacts from TSF2 be evaluated if the design of TSF2 is not completed?

- How may site specific conditions change the initial design to reduce impacts? What are the criteria to change initial designs and will the public be able to comment on changes to the initial design to evaluate potential impacts to Waters of the US, human health and the environment?

Section 2.5.7.1.2 on page 2-55 states, "The design and operation of TSF2 will comply with the GISTM, striving to achieve the ultimate goal of zero harm to people and the environment, with zero tolerance for human fatality, following guidelines on the rights of project-affected people, use of an integrated knowledge base, risk-based design and operation, governance, emergency response, and access to information."

- How will complying with GISTM help achieve goals and provide examples of how GISTM failed to achieve goals? How can complying with GISTM prevent impacts to human health and the environment due to accidents, earthquakes, or extreme weather events?
- The current APP only requires one conceptual point of compliance well and is the basis for a current lawsuit.
- Can South32 Hermosa provide to the public the criteria used to evaluate the ultimate goal of zero harm to people and the environment to better understand what South32 considers acceptable impacts to human health and the environment?
- Can South32 Hermosa provide to the public the guidelines on the rights of project-affected people to better understand what South32 Hermosa considers acceptable impacts to human health and the environment?
- Can South32 Hermosa provide to the public the policy for "access to information" mentioned in the PoO statement above to better understand what information South32 is considered public so the public can evaluate the impacts to human health and the environment?
- Site-specific baseline data, required by NEPA, has been requested by the public including by the advisory panel to South32 Hermosa but data such as water levels, water quality and groundwater chemistry has not been shared with the panel or the public. Why has South32 not provided the panel the information they requested so they can better understand the impacts to human health and the environment?

Section 2.5.7.1.2 on page 2-56, the table states, "Peak flow: 100-yr/24-hr storm (BADCT); 100-yr/72-hr storm (ANCOLD)."

- What will be the impacts from a release from TSF2 to human health and the environment from a storm which exceeds the 100-yr/24 hour event and overflows internal containment structures?

Section 2.5.7.1.3 on page 2-56 states, "Upon approval of this PoO, a geotechnical investigation would be conducted within the footprint of TSF2 in order to confirm geotechnical parameters to inform the final design of TSF2. The proposed geotechnical investigation includes 17 boreholes and test pits (locations shown on Figure 2-20)."

- What will be the impacts to human health and the environment from the geotechnical investigation and construction of TSF2, specifically from dust and stormwater?
- Stormwater releases of contamination which exceed limits have been reported to the ADEQ suggesting current methods to control stormwater are not sufficient to control the release of contamination to the environment from South32 Hermosa. This is especially concerning for lead which is present in the soils near the location for TSF2 which is near the location of the Lead Queen Mine and other mines.

Section 2.5.7.2.1 on page 2-63 states, "Trafficability (the ability for tailings haul trucks to drive on top of the tailings in TSF1 or TSF2)— trucks are not able to transit on overly wet tailings and would get stuck, thus identifying any off specification tailings that have been inadvertently placed."

- How will the generation of dust and track out of contamination by trucks in TSF1 or TSF2 be prevented to protect human health and the environment?
- In the event of a stuck haul truck, how will the generation of dust from ore in the bed of the truck be controlled and how will the track out of contamination by the stuck truck be prevented to protect human health and the environment?

Section 2.5.7.2.1 on page 2-63 states, "While mining and beneficiation of sulfide ore occurs, filtered tailings would be loaded into haul trucks from the sulfide beneficiation facilities on South32 Hermosa private land and trucked to TSF2."

- How will the generation of dust and track out of contamination by trucks in TSF1 or TSF2 be prevented to protect human health and the environment?

Section 2.5.7.2.1 on page 2-64 states, "The settlement monuments would be surveyed to establish the initial crest elevation and periodically thereafter as part of the operational monitoring program to determine if the TSF2 perimeter road/embankment is experiencing settlement that might impact containment."

- What will be the impact to human health and the environment in the event of containment failure?
- How will releases from failed containment be cleaned up and how will the containment be repaired and monitored to prevent future failure? Section 2.5.7.2.1 on page 2-65 states, "TSF1 is permitted to accept other materials aside from tailings, and it is anticipated that TSF2 would be permitted under an applicable APP in a similar manner."
- This is a misleading statement to the public as the current APP is in Arizona Superior Court and an APP for TSF2 will likely be contested in court too. Section 2.5.7.2.3 on page 2-65 states, "In addition, the TSF2 UDCP is designed to contain stormwater runoff and direct precipitation over the pond area from the 100-year/72-hour storm event while maintaining a minimum of 1.64 feet (0.5 meter) of freeboard. This provision satisfies South32 Hermosa requirements to comply with industry standards."
- What is the probability that a precipitation event which exceeds the 100-yr/72- hour storm event will occur? What will be the impacts to human health and the environment in the event of a precipitation event which exceeds design parameters for TSF2?
- How will such a failure be remediated during operation of the mine? How will such a failure be remediated after closure of the mine?

Section 2.5.7.2.3 on page 2-66 states, "The pipeline utilized to transfer water from TSF2 UDCP to WTP2 would be buried and designed to minimize impact to USFS property. Pipeline alignment would typically follow the road alignment for easy maintenance and to minimize disturbance."

- How will this pipeline be maintained and monitored to prevent the release of contamination and impact human health and the environment?

Section 2.5.7.4 on page 2-69 states, "After completion of TSF2, the appropriate waste rock may be used as armoring of the exposed face of TSF2 to prevent stormwater and wind erosion, for other construction uses around the Project, or placed in TSF1 or TSF2 when NPAG stockpiles on South32

Hermosa private land are at design capacity. At closure the NPAG waste rock would also be used for the closure cover on the top of TSF1 and TSF2."

- How will the concentration of contaminants in and on the waste rock used across the site for erosion control be determined to prevent mobilization of contaminants from the waste rock into the Waters of the U.S. and to protect human health and the environment?

Section 2.5.7.4 on page 2-69 states, "After completion of TSF2, the appropriate waste rock may be used as armoring of the exposed face of TSF2 to prevent stormwater and wind erosion," and later that, "The armoring berms are intended to decrease the potential for wind and water erosion of the exposed external tailings slopes."

- These statements are not consistent and mislead the public as to how much erosion will occur from TSF2, during storm events or extreme wind events, how will opacity be measured and mitigated. What are the potential impacts of wind and stormwater erosion to Waters of the U.S., human health, and the environment?
- How much loss of tailings mass due to stormwater and wind erosion will occur before armoring and after armoring?
- What mass of contamination will be mobilized by stormwater and wind erosion from TSF2 with and without armoring?

Section 3.4.2 on page 3-7 states, "A redundant pumping system would be installed in the UDCP for use during emergencies or maintenance, reducing potential for discharge of untreated water."

- What will be the impacts from discharge of untreated water in the event of equipment failure or human error? How long will the discharge of untreated water persist if all pumps fail due to a lightning strike, power surge or power failure and need to be replaced?
- What is the potential for discharge of untreated water with one pump and how much is that potential reduced with a redundant pumping system? Will a third pump system be necessary to protect Waters of the US, human health and the environment?

Section 3.4.2 on page 3-7 states, "Lined, dry-stack facilities reduce the potential for seepage because of the use of filtered tailings and have a reduced risk of failure compared to traditional slurry tailings facilities. The design of a lined facility allows the seepage collection system to capture any seepage or stormwater contacting the tailings for routing to the UDCP for treatment by WTP2, reducing the risk of discharge from seepage or contact stormwater to the aquifer."

- Both TSFs should be double lined, as required for landfills, to truly reduce the risk of discharge from seepage or contact stormwater to the aquifer.

Appendix B on page B-2 states, "These structures may include armoring to minimize erosion and sediment transport as needed."

- How will the need for structures to be armored be determined?
- How will opacity of fugitive dust be measured to determine the need for mitigation.
- How much erosion and sediment transport will occur prior to structures being armored?
- How much erosion and sediment transport will occur after structures are armored, and how will these controls be measured and evaluated, as required?

Appendix B on page B-5 states, "Possible controls include wattles, silt fences, sand bags, berms, temporary sediment basins, benched slopes, soil binders, erosion control blankets or mats, slope transitions, slope drains, check dams, and stabilized vehicle ingress/egress (rock pads).

- What is the criteria for selecting these structures and how will their effectiveness be evaluated to protect Waters of the U.S. and prevent erosion of contaminated soil to protect human health and the environment?

Figure B1 shows several design features for TSF2 including four 36-inch diameter culverts which appear to extend from TSF2, under the perimeter road to outside TSF2.

- What is the purpose of these culverts extending from TSF2 which appear to bypass the catchment system?
- What are the impacts of stormwater flow from TSF2 through the culverts to Waters of the US, human health and the environment?

Accidental Impacts Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.3.2 on page 2-37 states, "In the event that an accident occurred and oxide ore was released, an emergency response and clean-up crew would be mobilized. Material would be contained and removed with guidance from any applicable regulators, including the Forest Service, if occurring during transportation across NFS land."

- What are the plans or guidance documents from any applicable regulators for emergency response and clean-up to prevent impacts from discharge, runoff, overflows, track out and dust to Waters of the US, impacts to air quality, impacts to soil, and to protect human health and the environment?
- Why are the public and private emergency response and clean-up crews not identified in the PoO? Will South32 Hermosa emergency response and clean-up crews be available to work on public and private land not owned by South32?
- Has it been determined which emergency response and clean-up crews will be responsible for each mile of the haul truck route?
- What is the haul truck route, where will the contaminated ore be transported and what communities will the contaminated ore be transported through?
- Will communities be informed before the transportation of contaminated ore passes through their communities?
- What is the anticipated response time for an emergency response and clean-up crew for each mile to the haul route? Are there enough crews to manage multiple emergencies?
- Is there clear guidance as to whether South32 or public agencies will manage emergency responses?
- Will South32 or public agencies be responsible for the cost of clean-up crews?
- Will South32 or the public be responsible for the public cost of additional emergency response and clean-up crews added because of mine operations?

Section 2.5.3.2 on page 2-37 states, "Generally speaking, a spill of ore material would not be difficult to mitigate. As a solid material, migration from the accident site would not occur and simple excavation and removal of the spilled material would remedy any potential exposure risks to humans or the environment."

- These are very questionable statements regarding spill mitigation, and accidental releases, and fails to consider dust releases from accidental spills. Difficulties in mitigating spills are likely in heavily vegetated canyons, residential areas, and other challenging topographic, structural, social, and culturally sensitive settings.
- Spill of ore material into difficult terrain including steep, deep gulches along Forest Service roads, will present difficult access challenges for crews due to access issues and will likely prevent effective, timely and complete mitigation and that stormwater can further distribute contamination.
- What are the plans or guidance documents from any applicable regulators for emergency response and clean-up in difficult to access areas such as areas along Forest Service roads to prevent impacts due to traffic accidents to Waters of the US, impacts to soil, and to protect human health and the environment?

Section 2.5.4 page 2-41 states, "Diesel fuel will be delivered via Harshaw Road (before Primary Access Road construction) or via Primary Access Road as described in Section 2.5.11. An estimated 2 to 5 fuel deliveries will happen per day, with fuel delivery trucks typically range from 4,500 to 7,500 gallons in size."

- Spill of fuel into steep, deep gulches along Forest Service roads will present difficult access challenges due to access issues likely preventing effective, timely and complete mitigation.
- What are the plans or guidance documents from any applicable regulators for emergency response and clean-up in difficult to access areas such as areas along Forest Service roads to prevent impacts due to traffic accidents to Waters of the US, impacts to soil, and to protect human health and the environment?

Section 2.5.5.1 on page 2-42 states, "To the extent practicable, water is captured for reuse and management to maximize recycling and minimize the need for raw water input consistent with South32 Hermosa's commitment to water sustainability."

- This mine requires dewatering of the mountain and pumping of groundwater is not limited and the draft discharge permit allows for the discharge of 6.48 million gallons per day. These facts are not consistent with claims of water sustainability and the statement in the PoO is propaganda meant to mislead the public as to the impacts from South32 Hermosa.

Section 2.5.6.1.3 on page 2-53 states, "While the specific containers have not been selected, such containers are commercially available and widely used in train, ship, and truck transport for a variety of goods, including mine products and grain." And, "This eliminates spillage, dust, and reduces the potential release of material during an unexpected event or accident during transportation."

- This statement in the PoO is misleading the public as containers which have not been selected cannot be evaluated for spillage, dust, and the potential for release during an accident. Why are no references to container specifications provided in the PoO to be evaluated by the public to access potential impacts to health and the environment?
- Because containers open and close and rely on a seal which can fail, all containers spill and emit dust to some extent. If not properly maintained, seals can fail. Why is there no mention of maintenance and operation of container seals to prevent seal failure during transportation?
- For South32 Hermosa to claim, in the PoO statement above, that spills and dust will be eliminated is misleading the public as to the potential impacts to health and the environment from transportation. How will the containers be monitored to determine if spillage or dust occurs on public roads?

Assuming the containers are sealed and don't leak, the transportation method at a minimum will cause significant track out, embedded in the tires and undercarriages of transport vehicles as they move through the tailings of the mine site and onto paved, public roads. Will public roads be monitored and tested for spillage, will track out levels be measured, and will resulting toxic dust be mitigated to reduce the impact to US waters, human health, wildlife and flora sustainability and impacts to threatened and endangered species, as the dust related to the transportation of ore, contaminates the mountain, the community, the airshed and watershed?

How will Waters of the US, human health and the environment be protected from spillage and dust related to the transportation of contaminated ore?

- These are very questionable statements regarding dust, spillage, and accidental releases. Crushed manganese ore will be transported to "distal" processing plant instead of cobble-sized rock as was described many times in panel and public presentations. The roads supporting this ore transportation are not maintained to support the level, or weight of traffic proposed. The traffic alone will cause a public hazard, as evidenced by the deterioration of Harshaw road from the exploratory operations to date.

Section 2.5.6.1.4 on page 2-53 states, "All reagents would be transported to the Project in sealed containers, in compliance with any appropriate regulations."

- What will be the impacts to human health and the environment when there are accidents associated with transportation of the reagents, on public roads not designed to transport heavy vehicles or high traffic volume?
- Will there be adequate emergency response if there is an accident in difficult terrain such as along Alum Gulch, is it even possible for a transportation vehicle expected to be the size of a Tractor trailer rig ~ 60' to traverse the existing road?
- What are the plans or guidance documents from any applicable regulators for emergency response and clean-up to a reagent spill to prevent impacts from discharge, runoff, overflows, track out and dust to Waters of the US, impacts to air quality, impacts to soil, and to protect human health and the environment?
- Why are the public and private emergency response and clean-up crews not identified in the PoO? Will South32 Hermosa emergency response and clean-up crews be available to work on public and private land not owned by South32? How will impacts to State, County and City emergency response capability be compensated? How will this utilization impact the residents health risk and availability of emergency resources.
- Has it been determined which emergency response and clean-up crews will be responsible for each mile of the reagent transport?
- What are the reagent transport routes and what communities will the reagents be transported through.
- Will communities be informed before the transportation of reagents passes through their communities?
- What is the anticipated response time for an emergency response and clean-up crew for each mile of the reagent haul route? Are there enough crews to manage multiple emergencies?
- Is there clear guidance as to whether South32 or public agencies will manage emergency responses?
- Will South32 or public agencies be responsible for the cost of clean-up crews?
- Will South32 or the public be responsible for the public cost of additional emergency response and clean-up crews added because of mine operations? Section 2.5.10.1 on page 2-73 states, "South32

Hermosa will conduct emergency response and contingency planning with appropriate agencies, and these results will be incorporated into emergency response plans."

- What is the plan for land treatment to reduce the risk of wildfire?
- The US EPA has identified wildfire as a significant impact to human respiratory health. How will the US Forest Service address the increased risk of wildfire in the Patagonia mountains as a result of mine operations? How many additional fire fighters are budgeted to address this increased risk, of one of the greatest risks to human health, wildfire smoke?
- What are the increased risks of wildfire associated with construction, operation, and closure of South32 Hermosa?
- What are the increased risks of wildfire associated with traffic associated with South32 Hermosa?
- If the mountain is dewatered and current vegetation is the source of fuel for future fires, will the Forest Service be able to control a wildfire in the Patagonia Mountains? What is the added risk of wildfire in the Patagonia Mountains due to dewatering activities by South32 Hermosa? What is the added risk of smoke damage to property and impacts to human health and the environment from the additional risk of wildfire in the Patagonia Mountains due to dewatering activities by South32 Hermosa?
- What are the potential impacts to the mine if a wildfire occurs in the Patagonia Mountains? Section 2.5.10.1 on page 2-73 states, "Adequate fire control and prevention equipment will be available throughout the Project."
- What Perfluorooctanoic acid (PFOA) or perfluorooctanesulfonic (PFOS) acid containing products or microplastic containment have been or will be used at South32 Hermosa? The use or release of PFASs must be fully analyzed and any release must be prevented.

Referring to Table C1, Materials and Supplies Anticipated for Plan Operations in Appendix C on pages C-1 through C-2 lists the chemical will be on site:

- Why is the list incomplete as cement and type of cement is missing for example?
- All chemicals used on site must be listed and along with their Safety Data Sheet (SDS) so one can determine health and reactively issues with other chemicals, long term effects to the environment, etc., is this the policy of South32 Hermosa?
- Will there be any PFOS chemicals brought to the mine site?
- There is no detailed discussion on the fate of the chemicals once mixed together with other chemicals, and the possible reactions-leaching characteristic once mixed and placed in the stacked tailings and/or cement paste backfill? Will such fate and reaction details be provided to employees and the public?
- Will any of these chemicals have any negative effects or impacts on groundwater once dewatering activities stop?
- Will any of these chemicals have an adverse effect once exposed to acid water (e.g.: zinc cyanide, ferrous cyanide)?

4.2 on page C-10 Hazardous Material Assessment states "The purpose of hazardous materials management is first to identify potential hazardous materials. Once hazardous materials are identified, an assessment of potential contamination risks would be completed. This evaluation should identify the measures needed to ensure proper transport, storage, use, transfer, and disposal measures for hazardous materials to minimize the risk of adverse impacts to human health or the environment."

- Why is the hazardous material assessment plan not provided in the PoO for review as it is important

to better understand impacts to Waters of the US, human health and the environment? The mine must know what hazardous materials will be delivered to South32 Hermosa. Will hazardous materials plan be developed and provided for review by USFS and the public?
- Why is there no traffic plan discussed or presented in the PoO?

Cement Paste Backfill Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 1.3.2.4 on page 1-4 states, "During the sulfide beneficiation, approximately half of the tailings will be mixed with cement and used as a cemented paste backfill underground. Cemented paste backfill is described in more detail in Section 2.5.7.3."
- Cemented paste underground backfill must have the same hydraulic conductivities as the original parent material to function and convey future groundwater recharge as it does now naturally. Section 1.3.2.4 on page 1-4 states, "TSF1 has capacity for less than 10 years of placement of waste rock and tailings but does not have adequate capacity to accommodate all production tailings for the Project. A separate lined dry-stack TSF is proposed on adjacent NFS land on unpatented claims (known as TSF2)."
- Can TSF1 be expanded for extra capacity, to avoid the need for tailings on public lands? Given the significant impacts from South32 Hermosa, can mining be limited to prevent the need for TSF2? Can tailings for TSF2 be transported and stored on patented claims or private land outside South32 Hermosa?

Section 2.3.4 on page 2-24 states, "Cemented Paste Backfill. The cemented paste backfill provides structural support for the underground mine workings and binds the tailings in a structural mass that has substantially reduced chemical reactivity."
- Why does the PoO contain no information in support of this statement?
- What is the mixture of the cemented backfill?
- Will fly ash or another type of pozzolan be used in cemented backfill admixture? If so, what is fly ash toxicity and what are the merging issues associated with fly ash? What is the compressive strength of the cemented backfill?
- Where is the testing data and the engineering report that the cemented backfill provides structural support needed to prevent cave-ins and surface collapse?
- Where is the testing data and the engineering report that states and shows the cemented paste backfill has reduced chemical reactivity?
- If cylinder strength testing was conducted by South32, was the cylinder strength testing with fresh water or was it tested with the predicted mill solution water with all the chemicals and reagents?
- What testing methods were used to determine chemical reactivity?
- What are the impacts if chemical reactivity of the cemented paste backfill is not reduced as estimated or only partially reduced?
- Where is the supporting test data the cemented paste backfill will reduce chemical reactivity or acid rock drainage?
- What will be the impact on the hydrogeology of the mountain resulting from the paste backfilling operation? Will flow to springs, seeps and habitat which are dependent on shallow groundwater be permanently impacted due to changes in the hydrogeology resulting from paste backfilling operation?

- How will the reactivity be tested and what are the specific thresholds for "unreactive" and "substantially reduced chemical reactivity"?

Section 2.5.3.1 on page 2-35 states, "Primary stopes will be mined first, and when complete, will be filled with cemented paste backfill or waste rock."

- How will stability of these filled stopes be monitored and maintained during operation and closure?
- How will the stability of these filled structures change over time due to reaction with groundwater? Was sensitivity analysis done when calculating the stability of the filled stopes and what are the confidence intervals for the stability calculations?
- What is the potential for earthquakes at South32 Hermosa? Considering a regional earthquake may occur, what is the probability of stability failure associated with open or filled stopes during operation and closure?

Section 2.5.7.3 on page 2-69 states "Cemented paste backfill is an engineered backfill made of tailings, cement, and water designed for strength to make future excavations safe and to minimize the possibility of ground subsidence."

- Why is the documentation to support this statement (testing, engineering report, etc.) not provided in the PoO?

Section 2.5.7.3 on page 2-69 states "Cemented paste backfill will be mixed in three surface paste plants that will be on South32 Hermosa private land and delivered underground via boreholes on South32 Hermosa private land using a hydraulic pump."

- Figure 2-1 on page 2-3 only shows two backfill plants, where is the third backfill plant located?

Section 2.5.7.4 on page states "A portion of the waste rock will be managed underground as rock backfill where geotechnically appropriate to do so. Rock backfill will only be used in situations where the void being filled will not be exposed again. In this case the void will be surrounded on all sides by either cemented paste backfill or the in-situ rock mass."

- Will this waste rock be characterized as PAG or NPAG? What tests will be conducted to determine this?
- If PAG, how will acidic water be prevented?

Section 2.5.7.3 on page 2-67 states, "After extraction of the underground material, significant mined voids in the sulfide and oxide portions of the orebody beneath both South32 Hermosa private land and NFS land will be filled with cemented paste backfill or waste rock in order to minimize the possibility of subsidence."

- What is the potential for groundwater to have a negative chemical reaction, such as the dissolution of cement, with the cemented paste backfill? Can these chemical reactions affect the stability of mined voids?
- Will such a reaction occur quicker if the groundwater has a low pH? If cement is dissolved creating voids in the backfill, will there be subsidence issues?
- What are the results and sensitivity analysis of the study of cement/water/waste ratio vs backfill strength?
- If there is a problem with the cement paste backfill process discovered after installation of the cemented paste backfill, such as a cement/water/waste ratio error due to instrument failure, how will

this issue be remediated to prevent subsidence issues?

- What is the potential for localized earthquakes associated with the cement paste backfill process, especially considering reactions with the cement paste backfill and groundwater? What would be the impact if all the mined voids failed at the same time due to a regional earthquake?
- What is the risk of subsidence to public and private land associated with South32 Hermosa?
- What would be the impact to containment structures and other structures designed to protect human health and the environment due to local and regional earthquakes during operation or after closure of South32 Hermosa?
- Cemented paste underground backfill must have the same hydraulic conductivities as the original parent material to function and convey future groundwater recharge as it does now naturally.

Section 2.5.7.3 on page 2-68 states, "The benefits of cemented paste backfill include: reducing the risk of surface subsidence."

- This statement is misleading or indicates the risk of subsidence has been calculated for different scenarios. What is the risk of subsidence without using cemented paste backfill?
- What is the risk of subsidence using cemented paste backfill? What is the risk of subsidence if the cemented paste backfill fails due to chemical reaction issues and/or earthquakes?
- Where are the plans and emergency procedures to address heavy rain and flooding events common to southern Arizona, with regards to subsidence possibility?
- What structures associated with South32 Hermosa could fail if subsidence occurs and what are the potential impacts to US waters, human health, the environment and threatened and endangered species?
- Any change to the understructure, will impact the natural waters of the US, human health and threatened and endangered species that must be fully analyzed and prevented.

Table 2-10 on page 2-28, U.S. Environmental Protection Agency - Underground Injection Control Permit states "Permit for Class V wells for injection of non-hazardous fluids into or above underground sources of drinking water. This permit may be required for the cemented paste backfill. Note that the ADEQ is in the process of taking over this program."

- What agency is responsible for South32 Hermosa underground injection permits and can the public comment on permit applications?
- When is it anticipated the ADEQ will take over the Underground Injection Control Permit program for Class V wells? Why is the ADEQ, at the expense of Arizona taxpayers, intending to take over the Underground Injection Control Permit process when the EPA is currently staffed and funded to oversee the program?

Does the ADEQ have the staff and expertise to review permits and provide oversight for the underground injection control program?

- What are the potential impacts to human health and the environment for exceedances or violations to the underground injection control permit which the ADEQ may not be capable of addressing due to staff issues or issues addressing regulation enforcement in the US Forest? An example of such an issue is an exceedance of total lead in a stormwater discharge sample which has been reported to the ADEQ.
- Why is there no supporting data or testing data in the PoO on the existing tailings to determine if acidic water will be produced? What are the implications if acidic water occurs in the old tailings?

- Why is there no testing or data supporting the stacking tailings and/or cemented paste backfill will or will not produce acidic water? What will be the impacts to groundwater and stability of the mined voids if acidic water occurs in the paste backfill?
- Why is there no acid-base accounting supplied for either the stacked tailings or the cemented paste backfill? What are the implications of not understanding the acid-base accounting on what is mined?
- Will South32 Hermosa list all chemicals used on site along with their Safety Data Sheet (SDS) so one can determine health and reactively issues with other chemicals and long term effects to human health and the environment?
- Will there be any PFOS chemicals brought to the mine site?
- Why are there no details in the PoO on the fate of the chemicals once mixed together with other chemicals, and the possible reactions-leaching characteristic once mixed and placed in the stacked tailings and/or cement paste backfill? Will such fate and reaction details be provided to South32 Hermosa employees and the public?
- Will any of these chemicals have any negative effects or impacts on groundwater once dewatering activities stop?
- Will any of these chemicals have an adverse effect once exposed to acidic water (e.g.: zinc cyanide, ferrous cyanide)?
- What will be the mixture of the cemented backfill?
- Will fly ash or another type of pozzolan be used in cemented backfill mixture?
- What is the toxicity and emerging issues associated with fly ash?
- What is the compressive strength of the cemented backfill?
- Where is the testing data and the engineering report that the cemented backfill provides structural support needed to prevent cave-ins and surface collapse?
- Where is the testing data and the engineering report that states and shows the cemented paste backfill, "substantially reduced chemical reactivity" as indicated on page 2-24?
- Was the cylinder strength testing done with fresh water or was it using the predicted mill solution water with all the chemicals and reagents?
- What testing methods were used to determine chemical reactivity?

Section 2.5.7.4 on page 2-69 states, "A portion of the waste rock will be managed underground as rock backfill where geotechnically appropriate to do so. Rock backfill will only be used in situations where the void being filled will not be exposed again. In this case the void will be surrounded on all sides by either cemented paste backfill or the in-situ rock mass."

- How do the properties of rock backfill differ from cemented paste backfill?
- What are the risks using rock backfill if geotechnical calculations are not correct or site-specific conditions are not evaluated properly?
- Considering the risk of subsidence and earthquakes, when is it appropriate to use rock backfill?

Section 3.4.2 on page 3-7 states, "At local scales, groundwater flow in bedrock is controlled by fracturing associated with geologic structure, and in some cases dissolution cavities. In addition to the preferential flow in fractures and dissolution cavities, historic underground mine workings also likely serve as conduits for localized groundwater flow."

- This combination of fracturing, dissolution cavities, and igneous intrusions is exactly why the hydraulic conductivity of the backfill paste is so important.

Section 5.3.3.4 on page 5-4 states, "Permanent underground workings, including the shafts, decline, vent raises, and development tunnels, may not be backfilled but would be permanently sealed with an engineered cap or plug. Any areas being fully abandoned will have their access permanently barricaded. Upon closure, roughly 20% of the underground workings South32 Hermosa Critical Minerals Exploration and Mine Plan of Operations would remain open, with the rest filled with cemented paste backfill or rock fill.

- How will the 20% of these large voids remaining open underground alter the natural hydraulic conductivities and mountain front and mountain block recharge functions?

Section 5.3.3.4 on page 5-5 states, "Equipment typically left underground could include shaft infrastructure, station infrastructure, the crusher, ore bins and conveyors, shop cranes and lifts."

- How will all/any of the equipment left underground alter the natural hydraulic conductivities, mountain front and mountain block recharge functions, and water quality?

Acidic Water and Contamination Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.3.2.1 on page 2-19 states, "Prior to any mining under NFS land, there will be multiple years of underground exploration, development, and sulfide ore mining under South32 Hermosa private land."

- The PoO contains very little facts or data to confirm whether acidic water will occur or not within the stacked tailings and/or the underground workings. Why is acidic water not discussed in the PoO?
- Why is there no discussion in the PoO of how to prevent acidic water from the underground workings from contaminating groundwater or surface waters to protect Waters of the US and human health and the environment?

Section 2.3.2.1 on page 2-19 states, "Project activities on private land will also include the development of underground infrastructure prior to the use of production drifts and stopes during underground mining." And, "Underground infrastructure associated exclusively with the oxide portion of the orebody includes sumps and pumps for underground water management (major pumps around Level 4040 and 3200), secondary maintenance bays (around Level 4700), and a powder magazine (around Level 4200)."

- How will releases and leaks of contamination in the underground infrastructure be identified and remediated?
- How will acidic water from the underground workings be prevented from contaminating groundwater or surface waters to protect Waters of the US and human health and the environment?

Section 2.3.4 on page 2-24 states, "The tailings remaining after the beneficiation of sulfide ore contain unrecovered sulfides, acid-neutralizing carbonates, residual pyrite (iron sulfide, FeS2), and other chemically unreactive materials."

- Why is the reactivity of acid rock drainage producing minerals of the Taylor and Clark deposits not provided in the PoO?
- Why is there no discussion of carbonate armoring in the PoO which reduces the neutralizing

capabilities of carbonates? What are the chemical implications for chemical weathering of armoring and what are the rates of coupled dissolution- precipitation reactions?

- Why is there no sulfide balance in the PoO on the mined ore, what is removed and what is placed on the stacked tailing or in cemented paste backfill? What are the implications of not understanding the sulfide balance of the mined ore?
- Why are there no supporting theoretical calculations in the PoO which states whether or not acidic water will occur in the stacked tailings and/or the cemented backfill. What are the implications if acidic water occurs in the stacked tailings and/or the cemented backfill?
- Why are there no supporting data or testing on the existing old tailings on whether or not acidic water will be produced? What are the implications if acid water occurs in the old tailings?
- Why is there no testing or data in the PoO supporting the stacking tailings and/or cemented paste backfill will or not will produce acidic water? What will be the impacts to groundwater and stability of the mined voids if acid water occurs in the paste backfill?
- Why is there no acid-base accounting supplied in the PoO for either the stacked tailings and the cemented paste backfill. What are the implications of not understanding the acid-base accounting of the mined ore?

Section 2.3.4 on page 2-24 states, "The characterization of rock and tailings associated with the Project began in 2016, continues to the present, and will continue throughout the life of mine. Data have been gathered specifically to inform material management strategies to avoid negative impacts associated with: acid weathering of sulfide mineral- containing rock and tailings (known as acid rock drainage), and metal leaching."

- Why is the test data to support this statement not in the PoO?
- Will this test data be shared with the public to better understand how to protect the Waters of the US, human health and the environment?
- How much of the rock and tailings are characterized by testing and how much of the rock and tailings are not tested but considered characterized? How much material does South32 anticipate to not be characterized correctly based on sample frequency?
- If there is an error in characterizing the rock and tailings, how will South32 Hermosa identify and remediate the mischaracterized rock and tailings to protect Waters of the US, human health and the environment?

Section 2.3.4 on page 2-25 states, "Methods used to characterize materials include: • Acid-base accounting, including acid-generation potential, neutralization potential, neutralization potential ratio, and net neutralization potential • Net acid-generating pH and analysis of metals released during testing • Synthetic precipitation leaching procedure • Meteoric water mobility procedure • Humidity cell testing • Leaching Environmental Assessment Framework [LEAF] diffusion test (U.S. Environmental Protection Agency Method 1315)"

- Why are these methods not presented in the PoO?
- Will these methods be shared with the public to protect the Waters of the US, human health and the environment?

Section 5.3.3.4 on page 5-4 through 5-5 states "Upon closure, roughly 20% of the underground workings would remain open, with the rest filled with cemented paste backfill or rock fill. "

- What is the plan for preventing acid water in the underground deposits and workings?

- What is the plan for preventing groundwater and near surface water from being contaminated with acid water?
- Sulfide oxidation occurs in the aerobic, anoxic, and/or anaerobic modes at different temperatures. Once the deposits are opened sulfide reducing bacteria will populate. What will stop this acidic water from being generated and migrating into the aquifer?
- Track out will occur at the property boundaries by vehicles, environmental releases, wind, etc. What is preventing acidic water from occurring with the track out and how will USFS lands be remediated if contamination occurs?

RIBS and Recharge Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 1.3.2.6 on page 1-5 states, "Part of the treated water would also be routed to RIBs proposed on NFS land, which would be located where recharge would benefit the aquifer by reducing drawdown."

- Why is this not discussed in the PoO document as it is an important element of the water management plan?
- Why are the predicted drawdown results from the NewFields models (regional and mine) not shown, presented and/or discussed in the PoO?
- How is this benefit to the aquifer demonstrated?
- Will monitoring wells be used to evaluate and manage the RIBs and will this data be available to the public?
- What are the impacts of the RIBS on private land, i.e., flooding and water quality?
- Why are proportions of the discharge going to each of RIBs or Harshaw Creek not disclosed? To function as designed, the rock underlying the RIBs will have to be fractured to have rapid infiltration rates into the bedrock aquifer. Do bedrock aquifers typically infiltrate rapidly?
- Long-term dewatering will eventually reduce/eliminate mountain-front groundwater recharge which will decrease groundwater gradients & flow rates, lower water tables and water levels in wells levels, and worsen any existing water shortages.
- Dewatering reduces/eliminates perennial (base) flows in streams and the isotopes studies have shown mountain front/block recharge is the origin of perennial stream reaches.
- Dewatering will result in riparian habitat losses, will result in less vegetative ground cover increasing peak flows and soil erosion and that climate change accelerated and exacerbated.

Section 2.5.5.2.2 on page 2-48 states, "Recharge of regional groundwater will occur by passive recharge through the channels of Alum Gulch (from the discharge from WTP1) and Harshaw Creek (from the discharge from WTP2). To reduce the impacts associated with orebody depressurization which also results in lowering groundwater elevations within the aquifer, both RIBs and passive recharge from natural channels will be utilized to achieve broader distribution of recharge locations. RIBs located on NFS land are anticipated to be an effective method of additional recharge."

- What is the basis for these statements as it seems to be an exorbitant claim as the groundwater being pumped took orders of magnitude longer in the time to recharge than the duration of pumping?
- A model which includes the connections between surface water and groundwater is required to make such a statement. Does this model exist, and will it be made available for review by the public to

better understand impacts to human health and the environment?

- At several proposed RIB locations, water will infiltrate into shallow stream bed deposits then flow laterally on top of bedrock generally following the tributary to Harshaw Creek where the water from the RIBs will join with the discharge to Harshaw Creek. Other proposed RIB locations are outside the Cienega Creek groundwater basin and will likely flow on top of bedrock away from the area of drawdown impacts into San Rafael Valley. Significantly more water will flow horizontally on top of bedrock and become surface water than will infiltrate into the bedrock aquifer to reduce drawdown impacts. Why are proportions of the discharge going to each of RIBs or Harshaw not discussed in the PoO?
- The statement quoted from the PoO above is misleading the public as to the impacts of South32 Hermosa.

Section 2.5.5.2.2 on page 2-48 states, "Six alternative RIB locations are shown on Figure 2-1; it is anticipated that two of these locations would be selected and constructed as part of Plan Operations (one to the east of the Project and one to the south of the Project. The excavated basins would be filled with water to between 12 and 18 inches in depth (see Appendix E)."

- The location of some the RIBs suggest there may be impacts to private property downstream of the RIBs.
- Impacts may include degradation of drinking water quality as the contamination such as lead and arsenic are permitted to exceed drinking water standards.
- There may be surface water impacts as the water infiltrated from the basin may mobilize existing contamination in the aquifer or in stream deposits as the recharged water will likely become surface water flow.
- There may be additional flooding in areas along the drainages downstream of RIBs. What has been done to better understand RIB impacts on flooding, human health and the environment?
- Will point of compliance wells be installed and monitored as required by state law? This is a concern since there is no Point of Compliance well in Harshaw creek between the Outfall 2 and the aquifer used by the Town of Patagonia.
- Since the RIBs would each be about 18 surface acres, the shallow depths (12" and 18") will likely result in RIBs functioning more like evaporation ponds in our arid climate and with higher climate change temperatures, even higher evaporation rates can be expected, resulting in further reduced infiltration rates.
- The actual permeability of selected basin locations must be verified since this area is predominately underlain by bedrock.
- A contingency discharge plan with adjusted distributions between proposed RIB locations and Harshaw Creek, or more preferable alternative location(s) in Upper Sonoita Creek should be considered in the DEIS as a "back-up" plan in case RIB infiltration rates prove to be insufficient.

Section 2.5.5.2.2 on page 2-48 states, "The multiple recharge basins at each of the two RIB locations (east and south) would ultimately operate in rotation; as some basins are filling, others may be drying, and others would undergo maintenance."

- What will be the impacts to the health of humans and the environment from dust generated during maintenance of the basins?
- How much track out of contamination will occur on public roads by South32 vehicles which maintain the RIBs?

- How will this track out of contamination and dust be identified and prevented from exposing the public from contamination when traveling on the same public roads as South32 vehicles?

Section 2.5.5.2.2 on page 2-49 states, "pipelines would be built to service each RIB."
- How will South32 protect the pipelines from damage such as vehicle accidents?
- How will South32 monitor and maintain the pipelines to prevent leaks and potential flooding associated with a pipeline failure?
- What is the potential for a pipeline failure to mobilize existing contamination which may impact Waters of the US human health and the environment?

2.5.5.2.2 RIBs on page 2- 49 states "Benefits of using the RIBs include a reduction in the aerial extent of drawdown within the aquifer as well as reduction or elimination of impacts to some seeps and springs and groundwater wells in the Patagonia Mountains. In addition, undertaking recharge activities in relatively close proximity to the Project should enhance groundwater recovery within the region after completion of mining and GWM activities" and "The selection of the two strategic RIB locations (one east and one south) was based on preliminary hydrologic modeling and anticipated changes in water table elevation. The identification of three alternative locations within each of the strategic areas (to the east and to the south) allows for more specific siting that would be of the most benefit to regional groundwater conditions, informed by the hydrologic characterization."
- Why are the predicted results from the NewFields regional and mine models not shown, presented and/or discussed in the PoO? What were the predicted results from the NewFields models? What were the predicted results from the NewFields models if the RIBs were added to the model? How do NewFields models results (including RIBs and no RIBs) differ from the preliminary hydrogeologic modeling mentioned in the PoO statement above?
- Why does the PoO document not discuss modeled impacts to seeps and springs and impacts to water levels in wells?
- Why is the preliminary hydrologic modeling not discussed in the PoO as the RIBs are presented as a major component of groundwater management by South32 Hermosa? Will this model used to evaluate the RIBs be available to the public to better understand impacts to Waters of the US, human health and the environment?
- What are the estimates of impacts to seeps, springs and shallow groundwater which supports biodiversity and habitat for threatened species such as the Mexican Spotted Owl and the Yellow-billed Cuckoo? How much critical habitat for threatened and endangered species will be impacted by pumping and other activities by South32 Hermosa?

Section 2.5.11.41 on page 2-83 states "For RIBs, pipelines would be installed in the same road corridor."
- How will the pipelines be protected from storm events, the public, and traffic accidents?

Table 2-10 Permits on page 2-89.
- South32 has not requested the necessary permitting for the proposed RIBs (APP, AZPDES, etc.).
- Why has no annual maintenance plan or operating manual for the RIBs been presented in the PoO?

Section 2.5.5.1 on page 2-43 states, "Discharge of treated water from WTP2 to the RIBs, to actively recharge regional groundwater in key areas to reduce drawdown impacts."

- The statement quoted from the PoO above is misleading the public as to the impacts of South32 Hermosa.
- Pumping is not limited and the RIBs allow for the discharge of pumped water in excess to that permitted to be discharged to Harshaw Creek.
- Use of RIBS can result in additional drawdown impacts as more water can be pumped than is permitted to be discharged to Harshaw Creek.
- At several RIB locations, water will infiltrate into shallow stream bed deposits then flow laterally on top of bedrock within the stream bed deposits in the tributary to Harshaw Creek where the water from the RIBs will join with the discharge to Harshaw Creek.
- Other RIB locations are outside the Cienega Creek groundwater basin and will likely flow on top of bedrock away from the area of drawdown impacts.
- In either case, significantly more water will flow horizontally on top of bedrock and become surface water that will infiltrate into the bedrock aquifer to reduce drawdown impacts.
- Use of the RIBs will likely increase flooding on public and private land and may damage private property and structures.

Section 3.1 on page 3-2 states, "The Project will require far less water than most mines today, and South32 Hermosa is working with the community to explore beneficial reuse of the groundwater that needs to be relocated away from the orebody for safety, including recharge to the aquifer using RIBs to offset the effects of drawdown in the aquifer and potential impacts to groundwater-dependent ecosystems."

- No modeling or other work has been done by South32 or the Forest Service to support the statement, "including recharge to the aquifer using RIBs to offset the effects of drawdown in the aquifer and potential impacts to groundwater-dependent ecosystems," which makes this statement misleading to the public.
- South32 has changed the charter of its public panel to exclude experts in the community from participating in discussions and making recommendations. Other than the panel, how has South32 demonstrated it is working with the community to explore beneficial reuse of groundwater?

Section 3.4.3 on page 3-7 states, "Annual precipitation is anticipated to decrease in future years, while rainfall from specific design storms is predicted to increase. Evaporation is expected to increase due to increases in solar radiation, temperature, and wind speed. The assessment was incorporated into the operational designs for TSF2, the TSF2 UDCP, and stormwater conveyance structures, and for the passive- closure design for TSF2 and the TSF2 UDCP."

- Have predicted changes in precipitation and evaporation been considered in the RIBs design?
- How will flooding impact the RIB structures?

Table 2-10 Permits on page 2-89.

- South32 has not requested the necessary permitting for the proposed RIBs (APP, AZPDES, etc.).
- Why has no annual maintenance plan or operating manual for the RIBs been presented in the PoO?

Modeling Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.3.1 on page 2-17 states, "Groundwater management is necessary to reduce hydrostatic

pressures to allow the development of underground infrastructure and ultimately to allow excavation for exploration and mining from both private land and NFS land."

- Why are the predicted results from the NewFields models (regional and mine) not shown, presented and/or discussed in the PoO?
- What modeling or water balance studies have been conducted by South32 Hermosa and the Forest Service in the area of South32 Hermosa? Why has groundwater modeling and/or a water balance study not been presented by South32 Hermosa and the Forest Service to the public for review to better understand impacts to Waters of the US, human health and the environment? Why has South32 Hermosa not shared the groundwater models for public review?
- What models are being used by South32 and, if so, how often will the model be updated including recalibration to monitoring data? With much shorter computation intervals, has the MIKE SHE model been used as it has better groundwater/surface interaction capabilities than Modflow? Does the US Forest Service understand the interaction of surface water and groundwater and why it is an important concept in the Patagonia area to protect human health and the environment?
- Statements in a Lacher & Prucha report that, "a FULL integrated modeling study is required to assess the concurrent and closely coupled impacts of mine dewatering and long-term discharge to Harshaw Creek" and that the, "complex relationships between groundwater and surface water in this system clearly mandate the use of a fully integrated hydrologic model. No other predictive tool will be able to evaluate the rapid feedbacks between the various hydrologic system components and simulate the transport of chemical constituents within the surface and subsurface flows.".
- Will the fractured rock be carefully analyzed with known faults and thrust zones, or will it be modeled as porous media?
- Will electro-magnetic fly-over mapping be used in the model to accurately represent subsurface geology and the bedrock basement complex?
- Will South32 Hermosa and US Forest Service models be peer reviewed by a third party?
- Do South32 Hermosa models show some groundwater mounding or return flow within the much larger area of dewatering influence? Do models simulate the surface water recharge from discharging at Harshaw Creek? Do the models show any recycle (short circuiting) with the discharge into and along Harshaw Creek flowing back towards the dewatering pumps? Will dewatering create a groundwater mound somewhere downstream?
- What is the modeled cone of depression by discharge volume and by discharge rate over the operating and closure period of South32 Hermosa?
- Why does the NewFields model not differentiate dewatering impacts between the Cienega Creek and Santa Cruz AMA groundwater basins?
- Why doesn't the NewFields model show some groundwater mounding or return flow within the much larger "area of dewatering (draw-down) influence? Doesn't the model simulate the surface water recharge from discharging at RIBs and Harshaw Creek?
- MIKE SHE groundwater model is also the BADCT that should be used for dewatering evaluations, because its simulation capability of surface/groundwater interactions is much better than MODFLOW.

Section 3.4.2 on page 3-7 states, "Conversely, large, low-permeability igneous intrusions (e.g., the porphyry intrusion at Red Mountain, the granodiorite intrusion on west side of the Patagonia Mountains, and the monzonite intrusion at Mount Benedict) are anticipated to impede the flow of groundwater."

- How has it been demonstrated that the intrusions will impede the flow of groundwater? Does the US Forest Service understand water level impacts to the Town of Patagonia presented by South32 Hermosa without 3rd party review have been shown to be minimal based on this assumption that the igneous intrusions between the South32 Hermosa and the Town of Patagonia have a low permeability and are not fractured?
- What is the confidence interval of the permeability estimates for the igneous intrusions and the confidence interval that the unit is not fractured or faulted? Is the permeability of the igneous intrusions considered homogenous for the entire unit?
- If the igneous intrusions are fractured and/or there are unmapped faults present, will these intrusions truly impede groundwater flow and, if not, how will that impact water levels in Town of Patagonia municipal water supply wells?
- What will be water level impacts along the Harshaw Creek Fault, Sonoita Creek and to the Sonoita Creek aquifer downstream of the Town of Patagonia?

3.7.4 on page 3-14 states "To further reduce regional groundwater impacts, South32 Hermosa has designed for the treated water from WTP2 to be discharged into RIBs. This would actively recharge regional groundwater in key areas to reduce drawdown effects and potential impacts on groundwater-dependent ecosystems. Continued implementation of a groundwater monitoring program would inform the location and effectiveness of recharge in reducing drawdown effects."

- Why are South32 Hermosa impacts to groundwater-dependent ecosystems not discussed in the PoO?
- Why are the predicted results from the NewFields regional and mine models not shown, presented and/or discussed in the PoO? What were the predicted results from the NewFields models? What were the predicted results from the NewFields models if the RIBs were added to the model? How do NewFields models results (including RIBs and no RIBs) differ from the preliminary hydrogeologic modeling mentioned in the PoO statement above?
- Why does the PoO document not discuss modeled impacts to water levels in wells?
- Why is the preliminary hydrologic modeling not discussed in the PoO as the RIBs are presented as a major component of groundwater management by South32 Hermosa? Will the model used to evaluate the RIBs be available to the public to better understand impacts to Waters of the US, human health and the environment?
- What are the estimates of impacts to seeps, springs and shallow groundwater which supports biodiversity and habitat for threatened species such as the Mexican Spotted Owl and the Yellow-billed Cuckoo? How much habitat for threatened and endangered species will be impacted by pumping and other activities by South32 Hermosa?

Recommendations to Mitigate Water Issues: It is recommended the DEIS include the Town of Patagonia request in a letter dated August 12, 2020 for a comprehensive surface water and groundwater study preferably done by the USGS which includes the following:

- Conceptual finite element and finite difference 3-D groundwater models,
- Flow rate and contaminant fate transport and analysis,
- A three-dimensional hydrogeologic model, including an aeromagnetic geologic survey, like the study done for Rio Rico and Nogales,
- A full geographic coverage for the contributing watershed's groundwater basins, including geologic mapping of all contributing media formations such as aerial electromagnetic mapping by the USGS,
- Groundwater level monitoring in Town of Patagonia wells and surrounding wells,

- Streamflow water quality and water quantity monitoring in the Town of Patagonia and the Patagonia area,
- Isotope study to confirm sources of water for the Town of Patagonia and Sonoita Creek,
- Full geographic coverage of contributing watersheds groundwater basin, including updated geologic mapping of all contributing media formations such as aerial electromagnetic mapping by the USGS and
- Heavy metals baseline data collection with operation and closure monitoring.

The DEIS must evaluate, and require South32 Hermosa to treat their discharge to comply with all water quality standards, such as those protecting aquatic life and drinking water. It should analyze conveying the discharge beyond Harshaw Creek by pipeline into the upper reaches of Sonoita Creek to create riparian habitat for the benefit of wildlife in the Borderlands Restoration Network Wildlife Corridor. This pipeline would prevent existing contamination in Harshaw Creek from mobilizing into the aquifer used by the Town of Patagonia and will help protect the Sonoita Creek aquifer from the impacts of drought. Can this mitigation plan be evaluated?

The DEIS must evaluate, and require at least three POC wells be installed and sampled in Harshaw Creek stream bed deposits between Outfall 002 and the Town of Patagonia to protect human health and the environment.

The agency and DEIS must require point of compliance wells be installed to monitor water quality and water level impacts in the aquifer at each of the RIB locations to protect Waters of the US, human health and the environment.

The agency and DEIS must require point of compliance wells be installed to monitor releases of contamination from TSF2 to the aquifer and to protect human health and the environment.

The following should be used to evaluate mobilization of
existing contamination in Harshaw Creek by the discharge from South32 Hermosa:

- Fully characterize the Harshaw Creek stream bed aquifer hydrogeology and contamination load using a drilling program to collect sediment samples for laboratory analysis and to install monitoring wells to collect water samples, measure water levels and test aquifer parameters.
- Evaluate what contaminants are capable of mobilizing based on an equilibrium that DEIS evaluates geochemical model over a range of water quality parameters anticipated from South32 Hermosa discharge. The range of discharge water quality used in the model should include water quality when the treatment plant is fully functional and when there are potential issues with the treatment plant such during equipment failure and the excess presence of grit in the treatment plant.
- Evaluate mobilization of contamination using a three-dimensional fate transport model considering hydraulic gradients can result in the leaching and mobilization of contamination.
- To evaluate this fractured rock hydrologic system, an integrated hydrologic model is requires to assess the complex groundwater-surface water dynamics and to evaluate the real long-term risks of dewatering and contaminant transport from

WTP2 and Harshaw Creek to all downstream drinking water wells and riparian ecosystems.

- The US Forest Service should use the MIKE SHE model as it has much shorter computation

intervals and has better groundwater/surface interaction capabilities than Modflow as the interaction of surface water and groundwater is an important factor to evaluate in the Patagonia area to protect human health and the environment.

- MIKE SHE groundwater model is also the BADCT that should be used for dewatering evaluations, because its simulation capability of surface/groundwater interactions is much better than MODFLOW.
- The DEIS should evaluate using a system model that includes climate change predictions.

The DEIS should use the following questions to evaluate the regional groundwater model:

- Does the model oversimplify the range of aquifer parameters and hydraulic features in the study area? Is the bedrock aquifer considered so fractured that it is modeled as porous media? Are the presence of fractures and faults represented in the model?
- How are fractures and faults represented in the model and what is the spacing of these features?
- How does the model address the high-level of uncertainty of key hydraulic features like the presence of faults and fractures and the range of hydraulic conductivities?
- Based on actual measurements of aquifer parameters, how much uncertainty is there with model parameters and hydraulic features?
- What is the grid spacing of the model? Is the grid spacing appropriate to evaluate water level impacts at specific springs and seeps and impacts to specific wells?

The agency and DEIS should require that before discharge occurs from Outfall 001 and Outfall 002, there be finalized TMDL studies for impaired surface waters of Alum Gulch, Harshaw Creek, and Sonoita Creek, and the necessary waste load allocations for these discharges to include all sources of discharge as required by the Clean Water Act and its implementing regulations.

The agency and DEIS should require AZPDES Permit Discharge Characterization Testing be conducted monthly at South32 Hermosa to provide a more accurate set of data results which can be meaningfully analyzed considering seasonal and operational changes.

Discharge sampling to report monthly averages and daily maximums should not be based on only one 8-hour composite sample per month but the sample frequency will be based on a statistical analysis to provide meaningful data to report monthly averages and daily maximums.

Whole Effluent Toxicity (WET) testing should be done more than once within 6 months of commencing discharge and annually thereafter, but the sample frequency will be based on a statistical analysis to provide meaningful data to address levels of toxicity in the environment resulting from discharges.

The agency and DEIS should require limits for manganese and sulfate be established, monitored and reported to protect human health, the environment and the water quality of drinking water systems.

The agency and DEIS should require the proposed AZPDES Permit No. AZ0026387 for January Mine Hermosa Project to include manganese monitoring. Outfalls 001 and 002 should be monitored for the manganese with the health advisory limit of 0.3 mg/L on a quarterly sampling basis. It would be discreditable not to collect this data for the health and welfare of this environmental system.

The DEIS should evaluate using a network of injection wells to recharge the pumped water back into the bedrock aquifer as a method to recharge the bedrock aquifer as an alternative to discharging to Harshaw Creek and the RIBs to minimize impacts to water quality, water levels, habitat and wildlife.

The DEIS should require the discharge piping to the RIBs have burst alarming and a SCADA system (Supervisory Control and Data Acquisition, a system that automates industrial processes and collects data from sensors and devices) to monitor and manage the RIB pipelines and prevent leaks and spills which could impact Waters of the US, human health and the environment.

The AZDES permit and/or the APP permit does not address any long-term reactive chemistry with the WTP1/WPT2 produced residual solids and/or the covered tailings within the lined tailings impoundment. The DEIS should contain a study to understand and address this long-term system seepage control and treatment especially for closure as it is critical to protect Waters of the US, human health and the environment.

The agency and DEIS should require the following tests be added on a semi-annual basis to composited samples: Leaching Environmental Assessment Framework (LEAF) Methods and Guidance, Toxicity Characteristic Leaching Procedure (TCLP) and wet cell testing.

Without further information descripting the water treatment plants, cross-connection controls, short circuiting, mine and mill water balances, chemicals used on property, etc., the DEIS should require the following to be added to fully characterize these outfalls: Chemical oxygen demand, oxidation reduction potential, dissolved oxygen and total dissolved solids analysis should be done monthly and PFOS chemicals should be quarterly.

To better understand any potential flooding and mounding issues in and around Patagonia, the DEIS should require development of a surface water routing model to isolate impacts of mine water discharge on flow histograms for Harshaw Creek.

TSF2 IMPACTS: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.7.1 on page 2-54 states, "Note that the description of TSF2 is an initial design, subject to further engineering and permitting refinements and site-specific geotechnical drilling confirmations."

- Why in the PoO is it not discussed where tailings from the Peake Prospect will be stored as the Peake Prospect is planned to be mined by South32 Hermosa?
- Does the US Forest Service understand this statement misleads the public of what may be the impacts from TSF2 to Waters of the US, human health and the environment? How can the potential impacts from TSF2 be evaluated if the design of TSF2 is not completed?
- How may site specific conditions change the initial design to reduce impacts?

What is the criteria to change initial designs and will the public be able to comment on changes to the

initial design to evaluate potential impacts to Waters of the US, human health and the environment?

Section 2.5.7.1.2 on page 2-55 states, "The design and operation of TSF2 will comply with the GISTM, striving to achieve the ultimate goal of zero harm to people and the environment, with zero tolerance for human fatality, following guidelines on the rights of project-affected people, use of an integrated knowledge base, risk-based design and operation, governance, emergency response, and access to information."

- How will complying with GISTM help achieve goals? Can the US Forest Service provide examples of how GISTM failed to achieve its goals? How can complying with GISTM prevent impacts to human health and the environment due to accidents, earthquakes, or extreme weather events?
- The current APP inadequately only requires one conceptual point of compliance well and is the basis for current legal action.
- Can South32 Hermosa and the US Forest Service provide to the public the criteria used to evaluate the ultimate goal of zero harm to people and the environment to better understand what South32 considers acceptable impacts to human health and the environment?
- Can South32 Hermosa and the US Forest Service provide to the public the guidelines on the rights of project-affected people to better understand what South32 Hermosa considers acceptable impacts to human health and the environment?
- Can South32 Hermosa and the US Forest Service provide to the public the policy for, "access to information" mentioned in the PoO statement above to better understand what information South32 is considered public so the public can evaluate the impacts to human health and the environment?
- Site-specific baseline data, required under NEPA, has been requested by the public including by the advisory panel to South32 Hermosa but data such as water levels, water quality and groundwater chemistry has not been shared with the panel or the public. Why has South32 not provided the panel the information they requested so they can better understand the impacts to human health and the environment.

Section 2.5.7.1.2 on page 2-56, the table states, "Peak flow: 100-yr/24-hr storm (BADCT); 100-yr/72-hr storm (ANCOLD)."

- What will be the impacts from a release from TSF2 to human health and the environment from a storm which exceeds the 100-yr/24 hour event and overflows internal containment structures?

Section 2.5.7.1.3 on page 2-56 states, "Upon approval of this PoO, a geotechnical investigation would be conducted within the footprint of TSF2 in order to confirm geotechnical parameters to inform the final design of TSF2. The proposed geotechnical investigation includes 17 boreholes and test pits (locations shown on Figure 2-20)."

- What will be the impacts to human health and the environment from the geotechnical investigation and construction of TSF2, specifically from dust and stormwater?
- Stormwater releases of contamination which exceed limits have been reported to the ADEQ suggesting current methods to control stormwater are not sufficient to control the release of contamination to the environment from South32 Hermosa. This is especially concerning for lead which is present in the soils near the location for TSF2 which is near the location of the Lead Queen Mine and other mines.

Section 2.5.7.2.1 on page 2-63 states, "Trafficability (the ability for tailings haul trucks to drive on top

of the tailings in TSF1 or TSF2)— trucks are not able to transit on overly wet tailings and would get stuck, thus identifying any off specification tailings that have been inadvertently placed."

- How will the generation of dust and track out of contamination by trucks in TSF1 or TSF2 be prevented to protect human health and the environment?
- In the event of a stuck haul truck, how will the generation of dust from tailings in the bed of the truck be controlled and how will the track out of contamination by the stuck truck be prevented to protect human health and the environment?

Section 2.5.7.2.1 on page 2-63 states, "While mining and beneficiation of sulfide ore occurs, filtered tailings would be loaded into haul trucks from the sulfide beneficiation facilities on South32 Hermosa private land and trucked to TSF2."

- How will the generation of dust and track out of contamination by trucks in TSF1 or TSF2 be prevented to protect human health and the environment?

Section 2.5.7.2.1 on page 2-64 states, "The settlement monuments would be surveyed to establish the initial crest elevation and periodically thereafter as part of the operational monitoring program to determine if the TSF2 perimeter road/embankment is experiencing settlement that might impact containment."

- How often will settlement monuments be surveyed and will this information be available to the public?
- What are the criteria to evaluate settlement and what are the corrective actions to address settlement which can result in impacts to Waters of the US, human health and the environment?
- What will be the impact to human health and the environment in the event of containment failure
- How will releases from failed containment be cleaned up and how will the containment be repaired and monitored to prevent future failure?

Section 2.5.7.2.1 on page 2-65 states, "TSF1 is permitted to accept other materials aside from tailings, and it is anticipated that TSF2 would be permitted under an applicable APP in a similar manner."

- This is a misleading statement to the public as the current APP is in Arizona Superior Court and an APP for TSF2 will likely be contested in court too.

Section 2.5.7.2.3 on page 2-65 states, "In addition, the TSF2 UDCP is designed to contain stormwater runoff and direct precipitation over the pond area from the 100-year/72-hour storm event while maintaining a minimum of 1.64 feet (0.5 meter) of freeboard. This provision satisfies South32 Hermosa requirements to comply with industry standards."

- What is the probability that a precipitation event which exceeds the 100-yr/72- hour storm event will occur? What will be the impacts to human health and the environment in the event of a precipitation event which exceeds design parameters for TSF2?
- How will such a failure be remediated during operation of the mine? How will such a failure be remediated after closure of the mine?

Section 2.5.7.2.3 on page 2-66 states, "The pipeline utilized to transfer water from TSF2 UDCP to WTP2 would be buried and designed to minimize impact to USFS property. Pipeline alignment would typically follow the road alignment for easy maintenance and to minimize disturbance."

- How will this pipeline be maintained and monitored to prevent the release of contamination and

impact human health and the environment?

Section 2.5.7.4 on page 2-69 states, "After completion of TSF2, the appropriate waste rock may be used as armoring of the exposed face of TSF2 to prevent stormwater and wind erosion, for other construction uses around the Project, or placed in TSF1 or TSF2 when NPAG stockpiles on South32 Hermosa private land are at design capacity. At closure the NPAG waste rock would also be used for the closure cover on the top of TSF1 and TSF2."

- How will the concentration of contaminants in and on the waste rock used across the site for erosion control be determined to prevent mobilization of contaminants from the waste rock into the Waters of the U.S. and to protect human health and the environment?

Section 2.5.7.4 on page 2-69 states, "After completion of TSF2, the appropriate waste rock may be used as armoring of the exposed face of TSF2 to prevent stormwater and "wind erosion" and later that, "The armoring berms are intended to decrease the potential for wind and water erosion of the exposed external tailings slopes."

- These statements are not consistent and mislead the public as to how much erosion will occur from TSF2. What are the potential impacts of wind and stormwater erosion to Waters of the US, human health and the environment?
- How much loss of tailings mass due to stormwater and wind erosion will occur before armoring and after armoring?
- What mass of contamination will be mobilized by stormwater and wind erosion from TSF2 with and without armoring?

Appendix B on page B-2 states, "These structures may include armoring to minimize erosion and sediment transport as needed."

- How will the need for structures to be armored be determined?
- How much erosion and sediment transport will occur prior to structures being armored?
- How much erosion and sediment transport will occur after structures are armored?

Appendix B on page B-5 states, "Possible controls include wattles, silt fences, sand bags, berms, temporary sediment basins, benched slopes, soil binders, erosion control blankets or mats, slope transitions, slope drains, check dams, and stabilized vehicle ingress/egress (rock pads)."

- What is the criteria for selecting these structures and how will their effectiveness be evaluated to protect Waters of the US and prevent erosion of contaminated soil to protect human health and the environment?

Figure B1 shows several design features for TSF2 including four 36-inch diameter culverts which appear to extend from TSF2, under the perimeter road to outside TSF2.

- What is the purpose of these culverts extending from TSF2 which appear to bypass the catchment system?
- What are the impacts of stormwater flow from TSF2 through the culverts to Waters of the US, human health and the environment?

Recommendations to Mitigate TSF2 Issues: It is recommended that the DEIS require both TSFs be double lined, as required for landfills, to truly reduce the risk of discharge from seepage or contact

stormwater to the aquifer.

SOIL, STORMWATER AND TRACKOUT IMPACTS

ADEQ and the PoO do not discuss soil contamination occurring as a result of water discharge or as a result of deposition from air emissions which is relevant as the area has highly mineralized soils and contamination is present from historic mining operations. Site specific data was not considered by the ADEQ for the APP or the Air Quality Permit, however the Patagonia Mountains that are known to have contaminated waters and soils including areas in the Town of Patagonia. The ADEQ and the PoO does not discuss how the deposition of pollutants can add or contribute to an exceedance of standards. ADEQ and the PoO do not discuss how much contamination will accumulate in the soil from water discharges and air emissions over the estimated 60 year operation of the mine and from water discharges during closure. Further, ADEQ and the PoO does not address the acute health damage of Airborne dust resulting from simple track out, much less failure of the primary air emission controls in the concentrator. Nor are the chronic health effects of metals and manganese on the immediate population, or the ecosystem disturbed by the mining operation. Does the US Forest Service understand metals in the Harshaw Creek Watershed are bio-available and can enter the human food chain? To protect public health, the DEIS has to ask for an acknowledgement of the existence of such Site-Specific Factors in the PoO and demand corresponding changes in the APP. The DEIS has to demand the publication of such an evaluation against known standards for soil and water, not only for lead but also for manganese.

The Patagonia Mountains that are known to have contaminated waters and soils; the discharge of total lead in stormwater has been reported at orders of magnitude greater than the limits in the stormwater MSGP permit. This suggests current stormwater and sediment controls are not adequately protecting the release of contamination to Waters of the US or protecting human health and the environment. The stormwater exceedance issue has not been addressed by the ADEQ and there is a concern the ADEQ will not be able to control the discharge of contaminants in stormwater from South32 Hermosa. ADEQ staff indicated its authority to control stormwater discharge is complicated and limited in US Forests. The impacts of soil erosion from stormwater control structures and impacts from the result of large scale removal of vegetation on public and private lands for the planned expansions of South32 Hermosa including land cleared for access roads is not discussed by the ADEQ or the PoO. The erosion of highly mineralized soils will result in deposits of contamination downstream, affecting areas of much lower mineralization.

Track out Issues:
Track out of contamination is a concern to the community as contamination from South32 Hermosa will be spread by traffic and workers outside South32 Hermosa by soil and dust on vehicles and clothing, including public vehicles and clothing on public roads. Public roads which are present across South32 Hermosa private and public property. Track out of contamination will be spread as soil and dust sheds off vehicles along transportation routes, in parking lots, from vehicle maintenance facilities and from vehicle washes. Contamination track out will also be spread into the community as soil and dust from contaminated clothes and boots used at South32 Hermosa and from worker's skin and hair. Contaminated track out will be distributed by stormwater runoff into the environment to Waters of the

US and a portion of the contamination will be concentrated in municipal water treatment systems. There are documented cases of contamination track out from mine sites which have impacted municipal wastewater treatment systems. These exceedances have resulted in costs to upgrade systems to address contamination track out to protect Waters of the US, human health and the environment. The US Forest Service should review track out issues for the City of Elko, Nevada in 2003 related to mining operations as an example of track out issues impacting municipal wastewater treatment systems.

Soil, Stormwater and Track Out Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 1.3.2.7 on page 1-5 states, "A new permanent Primary Access Road would be constructed on NFS land."

- How will the Waters of the US and the public health be protected from contaminated track out, runoff and mobilization of contaminants in soil and dust associated with this road?
- Will South32 Hermosa or the US Forest Service be responsible for remediation of contamination downstream of any of its outfalls including stormwater outfalls?
- Will soil samples be collected to determine site-specific baseline contamination concentrations to evaluate potential future impacts from soil erosion, stormwater runoff, track out and deposition from air emissions?
- How will the road be maintained, what is the maintenance budget, is it approved by the Arizona Department of Transportation or will this be funded by Forest Service resources?

Section 2.4.1.1 on page 2-27 states, "Drill pads would be constructed with berms or stockpiles being placed nearby to store growth media and slash (brush trimmings) for reclamation."

- How will Waters of the US, public health and the environment be protected from contaminated track out, runoff and mobilization of contaminants in soil and dust associated with construction, use and reclamation of drill pads and access roads?
- How will the roads be maintained, will this be funded by the forest service, has the forest service budgeted for the expanded maintenance of access and transportation roads, affiliated with South32?

Section 2.4.1.1 on page 2-27 states, "Portable bathrooms would be serviced by a licensed septic company approximately twice per week, using a service truck (F-450 or F-550 size pickup, or equivalent)."

- Will septic hauled off-site be analyzed for 503 metals including lead and manganese to protect human health and the environment? Where will the septic be processed and does this facility have the water treatment system and permitting to protect human health and the environment if waste is impacted from contamination?

Section 2.4.1.3 on page 2-30 states, "Any drill pad disturbance left open and not active for more than 14 days would be subject to interim reclamation activities (such as installation of stormwater controls, stabilization, or seeding) as described in Section 5.3.1."

- How will sediment controls and resulting runoff, overflows, track out and dust be monitored and maintained to prevent soil and contamination from entering Waters of the US, impacting air quality,

impacting soil, and to protect human health and the environment?
- How will fugitive dust be measured and mitigated?

Section 2.4.1.3 on page 2-30 states, "In general, where a borehole may penetrate multiple saturated and permeable zones, care is taken to seal the borehole to prevent any migration of water between different zones via the borehole. This is accomplished by using a sealing material that is no more permeable than the geologic formation (often in the absence of better information, a hydraulic conductivity of 10-7 centimeters per second is targeted for sealant materials).

- How does the hydraulic conductivity of the seal material compare to the existing natural hydraulic conductivity? If the natural hydraulic conductivity is less than the hydraulic conductivity of the seal material, will there be preferential flow along the seal? The statement indicated there is often a absence of better information, can better information be obtained to better design seals to prevent leaks which may impact human health and the environment?

Section 2.4.1.4 on page 2-31 states, "The general order of each sequence of operations during road construction, exploration drilling, and reclamation of the surface exploration is: Install sediment controls (such as wattles, silt fences, water bars, rolling dip cross drains, etc.)" and "Interim reclamation is described in Section 5.3.1 and is intended to stabilize the surface and prevent erosion. This may be accomplished through installation of stormwater and sediment controls, recontouring, and/or revegetation (such as seeding)."

- How will sediment controls and resulting runoff, overflows, track out and dust be monitored and maintained to prevent soil and contamination from entering Waters of the US, impacting air quality, impacting soil, and to protect human health and the environment?
- Is there a SWPPP specifically describing types and locations of these BMPs mentioned for all disturbed surface areas to prevent soil erosion as Appendix B is not a SWPPP? Does the US Forest Service understand the PoO does not have specific BMP types and locations and that PAG standards should apply to permanent roads and USFS guidelines for "Low Volume Roads" should apply to temporary road construction?

Section 2.5 on page 2-33 states, "Mining of both the sulfide and oxide portions of the orebody below South32 Hermosa private land, and beneficiation of sulfide ore on South32 Hermosa private land, will commence after the development of the underground infrastructure described in Section 2.3 and sufficient waste rock is removed to access the orebody."

- How will the mine and vendor vehicle traffic be managed between the Clark deposit and Taylor deposit as they cross Harshaw road to prevent track out and contamination of Harshaw Road which is open to the public?
- Where mine and vendor vehicle traffic between the Clark deposit and Taylor deposit cross Harshaw road, how will track out of contamination such as lead and manganese by public vehicles be identified, monitored, prevented and remediated.
- Will the Clark deposit manganese ore trucks be covered or use sealed rotainers when transporting between locations in South32 Hermosa to reduce air quality impacts?

Section 2.5.2 on page 2-33 states, "Typical surface blasting operations (during construction of Primary Access Road and TSF2) are estimated to occur two to three times per week."

- During surface blasting operations, how will sediment controls and resulting runoff, overflows, track

out and dust be monitored and maintained to prevent soil and contamination from entering Waters of the US, impacts to air quality, impacts to soil, and to protection of human health and the environment?

Section 2.5.3.2 on page 2-35 states, "Ore from the crushed ore silo will be loaded into sealed containers on transportation vehicles from the discharge gate of the crushed ore silo. The crushed ore will then be trucked across NFS land to a facility on private land distal from the Project for beneficiation. The beneficiation facility is anticipated to be in Santa Cruz County on private land distal from the Project."

- How will transportation of the ore in sealed containers prevent track out, leaks and failures which will result in the release of contamination to Waters of the US, impacts to air quality, impact soil, impacts to human health and the environment?
- What actions have been taken by South32 Hermosa to manage and mitigate track out? What actions will be taken by South32 Hermosa to identify, monitor, manage and mitigate track out? How will South32 Hermosa identify contamination track out?
- South32 Hermosa is in a mineralized area and that mineralization is present on the roads and that contamination is spread by all transport and mine traffic including public and private vehicles, motorcycles and bicycles. Did South32 Hermosa or the Forest Service collect baseline track out data prior to construction start, to better understand and baseline, soil, air and road conditions prior to the existing track out damage, and model the future damage base on increased traffic and transportation impact, with respect to protecting the Waters of the US, human health and the environment? What are the results of baseline track out measurements and track out monitoring conducted by South32 Hermosa and/or the Forest Service?
- Will South32 Hermosa track out data be reported to the community, in terms of Opacity and nuisance emissions, will the road dust be measured with Federal Reference or Equivalent Monitors? Has the US Forest Service, and/or Environmental Protection Agency, and/or ADEQ, ADOT, budgeted and planned for the implementation of the monitoring required to protect the US Air and Water, Public Health, wildlife, threatened and endangered species in and around the mine, particularly those downstream and downwind of the operation. Does the US Forest Service realize the mine is located in the headwaters of the Santa Cruz river, a primary Arizona water source, serving millions of residents?
- Will South32 Hermosa implement a Storm Water Pollution Prevention Plan for addressing track out of contamination onto public and private roads? Winter storms and summer "monsoon" activity in the area historically cause significant "flash flooding" washing tracked out contamination into uncontrolled creeks and streams feeding the Santa Cruz river, a primary water source for southern Arizona residents in Santa Cruz, Pima, and Pinal counties.
- How will South32 Hermosa remediate tracked out contaminants, will sweepers and/or controlled wash down practices be deployed?
- Will South32 deploy industrial hygienists and epidemiologists to baseline the existing levels of track out contaminants, and measure and report increases as the mine operations continue? In order to measure the impact of South32 Hermosa on the public health a baseline of health indicators must be collected and the monitoring must continue through the lifecycle of the mine to shut down and remediation Where is the baseline health data?
- How will South 32 prevent track out contamination from entering Waters of the US?
- Will South32 Hermosa cover the beds of Clark deposit ore trucks to reduce dust or will sealed

rotainers be used? What are the differences in air quality impacts between covered haul trucks and rotainers?

- How will South 32 prevent track out contamination from entering Waters of the US?
- Will South32 Hermosa cover the beds of Clark deposit ore trucks to reduce dust or will sealed rotainers be used? What are the differences in air quality impacts between covered haul trucks and rotainers?
- How will the following vehicles be addressed to prevent track out: buses, service trucks, reagent trucks, delivery trucks, fuel trucks, drilling rigs and their support vehicles, semi-trucks with flatbeds or trailers, Clark deposit ore trucks, Taylor deposit concentrate trucks, public vehicles and bicycles?
- Will additional sampling be conducted at the locations listed below to identify contamination track out?
    - o Biosolids from the Town of Patagonia and City of Nogales wastewater treatment plant?
    - o Water from the Town Patagonia's potable drinking water system?
    - o Harshaw Creek sediments?
    - o Harshaw Road, Cross Connector Road and Flux Canyon-Gas line road-sediments?
    - o Vehicle droppings and sediments at Park and Ride parking lots?
    - o Vehicle droppings and sediments at Patagonia South32 office and nearby parking?
    - o Vehicles dropping and sediments at the IROC site?
    - o Vehicles dropping and sediments at the manganese processing plant site?
    - o Discharges from laundry service into the sewer collection system?

- With the removal of equipment, parts and vehicles for repairs or disposal, will they be washed and cleaned before leaving the mine site? How will it be verified that contamination had been removed from equipment and parts to be disposed of and from vehicles sent for repairs?
- Will South32 conduct yearly aerial or drone flights looking for changes in surface coloration caused by the mined minerals to determine the effectiveness of track controls at the mine site, park and rides sites, access roads, IROC site, future Mn processing plant, etc.?

Section 2.5.5.1 on page 2-43 states, "Collected contact stormwater/precipitation...some... will be discharged from the Project during storm events..."

- The South32 Hermosa property is in a mineralized area and stormwater samples required have been reported to the ADEQ which exceed limits in the permit.
- How will current stormwater structures be modified and how will future stormwater be monitored and prevented from impacting Waters of the US and impacting soil for the protection of human health and the environment?

Section 2.5.5.1 on page 2-44 states, "ADEQ regulates the discharges associated with both the WTPs and stormwater. The discharges will meet strict water quality standards. Regular sampling, operational controls, maintenance, and housekeeping ensure that Project discharges will consistently meet regulatory standards."

- Contaminated stormwater samples have been reported to the ADEQ which suggests current controls are not adequately protecting the release of contamination to Waters of the US and not protecting human health and the environment.

Section 2.5.5.1 on page 2-46 states, "Typical structural and non-structural controls are fully described

in the Stormwater Pollution Prevention Plan (SWPPP) for South32 Hermosa private lands, that will be expanded to include all operations, including those on NFS land."

- Why is the SWPPP not presented or described in the PoO as the SWPPP is an important plan to understand the impacts to the Waters of the US, human health, and the environment?
- Contaminated stormwater samples have been reported to the ADEQ which suggests current SWPPP controls are not adequately protecting the release of contamination to Waters of the US and is not protecting human health and the environment.
- Why is the SWPPP not mentioned for drill pads or ST-TARs?

Section 2.5.5.2.1 on page 2-48 states, "The ADEQ regulates the discharges associated with both the WTPs and stormwater. The discharges will meet strict water quality standards."

- Contaminated stormwater samples have been reported to the ADEQ which suggests current SWPPP controls are not adequately protecting the release of contamination to Waters of the US and are not protecting human health and the environment. Does the US Forest Service understand the ADEQ has issues addressing stormwater and soil contamination issues in the US Forest? Will the US Forest Service work with the ADEQ to resolve issues addressing contamination issues including stormwater issues in the US Forest which impacts Waters of the US, human health and the environment?

Section 2.5.11 on page 2-75 states, "In addition to the use of existing FRs, there are four types of roads associated with Plan Operations on NFS land: permanent roads, long-term TARs (LT-TARs), short-term TARs (ST-TARs), and upgraded connecting haul roads (which are also LT-TARs) between discontiguous South32 Hermosa private land parcels."

- Is there a SWPPP specifically describing types and locations of these BMPs mentioned for all disturbed surface areas to prevent soil erosion? Does the US Forest Service understand Appendix B is not a SWPPP as it does not have specific BMP types and locations?
- PAG standards should apply to permanent roads, USFS guidelines for "Low Volume Roads" should apply to temporary road construction.

Section 2.5.11.3.2 on page 2-80 states, "When the geotechnical investigation is complete and the Primary Access Road design is finalized, the associated existing FRs would be reconstructed including installation of new culvert crossings, cut/fill associated with widening and straightening of some portions of the roads for safety and to accommodate truck traffic, installation of rockfall protection, grading, and resurfacing according to final construction specifications."

- How will construction of the road and installation of culverts impact erosion and mobilization of soil and contaminants into Waters of the US?
- Has the US Forest Service budgeted for the maintenance of these new roads and the impact of the increased weight and traffic loads on these roads? How much has been budgeted by the US Forest Service, EPA, the ADEQ, ADOT, Santa Cruz, Pima and/or Cochise counties to maintain this new infrastructure on public lands?
- Specifically how will flash flooding and extreme weather events common in southern Arizona be managed, for instance if a flash flood washed out a bridge on Harshaw road who would respond and how would the repair be funded?

Section 2.5.11.3.2 on page 2-80 states, "Depending on final design, drainage crossings could be improved with the installation of culverts, at-grade crossings, and water bars. If any fill operations

within drainages that are determined to be waters of the U.S. are to occur, a Clean Water Act Section 404 permit would be obtained from the U.S. Army Corps of Engineers prior to commencing work.

- Is there a SWPPP specifically describing types and locations of these BMPs mentioned for all disturbed surface areas to prevent soil erosion? Does the US Forest Service understand Appendix B is not a SWPPP as it does not have specific BMP types and locations?

Section 2.6, Table 2-10 on page 2-88 states, "South32 Hermosa also has received authorization under the AZPDES mining multisector general permit for stormwater at the site, which authorizes discharge from stormwater runoff (AZMS81380), and has developed the required Stormwater Pollution Prevention Plan (SWPPP) for these discharges."

- The South32 Hermosa property is in a mineralized area, including the soil, and contaminated stormwater samples have been reported to the ADEQ which suggests current controls are not adequately protecting the release of contamination to Waters of the US or protecting human health and the environment.

Section 3.1 on page 3-2 states, "Limited Surface Disturbance Footprint. The surface disturbance footprint for the Plan Operations is less than 500 acres."

- How much track out of contamination will there be by private vehicles operating on public roads within the surface disturbance footprint for the Plan Operations?

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Section 3.4.2 on page 3-8 states, "Sizing of stormwater controls was evaluated independently against each standard, and the standard yielding the most conservative result was selected, ensuring that stormwater controls will not be undersized."

- How much contamination and soil will be mobilized because of stormwater control structures?
- How will South32 Hermosa control the mobilization of contaminated sediment from road surfaces including road surfaces made with native soil?

Section 3.5 on page 3-9 states, "Solid waste will be disposed of in a distal permitted construction landfill not associated with the Project," and, 'Wood and inert wastes such as concrete will be hauled to a local landfill for disposal, unless a facility is properly permitted on South32 Hermosa private land" and "The disposal or recycling of hazardous materials will be done through qualified vendors in a manner that is consistent with applicable local, state, and federal regulations.

- Distal permitted construction landfill site and the hauling route should be considered part of the affected environment

evaluated by the DEIS.

- Santa Cruz, Pima and Cochise county landfills are not properly sized and permitted to handle the increase in volume associated with South32 Hermosa.
- Have the counties expected to welcome this new solid waste stream budgeted for the reduction in public capacities that will result from this increase?

Appendix B on page B-2 states, "Non-contact water will be routed around the Project through external conveyance structures. Some non-contact water may still be detained in sediment control ponds prior to release to natural drainage paths or streams to allow settlement of suspended solids; this water may also be sent to WTP2 for treatment depending on water quality."

- How will settled suspended solids be collected and disposed to prevent mobilization of the solids with the next storm event?

- How will sediment control structures be monitored to evaluate if contamination is accumulating in the structures? How will structures impacted with contamination be remediated and will the design of structures be updated to prevent the mobilization of contamination? Will the area down gradient of the sediment control structures be tested for contamination to evaluate the effectiveness of these structures?
- How will these sediments be managed to reduce resulting fugitive dust and its impact on US Air and Water, Public Health, flora and fauna, wildlife, threatened and endangered species?

Appendix B on page B-6 states, "Inspections and maintenance are integral to ensuring that all stormwater control structures continue to operate as intended. The inspection schedule and requirements will be at least as stringent as the requirements of the multi-sector general permit for mining (AZMSG2019-002)."

- South32 Hermosa property is in a mineralized area, including the soil, and contaminated stormwater samples have been reported to the ADEQ which suggests current controls are not adequately protecting the release of contamination to Waters of the US or protecting human health and the environment. ADEQ staff indicated its authority to control stormwater discharge is complicated and limited in U.S. Forests.
- What is the US Forest Service budget to mitigate the damage of seasonal flooding, to prevent disasters such as the contamination of San Pedro river, from mining and mining support operations within the watershed, located in the Coronado National Forest?
- The US Forest Service must analyze and factor in the disasters, mitigation and conservation of San Pedro watershed, and apply all lessons learned to the South32 Hermosa plans to insure the Santa Cruz watershed does not suffer the same fate.
- Long term residents of southern Arizona notice the lack of flowing Artesian Wells in the San Pedro watershed near St David, largely attributed to the dewatering and heavy mine water use at the headwaters of the river. Where is the data that compares the disaster of the San Pedro watershed, to the forecasted impact on the Santa Cruz watershed?

Section 2.1 on page C-2 states the "Project-specific SPCC (spill prevention, control, and countermeasures) plan, SWPPP (Stormwater Pollution Prevention Plan), and Project Emergency Response Plans that will be developed or updated prior to Final PoO approval."

- Why are these documents and/or plans not completed and reviewed by the proper authorities as well as presented for public comment as they are important to understand impacts to Waters of the US, public health and the environment?
- Emergency Response will be absolutely required in any mining operation in the Patagonia mountains. Historically, the Patagonia Mountains experience flooding annually during the Monsoon and hard freezes followed by fast melts in winter, which heavily impact road maintenance costs. Have the responsible parties who provide emergency services and rescue budgeted for the increased demand fueled by South32 Hermosa operations.
- Why is a traffic control plan not included in the PoO, the operations will increase weight and traffic significantly on roads not designed, maintained, or funded to manage these loads. The unfunded requirements will quickly develop into public safety hazards and likely result in fatalities related to vehicle accidents, landslides, contaminated air and water. No doubt just the traffic increase will increase respiratory related health ailments significantly in the surrounding areas increasing healthcare demand. Are these healthcare demand increases budgeted for and forecasted for increased

capacity resulting from mine contamination.

- Why are there no discussions of a chemical spill into Harshaw Creek, a highly likely event, or a transport roll over into the creek causing water diversion/erosion? Where are the disaster scenarios and possible responses listed to build public confidence. Where has South32 operated that is a parallel to the climate of southern Arizona. Where is a believable plan to respond to the climate of southern Arizona? How will South32 Hermosa prove its ability to understand the annual flooding, extreme heat, extreme cold and high winds, but most specifically the rapid transport of contamination throughout the Santa Cruz watershed? The risk to the public Air and Waters of the US, the public health, the environment, flora and fauna, wildlife, threatened and endangered species is simply too high based on the information provided?

Section 2.5 page C-4 Spill Response states "An uncontrolled discharge is one that cannot be safely controlled or cleaned up by South32 Hermosa, is large enough to spread beyond the immediate source location, has the potential to enter navigable waters of the United States, requires special training or equipment for cleanup or there is a danger of fire or explosions."

- Why is there no discussion in the PoO on spill prevention, clean up, how aquifers will be protected and how Waters of the US, public health and the environment are protected? Why is the spill response plan not discussed or provided in the PoO?
- What South32 Hermosa operations or activities are capable of an uncontrolled discharge that cannot be safely controlled or cleaned up by South32 Hermosa?

Recommendations to Mitigate Track Out Issues:

The DEIS should require South32 conduct yearly aerial or drone flights looking for changes in surface coloration caused by the mined minerals to determine the effectiveness of track controls at the mine site, park and ride sites, access roads, IROC site, future processing plant and other locations related to South32 Hermosa.

The DEIS should require that track out opacities be measured in near real time and displayed to the public, for community level enforcement of nuisance emission violations, Further the effects of toxic dust of contamination such as arsenic, copper, lead, manganese, mercury and zinc by the public and by South32 Hermosa be identified, monitored, prevented and remediated by a third party epidemiologist and industrial hygienist contractors specializing in track out of heavy metal contaminants and remediation.

The DEIS should evaluate if containers with no seals, such as containers with access ports welded shut to the container for closure are to mitigate spills and accidental releases of contamination.

The DEIS should require additional sampling for contamination such as arsenic, copper, lead, mercury, manganese and zinc be conducted at the following locations to identify contamination track out:

- Biosolids from the Town of Patagonia and City of Nogales wastewater treatment plant,
- Water from the Town Patagonia's municipal drinking water system,
- Harshaw Creek sediments,
- Harshaw Road, Cross Connector Road and Flux Canyon-Gas line road-sediments,
- Vehicle droppings and sediments at South32 Park and Ride parking lots,

- Vehicle droppings and sediments at the South32 Patagonia office and nearby parking,
- Vehicles dropping and sediments at the IROC site,
- Vehicles dropping and sediments at the manganese processing plant site, and
- Discharges into storm drains and sewer collection systems from laundry service, vehicle washes and from other industrial businesses which provide services to South32 Hermosa.

Dewatering Operations:
At the outset, under the Forest Service Organic Act and federal mining, environmental and public land law, USFS cannot approve activities for which the applicant has not demonstrated that it has obtained all of the necessary water rights and other required permits and approvals and will not adversely affect federal interests in water and water flows. Under NEPA, the ESA, and the Organic Act, the DEIS must fully analyze all the baseline conditions of, and impacts to, all potentially affected surface and ground water resources, and rights.

The DEIS should demonstrate that the applicant has all necessary water rights and permits. Particularly for the project's impacts to air and water, the USFS cannot rely on eventual ADEQ permitting (which does not require compliance with NEPA) to fulfill USFS's NEPA, Clean Air and Water Acts, and other obligations. *See Env'l Defense Ctr. v. Bureau of Ocean Energy Mgt.*, 36 F.4th 850, 874 (9th Cir. 2022).

Hydrologic Baseline and Analysis:
The DEIS should provide a complete characterization of the groundwater conditions and movement, surface waters, springs, seeps, wet meadows, and other groundwater features within the Patagonia Mountains, Sonoita Creek Basin, Santa Cruz Valley, and all related lands and waters. To achieve this end, at least one year of monthly samples followed by quarterly samples should be collected as a baseline. There should have been recorded water level data in every exploration bore-hole collected. An adequate number of those boreholes should become monitoring wells to address modeling accuracy and the mine plan's ongoing effects to groundwater, and there should be a minimum 2 years of hydrologic baseline data collected.

Complete assay analysis is also needed to ensure compliance with all Clean Water Act, Safe Drinking Water and Arizona/ADEQ standards and requirements.

Isotopic and geochemical analysis of groundwater and spring discharge will help more accurately determine paths of groundwater flow near the project area. A full geochemical workup is necessary to properly assess the impacts of the project.

Baseline Monitoring Plan:
The purpose of a baseline monitoring plan is not only to evaluate existing conditions but also to provide a monitoring network and a dataset that can be used after project implementation for assessing changes in the groundwater system and potential impacts to water. This can inform trigger thresholds for changes to management when impacts occur. The DEIS should include for public comment the

applicant's baseline monitoring plan.

Groundwater and Surface Water Investigation:
A groundwater investigation should be conducted that addresses at a minimum:

- Potential for dewatering and associated issues including estimation of volume of water to be extracted, water quality of extracted water, disposal options for extracted water, and potential impacts associated with discharge of poor-quality water;
- Water-use requirements by proposed operation including processing and disposal of tailings; and,
- Potential for surface and subsurface (including groundwater) discharge of waters associated with processing and tailings.

That hydraulic characterization of the proposed mine area requires constructing test wells and conducting aquifer testing to evaluate hydraulic characteristics of earth materials present as well as effects of hydrogeologic boundaries such as faults. This data will be important for providing a sound basis for future modeling.

The DEIS should provide a complete analysis of the produced water plan, including a detailed plan for handling and treatment of dewatered water, including an analysis of the baseline conditions in the groundwater, including geochemical and isotopic makeup, conductivity, temperature, depth to groundwater and other parameters.

The DEIS should also assess the risks associated with spills due to transport of chemicals on-site, and waste off-site.

Groundwater Quality Sampling and Analysis:
A sampling and analysis plan should be developed based on monitoring and sampling from locations investigated for hydrologic conceptualization and baseline groundwater monitoring from springs and monitoring wells. Included in that sampling and analysis plan should be procedures for quality assessment and quality control for control sampling and analyses. To gain a better understanding of the baseline groundwater quality conditions, before the mining operations begin, groundwater should be sampled for the same parameters completed at the springs.

Numerical Groundwater Model Development:
A numerical groundwater model that can be used to evaluate both flow and potential contaminant transport aspects will ultimately need to be developed to analyze the effects of the Project on an already stressed groundwater basin. The spring monitoring, groundwater investigation, and monitoring data will provide a basis for the development of the model. The publicly accessible model should be used to evaluate changes in groundwater elevation (drawdown) and the basin groundwater balance as well as potential transport scenario results. A groundwater modeling report

should accompany the model for public review that includes modeling assumptions, construction, scenario results, parameter sensitivity analysis results, and descriptions of calibration quality.

The DEIS needs to consider the impacts of a one-foot drawdown contour on surface and ground water resources and spring-dependent species and habitat

The USFS should not plan on only analyzing the impacts of a ten-foot drawdown contour. The effects of drawdown on surface water resources is a severe risk to resources within the affected area. A spring or seep that depends on the water table will go dry if the water table drops below that intersection of the water table with the surface. Moreover, it's likely that even small amounts of drawdown can cause significant effects on lower flowing springs and seeps by diverting water away from these features, towards the cone of depression.

Other federal EISs for mining projects have used a much lower drawdown contour for the consideration of impacts (these federal documents are adopted and incorporated into the administrative record for this case, as the agency has ready access to these documents). The following is a small sample of those documents drawn from different states: Copper Flat Copper Mine: Final Environmental Impact Statement, Sierra County, New Mexico, BLM/NM/ES-16-02-1793 – 2019. The FEIS considers drawdown to 1 foot. BLM. 2019. Copper Flat Copper Mine Final EIS. Vol. 1. April 2019. Available at: https://eplanning.blm.gov/public_projects/nepa/75353/169629/206199/Copper_Flat_Final_EIS.pdf, pp. 3-100, 3-101, 3-103; Environmental Impact Statement, Alaska, 2018. This FEIS considers drawdown to 0.1 feet due to the nearby wetlands that could be dried. U.S. Bureau of Land Management. 2018. Final Environmental Impact Statement, Donlin Gold Project, Chapter 3.6: Groundwater Hydrology. April 2018. Available at: https://cdxnodengn.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=247774 https://eplanning.blm.gov/public_projects/nepa/35860/154866/189534/Sec_3.6_Groundwater_Hydrology.pdf, p. 3.6-31; Haile Gold Mine Project, Final Environmental Impact Statement, 2014, SAC 1992-24122- 41A The FEIS considers drawdown to 1 foot. BLM. 2014. Haile Gold Mine EIS. Final EIS Chapter 4. July 2014. Available at: https://www.gbrw.org/ftpgbrw/Thacker%20Pass/EIS-2020/FEIS/FEIS%20Submission/Thacker%20Pass%20Science/Haile/Haile_FEIS_Chapter_04_Environmental_Consequences.pdf, p. 4.3-7.

Further, even if a one-foot drawdown is within the range of seasonal variability, a one-foot drawdown may still cause significant impacts to the resource. Smaller drawdowns merely superimpose on top of the natural variability. A phreatic spring by definition is one for which the water table is at the ground surface. Lowering the water table by a foot turns a flowing spring into a mud hole. Lowering the water table by a foot even with natural variability increases the time that the spring is dry. The one-foot drawdown therefore provides a more complete rendition of the springs which could be affected.

The drawdown effects could also occur over many years and reduce the elevation at which the water table occurs more or less permanently, given that groundwater recharge or inflow is likely to occur more gradually than the dewatering/outflow. The DEIS must analyze both the short-term and long-term effects of that drawdown on water and biological resources.

If the DEIS sets the threshold for impacts analysis at a greater-than-one-foot drawdown, it must explain the rationale for that threshold and why a one-foot drawdown is not significant.

Streams, Seeps, Springs, and phreatophytic vegetation:

According to the Plan of Operations there will be considerable water consumption at the mine, including considerable dewatering, which must be evaluated for effects to flora and fauna as well as rangeland watering holes, and springs. A complete mitigation plan for each affected spring or resource must be detailed including exploration of how the sources of springs can be protected. Source protection is critical to addressing Indigenous cultural values of springs, and optimally preserving riparian areas. A detailed preliminary reconnaissance of the springs must be conducted (for those springs that are accessible) to evaluate current conditions (providing a baseline condition assessment) and to evaluate if past groundwater management has reduced or eliminated springs in those areas. Spring and seep monitoring should include the following tasks:

- Measuring field water quality parameters (pH, temperature, electrical conductance [EC], oxidation-reduction potential [ORP], and total dissolved solids [TDS]) from identified springs/waterholes and/or wells.
- Collecting supplemental surface water samples for stable isotopes, tritium, and radiocarbon.
- Collecting supplemental surface water samples for various chemical analysis: metals (i.e., arsenic, copper, lead, mercury); general minerals (i.e., potassium, sulfate, calcium, magnesium, sodium); cyanide; sulfide; total organic carbon (TOC); per- and polyfluorinated alkyl substances (PFAS); total petroleum hydrocarbons (TPHs); uranium; nitrogen species (i.e., nitrate, nitrite, ammonia); and pesticides.
- Documenting conditions present at each spring/waterhole and/or well, which may include:
    - Location - including GPS coordinates and directions;
    - Date/time/weather conditions at time of visit; and
    - General description of spring/well including spring type, channel and flow dimensions, and site condition (disturbance).
- Collecting photographic and video coverage of each spring/waterhole or well (video focusing on water flow) and surrounding area with an emphasis on vegetation coverage.
- Documenting wildlife observations, including birds and tracks observed.
- Describing general flora present, including presence/absence of invasive species. The reconnaissance should include small as well as larger springs.

Geochemical Analysis:

A geochemical analysis of the bedrock, waste rock, tailings and stockpiled materials must be performed and updated (including using data gathered since any previous analysis) for potential acid production, including crystallographic analysis to determine the extent of fracturing expected upon blasting. In this regard the full range of static and kinetic tests need to be performed. This includes determining the values for net acid producing potential (NAPP) and net acid generation (NAG) (the potential for waste material to produce acidic drainage and form acid, respectively).

The DEIS should contain a plan to analyze and handle acid and metals generation, including a contingency plan for acid generation capacity that exceeds preliminary testing results. In our experience, predictions of water quality due to mine projects are often far off the mark, so detailed plans are needed to assure that the various operations will be able to be mitigated in the event of acid generation.

The DEIS should also include analysis of potential water quality impacts to surface and groundwater resources due to spills and leaks within the project area, and evaluation of whether past management has degraded the water quality of those resources.

Surface water diversion and capture:

The DEIS should assess how construction of mine facilities and roads, and diversion of surface (including meteoritic) water to protect mine infrastructure, will change infiltration and groundwater flow patterns. It should also assess how consumption of surface water during mining operations will reduce the amount of water available to recharge aquifers. Changes in flow patterns resulting in altered flooding dynamics must also be examined. Impacts to wildlife and plants from alterations to the flood regime must be examined.

Clean Water Act and Organic Act Compliance:

Under the federal Clean Water Act, the USFS Organic Act, and agency regulations, the USFS cannot approve any operations that may result in any violation or exceedance of any water quality standard or requirement. The DEIS must fully analyze all project water discharges and releases to ensure that this is the case. As noted above, simple reliance on ADEQ permits does not satisfy the USFS's NEPA and other duties. Also, regarding water quantity, the Organic Act requires that the agency ensure the favorable conditions on water flows on public land. The DEIS must fully analyze and ensure that this will be the case (e.g., ensure that the dewatering and releases do not adversely impact flow conditions of potentially affected streams and springs).

Air Issues:

The DEIS must fully analyze and quantify the baseline conditions and direct, indirect, and cumulative impacts, as well as all mitigation measures and alternatives to project operations, regarding air quality that may be affected by the project.

There are several issues with the ADEQ Air Quality Permit for South32 Hermosa including the following:

- The draft air permit No. 96653 as written fails to protect and enhance public health and the environment in Arizona.
- The draft permit does not properly address air sampling and analysis of the PM2.5 and PM10 and does not address any concerns associated with manganese.
- The draft Air Quality permit does not monitor and/or record long term effects to the environment or protection to the health and wellbeing of living organisms and air permits do not address the accumulative effects over time.

Plumbism and manganism are both serious medical conditions caused by exposure to lead and manganese, respectively. Plumbism, also known as lead poisoning, is caused by the accumulation of lead in the body. It can cause a wide range of symptoms, including abdominal pain, constipation, headaches, irritability, memory problems, infertility, and tingling in the hands and feet. Manganism, on the other hand, is caused by exposure to manganese and can cause symptoms such as tremors, difficulty walking, and speech problems. Both conditions can be debilitating and have long-term effects on the body.

The US Forest Service must analyze and utilize the health impacts of manganese published by the US EPA regarding the Ferro-Alloy National Emissions Standard for Hazardous Air Emissions (NESHAP) 2017. Regulations.gov docket EPA-HQ-OAR-2010-0895-0338

Due to sampling deficiencies, the draft Air Quality permit also fails to enforce containment of contaminants within the mine's property boundary preventing a possible Superfund site of public lands especially with the forecasted life-of-mine.

The draft Air Quality Permit states on Page 88 of 108, Part C - PM10 and PM2.5 Monitoring, "At least 90 days prior to the startup of mine operations, the Permittee shall install, operate, and maintain a continuous PM10 monitor and a continuous PM2.5 monitor at a location approved by the Director at the Brush Hill property. The stations will be installed, maintained, and operated in accordance with the written and approved QAPP, which is consistent with the monitoring protocol approved by the Director, addressing all general requirements, particulate matter station operations, and quality assurance initiatives." However, the Brush Hill property is located approximately 1.9 miles away from the mine which would encircle approximately 11 square miles without any other permit required air monitoring. Additionally, the Brush Hill property sets along the main travel route (Harshaw Creek Road) to the Hermosa mine and will be subjected to road dust and mine vehicle track-out mineralized dust especially since the property is nestled in the valley bottom.

To protect human health and predict negative health outcomes before they are permanent, the Mine Plan of Operations must include Air Quality monitors throughout the South32 Hermosa facilities, fence lines and transportation corridors monitoring for all the Clean Air Act criteria pollutants, as well as, specifically metals affiliated with the mine, Lead, Zinc and of course Mn. Further nuisance and public hazard emissions, related to visibility, clear skies and visible impact must be minimized and controlled which is not addressed in any of the documents presented. There is a very high likelihood that 40% opacity levels defining nuisance emissions in the US Clean Air Act will be exceeded by

heavy transports hauling containerized ore, on dirt roads and paved roads with track out residual on the surface. Arizona State Implementation Plan limits nuisance emissions to 20% opacity, a limit that will most likely be exceeded daily from heavy multi axle vehicles transporting ore. Where is the modeling explaining this hazard is recognized by the US Forest Service/US EPA and ADEQ/ADOT and how will it be measured and mitigated? Will it require a fatal vehicle accident on Harshaw Road due to dust impairment to bring this extreme hazard to public health and safety into the documents required to address public health and safety concerns.

There are public roads which pass through South32 Hermosa. The draft Air Quality Permit inadequately does not recognize public roads within the Ambient Air Boundary at which the modeled air concentrations have to be determined to meet Air Quality permit standards. ADEQ Modeling Guidance regarding the Ambient Air Boundary Determination states that "ADEQ will not accept a proposed ambient air boundary that consists of portions which could not effectively preclude public access". The proposed air concentrations in the ADEQ Air Quality permit fail to meet the ADEQ Modeling Guidance and could constitute a risk to public health as the public will be able to cross into the Ambient Air Boundary.

Instead of using site-specific metal concentrations in soil, S32 in appropriately decided to use an "Arizona average" for metal concentration in soils as published in the referenced 1991 ADEQ report and the applicant chose to use measurements from samples collected by ADEQ specifically near the metro area of Phoenix and Tucson. In the Patagonia area, the USGS collected and tested soil samples and the value for lead out of 119 samples was 1,490 ppm, or 61 times higher than the value for lead used in the air quality model to support the permit. If a site-specific value for lead in soil is used, the total lead emission rate will increase, likely causing acute and chronic negative health impacts from lead and other metals as well as Mn, for miles downwind of the mine site. Further, the track out and other related fugitive sources will likely exceed the National Ambient Air Quality Standards for PM2.5 and PM10. Omission of site-specific data seriously underestimated total metal emission values by not using metal concentrations in road soils relevant for South32 Hermosa. As a result of using Pima and Maricopa County sediment models the resulting health impact related to metals poisoning, respiratory ailments, asthma and emphysema, and environmental contamination is seriously underestimated, as exemplified above. Who will bear the cost of the increased health care demand resulting from these environmental exposures related to the South32 Hermosa operation?

The Air Quality Permit improperly only requires the determination of dispersion for lead and not for other metals. There is a major concern that Manganese, the dominant metal air pollutant, and primary mineral driver of the Fast41 funded mine is not listed in the emission estimation tables nor included in the dispersion modeling. The next generation Manganese mine Air desperation models did not include Mn or Silica because the outcomes were toxic, or above the permissible exposure limits published by OSHA? Manganese is not shown in the emission estimation tables and manganese is not included in the dispersion modeling.

Other oversights in the Air Quality Permit include:

- All the vehicle traffic to South32 Hermosa, vehicle counts, weights, and axils for the mine at full operational capability "Maximum Potential to Emit" needs to be modeled using emission factors derived from localized sampling, such that realistic controls can be implemented to prevent negative outcomes to the Air and Waters of the US, Public Health, Flora and Fauna, Wildlife, Threatened and

Endangered species.

- All the internal driving around the mine site, to RIBs, etc. is not reported, opacity and PM emissions are not addressed, controls for track out that will inevitably contaminate downstream and downwind areas is not addressed.
- Off-loading of reagents into silos, generating off gas and acid Air emissions is not addressed or controlled.
- Track out, through the mine site, on to and off of public roads will cause toxic dust ladened with Mn, Lead, and other heavy metals with low Permissible Exposure limits, 5ug/M3. No doubt the track out alone will increase healthcare demand in Santa Cruz county and cause a public hazard on the roadways, transforming from quiet country dirt roads, to heavy, multi axle vehicles, buses, delivery trucks, visitors and other non- mine related traffic. Where is the modeling that demonstrates recognition of these inevitable factors?
- Clark mine external crushing and stockpiling will be a major fugitive dust source and a heavy impact on the downwind, and downstream environments, as well as public health. Yet its emissions are excluded from the draft permit because? One can only assume the modeling demonstrated contaminates above exposure limits without controls.
- Taylor conveyor belt transfers to silos, watching the conveyor belt systems in the sand and gravel pits of Pinal county that cause the PM 10 non- attainment designation in the area is a simple means to understand the heavy dust load conveyor belts contribute to the Ambient Air. Excluding conveyor belts is again looked at as a significant oversight given the ADEQ knowledge related to other rock product related businesses throughout Arizona. Are the belts to be covered, will they have water spray controls?
- Transports of filtered cake to the paste batching plants, will generate dust and related off gassing yet these emissions are not addressed.
- Dust generation issues which may have only become evident from the PoO. Such as the dry tailings dust control and the need for armoring of the tailings to prevent excessive nuisance emissions, not addressed, nor the general nuisance emissions from operations above ground moving mined ore from the unmanned underground (too toxic for humans to exist, in the mine) to the top side collection and concentrators will effectively bring the toxicity of the underground to the surface. How will these dust emissions be managed and mitigated so as to not become a public health hazard? How will increased health care demand in Santa Cruz county be addressed? What agency is budgeting to provide for the increase in public health care required in the communities downwind of the operating mine?

The concentrator on private land will likely emit the highest concentrations of airborne contaminants. Why are more details on the concentrator not presented in the PoO as it is an important component of South32 Hermosa to understand and evaluate impacts to Waters of the US, human health and the environment?

Air Quality Comments to the PoO: The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.3.2 on page 2-37 states, "Oxide ore is planned to be transported in fully sealed containers. While the specific containers have not been selected, such containers are commercially available and widely used in train, ship, and truck transport for a variety of goods, including to ship mine products

and grain. These containers are sealed at the site, loaded onto trucks, and the containers remain sealed until arriving at the destination for unloading. This eliminates spillage, dust, and reduces the potential release of material during an unexpected event or accident during transportation."

- First the section does not address the primary source of pollution is the heavy multi axle vehicles hauling the containers of ore operating on unpaved dirt roads of soil laden with heavy metal contaminants. The toxic dust from one of these vehicles loaded and unloaded MUST be modeled using emission factors from local soil samples to determine the downwind impacts to Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species.
- If the containers have not been selected, how can it be claimed to eliminate spillage, dust and reduce releases during accidents. How much contamination is anticipated to be released during loading, transportation and due to traffic accidents? Harshaw Road has already endured significant deterioration due to exploratory mine traffic. Opacity levels at bumper height are regularly above 20%, creating a public visibility hazard on a public road. How is it believable that ore transports will operate accident free, when it is currently hazardous to drive Harshaw Road, with visibility decreasing as the temperatures increase into summer months. As mentioned earlier opacity levels on public roads are already exceeding nuisance emission limits in AZ. Further where is the control for this dust, the PoO speaks to building paved access to the mine, but does not address the use of public currently dirt roads to the undisclosed Zinc and Mn processing facilities, wherever they may be located. Will the containerized ore be placed on rail? Where will the ore be processed? How will it get there? It is not possible to do a full Green House Gas assessment, Scopes 1, 2 and 3 analysis as required for new significant GHG sources. The Natural Gas generators currently operating on site combined with the full PTE of mine related vehicles will exceed the threshold making South32 Hermosa a significant GHG source. Where is the mitigation plan and offsets to these GHG emissions.
- How will the container seals be evaluated and maintained to eliminate spillage, dust, and reduce the potential release of material during an unexpected event or highly probable accident during transportation? Summer monsoons in Southern Arizona, often cause flash flooding, wash out roads and cause significant hazards to heavy multi axle vehicles, towing large containers. Modeling for how to address various high impact, high probability accident scenarios, "roll overs","landslides" "washouts" and the alternative dry heat related scenarios heavy dust, impacting "visibility" and wildfires resulting from vehicle related ignition, needs to be performed and response plans equipped, maned and supplied. Is the US Forest Service budgeting for the highly probable wildfires that will result from this mine? Road repair required from the highly probable annual flooding events?

Section 2.5.3.2 on page 2-37 states, "The crusher and crushed product discharge chute to the transfer conveyor and coarse ore silo is serviced with a dust collection system using a fan and baghouse."

- How will the area along the route described above be designed and monitored to prevent impacts from runoff, overflows and dust to Waters of the US, human health and the environment?
- Will the area along the route be tested for soil contamination to evaluate the effectiveness of the system to prevent impacts to the Waters of the US, human health, and the environment.

Section 2.5.6.1.2 on page 2-51 states, "Ore from the primary mill conveyor is discharged into the primary mill, also on South32 Hermosa private land."

- What are the anticipated impacts to human health and the environment due to the emission of contaminated dust generated from grinding the ore and contaminated dust associated with conveyance of the ore?

- How will air quality from the milling facility be monitored and how will exceedances in air quality be remediated?
- Will exits from the primary mill be monitored for lead, manganese, zinc, other heavy metals and opacity?
- What air quality controls will be installed to maintain worker health and safety and to protect the environment?
- What is the PTE from this conveyance and how will this known emission source be monitored and modeled such that the downwind impact to the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species be measured?

Section 2.5.7.1 on page 2-54 states, "The existing TSF1 will be expanded from its present footprint…"
- How will dust from the TSF1 expansion be controlled and monitored to prevent impacts to air quality, human health and the environment?
- How will dust and track out from transportation of tailings to TSF1 be controlled and monitored to prevent impacts to air quality, human health and the environment?

Section 2.5.7.2.1 on page 2-62 states, "Although the haul trucks would have an open top, fugitive dust is not anticipated due to the fact the filtered tailings would be moist." It is not unreasonable that dust will be generated during loading, transport and unloading of tailings, even if they are moist when loaded. Is it unreasonable to assume the top of the filtered tailing will dry out quickly in 100 plus degree temperatures with very low humidity in the peak of summer? How will these haul trucks be monitored for opacity? How will the dust content and opacity in the air be monitored and controlled during loading, transport and unloading of tailings to prevent impacts to Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species?

Section 2.5.11.3.2 on page 2-79 states, "Resurfacing treatments could include asphalt, soil-cement base, and/or chip-sealing. Depending on the final design, drainage crossings could be improved with the installation of culverts, at-grade crossings, and water bars."
- What are the impacts from dust to air quality associated with each of the proposed road materials
- Will the native soil adjacent to the roads be evaluated for contamination? Will the soil in the soil-cement base be evaluated for contamination?
- What are the impacts from dust to air quality associated with construction of roads?
- How will dust and airborne contaminants from the building of upgraded roads be mitigated specifically the blasting that will be required to widen the public roads to accommodate heavy large multi-axle transports, and what is the mitigation plan to not negatively affect the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species?

Section 2.5.12 on page 2-86 states, "Existing line power will be supplemented by natural gas- and diesel-fueled generators…"
- What are the impacts to air quality, where are the GHG scope 1 documents estimating the GHG emission from the direct sources and where are the scope 2 and 3 documents detailing the emissions from transportation and third party use of the mined material. Where is the impact assessment from the use of these giant generators to the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species?
- How is the use of generators consistent with South32 claims of clean energy goals? And assuming a

multi-year build out of the 138 KV transmission lines will the generators currently in operation exceed the GHG emissions thresholds of a Major source or Title V source and how will these emission impacts be mitigated to insure no negative impact to the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species?

Section 3.1 on page 3-2 states, "Limited Surface Disturbance Footprint. The surface disturbance footprint for the Plan Operations is less than 500 acres."

- How much air pollution will the public be exposed to when operating vehicles or cycling on public roads within the surface disturbance footprint for Plan of Operations?
- Why is the data currently being collected through the Canary Project monitors that are on the site not being provided to the public?
- With the bulk of larger particles deposited most presumably at and near the Hermosa Mine site, the question arises how many decades of accumulation on neighboring public soil and surface water will lead to an exceedance of existing quality standards for soil and water? Crushed rock is a significant dust source; the downwind public lands will be covered with heavy metal laden dust and yet no wind fencing or other controls are stipulated to mitigate downwind impacts to Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species.

Section 3.1 on page 3-2 states, "Electrified Transport. Application of low-carbon design principles includes planning for an all-electric vehicle fleet powered by renewable energy to reduce noise, improve working conditions, safety, and health, and support delivery of South32's greenhouse gas reduction targets and goals."

- How is using onsite fossil fuel generators to completely power operations to support South32's greenhouse gas reduction targets and goals?
- What will be the source of energy to power the fleet? What will be the mass of greenhouse gas emissions generated as a source of energy for the fleet? Was this considered in South32's greenhouse gas reduction target calculations?
- Why are South32's greenhouse gas reduction targets and goals not discussed in the PoO? Where are these reduction targets and goals published and what is the consequence of non-achievement? It's easy to make a statement as cited above but difficult to measure and quantify unless such quantification is reliable, repeatable and reproducible as required of all compliance reporting data under the Clean Air and Water Acts of the US.
- Will South32 commit to generating all their power from solar and wind generated in Arizona?

Section 3.1 on page 3-2 states, "In addition to these key mine development strategies, South32 Hermosa is applying low-carbon design principles in the Project's design and engineering plans in order to reduce greenhouse gas emissions."

- How is using fossil fuel generators capable of supporting the entire operation, support the projects design and engineering plans in order to reduce greenhouse gas emissions?
- Why is South32's greenhouse gas reduction targets and goals not discussed in the PoO as this is important to understand the impacts of South32 Hermosa to human health and the environment? Where are these reduction targets and goals published and what is the consequence of non-achievement? It's easy to make a statement as cited above but difficult to measure and quantify unless such quantification is reliable, repeatable and reproducible as required of all compliance reporting data under the Clean Air and Water Acts of the US.

- Why are South32's low-carbon design principles not discussed in the PoO?

Section 3.1 on page 3-2 states, "South32 Hermosa foresees using automation and technology to minimize impact on the environment to help achieve South32's long-term goal of achieving net-zero greenhouse emissions by 2050. An additional component of this goal is the use of renewable energy. The mine designs will enable power supply from renewable energy, which could underpin new renewable energy capacity and infrastructure across the local region."

- Other than onsite generation of power using fossil fuel generators, how will South32 Hermosa be able to control the source of power supplied to the project by a powerline from a private power company?
- Power to South32 Hermosa will be supplied by a utility company which uses natural gas and coal fired generators and that will produce greenhouse gases and is not a source of renewable energy. Will South32 offset the emissions from the utility company used to generate power for South32 Hermosa or will they rely on programs developed by power companies to meet their goals?
- What is the net-zero greenhouse emissions by 2050 plan and why is it not discussed in the PoO as this is an important plan to evaluate as South32 Hermosa will have an impact on human health and the environment? Will South32 Hermosa only rely on programs developed by power companies to meet their goals?
- The net-zero emissions plan will probably not be able to benefit the region with cleaner air or less emissions and will in fact allow for more impacts by need for more regional power generation.
- Will carbon offsets be used to achieve net-zero greenhouse emissions by 2050? Will those carbon offsets be achieved using domestic or regional offsets or will carbon offsets be purchased for projects outside the United States? How will the carbon offsets be verified?
- Will South32 Hermosa release the Scope 1, 2 and 3 Greenhouse Gas Emissions to the public to track their sustainability goals?

Section 3.3 on page 3-3 states, "However, the Project is outside of the nonattainment area and is not affected by these designations (ADEQ 2022). Class I areas are granted special protection under the Clean Air Act and analysis may be required to demonstrate the Project will not impact these areas."

- The project poses air quality risks to the non-attainment area and that frequent monitoring should occur throughout the "affected environment" including all mineral and HAZMAT transportation corridors to protect human health and the environment.
- Why is an analysis to demonstrate that air quality impacts from South32 Hermosa will not impact Class I areas, not included in the PoO? Where is the closest Class I area to South32 Hermosa and will this area be impacted by South32 Hermosa considering emissions based on site-specific data?
- Are there portions of the Harshaw Creek or San Rafael areas on the National Registry of Historic places that have special protection under the Clean Air Act?
- Have emissions from South32 Hermosa been included in the State Implementation Plan?

Section 3.3 on page 3-5 states, "In addition to the Class I permit requirements, South32 Hermosa will identify and minimize air pollutants (and their potential impacts). The Project will implement monitoring programs to assess operating performance, verify compliance with adopted performance criteria, facilitate reporting requirements, and quantify the material emissions sources that have the potential to cause adverse environmental or community health impacts."

- How will South32 Hermosa identify and minimize air pollutants and their potential impacts? Why is

this not included in the PoO as it is an important element to understand the impacts to human health and the environment?

- The air permit has not been issued to South32 Hermosa by the ADEQ. The ADEQ is currently reviewing comments on the draft air permit.
- The ADEQ response to public comments period for the draft air quality permit started 2/26/24 and was still continuing as of 5/16/24, that's almost 3 months and responses were still not completed as of 5/16/24. The ADEQ generally responds to comments within 30 to 45 days.
- The PoO is dated December 1, 2023, before the comment period for the draft air permit began. This above statement in the PoO is misleading the public as to the status of the permitting process. The air permit was not issued in December 2023, and it is still not issued in May 2024.
- The draft air permit likely violates the Clean Air Act and the public has been waiting for responses from the ADEQ to address this concern.
- Responses to comments need to be reviewed to understand if the permit is compliant with the Clean Air Act and if the discharge will impact Waters of the US and human health and the environment. Impacts to human health and the environment can't be completely evaluated until the air quality limits have been issued by the ADEQ.
- The project poses air quality risks to the non-attainment area and frequent monitoring should occur throughout the "affected environment" including all mineral and HAZMAT transportation corridors.

Section 3.3 on page 3-5 states, "Engineered control equipment will be used (e.g., dust collectors) at crushing and process areas requiring dust and/or emission controls, as determined to be necessary to prevent excessive emissions."

- How does South32 Hermosa define and monitor excessive emissions? How will South32 Hermosa predict conditions that would create excessive emissions and how will operations change to prevent excessive emissions based on predictions?
- What is the criteria to determine when it is necessary to prevent excessive emissions and what will be the controls to prevent excessive emissions?
- How will South32 Hermosa remediate excessive emissions after discharge to the environment due to failed equipment or operator error?
- Without stipulated compliance limits such as 20% opacity will not be exceeded, and/or emissions greater than 5ug/M3 of Mn will not be exceeded, who will be responsible and accountable for the downwind and downstream damage inflicted on to public lands and into the Air and Waters of the US, impacting Public Health, Environmental Health, Wildlife, Threatened and Endangered species. How will these impacts be measured? Who will insure accountability to the limits stipulated and how will the public be informed of exceedances that impact public health?

Section 3.3 on page 3-5 states, "Although the majority of mining operations would occur underground, fugitive dust would be produced and potentially fugitive emissions would emanate from mining surface operations (hauling, stockpiling, blasting, drilling etc.), particularly on windy days."

- What is the criteria to determine when it is necessary to prevent excessive emissions and what will be the controls to prevent excessive emissions?
- What will South32 Hermosa do on particularly windy days to prevent excessive emissions? What is the wind speed threshold?
- How will South32 Hermosa remediate excessive emissions after discharge to the environment due to failed equipment or operator error?

- How will "Dust Devils" that occur during hot dry pre-monsoon months be predicted and mitigated?
- How will South32 Hermosa mitigate impacts to the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species.

Section 3.3.1 on page 3-5 states, "Dust associated with oxide material will be managed by containerized transport and the use of roads will be minimized to the extent practicable by using buses to transport staff and encouraging contractors and staff to minimize trips to and from the Project on a daily basis."

- What guarantees that containerized transport will not result in fugitive dust along transportation route(s)?
- Seems highly likely that heavy multi axil vehicles transporting heavy loads of ore will create significant dust on the current dirt roads of the area and significantly impact the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species.

Section 3.4.2 on page 3-8 states, "Evaporation is expected to increase due to increases in solar radiation, temperature, and wind speed."

- Were these factors considered for air permitting as additional dust will be generated by South32 Hermosa by increased winds in the future and the basins will require more dry periods for maintenance?

Recommendations to Mitigate Air Quality Issues:

The DEIS should provide a greater emphasis on understanding the combined toxic effects of metals and other air emissions to evaluate impacts from South32 Hermosa. To date, emphasis has been focused largely on single metal exposures. The magnitude of toxicological interactions related to the combined toxic effects of metals needs to be evaluated as the practical consequence of studying single metal exposures likely underestimates the risks to human health and the environment.

The DEIS should require an evaluation of a site-specific value for lead and manganese in soil to be used to calculate the total lead and manganese emission rates.

The "distal" location of the Manganese processing plant should be specifically required by the DEIS to be disclosed and not located within the Upper Santa Cruz airshed/watershed to protect local populations from neurotoxic dust and related manganism illnesses. Tailings at the Manganese processing plant and their related long-term effects need to be addressed in the DEIS.

The DEIS should require the following air Monitoring Recommendations:

1. The "remote" Brush Hill property air monitor needs to be relocated to avoid the interferences from road dust and provide a reliable baseline.

2. Add multiple additional lower cost air quality monitors surrounding the perimeter of the South32 Hermosa operations with line of site cameras to rapidly assess the causation of PM monitor spikes. Air monitors need to be installed to insure complete air sampling which would include the access roads public and private, measuring nuisance emissions "opacity" and PM at a minimum and including all

metal and known contaminants from soil samples collected from the Clark and Hermosa sites. This monitoring network should follow the USEPA's Handbook for Air Quality monitoring, to ensure the network is reliable, repeatable and reproducible, as required by the handbook, which would also require a Federal Reference Monitor along the prevailing wind side of the facility to collect samples for speciated contaminate (lead) analysis of collected PM samples. Further Federal Equivalent Monitors should be deployed for rotated calibration checks on the lower cost remote monitors. Monitors should be placed based on win rose models of the mine site from the AEROMOD models rerun using emission factors based in localized soil samples, e.g. determine the likely surface load of the target contaminates and use these factors to determine the impact to Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species.

3. Add multiple low cost monitors along the roads accessing the Hermosa site and opacity cameras as required to monitor public safe concerns related to dust opacity. include FRM and FEM air monitors at the Hermosa mine property boundaries to cross check and calibrate the lower cost remote monitors, as required by the EPA handbook of Air monitoring to insure the monitoring is reliable, repeatable and reproducible, and ensures dust control measures are adequate and effectively mitigating nuisance emissions and the dust modeling is correct, and to protect the surrounding environment from any short-term or long-term exposures to toxic metals and/or toxic minerals.

4. The draft permit does not expressly state lead will be analyzed on the FRM collected PM2.5/PM10 samples. Lead needs to be analyzed to understand the correctness of the air model, to determine lead loading to the environment and potential health issues, and the effectiveness of the dust controls.

5. XRD/XFR analysis should be conducted on the FRM collected PM2.5/PM10 samples to determine minerals and metal concentrations for each PM2.5/PM10 sampler as this analysis is critical to determine mineral and metals loadings to the environment and potential health issues, and the effectiveness of the dust controls. This should be monitored and recorded for review by the public.

For the reason of obtaining the most realistic emission numbers, the DEIS should require obtaining "site-specific" values by means of onsite assessments. As confirmed by ADEQ when asked for by email, onsite assessments of the emission - and emission control factors have not been conducted. Considering the absence of EPA recommended site-specific emission assessments, a comparison between estimated emission rates with available release limits and subsequently between modeled air concentrations of dispersed pollutants with available air concentration standards, is of low confidence and likely underestimates impacts to Waters of the US, human health and the environment.

Overall, the DEIS must fully analyze alternatives that may reduce emissions from each source. For example, the DEIS must consider using lower-emission and/or electric vehicles.

Hazardous Air Emissions:

The DEIS should quantify and analyze all criteria pollutants (such as sulfur oxides, nitrogen oxides, etc.) and hazardous air pollutants from all mine facilities and vehicles and identify mitigation measures to avoid and reduce these emissions.

Greenhouse Gases:

The DEIS should analyze the Project's contribution to carbon dioxide and other significant greenhouse gas emissions. The DEIS should take a life-cycle emissions approach and quantify emissions from all potential direct and indirect sources, including emissions from electricity generation and use (including all sources of incoming electricity for the project), waste generation and pollution treatment, blasting, stationary and mobile sources, and land-use. The DEIS should analyze mitigation measures to avoid and mitigate emissions, including electrical vehicles, renewable energy sources, and energy efficient equipment and processes, and quantify potential emissions reductions.

Particulates:

The DEIS should quantify particulate emissions from all aspects of the Project, including concentrations for varying wind factors. This analysis should include emissions from drilling and blasting, loading and unloading, crushing, overburden replacement, refining, diesel vehicle and equipment, roads, stockpiling, and wind erosion, among other sources. EPA. 2020 National Emissions Inventory Technical Support Document: Industrial Processes – Mining and Quarrying. March 2023. Available at: https://www.epa.gov/system/files/documents/2023-03/NEI2020_TSD_Section28_MiningQuarrying.pdf.

Metalliferous mine dust can contain (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), uranium (U), and zinc (Zn), of which arsenic, cadmium, mercury and lead are the most toxic. Numerous studies highlight the increased risks for long-term residents of communities living close to active, re-activated and abandoned mine sites around the world. Entwistle, J.A., *et al.* 2019. Metalliferous Mine Dust: Human Health Impacts and the Potential Determinants of Disease in Mining Communities. *Curr Pollution Rep* 5, 67–83. Available at: https://doi.org/10.1007/s40726-019-00108-5.

Impacts of the "dust" should be evaluated for inhalation health impacts, visibility impairment, and resettling on surface water and vegetation. In the case of resettling on surface water there should be a chemical analysis of the dust to determine whether the dust could have an adverse effect on the chemistry of the water, or its turbidity and assess consequences for wildlife. The DEIS should detail a plan for dust control and emissions reductions, and analyze the effectiveness of proposed mitigation measures.

Reclamation:

The DEIS must include a reclamation plan that details how the project will deal with the occurrence of leaks in the water containment system, tails, and waste rock. The DEIS should estimate the lifetime of the protection and drainage capture system, and analyze the likelihood and consequences of failure, which will occur eventually. USFS should require a detailed plan for arresting spills and

cleanup procedures.

USFS must also determine any aspect of the mine plan that will require long-term management such as treatment of acid mine or metals drainage. The DEIS should detail for public review adequate financial assurances for complete reclamation, including any long-term funding mechanisms. The DEIS should demonstrate that the bonding will ensure satisfactory reclamation.

The reclamation plan should also include comprehensive revegetation plans, including concrete measures and specific performance criteria, for public review and comment. Mitigation to revegetate disturbed areas should be based on best practices and local ecological processes, or efforts to revegetate the impacted areas are not likely to succeed. There should be specific thresholds for successful reclamation that must be met, or changes to reclamation practices should be implemented to reach such thresholds.

Revegetation plans should require planning and collection of seeds in advance of soil disturbance. The planting palette should include seeds appropriate to the environment and climate conditions. Only local native plant propagules should be used and the plantings/seedings should be administered in an ecologically successional way – introducing early successional species first, followed sequentially over a multiple year process with mid-successional species and finally late-successional species. A frequent weeding schedule particularly during the growing season (removal before seeds are produced is best) should be implemented, particularly in the first three years to reduce non-native and invasive species from proliferating, which would doom revegetation efforts.

Revegetation plans should include short-term and robust "establishment" criteria, so that problems can be identified and remedied early (e.g., protection from herbivory, adequate soil moisture, stopping weed invasions before they start). Long-term success criteria should also be included (e.g., monitoring shows that the revegetation site is statistically similar to a reference (undisturbed) site by looking at cover, density, diversity). The project developer should be held to all revegetation plan requirements and success criteria. Otherwise, revegetation is unlikely to be successfully implemented. To the extent any state or federal agency or tribal authority has management authority over disturbed areas, the agency or tribal authority should be required to monitor compliance with all revegetation requirements for those lands.

Finally, required revegetation periods and monitoring should have at least five years of monitoring with the last two years not having any "interventions" (no additional irrigation, weed removal, augmentation of revegetation). If additional remediation/revegetation is required, then the clock should restart in those areas with five more years of monitoring. For example, if most of the revegetation area is meeting success criteria (which should be clearly identified in the revegetation plan), but one area is not meeting the success criteria, then additional revegetation augmentation should be done in the "unsuccessful" area and the monitoring continues for five years after the augmentation, which is standard practice.

The better practice, however, would be to require long-term monitoring up to ten years (with a reduced monitoring schedule in years 6-10 – once every 2 years) to assure that the success criteria are met. There is not much data on long-term outcomes of revegetation, so ultimately the long-term success for most projects is unknown. Thus, long-term monitoring is advisable.

Wildlife and Biodiversity Issues:

The Hermosa project lies within one of just thirty-six biodiversity hotspots in the world, the Madrean Pine-Oak Woodland…also known as the Sky Islands. Fifteen threatened, endangered, and candidate species rely on habitat in the vicinity of the Hermosa project for their survival, along with 129 sensitive species and USFWS designated critical habitat for three species. That the USFS would even consider a mine of this magnitude within this extremely sensitive and essential habitat undermines their ability to successfully manage land. PARA has identified a multitude of issues South32 and the USFS have ignored in their preliminary documents and must be examined in detail by the DEIS. Under its mining regulations, the agency must analyze and ensure compliance with its requirement that it "maintain and protect fisheries and wildlife habitat which may be affected by the operations."

The Hermosa Mine project area lies within USFWS designated critical habitat for the endangered jaguar (Panthera onca). No studies have been conducted on jaguar (endangered) presence in the area by South32 and the USFS; a baseline camera trapping program should have been established years ago as jaguars are known to occupy the surrounding area. At a minimum, a 5-year study must be conducted to adequately collect data for the DEIS. Mining activities are expressly identified in the jaguar critical habitat designation as having the potential to adversely modify critical habitat for the species, especially those mining projects with the potential to sever connectivity to Mexico. This project is located within 5-10 miles of the US-Mexico border and has significant potential to impact this connectivity. Section 7 consultation with the USFWS should have already been conducted prior to the DEIS. Section 7 consultation with the USFWS must be conducted.

The threatened Mexican spotted owl (Strix occidentalis lucida, MSO) is known to exist within the Hermosa Mine project area. Section 7 consultation for this project has not been conducted with the USFWS and should have been completed prior to the DEIS so impacts would be properly studied. Impacts to MSO from long-term increased decibel levels resulting from drilling and mining activities have never been studied. At minimum a 5-year study should be conducted for the DEIS to properly analyze potential impacts to the MSO. Citing a study on short bursts of helicopter noise is not sufficient, as has been the incorrect industry standard. Groundwater extraction will impact deep-rooted canopy trees, in turn significantly impacting MSO designated critical habitat. A study must include proper analysis of these long-term impacts. Additionally, if the Hermosa Mine project is approved, assurances must be given that activities will not occur during MSO breeding season. The CNF's Land Management Plan requires "limiting human activities in these areas during breeding season, and avoiding road and trail construction completely unless for "pressing management reasons." Departing from these management standards and guidelines for this brings in question CNF's unbiased study of impacts to the MSO.

The threatened yellow-billed cuckoo (Coccyzus americanus, YBCU) has been documented throughout the Hermosa Mine project area. USFWS designated critical habitat is present along the entirety of Harshaw Road, which will see a dramatic increase in traffic. Studies must be conducted on the

long-term impacts to the species as a result of this, evaluating in detail a noise analysis and impacts to critical habitat resulting from runoff, erosion, and sedimentation, as well as impacts resulting from groundwater extraction. The canopy trees are deep-rooted and dewatering will cause canopy loss, significantly impacting YBCU critical habitat.

The Patagonia Mountains play an important role in the conservation of ocelots (Leopardus pardalis) in the United States. The proposed project sits 30 miles or less from where ocelots have been documented in both Arizona and Sonora. The DEIS must examine impacts to the ocelot and its habitat.

To emphasize, this project is located within critical habitat for endangered jaguar, threatened YBCU, and the threatened MSO, and habitat for a total of fifteen threatened and endangered species, and is likely to adversely modify this habitat and potentially jeopardize these species. We are concerned by the long-term impacts to critical habitat and the unique biodiversity of the Patagonia Mountains resulting from groundwater extraction and mining activities. The dewatering of the aquifer will introduce impacts a DEIS does not examine. The USFS must conduct a scientifically accurate and unbiased long-term study to determine impacts before approving an EIS. Additionally, the impacts of habitat fragmentation resulting from project activities for all species in this biodiversity hotspot are poorly studied and must be fully analyzed in the DEIS.

Altered hydrology from construction of transmission lines and groundwater extraction will impact the persistence and viability of the federally threatened plant species, Bartram's stonecrop (Graptopetalum bartramii), in Flux Canyon. Dewatering the aquifer and altering hydrology via surface disturbance will likely impact overstory canopy survival and surface water availability. Loss of shade is indicated as a primary threat to Bartram's stonecrop. The USFWS listing specifically notes that "the loss or reduction of groundwater, stream flow, or spring flow in or near a Bartram's stonecrop population due to mining-related activities could lead to extirpation of that population". Further, Flux Canyon is where the type specimen used to first describe this species was collected. While the type location does not hold biological significance, it is a part of the botanical legacy of the Patagonia Mountains.

Clearance surveys for the endangered plant species, beardless chinchweed (Pectis imberbis), should be conducted and the potential for direct and indirect impacts to plants and critical habitat should be thoroughly analyzed. The project activities have potential to impact designated critical habitat and likely occupied habitat that has not been adequately surveyed. While historic populations of beardless chinchweed within the Patagonia Mountains are considered extirpated (Flux Canyon and Washington Camp), the project area contains suitable habitat for the species that should be surveyed thoroughly during flowering time. The species is exceedingly difficult to detect, even when in bloom. It is likely that populations have gone undetected due to lack of concentrated survey efforts by qualified botanists at appropriate survey times.

No biological surveys have been conducted on adjacent Santa Cruz County, CNF, and private lands that will be impacted by the additional runoff, erosion, sedimentation, and habitat impacts created by mining activities and truck traffic. The CNF has not assessed depletion of groundwater on adjacent riparian vegetation in streamside corridors. With fifteen threatened and endangered species in the wildlife corridor between Highway 82 and San Rafael Valley, there is likely to be significant impact and these studies must be conducted.

Invasive Species:
Project activities such as the transmission line construction and trucking traffic have potential to introduce invasive species that can extend well beyond the project footprint and alter the entire vegetation community of the Patagonia Mountains in perpetuity. The project should specify how invasive species treatments will avoid negative impacts to native vegetation (i.e. if using herbicides, using appropriate chemicals at appropriate times and minimizing chance of drift). Reclamation seeding can cause invasive species introductions (there is no certification for "weed-free" seed as mentioned in the Plan) and the use of non-local genotypes of native species from commercial sources in seed mixes can genetically "swamp" local genotypes and disrupt pollinator networks. For these reasons, the seed mix should specify which available seed materials of the suggested are best adapted to the area. While there are not entirely local sources for many species, there are better and worse options to choose from. If native seeds are collected from wild populations for use in reclamation seeding, collection methods should ensure that wild populations are not negatively impacted. The DEIS should analyze the potential spread of invasive species due to mining and other operations including at Arundo at Alum Gulch

Setaria vulpiseta (in the approved seed mix) is not common in the area and there are no records of it within the Patagonia Mountains. Setaria leucopila or S. macrostachya are more commonly found in the area. An alternative grass species such as the 'Bonita' release of plains lovegrass (Erogrostis intermedia) developed specifically for southeast Arizona should be used. Alternatively, a perennial forb could be substituted in place of the Setaria. The only forb species included in the seed mix are annuals. That we are introducing these ideas exemplifies South32's and the USFS's lack of concern and knowledge of the impacts resulting from the Hermosa Mine project.

Soil compaction is only addressed in the Mine Plan of Operations at the time of mine closure. In the interim soil compaction can negatively influence concurrent reclamation seeding during and plant establishment success and lead to increased run-off speeds and subsequent erosion surrounding compacted areas. These impacts must be analyzed in a proper study.

South32 and the County blading of new high traffic roads has generated a barren corridor of highly invasive weeds like the exotic Russian thistle immediately above the Borderlands Restoration Nursery and the Safe Harbor pond and Monti-Nabhan nursery downhill from South32's new road just north of the Patagonia town limit. As federal and county monies are involved in connecting this road to State Route 82 and Harshaw Road as part of the project, and because Borderlands Restoration Nursery has permits to salvage and grow endangered species for three federal agencies within fifty yards of road disturbance, South32 must come up with funds and staff time to routinely reduce impacts into perpetuity on these sites of endangered species propagation.

Wildlife Corridors:
The Patagonia Mountains cross the international border into Mexico and provide one of the last remaining cross-border migration corridors connecting this habitat to habitat in northern Mexico, where jaguar source populations are known to exist, making this wildlife corridor a critical pathway for these large cats to migrate into and out of suitable habitat in the United States. The Hermosa Mine project area is extremely important not only as threatened and endangered species habitat but also for habitat connectivity and wildlife corridors at a regional level for all species in this biodiversity hotspot. The Patagonia Mountains are a critical wildlife corridor for species migrating north or south within the

region; the Hermosa Mine project area falls within the designated Patagonia-Santa Rita Linkage Wildlife Corridor as identified by Arizona's Wildlife Linkages Assessment, prepared by the Arizona Wildlife Linkages Working Group, which consists of the Arizona Department of Transportation, Arizona Game and Fish Department, Federal Highway Administration, USFS, Bureau of Land Management, USFWS, Northern Arizona University, Sky Islands Alliance, and The Wildlands Project. The Hermosa Mine project area will disrupt one of the last remaining places in the Sky Island region where cross-border migration can occur. Wildlife road kills from the heightened truck traffic has already increased on Harshaw Road and State Route 82, yet South32 and the USFS have not done their due diligence in conducting a study. Wildlife roadkill may also include threatened and endangered species. A thorough study should already have been conducted by the USFS, and must be conducted for DEIS.

Climate Change:
According to USFS guidance, the agency is mandated to consider climate change in project-level NEPA analysis, including documentation on both the effects of agency action on global climate change and the effects of climate change on the project. The Rocky Mountain Research Station released "An Assessment of Climate Change and the Vulnerability of Wildlife in the Sky Islands of the Southwest," in which the 30 vertebrate species of interest on the CNF were assessed for vulnerability to climate change. Vulnerability scores were calculated for a habitat and physiology category and management considerations based on this assessment are given. Scientists have already recognized global warming as a key threat to biodiversity. A primary reason for this is because the cumulative impacts of climate change combined with other, non-climate stressors affecting the landscape will simply be too much for many species to bear. Ongoing habitat fragmentation combined with the impacts of climate change may be the biggest threat of all. The best scientific information available clearly points to the need to maintain landscape connectivity and overall resiliency, and to facilitate the migration of native species and expansion of new suitable habitat in order to allow species to adapt to the growing impacts of climate change in this region. The USFS must study climate change and the Hermosa Mine project as cumulative impacts in the DEIS.

Cumulative impacts:
Cumulative and indirect impacts of the Hermosa Mine to all potentially affected resources must be fully analyzed in the DEIS. Issues/impacts that must be examined in association with the Hermosa Mine impacts include, but are not limited to:

- zone of depression and habitat changes resulting from groundwater extraction and discharges
- heavy metal accumulation
- construction of the border wall and habitat fragmentation
- truck traffic outside the immediate vicinity of the mine
- the Patagonia region existing as a Number 3 Earthquake Hazard Zone (on a scale of 1-5)
- increased potential for wildfires due to mine activities and powerline transmission
- other proposed exploratory drilling by a Canadian exploratory company, as well as all other past, present and reasonably foreseeable mineral, energy, grazing, recreation, and other activities in the region
- off-site processing and transport of all minerals produced.

Flora and Fauna in General:
A full inventory and analysis of the baseline conditions of all potentially affected plants and wildlife

must be done, including but not limited to threatened and endangered species. Additionally, a complete analysis of the Project's direct, indirect, and cumulative impacts to plants and wildlife must be included in the DEIS. This analysis should include the impact of an affected area on both resident species and migratory species, including species such as jaguar and mountain lion that require large ranges.

The DEIS should analyze the potential for all project operations, including groundwater pumping and dewatering and water pollution, to cause habitat destruction, degradation and/or fragmentation, and direct or indirect killing of plants or wildlife. The DEIS should analyze the consequences for local and range-wide populations, including population viability. As noted herein, this analysis should consider and analyze cumulative impact in light of other stressors like climate change, other mining, development projects in the region, invasive species, and livestock grazing.

Threatened and Endangered species
The MPO states that it has "conducted site specific baseline data near the project" for certain species. The specific results of these studies should be made available for comment and analysis. Moreover, it is critical to know the geographic area and methodology used to enable the FS and the public to comment on the adequacy of S32's determination of impact and proposed measures to address such impacts. For example, it is critical that such studies cover the broad area affected by both the site of operations, exploratory activities, and transportation in and beyond NFS land.

The DEIS should include baseline studies conducted on all threatened and endangered species. While S32 stated that it conducted studies of some, there is no mention of studies or consideration of the following threatened and endangered species that may be present in the affected area, including:
- Arizona eryngo
- Cactus ferruginous pygmy-owl
- California least tern
- Canelo Hills ladies'-tresses
- Desert pupfish
- Gila chub
- Huachuca water-umbel
- Masked bobwhite (quail)
- Northern Mexican garter snake
- Ocelot
- Pima pineapple cactus
- Sonora chub
- Sonoran pronghorn
- Sonoyta mud turtle
- Southwestern willow flycatcher
- Wright's marsh thistle

The DEIS should analyze the impact on wildlife of all direct, indirect, and cumulative impacts, including: 1) the site of operations, including the extensive vehicular traffic, noise, surface disturbance and associated activities: 2) drawdown of the and disruption of the highly biodiverse Sonoita Creek riparian systems, including feeder streams and Sonoita Creek itself; and impact of road expansion and

exponentially increased traffic and associated road mortality and associated impacts from noise, lights, and other road associated stressors. More specifically:

• Site of Operations and Exploration
The DEIS should fully analyze the impact of loss of acreage in the highly biodiverse area. In addition to habitat loss, the site of operations will generate noise and light, which will affect wildlife in the surrounding area. Light pollution alters animal movement in negative ways by either excluding or attracting wildlife to illuminated areas. Light and noise can drive animals away, discourage movement by migrating animals, and/or prevent breeding of those animals that remain. For example, such disturbances can prevent breeding by Mexican Spotted Owls. These impacts on all wildlife and measures to prevent or mitigate such impacts should be analyzed.

The water table and effect on Sonoita Creek and its watershed: The MPO describes impacts on water that will have significant foreseeable impact on wildlife in multiple ways. The DEIS must fully analyze the impact of the projected draw down on plants and wildlife. It could lower the water table in the Patagonia Mountains over an area 7 miles in diameter, over 35 square miles, during the life of the mine. This action would occur in a region already experiencing long-term drought that is now being exacerbated by climate-change. The drop in the water table could dry up springs and affect vegetation that is critical to resident and migrating animals. This fragile habitat could be irreversibly damaged leading to wildlife population loss.

- In addition, the DEIS must contain a full analysis of the impact of artificial augmentation of Harshaw Creek and the subsequent abrupt cessation of water supply. It is foreseeable that this will be disruptive to the sustainable survival of plant and wildlife communities of animals that live year-round in the Sonoita Creek watershed as well as to nesting and migrating birds and migrating mammals. The FS must do an analysis of the foreseeable impacts of this disruption on native fish, reptiles and amphibians, insects, birds, and mammals.

- Impacts of mine-related transportation on wildlife and TES animal and plant species From statements in the MPO, the transportation of personnel and materials will have a significant impact on wildlife that must be analyzed and prevented or mitigated. The MPO, however, does not provide essential information allowing for evaluation of this impact or for analysis of prevention or mitigation. S32 must provide the information and analysis set out below and herein.

- The MPO describes two access routes to the mine site. The impact of both road systems must be fully analyzed in the DEIS. The first is characterized as a temporary access route that connects from the mine's site of operations via Harshaw Road in the FS land and Santa Cruz County land across the to-be-constructed Cross Creek Connector (CCC) to SR82. To our knowledge, access onto SR82 from the CCC has not yet been fully permitted by ADOT. The MPO states that once the CCC is constructed, mine-related traffic will use this route until a proposed new "Primary Access Road is constructed. The MPO further states that during this period the mine traffic will avoid the Town of Patagonia and turn east on SR82, connect to SR 90, sending increased traffic of heavy trucks, and vehicles up SR through multiple critical wildlife corridors. The MPO further states that after the Primary Access Road is constructed, the CCC will be discontinued, but mine-related traffic will continue to use Harshaw Road for access to the site of operations for the life of the mine. According to the MPO, the mine will begin "development and construction" of the permanent route only after

the EIS is approved. The impact of this route along its entire length, including impacts on wildlife using the documented wildlife corridors and along SR82 and SR 90 should be fully analyzed.

The second access route, the proposed Primary Access Road has two segments of new disturbance totaling about 1.9 miles in length, improvements to FR segments include: Flux Canyon Road (FR 812), approximately 2.6 miles in length; Barriles Tank Road (FR 4653), approximately 2.8 miles in length; and Flux Road (FR4654), approximately 0.2 miles in length, including upgrading the maintenance level of existing segments of Flux Canyon Road (FR 812), Flux Road (FR 4654), and Barriles Tank Road (FR 4653). The MPO describes a paved road, stating that "Resurfacing treatments could include asphalt, soil-cement base, and/or chip-sealing." These currently narrow and rough roads will be widened to two 14-foot lanes and 2 5-foot shoulders. Bridge and significant construction will be undertaken, including blasting. The impact of this route along its entire length, including impacts on wildlife must be analyzed and mitigation measures must be identified.

Although the MPO states that mine operations and road use will be 24/7 with three shifts, the MPO provides no information on projected frequency of vehicle trips, types of vehicles, speed and associated noise and the foreseeable direct and cumulative impacts on animals. The absence of this information is in sharp contrast to the information provided by other mines such as Resolution Copper during the EIS process. We ask that the FS require S32 to provide projected vehicle trips of all vehicles, both vehicles operated by S32 employees and contractors, including vehicle type and weight, speed to be traveled, frequency and hours of travel, and noise generated. Further that information should be made available for all roads proposed to be used by the Hermosa project. Based on this information, FS should require an analysis of impacts and ways to prevent or mitigate those impacts.

The MPO also states that the Primary Access Road will remain open to the public and that no reclamation is planned. This is contrary to the Forest Service's efforts to decrease the impacts of roads on habitat and discontinue unneeded roads as appropriate. Leaving a wide paved road into the heart of this biodiverse habitat will invite high-speed use, noise and other factors that will continue to impact wildlife and will leave the Forest Service with infrastructure that is potentially costly and serves no purpose. We ask that the FS require the mine to provide a reclamation plan discontinuing new segments and returning the FS roads to a more primitive condition or discontinue them in accordance with a FS plan in effect at the time or reclamation.

Even given the lack of specific information provided, it is clear that vehicular traffic will be dramatically increased, both in frequency and intensity and is scheduled to run 24/7. The direct significant impact of this will foreseeably be an increase in wildlife mortality due to vehicular-wildlife collisions, especially as this exponential increase will take place on rural and Forest Service roads that historically have had low to no traffic. An increase in vehicular traffic both in the area surrounding the site of operations and exploration not only directly affects wildlife through collisions, but some species will avoid roads with constant traffic, altering distributions and separating populations. For the highway system that feeds into and out of the mine, an increase in traffic will have the same repercussions, plus the risk of turning the paved roads into impassable barriers. Vehicular effects are significant on all terrestrial wildlife, from mammals to reptiles and amphibians and insects. In addition, birds, bats, and flying insects like Monarch butterflies and other pollinators are common victims of vehicular collisions.

While the MPO makes the general statement that the mine will make "design considerations" when designing roads, it provides no specifics to support this statement. There is no mention of wildlife consideration in the detailed Appendix A describing, among other things, the construction of the Primary Access Road. The FS must require a true analysis of impact on wildlife and ways to prevent and mitigate this impact.

The FS should require S32 to contract with qualified road ecologists to analyze the direct, indirect, and cumulative effects of the foreseeable impact of traffic on wildlife and to provide a range of prevention and mitigation measures, including wildlife crossings appropriate to multiple species, adjustment of timing of transport to account for increased mortality and operations and speed of mine traffic and of the public. (It must be noted that the mine will be building a road that will allow the public to travel at high speed. In the biodiversity rich eco-region, all available steps to prevent and mitigate these impacts should be required.

The effects of mine traffic and road building are of particular concern on two T&E species, Western Yellow-billed Cuckoo (WYBC, Coccyzus americanus occidentalis) and Jaguar (Panthera onca), as well as on other T&E species. For WYBC, background for this comment is summarized by this document from the California Department of Transportation, Division of Environmental Analysis: "Technical Guidance for Assessment and Mitigation of the Effects of Highway and Road Construction Noise on Birds" (2016): In contrast, construction or traffic noise that adds significantly to natural ambient noise has the possibility of producing a suite of significant short- and long-term behavioral and physiological changes in birds. These may include changes in foraging location and behavior; interference with acoustic communication between conspecifics; failure to recognize other important biological signals, such as sounds of predators and/or prey; decreasing hearing sensitivity temporarily or permanently; and/or increasing stress and altering steroid hormone levels. Any of these effects could have long-term consequences and enduring impacts that include interference with breeding by individuals and populations, thereby threatening the survival of individuals or species. [Dooling and Popper 2016]

Federally designated critical habitat for western yellow-billed cuckoo overlaps the Project's area of impact significantly; there is a breeding population along almost all the significant drainages of the affected area. [2013 SURVEY FOR YELLOW-BILLED CUCKOO (COCCYZUS AMERICANUS) IN THE PATAGONIA MOUNTAINS, NEAR HARSHAW, ARIZONA (2013). Report to ARIZONA MINERALS, INC. by Westland Resources, see also eBird (2024). Cornell Lab of Ornithology, Ithaca, New York].

The major drainage- Harshaw Creek- is the route for all mining traffic along Harshaw Road, and cuckoos breeding in the Harshaw Creek basin will be subject to all disturbances related to the enormous growth in vehicle traffic that accompanies the Project. Considering the precarious state of the WYBC global population, studies of the effects of the proposed around-the-clock traffic on western yellow-billed cuckoo demography and persistence in the affected area should be included in the EIS and a robust monitoring protocol should be required for the life of the project.
Among large mammals, Jaguars have the greatest global range contractions caused by human disturbance. [John C. Morrison, Wes Sechrest, Eric Dinerstein, David S. Wilcove, John F. Lamoreux. 2007. Persistence of Large Mammal Faunas as Indicators of Global Human Impacts, Journal of Mammalogy, Volume 88, Pages 1363–1380, https://doi.org/10.1644/06-MAMM-A-124R2.1]

Southern Arizona and a small area of New Mexico host the only U.S. population of Jaguars, listed as Endangered under the U.S. Endangered Species Act (1973). In March 2014, the USFWS designated parts of Santa Cruz, Pima, and Cochise Counties (AZ) as Jaguar Critical Habitat. Virtually all mining and transportation activities (within Coronado National Forest) of the Hermosa Project lie within the Jaguar Critical Habitat.

Many peer-reviewed studies have shown that Jaguars are strongly and negatively affected by anthropogenic disturbance, including that associated with roads. [Espinosa S, Celis G, Branch LC. 2018. When roads appear jaguars decline: Increased access to an Amazonian wilderness area reduces potential for jaguar conservation. PLoS ONE 13(1): e0189740. https://doi.org/10.1371/journal.pone.0189740] Those studies show unequivocally that Jaguars prefer to inhabit and move through areas far removed from such disturbance. [F. Colchero, D. A. Conde, C. Manterola, C. Chávez, A. Rivera, G. Ceballos. 2011. Jaguars on the move: modeling movement to mitigate fragmentation from road expansion in the Mayan Forest. Animal Conservation 14: 158-166. https://doi-org.oregonstate.idm.oclc.org/10.1111/j.1469-1795.2010.00406.x]

The U.S. population of jaguars is reliant on unfettered movement between populations in the northern Sierra Madre and suitable montane habitat in Arizona; all recent records have occurred in protected mountainous corridors, with individual Jaguars recorded moving between separate Sky Island ranges at intervals.

The Santa Rita Mountains are one of these ranges most consistently occupied by Jaguars recently. While there is no direct linkage between the Santa Ritas and the northern Sierra Madre, there is indirect linkage provided through the higher elevations of the Patagonia and Huachuca Mountains. Recognizing the critical importance to (U.S.) jaguars of safeguarding linkages between Sky Island mountain ranges, Arizona Game and Fish and Northern Arizona University identified 3 major linkage corridors between the Patagonia and Santa Rita Mountains (Fig. X). Conservation efforts have focused on creating permanent conservation easements on private land to preserve these critical linkages.

The geography of the proposed elements (mining activity and transportation corridor footprints) of the Hermosa Project forms a potentially catastrophic barrier to Jaguar movement through these identified linkages. If Jaguars respond to consistent around-the-clock road noise the way many other species of wildlife do, they may be unwilling to traverse the portions of their critical habitat most suited to encouraging exchange between Jaguar Critical Habitat in the Patagonia and Santa Rita Mountains.

It is unclear how mining traffic patterns will develop because of a lack of information in the plan of operations (South 32 has indicated only that it intends to operate essentially 24-7[MR1], but in any scenario that heavy vehicle traffic will increase and temporal patterns of traffic will change drastically from historical patterns. Because it is unknown how Jaguars might respond to disturbances associated with increased traffic volume and duration, there is an unacceptably high risk of cutting this critically endangered species off from one of its recent historical strongholds. The DEIS should require that affects to all endangered species to be much more thoroughly considered than they have been to date, with special attention paid to Jaguars, which stand to be more negatively affected than others because of their small population, requirements for movement corridors, and preferences for undeveloped

habitat through which to move.

Weed dispersal: Vehicles are prime dispersers of invasive and exotic plants (weeds). Increasing vehicular traffic in wild areas facilitates the establishment and expansion of exotic and invasive plant populations. The MPO states generally that S32 will "implement measures" to prevent the spread of noxious and invasive weeds, but provides no information concerning the measures contemplated. We ask that the FS require S32 to develop a mitigation plan for this foreseeable impact.
Effect of Roads on T&E species.

Wildfire risk: An increase in road utilization increases the risk of wildfires by increasing the chances of ignition. The FS should require S32 to analyze the impact of transportation on increased fire danger and include mitigation for transportation-caused fire. See comments from others on wildfire risks from transmission lines.

Environmental Justice

Federal actions to address environmental justice are required by Executive Order 12898. It is the responsibility of federal agencies to mitigate undue and disproportionate environmental impacts affecting historically marginalized communities such as low-income, Black, Indigenous, or communities of color.

The DEIS should analyze the following:

- Do communities in the region such as Nogales, Kino Springs, Nogales, Rio Rico, and Sonoita qualify as being historically marginalized and thus require analysis in terms of environmental justice?
- Will there be cross border pollution to Mexico that could result in environmental (in)justice?
- What are the legal obligations of the Forest Service in identifying, analyzing, mitigating, and avoiding environmental justice impacts?
- When the preferred action seeks to mitigate environmental justice issues rather than avoid, the DEIS should provide justification for such decisions.

<u>Environmental Justice Communities and Air Pollution</u>

In the context of the Hermosa project, Nogales is within the region of the project, and there is potential for at least two remote facilities to be sited near Nogales in Santa Cruz County. Nogales is a designated nonattainment zone for PM_{10}.

Construction, mining operations, tailings piles, the subsidence zone, vehicle emissions from trucks, and reclamation activities related to the Hermosa Mine and along transportation and utility corridors will increase dust, airborne chemicals, and mobile emissions in the region and could compromise air quality standards. Particulate matter 2.5 microns in size ($PM_{2.5}$) would increase over background levels and particulate matter 10 microns in size (PM_{10}) would also increase over background levels, and could contribute to an exceedance of National Ambient Air Quality Standards (NAAQS) for particulates.

There are real and significant public health issues related to particulate emissions that must be considered in the draft EIS. The Forest Service must consider these emissions in terms of federal obligations to mitigate environmental justice issues. When particulates ($PM_{2.5}$ and PM_{10}) are inhaled, they can affect the heart and lungs and increase respiratory symptoms, irritation of the airways, coughing, breathing difficulty, and more. The elderly, children, and those with respiratory or other health issues are at greatest risk relative to particulate pollution. A study released in 2008 by the Arizona Department of Environmental Quality (ADEQ) showed that when the levels of PM_{10} in Central Phoenix were high, there was a significant increase in asthma incidents in children. *See* 45 Arizona Children's Health Challenge Grant, Arizona Department of Environmental Quality, December 2008.

The DEIS should analyze the following:

- Hazardous Air Emissions. Analysis and mitigation of gaseous emissions (such as sulfur oxides, nitrogen oxides, etc.) from all exploration activities and related construction and vehicles is needed.
- Greenhouse Gases. The DEIS should quantify and analyze the project's contribution to carbon dioxide and other significant greenhouse gas emissions, and the potential adverse impacts associated with these GHG emissions.
- Particulates. The expected amount of airborne particles as dust or diesel vehicular emissions from all aspects of the project needs to be quantified with concentrations for varying wind factors. Impacts of the "dust" should be evaluated for inhalation health impacts, visibility impairment, and resettling or deposition on surface water, aquatic life, wildlife and vegetation. The DEIS should include modeling projections of dust deposition from all potential sources. In the case of resettling on surface water, there should be a chemical analysis of the dust to determine whether the dust could have an adverse effect on the chemistry of the water. The DEIS must also analyze any proposed plans for dust control, including the potential effectiveness of dust mitigation measures
- Cumulative: The DEIS should analyze the cumulative impacts of all existing and reasonably foreseeable sources of air pollution in terms of environmental justice.

Refugees, Migrants, and Springs

Dewatering as a part of the Hermosa mine will predictably dry up certain seeps and springs in the area. In addition to other impacts to wildlife or recreation, the drying of these springs are likely to impact refugees and other migrants who travel through the Sky Island region of Southern Arizona. As these springs go dry, it creates the potential to worsen environmental injustices through increased death rates of these marginalized populations who benefit from spring flows. These issues and imapcts must be fully analyzed.

It is the requirement of the lead agency in NEPA to take a hard look at all reasonably foreseeable impacts.

In terms of environmental justice and water/springs, the DEIS should analyze the following:

- What are the baseline refugee and migrant annual death rates in the project area and surrounding communities?

- The DEIS should provide baseline data to characterize the hydrology and water quality associated with springs, seeps and other Groundwater Dependent Ecosystems (GDEs) that may experience reduced flows as a direct, indirect or cumulative effect of the proposed action. How many and which of these GDEs (springs and seeps) are expected to have reduced or no flow during dewatering?
- How many of these affected springs are near routes used by migrants or are near locations where the bodies of deceased migrants have been found?
- In addition to public health and safety, GDEs have been identified by the U.S. Forest Service as encompassing regionally and nationally significant ecosystems on NFS lands and in many watersheds, they support a disproportionately large percentage of the total biodiversity relative to their size. Christopher Carlson, PhD, "Groundwater Dependent Ecosystems on National Forest System Lands, Recognizing and Managing a Largely Overlooked Resource. U.S. Forest Service Powerpoint. The Forest Service describes Environmental Water Requirements (EWRs) as the quantity, quality and timing of water flows and levels required to sustain water-dependent ecosystems and the human livelihoods and well-being that depend on these ecosystems. Id. The DEIS should characterize the EWRs for all GDEs that may be adverse affected by groundwater drawdown and the potential impacts to EWRs related to the direct, indirect and cumulative effects of groundwater drawdown from the proposed project.
- What increase is migrant death rates as a result of dewatering and other mining related activities does the forest service expect as a result of the agencies permitting action?
    - If the agency does not plan to include a predictive model of increased migrant deaths as part of robust analysis, the DEIS should provide justification for this decision based on legal grounds and not based on barriers such as staffing, expertise, or capacity.

Cultural Impacts

The Hermosa project is located on the ancestral lands of the Tohono O'odham Nation and thus poses the risk of cultural impacts. The Tohono O'odham Nation can best represent any concerns they may have both through NHPA Section 106 consultation and directly with the permitting leads. However, there are obligations and responsibilities in regards to cultural impacts held by the non-native communities and by the US federal government. Furthermore there are potential impacts to a number of non-Indigenous historic and cultural sites that should be analyzed in the DEIS.

The project area must be surveyed for historical and archeological artifacts, and mitigation plans must be developed for any of these sites.

In the American Indian Religious Freedom Act (AIRFA), Congress stated that "[i]t shall be the policy of the United States to protect and preserve for American Indians their inherent freedom to believe, express, and exercise the traditional religions." 42 USC § 1996 (1982). The Forest Service must analyze the cumulative impact to the ability of Native Americans to fully practice the traditional religions within the study area. The analysis must include both known sacred and spiritual sites as well as traditional food and medicine gathering locations, which are important components of traditional practice.

Archaeological sites consist of bounded spaces or linear features that contain physical evidence of past human behavior. The exact definition of what does or does not qualify as an archaeological site, however, can vary between land management agencies. Federal standards are not uniform amongst all agencies, environmental settings, or cultural frameworks. State, county, and local laws and regulations (where they exist) can differ from federal standards and from each other. This cross-jurisdictional patchwork of definitions and standards can result in very different conclusions about the presence, absence, type, and significance of archaeological remains within a given area. Furthermore, these standards have changed over time. The general trend among professional archaeologists and land managers is toward recognition of a greater diversity and age range of cultural resources, but this has not been consistently applied and many issues are still dealt with on an ad-hoc basis. For example, depending on the standards applied, a given area containing many small, closely-spaced cultural resources may be split into numerous individual archaeological sites; or the same set of resources might be lumped together into a single large archaeological site. As a second example: large low-density artifact scatters that may be keyed to certain landscapes or resource zones have not always been defined as archaeological sites, instead being written off as non-site "background noise" or isolated occurrences with no important research potential.

The DEIS should address the following questions related to the definition and recording of archaeological sites.

- Exactly what written standards were used to define what does, or does not, constitute a cultural resource, a historic property, or a sacred site?
- Were the standards consistent across all land jurisdictions?
- Did the standards change during or after the time the archaeological surveys were conducted?
- What was the minimum age at which human-made artifacts and features were required to be recorded as cultural resources?
- If archaeological sites were defined on the basis of some minimum number of artifacts within a given area of dispersal, what scientific evidence backs up such a judgment? • How were site boundaries defined?
- If artifacts were observed outside of an identified site, how were they recorded and evaluated?
- Were non-site artifacts viewed as evidence of meaningful land use patterns that may not be apparent through studies limited to discrete, bounded sites?
- What written criteria were used to differentiate between low-density artifact scatters that were recorded as sites, and broadly-distributed artifacts that were recorded as isolated occurrences?
- Did the written standards specify that artifact scatters lacking surface features would be recorded as sites?
- Did the written standards specify that all surface cultural features would be recorded as sites even if they lacked associated artifacts?

Treaty Obligations

The Hermosa project is on lands which the US government claimed through the Gadsden Purchase and the Treaty of La Mesilla. Article 5 of the Treaty of Mesilla states that articles in the Treaty of Guadalupe Hidalgo asserting land rights for those previously residing in the area are still in effect. Tohono O'odham People should maintain rights to these ancestral lands based on relevant US treaty and their historic use of these lands. According to information provided by the Tohono O'odham Nation these legal rights have been eroded through the encroachment of mining. http://www.tonation-nsn.gov/history-culture/

- The DEIS should analyze all legal obligations of the United States as defined in the Treaty of La Mesilla, and obligations from the Treaty of Guadalupe Hidalgo that carry over through La Mesilla.
- The DEIS should analyze the historic trend of Tohono O'odham rights to ancestral lands as defined by this treaty have been eroded by mining, and whether the permitting of this mine by the federal government continues this trend.
- Does permitting the destruction of ancestral Tohono O'odham lands impact the federal trust responsibility to Tribes held by the US federal Government?
    - If not, the DEIS should provide justification regarding why the destruction of ancestral lands does not impact the wellness of the Tohono O'odham Peoples and thus does not violate the federal trust responsibility to Tribes.

In November of 2022, the White House hosted the second Tribal Nations Summit of Biden's Administration. At the summit, 17 federal agencies approved new best practices to integrate treaty rights into decision making.

- How will the Forest Service integrate these best practices into permitting for the Hermosa Project in regard to the Treaty of Mesilla?

The La Paz Agreement between the United States and Mexico formally outlines expectations regarding management of pollution in border regions. This agreement should be analyzed in robust detail relative to this project proposal and permitting action.

- What requirements or expectations exist in the La Paz Agreement regarding all forms of pollution that could be generated by mine exploration, construction, operation, material transport, and off site facilities?
- Will this permitting action result in any cross border pollution from either new sources or from mobilizing existing sources?
- What accountability measures exist to ensure that the Forest Service follows the La Paz Agreement in permitting this mine?
- Should this project violate the La Paz Agreement in unforeseen ways, what corrective action will be taken?

Missing and Murdered Indigenous Peoples (MMIP) and Gendered Violence

Based on common trends in the extractive industry it can be expected that a majority of workers will come from outside of the community. It is common for these workers to require on- site worker housing often referred to as man camps.

The construction of man camps is a connected action that must be considered relevant to this NEPA analysis. The DEIS must analyze the potential direct, indirect and cumulative effects of proposed man camps, including the potential increase of violence.

In February of 2019, the Department of Justice published a report titled, Violent Victimization Known to Law Enforcement in the Bakken Oil-Producing Region of Montana and North Dakota, 2006-2012. https://www.ojp.gov/ncjrs/virtual-library/abstracts/violent-victimization-known-law-enforcement-bakken-oil-producing#:~:text=From%202006%20to%202012%2C%20the,assault%2C%20which%20increased%2070%25.

This report analyzed increases in violent crime as a result of man camps, or worker housing, associated with extractive industry. The report found that, "From 2006 to 2012, the rate of violent victimization known to law enforcement in the Bakken oil-producing region of Montana and North Dakota increased, particularly the rate of aggravated assault, which increased 70%. There was no similar increase in rates of violent crime in the counties surrounding the Bakken oil region." There is clear documentation from federal sources that a drastic increase in violence is to be expected based on objective evidence. Moreover, it is well understood through the issue of Missing and Murdured Indigenous People (MMIP) that this type of violence provides greater impacts Indigenous people as well has increase gender-based violence, such as rape, human trafficing, murder, and domestic assault.

It is part of the federal government's Trust Responsibility with Tribes to ensure the physical health and wellness of Indigenous Peoples. Therefore, given the available information, it is the role of the federal government to include an analysis of the effects of man camps (or worker housing) on the local community with a specific focus on impacts to Indigenous Peoples.

- How many workers at different stages of this project are expected to require on-site housing?
- How much additional housing will be required and where will it be located?
- What percentage of the workforce is expected to be hired locally?
- What percentage of the workforce is expected to be male gender based on similar projects?
- Based on existing evidence such as the Department of Justice study shared in this comment, the Forest Service should model the expected increase in localized violence as a result of this permitting action.
- As a part of this permitting, will there be consultation with relevant Tribes regarding the potential direct, indirect and cumulative impacts of man camps and MMIP?
- What mitigation strategies are planned to address this foreseeable increase in violence? How will those mitigation measures be funded?
- Will mitigation take into account the particular pattern of this violence disproportionately affecting Indigenous People's and relating to gender-based violence?

Federal Commitment to Traditional Indigenous Ecological Knowledge

Southern Arizona is home to numerous plants, animals, medicines, and locations that are essential components of important Indigenous cultural practices of Traditional Ecological Knowledge. In November of 2021 (the) "White House Office of Science and Technology Policy (OSTP) and the White House Council on Environmental Quality (CEQ) jointly released a new memorandum that commits to elevating Indigenous Traditional Ecological Knowledge (ITEK) in federal scientific and policy processes."3 Enacting this commitment will require applying ITEK to decision making as it relates to the Patagonia Mountains, and the Indigenous People's with ties to this area.

- How was the cultural resource inventory updated from previous practices to implement this federal commitment to ITEK?
- How will ITEK be considered in the locations of drill sites, potential impacts and mitigation to water, and revegetation of drill sites?
- In general, how will ITEK be utilized in decision making?
- What is the process for soliciting local ITEK, how will it be analyzed, and what role(s) beyond consultation will local Indigenous stewards of ITEK play?

In addition to Indigenous cultural sites, it is well documented that early European settlers traveled through this region during Coronado's expedition. Archaeological work on this history is ongoing and continues to yield new information. There are also a number of historic properties such as ranchers which could qualify for listing as a historic place.

- Has the forest service included an analysis of recent archaeological findings in terms of European settlement?
- Have all private properties, where owners have requested consideration for historic site listing, been considered by the SHPO and Forest Service and included in NHPA Sec. 106 review?
- The DEIS should consider the potential direct, indirect and cumulative effects to all archaeological, historic and cultural resources.

Due Diligence in Terms of Federal Support

The Hermosa Project is receiving special and preferential treatment from the US Federal Government as the first hard rock mine to have permitting fast-tracked via the Fast41 program.

- Based on this preferential treatment, will the Forest Service or other federal agency conduct any form of due diligence in terms of the formal support for this private mining company?

To meet expected due diligence standards, the lead agency should follow the UN Guiding Principles (UNGP's) on due diligence. The inclusion of Indigenous Human Rights in due diligence is required to meet the UNGPs and OECD guidance which state that companies should commit to respecting Human Rights.

- Will the lead agency follow these international due diligence standards, and how will the violation of treaty rights, specifically those treaty rights members of the Tohono O'odham Nation have as previous Mexican citizens under the Treaty of Mesilla, be considered and mitigated through this due diligence process?

Additional due diligence requirements to meet the standards set in UNGP and OECD are that the process is ongoing, and that there is public transparency.

- Will due diligence be an ongoing process?
- In what specific ways will the public have access to information and transparency regarding due diligence?

Some essential components of public transparency should be addressed in the DEIS, including the following questions:

- What standards is this process are being measured against (such as the UNGP's)
- What definition of human rights will be used?
- Who will be in leadership positions?
- How will resources and staff be allocated?
- How often will there be review of the process and who has oversight?
- What grievance mechanisms will be in place and how can the public access them?

Archeological

The project area must be surveyed for historical and archeological artifacts, and mitigation plans must be developed for any of these sites.

Native American Cultural Concerns

In the American Indian Religious Freedom Act (AIRFA), Congress stated that "[i]t shall be the policy of the United States to protect and preserve for American Indians their inherent freedom to believe, express, and exercise the traditional religions." 42 USC § 1996 (1982). The agencies must analyze the cumulative impact to the ability of Native Americans to fully practice the traditional religions within the study area. The analysis must include both known sacred and spiritual sites as well as traditional food and medicine gathering, important components of traditional practice.

USFS must consult with tribes regarding any sacred sites and landscapes in and around the project area that may be affected. The DEIS should describe each of the potentially important sites or landscapes, including their cultural and spiritual importance to individual tribes, and the Project's potential to harm sacred cultural and spiritual values. The analysis should be informed by close coordination and consultation with the affected tribes. However, any information about these sites that is sensitive to the tribes should not be publicly disclosed (e.g., specific locations).

Consultation with Indigenous Communities

Executive Order 13175 of November 6, 2000 requires that, "Each agency shall have an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." (Section 5 (a)). Key to this executive order is "meaningful" consultation. A simple letter from USFS inviting the participation of tribes is not meaningful to the tribes, as they have stated repeatedly over the years.

Agriculture Secretary Vilsack and Interior Secretary Haaland's Nov. 15, 2021 Joint Secretarial Order 3403 seeks to "ensure that the Department of Agriculture and the Department of the Interior . . . and their component Bureaus and Offices are managing Federal lands and waters in a manner" that protects "the treaty, religious, subsistence, and cultural interest of federally recognized Indian Tribes." Joint Secretarial Order 3403 (doi.gov).

The Order directs each Department to "[e]nsure that all decisions . . . relating to Federal stewardship of Federal lands, waters, and wildlife under their jurisdiction include consideration of how to safeguard the interests of any Indian Tribes such decisions may affect." *Id.* § 2. Through the Order, the Agriculture and Interior Departments commit to consultation and collaboration with Indian Tribes "to ensure that Tribal governments play an integral role in decision making related to the management of federal lands and waters," and to give "due consideration" to "Tribal recommendations on public lands management." *Id.* § 3. The Order sets forth principles of implementation which apply "[w]hen making management decisions for Federal lands and waters, or for wildlife and their habitat that impacts the treaty or religious rights of Indian Tribes." *See id.* § 4.

To fulfill the above responsibilities and duty to conduct meaningful consultation that does not "compromise the rights of Indian Tribes," USFS should make every effort to reach out early and meet in person regularly with all of the affected tribes regarding the Project. This approach would be more respectful of the tribes as coequal sovereign governments and of the tribes' desire for in-person meetings. It would lead to better information exchange on both sides and a more fully informed decision.

Tourism and recreation

The DEIS needs to assess the impact that mining will have on tourism and recreation in the region.

Socioeconomic impacts

This proposed mining activity is mutually exclusive to the thriving nature based restorative economy in Santa Cruz County as documented by a University of Arizona economic study.

The DEIS should analyze the Project's socioeconomic impacts on the local economy, infrastructure,

and community. "The rapid growth of an extractive industry, or *boom*, can stimulate a local economy but bring with it problems such as environmental degradation and infrastructure damage. During a *bust*, when the extracted resource is exhausted or demand for it falls, economic gains tend to dissipate and affected communities are left the same or worse off." Klasic, Meghan, et al. A review of community impacts of boom-bust cycles in unconventional oil and gas development, Energy Research & Social Science. Nov. 2022. Available at:

https://www.sciencedirect.com/science/article/pii/S2214629622003462.

For example, the boom can bring in man camps and a rapid population rise, straining public facilities and services, such as increased traffic congestion and wear and tear of rural roads not meant for high-volume traffic; spikes in vehicle and industrial accidents and emergency calls; higher violent crime rates, including domestic violence and victimization of Indigenous women (as seen with the Baaken fracking boom in North Dakota); a rise in substance use and spread of contagious diseases; strains on hospitals and medical clinics; greater housing demand, housing costs, and homelessness; water supply strains and water contamination; social disruption, community disintegration, and lower quality of life brought about by these rapid changes; and widening economic inequality between the "haves" and "have nots." *Id.*; University of Colorado Boulder, First Peoples Worldwide, Violence from Extractive Industry 'Man Camps' Endangers Indigenous Women and Children. Jan. 29, 2020. Available at:
https://www.colorado.edu/program/fpw/2020/01/29/violence-extractive-industry-man-camps-endangers-indigenous-women-and-children; Horwitz, Sari. Dark Side of the Boom. Washington Post. Sept. 28, 2014. Available at:

https://www.washingtonpost.com/sf/national/2014/09/28/dark-side-of-the-boom/.

Less populated rural areas do not have the economic and social resources to deal with the strains on local government services, and there can be a lag of several years between the necessary infrastructure expenditures needed early in a boom cycle and peak tax revenues. These problems are compounded by the absence of any requirement for mining companies to financially alleviate these impacts. For example, the 1872 mining law does not require mining companies to pay royalties to the federal, state, or local governments to help them deal with these boom-and-bust cycle impacts.

A bust, on the other hand, can lead to unemployment, property value declines, and poverty, with local governments having insufficient resources to deal with those impacts (as workers leave and tax revenues decline), not to mention costly environmental damage and long-term public health effects inflicted by the mining operations and/or legacy contaminants. With the loss of workers, "[o]ut-migration may cause investors to avoid the region because of fears about lack of product demand and/or labor." Klasic 2022. The environmental damage left behind may prevent other industries like recreation from coming back. For example, in the Marcellus and Utica shale regions, "farmers reported having to abandon their farm practices even after production ceased

and reclamation was completed because the land was no longer suitable for farming; the loss of their farms increased their dependence on oil and gas revenue, which exacerbated their financial plight after the bust." *Id.* "Addiction and gender- based violence can persist or increase during these downturns." *Id.* But local governments may have less resources for police and social services during the downturn. These wild upswings and downswings can leave rural communities worse off. Research has shown "[b]oom-bust communities often end up poorer and with slower economic growth than comparable communities that did not experience a boom." *Id.*

The DEIS should analyze the socioeconomic impacts of the mining boom and bust cycle, and mitigation measures to reduce these impacts.

Additional Issues and Concerns

The DEIS and USFS's review must also fully address and satisfy the legal requirements of the following issues.

Rights Under the 1872 Mining Law

In order for the Project to have any rights under the Mining Law, each claim (filed under the 1872 Mining Law) to be utilized by the Project must be verified by USFS as valid, based on evidence and detailed review. Without such verification, the company/claimant has no rights to use and occupy the claims (except for preliminary exploration which has largely already occurred) and USFS has full discretion over the Project. Relatedly, the DEIS must fully consider the various alternatives of not approving an activity on public land unless that activity is proposed on lands covered by claims that have been verified to be valid under the Mining Law.

NEPA and Related Analysis

In addition to the NEPA requirements noted elsewhere in these comments, the DEIS must fully analyze and quantify the direct, indirect, and cumulative impacts of the Project, and their significance, on all potentially affected resources, including but not limited to: fish and wildlife, habitat, surface and ground water quality and quantity (including on-site water issues as well as impacts from off-site water supply), groundwater dependent ecosystems, federal water flows, other water rights and their associated economic uses, other seeps and springs and their associated habitat and wildlife, air quality, cultural/historical resources, recreation, visual resources, paleontological and geological features, and roads and traffic.

The DEIS must also consider off-site impacts from project operations such as power generation, water supply, truck and other traffic, and from additional workers and workforce housing on the regional and local economy, culture, infrastructure, and community. In addition, regarding power

transmission/generation, the DEIS must fully review the reasonable alternative of burying power transmission lines, instead of the proposed installation of overhead lines, as a reasonable alternative under NEPA, as well as under the USFS' duties to impose project controls and mitigation measures to minimize all project impacts under public land and mining laws. For example, burying power lines reduces the risk of fire, which should be a paramount goal of the agency.

Any "possible conflicts between the proposed action and the objectives of Federal, regional, State, Tribal, and local land use plans, policies and controls for the area concerned" must be disclosed. 40 C.F.R. § 1502.16(a)(5). This necessarily includes a detailed analysis of whether, and how, the project will comply with all federal, state, tribal, and local laws, regulations and requirements.

As noted, the cumulative impacts analysis must consider the Project's impacts in connection with impacts from all other past, present and reasonably foreseeable future activities in the region, including but not limited the following activities and projects (whether occurring, or reasonably foreseeable, on federal public, private, or state, land):

- surface water diversion for residential development and industrial and agricultural operations;
- energy exploration and development;
- mineral exploration and development;
- agriculture, including surface and groundwater use;
- roads/transportation;
- grazing;
- water use;
- invasive species (including plants);
- off-site processing and transport of mined minerals;
- recreation, including but not limited to off-highway vehicle use.

The DEIS must also fully analyze and quantify the impacts of climate change.

TRANSPORTATION AND MANGANESE PROCESSING IMPACTS

The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.3.2 on page 2-37 states, "The beneficiation facility is anticipated to be in Santa Cruz County on private land distal from the Project. Once crushed oxide ore leaves NFS land, it will not again enter NFS land either before or after beneficiation."

- Why is the "distal" location of the manganese processing plant not specifically disclosed? Does the US Forest Service understand the plant should not be located within the Upper Santa Cruz airshed/watershed to protect local populations from neurotoxic dust and related manganism illnesses? Why are tailings at the manganese processing plant and their related long-term effects are not addressed in the PoO? Does the US Forest Service understand any manganese processing

plant within Santa Cruz County is highly opposed by the resident public?

- Portions of Santa Cruz County, including the City of Nogales, is an air quality non-attainment area and a South32 Hermos processing facility will further impact air quality. Section 2.5.7.1 on page 2-54 states, "The distal oxide ore beneficiation facility has not yet been located, but is anticipated to be in Santa Cruz County.
- This statement misleads the public as a facility in Santa Cruz County has been strongly opposed by the public and there has not been a proposed site nor has there been public study as to where to locate the facility in Santa Cruz County or anywhere in the United States.
- The critical issue associated with manganese is processing, not availability. There is limited manganese processing in the United States and it's mostly east of the Mississippi Rivier and related to the steel production industry. One of the major facilities is integrated with an existing mine and will not likely accept ore from a competitor. Where in the US will the manganese ore be processed by South32?
- It is anticipated by many in the public that the South32 Hermosa manganese ore will be transported through Mexico by rail then to China for processing as no facilities in the United States have been identified by South32 to process the ore. To benefit the American public, the ore must be processed in the United States for domestic consumption – that is the point of the FAST 41 process.
- The claims that the manganese ore will be processed in Santa Cruz County or anywhere in the United States must be supported by evidence in the record and the DEIS. And as noted, the impacts from off-site processing and transport must by fully analyzed.

NOISE & LIGHT POLLUTION IMPACTS:
The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.12 on page 2-86 states, "The Project is anticipated to require between 27 to 58 generators (depending on size) that will be on the portion of South32 Hermosa private land supporting mining of the sulfide ore, and two or three generators and one backup generator on the portion of South32 Hermosa private land supporting mining of the oxide ore. A small number of additional diesel generators will also be used, five of which will be for emergency power."

- Why is a noise study or light pollution study not presented in the PoO?
- What will be the impacts to the dark skies?
- What will be the impacts to wildlife including the threatened Mexican Spotted Owl?
- Are jaguars expected to be present in the Patagonia Mountains based onSouth32 Hermosa activity?

Section 3.1 on page 3-2 states, "Limited Surface Disturbance Footprint. The surface disturbance footprint for the Plan Operations is less than 500 acres."

- What are the impacts from light pollution associated with the footprint of the Plan Operations?

Section 3.6.1 on page 3-11 states, "South32 Hermosa will develop and implement an outdoor lighting plan to reduce impacts from artificial night lighting, reducing illumination levels where appropriate while still meeting MSHA requirements for lighting sufficient to provide safe working conditions."

- Why is a lighting plan or the effects on wildlife and light pollution not included or discussed in the PoO?
- Were baseline night sky measurements collected prior to construction and/or since construction started at South32 Hermosa?
- Which contractor has been used for the outdoor lighting design at South32 Hermosa and which dark sky guidance was followed? Which contractor will be used for the outdoor lighting design at South32 Hermosa and will Santa Cruz County dark sky guidance be followed?
- What equipment was used to measure the night sky at South32 Hermosa?
- What are the results of measurements of the night sky at South32 Hermosa including baseline measurements and since the start of construction?
- Will the outdoor lighting systems be compliant with Santa Cruz County Dark Sky requirements
- How often will the night sky be evaluated during operation of South32 Hermosa?
- Given the economics of Southern Arizona the University of Arizona's multimirror manufacturing and global dominance of deep space telescopes, coupled with the state's dark sky mandates it is imperative to not create a hotspot impairing the existing observatories on Mt Hopkins, Mt Graham, and Kitt Peak. What is the light measure that can be used without impact on the observatories? Is this level of illumination above or below the MSHA mandates? Why are the MSHA illumination mandates not noted in the PoO?

Section 3.6.1 on page 3-11 states, "South32 Hermosa will develop and implement an outdoor lighting plan to reduce impacts from artificial night lighting, reducing illumination levels where appropriate while still meeting MSHA requirements for lighting sufficient to provide safe working conditions."

- Why is a lighting plan or the effects on wildlife and light pollution not included or discussed in the PoO?
- Were baseline night sky measurements collected prior to construction or since construction started at South32 Hermosa?
- Who has been used for the outdoor lighting design at South32 Hermosa and which dark sky guidance was followed? Who will be used for the outdoor lighting design at South32 Hermosa and which dark sky guidance will be followed?
- 3.7.4 on page 3-15 states, "Infrastructure improvements incorporate design features that promote biodiversity plan goals by minimizing impacts to sensitive wildlife species or populations. Examples include: dark sky measures to reduce or minimize artificial night lighting to reduce impacts to migrating birds, bats, and moths; design considerations of bridges and culverts that can

maintain habitat connectivity and reduce wildlife-vehicle collisions; fencing designed to address wildlife concerns; and avian protection measures included in the design, construction, and maintenance of overhead electric transmission and distribution lines that can minimize or eliminate impacts to avian birds of prey (raptors).

- Why are dark sky measures only mentioned in the PoO once considering dark skies are an important shared value in Santa Cruz County?
- How does the Forest Service and South32 value dark skies, in relation to citizens in Santa Cruz County? How has South32 and the Forest Service demonstrated a value for dark skies and what equipment and procedures are in place to ensure dark skies are protected?
- What observatories has South32 Hermosa made to better understand dark sky issues and an outdoor lighting plan and/or methods/equipment/design to use during the design phase to prevent the impact of light pollution from South32 Hermosa? Does South32 Hermosa and the Forest Service understand that the best time to prevent light pollution is during the design phase as turning the reflectors downward is not an acceptable approach to mitigate light pollution
- What observatories will South32 Hermosa contact and consult with to discuss the outdoor lighting plan and/or methods/equipment/design to use to prevent the impact of light pollution from South32 Hermosa?
- Has light pollution from South32 Hermosa been measured from observatories and/or from satellites? What are the current impacts of outdoor lighting from South32 Hermosa?
- Did an increase in radiance from South32 Hermosa correlate to an increase in radiance measured by observatories and satellites?
- What are the current impacts of outdoor lighting from South32 Hermosa as measured from satellites designed to measure light pollution? How much radiance is currently being emitted from South32 Hermosa? How much will radiance from South32 Hermosa increase during operation?
- How much more radiant is South32 Hermosa compared to the Town of Patagonia? How will the radiance of South32 Hermosa change over time?
- How will dark skies be impacted by emissions from South32 Hermosa which impact air quality such as particulate matter?
- Why does the PoO not discuss the lighting plants for the drill pads as it is important to understand the impact of these lights on the night sky brightness which will be in addition to the current radiance values?
- Why are the type of lights, the type of luminaires, shielding, initial lumens and color temperature not provide in the PoO as it is important to better understand impacts from South32 Hermosa to the environment including the shared value of dark skies?
- Will South32 Hermosa use an expert to develop and maintain a lighting plan designed to eliminate or reduce to the maximum extent possible the impacts to dark skies from South32 Hermosa activities?
- How will artificial light at South32 Hermosa negatively impact wildlife behavior, insect populations, migratory patterns, plant photoperiodism, predator-prey dynamics and ecosystem

balances?

- How will artificial light at South32 Hermosa negatively impact human health and well-being such as circadian rhythms and mental health?
- Why is it not discussed in the PoO that Arizona hosts 10% of all the world's largest telescopes? Does the Forest Service and South32 understand that the Department of Energy, the National Science Foundation, the Smithsonian Institution, US Navy, and NASA, along with US universities and foreign institutions, invest tens of millions of dollars annually in the operation and upgrade of the Arizona observatories? Does the Forest Service and South32 understand that a basis for their long-term scientific investment strategy is their perception of the commitment of both local and national government to protecting that national and international investment? Does the Forest Service and South32 understand that in the vicinity of the Patagonia Mountains there are multiple members of the astronomical community, including the University of Arizona's Patterson Observatory in Sierra Vista, the Winer Observatory in Sonoita, the Fairborn Observatory in Washington Camp, the Tenagra Observatory in Rio Rico and the F. L. Whipple Observatory on Mt Hopkins?
- How will skyglow and light pollution from South32 Hermosa impact observations from these telescopes in Arizona? What will be the financial impact from South32 Hermosa to citizens and institutions in Arizona due to impacts from light pollution at South32 Hermosa? Will these observatories be capable of making observations they make today after operation of South32 Hermosa starts? Could impacts from light pollution from South32 Hermosa obscure the observation of the next planet killing asteroid until it was too late to manage? What would be the impacts from missing a planet killing asteroid in time to react due to light pollution from South32 Hermosa?
- Will the US Forest Service require that South32 Hermosa cooperate with local government and communities in Santa Cruz County to promote the protection of dark skies by implementing Santa Cruz County outdoor lighting codes?

Recommendations to Mitigate Light Pollution Issues:

- The DEIS should analyze and require an outdoor lighting plan that is consistent with Santa Cruz County Dark Skies Ordinance be immediately developed and implemented and baseline night sky measurements be collected prior to additional construction activity.
- The DEIS should require the use of an expert to develop and maintain an outdoor lighting plan designed to eliminate or reduce to the maximum extent possible light pollution from South32 Hermosa activities.
- The DEIS should evaluate requiring South32 Hermosa to shut down outdoor lighting or reduce outdoor lighting and night operations to reduce impacts from light pollution.

WILDLIFE IMPACTS of LIGHT POLLUTION:

The following questions to the PoO should be evaluated by the US Forest Service and discussed in detail in the DEIS:

Section 2.5.2 on page 2-33 states, "Anticipated Operations Schedule (Private and NFS Land) Operations at the Project are anticipated to occur for 24 hours per day, 365 days per year, with periodic maintenance or other operational suspensions."

- How will the operating schedule impact light pollution and wildlife? What would be the impact to light pollution and wildlife if the operating schedule was changed to day-light hours only?

Section 3.7 on page 3-11 states "Additional surveys of aquatic and riparian areas have been conducted since 2012 and 2019, respectively. These monitoring data have been used to support mine design and develop environmental protection measures."

- Why is no survey or monitoring data presented in PoO which supports the mine design?
- What changes have been made to the mine design to support aquatic and riparian areas?
- Why are there no reports or surveys from the USFS or Arizona Game and Fish included in the PoO?

Section 3.7.4 on page 3-15 states "During active operations, South32 Hermosa would monitor disturbed areas on NFS land where there is a risk of spread of undesirable invasive plants and noxious weeds. South32 Hermosa would also implement measures to prevent the spread of noxious and invasive weeds from vehicles/equipment between work locations. If areas of invasive and/or noxious weeds are identified, they would be treated as soon as they are identified. Monitoring reports summarizing noxious weed control efforts would be periodically submitted to the Forest."

- Will baseline mapping of invasive and noxious plants along roadways used by South32 be conducted?
- How will invasive species be identified, tracked over time, and mitigated?
- To prevent the spread of invasive species seeds, will vehicle washes be located to washes off seeds before vehicles enter the US Forest and to washes off seeds before vehicles leave the US Forest and access Highway 82?
- How will the spread of invasives and noxious plants be prevented from spreading from one location to another within South32 Hermosa and areas within the US Forest?
- What types of herbicides will be used to control invasive species? Will only glyphosate, 2,4-D and triclopyr herbicides be used or will other more long-lasting herbicides be used?
- Will hand pulling of invasive species be done along waterways and high traffic areas?
- How will invasives be prevented from being introduced into waterways such as Tree of Heaven, Vinca, Siberian Elm and Arundo?
- Will South32 Hermosa be able to control invasive species on US Forest Service and private property?
- How will invasive species be prevented from being introduced into San RafaelValley?

Recommendations to Mitigate Wildlife Issues:

The DEIS should require South32 to permit and install animal drinkers (guzzlers) or watering ponds at ¼-mile intervals to supplement the loss of animal waters due to dewatering activities.

The DEIS should require South32 to permit and maintain flow of potable water to perennial springs, seeps and habitats which rely on shallow groundwater to mitigate the loss of water and habitat due to dewatering activities.

The DEIS should evaluate requiring underground powerlines be installed to reduce risks of forest fires to a minimum.

ADDITIONAL PERMITS
The following questions regarding additional permits should be evaluated and discussed in detail in the DEIS:

Arizona Resource Conservation Recovery Act Subtitle C Identification Form

- Hazardous waste is regulated under Resource Conservation and Recovery Site Act Subtitle C. This includes notification requirements for any facility determined to generate, transport, recycle, treat, store, or dispose of hazardous waste.
- Has this form been issued to South32 Hermosa and if so, why are these forms not included in the PoO?
- These forms are necessary for the public to evaluate the potential impacts of South32 Hermosa to Waters of the US, human health, and the environment.

Arizona State Water Quality Certification, Clean Water Act Section 401

- This certification is for state issuance of a Section 401 State Water Quality Certification for an activity or project requiring a federal permit or license, that may result in a discharge to waters of the U.S.
- Has this certification been issued to South32 Hermosa and if so, why are these certifications not included in the PoO?
- Why is this certification not provided in the PoO as it is necessary for the public to evaluate the potential impacts of South32 Hermosa to Waters of the US, human health, and the environment.

Arizona Reclamation Plan- annual renewal:

- South32 Hermosa has an approved reclamation plan for exploration activities on its private land (Site ID# 13-03295; Mine ID# 02-03398). A modified reclamation plan or new reclamation plan would be required for mining activities.
- Has this plan been renewed to South32 Hermosa? Why are these plans not included in the PoO?
- An updated reclamation plan for new mining activities is necessary for the public to evaluate the potential impacts of South32 Hermosa to Waters of the US, human health, and the environment.

USFS Exploration and Mine Plan of Operations (PoO)

- A PoO is required to be submitted for operations on USFS-administered land (36 CFR 228 Subpart A). As part of approving a PoO, the USFS must also comply with the National Environmental

Policy Act, National Historic Preservation Act, Endangered Species Act, and other applicable federal laws, regulations, and policies. The agency must require (and analyze accordingly) a right-of-way under FLPMA for all transmission and water lines, as such facilities are not governed by rights under the mining law, and instead are discretionary permits.

- This PoO includes many misleading statements to the public and to the Forest Service by South32 Hermosa indicated herein.
- This PoO may include inaccurate statements to the public and to the Forest Service by South32 Hermosa indicated herein.
- This PoO does not adequately address the risk of impact to the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species. The PoO does not address measurement of or control of fugitive dust resulting from transport, mine and public traffic, tracking through the mine site. The impact to downwind and downstream areas from the mine, the transport and beneficiation facilities are not addressed or located making the existing PoO noncompliance with FS regulation as the lifecycle of the mine and its produced products cannot be assessed for impact on the Air and Waters of the US, Public Health, Environmental Health, Wildlife, Threatened and Endangered species, without including the areas with the highest risk, e.g. the transportation of concentrated ore to beneficiation facilities over the current dirt road, low traffic small vehicle designed road system.

USEPA Underground Injection Control Permit

- Permit for Class V wells for injection of non-hazardous fluids into or above underground sources of drinking water. Will this permit be required for the cemented paste backfill?
- What agency is managing underground injection permits and can the public comment on permit applications?
- When is it anticipated the ADEQ will take over the Underground Injection Control Permit program for Class V wells? Why is the ADEQ, at the expense of Arizona taxpayers, intending to take over the Underground Injection Control Permit process when the EPA is currently staffed and funded to oversee the program? Does the ADEQ have the staff and expertise to review permits and provide oversight for the underground injection control program?
- What are the potential impacts to human health and the environment for exceedances or violations to the underground injection control permit which the ADEQ may not be capable of addressing due to staff issues or issues addressing regulation enforcement in the US Forest service? Does the US Forest Service understand an example of such an issue is an exceedance of total lead in a stormwater discharge sample which has been reported to the ADEQ?
- Will well integrity testing be required for each injection well and who will be responsible for reporting results of well integrity testing? Will integrity testing be conducted under the observation of a third party not associated with South32 Hermosa?
- Will the cement seals for the injection wells be compromised if acidic water is present in the well annulus?

- Will wells which fail well integrity testing be used to install cement paste backfill?
- How will failed injection wells be abandoned to prevent the flow of contamination and/or acidic water along the failed well seal?
- What is the plan for preventing acidic water in the underground deposits?
- What is the plan for preventing groundwater and near surface water from being contaminated with acid water?
- Sulfide oxidation occurs in the aerobic, anoxic, and/or anaerobic modes at different temperatures and once deposits are opened, sulfide reducing bacteria will populate. What will stop this acid mine drainage from happening and migrating into the aquifer?
- Why is there no testing or data in the PoO supporting the cemented paste backfill will or will not produce acid water? What will be the impacts to groundwater and stability of the mined voids if acid water occurs in the paste backfill?
- Why is there no acid-base accounting supplied for the cemented paste backfill? What are the implications of not understanding the acid-base accounting on what is mined?
- Will the draft underground injection permit or permits be open to public comment?
- Will South32 Hermosa list all chemicals used on site along with their Safety Data Sheet (SDS) so one can determine health and reactively issues with other chemicals and long term effects to human health and the environment?
- Will there be any PFOA chemicals used or brought to the mine site?
- Why are there no details in the PoO on the fate of the chemicals once mix together with other chemicals, and the possible reactions-leaching characteristic once mixed and placed in the stacked tailings and/or cement paste backfill? Will such fate and reaction details be provided to South32 Hermosa employees and the public?
- Will any of these chemicals have any negative effects or impacts on groundwater once dewatering activities stop?
- Will any of these chemicals have an adverse effect once exposed to acidic water (e.g.: zinc cyanide, ferrous cyanide)?
- What will be the mixture of the cemented backfill?
- Will fly ash or another type of pozzolan be used in cemented backfill mixture?
- What is the toxicity and emerging issues associated with fly ash?
- What is the compressive strength of the cemented backfill?
- Is there testing data and the engineering report that the cemented backfill provides structural support needed to prevent cave-ins and surface collapse?
- Is there testing data and an engineering report that states and shows the cemented paste backfill, "substantially reduced chemical reactivity" as indicated on page 2-24?
- Was the cylinder strength testing done with fresh water or was it using the predicted mill solution water with all the chemicals and reagents?
- What testing methods were used to determine chemical reactivity?

ADDITIONAL RECOMMENDATIONS

It is recommended the US Forest Service prepare a benefit-cost analysis consistent with Office of Management and Budget (OMB) Circulars A-4 or A-94 which includes analyzing ecosystem services. The document, "Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis," is recommended for analyzing changes in ecosystem services in the benefit-cost analysis context. The term ecosystem services to encompass all relevant contributions to human welfare from the environment or ecosystems. This guidance document is intended to help all Federal agencies in developing their RIAs, policy, and program alternatives to include ecosystem services. Benefits, costs, transfers, and distributional effects related to ecosystem services should be reported alongside, and in the same manner as, other effects. That is, benefit and cost estimates should be reported within the following three categories: monetized; quantified, but not monetized; and unquantified. No separate or adjusted reporting for ecosystem services is needed, and they should be directly integrated into the reporting of all other effects. Ecosystem service effects that have been monetized should each be summed along with other effects with appropriate discounting, and then costs should be subtracted from benefits to compute one comprehensive estimate of monetized net benefits.

As operators conducting Plan Operations under the Final PoO approved by the Forest Service are required to furnish a bond or other financial assurance in an amount specified by the USFS, it is recommended that the amount of a bond or other financial assurance be determined jointly with input and concurrence by local participating entities in a legally binding agreement with South32 and the USFS prior to operations.

The following information includes impacts that have immediate effects that are compounded over time and must be fully analyzed in the DEIS. Roads and transportation have one of the largest impacts on the scenic integrity of
the landscape after the physical mine footprint with the disruption of the habitat, pollution, roadway hazards and safety. It also affects the socioeconomic structure and activity in the Forest as well as in the region. Mining activity is popular again fueled by the EV battery push and will be compounded as other mines in the region are placed and S32 expands.

1. Recommend training the existing first responders in Patagonia, Sonoita, and Nogales Fire Departments and clinics for emergency treatment of probable mine accidents and toxicities.
2. S32's President Mr. Risner stated their ore trucks will turn east on highway 82 when leaving the Cross Creek Connector and travel through the bottleneck at Sonoita Crossroads and continue to highway 90, then I-10 and I-19 to Nogales, thereby missing Patagonia. Query? How will that be enforced? Our understanding is that once licenses and overload fees on their trucks are current and paid, they can travel on all state and

federal highways. This should be investigated.
3. The figures A2 through A9 in Appendix A, Roads, does not include grade and slope of proposed haul road. The mapping of topography is of poor resolution and does not give a true representation of the primary access road. Can this be represented in a manner that is more reviewable?
4. The proposed primary access road between Forest Road 812 Flux Canyon Road and Forest Road 4653 Barriles Tank Road traverses' steep SW slopes and will be visible from a considerable distance. Will this be reviewed and is this within the guidelines of Scenery Management Plan 2013?
5. Erosion and runoff on the primary access road may be difficult to manage, impacting water quality. The shape of the land will be considerably altered. How will this be mitigated and managed?
6. Table 2A, Page A-5 is vague and contradicted in the following note. It could be assumed that the greater the construction corridor slope the greater the disturbance. The Access Road traverses a considerable elevation changes and difficult topography to intersect with Hwy. 82. Large and loaded trucks may have a difficult time negotiating this road during adverse weather conditions creating environmental impacts. Will the Coronado National Forest consider these transportation related impacts during their assessment?
7. There is little mention of the topography where the primary access road intersects with State Hwy 82. The grade may require an extensive system of turn and runout lanes to accommodate large trucks entering and exiting the access road. Is the Arizona DOT part of the analysis process and what are the design features needed to accommodate this type of traffic? Although it is not part of this process the Cross Creek Connector also has a large footprint on Hwy, 82 and the adjoining lands. How will that affect the scenic designation?
8. Hwy 82 at the point of primary access is raised above the existing topography and will require a large amount of fill to widen the highway for access. Where will this fill be acquired and how will it impact the vegetation and topography of the area? This is USFS lands.
9. Arizona Highway 82 is designated a Scenic Highway, (one of the first in Arizona). Considering the major construction and alterations to Hwy. 82 for both Access Road and the Cross Creek Connector, will this negate the scenic designation and have impacts on the access to Patagonia State Park and Circle Z guest ranch?
10. Hwy 82 has a considerable amount of truck traffic, both north and south generated by cross border truck traffic through the Nogales, AZ port of entry. What will the impacts be of the additional traffic generated by the Hermosa Mine considering that truck traffic is at 22% (referenced Operating plan)?
11. The intersection of Hwy. 82 and Grand Ave. in Nogales, AZ is a busy intersection. The addition of the Hermosa Mine traffic will add substantially to the traffic and congestion of Grand Ave. How will this additional traffic on Grand Ave. through to I-19 affect the

businesses, schools and truck congested areas of Nogales?
12. Will the local first responder communities be prepared for the additional traffic associated with the Hermosa Mine and their response to medical, fire and HazMat? Included Patagonia, Sonoita, Nogales, Rio Rico, Santa Cruz and Cochise Counties.
13. Driver of mining is Critical Minerals (priorities are Zinc and Manganese) tied to IRA – so cost / benefit should be an ongoing focus. Please study the size / constituents / impact of different dust particle sizes created hauling minerals from mine to onsite processing in mine trucks, transportation of equipment, materials, supplies, and personnel to and from the project area using existing Forest Roads, the primary access road, and temporary access roads. Also please assess direct effect of mined, crushed and trucked emissions on Federal Land including the effect on "downstream" air, water, flora, wildlife & personnel safety.
14. Also include transportation of filtered zinc and lead and silver concentrates off-site in sealed containers and crushed oxide ore in sealed containers to beneficiation facilities on private land distal from the project area. Mine Traffic is listed as on-highway trucks hauling Zinc and lead/silver concentrate and Oxide ore; on-highway fuel delivery trucks for natural gas and diesel; on-highway trucks with input materials (sand, gravel, aggregate) and other materials and supplies including potable water, cement, tires, and chemicals; trucks hauling explosives; and personal vehicles / buses for personnel. Please study the number of trips and miles operated currently on Harshaw Road and plans for future loads and routes. Also study inputs S32 provided to consultants for accuracy and plans for current and future planning address road designs, dust and other pollution.
15. S32 notes future automation and electric vehicles are planned for use on Forest Service Lands without any details. Please study specifically what types of vehicles will be utilized over time as well as environmental cost-benefit.
16. Mined ore is to be trucked in "sealed" containers on trucks through Forest Service land. Their plan is an oversimplification of Hazardous Material responses lacks other issues of getting into waterways and addressing other spilled materials (e.g. fuels). Sealed containers are touted as a mitigating design to "eliminate" hazardous materials as it is being transported and in case of an accident. Attempts to get information on such from the manufacturer have failed to confirm this claim. Experience in transport indicates that accidents and leaks / spills will occur. Please study equipment design to ascertain failure rates and risk to NFS land and the recreation and traveling public. Also please study integrity of all equipment on roadways used to include fuel / oil and other fluid leakage, mineral carry-out and also when rollover or collisions with other vehicles occur.
17. Mined ore trucked product supposedly will not re-enter NFS land. Please study routes for both supplied to the mine and ore shipped out to identify other public roads on other Federal, Tribal and private depending on traffic lanes to and from the mine.
18. Ore and other heavy truck noise and support traffic up and down the mountain will be notable. Please study the effect on wildlife, recreational users and landowners on all

routes.
19. Electric trucks and other equipment are "planned" for operations through NFS land and on Public Roadways. The technology is arguably not retail ready in most applications where Battery Technology is utilized will not currently work. If planned, please study how it will be implemented to include vehicle ownership / operation (3 rd Party), loss in productivity (heavier weights / added trips), fire risk (added responder equipment needs with higher capacity retardants, etc.) and the effect on wildfire promulgation.
20. Dry Stack Tailings at mine site have multiple issues including long-term onsite land contamination, mixing and reinserting in underground mine caverns. There are also underground and downstream air and water related issues. Please study amounts of tailings to remain over time and the impact of using tailing / cement mix in water quality within aquifers.
21. Wet flotation process for zinc and lead is proposed to be used above ground at mine location. Please study the volumes and effects on both air and water, as well as the safety record in such processes along with the effect on the environment.
22. Natural Forest Scenic Integrity rules conflict with above ground rock / tailing mineral sites. One option presented is to manage the mineral heaps "above ground" which means piles of overburden and potentially utilizing an acid leaching process to recover more minerals. Please study acid leaching operations against scenic mitigation rules.
23. Counter to Natural Forest Scenic Integrity rules, dozens of planned drilling pads away from the main mining operation will require generator set power and numerous support trucks, water trucks, material trucks, bulldozers and other equipment as noted. Please study disturbed forestland, roadway designs, traffic, noise, emissions and reparations for each site.
24. Also counter to Natural Forest Scenic Integrity rules, vehicle operations, powerline infrastructure and public use wildfire plans need to be reassessed. Those need to include fires ignited from vehicles and other support equipment sources as well as power lines. Also please study fire protection and response plans for all vehicle used in onsite operations and trucks traveling through Forest Service lands.
25. Planning for new 'primary" 7.5 mile Level 2 Maintenance road down Flux Canyon to 82 on National Forest Land as a future primary route has steep grades, sharp turns, considerable land disturbance, subsidence, washout and maintenance issues appears to need to be of higher quality / durability. Per NFS stated recommendations, construction of roads across highly erodible soils and areas of high and very high scenic integrity should be avoided unless as needed to meet statutory requirements, such as mining law or laws to protect public health and safety. Please study the planned low quality road design, sustainability of products used, maintenance responsibilities and costs.
26. Road design and public use plan does not support safe high use heavy truck and mixed use traffic use. Roadway accident and personal injury accident / death liability will occur on mixed traffic. Please study expected public liability costs as noted mix of hikers,

horses, cattle, bicycles, UTVs, ATVs, SUVs, mine support vehicles and large trucks. Also please study the cost to taxpayers to include a deterrent to visitors and costs per item 27.
27. We see a potential large "tax-payer" risk / liability involving heavy trucks doing hazardous materials on 2-lane Scenic State Highways, County and Forest roads. Forest Service land will include traveling on 2-lane mountainous roads. Please study hazardous material response plans for accidents for each hazmat material including with ore trucks, fuel tanker trucks, explosive trucks, toxic chemical trucks and all other materials.
28. The Forest Service and the mine desires to be Green, but most Carbon emissions come from logistics and other things used at the mine – like cement (item 29). We don't know where the ore is going or where mining supplies are coming from or the inputs Carbon footprint. We ask to get a full-chain Carbon cost versus benefits analysis for traffic passing through Forest Service land – and as a logical model for the future.
29. Cement use is one of the largest sources of Carbon emissions emitted in the US (and globally). Please study the amount of emissions emitted in operations along with options for alternative construction materials for both filling in shafts and building roadway structures.
30. Coronado National Forest Services Plan references the "Patagonia-Sonoita Scenic Road" in the Plan focused on recreational traffic to include to/from the CNF. It has been estimated that Hazardous Material Placarded large trucks will increase up to 800% of current Hazmat trucks on highway 82 (and much higher through NFS land). Please study added Hazard Material Truck traffic not only from Hermosa as planned today, but also other similar traffic from yet to be announced expanded Hermosa operations, Barksdale and Rosemont Mines.
31. When we get on AZ State Roads there are tourists and school buses (with stops to pick-up and discharge students) added in, both also with potential destinations and linked to CNF and other National Forest Service lands. We also have cumulative impacts NOT addressed with growth yet to be announced S32 expansion in CNF Land. That means added traffic, minerals in dust, track-out, noise and more we ask to be addressed.
32. While ore and service trucks are noted in the S32 mine plan and permit applications, we need current and future traffic numbers, data from trucks, road design info, road maintenance plans, Haz-mat accident / fire response for the entire route, etc. Please study plans but utilizing local and current data.
33. Upgraded and new disturbance roads for logistics to / from mine and exploration on Forest Service land needs to utilize sustainable practices and the latest environmentally friendly equipment and materials. Please study roadway planning, design, construction and maintenance of all roadways for use of best practices.
34. There will be subsidence issues with the interruption of underground water and mineral depletion. Also, while blasting is noted, the effect on soil and roadway stability are not assessed. Please study roadway and right-of way plans to address long-term roadway subsidence, stability issues and costs.

35. Counter to Natural Forest Scenic Integrity and other rules, please study replacing pristine National Forest Land hiking and horse trails with a heavy trafficked trucking road. Please study the effect on what is currently used as pristine trails for recreation.
36. Utility right-of-ways and power poles also conflict with National Forest Scenic Integrity rules. Maintenance roads will need to be maintained, but will be accessed by recreational users. Please study power line as well as underground power line options. Also study road designs and how accidents will be responded to as well as liability for accidents on utility right-of-way trails.
37. For other exploration drilling, it is noted that there will be many additional roadway disruptions created in the mountains. Please study equipment and supplies used and advise on effects of road building, noise and effect on wild-life, flora and fauna.
38. Construction and maintenance of fencing and berms are noted as required for worker and public safety. This includes construction and maintenance of temporary roads. Please study effects on wildlife and recreational users in NFS land.
39. Exploration roads and drilling sites have multiple issues including exploration- related emissions from all equipment used and transport supplies, to-from (water measurement, materials etc) similar to fracking, water usage, air quality, and habitat disruption, tree and vegetation removal / replacement numbers and roadway dust.. The Environmental Protection Agency (EPA) now requires more robust tracking at extraction sites across the country. On-site devices measure emissions leaks drilling and low-pressure sources like wastewater storage tanks, with penalties for exceeding emission thresholds.
40. Reclamation and closure activities will include ongoing management of dry-stack tailings storage facility including closure cap, passive treatment, abandonment of well, drill holes, stormwater management, monitoring and more. Please study long-term plans to include effects on traffic, recreational users, wildlife, streams, etc.
41. Contractors utilized in the design and construction of roadways for heavy duty truck traffic in mountains should have experience in working with public lands in environmentally pristine areas. Please study requirements for consultants to engage with all appropriate stakeholders for full analysis of planning.
42. Added detail in POO included "To provide connectivity between discontiguous South32 Hermosa private land parcels, two segments of existing FR5521 totaling approximately 880 feet would need to be upgraded to a level sufficient for heavy haul trucks and similar internal operational traffic. These connecting roads would have 60-foot driving width, but based on estimates of necessary cut and fill, the acreage of disturbance width is estimated as 120 feet, for a total disturbance of 2.4 acres. Additionally, upgrade to a small portion of FR4687 would be 1-5 South32 Hermosa Critical Minerals Exploration and Mine Plan of Operations required; this upgrade would be about 200 feet in length, for a total disturbance of 0.6 acres. These connecting haul roads would be similar in construction to LT-TARs (see cross-section in Appendix A, Figure A15) but with a wider

60-foot driving lane. Buried water pipelines would also fall within the disturbance areas, including for the movement of water between WTP2 and operational facilities. Internal powerlines may also cross within these corridors." S32 has met with some ranchers indicating this may not be the options pursued, but no other options have been formally presented. Please study implications for this option versus others – and clarifying options effects.

43. The sulfide ore mining process is designed to deliver an average of 4,300 kilotonnes11 per year, with the beneficiation facilities designed to an approximate maximum capacity of 14.2 kilotonnes per day. The oxide ore mining process is designed to deliver an average of 600 kilotonnes per year. TSF1 has the capacity for less than 10 years of placement of waste rock and tailings. Mining of the (Zn) sulfide portion of the orebody is anticipated to take up to ~30 years. Mining of the (Mn) oxide portion of the orebody is expected to take up to ~70 years. Please study impacts on all concerns over time versus previous lower number of tons and years shared with the community.

44. While ore and service trucks are noted in the POO and permit applications, we do not see where there has been a Regional Impact Study completed and where projected pollution numbers are forecast. Other mines around the globe also have plans to address ongoing roadway maintenance required to address and mitigate such air pollution. Please study what other mines have addressed in planning as well as using newer methods and technologies

45. In the oil and gas industry on Public Land, full chain analysis are often required due to the perceived dirty production and supply chain aspects of the sector. We should include the same for mining, as it has many of the same issues. Additionally similar to the oil and gas industry, there are subsidence issues with the interruption of underground water and oil depletion. Please study requiring the same analysis for mining as the Oil & Gas Industry does on Federal Land.

46. There are questions surrounding the data used for calculations of emissions. While there is onsite weather information, the other data used from Yuma, Tucson and north of Phoenix doesn't create a representative baseline. Basic engineering says that mineral rich areas have a different emission profile than other areas. This mining is in a mineral rich area. Additionally, we don't know the mineral content of the airborne dust, as well as what the increases are with expanded operations. We would like to see site and area specific baseline information with an independent crosscheck. An in-depth review of corresponding air concentrations as estimated and submitted by S32 for the application of permit No. 96653 (Permit) to demonstrate adequate protection of public health and the environment is warranted.

47. NFS and Department of Transportation(s) have mutual interests in safe roadways and vehicles. Please study the integration of the following Department of Transportation Principles in the Scoping process:

a. PRINCIPLE 1: Collaboration for Roadway Safety - Everyone has a stake in roadway

safety. The collaboration of all stakeholders will yield cross-cutting opportunities to improve roadway safety with the promise of stronger outcomes. DOT will lead this collaboration within its operating administrations and through outreach to potential partners, starting with the development of a national roadway safety goal.

b. PRINCIPLE 2: Safer Behaviors - The greatest potential for reducing crashes lies in the difficult task of transforming public and personal attitudes toward roadway safety. Citizens should consider roadway deaths along with the attendant suffering and economic costs as unacceptable rather than inevitable. A shift in safety culture will bring us closer to making these changes. DOT can support the needed change by targeting at-risk operators and users through education and enforcement.

c. PRINCIPLE 3: Safer Vehicles - Safer and smarter vehicles will prevent crashes or mitigate their severity. DOT will continue to foster development of the engineering and technology critical to improved vehicle crash avoidance, crashworthiness, and communication. The public needs to understand and demand current and innovative vehicle technologies that save lives. Some of these innovations will enhance the safety of the user within the roadway environment through connectivity of the vehicle and the infrastructure.

d. PRINCIPLE 4: Safer Roadways - The Nation should have the safest roads in the world, not just for vehicles, but for all users. Safer roadways will result from expanding improved infrastructure, using technological innovations and countermeasures, and integrating safety into all phases of the roadway life cycle.

e. PRINCIPLE 5: Empower Communities - Local jurisdictions must be able to prioritize transportation objectives based on their own specific needs. By developing data-driven roadway safety plans, communities can meet the needs of all the road users in their locality. The Department will empower communities by enhancing State and local participation in safety planning processes, providing greater flexibility in their resources, and fostering linkages between safety and livability initiatives.

f. PRINCIPLE 6: Accountability and Managing for Results - The public expects its roadway investment to produce tangible program results. Program success is achieved through improved data, integrated planning, and measurable performance targets. Greater accountability and results-oriented management will provide the transparency necessary to maintain the commitment and support to significantly reduce roadway fatalities.

PUBLIC HEALTH. There are significant areas of concern that will likely impact the public health of local area residents:

1. Dust, particulate matter and toxic substances management, noise pollution
2. Emergency and Crisis Management Plan; Health, Safety and Security Management Plan
3. Consultation and transparency with the public
4. Plan of Operations Issues
    - Safety, cleanup, and maintenance
    - Tailings production and management
    - Handling of hazardous materials

- Subsidence monitoring
- Air Quality -Wind gusts and "fugitive dust management"
- Surface Water
- Ground Water
- Public Safety and Fire
- Public and Private Road Safety

5. Community mental health and cohesiveness

Please study, investigate and assess the following issues, questions, potential impacts on human health and recommended alternatives:

Dust, particulate matter and toxic substances exposure and management:

Significant public health risks exist to vulnerable populations and mine workers from exposure to toxic materials to be mined by South32 Hermosa and mining related chemicals. Regular exposure to dangerous levels of airborne particulate matter (PM), containing manganese, lead, zinc and mining related chemicals such as sulfuric acid and cyanide disseminated via air, water, and/or soil or from direct exposure are known to cause direct and indirect health problems. This mining project is planned to be operating for decades, further intensifying the cumulative health risks for the community.

Manganese toxicity is primarily manifested by neurological effects such as tremors, difficulty walking and behavioral changes. In children, the effects may include learning difficulties and behavioral issues. These consequences are often not reversible, and may not be amenable to medical treatment.
Manganese Toxicity Upon Overexposure: a Decade in Review - PubMed (nih.gov)

Dose-dependent progression of parkinsonism in manganese-exposed welders - PubMed (nih.gov)

Lead toxicity leads to adverse effects in almost every organ system, and children are especially vulnerable. Neurological problems are most frequent including decreased cognitive function, altered behavior, and neuromotor and neurosensory disorders. Other adverse effects may include renal, cardiovascular, hematological, reproductive and developmental problems.
Bioaccumulation of lead (Pb) and its effects on human: A review - ScienceDirect
toxguide-13.pdf (cdc.gov)

Additionally, consider the exposure risk of area residents living along the transport routes of the mining operation and in the general vicinity of the mine from direct, indirect and cumulative impacts of airborne particulate matter (PM). Human health is adversely affected by airborne

particulate matter such as PM10's and PM2.5's, the latter being associated with the most dangerous health effects because they reach farthest into the lungs, and into the bloodstream, including primarily damage to the cardiovascular and respiratory systems, as well as harm to the renal, neurological, gastrointestinal and reproductive systems. Children and older adults with asthma are particularly vulnerable to PM.

Recent Insights into Particulate Matter (PM2.5)-Mediated Toxicity in Humans: An Overview - PMC (nih.gov)

Toxicological Effects of Fine Particulate Matter (PM2.5): Health Risks and Associated Systemic Injuries-Systematic Review - PubMed (nih.gov)

It is critical to assess the adequacy of mine's processes for rigorous independent science based monitoring that would include: baseline levels of the minerals (lead, zinc and manganese); documentation of mine related chemicals; regular ongoing measurements reported for air, water, and soil quality. Will quantifiable, enforceable and transparent science based monitoring of water, airborne particulate matter (PM), and toxic materials listed above be carried out by qualified independent entities such as the local, state departments of public health?
What specific standards will be used to define excessive emissions? Which pollutants will be measured and what level of air and water contamination of each of these pollutants will be considered excessive? The allowable limits in the air and water permits must be compared to values recommended by the EPA, CDC and ATSDR as well as all relevant laws and regulations. Who will monitor and measure this?

What are the consequences and plan of action/remediation if emission standards are exceeded once? Twice or more?

Manganese poses a special problem because, at present, there are no federally mandated regulatory limits in air or water for this heavy metal. What limits are to be used? A bill requesting the EPA to mandate standards for manganese is currently "stuck in committee"; in the Arizona legislature.
Neurologist: Manganese Exposure Limits Not Adequate | Chicago News | WTTW
Lead - Overview | Occupational Safety and Health Administration (osha.gov
Self monitoring and self reporting by South32 as proposed in the draft versions of the air and water permits are not adequate, and must be periodically corroborated by independent agencies, if it is to be allowed. Please assess South32's track record worldwide in other locations on ensuring health and safety, and compliance with regulations when considering the advisability of allowing self-monitoring.
Indigenous and Afro-descendant Peoples Win Court Case against Multinational Mining Company - ABColombia

South32 reviewing tailings dam risk after Brazil disaster (miningweekly.com)
South32 to pay $2.9m for diverting water to mine without permit (mining-technology.com)
Sustainable mining? South32 leaving destruction in its wake as it attempts to clean up its image

- MACUA

Climate change related impacts: Can exposure to PM be exacerbated by climate- more frequent and intense storms and winds throughout the region? What is the footprint/ impact of mining activities on greenhouse gasses?

Noise related impacts: Construction and demolition with heavy equipment, mining operations - including blasting and truck transport of materials- affect residents living in the areas in proximity to the mine and along the surrounding transportation routes and along the construction of the roads such as Cross Connector, Flux Canyon etc. Most residents live in the area because it is quiet. These residents, mine workers, birds and bird watchers, children, dogs, musicians and many others are vulnerable to low background noise and suffer pain at levels above 80 dBA.

DEIS requirements:

Baseline monitoring of the primary minerals to be mined (lead, zinc and manganese), and mine related chemicals in air and water should be taken prior to initiation of mining activities. PM monitoring of various diameters should also have baseline measurements done not only in the vicinity of the mine but also along all proposed transport routes.
Monitoring sites should be located at strategic locations that capture variable wind conditions and different locations throughout the region at varying distances from the mine for both air and water. Since South32 will be discharging up to 6.5 million gallons of "treated" water into local streams, there should also be monitoring at various points downstream as well as at the point of discharge.

Exhaustive consideration of all possible prevention measures against exposure to the the aforementioned toxins should be studied. What are the ways the community can be protected? Consider invoking and implementing the precautionary principle (PP) as the known and unknown health risks are varied, serious, often irreversible and still even more is being learned every year. Using lead as an example, it has been known to be toxic for many years, yet regulatory limits were just recently made stricter because of new information, underscoring how immature the science is with respect to public safety.

The PP has four central components: taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making.
The precautionary principle in environmental science. - PMC (nih.gov)

Noise and traffic oversight monitoring and mitigation should be part of everyday operations. Hearing loss assessment among mine workers and other vulnerable groups should be readily available.

Emergency and Crisis Management Plan; Health, Safety and Security Management Plan, Fire Safety Plan, and Emergency Planning
South32 has not shared any details or information in the Plan of Operation (POO), only mentioning the plan titles (see above). When will these plans be shared with the community and healthcare institutions in the County and larger region? Emails to askhermosa@south32.net were met with a response from South32 of not being able to share the plan contents to the public because "the documents are sensitive to the security and safety of the site and its employees".

South32 worker safety and health protection plans: Are they in compliance with OSHA occupational standards? Are protocols and procedures in place for prevention and timely response to work related health issues? Will baseline assessments be conducted and ongoing monitoring of worker health? What are the measures in effect to control and limit track out? How will this be monitored?

Risk Management- Do the South32 risk management plans conform with State and Federal Regulations, as they must?

Healthcare capacity- Is there regional capacity to respond to the multiple complex risks involved in mining in an arid fire prone region? Fire, spills, and accidents are common in mining. Is daily updating of local officials of transport materials and routes part of the routine operations? What about initial and ongoing training for all local first responders for potential accidents and exposures specific to the risks inherent in this mine and its operations? Will there be training and ongoing education for local medical staff to be aware of and competent in managing all the various acute and chronic toxicities potentially associated with this specific mining operation?

Safety regulation for toxic exposure compliance- If the air or water contamination from aforementioned mining related substances exceeds allowed limits, how will the regulations be enforced? Who will enforce that mitigation measures be taken? What are the specific consequences to South32 for non-compliance?

Community Health Protection- Assessment and Mitigation
South32 has said they will conduct community health assessments in conjunction with University of Arizona, however other issues must be considered to effectively protect the health of the communities and vulnerable populations potentially affected.

Given the multitude of negative health consequences possible from mining at South32 Hermosa, how will the community be able to hold South32 responsible if/when individuals suffer from any of these adverse effects, particularly in cases where specific emission standards are exceeded? Will medical services and reimbursement for medical costs be available by some mechanism to community members, or will community members need to resort to the costly and lengthy process of seeking relief through the legal system? Will the burden of proof of causality remain on the affected individual(s)?

DEIS Requirements:
The agency must focus baseline health assessments on vulnerable populations (mentioned throughout this document) and continue to monitor these subgroups. Offer free toxic metal assessment services to everyone who considers themselves at risk. Conduct public health education and outreach focused on the risks, symptoms of toxic exposures, water quality parameters. Consider an on-site clinic with emergency response capacity and training the existing first responders in Patagonia, Sonoita, and Nogales Fire Departments and clinics for emergency treatment of probable mine accidents and early identification of toxicities.

6. Consultation, Transparency and Public Accountability
What processes are in place to assure transparency and regular communication with the public of risks, exposures and mitigation measures associated with South32 mining operations? Will qualified independent health entities oversee this process? Will health authorities be responsible for prevention, health care for affected and vulnerable individuals and the community? What are the specific consequences to South32 for non-compliance and damages?

Environmental Justice- Spanish speaking low income residents present additional challenges for effective communication, are often not likely not to seek healthcare for early "minor" symptoms, and are more likely to have preexisting conditions that place them at higher risk. How can effective outreach and communication be achieved with vulnerable populations?

Recommendations
Establishment of a community public health and wellbeing monitoring committee that interfaces with public and private health institutions and authorities, agencies.
Require of South32 and its parent company the establishment of a Reserve Fund/ Cash Bond to sustain the costs of public health monitoring, preventive and treatment costs and remedial / mitigation measures for spills and disaster response of 10% of the announced $2.16 billion investment.

7. South32 Plan of Operations We request study, investigation and assessment of the following issues specific to the South32 Plan of Operations:

POO Ch 2
What are the operational systems for safety, cleanup, and maintenance? These systems are not included in the POO.
2.2 Tailings management and safety- Tailings Surface Facility vs Cement paste backfill. What is the potential for leakage into the aquifer of acid/ heavy minerals etc from cement paste backfill- once the backfill mined area is allowed to refill with water? How will this be monitored?
-Waste water safety -At what concentrations are the reagent chemicals listed in the POO toxic to humans or animals? Do those mentioned by name in the POO represent a complete list? How are safe water levels of reagent chemicals determined and monitored for compliance? What is the potential for spill, inadvertent exposure, and/or persistence of in the waste water of the chemical reagents which will be used as activators, collectors, depressants and frothers to aid in heavy mineral separation? Chemicals specifically listed in the POO: copper sulfate, aerophine 3418A, Aero 5100, zinc sulfate, zinc cyanide, methyl isobutyl carbinol, oroprep x-133. Will any other reagents or chemicals be used that are not listed in the POO?
2.5.7.2.1. Tailings Production

-The POO defines a special category of tailings that do not go to either the cement backfill or to the TSF as "Off specification tailings". POO states that water content greater than 3% will make tailings unsuitable for the above ground facility; Other than moisture levels, are there other indicators for lack of safety of tailing storage? (For example the presence and levels of toxic contaminants).
What is the plan for storage of tailings that are "off specification"? Stormwater collection of run-off from the "off specification" tailings is unclear in the POO. What is the danger of toxic runoff in a heavy storm event involving the "off specification" tailings?
For TSF 1 and TSF 2 how will the water collection systems be monitored after a storm/monsoon event for meeting safety specifications? Is the proposed monitoring plan one that is quantifiable with mitigation measures that are enforceable? Transparency-Will the results be reported to the public and to the Forest Service? What are the consequences for non compliance?
2.5.8.2. Handling of hazardous materials
What is the oversight and monitoring plan for transportation by qualified vendors? Is it quantifiable and enforceable? What are the consequences and mitigation measures for noncompliance or accidents? POO states that "an emergency and crisis management plan will be implemented…". This plan is not included in the POO nor is it given as an appendix, it should be provided for review and comment.
-Transparency- what are the plans for notifying residents living along the transport routes of the details of the timing of the transport of particular hazardous materials, for example? Is there a public communication of a plan for emergency measures to take if spills and other accidents take place?
South32 POO Chapter 3. Environmental Protection
3.1 Subsidence monitoring- What does the mine consider an acceptable level of subsidence?

Will subsidence be monitored to prevent damage to area forest roads? What is the potential for damage to water collection systems and or the TSF1 and TSF2 facilities with subsidence changes in topography? What does the forest service consider an acceptable level of subsidence? Over what time period? How will this be measured? What are the consequences and plan of action/remediation if acceptable level of subsidence is exceeded?

3.3 Air Quality (also see input from the Air Quality Advisory Council)

Wind gusts and "fugitive dust management" POO states that Fugitive Dust Management of dust created during hauling, stockpiling, blasting, and drilling will be subject to a pause in surface activities "as practicable" when wind gusts are expected to exceed 25 mph? Why not set the wind gusts limit at 15mph? 20 mph? ... what data supports a threshold of 25mph? If wind gusts are expected to exceed the threshold, who will determine when a pause is "practicable", or not? What are the consequences if the mine determines a needed pause to NOT be practicable?

Transparency How will the community be informed if air quality is compromised or if a decision is taken not to halt operations in high wind conditions? What protective measures can be implemented if this is the case?

How can a system of continual oversight and monitoring of the data be set up to alert the mine workers and local residents of dangerous particulate matter levels in the air?

Recommendations

Due to high wind variability throughout the region, consider multiple local air quality monitoring stations at strategic locations to capture existing baseline levels of particulate matter pollution in the area and subsequently to capture and monitor dynamic changes in air quality.

Mitigation -POO states that South 32 will employ "new technologies for dust management". What are these new technologies for dust management? Who will determine when/ how they should be used? Will this be mandated by a regulatory agency or a voluntary action of the mine?

3.4.2 Ground Water

Surface water impairment. POO states Upper Harshaw Creek has been designated as impaired surface water. But to our knowledge neither lower Harshaw Creek, East Harshaw Creek, nor Mowry Wash have been tested to determine whether or not they have pre-existing/current levels of surface water impairment. If they were tested and found to NOT be impaired already we would like to know more details. If they have not been tested, we ask that such testing be performed before water can be released by the mine into these drainages.

-When was Lower Harshaw Creek (destination of water release from WTP2) evaluated and what were the results of surface water analysis for possible preexisting impaired water in Lower Harshaw Creek?

-When was Upper East Tributary of Lower Harshaw Creek (Destination of release from WTP2) from West Rapid Infiltration Basin evaluated and what were the results of surface water analysis for possible preexisting impaired water in the East Tributary of Harshaw Creek?

-When was Mowry drainage (Destination of release from WTP2) from Southern Rapid infiltration Basin evaluated and what were the results of surface water analysis for possible preexisting impaired water in the Mowry drainage basin?
- Will baseline and ongoing monitoring take place of the water quality in each of these drainages destined to receive output from WTP2? Will the monitoring plan and compliance of results be quantifiable and enforceable? What mitigation plans and consequences are envisioned if the acceptable water quality standards are exceeded?

3.9 Public Safety and Fire. 3.9.1 Environmental Protection Measures
POO states that "A health, safety and security management plan has been developed for the current and ongoing operations on private land and will be updated to cover all project activities."
Transparency- This plan should be available now to include all projected activities on forest service land and a copy of that updated health, safety and security management plan should be provided for review as part of the scoping process.

Recommendations
-The proposed health and safety plan should also address the concern for toxic exposure to the hard minerals being mined, specifically lead and manganese.
The toxicity of lead and manganese to hard mineral mine workers has been well documented and the mine POO needs to specifically define this problem and delineate how high levels of toxic exposure to mine workers, and the nearby community to lead and manganese will be monitored, managed and prevented. Low levels of chronic exposure to lead and manganese have also been documented to cause adverse health effects, especially to children, pregnant women and other vulnerable populations in the community and vicinity of the mine. Vulnerable populations in the case of lead and manganese are known to include the elderly, those with genetic conditions precluding proper regulation of magnesium/manganese transporters, those with liver conditions affecting biliary excretion of manganese, and those with asthma in the case of dust. For example, in the South 32 Manganese mine in Australia the aboriginal population in proximity to the mine has a genetic defect putting them at very high risk, and exceptionally high rates of the neurologic disease of manganism exist in the community in proximity to the mine. How does the mine plan to monitor for potential long term toxicity of chronic exposure to lead and manganese by neighboring residents, livestock, and wildlife in proximity to the mine? What measures define an area of "proximity" or safe distance under variable wind conditions that characterize this region?
The pathogenesis of Machado Joseph Disease: a high manganese/low magnesium initiated CAG expansion mutation in susceptible genotypes? - PubMed (nih.gov)
Machado Joseph Disease is reported to occur in epidemic incidence in populations surrounding South 32 Manganese mine in Australia.
Mutations in SLC39A14 disrupt manganese homeostasis and cause childhood-onset

parkinsonism-dystonia - PubMed (nih.gov)
Consequences of Disturbing Manganese Homeostasis - PubMed (nih.gov)

"Abstract: Manganese (Mn) is an essential trace element with unique functions in the body; it acts as a cofactor for many enzymes involved in energy metabolism, the endogenous antioxidant enzyme systems, neurotransmitter production, and the regulation of reproductive hormones. However, overexposure to manganese is toxic, particularly to the central nervous system (CNS) due to it causing the progressive destruction of nerve cells. Exposure to manganese occurs by inhalation, ingestion, or dermal contact. Associations have been observed between manganese accumulation and neurodegenerative disease such as manganism, Alzheimer's disease, Parkinson's disease, Huntington's disease, and amyotrophic lateral sclerosis (ALS). People with genetic diseases associated with a mutation in the gene associated with manganese excretion, kidney disease, iron deficiency or a vegetarian diet are at particular risk of excessive exposure to manganese. This review has collected data on the current knowledge of manganese exposure……."

Third Party Vendor Accountability Responsibility and Liability- Who is responsible for monitoring compliance and who bears responsibility for consequences- accidents, toxic exposures, onset or exacerbation of chronic illness?

South 32 distributed through the postal service to Patagonia residents a public relations flyer (USPS to Patagonia residents May 2024). The company flyer made the bullet point claim that the South 32 company would be "contracting with a third party" for monitoring and maintenance of public safety. What third party? This is not mentioned or addressed in the POO. Details of this arrangement needs to be described in detail in the POO. South32 has also said they would be conducting community baseline health assessments and periodic monitoring, again to be conducted by a third party. What are the details of this plan? Will it include lead or manganese toxicity monitoring?

What are the consequences to S32 for breaches in public safety? What if a 3rd party vendor is responsible for an accident on the road?

Public and Private Road Safety
South 32 POO Chapter 6. Transportation
How will traffic conflicts between mine vehicles/South 32 contractors and private vehicles, area ranchers, recreational bicycles, campers/ATVs, hikers, grazing cattle, and horseback riders and wildlife be prevented? How is the forest service, community to be compensated for loss of life/health secondary to motor vehicle accidents? Loss of wildlife to roadkill, loss of livestock, poor growth of livestock due to traffic stress? Loss of recreational opportunity to use the involved forest service roads, etc.

POO states that the speed limit on primary access roads will reduce potential for traffic conflicts between mine and public vehicles. What about traffic on Harshaw Road and the high volume use of Harshaw Road by recreational bicycles? By Arizona Trail Hikers? By grazing cattle? By ATV's and campers? By ranchers?

Consider the impacts of the S32 Cross Creek Connector- a new road constructed along the outer boundary of the Town of Patagonia cuts through residential neighborhoods of residents of the Town of Patagonia Santa Cruz County residents. While considered a temporary road, it will be used to indefinitely transport all the mineral products in the upcoming years until a permanent road is identified and constructed. Who owns this road and who is responsible for monitoring and mitigating air, dust and noise pollution in this area?

Please assess alternative routes with lesser human health impacts - such FS Road 49 to Lochiel- which may have less human health impact.

5. Patagonia town character, community mental health and cohesiveness
Direct and indirect and cumulative negative impacts on community mental health and potential psychological trauma are a serious concern.
Assess strategies and options to foresee, prevent and mitigate damages to the rural character and community wellbeing of the Town of Patagonia. Patagonia area residents are remarkably unified in what they want to keep about their town character and what they want to prevent in terms of change- whether or not they support the mine project or not, according to a recent survey of 265 residents and leaders representing the diverse sectors of the Patagonia area community. Public health and safety issues are among their top concerns. Area residents indicate they are worried about mining's effects on water and environmental quality (84%), disturbed by the impact of mining on Patagonia daily life (78%), and are bothered by noise, air quality and light pollution (76%). Respondents to the survey dearly cherish Patagonia's quiet, rural lifestyle, friendliness and the strong community fabric they have cultivated over the decades. Over 70% of the adult and 87% of the youth respondents are involved in at least one of over two dozen volunteer driven organizations, working to sustain, protect and improve the Patagonia area and the well being of its residents.

Our Town Patagonia Citizen Survey Executive Summary
https://drive.google.com/file/d/1RAFZX4lwq6PepeY__3YPHEyKPVtoezfl/view
Just as seemingly straightforward changes in the natural environment can cause severe ripple effects, disruptive cultural change-- like increased traffic, noise, loss of neighborhood safety, higher housing costs and the rapid influx of new people - can threaten the very community spirit and fabric that makes the town work well.

The cumulative impact of the loss of a way of life can cause significant psychological stress and moral grief to area residents and vulnerable populations as they face challenges on multiple

fronts: serious health threats, retirement plans derailed, displacement and disrupted lives, diminished nature based livelihoods, diminished recreational activities such as bicycling, and the loss of unique natural beauty and biodiversity of the region. These multiple and simultaneous losses can have a cascading effect, that ultimately damages individual wellbeing and unravels community cohesiveness.

Recommendations
Foster strong community partnerships with public health authorities and other expert resources; generate effective communications and reliable information. Facilitate access to supportive health resources. Enable resident participation in early identification of and intervention in potential problem areas. For example training in the use of meters to track noise, air quality and traffic volume; health education on stress management, early warning symptoms of toxic metal exposure etc.
Alternatives such as NOT allowing mining in this already drought stricken unique biodiversity hotspot would be a reasonable outcome to spare our community all the negative consequences listed throughout these scoping comments.

As noted, the DEIS must fully analyze and quantify the current baseline conditions of all potentially affected resources including but not limited to: fish and wildlife, habitat, surface and ground water quality and quantity, groundwater dependent ecosystems, seeps/springs, air quality, cultural/historical resources, recreation, economic and community values and resources, and visual resources.

To the extent that USFS does not have complete baseline or other information to inform its analysis of reasonably foreseeable significant effects, the CEQ regulations require it to obtain the missing information. See 40 CFR § 1502.21 Incomplete or unavailable information.

USFS Must Review and Regulate the Project Under the Correct Permitting Regimes

In addition to ensuring that all aspects of the Project comply with all provisions of applicable state and federal laws and regulations and all provisions of the Coronado Forest Plan (pursuant to the National Forest Management Act, NFMA), USFS can only consider approving any electrical transmission line(s) and any other similar land use facility under a special use permit/Right-of-Way (ROW) under FLPMA Title V and its implementing regulations. Under mining and public land law, USFS's review and approval of such off-site infrastructure is not governed by the 1872 Mining Law and USFS's 36 CFR Part 228 regulations, but rather under FLPMA Title V. Such ROW/permit review is entirely discretionary with USFS and the agency is not governed by any constraints under the Mining Law.

Alternatives

The DEIS must fully analyze all reasonable alternatives to the project as a whole as well as all reasonable alternatives to each major project facility and activity.

Conclusion

The above groups look forward to the DEIS and additional public review. Please include all of these commenting groups in any future email, internet, or other public notices involving this Project.

Sincerely,

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