

## 4.18 PUBLIC HEALTH AND SAFETY

### 4.18.1 Effects Analysis Indicators and Methodology of Analysis

The analysis of effects to public health and safety from the Stibnite Gold Project (SGP) includes the following issues and indicators:

**Issue:** The SGP may affect public safety on the roads used by mine vehicles during construction, operation, and closure activities.

**Indicators:**

- Number of SGP-related vehicles trips on public roads.

**Issue:** The SGP may affect human health or exposure to hazards.

**Indicators:**

- Change in public health statistics.
- Changes in health metrics such as soil, air, and water quality.
- Quantity of hazardous materials transported on access roads.
- Risk of natural hazards (wildfire, avalanche, landslide).

**Issue:** The SGP may affect infrastructure and services as related to emergency services, medical services, utilities, sanitation, and wastewater treatment.

**Indicators:**

- Capacity of existing infrastructure and services to meet anticipated increased use.

**Issue:** The SGP may cause public health effects related to changing environmental conditions.

**Indicators:**

- Changes in soil, air, and water quality.
- Disruption at recreational areas during construction, operation, and closure and reclamation.
- Psychological effects due to noise.

Public health and safety was analyzed using baseline health statistics obtained from federal, state, and local government agencies, scientific literature reviews, and information and analysis documented in reports prepared for the SGP. The evaluation of public health and safety effects

relies heavily on the analyses conducted for other resources as they relate to public health impacts.

In assessing the potential for health impacts due to the SGP, the types of health impacts (e.g., chronic disease, injury, well-being, etc.) selected and described in the affected environment discussion in Section 3.18, Public Health and Safety Affected Environment, are evaluated and the magnitude of the health impact is assessed. In assessing the magnitude of the impact (high, medium, low, or none), several factors are evaluated: the actual consequence (e.g., minor injury/illness or severe injury or death), the duration of the exposure, and the number of people potentially affected. In addition to categorizing the magnitude of the impacts, effects are categorized as positive or negative, with information on potential mitigation provided (see **Table 4.18-1**).

**Table 4.18-1 Definitions of Magnitudes of Health Impacts**

<b>Magnitude of Health Impact</b>	<b>Positive Effect</b>	<b>Negative Effect</b>	<b>Mitigation</b>
None	No discernible or measurable impacts	No discernible or measurable impacts	None
Low	Low level quality-of-life impacts, low/short exposures, limited area/people affected	Low level quality of life impacts, low/short exposures, limited area/people affected	Mitigation measures possible
Medium	Significant quality-of-life enhancement, or reduced exacerbation of existing illness, or reduced disease incidence; Moderate, intermittent, exposures, relatively localized	Exacerbations of existing illness, reduction in quality of life (e.g., increase in "nuisance" factors such as noise/odors); Moderate, intermittent, exposures, relatively localized	Mitigation measures possible, but minor residual negative effects may remain
High	Prevent deaths/prolong life	Increase deaths, increase chronic or acute diseases, increase mental illness; High/long duration exposures, over a wide area	Mitigation measures possible, but residual negative effects may remain

Table Source: International Council on Mining and Metals (ICMM) 2010

As described in the ICMM 2010, when analyzing the overall public health impact, the magnitude of the consequence is combined with the possibility that the consequence will occur. There is no universally agreed upon formula for assessing overall public health impact (ICMM 2010). Characterization of public health effects relies on qualitative and quantitative evidence (National Resource Council of the National Academies [NRC] 2011) and the assessments of the magnitude of the impact or possibility of occurrence are often based on a subjective judgement (ICMM 2010). Both NRC and ICMM recommend the use of a matrix to organize the results of the public health analysis and to convey results of the overall public health impacts in a manner that is easy to understand. Overall impact rating on public health is assigned using the following matrix, which was adapted from the ICMM and NRC. The matrix is supplemented in the following sections with an explanation of the evidence used to develop the ratings in each public health category. The characterization of the magnitude of action is determined by using the descriptions of public health impact ratings provided in **Table 4.18-2**. The number of persons affected, and the spatial impact is considered when determining the magnitude of action.

**Table 4.18-2 Public Health Impact Rating Matrix**

<b>Magnitude of Health Impact</b>	<b>Low Possibility of Health Impact Occurrence (unlikely to occur)</b>	<b>Medium Possibility of Health Impact Occurrence (likely to occur sometimes)</b>	<b>High Possibility of Health Impact Occurrence (likely to occur often)</b>
None	negligible	negligible	negligible
Low	negligible	minor	moderate
Medium	minor	moderate	major
High	moderate	major	major

Table Source: ICMM 2010; NRC 2011

## 4.18.2 Direct and Indirect Effects

The following analysis of effects associated with public health and safety is focused on the potentially affected local population of Valley County, particularly the residents of the village of Yellow Pine, the nearest residential community to the mine site area, as well as recreational visitors who frequent the area. The scope of this analysis is limited to affected communities outside of the mine site and associated facilities. Accordingly, this analysis does not include a direct evaluation of the anticipated workforce safety and health issues that could occur at the mine site, because the action alternatives would be governed by the Occupational Safety and Health Administration and Mine Safety and Health Administration regulations in the areas where mining and mining-related activities would occur.

This analysis evaluates the magnitude of the potential health issues (both positive and negative) on the local community and the cumulative impacts. Each action alternative section below includes a table that summarizes the assessed impacts described and presents the overall public health impact rating of each impact. Elements of this context include potential public health impacts regarding environmental quality, economy, public services/infrastructure, and demographics.

### 4.18.2.1 Alternative 1

Alternative 1 has the potential to result in direct and indirect effects to public health and safety through alterations in environmental conditions; economic conditions; local public services and infrastructure; and land use and demographics.

This analysis evaluates the public health impacts related to environmental conditions, economy, public services/infrastructure, and demographics, and evaluates the magnitude of the potential health issues (both positive and negative) on the local community. **Table 4.18-3** summarizes the assessed impacts described in the following sections and presents the overall public health impact rating of each impact.

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**Table 4.18-3 Summary of Public Health Impacts for Alternative 1**

<b>Category Relevant to Public Health</b>	<b>Potentially Affected Resources</b>	<b>SGP Specifics</b>	<b>Impact Relevant to Public Health and Safety</b>	<b>Possible Health Impact</b>	<b>Positive or Negative Health Impact?</b>	<b>Pathway of Health Impact</b>	<b>Magnitude of Impact</b>	<b>Possibility of Impact</b>	<b>Overall Impact on Public Health (Magnitude x Possibility)</b>
Environment	Air	Localized impacts to air quality from fugitive dust and particulate emissions during mining operations; diesel emissions from vehicle traffic and machinery	-Inhalation of pollutant emissions	-Chronic Disease -Well-Being/ Psychosocial	Negative	Direct – Pollutant Inhalation	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible
Environment	Soil	Deposition impacts to soil from proposed mining operations	-Direct contact with hazardous pollutants	-Chronic Disease-Well-Being/ Psychosocial	Negative	Direct - Contact	Construction Phase: Medium  Operation Phase: Medium  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Minor  Operation Phase: Minor  Closure and Reclamation Phase: Negligible

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<b>Category Relevant to Public Health</b>	<b>Potentially Affected Resources</b>	<b>SGP Specifics</b>	<b>Impact Relevant to Public Health and Safety</b>	<b>Possible Health Impact</b>	<b>Positive or Negative Health Impact?</b>	<b>Pathway of Health Impact</b>	<b>Magnitude of Impact</b>	<b>Possibility of Impact</b>	<b>Overall Impact on Public Health (Magnitude x Possibility)</b>
Environment	Groundwater	Leaching of contaminants to groundwater from proposed mining operations	-Degraded environmental quality	Well-Being/ Psychosocial	Negative	Indirect	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible
Environment	Soil	Reclamation of legacy mining materials	-Minimizes direct contact with hazardous pollutants  -Improved environmental quality	-Chronic Disease -Well-Being/ Psychosocial	Positive	Direct - Contact	Closure and Reclamation Phase: Medium	Closure and Reclamation Phase: High	Closure and Reclamation Phase: Moderate
Environment	Soil	Uptake of contaminants from soil into subsistence foods (berries and plants)	-Ingestion of contaminants from edible plants and berries	-Chronic Disease -Nutrition -Well-Being/ Psychosocial	Negative	Indirect - Bioaccumulation	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible

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Environment	Surface Water/ Sediment	Direct contact with hazardous pollutants released to surface water	- Direct contact with hazardous pollutants  - Ingestion of hazardous pollutants in fish harvested from local waterbodies	-Chronic Disease -Nutrition -Well-Being/ Psychosocial	Negative	Direct	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible
Environment	Surface Water/ Sediment	Reclamation of surface conditions, re-vegetation to reduce run-off of hazardous pollutants to streams and rivers	-Minimization of direct contact with hazardous pollutants  -Reduction of hazardous pollutants in fish harvested from local waterbodies  - Improved environmental quality	-Chronic Disease -Nutrition -Well-Being/ Psychosocial	Positive	Direct and Indirect	Construction Phase: Low  Operation Phase: Low Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible Closure and Reclamation Phase: Negligible

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Environment	Existing Terrain and Features	Disturbance of existing terrain and features	-Injury due to natural hazards - avalanche, land slide, flash flooding and water hazards, wildfires	-Injury -Well-Being/ Psychosocial	Negative	Direct - Injury	Construction Phase: High  Operation Phase: High  Closure and Reclamation Phase: High	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Moderate  Operation Phase: Moderate  Closure and Reclamation Phase: Moderate
Economy	Personal (income, employment)	Increase in local employment	-Increased income -Increased food security/ improved nutrition -Increased access to health care through employee benefits, including insurance	-Chronic Disease -Well-Being/ Psychosocial	Positive	Indirect	Construction Phase: Medium  Operation Phase: Medium  Closure and Reclamation Phase: Medium	Construction Phase: High  Operation Phase: High  Closure and Reclamation Phase: Medium	Construction Phase: Major  Operation Phase: Major  Closure and Reclamation Phase: Moderate



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Economy	Personal (income, employment)	Decrease in local employment	-"boom and bust" impact -reduced demand for private and public goods and services -reduction in demand for labor	-Chronic Disease -Well-Being/ Psychosocial	Negative	Indirect	Closure and Reclamation Phase: Medium	Closure and Reclamation Phase: Medium	Closure and Reclamation Phase: Moderate
Public Services and Infrastructure	Need for new infrastructure	Worker Housing Facility	-Increased access to health care and emergency service support -Increased emergency services in remote area	-Chronic Disease -Infectious Disease -Injury -Well-Being/ Psychosocial	Positive	Indirect	Construction Phase: Medium  Operation Phase: Medium  Closure and Reclamation Phase: Medium	Construction Phase: Medium  Operation Phase: Medium  Closure and Reclamation Phase: Medium	Construction Phase: Moderate  Operation Phase: Moderate  Closure and Reclamation Phase: Moderate
Public Services and Infrastructure	Need for new infrastructure	Worker Housing Facility	-Potential transmission of infectious disease	-Infectious Disease	Negative	Indirect	Construction Phase: medium  Operation Phase: Medium  Closure and Reclamation	Construction Phase: low  Operation Phase: low  Closure and Reclamation Phase: low	Construction Phase: Minor  Operation Phase: Minor  Closure and Reclamation Phase: Minor

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							Phase: medium		
Public Services and Infrastructure	Roads	Construction of improved mine access road	-Improved access to remote area for emergency responders	-Injury -Well-Being/ Psychosocial	Positive	Indirect	Operation Phase: Medium  Closure and Reclamation Phase: Medium	Operation Phase: High  Closure and Reclamation Phase: High	Operation Phase: Moderate  Closure and Reclamation Phase: Moderate
Public Services and Infrastructure	Roads	Construction of improved mine access road, Increased trucking traffic on mine access routes	-Increased potential for hazardous waste spill -Increased potential for traffic accidents	-Injury -Well-Being/ Psychosocial	Negative	Direct	Construction Phase: High  Operation Phase: High  Closure and Reclamation Phase: High	Construction Phase: Medium  Operation Phase: Medium  Closure and Reclamation Phase: Medium	Construction Phase: Major  Operation Phase: Major  Closure and Reclamation Phase: Major

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Public Services and Infrastructure	Transmission Lines	Increased power demand to support mining operations	-Increased exposure to electro-magnetic field (EMF) along transmission lines	-Chronic Disease -Injury -Well-Being/ Psychosocial	Negative	Direct	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible
Demographics	Land use	Disturbance of current recreational land use	-Alteration or elimination of recreational sites	-Well-Being/ Psychosocial	Negative	Indirect	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible

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Demographics	Land use	Noise disturbances during mine blasting and vehicle noise along access routes	-Psychological effects due to noise	-Well-Being/ Psychosocial	Negative	Indirect	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Low  Operation Phase: Low  Closure and Reclamation Phase: Low	Construction Phase: Negligible  Operation Phase: Negligible  Closure and Reclamation Phase: Negligible

#### **4.18.2.1.1 ENVIRONMENT AND PUBLIC HEALTH**

As indicated in Section 3.18, Public Health and Safety, possible public health impacts associated with the following environmental resources were noted: air, soil, groundwater, and surface water quality. In addition, possible public health impacts due to disturbance of existing terrain and features were noted.

##### **4.18.2.1.1.1 Air Quality**

Health impacts associated with air emissions can result from inhalation of criteria air pollutants, such as particulate matter with a diameter of 2.5 microns or less ( $PM_{2.5}$ ) and nitrogen oxides ( $NO_x$ ), as well as inhalation of hazardous air pollutants (e.g., metals, polycyclic aromatic hydrocarbons). This section discusses the possible public health impacts associated with predicted air quality impacts.

Section 4.3.2.1, Direct and Indirect Effects, details the potential impacts to air quality associated with Alternative 1 and assumes that the SGP would be designed, constructed, and operated in compliance with appropriate air pollution controls to comply with applicable regulations and any air quality permits issued by the Idaho Department of Environmental Quality. Dust control, dust suppression, and/or dust abatement measures would be implemented. Air emissions were estimated for each activity and process source included in Alternative 1 for all phases of the SGP. The highest combined pollutant annual emissions (including fugitive dust) were predicted to occur for Alternative 1 in mine year 7 (after up to 3 years of construction and pre-production activities and during the 4th year of mining). The predicted emissions of particulate matter (PM) (PM with a diameter of 10 microns or less [ $PM_{10}$ ], and  $PM_{2.5}$ ) modeled for mine year 7 represent the largest contributor to overall emissions. As discussed in Section 4.3.2.1, the locations of the predicted concentration maximums during mine year 7 are located along the SGP Operations Area Boundary, or within one mile of the boundary.

Criteria air pollutants, including carbon monoxide (CO),  $NO_x$ ,  $PM_{2.5}$ ,  $PM_{10}$ , and sulfur dioxide ( $SO_2$ ), would be directly emitted from mine site activities. Air quality impacts would decrease with increasing distance from the mine site. Ozone, an additional criteria pollutant, is not emitted directly, but forms from the precursors of volatile organic compounds and  $NO_x$  that would be emitted. Predicted ambient air concentrations at the Operations Area Boundary, where the public is not restricted, were shown to be below the National Ambient Air Quality Standards (NAAQS). The NAAQS (described in Section 3.18, Public Health and Safety, and Section 3.3, Air Quality) are allowable air concentration limits adopted by the State of Idaho into the Rules for the Control of Air Pollution in Idaho and are considered protective of public health. hazardous air pollutants emissions are not predicted to exceed air quality regulatory levels requiring additional analysis. Screening modeling of mercury deposition indicated that the maximum additional deposition from the SGP would be less than 1 percent above background for the west side of the SGP and below the modeled limits for all other subbasins modeled.

The existing background 24-hour  $PM_{2.5}$  concentration is approximately 18.9 micrograms per cubic meter ( $\mu g/m^3$ ), based on air quality levels collected at the Midas Gold Idaho, Inc. (Midas Gold) Stibnite monitoring station. The predicted primary and secondary source emissions

associated with construction and operations of Alternative 1 at mine year 7 would result in predicted 24-hour  $PM_{2.5}$  concentrations of  $3.1 \mu\text{g}/\text{m}^3$  (primary) and  $0.15 \mu\text{g}/\text{m}^3$  (secondary) and would increase the total 24-hour  $PM_{2.5}$  concentrations to  $22.2 \mu\text{g}/\text{m}^3$ . Though the maximum impacts associated with Alternative 1 could potentially increase the current 24-hour  $PM_{2.5}$  concentrations by 16 percent, the maximum cumulative impact on 24-hour  $PM_{2.5}$  concentrations of  $22.2 \mu\text{g}/\text{m}^3$  would not exceed the NAAQS criteria for 24-hour  $PM_{2.5}$  of  $35 \mu\text{g}/\text{m}^3$ . Likewise, the predicted primary and secondary source emissions impacts of Alternative 1 on the annual average  $PM_{2.5}$  concentrations also would meet the NAAQS criteria for annual  $PM_{2.5}$  of  $12 \mu\text{g}/\text{m}^3$ . Specifically, the existing background annual average  $PM_{2.5}$  concentration is  $3.4 \mu\text{g}/\text{m}^3$ , based on current air quality levels measured from the Midas Gold Stibnite monitoring station. Predicted emissions would result in predicted annual average  $PM_{2.5}$  concentrations of  $1.2 \mu\text{g}/\text{m}^3$  (primary) and  $0.01 \mu\text{g}/\text{m}^3$  (secondary), which would increase the total annual average  $PM_{2.5}$  concentrations to  $4.6 \mu\text{g}/\text{m}^3$ , which is only 38 percent of the NAAQS criteria of  $12 \mu\text{g}/\text{m}^3$ . Because criteria pollutant concentrations would meet NAAQS criteria, air emissions resulting from operation of Alternative 1 are expected to have little to no effect on the health of the general population.

The SGP is not required to show compliance with the Prevention of Significant Deterioration increments because it is considered a minor source for New Source Review, due to its proximity to the Frank Church River of No Return Wilderness area and Nez Perce Tribal Land. Section 4.3.2.1, Direct and Indirect Effects for Air Quality, compared predicted ambient air concentrations to the Class II Prevention of Significant Deterioration increments. The results of the Class II near field air quality analysis show that predicted ambient concentrations of the criteria pollutants are below the Class II increments.

### ***Sensitive Subpopulations***

The NAAQS are set at a level expected to protect public health with an adequate margin of safety, taking into consideration effects on susceptible populations (U.S. Environmental Protection Agency [EPA] 2012). A broad range of health effects have been associated with ambient particulate matter. While air emissions from operation of Alternative 1 are expected to have little to no effect on the health of the general population, because criteria pollutant concentrations would meet NAAQS criteria, it is still not clear whether there is a threshold concentration below which adverse health effects are not seen, even for sensitive populations. The detection of a threshold level for the effects of particulate matter on mortality has proven to be very difficult.

The current evidence shows limited support for use of a “no-threshold” model (EPA 2009, 2012). Because individual thresholds vary from person to person due to individual differences in susceptibility and pre-existing disease conditions (e.g., asthma or reactive airway disease), it is extremely difficult to mathematically demonstrate that a clear threshold exists in population studies. This is especially true if the most sensitive members of a population (generally children and the elderly) have pre-existing conditions (e.g., asthma) that make them unusually sensitive even down to very low concentrations. Because of these issues with determining a threshold, there may be some health effects associated with  $PM_{2.5}$  for sensitive susceptible individuals

even if ambient PM<sub>2.5</sub> levels meet the air quality criteria (EPA 2009, 2012). Levy et al. (2002) estimated that a 1 µg/m<sup>3</sup> increase in daily PM<sub>2.5</sub> concentration could result in a 1 percent increase in asthma-related emergency room visits.

Uncertainty remains regarding associations between long-term exposure and adverse health effects, and between short-term exposures and adverse health effects. In addition, as presented in Section 4.3.2.1, Direct and Indirect Effects, maximum PM<sub>2.5</sub> impacts at the Operations Area Boundary are largely influenced by ambient background PM<sub>2.5</sub> concentrations and total impacts are well below the ambient air quality criteria. While small increases in ambient PM<sub>2.5</sub> concentrations over existing background concentrations could potentially exacerbate existing health conditions of sensitive subpopulations, Valley County ranks fourth best in the state for overall health factors, based on weighted scores for health behaviors, clinical care, social and economic factors, and the physical environment. In addition, Valley County has better health outcomes than the state overall, as well as the U.S. median, in most categories measured. Therefore, the magnitude of the health impact of air quality is rated as “low” on **Table 4.18-3** (because some minor impacts could potentially occur for sensitive subpopulations), and the possibility of the impacts also is rated as “low” on **Table 4.18-3** (because concentrations are predicted to be well below the NAAQS criteria). This results in an overall public health rating of “negligible.” There are no differences in impact findings between the construction, operation, and closure and reclamation phases of the SGP.

#### **4.18.2.1.1.2 Soil Quality**

As described in Section 3.7, Hazardous Materials, past mining activities at the mine site have deposited metals, ore, waste rock, and mine tailings throughout the mine site. Previous studies at the mine site have assessed potential soil contamination resulting from legacy mining activity (URS Corporation 2000). Soils were sampled in areas suspected to contain mining or ore processing contamination. The samples showed elevated levels of arsenic, antimony, and mercury relative to background concentrations in areas disturbed by legacy mining. Some known contaminated soil was removed in 2002. Legacy mine tailings are known to contain elevated levels of arsenic and antimony (Midas Gold 2016). As described in Section 4.5.2, Direct and Indirect Effects, significant soil disturbance is expected during construction and operation. Thus, additional soil contaminants may be exposed during the construction and operation phases of the SGP. However, these soil impacts would be limited to the active mining areas, with restricted public access.

As discussed in Section 4.7.2, Direct and Indirect Effects, a release of hazardous materials could range from a minor fuel spill within the boundaries of the mine site or the off-site facilities, where cleanup equipment would be readily available, to a large spill of hazardous materials along access routes, at the mine site, or off-site facilities. A release could potentially lead to exposures to contaminants in soil. The direct and indirect effects of a spill may range from negligible to major depending on the spill incident. As discussed in Section 4.7.2, Direct and Indirect Effects, based on the planned infrastructure specifically designed for the storage and management of hazardous materials, a large release to the environment within the mine site or off-site facilities is not likely to occur. In the event a release was to occur, it would likely be

relatively small in volume based on estimated container volumes and would be addressed promptly as per the Spill Prevention, Control, and Countermeasure Plan and Spill Response Plan. The Spill Prevention, Control, and Countermeasure Plan would address site-specific spill prevention measures, fuel haul guidelines, fuel unloading procedures, inspections, secondary containment of all onsite fuel storage tanks, and staff training. The Solid and Hazardous Materials Handling and Emergency Response Plan would address response and cleanup for any spill of hazardous materials, including concentrate, on all transport routes. The plan would include a sampling plan to assure that all spilled material is cleaned up and would include contingency plans for remediation of potential impacts to soil, wetlands/riparian, and water resources.

In the event that large quantities of hazardous materials are spilled into the environment from a storage tank release or transport truck accident, or in the event that a spill is not immediately discovered or addressed, the impact could be more substantial.

For these reasons, the magnitude of the health impact related to soil quality is rated as “medium” on **Table 4.18-3**, because some exposure of legacy contamination and/or a release of hazardous materials (ranging from small to large quantities) is possible. However, the possibility of the impacts on public health is rated as “low” on **Table 4.18-3**, because the public access is restricted in the active mining area, public access would be limited during response actions along access routes, and the probability of a large spill is low. This results in an overall public health rating of “minor.” There are no differences in impact findings between the construction and operation phases of the SGP.

During closure and reclamation, reclamation cover material (RCM) would be used as surface material to support vegetation growth and slope stability. The Reclamation and Closure Plan (RCP) would consider appropriate types and concentrations of material that would be protective of human receptors when identifying suitable RCM. The reclamation process is expected to lead to an overall reduction in chemical impacts to surface soil. As described in Section 4.5.2, Direct and Indirect Effects, reclamation activities would include removal and reprocessing of historical tailings, planting of trees in mining-impacted areas, removal of potentially contaminated soils, and repair of Blowout Creek (i.e., the result of a 1960s dam failure on the East Fork of Meadow Creek, also known as Blowout Creek) to recover wetlands and reduce sedimentation, among other goals. These proposed activities directly relate to soil quality by removing potential sources of metals leaching into the soils, removing sources of erosion and sedimentation (e.g., development rock adjacent to the East Fork South Fork Salmon River [EFSFSR]), reducing erosion of soils and sedimentation, and reducing downstream sediment transport. Thus, potential negative impacts to soil during mining could be off set by positive impacts from reclamation of legacy contamination. Therefore, the evaluation of the potential public health and safety impacts associated with exposure to contaminants in soil during the closure and reclamation phase resulted in a “negligible” negative impacts rating (**Table 4.18-3**).



#### 4.18.2.1.1.3 Reclamation Cover Materials

As stated in the RCP (Tetra Tech 2019), the overall purpose of the RCP is to reclaim areas impacted by historical exploration, mining, and processing activities, as well as to return SGP impacted areas to stabilized and productive conditions for long-term, post-SGP protection of wildlife, fisheries, land, and water resources in a sustainable environment. The RCP will continue to be updated throughout the planning and permitting process.

During closure and reclamation, RCM would be used as surface material to support vegetation growth and slope stability. In addition, the RCP would consider concentrations protective of human receptors when identifying suitable RCM. Reclamation activities are assumed to lead to an overall reduction in chemical impacts to surface soil. Reclamation activities would include removal and reprocessing of historical tailings, planting of trees in mining-impacted areas and removal of potentially contaminated soils (Tetra Tech 2019).

The mine site occurs in a highly mineralized zone, and natural background concentrations of some metals are known to be relatively high in some soils compared to regional natural background metals concentrations. In addition, elevated levels of arsenic, antimony, and mercury have been observed in soils disturbed by legacy mining operations (URS Corporation 2000). Known locations of contamination were cleaned up in the past, but it is possible that additional areas of contamination would be exposed and observed during SGP-related construction and operations. If these existing elevated levels of metals were left exposed following closure and reclamation, impacts to recreationists could be higher than assumed.

Idaho Department of Health and Welfare (IDHW) reviewed available information from the proposed RCP for the SGP to consider whether potential health risks from metals in soils exist for future site users. The IDHW Letter Health Consultation stated that based on information available in the RCP, concentrations of arsenic and antimony in surface soil adjacent to the site may exceed the health-based screening values. The IDHW included recommendations for additional characterization to adequately assess risks to public health and recommended that potential human exposure following closure and reclamation should be considered when identifying RCM to ensure protection of recreational receptors (IDHW 2019).

To mitigate this concern, a proposed risk-based soil screening level (RBSL) has been calculated for metals of primary concern (arsenic, antimony, and mercury) that is protective of recreational exposures. RBSL(s) protective of human receptors, such as the ones calculated in **Table 4.18-4** should be considered in the development of the RCP and the identification of RCM in order to ensure that public health is protected. The proposed RBSLs, or another agreed upon RBSL protective of recreational exposures to surface soils for this SGP area, are recommended to be used to screen the RCM for suitability and protection of public health. The reclamation material samples that would be compared to RBSLs should be analyzed by EPA-approved analytical methods, to ensure consistency with risk evaluation guidance. RBSLs have been calculated using assumptions regarding media intake (in this case, soil ingestion), exposure frequency and exposure duration. RBSLs presented in **Table 4.18-4** were calculated using EPA's default assumptions for a residential scenario (EPA 2014) but adjusting the exposure frequency and

duration to be more applicable to a recreational visitor. The exposure duration was assumed to be 16 days per year, which is the Payette National Forest camping stay limit for individual campground sites. The exposure duration assumed for recreational visitors, 26 years, is the default exposure duration recommended by EPA for residents. It was further assumed that two years of the exposure occur as a child (4 to 6 years old) and 24 years as an adult (>6 years of age).

RBSLs were calculated based on EPA's range of acceptable excess lifetime cancer risk (ELCR) level range of  $10^{-6}$  to  $10^{-4}$  for carcinogenic endpoints and a target hazard quotient of 1 for noncarcinogenic endpoints. Arsenic is associated with both carcinogenic and noncarcinogenic endpoints. At any specified target ELCR level, the lower RBSL between carcinogenic endpoints and noncarcinogenic endpoints was selected as the most conservative arsenic RBSL. At the  $10^{-4}$  target ELCR level, noncarcinogenic effects become the driving health endpoint for the RBSL.

The suitability of RCM for arsenic could be categorized as follows: RCM containing concentrations of arsenic at the RBSL based on a target ELCR of  $10^{-6}$  or lower is "optimal," between  $10^{-6}$  and  $10^{-5}$  is "acceptable," between  $10^{-5}$  and  $10^{-4}$ , but below the target hazard quotient of 1 is "poor," and greater than the target hazard quotient of 1 is "unsuitable." No range of RBSLs are presented for non-carcinogens. The RBSLs calculated for antimony and mercury are based on the target hazard quotient of 1. Exceedance of the target hazard quotient of 1 is generally considered unacceptable. The detailed calculations and assumptions used to derive these RBSLs are included in **Appendix M**.

These proposed RBSLs, or another agreed upon RBSL, are intended to be used to determine the suitability of RCM for protection of public health. That is, they are intended to be used to screen samples from various potential reclamation areas to determine whether the material is suitable or not suitable for RCM where human exposure could occur (i.e., materials approaching and exceeding the "Do Not Exceed" RBSL are not suitable for RCM where human exposure could occur). The RBSLs are calculated independently of existing site soil concentrations and final surface cover concentrations of reclaimed areas. Furthermore, they are not intended to represent acceptable exposure point concentrations of final cover material. These proposed RBSLs should be considered as a starting point. In addition, natural background levels of metals in soils also should be considered when identifying suitable RCM. The IDHW (2019) recommendations should be considered and a site-specific study on how RCM is identified, allocated, and used should be conducted, with agency consultation, to ensure protection of public health.

Identification of RCM that is suitable for protection of human health would have a positive impact on public health during the closure and reclamation phase. The magnitude of the positive health impact during the closure and reclamation phase is rated as "medium" and positive on **Table 4.18-3**, and the possibility of the impacts is rated as "high." This results in an overall public health rating of "moderate" positive significance.

**Table 4.18-4 Proposed Recreational Risk Based Screening Levels for Reclamation Cover Material**

<b>Metals</b>	<b>Optimal RBSL (mg/kg)</b>	<b>Acceptable RBSL (mg/kg)</b>	<b>Do Not Exceed RBSL (mg/kg)</b>
Arsenic	27	268	763
Mercury	240	240	240
Antimony	684	684	684

Table Source: AECOM 2020

Table Notes:

RBSLs were calculated based on EPA's target health goals for non-carcinogens of target hazard quotient of 1 and for carcinogens of a ELCR range of  $1 \times 10^{-6}$ ,  $1 \times 10^{-5}$ , and  $1 \times 10^{-4}$ . Arsenic is associated with both carcinogenic and noncarcinogenic endpoints. At any specified target ELCR level, the lower RBSL between carcinogenic endpoints and noncarcinogenic endpoints was selected as the most conservative arsenic RBSL. At the  $10^{-4}$  target ELCR level, noncarcinogenic effects become the driving health endpoint for the RBSL. The RBSLs calculated for antimony and mercury are based on the target hazard quotient of 1 (see **Appendix M** for details).

mg/kg = milligrams per kilograms.

#### **4.18.2.1.1.4 Surface Water Quality**

As discussed in Section 4.9.2.1.2, Direct and Indirect Effects, the inventoried waterbodies at the mine site have designated beneficial uses of “cold water communities,” “salmonid spawning,” and “primary contact recreation.” All waterbodies except Sugar Creek have additional designated beneficial uses of “drinking water supply” and presumed beneficial uses of “secondary contact recreation.” Sugar Creek has additional beneficial uses of “agricultural water supply” and “wildlife habitat.” Each of these inventoried waterbodies (except for West End Creek) are listed as impaired for specific uses in accordance with Clean Water Act Section 303(d). The causes for listing of these waters are associated with arsenic, for exceedances of Idaho's human health criterion for consumption of water and organisms. The EFSFSR downstream of Meadow Creek also is listed for antimony for exceedances of Idaho's human health criterion for consumption of water and organisms. Sugar Creek also is listed for mercury, unrelated to human health criteria (the impairment listing is for cold water aquatic life and salmonid spawning, for exceedances of Idaho's aquatic life chronic criterion. Post-closure concentrations of these elements in the EFSRSR with water treatment have not been modeled for Alternative 1 and are not known at this time. The Idaho Department of Environmental Quality may identify goals towards developing a water quality improvement plan/total maximum daily loads for the EFSRSR. However, the modeled post- closure decreases of antimony and arsenic relative to baseline concentrations may help with progress toward beneficial use attainment that led to the listing of arsenic and antimony for the EFSFSR and its tributaries.

Long-term passive water treatment as proposed by Midas Gold is predicted to improve surface water quality conditions throughout much of the watershed following closure and reclamation, and any public exposures to surface water are expected to be of limited magnitude and short duration. **Table 4.18-3** assigns the magnitude of the health impact related to surface water quality is rated as “low” and the possibility of the impacts as “low.” This results in an overall

public health rating of “negligible.” There are no differences in impact findings between the construction, operation, and closure and reclamation phases of the SGP. These findings are consistent with the conclusions of the Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Assessment that states risks to recreational receptor exposures from surface waters in the Stibnite Area are not expected to be a public health concern (ATSDR 2003).

#### **4.18.2.1.1.5 Groundwater Quality**

As discussed in Section 3.9.3.2, Groundwater Quality, contaminant levels in groundwater samples collected from the alluvial and bedrock wells in the analysis area were detected at concentrations that meet regulatory criteria (EPA’s maximum contaminant levels) for most constituents. As discussed in Section 4.9.2.1.3, Direct and Indirect Effects, groundwater quality beneath the mine site is expected to either be the same or similar to existing groundwater chemistry during both the operational and post-closure periods, and in some areas, groundwater quality in the post-closure period would improve from existing conditions to below regulatory criteria.

There are three permitted wells on the mine site and are controlled by Midas Gold: the Gestrin Airstrip mining well, the original temporary camp water supply well, and the new camp water supply well. As stated in Section 3.8, Surface and Groundwater Quantity, as of June 2017, the original camp water supply well has not been used since 2013 and the new camp well has never been used, except to test the drinking water system. There are no active domestic groundwater wells used for residential drinking water within 15 miles of the mine site. Yellow Pine’s public water system uses surface water from Boulder Creek, which is located approximately 15 miles downstream of Yellow Pine. Because groundwater is not currently used as a public drinking water source at the mine site and is assumed to be unlikely to be used as a drinking water source in the future, the ATSDR Public Health Assessment conducted for the existing mine site eliminated the groundwater as drinking water pathway from consideration as a public health concern (ATSDR 2003). It is currently unknown how Idaho Department of Environmental Quality would regulate groundwater quality standards. This would be determined after submission of the Idaho Pollutant Discharge Elimination System permit application.

Concentrations of constituents in groundwater in excess of maximum contaminant levels may represent an adverse effect for drinking water users, however, groundwater in the area is currently not used as drinking water by recreators or nearby residents. Because groundwater quality conditions are expected to be the same as existing conditions or may improve following closure and reclamation and no direct exposures to groundwater beneath the mine site are expected, the magnitude of the health impact related to groundwater quality is rated as “low” on **Table 4.18-3**, and the possibility of the impacts also is rated as “low.” This results in an overall public health rating of “negligible.” There are no differences in impact findings among the construction, operation, and closure and reclamation phases of the SGP.

#### **4.18.2.1.1.6 Existing Terrain and Features**

Potential public health and safety impacts can result from hazards associated with disturbance of existing terrain and features, including flash flood, wildfires, avalanches, and landslides. Steep slopes and uneven terrain also present potential hazards for recreational visitors. The SGP is not expected to exacerbate any of these existing hazards, but could increase the risk of damage, injury, or loss of life from the hazards due to the increased number of people traveling through the area to the mine site.

Regarding avalanches, as detailed in Section 4.2, Geologic Resources and Geotechnical Hazards, construction and/or use of roads is not expected to exacerbate existing avalanche hazards, but would increase the risk of damage, injury, or loss of life from such hazards by allowing additional people and facilities into avalanche susceptible areas. Existing avalanche hazards on the Yellow Pine Route would continue to exist and could impact travel along this route during the construction period; however, construction of the SGP would not increase the avalanche hazard. The risk of damage, injury, or loss of life from such existing avalanche hazards would increase temporarily during the construction period but would decrease following transition to use of the Burntlog Route for operational access. Conversely, the risks from existing avalanche hazards along the Burntlog Route would increase due to increased vehicular traffic during mine operations and closure/reclamation activities. However, as discussed in Section 4.2, Geologic Resources and Geotechnical Hazards, the Burntlog Route has less susceptibility to avalanche hazards than the Yellow Pine Route.

The risks to public safety from existing terrain and features such as wildfires, avalanches or landslides due to the SGP is “low,” because the possibility of occurrence due to the SGP is low. However, if a wildfire, avalanche, or landslide were to occur, the potential injury to the individual could be severe; therefore, the magnitude of effect is rated as “high.” This results in an overall public health rating of “moderate.” There are no differences in impact findings among the construction, operation, and closure and reclamation phases of the SGP.

#### **4.18.2.1.2 ECONOMY AND PUBLIC HEALTH**

Potential positive health impacts associated with the SGP on local economic conditions are indicated on **Table 4.18-3**. Section 4.21.2, Direct and Indirect Effects to Social and Economic Conditions, presents a detailed analysis of the impacts that the SGP would have on the socioeconomic conditions of the local communities. The SGP would make a significant contribution to the Valley County economy in terms of direct and indirect employment and wages during the life of the SGP. In addition, the SGP would generate significant tax revenues for various levels of government. The economic benefits associated with increased employment opportunities and tax revenues could lead to continued or improved access to health services, better nutrition, and better overall well-being for the local community. Also, if the new fulltime positions include health insurance and improved access to health care, this may have a positive effect on chronic and infectious disease and injury categories for both the employees and their families.

Overall the SGP is expected to result in economic benefits to the local community which would indirectly lead to positive public health impacts. The magnitude of impact shown on **Table 4.18-3** is “medium” and positive, and the possibility is rated as “high,” with an overall public health rating of “major” positive significance. There are no differences in impact findings between the construction and operation phases of the SGP. During the closure and reclamation phase and as discussed in Section 4.21.2, Direct and Indirect Effects, dislocation resulting from 75 to 83 percent of the SGP work force reduction from operations phase levels could offset the benefits noted during the construction and operation phases. However, the SGP closure and reclamation phase would result in net increases in local employment compared to baseline conditions. Thus, the magnitude of positive impact during and after the closure and reclamation phase shown on **Table 4.18-3** is “medium” and the possibility is rated as “medium,” with an overall public health rating of “moderate” positive.

Conversely, the decrease in mine-closure related local employment and labor income also could have significant adverse effects on the local economy. Section 4.21.2, Direct and Indirect Effects, discusses the potential for adverse economic impacts on the local area’s economy from the “bust” following the prior “boom.” While there could be some residual economic benefit to the community following closure and reclamation, there also could be an indirect or induced negative impact associated with the reduction in work force resulting from mine closure. Such potential “boom and bust” effects from a mine’s closure are commonly recognized as potential source of adverse socioeconomic impacts on the local area economy. The impacts on the local area’s economy depend on employees’ responses after their mine employment ends as well as their other employment opportunities. If the local area’s economy is strong and there are sufficient job opportunities with adequate earning potential for the unemployed mine workers, then the adverse economic impacts on the local economy could be limited as the unemployed mine operations workers are re-employed locally elsewhere. While it may be difficult for the displaced mine workers to find equally high-paying replacement jobs, some individuals may be willing to accept less wages for job positions with more traditional work schedules, working conditions, and duties. Midas Gold has indicated that they could ramp up and ramp down employment in a measured way to reduce the “bust” effects on the local residents and economy (AECOM 2018). However, given the local analysis area’s largely rural and small economy, in the absence of adequate economic transition mitigation, the mine-closure related decrease in local employment and income could have a substantial medium-term adverse impact on the local area’s residents, businesses and overall economy, which would indirectly lead to negative public health impacts. Thus, the magnitude of impact from the “boom and bust” shown on **Table 4.18-3** is “medium” and negative, and the possibility is rated as “medium,” with an overall public health rating of “moderate” during and after the closure and reclamation phase.

#### **4.18.2.1.3 SERVICES/INFRASTRUCTURE AND PUBLIC HEALTH**

The demand on existing public services and infrastructure as it relates to public health and safety was evaluated for the SGP. The most significant demands on the existing services and infrastructure relate to the access roads and other roads, transmission lines and utilities, and the need for worker housing.

#### 4.18.2.1.3.1 Roads

Section 4.16, Access and Transportation, characterizes existing roads and transportation resources within the potentially affected area and analyzes potential effects on roads and transportation resources that would occur under implementation of Alternative 1.

Alternative 1 would add traffic volumes to various roadways in the analysis area during construction, operation, and closure. During construction, Warm Lake (County Road [CR] 10-579), Johnson Creek (CR 10-413), and the Stibnite segment of the McCall-Stibnite (CR 50-412) roads would be affected during the first 3 years of the SGP by construction activities until the Burntlog Route is completed. Once Burntlog Route is completed, the substantial increase in traffic volume would shift to exclusively Warm Lake and Burnt Log (National Forest System Road [FR] 447) roads as they are parts of the Burntlog Route.

As discussed in Section 3.16.3, Existing Conditions, existing traffic volumes on Warm Lake Road are at least 15 times greater than the other access roads. Due to the higher traffic volumes and higher speeds observed relative to other access roads, Warm Lake Road currently experiences the most accidents of the existing access roads in the analysis area. As discussed in Section 4.16.2, Direct and Indirect Effects, mine-related traffic on Warm Lake Road would increase by approximately 5 percent during construction and operation activities, and traffic volume on Burntlog Route would more than triple during the operation phase. While increases in traffic volume are expected due to SGP-related activities, overall traffic volume on these access roads are low due to the remote location and low-density population in the area. While the potential for accidents could increase due to the increased SGP-related traffic volume, the predicted 5 percent increase in traffic volume due to SGP activities on Warm Lake Road is minimal.

Accidents on area roads from 2000 through 2016, as detailed in Section 3.16.3, include: Warm Lake Road experienced an average of eight accidents per year; South Fork Salmon River Road (FR 50674/FR 474) had an average of three accidents per year; the Lick Creek segment of the McCall-Stibnite Road (CR 50-412) had two accidents per year; Johnson Creek Road (CR 10-413) had two accidents per year; and the Stibnite Road segment of McCall-Stibnite Road (CR 50-412) had one accident per year (DJ&A, PC 2017). Increase in traffic volume has the potential to increase the vehicle accident incidence rate. Thus, the possibility that an increase in traffic related accidents could affect public health and safety is rated as “medium” and the magnitude of impact shown on **Table 4.18-3** is “high” (because injuries from of an accident could be severe), resulting in an overall public health rating of “major.” As traffic impacts would be minimal even during the construction phrase, there are no differences in impact findings among the construction, operation, and closure and reclamation phases of the SGP.

Upon completion of the Burntlog Route, the public could access Thunder Mountain Road (FR 50375) using the Burntlog Route when access from Stibnite Road (CR 50-412) would not be permitted. This could provide improved access to remote recreational areas and better access for emergency responders, which could result in positive impacts to public health and

safety. Thus, the magnitude of impact of the Burntlog Route shown on **Table 4.18-3** is “medium” and positive and the possibility is rated as “high,” with an overall public health rating of “moderate” positive. There are no differences in impact findings between the operation and closure and reclamation phases of the SGP.

#### **4.18.2.1.3.2 Power and Utilities**

Alternative 1 would require upgrades to an existing 69-kilovolt transmission line to 138-kilovolt to support mining operations. No power is currently supplied via a transmission line to the mine site. Midas Gold would contract with the Idaho Power Company to supply electric service to the mine site from the upgraded 138-kilovolt transmission line, installed from an existing Lake Fork substation along existing transmission line rights-of-way to the new Johnson Creek substation and a new approximately 8.5-mile transmission line to the mine site. The magnetic field generated by a power line depends on both the current in the line and the distance from it. When the voltage of a line is increased, it requires greater clearance and, thus, must be installed at a greater distance from the ground. When voltage is doubled, as in this case, the current drops by half. When combined with the increased distance, the magnetic field at ground level is reduced by two-thirds (Idaho Power Company 2013). As discussed in Section 3.18, Public Health and Safety, research is inconclusive regarding potential public health risks from exposure to EMFs, and existing data do not provide evidence to conclude that EMF causes cancer. No EPA or State of Idaho limits for EMF exposure have been issued (Idaho Power Company 2013). Thus, the magnitude of impact of the upgraded transmission lines shown on **Table 4.18-3** is “low” and the possibility is rated as “low,” with an overall public health rating of “negligible.” Local communities may indirectly benefit from improved utilities, such as upgraded transmission lines, that could indirectly lead to positive public health impacts, which could offset any negative public health concerns related to these upgrades.

#### **4.18.2.1.3.3 On-Site Facilities and Worker Housing Facility**

On-site facilities at the mine site would include a worker housing facility with recreation resources, water storage and distribution facilities, fuel storage and dispensing facilities, communication infrastructure, and sewage disposal facilities (Midas Gold 2016). In addition, on-site facilities would include a safety department with the primary function of ensuring worker safety and training. Emergency medical technicians and emergency equipment and supplies would be on-site, including an ambulance, first aid and medical supplies. These facilities would minimize the demand on the local services and provide medical services for workers and site-visitors in an otherwise remote area. There could be an indirect positive benefit for the local communities because employees from the local community could use the mine site services; SGP employees not relying on the existing infrastructure or local services could indirectly allow more local access.

However, with 500 or more employees living and dining in relatively close quarters, the potential for transmission of infectious diseases exists. Employees from the local community who lodge at the on-site facility could potentially transmit infectious diseases to the local communities upon return from the on-site housing facility. However, worker safety protocols include basic



measures for good hygiene and protection of infectious disease transmission; and on-site health care services will provide basic treatments for worker illnesses. In addition, while dining and recreational areas will be common spaces, the personal spaces/sleeping quarters are designed for individual employees (Midas Gold 2016). Thus, while the magnitude of possible infectious disease transmission is “medium,” the possibility of occurrence is “low” due to worker health and safety protocols, on-site health services, and single-employee personal spaces/sleeping quarters.

For these reasons, the overall public health rating associated with the on-site facilities is “moderate” and positive; and the possible negative impact associated with transmission of infectious diseases from the housing site to the local community is “minor.” There are no differences in impact findings among the construction, operation, and closure and reclamation phases of the SGP.

#### **4.18.2.1.4 DEMOGRAPHICS AND PUBLIC HEALTH**

This section discusses the potential health impacts related to land use, noise, and nutrition.

##### **4.18.2.1.4.1 Land Use**

Section 3.18.3, Existing Conditions, summarizes the current land use patterns and demographics as relevant to public health and safety. The closest (non-Midas Gold) occupied residence is in Yellow Pine, approximately 14 miles west of the mine site. Most of the SGP area is currently open to the public, as most of the land is public land managed by the Forest Service. Common users of the SGP area include Forest Service employees, Midas Gold employees and contractors, residents of Yellow Pine, and recreationists. Recreation is a major use throughout much of the SGP area. Participation in recreational activities can result in positive effects on physical and mental health. Physical activity can lower body mass and improve blood pressure; and leisure and recreational activities can help manage stress and reduce depression. As discussed in Section 4.19.2, Direct and Indirect Effects to Recreation, several facets of Alternative 1 could directly or indirectly impact the access, use, and quality of the recreational sites in the SGP area. While no direct health impacts are anticipated from impacts to recreation sites, it is possible that there could be emotional stress associated with displacement that could occur for some recreationists, affecting the overall well-being of those individuals. Loss of recreational sites could result in less opportunity for the local community to engage in recreational activities, which could reduce positive health benefits. As discussed in Section 4.19.2, most of the impacts to the recreational sites relate to restricted access or visual impacts affecting the recreational setting. However, there are other nearby recreational sites that are unimpacted by Alternative 1. In addition, as discussed in Section 4.19.2.1, Direct and Indirect Effects to Recreation, improved road conditions and some of the road re-alignments could result in increased access to additional recreational activities, particularly in the winter, with snow-plowed roads improving access to remote areas. Thus, the magnitude of impact on recreation as it relates to public health is “low” and the possibility is rated as “low,” with an overall public health rating of “negligible.” There are no differences in impact findings among the construction, operation, and closure and reclamation phases of Alternative 1.

#### **4.18.2.1.4.2 Noise**

As discussed in Section 4.6.2, Direct and Indirect Effects, noise at the mine site and access roads would consist of an assortment of sounds at varying frequencies from typical operations, as well as noise associated with road construction and SGP-related traffic. As discussed in Section 3.6.3, Affected Environment, EPA guidance for an acceptable noise level for outdoor use areas is 55 decibels on the A-weighted scale (dBA) for day-night (measured between 10:00 pm and 7:00 am outdoors at residences, farms, and other areas where people spend varying amounts of time, where quiet is a basis for the use of such areas). For comparison, 40 dBA is relatively quiet and can be equated to the noise level of a residence at night, while 60 dBA is comparable to a normal conversation and is considered a comfortable noise level. As discussed in Section 4.6.2, noise levels were predicted for anticipated noise sources during the construction, operations, and closure and reclamation phases of the SGP at 12 noise receptor locations in the SGP area, as well as at various locations in the Frank Church River of No Return Wilderness Area at a range of distances from the mine access road (Burntlog Route). Of these noise receptor locations, Site 2 (the Miller Residence) and the locations in the Frank Church River of No Return Wilderness Area are the most relevant to the public health evaluation, as these are the locations where human receptors are most likely to be present.

During the construction phase, Alternative 1 would have a temporary impact on the noise environment at Site 2, the Miller Residence, while transmission line work is occurring in the immediate vicinity of the residence. Absent transmission line work, daytime noise levels at the Miller Residence are estimated at 41 dBA and average day-night noise levels are estimated at 39 dBA during the construction phase, below the outdoor threshold of 55 dBA.

During the construction phase, borrow area activities along the Burntlog Route would result in noise level increases above ambient noise levels within approximately 1,000 feet from a borrow area. Resulting noise levels would be at or above the recommended noise level of 55 dBA for outdoor use areas within 500 feet of a borrow area, but below this level farther away. Resulting noise levels approximately 3,000 feet from the roadway would be below the recommended noise level of 55 dBA for outdoor use areas. Direct effects on recreationists within 1,000 to 2,000 feet of borrow areas could include general annoyance or sleep disturbance at campsites in wilderness areas. Indirect effects could include a reduction in the overall quality of the remote wilderness experience. Overall, potential noise impact on recreationists from borrow areas would be limited to a discrete area within approximately 1,000 to 2,000 feet of borrow areas located along the Burntlog Route where it closely borders the adjacent wilderness area. Noise from these borrow areas would likely be periodic or intermittent, but ongoing throughout the construction phase. Although there are small increases of noise during the construction phase, they are temporary and intermittent. Therefore, the magnitude of impact on public health as it relates to noise is “low,” and the possibility is rated as “low” with an overall public health rating of “negligible.”

During the operations or closure and reclamation phases, Alternative 1 would have negligible to no effect on the noise environment at Site 2 or the various locations in the Frank Church-River of No Return Wilderness Area. For these reasons, the magnitude of impact on public health as it

relates to noise is “low” and the possibility is rated as “low,” with an overall public health rating of “negligible.”

#### **4.18.2.1.4.3 Nutrition**

Activities in the SGP area related to nutrition include fishing, hunting, or gathering of berries (or other edible vegetation). Contaminants in surface water could potentially bioaccumulate in the edible tissues of fish in impacted surface water or in wildlife that drink impacted surface water. Likewise, contaminants in soil could potentially bioaccumulate in plants growing in impacted soils. As discussed above, implementation of controls and surface water management during mine operations and the closure and reclamation activities would likely decrease concentrations of contaminants in soil and surface water relative to existing conditions. In addition, recreational exposures are expected to be of limited frequency and short duration (the Payette National Forest camping stay limit for individual campground sites is 16 days). For these reasons, the magnitude of impact on public health as it relates to nutrition is “low” and the possibility is rated as “low,” with an overall public health rating of “negligible.” There are no differences in impact findings among the construction, operation, and closure and reclamation phases of Alternative 1.

#### **4.18.2.2 Alternative 2**

Alternative 2 is similar to Alternative 1 with the main differences consisting of re-routing of a segment of the Burntlog Route, allowing public access through the mine site during operations, change in the location of the maintenance facility, re-routing a portion of the transmission line to be upgraded around the Thunder Mountain Estates, generating lime at the mine site, and establishment of a Centralized Water Treatment Plant. These changes are intended to reduce potential effects on surface water quality, reduce potential traffic related issues by providing public access through the mine site and potentially decreasing incidental public use of Burntlog Route, reduce SGP-related annual average daily traffic to the mine site during operations (through on-site lime generation) and reduce overall disturbance in the SGP area. However, Alternative 2 also would include an on-site propane-fired lime kiln and has higher air emissions than Alternative 1.

As discussed in Section 4.3.2, Direct and Indirect Effects on Air Quality, the PM<sub>2.5</sub> “annual” average (computed as the mean values from April through November) and PM<sub>10</sub> 24-hour average concentrations (12.8 µg/m<sup>3</sup> and 179.7 µg/m<sup>3</sup>, respectively) are predicted to be slightly over the respective NAAQS criteria at receptors along the public access road through the mine site (12 µg/m<sup>3</sup> and 150 µg/m<sup>3</sup>, respectively). NAAQS are set at a level expected to protect public health with an adequate margin of safety, taking into consideration effects on susceptible populations. Signage and security checkpoints would alert the public to requirements for driving through the mine site, including check in and out at the checkpoints, no stopping or loitering while traversing the operations area, and restrictions would be enforced by signage, fencing, berms and/or gates to restrict travel to the designated route. The amount of time spent within the mine site on the public access road would be of limited duration. In addition, it is anticipated that people would only occasionally use the route through the mine site, such that the frequency

of exposure would be limited. While air modeling results exceeded the NAAQS criteria during the operations phase along the public access road through the mine site, the limited duration and frequency of exposure to PM at modeled air concentrations would likely be minimal, which would significantly reduce the public health impact associated with air quality, even for sensitive subpopulations. The slight exceedances of the NAAQS criteria along the public access road are expected to have little to no effect on the health of the general population, however, sensitive susceptible populations are at greater risk of health effects associated with air quality conditions.

Overall, impacts to public health and safety under Alternative 2 would therefore be slightly improved compared to Alternative 1 for traffic-related issues and surface water quality impacts. However, on-site lime generation could lead to slightly greater air quality impacts along the public access route through the mine site, that could affect sensitive subpopulations.

### **4.18.2.3 Alternative 3**

Alternative 3 is similar to Alternative 1 with the main differences being no construction of the Meadow Creek off-highway-vehicle Connector Trail, the tailings storage facility (TSF) constructed in the EFSFSR, and different access through the mine site after mine closure/reclamation. Impacts to public health and safety would be essentially the same as those described under Alternative 1.

### **4.18.2.4 Alternative 4**

Alternative 4 is similar to Alternative 1 with the main differences being the use of the Yellow Pine Route for access to the mine for all phases, and public road access through the mine during operations (similar to Alternative 2). These changes would result in different impacts than Alternative 1, particularly the use of the Yellow Pine Route.

Under Alternative 4, the Yellow Pine Route would be used from construction through operations and closure and reclamation and the Burntlog Route would not be constructed. Use of Johnson Creek (CR 10-413) and Stibnite (CR 50-412) roads as the primary route to the mine site during construction, operations, and closure and reclamation would result in increased noise, traffic, and safety-related issues from mine-related traffic along the Yellow Pine Route. The Yellow Pine Route would route all mine-related traffic through the Village of Yellow Pine and public traffic and mine traffic would share the same road from Landmark to the mine site. Additionally, the Yellow Pine Route would result in one point of entry to the SGP, effectively combining public access with mining traffic for the life of the mine. This limited ingress/egress to the SGP site also will impact emergency vehicle access during periods of road blockage.

The steep terrain along the Yellow Pine Route would likely be a greater risk to public safety under Alternative 4, because it would be the only route used for the life of the SGP and would require safety considerations for geotechnical hazards, landslides, and avalanche zones (see Section 4.2, Geologic Resources and Geotechnical Hazards). Overall, Alternative 4 could lead to greater public health and safety impacts compared to Alternative 1 through use of the Yellow Pine Route (increase traffic-related issues and increased geotechnical, landslide, and

avalanche hazards). The possibility of impacts to public safety due to Alternative 4 is increased from “low” to “medium-high” and if a wildfire, avalanche, or landslide were to occur, the potential injury to the individual could be severe; therefore, the magnitude of effect is rated as “high.” This results in an overall public health rating of “major” for Alternative 4.

In addition, as discussed above for Alternative 2, modeled air quality receptors along the public access road through the mine site exceeded NAAQS. While air modeling results exceeded the NAAQS criteria during the operations phase along the public access road through the mine site, the limited duration and frequency of exposure to PM at modeled air concentrations would likely be minimal, which would significantly reduce the public health impact associated with air quality, even for sensitive subpopulations. The slight exceedances of the NAAQS criteria along the public access road are expected to have little to no effect on the health of the general population, however, sensitive susceptible populations are at greater risk of health effects associated with air quality conditions.

#### **4.18.2.5 Alternative 5**

Alternative 5 is the No Action Alternative. None of the action alternatives would be implemented and there would be no mine operation related to the SGP. Existing roads would be maintained, but improvements and new road construction would not take place.

Under Alternative 5, current land uses on patented mine and mill site claims and on the Payette National Forest and Boise National Forest would continue in compliance with all existing applicable codes and regulations. Current uses of National Forest System lands include mineral exploration and recreation, such as pleasure driving, hunting, off-highway-vehicle use, camping, hiking, snowmobiling, bird watching, target shooting, etc.

Under Alternative 5, no activities associated with the SGP would occur within the analysis area. However, previously permitted mineral exploration activities would continue along with any associated reclamation and monitoring requirements. Under the No Action Alternative, there would be no new permanent ground disturbance or visual and noise impacts, because no new utilities would be constructed, no large open pits would be created, no tall TSFs or development rock storage facilities would be formed, and blasting, drilling, and ore processing associated with the SGP would not occur. Past mining activities, however, have resulted in long-term impacts to soils, surface water, and groundwater quality.

Under the No Action Alternative, existing impacts of approximately 740 acres would remain as developed roads, existing waste piles (historic development rock and tailings), and other legacy mining features (Tetra Tech 2019). It is not anticipated that soils in most of these areas would recover naturally.

Under Alternative 5, all the negative health impacts associated with the SGP and identified on **Table 4.18-3** would not occur. In addition, the positive benefits on health associated with the improved socioeconomic condition, road improvements, and reclamation activities that the SGP would provide to the local community also would not occur under the No Action Alternative.

### 4.18.3 Mitigation Measures

Mitigation measures required by the Forest Service and measures committed to by Midas Gold as part of design features of the SGP are described in **Appendix D**, Mitigation Measures and Environmental Commitments; see **Table D-1**, Preliminary Mitigation Measures Required by the Forest Service; and **Table D-2**, Mitigation Measures Proposed by Midas Gold as Project Design Features, respectively. The preceding impact analysis has taken these mitigation measures into consideration, as well as measures routinely required through federal, state, or local laws, regulations or permitting, such that the identified potential impacts of the SGP are those that remain after their consideration.

Mitigation measures may be added, revised, or refined based on public comment, agency comment, or continued discussions with Midas Gold and will be finalized in the Final Environmental Impact Statement.

### 4.18.4 Cumulative Effects

The cumulative effects to public health and safety associated with the SGP are anticipated to provide an overall net benefit in the long term. Potential public health and safety impacts (both positive and negative) were evaluated. Several of the issues evaluated for public health and safety resulted in positive impacts, particularly those related to socioeconomics, road improvements, and reclamation activities. The SGP would improve access to remote recreational areas. In addition, the SGP would make a large contribution to the Valley County economy in terms of direct and indirect employment and wages, particularly during construction and operation phases of the SGP. The SGP also would generate tax revenues for the various levels of government. The economic benefits associated with increased employment opportunities and tax revenues, could lead to continued or improved access to health services (through employment insurance benefits and/or increased income), better nutrition, and better overall well-being for the local community. The potential negative effects from economic dislocation and disruption to local area economy after cessation of mine operations (“boom and bust” impacts) is somewhat offset by the residual positive impacts on social economic conditions, as discussed in the Section 4.21, Social and Economic Conditions. The SGP closure and reclamation phase would result in net increases in local employment compared to baseline conditions. In addition, post-mining economic expansion and investment may happen if tax revenue or fees from mining can be effectively re-invested in community services and infrastructure, which could create long-term economic growth. The potential negative effects to soil quality from open-pit mining are offset by the planned reclamation of the development rock storage facilities and the TSF, which would minimize direct contact with hazardous pollutants and lead to improved soil quality. Evaluation of the potential public health and safety impacts associated with injury from disturbance of existing terrain and features (i.e., landslides, avalanches, and wildfires) would result in moderate negative impacts on the overall public health and safety; and evaluation of the potential public health and safety impacts from accidents due to increasing traffic on access roads would result in major negative impacts on the overall public health and safety.

Reasonably foreseeable future actions that could cumulatively contribute to public health and safety impacts in the analysis area include all the projects listed in **Table 4.1-2** pertaining to land use management and development, road management, and hazardous materials management. Because of the size of the SGP, it is likely that cumulative impacts associated with other reasonably foreseeable future actions when added to the SGP would not be noticeable.

#### **4.18.5 Irreversible and Irretrievable Commitments of Public Resources**

No irreversible and irretrievable commitments of public resources would occur to the health and safety of the local community as a result of the SGP.

#### **4.18.6 Short-term Uses versus Long-term Productivity**

The SGP would reclaim historically damaged stream habitat, mitigate slope stability hazards, and perform post-mining reclamation. It also would improve access to remote recreational areas. In addition, the SGP would make a large contribution to the Valley County economy in terms of direct and indirect employment and wages during the life of the SGP. The SGP would generate tax revenues for various levels of government. The economic benefits associated with increased employment opportunities and tax revenues could lead to continued or improved access to health services, better nutrition, and better overall well-being for the local community.

#### **4.18.7 Summary**

Potential public health and safety impacts (both positive and negative) were evaluated. Several of the issues evaluated for public health and safety resulted in positive impacts, particularly those related to socioeconomics, road improvements, and reclamation activities. The potential negative effects from economic dislocation and disruption to local area economy after cessation of mine operations (“boom and bust” impacts) may be somewhat offset by the residual positive impacts on social economic conditions. The potential negative effects to soil quality are offset by the planned reclamation activities, which would lead to improved soil quality over current conditions and minimize direct contact with hazardous pollutants. Because of an increase in people traveling through the area to the mine site, potential public health impacts associated with injury from disturbance of existing terrain and features (i.e., landslides, avalanches, and wildfires) could result in moderate negative impacts. Injury from accidents due to increased traffic on mine access routes could result in major negative impacts on public health and safety.

**Table 4.18-5** provides a summary comparison of public health and safety impacts by issues and indicators for each alternative.

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**Table 4.18-5 Comparison of Public Health and Safety Impacts by Alternative**

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may affect public safety on the roads used by mine vehicles during construction, operation, and closure activities.	Number of SGP-related vehicles and trips on public roads.	SGP area is dominated by unpaved roads, one state highway, and county roads. The road segment of highest safety and traffic concern is Warm Lake Road.	Major  The increased mine-related traffic on Warm Lake Road and other access roads increases the potential for accidents	Same as Alternative 1, however slightly improved due to reducing potential traffic related issues.	Same as Alternative 1.	Major  The use of Yellow Pine Route would increase safety issues by routing heavy truck traffic through the Village of Yellow Pine and the general public traveling on the same road as large mining equipment.	Same as Baseline.
The SGP may affect human health or exposure to hazards.	Current public health statistics and descriptors.	Valley County ranks sixth best in state for health outcomes and fourth best in the state for overall health factors	Major  The economic benefits could lead to continued or improved access to health services, better nutrition, and better overall well-being for the local community. Potential negative economic impacts associated with "boom and bust" could result in negative health impacts during closure and beyond.	Same as Alternative, 1 however slightly improved.	Same as Alternative 1.	Same as Alternative 1.	Same as Baseline.
	Changes in health metrics such as soil, air, and water quality.	Baseline air quality measurements indicate current concentrations of the criteria air pollutants are well below the NAAQS.  Soil - legacy mine tailings are known to contain elevated levels of arsenic and antimony.  Surface Water – The chemicals of concern for public health were arsenic antimony, and mercury. Each of the inventoried waterbodies (except for West End Creek) are Clean Water Act Section 303(d) listed. The causes for listing of these waters are associated with arsenic, with the EFSFSR also being listed for antimony (downstream of Meadow Creek) and Sugar Creek also being listed for mercury.	Air - Negligible: predicted ambient air concentrations at boundary where public is allowed shown to be below NAAQS  Soil - Minor: exposures by recreationists to impacted soil materials would be of relatively low frequency, short duration, and low magnitude during construction and operations of the SGP; closure and reclamation activities assumed to lead to overall reduction in chemical impacts to surface soil.  Potential negative impacts are off-set by positive impacts from reclamation of legacy contamination.  Surface Water - Negligible. Exposures are expected to be of limited magnitude and short duration. Water treatment systems during construction and operation, as well as for in perpetuity following closure and reclamation will maintain or improve overall progress toward beneficial use	Impacts to public health and safety would not be substantially different than those for Alternative 1 with the following exceptions.  Air: Degraded air quality along the public access route could affect the public who elect to travel through the mine site, particularly sensitive subpopulations, though duration and frequency of exposure is expected to be minimal.  Surface Water: Operation of the Centralized Water Treatment Plant in perpetuity. Meadow Creek is not diverted into the water treatment plant, but will flow directly into the EFSFSR (preserving fish passage through Meadow Creek). Passive treatment of TSF consolidation water into Meadow Creek until post-closure year 45, resulting in improved water quality conditions from baseline.	Same as Alternative 1.	Impacts to public health and safety would not be substantially different than those for Alternative 1 with the exception that degraded air quality along the public access route could affect the public who elect to travel through the mine site, particularly sensitive subpopulations, though duration and frequency of exposure is expected to be minimal.	Same as Baseline.

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Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			attainment for the EFSFSR and improved water quality conditions from baseline.				
	Transport of hazardous materials on access roads.	SGP area could currently be impacted by accidental releases of hazardous materials during transportation to and from the mine site.	Minor	Same as Alternative 1, however with slight improvements.	Same as Alternative 1.	Moderate Steeper topography and terrain and more areas of potential landslides and rockfalls along the Yellow Pine Route than along the Burntlog Route increase the possibility of overturning a truck transporting hazardous substances to and from the mine site.	Same as Baseline.
	Increased risk of natural hazards (wildfire, avalanche, landslide).	The entire SGP area presents potential flash-flood and debris-flow hazards that also can cause severe injury or death, or block access. Some portions of the mine site also are conducive to landslides and avalanches. Fires can cause severe injury or death for travelers, recreationists, and Forest Service and Midas Gold employees, as well as damage to property.	Moderate  The SGP would increase the risk of damage, injury, or loss of life by allowing the increase in people traveling through the area to the mine site and construction and/or use of roads would increase the risk of damage, injury, or loss of life from such hazards by allowing additional people and facilities into avalanche susceptible areas.	Same as Alternative 1, however with slight improvements as it reduces overall disturbance of the area.	Same as Alternative 1 however with slight improvement by elimination of public access roads.	Major None of the positive impacts associated with improvement and development of the Burntlog Route. Yellow Pine Route has a steeper topography and terrain and there are more areas of landslides and rockfalls along the Yellow Pine Route than there are along the Burntlog Route. Safety issues also are increased by heavy truck traffic through the Village of Yellow Pine and the general public traveling on the same road as large mining equipment.	Same as Baseline.
The SGP may affect infrastructure and services as related to emergency services, medical services, law enforcement, social services, sanitation and wastewater treatment.	Capacity of existing infrastructure and services to meet anticipated increased use.	Due to the remote nature, most of the SGP area is located more than 30 miles from the nearest local emergency services.	Moderate and positive  Emergency medical technicians and emergency equipment and supplies will be on-site, including an ambulance, first aid and medical supplies.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Baseline.
The SGP may cause public health effects related to changing environmental conditions.	Disruption of recreational areas during construction, operation, and closure and reclamation.	Recreation is a major use throughout much of the SGP area; activities commonly include hunting, fishing, sightseeing, hiking, camping, all-terrain vehicle use, snowmobiling, and horseback riding.	Negligible	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Same as Baseline.
	Changes in health metrics such as soil, air, and water quality.	Baseline air quality measurements indicate current concentrations of the criteria air pollutants are well below the NAAQS.  Soil - legacy mine tailings are known to contain elevated levels of arsenic and antimony.	Air - Negligible: predicted ambient air concentrations at boundary where public is allowed shown to be below NAAQS  Soil - Minor: exposures by recreationists to impacted soil materials would be of relatively	Impacts to public health and safety would not be substantially different than those for Alternative 1 with the following exceptions.  Air: Degraded air quality along the public access route could affect the public who elect to	Same as Alternative 1.	Impacts to public health and safety would not be substantially different than those for Alternative 1 with the exception that degraded air quality along the public access route could affect the public who elect to travel through the mine site, particularly sensitive subpopulations, though	Same as Baseline.

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Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		<p>Surface Water – The chemicals of concern for public health were arsenic antimony, and mercury. Each of the inventoried waterbodies (except for West End Creek) are Clean Water Act Section 303(d) listed. The causes for listing of these waters are associated with arsenic, with the EFSFSR also being listed for antimony (downstream of Meadow Creek) and Sugar Creek also being listed for mercury.</p>	<p>low frequency, short duration, and low magnitude during construction and operations of the SGP; closure and reclamation activities assumed to lead to overall reduction in chemical impacts to surface soil.</p> <p>Potential negative impacts are off-set by positive impacts from reclamation of legacy contamination.</p> <p>Surface Water - Negligible. Exposures are expected to be of limited magnitude and short duration. Water treatment systems during construction and operation, as well as for in perpetuity following closure and reclamation will maintain or improve overall progress toward beneficial use attainment for the EFSFSR and improved water quality conditions from baseline.</p>	<p>travel through the mine site, particularly sensitive subpopulations, though duration and frequency of exposure is expected to be minimal.</p> <p>Surface Water: Improved water quality conditions from baseline due to operation of Centralized Water Treatment Plant in perpetuity; Meadow Creek is not diverted into the water treatment plant, but will flow directly into the EFSFSR (preserving fish passage through Meadow Creek); Passive treatment of TSF consolidation water into Meadow Creek until post-closure year 45.</p>		<p>duration and frequency of exposure is expected to be minimal.</p>	
	<p>Psychological effects due to noise.</p>	<p>Sound levels at the 12 baseline noise measurement locations in the SGP area ranged from 34 dBA to 64 dBA.</p>	<p>Negligible</p> <p>Predicted noise levels would be under, at, or slightly over the outdoor threshold level of 55 dBA.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Same as Alternative 1.</p>	<p>Same as Baseline.</p>

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