

# Chapter 7

## Irreversible and Irretrievable Commitments of Resources

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### 7.0 Introduction

In addition to assessing the specific direct, indirect, and cumulative impacts of the Haile 2018 Mine Expansion Plan (Proposed Project) and alternatives, National Environmental Policy Act (NEPA) regulations require broader consideration of the irretrievable commitment of environmental resources and the relationship of short-term use of resources to the long-term sustained productivity of the environment. That analysis and disclosure is discussed in this section.

Resources consumed or temporarily or permanently altered during mining and post-mining reclamation and closure are discussed below. Two categories (health and safety, and hazardous wastes and materials) evaluated in Chapter 4, *Environmental Consequences*, are not subject to the tradeoff between short-term use and long-term productivity; therefore, these categories are not evaluated in this section.

### 7.1 Irreversible and Irretrievable Commitment of Resources with Implementation of the Proposed Action

Regulations in 40 Code of Federal Regulations (CFR) 1502.16 require that an Environmental Impact Statement (EIS) must identify, consider, and disclose any irreversible and irretrievable commitments of resources that would occur with implementation of the proposed action. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the potential effects of such uses on future generations. Irreversible effects result primarily from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored (e.g., extinction of a species listed as threatened or endangered, or loss or disturbance of a cultural resource).

The following resources would be irretrievably and irreversibly committed with implementation of the Proposed Project (refer to Chapter 4 for a detailed discussion of the specific project impacts).

- **Geology.** Surface topography and geomorphology would be permanently altered due to excavation of overburden and ore from pits and storage of Potentially Acid Generating (PAG) overburden and tailings in various storage facilities. Some pits would be partially backfilled with overburden and/or yellow PAG, but the original topography would not be restored, and a pit lake would result in the Ledbetter comingled pit and Champion pits. The mineralized ore excavated and processed would be an irretrievable and irreversible commitment of the minerals extracted from the ore.

- **Water Resources.** The Proposed Project has the potential to affect surface water and groundwater resources through surface disturbance activities, groundwater pumping for mine depressurization, stream diversions, channel modifications, and discharges from pit lakes and National Pollutant Discharge Elimination System outfalls. Groundwater levels affected by pit depressurization are predicted to recover to near pre-Project levels in most areas by about 70 years after the end of mining, but irreversible drawdowns of 50 to 100 feet and 5 to 10 feet would occur below the Ledbetter Reservoir and the Tailings Storage Facility (TSF) and PAG storage areas, respectively. With the exceptions of ponds 8 and 9 and well 39 (Chapter 4, Tables 4.2-22 and 4.2-23), which would be eliminated by construction of the West PAG long-term impacts on surface water and groundwater supplies are expected to be negligible to minor. Construction of the Fresh Water Storage Reservoir, lowering of groundwater levels for mine depressurization, and formation of pit lakes, would affect flow in area streams both during and after mining. Filling of streams through project construction and operation would irretrievably eliminate segments of affected streams and their hydrologic and water quality functions.

Irreversible impacts on groundwater from the Horseshoe underground mine will include changes in the hydraulic conductivity of the mine workings. Cemented rock fill will be used in approximately 75 percent of the stopes and these areas will have hydraulic conductivities similar to the pre-mining condition. Non-cemented rock fill will be used in the remaining stopes, and no fill will be used in access tunnels and workings. These areas will have higher hydraulic conductivity than pre-mining condition. Local patterns of groundwater flow near the underground workings will be affected by changes in hydraulic conductivity caused by mining and by the formation of pit lakes. These changes will not significantly affect larger-scale groundwater flow patterns in areas away from the pits and underground workings.

- **Soils.** Construction and operation of the Proposed Project would affect the existing quality of native soils. Growth media excavation, transport and storage, and redistribution would modify existing soil structure, affect aeration and permeability, and likely would reduce microbial populations. Modification of the soil resource may result in an irretrievable loss of soil productivity, physical structure, and ecological function for disturbed areas but would not result in an irreversible loss for disturbed areas that are reclaimed. There would be an irreversible and irretrievable loss of soils in the areas that are not reclaimed, such as pit walls and pit lakes.
- **Floodplains.** The Proposed Project would fill 11 acres of 100-year floodplain along an unnamed tributary.
- **Wetlands and Other Waters of the United States.** Construction and operation of the Proposed Project would include filling wetlands and streams to construct project facilities. Filling wetlands and streams would irretrievably and irrevocably eliminate these resources and their hydrologic and water quality functions. This also would affect the viability of certain aquatic resources.
- **Aquatic Resources.** Wetlands and streams filled to construct project facilities would irretrievably and irrevocably alter these resources, eliminating any associated aquatic habitat and support for aquatic species.
- **Terrestrial Resources.** The expansion planned in the Proposed Project, in particular for the mine pits, Duckwood Tailings Storage Facility (DTSF), Overburden Storage Areas (OSAs), PAG facilities, roadways, and pond contact water storage capacity would cause short-term and, in some cases, permanent disturbance and loss of terrestrial habitat. Following reclamation, some of the terrestrial habitat and functions would be recovered, but limitations of the vegetation

communities that can be used for reclamation of the DTSF and West PAG OSA would constitute a minor irretrievable and irreversible commitment of resources.

- **Land Use.** The Proposed Project would involve expanding the project boundary, including expansion of the DTSF, aboveground PAG storage areas, and aboveground green OSAs. This would change the land use in the expanded boundary. The Proposed Project would disturb prime farmland and farmland of statewide or local importance.
- **Visual Resources.** As noted previously, the Proposed Project would include expanding the existing DTSF, the West PAG, and several OSAs. The visual impact of expansion of these expansions would be permanent. Depending on the vantage point of the observer, impacts would be minor to major, due to the change in topography once reclamation is complete. Reclamation and revegetation of these areas would lessen the visual contrast in the long term.
- **Transportation.** The Proposed Project would realign and reconstruct U.S. Route 601 (US 601) and intersecting roadways including South Carolina Highway (SC)-204 (Duckwood Road), SC-265 (Old Jefferson Highway) and SC-219 (Ernest Scott Road) to minimize the potential for conflicts or collisions during both construction and operations. Increased truck traffic during construction and operations would cause wear and tear on US 601.
- **Recreation.** The private land acquired for mine expansion would no longer be available for limited lease hunting in the short-term but could be available for recreational uses in the long-term after reclamation and closure.
- **Cultural Resources.** Construction of the Proposed Project would cause surface and subsurface disturbance, removing a number of historic resources. Resource removal would occur under a Memorandum of Agreement that includes protocols for assessing the resources to be removed and, in some cases, preserving cultural artifacts.

## 7.2 Unavoidable Adverse Effects

Regulations in 40 CFR 1502.1 and 1502.16 require disclosure of any adverse environmental impacts that cannot be avoided after implementation of mitigation measures. Major impacts were identified on groundwater, surface waters, water supply, wetlands and waters of the United States, and aquatic species. These impacts would occur through lowering of groundwater levels, filling of wetlands and streams, changes to streamflow regimes, and related effects on aquatic species. Major impacts were also identified on soils and would occur through removal, relocation, and disturbance of soils. Suitable topsoil and growth media would be salvaged and stockpiled during ground-disturbing activities for use in reclamation; however, there would be permanent alteration of soil type and cover due to surface disturbance activities from expansion of mine facilities. Impacts on cultural resources would occur where certain cultural resources would be eliminated by construction of the Proposed Project. No other significant environmental impacts were identified that could not be minimized, avoided, or mitigated by environmental protection features proposed as part of the project or identified by the U.S. Army Corps of Engineers (USACE) as mitigation measures. All residual impacts were found to be minor to moderate.

## 7.3 Short-Term Use versus Long-Term Productivity

NEPA regulations (40 CFR 1502.16) require that an EIS consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity—that is, whether the Proposed Project or alternatives would result in short-term environmental effects (adverse or beneficial) to the detriment of achieving or maximizing the long-term productivity of those same resources. Short-term uses of the environment may include consumption of nonrenewable resources or commitment of resources to a specific use. Long-term productivity refers to the continued sustainability of the resource. The analysis of short-term uses and long-term productivity is based on the impact analysis in Chapter 4, *Environmental Consequences*.

The No Action Alternative includes the permitted activities, which were first analyzed in the 2014 FEIS (USACE 2014) and the subsequent operational adjustments approved in the 2020 mine permit and the United States Department of the Army (DA) permit modifications (Appendix N, *2020 SEIS Permit Modification*). The No Action Alternative involves the continuation of mining and processing operations at the existing Haile Gold Mine site under the terms of current permits and approvals as authorized by South Carolina Department of Health and Environmental Control and USACE, but no new permit or additional modification to the existing permit would be issued or authorized. Under the No Action Alternative, USACE would not authorize a modification to Haile's existing DA permit number 1992-24122-4IA for the Haile Gold Mine to allow discharge of dredged or fill materials from the proposed mine expansion into waters of the United States pursuant to Section 404 of the Clean Water Act. Under this scenario, the Applicant would not expand activities beyond the currently permitted actions described in the 2014 FEIS and 2020 mine permit modification, and mining operations, reclamation, and closure activities would continue to occur on the private land owned by Haile, as described in the 2014 FEIS and 2020 mine permit modification. No further irreversible or irretrievable commitments of resources would occur under the No Action Alternative.

The Applicant's Proposed Project is the development of new and modification of existing facilities, as well as the continued use of existing facilities for the planned mine expansion. Chapter 2, *Proposed Action and Alternatives*, contains a summary of the project description, and Appendix A is the detailed description of the Proposed Project. This action would principally include the following.

- Increase the mine pit shell, increasing the cut-off per ounce gold price of what is economically feasible to mine expands the volume of gold-bearing ore compared to the original mine plan that was permitted in 2014.
- Perform underground mining operations at Horseshoe Deposit.
- Optimize Mill operations by removing several operational constraints to increase capacity.
- Expand the project boundary to include adjacent properties.
- Increase TSF storage (with HDPE liner and underdrain collection system) by adding additional lifts to the existing storage facility.
- Increase aboveground PAG storage (with HDPE geomembrane liner and contact water collection system) by expanding the existing Johnny's PAG facility (now called West PAG).
- Increase aboveground green OSAs primarily by adding a new, large green OSA facility along the southern border named the South OSA.
- Expand contact water treatment plant (CWTP) capacity.

- Increase primary contact water storage capacity at the 39 Pond (which services CWTP).
- Install additional stormwater management facilities.

Reclamation would be performed concurrently with mining operations when possible or would be performed after mining and processing are completed. This would include reclamation to provide stable, vegetated, post-mining landforms except for pit lakes and associated pit highwalls, and any roads that would remain for post-mining activities and land uses. The DTSF, West PAG, and East PAG would be closed with a geomembrane to minimize water infiltration, formation of acid leachate, and seepage of acid mine drainage. These facilities would be constructed with a liner and underdrain system to capture any seepage from the closed cells. All other OSAs would be graded and revegetated to provide wildlife habitat. Some of the mined pits would be refilled with overburden, others would be allowed to refill from surface water and groundwater sources to form permanent pit lakes. The Mill and other facilities not required for reclamation and closure would be removed.

The following discussion describes the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity by resource based on the Proposed Project (refer to Chapter 4, *Environmental Consequences*, for a detailed discussion of the specific project impacts).

- **Geology.** Impacts on geologic resources from the Proposed Project would be similar to those listed in Section 7.1.2.1 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Water Resources.** Impacts on water resources from the Proposed Project would be similar to those listed in Sections 7.1.2.2, 7.1.2.3, and 7.1.2.5 of the 2014 FEIS, which are incorporated in the SEIS by reference. New data and analysis developed since 2014 have modified some of the conclusions of the original analysis with respect to the following:
  - Groundwater pumping requirements for depressurization of the open pits and underground mine for the Proposed Project would be lower than previously modeled.
  - The area of influence for groundwater drawdown associated with depressurization pumping would be smaller than previously modeled.
  - Baseflow reductions and impacts on stream flows would be less than previously modeled.
  - The pit lakes would fill at slower rates than previously modeled.
  - The quality of water discharged from pit lakes would likely be better than previously modeled.
- **Soils.** Impacts on soil resources from the Proposed Project would be similar to those listed in Section 7.1.2.1 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Floodplains.** Impacts on floodplain resources from the Proposed Project would be similar to those listed in 7.1.2.5 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Wetlands and Other Waters of the United States.** Impacts on wetlands and other waters of the United States from the Proposed Project would be similar to those listed in Section 7.1.2.4 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Aquatic Resources.** Impacts on aquatic resources from the Proposed Project would be similar to those listed in Section 7.1.2.6 of the 2014 FEIS, which are incorporated in the SEIS by reference.

- **Terrestrial Resources.** Impacts on terrestrial resources from the Proposed Project would be similar to those listed in Section 7.1.2.7 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Federally Listed Species.** No federally listed species occur within the project boundary or in the area adjacent to the Proposed Project. Therefore, no short-term or long-term impacts would occur.
- **Socioeconomics and Environmental Justice.** Impacts on socioeconomic and environmental justice resources from the Proposed Project would be similar to those listed in Section 7.1.2.9 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Land Use.** Impacts on land use resources from the Proposed Project would be similar to those listed in Section 7.1.2.11 of the 2014 FEIS, which are incorporated in the SEIS by reference. Additionally, land use for converted acres of prime farmland and farmland of statewide or local importance would be restricted in perpetuity, therefore, representing a permanent impact on the long-term sustainability of these areas for future potentially productive agricultural uses of these lands. Land use for PAG facilities and DTSF would be restricted in perpetuity, therefore representing a permanent impact on the long-term sustainability of these areas for future potentially productive uses of these lands.
- **Air Quality and Climate Change.** Impacts on air quality and climate change resources from the Proposed Project would be similar to those listed in Section 7.1.2.15 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Noise and Vibration.** Impacts on noise and vibration resources from the Proposed Project would be similar to those listed in Section 7.1.2.16 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Visual Resources.** Impacts on visual resources and aesthetics from the Proposed Project would be similar to those listed in Section 7.1.2.12 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Transportation.** Impacts on transportation resources from the Proposed Project would be similar to those listed in Section 7.1.2.10 of the 2014 FEIS, which are incorporated in the SEIS by reference.
- **Recreation.** The private land acquired for mine expansion supported limited lease hunting. Recreational opportunities would be precluded in the short-term due to planned mining activities, but following reclamation and closure portions of the area within the project boundary could support recreation uses.
- **Cultural Resources.** Impacts on cultural resources from the Proposed Project would be similar to those listed in Section 7.1.2.12 of the 2014 FEIS, which are incorporated in the SEIS by reference.

## 7.4 References

U.S. Army Corps of Engineers. 2014. *Final Environmental Impact Statement for the Haile Gold Mine Project*. U.S. Army Corps of Engineers, Charleston District. SAC 1992-24122-4IA. July 2014.