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Golden Sunlight Mine: A Case Study for Tailing Reprocessing as a Closure Strategy

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Mine

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Overview



- Vision and Closure Strategies
 - Sustainability Principles
 - Montana Partner
 - History
 - Current Permitted Closure Alternative
 - Evaluating Closure Alternatives
 - Preferred Sustainable Closure Alternative – TRP
 - New Era for GSM and Future Opportunities
 - Project Benefits
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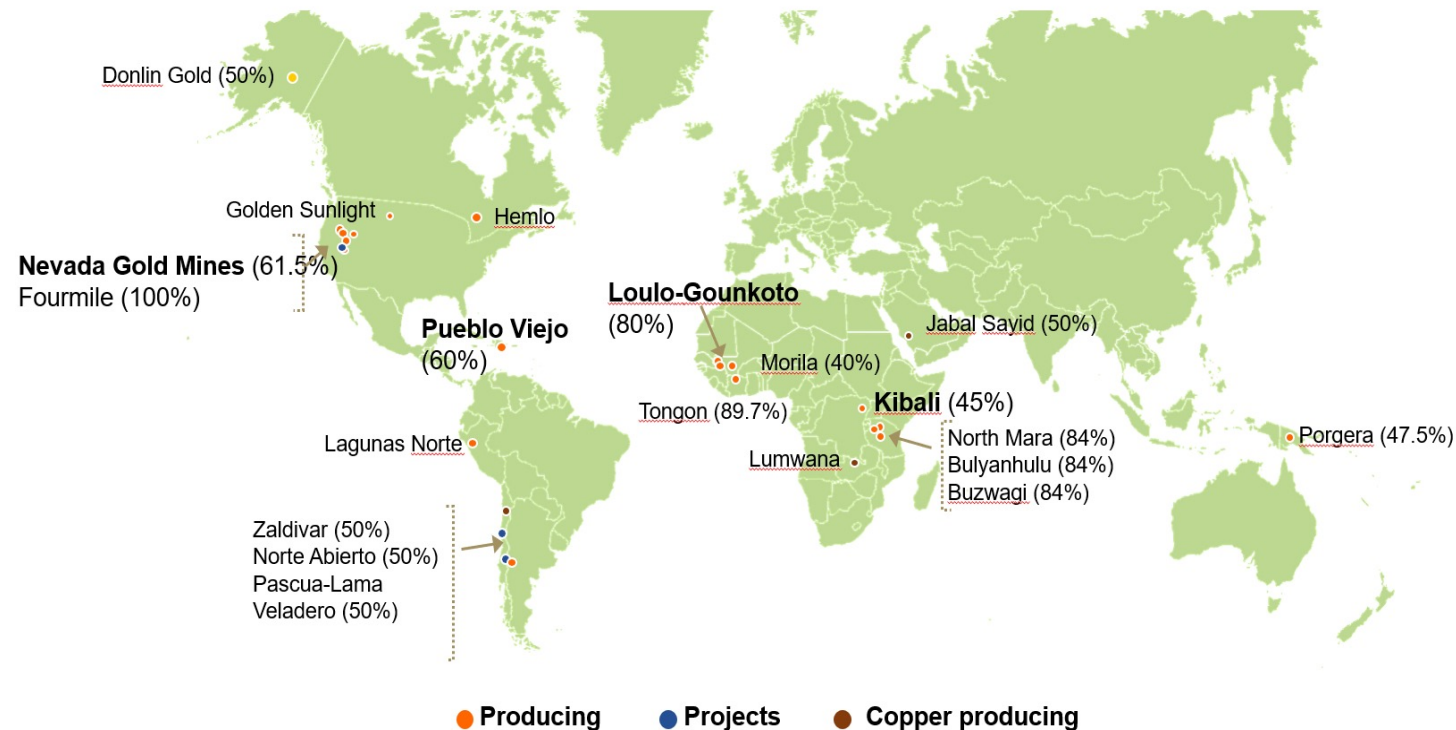
Barrick's Vision

To be the world's most valued gold mining business, by finding, developing and owning the best assets, with the best people, to deliver sustainable returns for our owners and partners

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Closure Strategy

- Eliminate Perpetual Water Treatment
- Engineer closure solutions for continued permitting ease and justification
- Permit, Mine, Process and Ship a Quality Concentrate to NGM per the PPA agreement (100K annually at 200K tonnes rate).
- Complete physical reclamation
- Protect Barrick's license to operate
 - TSF1 and 2 failure consequence classifications – completed
 - TSF-2 Draft Breach analysis review July 19.
 - Stakeholder relationships: Grant for increased employment, CTAC, CDC Advisory Board



Our Sustainability Principles



■ We put safety first

Everyone on our mines, from a General Manager to a haul truck driver, is part of an organization-wide goal of continuous improvement towards a zero-harm workplace.

■ We conduct our business with integrity, transparency and fairness

Our Code of Conduct and Business Ethics applies to all staff and contractors. We have zero tolerance of bribery and corruption in all forms. We transparently report on our sustainability performance and impacts.

■ We build and maintain genuine partnerships

We constantly work to form and maintain mutually beneficial and sustainable partnerships with our core stakeholders including Governments, local communities, shareholders and suppliers.

■ We prioritize local hiring and buying

We build the skills and capacity of host country workers and vendors, to multiply our positive impact on local, regional and national economies.

■ We empower local communities

We invest in social and economic opportunities including education and healthcare.

■ We reduce our environmental impacts

Every site is expected to minimize energy and water use, manage waste and land safely and be a responsible steward of its natural environment.

■ We plan for closure at all stages

We rehabilitate our mine sites as we go and we invest in economic and environmental projects that can be sustained beyond the life of a mine.

A Partner for Montana

Our commitment:

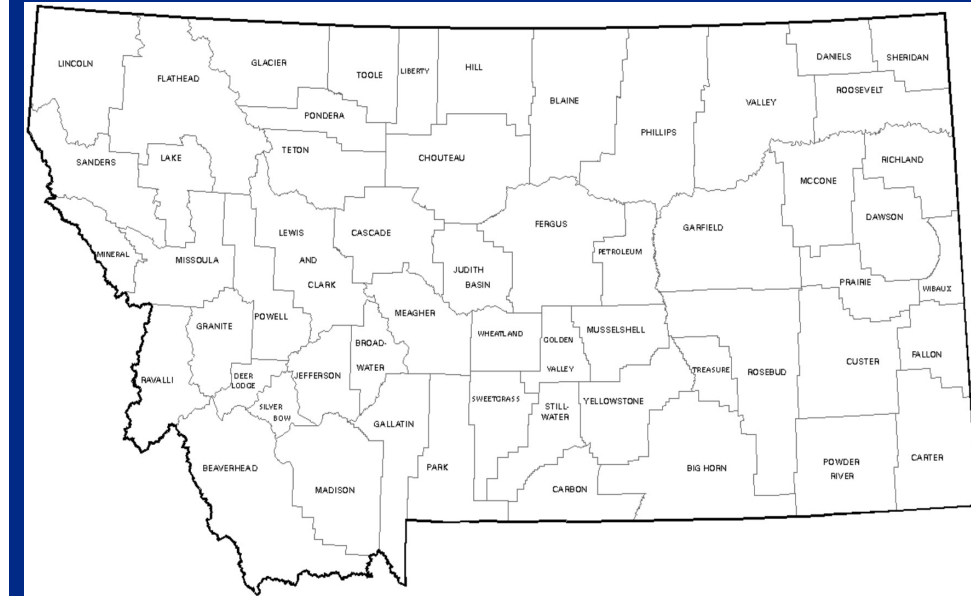
To be a responsible owner and operator of the Golden Sunlight mine; delivering opportunity and prosperity to our community and to the State of Montana even after active mining has ceased, whilst mitigating the long-term impact of the operation on the natural environment

We intend to deliver on that partnership through the following:

1. **PEOPLE:** A safe, productive, supported workforce – 4 years without a lost time incident; employing locally and developing talent from our surrounding communities
2. **ECONOMIC CONTRIBUTIONS:** Direct and indirect contributions to Montana and our local community
3. **ENVIRONMENTAL STEWARDSHIP:** Becoming a leading example in the US for responsible closure, removing existing source of contamination and avoiding wasteful water treatment

We will communicate on a continuous basis, updating each quarter on progress.

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MONTANA

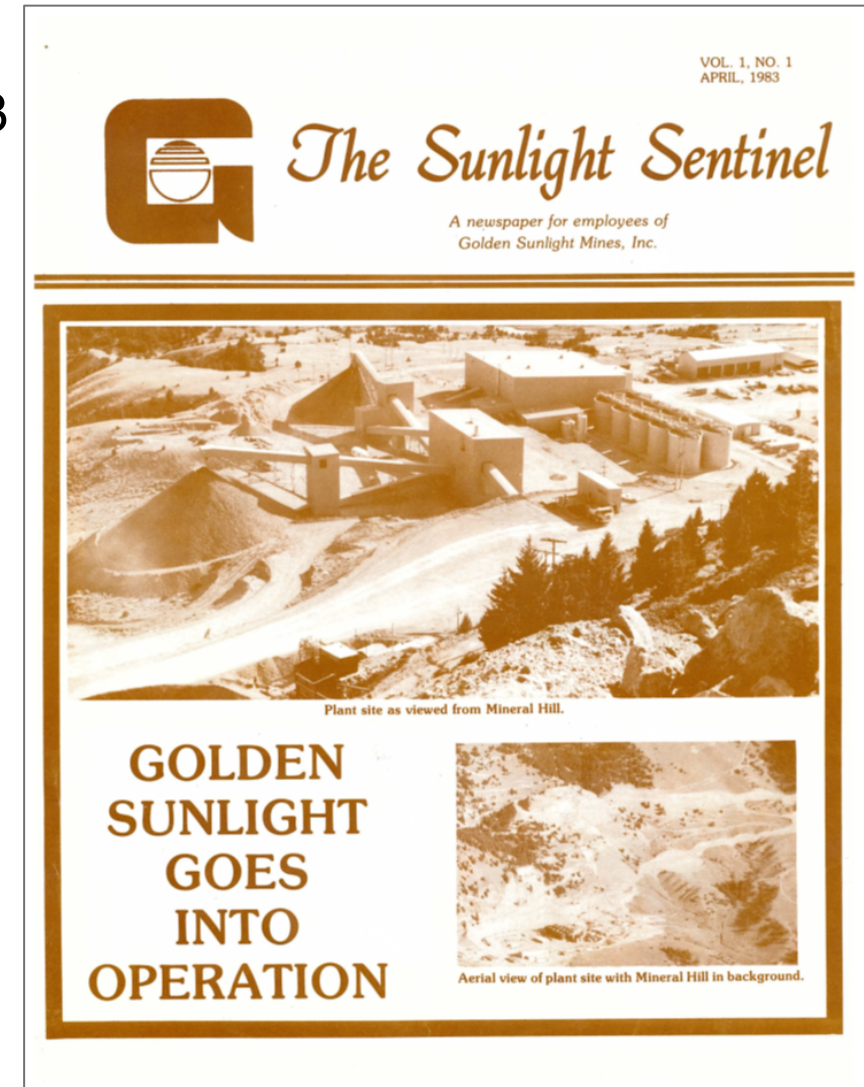


History

- Mining operations began – 1982
- Faulty construction of Tailings Storage Facility discovered - 1983
- Barrick acquired Placer Dome – March 2006
- TSF2 constructed – 1995
- Mining complete – May 2019



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Current Closure Alternative Strategy-Unsustainable Approach **BARRICK**

- Mining extended approximately 800 feet below the GW table.
 - Perpetual pit water treatment was ultimately permitted to avoid potential GW impacts and avian/wildlife exposure to a pit lake.
 - Permitting resulted in no sulfide waste rock backfill and required no pit pond.
 - GSM currently permitted and bonded to treat various impacted water sources (620 gpm HDS/RO WTP). Sludge managed on site.
 - TSF-2 lined seepage collection
 - TSF-1 groundwater pump back containment
 - Pit dewatering ARD
 - Potential ARD from waste rock seepage (100-300 years in the future)
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Evaluate Closure Strategy



- How to eliminate perpetual water treatment (on going costs/liabilities forever).
 - 100-year bond for building, operating to treating and discharge.
 - Can sources of contamination be eliminated or stabilized?
 - Is there any value in the sources of impact?
 - This is not a novel concept, but finding a customer for the value aids in the economics.
 - Geochem of tails, sulfides, gold, copper,
 - What processes exist to remove the value?
 - Sulfide flotation is straight forward (Steve Lloyd our Chief Metallurgist will discuss in detail)
 - Where would the process exist?
 - Would the project require permitting?
 - Environmental net benefits aids in permitting approval and project support
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Preferred/Permitting Closure Alternative - TRP



- Geochemistry provided tails include S, Au, Fe, Cu, Ag
 - NGM buys elemental S prill as fuel for Roasters and Autoclaves.
 - GSM could concentrate the S to an amount that would economically out compete prill.
 - Repurpose existing mill and ancillary buildings to reduce capital.
 - The residual gold and silver would concentrate as an added benefit.
 - Entire TSF would be processed and reclaimed (source of seepage eliminated-unlined TSF).
 - Desulfurized limed tail would be placed into the Mineral Hill Pit to provide some neutralization (<0.5% S – nonreactive).
 - After final processed tailing deposition, minimal pit dewatering could be treated passively to maintain the GW sink and protect water quality versus the 60 gpm currently required.
 - Tails surface would include soil cap and seeding to create 50 acres of vegetation and provide additional post mined land use.
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A new era for Golden Sunlight



- Golden Sunlight Mine evaluation of processing tailing during operations (2009-2011)
 - Provided MDEQ a modification to the OP - a fine ore processing plant and Air permit amendment in 2010/2011
 - GSM could not get the economics to pay as the project included a stand-alone processing facility below TSF-1 and 2. (2011-2014)
- Rand Gold and Barrick merge in 2018 – Rand created value in Africa through tailing and overburden reprocessing
- Began TSF1 Tailings Reprocessing Project (TRP) analysis as a result of mining and processing suspension - May 2019
- Reclamation by local contractor – Smith Brothers Construction, Whitehall
- TRP Permit Application submitted to Agencies - March 30, 2020
- GSM Contracts to deliver concentrates to NGM – April 2020
- MDEQ completes statutory review and begins RFP for EIS contractor – October 2020
- EIS completion and ROD – September 15, 2021
- First contracted shipment of concentrates – year end 2021

Future Opportunities

- Marketing our Product
 - Market understanding where product can provide benefits
 - Soil Amendments and Agriculture Markets
 - Identify Transportation alternatives e.g. OTR versus rail
 - Product has gold at reasonable concentrations
 - Bioleach gold recovery option
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Tails Reprocessing - Project Benefits



■ Environmental Benefits

- Long term goal to eliminate perpetual water treatment
- Ground water impact source elimination (removes the unlined tailing impoundment)
- Pit Acid Rock Drainage (ARD) neutralizing treatment
- Benign pit backfill goal will eliminate long term need for ARD containment pumping
- Pit Area reclamation will create addition of 55 acres of additional vegetation

■ Social and Communities Benefits

- Hire additional 20 Employees
 - Local Mining Contractor adds 10 additional employment
 - Transportation requires over 30 over the road drivers, half will reside locally
 - Increased taxes to support local, county and State
 - Increased payroll and local community revenue
 - Continue CTAC and CDC economic development programs
 - Continue 3500 acres of Block Management recreation opportunities
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Mine Overview

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Mining of TSF1



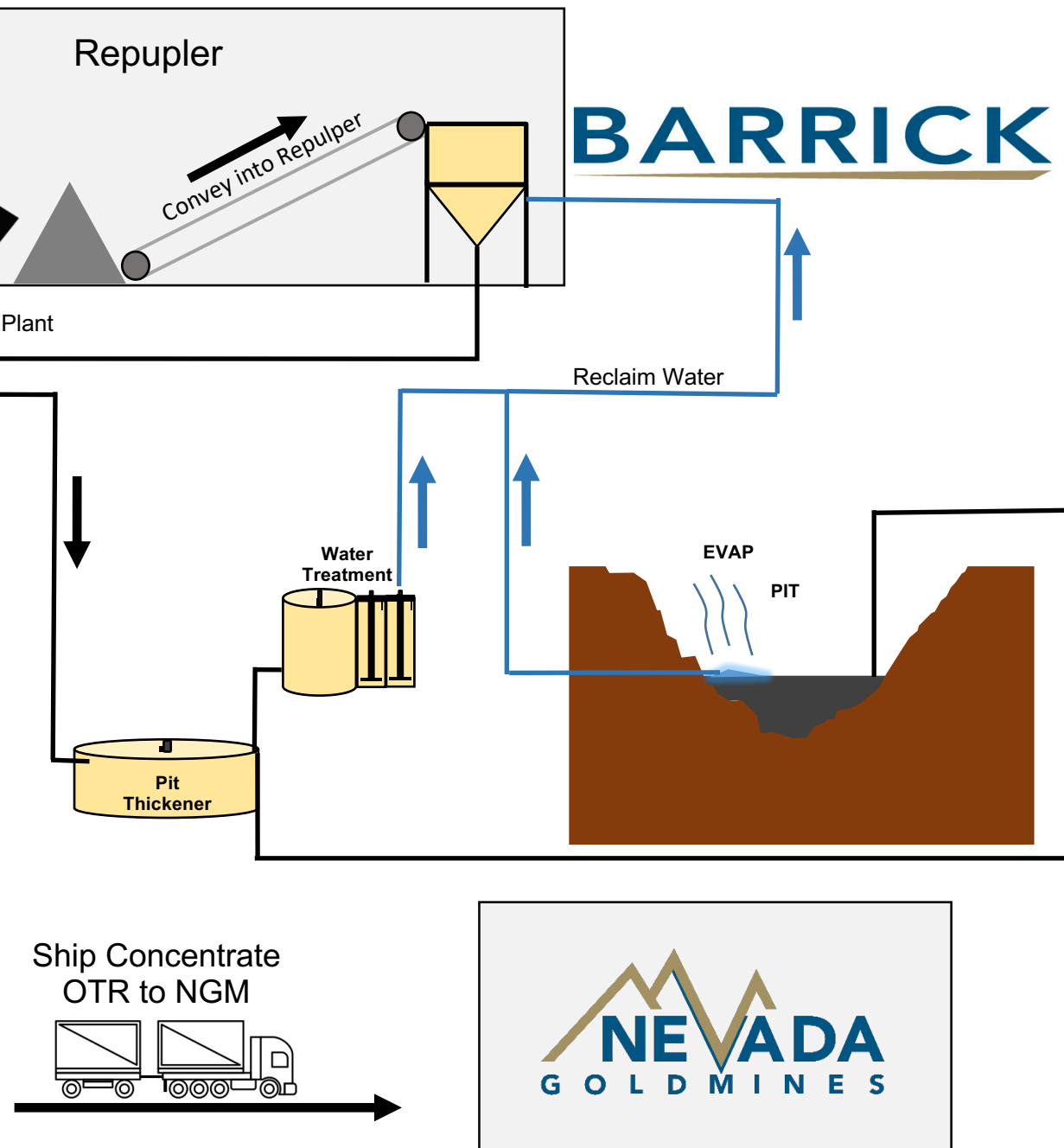
Short Haul to Repupler



Repupler



Convey into Repupler



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Tailings Slurry Pumped to Flotation Plant

Reclaim Water

Flotation Plant

Roughing

Cleaning

RO
Thickener

Concentrate
Thickener

Concentrate Slurry to Filter

Filtration Storage
and Transport

Con Dewater
and Filter

Load
Concentrate
onto OTR
Trucks

Water
Treatment

Pit
Thickener

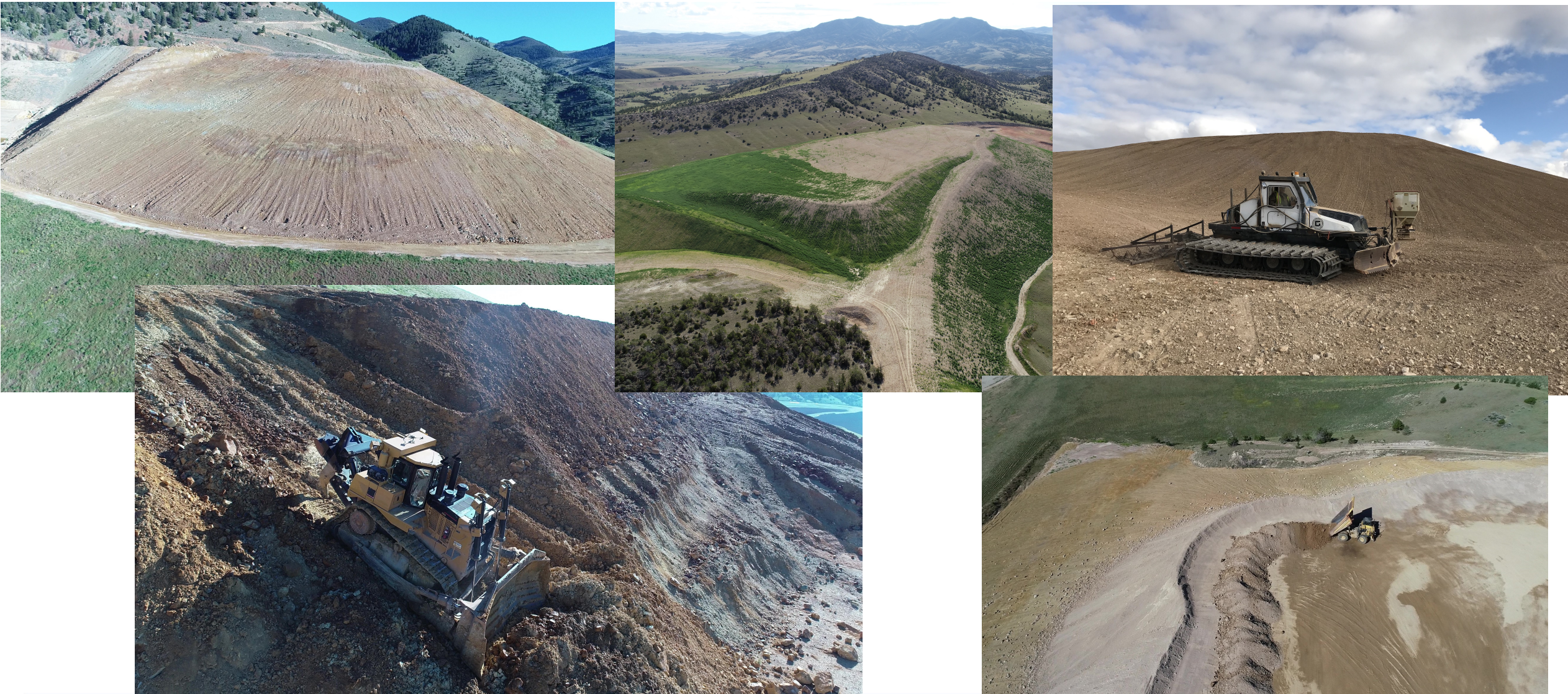
EVAP
PIT

Ship Concentrate
OTR to NGM

NEVADA
GOLD MINES

Reclamation Program

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GSM Social programs

- Off-site ore purchasing and processing:
 - Approximately 720,000 tons of Abandoned Mine waste processed at GSM between 2011 and 2019.
 - \$46.6M was paid out to the local ore suppliers and saved Montana tax payers clean-up costs
 - Project won the national BLM environmental award in 2012 and has potential to continue in the future.
- GSM is certified and compliant to the ISO14001 Environmental Management System standards.
- 75% of the mining related disturbance has been reclaimed (\$6.5M 2019-2021) and all steep slopes will be pushed before fall of 2022.
- Conservation:
 - Wild Turkey reintroduction at the GSM owned Candlestick Ranch during the late 1980s – current population is sustainable
 - Brown trout spawning project at the Candlestick ranch tributary that feeds the blue ribbon Jefferson River fishery
 - FWP Block management 3,500 acres of GSM owned property
 - Assist with Montana FWP mule deer and Elk surveys

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GSM Community

- Bordens Hotel – A special tax district was created (TIFID) that allowed GSM gross net proceeds and property taxes (\$800K) to be used for a three year period which allowed for the restoration and economic development of a historic landmark in Whitehall (generates revenue from 9 store fronts and 9 apartments/rentals).
- GSM Business Park – Business opportunities off I-90 corridor with 9 rental units occupied by various tenants.
- Wind development leases created at higher elevations around the mine are beneficial given the current power infrastructure. Data has been collected, compiled and exists in a report for prospective leases.
- The community of Whitehall and GSM created a Safety Fair. GSM experts participate and teach benefits of the safety culture existing at the Mine.
- CTAC – Citizen's Transition Advisory Council established in 2000 to prepare the local community on sustainability after mining.

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Direct Economic Contribution



- Golden Sunlight's contribution over the last 30 years (1991-2021):
 - Over \$1.1bn of goods purchased
 - Over \$420m in payroll
 - Over \$70M in taxes to the State of Montana through state, county and payroll taxes
 - Average of 157 employees over the life of the operation
 - Over \$3M in community investments
 - Tailings reprocessing project's forecast contribution 2022-2034:
 - Over \$20M in purchases and fuel
 - Approximately \$50m in payroll
 - \$20m in taxes
 - 35 employees and 40 contractors
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