

Colorado School of Mines

Southwest US Spring 2022



Society of Economic Geologists Student Chapter



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Contents

Acknowledgments and Sponsorship..... 2
Trip Itinerary 3
Trip Itinerary (cont'd)..... 4
Budget..... 5

Acknowledgments and Sponsorship

We would like to thank the many people and organizations who made this field trip possible and provided advice, contacts, as well as financial and organizational support. Special thanks go to the trip leaders who offered much-needed expertise and perspective on the trip. Likewise, we are indebted to the many industry professionals and companies who allowed us to visit their operations and the on-site teams who took time out of their busy schedules to make us feel welcome and guide us through their properties.

Companies



Sponsors



Trip Itinerary

Date(s)	Location
Beginning of trip. Participants depart from Las Vegas, NV.	
May 16	Visiting Lake Mead. Lake Mead lies along the eastern edge of the Basin and Range province created by Tertiary extensional tectonism. The bottom of Lake Mead is characterized by rock outcrops, alluvial deposits that existed prior to the formation of the lake, as well as sediments deposited as the Colorado River filled the reservoir created by the Hoover Dam. The river channel is bordered by steep walls composed primarily of Precambrian to Tertiary igneous and metamorphic rocks.
May 17 - 18	Visiting the Castle Mountain Mine, CA. Castle Mountain is a low-grade, large-tonnage low-sulfidation epithermal gold deposit hosted in Miocene volcanics. The mine operated as an open-pit heap leach and produced over 1.3 million ounces of Au between 1992 – 2004, when it was closed due to gold price. Equinox acquired Castle Mountain in 2017 and was commercially producing again late in 2020. We will conduct core logging and section work.
May 19	Visiting the Moss Mine, AZ. The Moss Mine is currently mining the Moss vein system, which consists of fault-hosted younger epithermal quartz-calcite veins that crosscut the Moss quartz monzonite porphyry host rock. The Moss mine uses a heap leaching system and a Merrill-Crowe plant which recovers both the gold and silver from solution. During the day, we will stop at several outcrops to allow students to learn about the Colorado River Extensional Corridor and to be able to place Lake Mead and the Castle Mountain and Moss mine visit into a regional context.
May 20	Visiting the Mountain Pass Mine, CA. Mountain Pass is the only integrated rare earth mining and processing site in North America. The deposit, discovered in 1949, contains higher-than-average grades of 7% rare-earth oxides and represented 15.8% of the world’s rare-earth metals production (38,000 tonnes) in 2020.
May 21	Visiting the Coso Geothermal Power Plant and Death Valley NP, CA. The Coso geothermal field is located at the Basin and Range and Sierra Nevada tectonic provinces boundary and is situated in a dextral strike-slip fault system between the Walker Lane Fault Zone, the Sierra Nevada, and the Garlock Fault. The geothermal field at Coso is classified as a liquid-dominated system. Superheated groundwater flashes to steam at <2 km depth. The area (approx. 6,4000 acres) has abundant surface thermal features (e.g., hot springs, mud pots, fumaroles).

Trip Itinerary (cont'd)

(cont'd)	<p>Visiting the Coso Geothermal Power Plant and Death Valley NP, CA. Death Valley occupies an interface zone between the arid Great Basin and the Mojave Desert. Death Valley is a graben. At 282 feet (86 m) below sea level, Badwater Basin on Death Valley's floor is the second-lowest depression in the Western Hemisphere. The park's oldest rocks are extensively metamorphosed and at least 1.7 billion years old.</p>
May 22	<p>Visiting the Beatty, Goldfields, and Tonopah Silver District, NV.</p> <p>The Bullfrog quadrangle of southern Nye County, NV, and eastern Inyo County, CA, is located east of Death Valley in the Beatty District of the Walker Lane gold belt. The area is underlain by Tertiary volcanic rocks and Paleozoic sedimentary rocks. Anglo's recently acquired North Bullfrog project lies along a north-trending district-scale fault system that extends to the historic Bullfrog mine.</p> <p>A brief stop will be made at Goldfield, which represents a major high-sulfidation epithermal district.</p> <p>At Tonopah, students will inspect intermediate sulfidation deposits and the associated host rock alteration, as well as visit Black Rock Silver's Tonopah West project.</p>
May 23	<p>Visiting the Silver Peak Lithium Mine, NV.</p> <p>Silver Peak is the only producing Li mine in North America. The production of lithium carbonate from brine began in the 1960s with the opening of the plant. This stop will allow students to learn about Li brine operations.</p>
May 24	<p>Visiting Bodie Hills District, CA.</p> <p>Bodie Hill hosts both low- and high-sulfidation epithermal deposits, with past production of 3.4 Moz. of gold and 28 Moz. of silver. During the field trip, emphasis will be placed on volcanic facies mapping and identifying different alteration and mineralization styles.</p>
May 25	<p>Visiting TerraCore Reno, NV.</p> <p>This part of the trip will allow students to get familiar with cutting-edge analytical service labs and provide an opportunity to learn about hyperspectral data acquisition and how gold fire assays are performed.</p>
<p>End of trip. Participants leave Reno.</p>	

Budget

The total spent on the Southwest US trip was \$10,813.61. All costs are in United States Dollars (USD). The largest expense was for hotels, single rooms for the trip leaders, and double rooms for the student participants. We had overbudgeted for the hotels, and thus the overall trip cost was less than projected. The next largest expense was for rental cars. We rented three minivans through Enterprise at ca. \$1450 per vehicle for the entire trip. We also purchased gifts for company on-site personnel. Several miscellaneous expenses were incurred during the trip, such as bottled drinking water. These were paid for on department faculty accounts, so they are not accounted for here. Likewise, fuel was purchased by faculty trip leads. Food and airfare were the responsibility of each participant.

Item	Qty	Multiple	Sub Totals	Notes
Minivans	3	9 days	\$4,350.99	+\$403.91 over budgeted amount
Hotel rooms	6	8 nights	\$6,252.90	-\$4,147.10 under budgeted amount
Gifts	14	2 x 7 sites	\$209.72	CSM mugs for companies
Total			\$10,813.61	