Guidebook

Society of Economic Geologists Foundation, Inc. Student-Dedicated Field Trip Course – Precious Metal Deposits of the Southwestern U.S.

May 12 - 18, 2013

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SEGF Student-dedicated Field Trip Course
Precious Metal Deposits of the Southwestern U.S.

Welcome to the Society of Economic Geologists Foundation, Inc. Field Trip Course – Precious Metal Deposits of the Southwestern U.S., May 12 to18, 2013. This field course is the eleventh in Society of Economic Geologists Foundations Series that was established as a response to a student petition at the at the 2006 SEG Conference held in Keystone, Colorado, to provide more support for field trips to important mining districts.

The course starts in Las Vegas at 1:00 Noon on Sunday May 12, 2013; meet at the McCarran International Airport Car Rental Center (take shuttle bus from airport terminal). We will travel by charter bus to Kingman, Arizona. On Monday we will depart promptly at 7:30 to visit the Gold Road Mine and return to Kingman. On Tuesday, pack all your gear for an early (7:30) departure to the Mineral Park Mine and evening destination of Pahrump, Nevada. Wednesday's destination is the Sterling Mine in the Bullfrog District with an overnight in Tonopah, NV, where we will stay two nights. Thursday and Friday features visit the Round Mountain Mine and the Goldfield District. The last night will be in Shoshone, California.

Entrance to the mine properties usually follows a specific protocol; please be patient. A proper and professional workplace dress code is required (steel-toe boots, hard hat, eye protection, gloves, reflective vest). At the mines we will receive safety training and a geological / engineering presentation. Do not take any pictures of the presentations unless and until we clear this point with company personnel. We will ask, but in general, participants can take pictures and collect samples on company property. Participants are responsible for their own samples (be aware of weight limits if you plan to take samples back with you). Please read through this website carefully for more detailed information (including a "guidebook") and additional requirements.

We will have VERY LIMITED . . . REPEAT: VERY LIMITED . . . space for luggage, so you should bring clothing and field gear ONLY IN DUFFLE BAGS - NO HARD-SIDED LUGGAGE.

We look forward to a fantastic field trip course. See you in Las Vegas!

Cover: Goldfield District, NV, ~2003. All photos by Erich U. Petersen

Acknowledgements

*This field trip is generously supported through the **Society of Economic Geologists Foundation** through the **SEGF Student Field Trip Fund**. We thank the companies that provided access to their operations in Arizona and Nevada and the many company representatives that gave generously of their time to make this trip a success. Special thanks are due to Borden Putnam, Brian Hoal, John Thoms, and Vicky Sternicki.*

The Society of Economic Geologists Foundation, Inc.

American Bonanza Gold

Addwest Minerals Inc.

Imperial Metals Corporation

Kinross Mining

International Minerals

Gold Road Mine

Sterling Mine

Mineral Park Mine

Round Mountain Gold Corporation

Gemfield

David Hedderly-Smith

University of Utah

New Mexico Tech

Erich U. Petersen

William X. Chávez, Jr.

Jeffrey W. Hedenquist

SEG Foundation Field Course
Precious Metal Deposits of the Southwestern U.S.

12-18 May, 2013

Leaders: **Dr. William X. Chávez, Jr.**
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Date	Itinerary	Overnight
May 12 Sunday	**1:00 PM** - Meet at Las Vegas McCarran Airport Car Rental Center. **- Best Western A Wayfarer's Inn and Suites** **6:00 PM** - Safety and logistics meeting for all participants.	Kingman, AZ
May 13 Monday	**6:30 AM**- Depart for **Gold Road Mine, Oatman District, Arizona** Review low-sulfidation vein systems and Oatman District history.	Kingman, AZ
May 14 Tuesday	**6:30 AM** - Depart for **Mineral Park Mine, Kingman, Arizona** - **Best Western Pahrump Station** Porphyry Cu-Mo Systems	Pahrump, NV
May 15 Wednesday	**7:00 AM** - Depart for **Sterling Au-Ag Mine - Best Western Hi-Desert Inn** Discuss structural setting of Bullfrog, - Montgomery - Shoshone ore deposits.	Tonopah, NV
May 16 Thursday	**7:00 AM** - Depart for **Round Mountain Mine** Low-sulfidation, structurally controlled Au system.	Tonopah, NV
May 17 Friday	**7:00 AM** - Depart for **Goldfield District** Review High-sulfidation systems and alteration geochemistry.	Shoshone, CA
May 18 Saturday	**6:30 AM Course ends. Travel to Las Vegas Airport (plan to arrive after 10:00 am)**	

NOTES:

* **Participants must arrive at the Car Rental Center at 7135 Gilespie Street in Las Vegas by 1:00 P.M. on the 12th of May** for a safety and logistics meeting.

* **All participants MUST - REPEAT - MUST - bring hardhat with lamp bracket, STEEL-TOE BOOTS, reflective vest, gloves, and eye protection. DO NOT plan to obtain these items during the course, as there is no time to do so!**

* **Participants will need to bring and wear long long-sleeve shirts and pants for the mine visits.**

* Participants **must provide proof of insurance coverage PRIOR** to participation in the course. **Please bring your insurance card ID with you.**

*** All participants must sign a liability waiver form that will be provided by SEGF prior to participation in the course.**

* Participants will need to check on **USA visa requirements** well in advance of their travel**.**

* All participants will need to submit their passport information (name, country of issue) to SEGF so that this information may be passed along to the mining companies as a part of our mine entrance procedures.

* The weather in Arizona and western Nevada during May is generally balmy and warm; nights may be cool. Please bring layers of clothing for warm days and cool evenings.

* Please bring all **prescription medications and your written prescriptions** - carry these with you, do not place in your checked baggage. If there are any conditions that might affect you during the course, please advise SEG prior to the course.

* Participants will need money for incidental expenses. SEGF provides transportation during the course, plus lodging and some breakfasts; most mines provide lunches, but prospects may not have facilities to do so. As such, you will need **CASH** (not credit cards) for your meal and other incidental expenses.

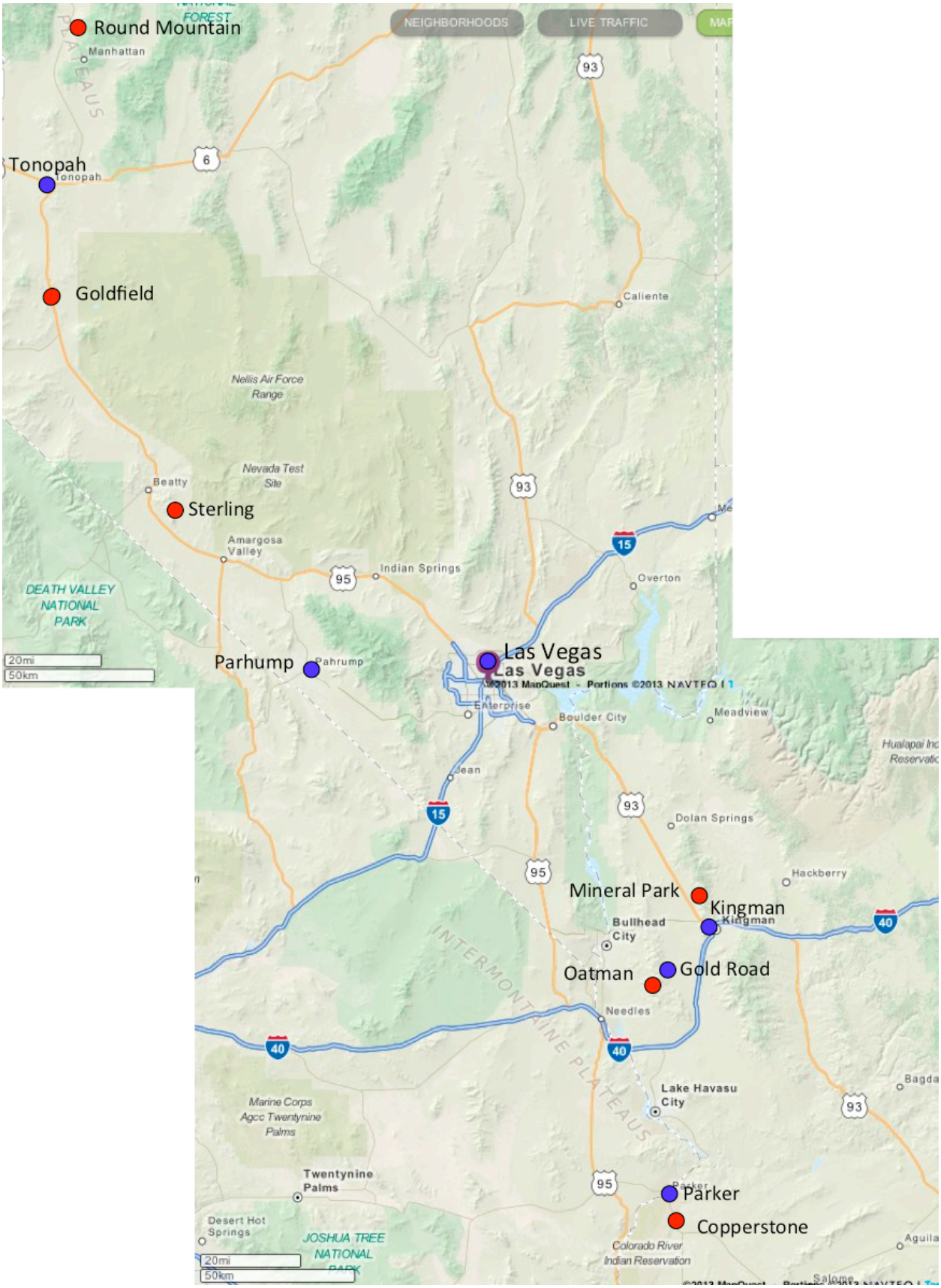
* It is recommended that participants bring sun screen/block, as well as a hat or cap for sun protection.

* **Pack Lightly** - we have **LIMITED SPACE** on the bus, so you will need to pack appropriately.

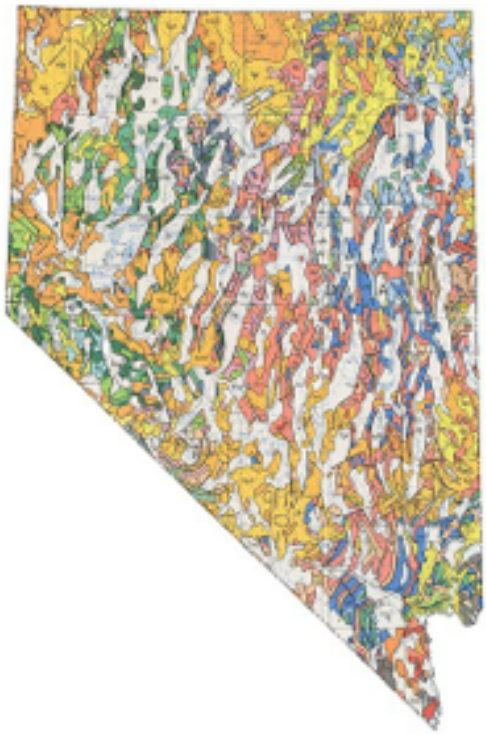
Participants

Participants	University	Country
Andrea Bowen	University of Mississippi	USA
Andrew Clark	Australian National University	Australia
Jesse Clark	University of Adilade	Australia
Matias Galina	Universidad Nacional La Plata	Argentina
Katherine Giraldo Africano	Universidad Nacional de Colombia	Colombia
Joshua Glauch	University of Texas, El Paso	US
Nyree Hill	University of Leicester	UK
Bartosz Karykowski	Freiburg Univ. Mining & Tech.	Germany
Ivan Krumov	Sofia Univ. St. Kilment Ohridski	Bulgaria
Freya Marks	University College of Dublin	Ireland
Christopher Olson	Colorado School of Mines	USA
L. Christine O'Neill	University of Texas, Austin	USA
Justin Palmer	Colorado School of Mines	USA
Krisztina Pandur	University of Saskatchewan	Canada
Jessica Pickett	Queen's University	Canada
Juanita Rodriguez	Univsersidad Estadual de Campinas	Brazil
Nurbol Sailaukhan	National University of Mongolia	Mongolia
Dennis Sanchez Mora	University of New Brunswick	Canada
Erin Summerlin	Auburn University	USA
Dave Hedderly-Smith	Park City, UT	USA
Jeffrey W. Hedenquist	Ottawa, Ontario	Canada
Erich U. Petersen	University of Utah	USA
William, X., Chávez, Jr.	New Mexico Tech	USA

Route Map


Round Mountain
Manhattan
Tonopah
Goldfield
Caliente
Nellis Air Force Range
Nevada Test Site
Beatty
Sterling
Amargosa Valley
Indian Springs
Overton
DEATH VALLEY NATIONAL PARK
Parhump
Las Vegas
Enterprise
Boulder City
Meadview
Jean
Dolan Springs
Hackberry
Mineral Park
Kingman
Bullhead City
Oatman
Gold Road
Needles
Lake Havasu City
Marine Corps Agcc Twentynine Palms
Twentynine Palms
Desert Hot Springs
JOSHUA TREE NATIONAL PARK
Parker
Copperstone
Colorado River Indian Reservation
INTERMONTAINE PLATEAUS
93
95
15
40
6

A



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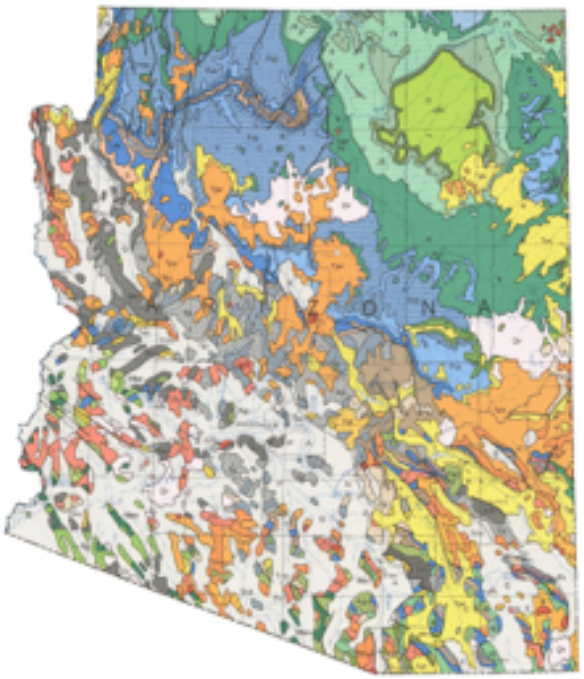

Geological maps: A) Nevada, B) Arizona

Readings

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Diaspore (20X, hand lens view). Goldfields.

Minerals commonly occurring in epithermal deposits

Mineral	Chemical Formula
electrum	AuAg
pyrite	FeS_2
covellite	CuS
enargite	Cu_3AsS_4
luzonite	Cu_3AsS_4
famatinite	Cu_3SbS_4
bismuthinite	Bi_2S_3
bornite	Cu_5FeS_4
chalcopyrite	$CuFeS_2$
chalcocite	Cu_2S
sphalerite	ZnS
molybdenite	MoS_2
mohite	Cu_2SnS_3
emplectite	$CuBiS_2$
hessite	Ag_2Te
chlorargyarite	AgCl
tennantite, tetrahedrite	$(Cu,Ag)_{10}(Zn,Fe)_2(As,Sb,Bi)_4S_{13}$
goldfieldite	$(Cu,Ag)_{10}(Zn,Fe)_2(Te,Sb,As)_4S_{13}$
acanthite	Ag_2S
kaolinite	$Al_2Si_2O_5(OH)_4$
dickite	$Al_2Si_2O_5(OH)_4$
pyrophyllite	$Al_2Si_4O_{10}(OH)_2$

muscovite ..... $KAl_3Si_3O_{10}(OH)_2$

illite ..... $K_yAl_2(Si_{4-y}Al_y)O_{10}(OH)_2$ $0.5<y<0.75$

montmorillonite ..... $(Na,Ca)_x(Al,Fe,Mg)_4(Si,Al)_8O_{20}(OH)_4.nH_2O$ $x \sim 0.3$

adularia ..... $KAlSi_3O_8$

alunite ..... $KAl_3(SO_4)_2(OH)_6$

jarosite ..... $KFe_3(SO_4)_2(OH)_6$

diaspore ..... $AlO(OH)$

zunyite ..... $Al_{13}Si_5O_{22}(OH)_{18}Cl$

topaz ..... $Al_2SiO_4(OH)_2$

native sulfur ..... S

Sinter, chalcedony, residual silica, (opaline, vuggy) ..... SiO_2

barite ..... $BaSO_4$

anhydrite ..... $CaSO_4$

calcite ..... $CaCO_3$

chlorite ..... $(Mg,Fe)_3(Al,Si)_4O_{10}(OH)_2.(Mg,Fe)_3(OH)_6$

epidote ..... $Ca_2FeAl_2Si_3O_{12}(OH)$

biotite ..... $KFe_3AlSi_3O_{10}(OH)_2$

alkali feldspar ..... $KAlSi_3O_8$

plagioclase ..... $(Ca,Na)Al_{2-1}Si_{2-3}O_8$

tourmaline ..... $(Na,Ca)(Li,Mg,Al)(Al,Fe,Mn)_6(BO_3)_3Si_6O_{18}(OH)_2$

turquoise ..... $CuAl_6(PO_4)_4(OH)_8 \cdot 4H_2O$.

Contacts and other important information

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At the end of the trip, and as soon as possible, please send a brief e-mail to Borden Putnam with a copy to Brian Hoal and John Thoms describing your experience on the trip and acknowledging the support of the Society of Economic Geologists. This is very important, as the feedback received by SEG is critical for the planning of future field trip courses. You will also find that maintaining contact in this manner will greatly benefit your career whatever course it may follow. The note may be in your native language.