UNESCO-SEG International Metallogeny Course

(June 17–26, 2002; Quito, Ecuador)

TOPIC: **MINE WASTE MANAGEMENT**

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The 21st meeting of the International Metallogeny Course was held at the Facultad de Ingeniería en Geología, Minas, Petróleo y Ambiental de la Universidad Central del Ecuador (Quito) on June 17–26, 2002. The course, traditionally sponsored by the Society of Economic Geologists and UNESCO, this year also had the generous support of the KFPE agency of the Swiss Agency for Development and Cooperation (SDC), as well as additional financial collaboration of the Instituto Geológico de España and the University of Lausanne, Switzerland. Financial support from these organizations permitted the funding of 25 travel grants (a record number in the history of the course) among the 43 Latin American geologists, mining engineers, chemists, and ecologists coming from universities (17), research institutes and geologic surveys (13), mining companies (1), consultants (5) and students (8) of Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Nicaragua, Peru, and Venezuela who attended the course.

FIGURE 1. Group photo in the Portovelo-Zaruma mining district.

The 2002 meeting—and this was new territory for the course—was completely devoted to the geochemical and geomicrobiological aspects of mine waste management. During the six days of lectures, a broad overview about the environmental problems of mining activities with special focus on the formation, control, and prevention of acid mine drainage was given. The aspects covered in the course included a general introduction to supergene processes (Bill Chávez, New Mexico Institute of Mining and Technology); geomicrobiology and bioremediation (Gordon Southam, University of Western Ontario); aquatic geochemistry, geochemistry of mine waste management, remediation, prevention, and treatment strategies of mine waters (Bernhard Dold, University of Lausanne); the Aznalcóllar tailings dam failure (Julio Arranz, IGME); and the geology and metallogeny of Ecuador (A. Paladines, U. Central Ecuador; W. Bonilla, BIRA S.A.). Presentations by the grant holders and practical exercises (geochemical calculations and the development of mine closure plans) completed the program.

In the four-day-long field trip, practical aspects related to mine waste, including arsenic, cyanide, and mercury contamination, were shown in the Ponce Enriquez and the Portovelo-Zaruma gold mining districts. The whole process, from mine production to ore dressing and tailings disposal, could be illustrated. The MINANCA mine and the SODIREC cyanidation plant were visited. The modern and clean SODIREC plant with its H_2O_2 cyanide-degradation process was in illustrative contrast to the problematic situation along the Río Amarillo and Río La Calera, with their numerous small-scale treatment plants without any environmental control.

The course was, in the opinion of participants and instructors, a great success and has originated a South American network on "Geochemistry on Mine Waste Management" (for additional information, contact Bernhard.Dold@cam.unil.ch).

Further information on this and past meetings of the course can be obtained from the web page, http://www.unige.ch/sciences/terre/mineral/ore/min_ore.html.

· · · from 21 Field Training Course on Sediment-Hosted Zinc Deposits (Continued)

Skorpion mine (24.6 Mt, average 10.6% Zn), with visits to the discovery and other outcrops followed by a visit to the open pit and the core shack. Participants were given the opportunity to sample ore that is hosted by siliciclastic rocks and which consists mainly of smithsonite, sauconite, and hemimorphite. The ore minerals are thought to have formed by the supergene alteration of sediment- and volcanic-hosted sulfide ores, which have been oxidized to a depth of several hundred meters. Lively discussions were held in the open pit and core shack about the timing and genesis of the deposit.

Participants thank SEG and the trip leaders for their time and effort in planning and preparing the course, and both participants and trip leaders would like to thank geologists from Kumba Resources and Skorpion Zinc/Ambase Exploration for their generous hospitality and permission to visit the Rosh Pinah and Skorpion mines. Also, many thanks to Roy Miller (Consultant, Windhoek, Nambia) for the numerous hours spent on organizing the trip.