0170 0057

The Discovery and Geology of the Nighthawk Ridge Deposit at Easy Junior, White Pine County, Nevada

John R. Carden
Echo Bay Exploration
Reno, Nevada

The Nighthawk Ridge deposit at Easy Junior is a sediment-hosted disseminated gold deposit located at the northern end of the Railroad Valley approximately 30 miles southeast of Eureka, Nevada. The orebody lies at the southeast end of the Cortez gold trend in T.15 N., R. 55 E., Section 9, Mt. Diablo Base and Meridian.

At least six companies have explored the property between 1979 and 1986 before Echo Bay (then Tenneco) discovered the deposit, through an extensive rock-chip and soil sampling program. The 39th hole intercepted 320 feet of 0.066 opt Au. The surface projection of the orebody measures at least 350 feet by 2,000 feet. As of February 1988, the preliminary geologic reserve of the Nighthawk Ridge deposit stands at 308,000 ounces of gold. The deposit is currently being developed through a 60-40 joint venture (Alta Bay Joint Venture) with Alta Gold Company being the operator.

The stratigraphy of the property is composed of a series of Upper Devonian through Mississippian carbonate and siliclastic-shale sequences deposited east of the Antler orogenic high. Gold mineralization is primarily hosted in the Chainman Shale and Joana Limestone which are deformed by northeast striking anticlinal folding and repeated by reverse faulting (Figure 1) related to the Antler orogeny.

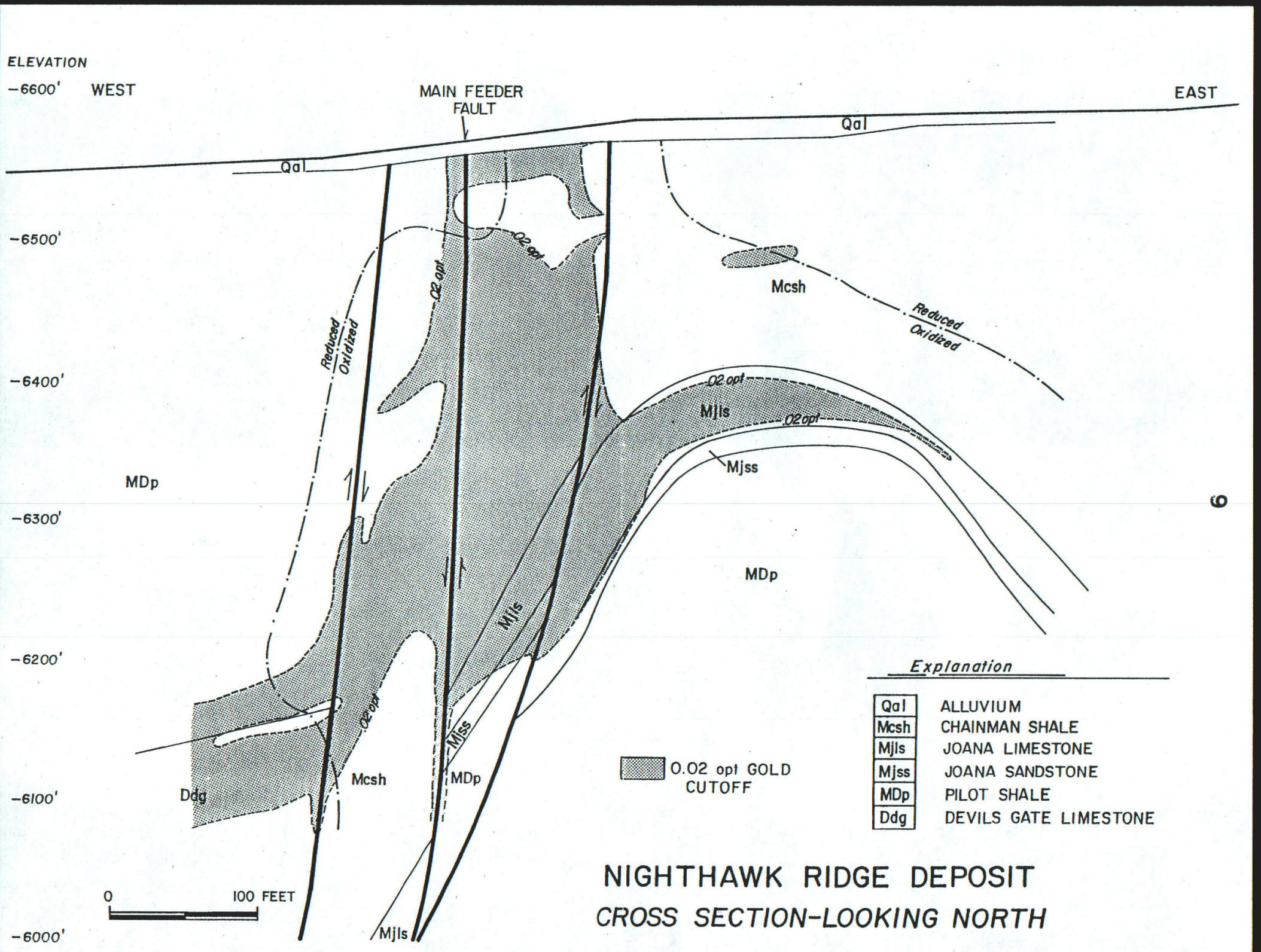
Compressional faults were reactivated by Basin and Range extensional activity at which time auriferous hydrothermal fluids were introduced. Gold mineralization is thickest where the northeast striking feeder fault is offset in a left-lateral en echelon fashion. En echelon faulting was responsible for structurally disrupting the rock and imparting secondary porosity and permeability characteristics to an otherwise tight shale. The Joana Limestone acted as a porous medium and disseminated mineralization mimics the anticlinal fold pattern. To a lesser extent, the Pilot-Devils Gate contact acted as a permissive host environment. Tertiary intrusive or volcanic rocks have not been found anywhere within the vicinity of the Nighthawk Ridge deposit.

The surface expression of the deposit is concealed by a thin veneer of Quaternary gravel. Mineralization and alteration are confined to several small outcrops (40 x 50 feet) exposed by a minor arroyo incising the gravel. The discovery outcrop is a maroon to pale gray liesegang banded silicified Chainman mudstone containing barite with admixed clay and silica on fractures. Limonite is late in the paragenetic sequence, occurring on fractures that cut the liesegang bands. The average elemental content of 32 rock-chip samples collected from the discovery outcrop is 518 ppb gold, 850 ppb mercury, 470 ppm arsenic, and 12.3 ppm thallium. Silver is not important in the system.

Supergene weathering has altered the characteristically black shale to a slightly bleached-tan or buff color at the surface to a depth of approximately 60 feet. However, extreme oxidation and silicification occur when the main feeder fault, which acted as a hydrothermal conduit, is approached. The interface between the oxidized and unoxidized rock is usually razor sharp. Alteration more-or-less conforms to the anticlinal fold of the Joana Limestone east of the feeder fault and forms a core zone that crops out near the northeast striking feeder (Figure 1). Over 90% of the deposit is oxidized which will aid in the overall recovery of the gold from the rock.

Silicification is the primary form of alteration within the deposit. Silicification and liesegang banding occur concomitantly in the Chainman Shale. Hematite is thought to be transported and related to the hydrothermal destruction of diagenetic pyrite within the rock. The Joana Limestone and associated bioclastic debris have undergone ubiquitous jasperization. The jasperoid is characterized by glassy-translucent silica replacement of the original calcium carbonate fabric and commonly displays recurring brecciation. Iron oxides associated with the jasperization process are strongly limonitic particularly near the upper contact of the Joana Limestone and grade downward to hematitic.

Argillization accounts for less than 25% of the alteration within the orebody and is confined to portions of the Chainman and uppermost Pilot Shale. It is caused by the hydrothermal degradation and destruction of diagenetic clay and detrital feldspar and the formation of secondary phyllosilicates.


ELEVATION
-6600'
WEST
MAIN FEEDER FAULT
EAST
Qal
Qal
-6500'
.02 opt
.02 opt
Mcsh
Reduced
Oxidized
Reduced
Oxidized
-6400'
.02 opt
Mjls
.02 opt
Mjss
MDp
-6300'
MDp
Mjls
-6200'
.02 opt
Mjss
Mcsh
MDp
Ddg
-6100'
0
100 FEET
Mjls
-6000'
0.02 opt GOLD CUTOFF
Explanation
Qal ALLUVIUM
Mcsh CHAINMAN SHALE
Mjls JOANA LIMESTONE
Mjss JOANA SANDSTONE
MDp PILOT SHALE
Ddg DEVILS GATE LIMESTONE
NIGHTHAWK RIDGE DEPOSIT
CROSS SECTION-LOOKING NORTH

CALENDAR OF UPCOMING EVENTS

The Society of Engineering & Mineral Exploration Geophysicists is presenting the 2nd annual Symposium on the Application of Geophysics to Engineering and Environmental Problems. The Symposium will be held on March 13-16, 1989, at the Colorado School of Mines in Golden, Colorado.

If you are interested in submitting a technical paper or case history for the Symposium, please send an abstract to:

Ron Bell, SEMEG
c/o BellWest Geoservices
P.O. Box 10845, Edgemont Branch
Golden, CO 80401

U.S. GEOLOGICAL SURVEY 5th ANNUAL V.E. MCKELVEY FORUM ON MINERAL & ENERGY RESOURCES will be held at Bally's Hotel in Reno, Nevada on January 24-27, 1989. Current studies of mineral deposits by the U.S.G.S. in collaboration with academia, industry, and other government agencies will be featured. A workshop on Geophysical Response of Buried Deposits is planned. For information contact Buhler and Abraham, Inc., 8700 First Avenue, Silver Spring, Maryland 20910, (301) 588-4177.

1988 - 1989 GSN OFFICERS

President	Vice-President	Treasurer	Secretary	Membership
Bob Cufney Consultant P.O. Box 2961 Truckee, CA 95734	Bob Schafer Addwest Gold 5301 Longley Lane Reno, NV 89511	Pam Klessig BP Minerals 4600 Kietzke Bldg L #230 Reno, Nv 89502	Jeff Clark Kerr-McGee 980 Greg St. Sparks, NV 89431	Ruth Buffa Consultant 1140 Evans Reno, NV 89512