

## **DONALD G. STRACHAN, Economic Geologist and Hydrogeologist**

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**CAREER SUMMARY:** Senior Economic Geologist – Ongoing 43 years devoted to exploration, development, and some open-pit mining operations with concentration on conception, planning, evaluation, and management of gold, base metals, uranium, and tellurium projects in disseminated, vein, porphyry, massive sulfide and skarn environments in Alaska, Arizona, British Columbia, Colorado, Eritrea, Ethiopia, Idaho, Nevada, Newfoundland, New Mexico, Peru, Turkey, Utah, Washington, Yemen, and the Yukon for individual and corporate clients.

My general goal has been to add value to mineral exploration, developing deposits, and active mines as a consultant. Over the years, an increasingly disciplined, incremental, and phased approach has constantly improved my evaluation, compilation, and collection of geological, geochemical, and geophysical data. My reports to clients have often included new working hypotheses for their projects and recommendations for testing these hypotheses. The goals have always been to start or increase production and profitability.

The following, chronologically ordered, projects are examples where this incremental approach has been implemented.

**SELECTED PROJECTS AND ACTIVITIES SINCE 1995:** Research world-wide for mesothermal and epithermal AuCu deposits, some with Te byproduct potential, including on-ground prospecting and evaluation of numerous North American mineral occurrences and districts, the highlights of which included:

◆ **1995-1996: Seven Troughs - Kamma Range - Jackson Mountains, Nevada** – compiling, mapping, sampling, and developing a geologic and geochemical background to the low-grade gold deposits at Sulfur for owner of Hycroft Mine, Humboldt County, Nevada.

◆ **1996-1998: Gold exploration, Yemen** – planned and carried out a six-month surface geological, satellite photo interpretation and geochemical examination of 342 anomalous Crosta sites within a 40,000 square kilometer license in the central Yemeni highlands on the southern end of the Arabian Peninsula with Yemeni geologists.

◆ **1999 to 2002 – Motherlode Cu and others, McCarthy-Nizina Districts, Alaska** – multi-property valuation of patented claims in the Wrangell-St. Elias region of Alaska. Evaluated, sampled, compiled previous data, developed drill targets when possible, identified potential resources where plausible, and reported to client with recommendations.

◆ **1999 to 2006 - Walker River Basin hydrogeology** – Long-term research focused within the Walker River drainage basin of western Nevada and eastern California. Established environmental criteria

and developed a hydrogeologic model for the Walker Basin. Prepared historical water budgets and modeled them under different scenarios for Smith, Mason, and Campbell valleys, and for Walker Lake using all precipitation, flow, use, storage, and loss factors. Press releases and materials from public talks are available.

◆ **2002 – Altintepe Au deposits, Fatsa, Eastern Pontides, Turkey** – evaluated, mapped, sampled, compiled previous data, developed drill targets based on mapping and AuBi geochemistry, reported to client with recommendations for developing a resource.

◆ **2003 – Fondaway Canyon AuAgW Stillwater, Churchill County, Nevada** – evaluated, planned, mapped, sampled, and reported to client an inferred resource along with a working hypothesis with recommendations for advancing prospect.

◆ **2004 April – HC Carlin Au prospect, Cortez District, Eureka County, Nevada** – evaluated, compiled, mapped, sampled, and reported the results to the client, including a working hypothesis for discovery drilling.

◆ **2004 – Sacramento Basin Natural Gas** – managed, evaluated potential, and completed recommendations for natural gas acquisition, central Tehama County, California, for client.

◆ **2005-2006 Nyac Au prospect, Tintina Belt, SW Alaska** – conceived, planned, and managed a twoyear gold exploration program for Tintina-type, intrusive-related, disseminated gold deposits in the Nyac District of southwest Alaska.

◆ **2007 – Sandstone U, Connors, North Dakota** – managed and evaluated potential in-situ uranium deposits in Paleocene-Oligocene sandstone channels of central North Dakota.

◆ **2007 – Sandstone U, Western Panhandle, Nebraska** – managed, evaluated for acquisition, potential in-situ uranium deposits in Oligocene sandstone channels of northwestern Nebraska.

◆ **2008 March** – field trip to several Mexican districts, including Pinos epithermal AgAu, Minas Francisco Madero Ag (Penoles) Zacatecas, Minas Conception de Oro Au Fresnillo, Penasquito AuAgTeCu, and Minas Charcas ZnPbCuAgAu San Luis Potosi.

◆ **2008 – King Tonopah AgAu and Murray AgAu Lodes, Tonopah District, Nye County, Nevada** - evaluated, compiled, and reported results to the client, including a working hypothesis for rediscovery and development.

◆ **2008 – Central California Motherlode AuTe** – sampled, evaluated, and reported upon numerous vein deposits and workings along the central Motherlode, characterizing byproduct Te potential for client.

◆ **2008 August – Money Knob Au, Livengood, Alaska** – sampled, evaluated, and reported upon gold-bearing pyritic black shales and phyllites during International Tower Hill's early-stage drilling program. Client's emphasis included byproduct Te assessment. Not geologically comparable to Donlin Creek Au, Nyac Au, Fort Knox Au or Pogo Au, but some similarities to Chandalar Au and Ketza River Au.

◆ **2008 August – Ketz River Au, Yukon** – sampled, evaluated, and reported upon gold-bearing pyritic and arsenical black phyllites at the developing Ketz River property. Client’s emphasis included byproduct Te assessment.

◆ **2008 September – Beaverbrook Sb Mine, near Springdale, northern Newfoundland** – assayed, evaluated, and reported upon production samples of epithermal quartz-dolomite-stibnite vein. Client’s emphasis included byproduct Te assessment.

◆ **2008 September – Ming CuAuPbZnAg mine, Baie Verte, northern Newfoundland** - sampled, evaluated, and reported upon the Ming underground volcanogenic massive sulfide deposit. Client’s emphasis included byproduct Te assessment.

◆ **2008 September – Nugget Pond Au mine and mill, Snooks Arm, Newfoundland** - sampled, evaluated, and reported upon the Nugget Pond mineralization exposed in the open pit, and also included piles of ore from the Nalunaq Mine, Greenland. Client’s emphasis included byproduct Te assessment.

◆ **2008 September - Pine Cove Au Mine, Baie Verte, Newfoundland** - sampled, evaluated, and reported upon the Pine Cover mineralization. Client’s emphasis included byproduct Te assessment.

◆ **2009 and 2010 – Darwin ZnAgPbWAu mine, Inyo County, California** – mapped, sampled, evaluated, and reported upon underground and surface outcrops, and historical geologic and geochemical data, from Defiance and Thompson breccia pipes and replacements, and oxidized Zn mantos(?). Client’s emphasis included byproduct Te assessment.

◆ **2009 June – Gibraltar Cu mine, Cariboo Mining Division, British Columbia** – sampled, evaluated, and reported upon the geology and mineralization of Taseko’s open pit Gibraltar Mine. Client’s emphasis included byproduct Te assessment.

◆ **2009 June – Mount Polley CuAu mine, Cariboo Mining Division, British Columbia** – sampled, evaluated, and reported upon the geology and mineralization of Imperial Metal’s open pit Mt Polley CuAu mine. Client’s emphasis included byproduct Te assessment.

◆ **2009 July – QR Au, Cariboo Mining Division, British Columbia** – sampled, evaluated, and reported upon the geology and mineralization of what is now Barkerville Gold Mine’s underground QR Au skarn mine and mill. Client’s emphasis included byproduct Te assessment.

◆ **2009 July – Spanish Mountain Au, Cariboo Mining Division, British Columbia** – sampled, evaluated, and reported upon the geology and mineralization of what is now Spanish Mountain Gold Ltd.’s open pit Au deposit in carbonaceous sediments and volcanoclastics. Client’s emphasis included byproduct Te assessment.

◆ **2010 – Revenue-Nucleus AuCuAgTe porphyry and Mechanic-Revenue AuTe placer, Mt. Freegold District, Dawson Range, Yukon** – evaluated Northern Freegold’s company data, mapped and sampled outcrops, inspected core, and reported upon on the Revenue-Nucleus porphyry deposit separately from gathering assay and spatial data on the Mechanic-Revenue placer deposit owned by the Gow family. Client’s emphasis included byproduct Te assessment. Northern Freegold was continuing to

expand the Revenue-Nucleus indicated and inferred resource of 5,000,000 oz. Au-equivalent stated in January 2012.

◆ **2010 – Sonora Gulch CuAuAgMo porphyry and Sonora Paleochannel AuTe, Hayes Creek, Dawson Range, Yukon** – evaluated Northern Tiger’s company data, mapped and sampled outcrops, inspected core, and reported upon on their Sonora Gulch porphyry deposit separately from gathering assay and spatial data on the Sonora Paleochannel placer deposit owned by the Wilson family. Client’s emphasis included byproduct Te assessment.

◆ **2010 – Casino CuAu porphyry, west-central Yukon** – evaluated Western Copper’s company data, examined and sampled core, and reported upon their Casino CuAu porphyry deposit. Client’s emphasis included byproduct Te assessment. Western Copper is adequately funded and expects to complete feasibility study in 2012.

◆ **2010 into 2014 – Tonopah Divide Au district, Esmeralda County, Nevada** – continual evaluation of corporate partner’s mapping, soil grid and rock-chip sampling, geophysical, and multiple drillhole program in Tertiary caldera-related, disseminated and vein district.

◆ **2011 February – Chipmo AuAgTe Orcopampa District, Peru** – sampled, evaluated, and compared Chipmo vein mineralization with other AuAgTe veins seen previously in AK, BC, NV, and YT. Chipmo in full production.

◆ **2011 – Big Hammer Au prospect, Skeena Mining Division, British Columbia** – managed district-wide exploration team and drill crews, and mapped, sampled and evaluated outcrops. Partially completed Phase Two surface and drilling program in a gold district with Pogo-style structure, alteration, mineralization, and geochemical characteristics. Awaiting funding from client to complete.

◆ **2011 – Chandalar Au district, Brooks Range, Alaska** – managed district-wide exploration team and drill crews, and mapped, sampled and evaluated outcrops. Partially completed Phase Two surface and drilling hardrock exploration program in a gold district with very large glacial-associated gold placers as well as wide-spread lode and disseminated gold in Devonian-aged sedimentary rocks. Client embarked upon a projected 25-year placer mining scenario beginning in 2012.

◆ **2011 – Deer Horn AuAgTeW, Omenica Mining Division, British Columbia** – sampled and evaluated outcrops, and participated in, modified, and further developed logging procedures for a gold-silvertellurium-tungsten vein exploration project. Development awaits favorable investment climate.

◆ **2012 March – Western Turkey Au field trip**: toured and inspected Hilaga Au Deposit (Teck), Ovachik Au Mine (KozaGold), Efemcukuru Au Mine (Tuprag-El Dorado), Kisladag Au Mine (Tuprag-El Dorado), and Akarca Au Deposit (Eurasian).

◆ **2012 into 2018 - Marietta CuAu district, Mineral County, Nevada** – managing district-wide exploration team, and mapped, sampled and evaluated outcrops. Identified three targets of exploration interest to date, conducted initial surface evaluations for the first and second targets, and completed Phase One geological, geophysical, and geochemical surface evaluation of the first target. Initiated and completed Phases Two, Three, and Four surface and drill programs of the second target in 2013, 2014,

2017 and 2018, with several drill intercepts of discovery-grade, thickness, and depth. Deposit is characterized as primary CuOx intercepts within an IOCG deposit. Numerous status and professional-grade reports issued.

◆ **2012 – Undisclosed caldera-related U district, Siberia, Russia** – evaluated existing data for owners and recommended management relationship for Phase One exploration program with subcontractors.

◆ **2012 – Undisclosed bulk-mineable Au district, Siberia, Russia** – evaluated geologic character of all surface and drill data developed since 1940's to ensure multimillion ounce gold deposit has been properly and completely considered. Structural, stratigraphic, alteration, and mineralogic components identified and projections made, discussed, compared with other Siberian and Alaskan-Yukon districts, and recommendations offered.

◆ **2012 into 2013 – Ellendale Au district, Nye County, Nevada** – multi-month mapping, soil grid and rock-chip sampling, and drill target evaluation in Tertiary volcanic-volcaniclastic-shallow intrusive district.

◆ **2013 into 2014 – Golden Elk Au, Piedmont, Virginia** – mapped, soil grid and rock-chip sampled, and developed drill targets in formerly-producing mesothermal vein system.

◆ **2013 into 2014 – Undisclosed Au, Lucky Boy District, Mineral County, Nevada** – mapped, soil grid and rock-chip sampled, and developed drill targets, intrusive-related early Tertiary(?) Au-As-Bi shears and bedded replacements in Triassic sediments and volcanoclastics.

◆ **2013 into 2014 – Tonopah Divide Au district, Esmeralda County, Nevada** –

◆ **2013 - Monarch Au prospect, Douglas County, Nevada** – mapped, rock-chip sampled, and developed drill targets in mesothermal vein system.

◆ **2015 - Pamlico Au district, Mineral County, Nevada** – evaluated and field-checked existing data, and issued a summary report with recommendations.

◆ **2016 – Wilson Au prospects, Comstock AuAg district, Storey and Lyon County, Nevada** – evaluated and field-checked existing data, and issued a summary report with recommendations.

◆ **2016 – Majuba Hill AuCu prospect, Pershing County, Nevada** – evaluated and field-checked existing data, and issued a summary report with recommendations.

◆ **2017 – Penelas and HRA Au prospects, Nye County, Nevada** – drilled, logged, evaluated assays, and issued preliminary reports.

#### EXPERIENCE SUMMARY

1974-1986: Economic Geologist. Western United States. Precious metals, uranium, and base metals in Tertiary, Mesozoic, Paleozoic, and Precambrian rocks. Managed exploration-deposit development of Borealis Gold District, including discovery of five additional economic gold deposits (1980-1983). Discovered a Jurassic sedimentary uranium deposit in 1977. Employers: Bear Creek Mining

Company and Duval Inc.-Tucson AZ (1974-1975), Houston Oil and Minerals Inc. - Denver CO (1976-1983), and St. Joe Minerals Inc. - Tucson, AZ (1984- 1986).

2004 - Natural gas exploration: Tehema County, California

1997 – 2004 Hydrogeology: Research in the Truckee, Carson, and concentrated in the Walker drainages of the western Great Basin. Established environmental criteria and a hydrogeologic model of the Walker River Basin. Prepared historical and projected water budgets under different scenarios for Mason Valley, Campbell Valley, Walker Lake, and in general for the Walker River Basin using precipitation, flow, use, storage, and loss factors. Press releases and materials from public talks are available.

1987-2018: Economic Geologist and Hydrogeologist. Economic Geology: Mine and exploration geology of gold, tellurium, uranium and base metals using surface mapping, GIS, geochemistry, geophysics, and drilling for mining and environmental purposes. Evaluated deposits and prospects in disseminated, vein, porphyry, massive sulfide and skarn environments in Nevada, Alaska, British Columbia, Yukon, Peru, Newfoundland, Turkey, Yemen, Eritrea, Ethiopia, New Mexico, Arizona, Utah, Colorado, Idaho, and Washington for individual and corporate clients.

PUBLICATIONS: ♦ 1981 - Geochemical Prospecting for Borealis-type Gold Deposits (abst.): GSA 1981, Hermosillo, Mexico. ♦ 1982 - Geology of the Borealis Gold Deposit (abstract): SEG 1982 New Orleans, Louisiana. ♦ 1985 - Geologic Discussion of the Borealis Gold Deposit: in USGS Bulletin 1646, pp. 89-94. ♦ 1991 - Economic Copper-Gold Potential, Orogrande District, Otero Co., NM (abstract): GSA Rocky Mountain Section Meeting, Albuquerque, New Mexico. ♦ 1994 - Geology Boss Gold Mine, Gilbert District, Esmeralda Co., NV: Econ. Geol. v. 89, p. 1176-1182. ♦ 1998 - Alteration & gold potential, W. Yemen's Rift Volcanics: IMA98, Toronto, poster session co-author. ♦ 2003 - Geochemistry of epithermal volcanic districts, western Yemen: abstract Nov GSA Seattle.

PROFESSIONAL ORGANIZATIONS: ♦ Certified Professional Geologist (CPG #10376) – American Institute of Professional Geologists. ♦ Fellow – Geologic Association of Canada. ♦ Member – Society of Economic Geologists. ♦ Member – Geologic Society of Nevada. ♦ Member – Nevada Petroleum and Geothermal Society. ♦ Member – Sacramento Petroleum Association.

DEGREES: Master of Science, Geology 1976 from New Mexico Institute of Mining and Technology, Socorro. Bachelor of Arts, Geology 1973 from California State University, Fresno.

PERSONAL: Born in San Francisco, 1946. Member of Grace Community Church, Minden, Nevada. Military: Honorable Discharge - U.S. Navy Submarine Service. Family: Married with seven children.