Consulting Geophysicist (Potential Fields): Ian Stewart Ph.D.

Location: Adelaide

- Ian Stewart is an independent Mining, Oil & Energy Professional with over 40 years international experience. Ian is highly experienced in Gravity and Magnetics and has worked in most other potential field methods. Ian operates Stewart Geophysical Consultants Pty Ltd.

IAN'S EMPLOYMENT AND QUALIFICATIONS:

EMPLOYMENT:

1968-1971. Part-time demonstrator in the Department of Physics, University of Adelaide, involving teaching at the first and second year levels.

April-December 1972. Full-time demonstrator in Exploration Geophysics in the Department of Economic Geology, University of Adelaide. Research was also carried out in earthquake seismology and exploration geophysics (aeromagnetic data analysis).

1973 to June 1974. CSIRO Post-Doctoral Fellow, undertaking aeromagnetic research with Professor D.M. Boyd in the Department of Economic Geology, University of Adelaide. Supervision of Honours Geophysics Students' research projects and lecturing in seismic methods was also carried out during this period.

September 1974 to August 1979. Assistant Professor in the Department of Physics, Memorial University of Newfoundland. Tenure obtained in 1978.

September 1979 to March 1982. Associate Professor in the Department of Physics, Memorial University of Newfoundland.

September 1980 to July 1981. Sabbatical leave at the Department of Economic Geology, University of Adelaide, and at the Pacific Geoscience Centre, Sidney, British Columbia.

April to August 1982. Associate Professor in the Department of Earth Sciences, Memorial University of Newfoundland.

From 1973 to 1982, consulting work was also carried out in the interpretation of aeromagnetic and seismic survey data, and in the estimation of earthquake risk.

Prior to 1982, extensive work was carried out on the construction, operation and maintenance of seismograph stations and portable field systems for earthquake seismology. Teaching at Memorial University included undergraduate and graduate courses in whole Earth and exploration geophysics (magnetic, gravity, seismic and electrical methods), and introductions to geophysical data processing and interpretation.

September 1982 to January 1984. Research Geophysicist with the Arabian American Oil Company (ARAMCO, now Saudi Aramco), Dhahran, Saudi Arabia, in the Special Projects group of the Exploration Research and Development Section.

February 1984 to August 1994. Supervisor of the Gravity and Magnetics group of the Geophysical Department, Exploration, Saudi Aramco, Dhahran, Saudi Arabia.

September 1994 to August 1996. Geophysical Specialist in the Research and Development Division of the Geophysical Department, Saudi Aramco. In addition to integrating seismic and potential field techniques, expertise was also provided for all potential field activities, including software development, survey planning and interpretation.

November 1996 to December 1998. Consulting geophysicist (Stewart Geophysical Consultants Pty. Ltd.) undertaking full-time work for Normandy Exploration Ltd. in Adelaide, South Australia. This included the development of new techniques for processing, enhancing and displaying potential field, resistivity and borehole magnetic data, as well as methods for data analysis in gold exploration. A considerable amount of software was written to run on PC platforms.

January 1999 to 2001. Independent consultant, where recent work has included the development and application of improved methods for processing and interpreting potential field and radiometric data, for both mineral and petroleum exploration. Planning and processing of gravity surveys have also been carried out, and gravity data have been used for inversion studies and basin analyses. Numerous large aeromagnetic surveys have been reprocessed and integrated for both local and regional studies. Automated proprietary procedures for depth analysis and for kimberlite detection have also been applied to areas within Australia and elsewhere. Software development is continuing.

2001 to 2003. Consultant to the Saudi Geological Survey on the compilation of data for a geophysical atlas. The reprocessing and analysis of existing magnetic and other data for much of Saudi Arabia as well as Yemen was also undertaken.

July 2003 to March 2013. Geophysical Technical Adviser to the Saudi Geological Survey in Jeddah in addition to normal consulting work. Within the National Centre for Earthquakes and Volcanoes technical expertise has been provided in many aspects of geophysics for mineral, hydrology, hazard and engineering projects, including planning and supervising field work, analysing data, preparation of reports, and training geophysicists. Studies in earthquake seismology have included the analysis of seismic hazard and regional variations in crustal structure.

Exploration projects have included the initiation, planning, execution and supervision of field surveys using non-seismic methods, including gravity (both onshore and offshore), aeromagnetic, electrical and magnetotelluric

techniques. This has involved familiarity with all phases of the potential fieldwork, from data acquisition through to the interpretation. While with Aramco, development of techniques and programs for the display and analysis of potential field data to assist in regional and more detailed interpretation was also undertaken, including interactive 2D and 3D modelling. Other work involved the study of deep sedimentary and basement structure in Saudi Arabia using non-seismic methods. Image enhancement procedures applied to potential field data were developed and employed in studies of regional structure. Regional interpretation projects in Saudi Arabia were also undertaken in conjunction with the U.S. Geological Survey.

Recent development work has concerned procedures for processing, integrating, enhancing and interpreting gravity, magnetic, radiometric and resistivity data. Development of data analysis techniques in earthquake seismology has also continued. This has included most of the Fortran software used in research projects and routine potential fieldwork.

MEMBERSHIPS OF PROFESSIONAL ORGANISATIONS:

Seismological Society of America
Society of Exploration Geophysicists
American Geophysical Union
International Association for Mathematical Geosciences
Geological Society of Australia
Geological Association of Canada
Australian Society of Exploration Geophysicists

PUBLICATIONS:

48 refereed papers and Saudi Geological Survey reports, excluding theses, seminars, conference abstracts and poster presentations, or numerous internal company reports and reports prepared as part of consulting work. Most of the work carried out for Saudi Aramco and other companies has involved proprietary data and hence could not be published.

CLIENTS include:

Forest Oil Corporation
Origin Energy Resources
Normandy Exploration
Saudi Geological Survey
Adelaide Resources
Newmont Mining Corporation
Gympie Eldorado Gold Mines
Essential Petroleum
Sons of Gwalia
Haines Surveys
Arc Energy Ltd.
Moly Mines Ltd.
Iluka Resources
Pitt Research

Oxiana Golden Grove
Territory Iron Ltd.
Ashburton Minerals
Beach Petroleum
St. Barbara Limited
Resource Potentials
FerrAus Limited
Mt. Gibson Iron
Flinders Diamonds
Flinders Mines Ltd.
Flinders Iron
Savannah Exploration
Western Warrior Resources
Gondwana Resources Limited
Rift Channel Madagascar SARL
Macarthur Minerals Ltd.
Desert Minerals (Zambia) Ltd.
Duration Gold Zimbabwe Ltd.
OM (Manganese) Ltd.
Shaw River Resources Ltd.
Asia Pacific Exploration Consolidated
Venus Metals Corporation
Vector Research
First Quantum Minerals
Alecto Minerals
Monax Mining

Through Pitt Research, Vector Research and Haines Surveys work has also been done for BHP, UTS, DeBeers, Pilbara Manganese, Lakes Oil, government surveys, and numerous other companies.

EDUCATION:

Primary and secondary schooling received in the U.K., South Africa, N.Rhodesia, S.Rhodesia and Australia.

TERTIARY EDUCATION:

1964-1967. University of Adelaide, South Australia. Undergraduate, majoring in Physics. B.Sc. (Hons.) awarded in 1968.

1968-1972. Postgraduate studies in Department of Physics, University of Adelaide. Thesis topic in seismology "Microearthquakes and tectonics of South Australia". Ph.D. completed April 1972, awarded 1973.

PUBLICATIONS (1993 onwards only):

Johnson, P.R. & Stewart, I.C.F. 1993. Magnetic anomalies and basement structure in Central Arabia. Saudi Arabian Directorate General of Mineral Resources Open-File Report USGS-OF-93-5, 29 pp.

Stewart, I.C.F. & Johnson, P.R. 1994. Satellite gravity and Red Sea tectonics. Saudi Arabian Deputy Ministry for Mineral Resources Open-File Report USGS-OF-94-10 (IR-877), 22 pp.

Johnson, P.R. & Stewart, I.C.F. 1995. Magnetically inferred basement structure in central Saudi Arabia. Tectonophysics, vol. 245, 37-52.

Stewart, I.C.F., Connally, T.C. & Copley, J.H. 1996. Stratigraphic interpretation of magnetotelluric data in central Saudi Arabia. GeoArabia: Middle East Petroleum Geosciences, vol. 1 (No. 1), 52-63.

Jeffery, R.W., Stewart, I.C.F. & Alexander, D.W. 1996. Geostatistical estimation of depth conversion velocity using well control and gravity data. First Break, vol. 14 (No. 8), 313-320.

Johnson, P.R. & Stewart, I.C.F. 1996. Comment on “Early Precambrian gneiss terranes and Pan-African island arcs in Yemen: Crustal accretion of the eastern Arabian shield”, by Windley et al. (1996). Geology, vol. 24, 1055-1056.

Stewart, I.C.F. & Deuter, M.J. 2001. Spectral depth analysis of the Merlinleigh Sub-Basin using potential field data. Aust. Soc. Explor. Geophysicists Conference, August 2001, Brisbane. Extended Abstracts, 4 p.

Stewart, I.C.F., Dickson, B.L., Taylor, G.M., Deuter, M.J., Annells, R.J. & Mulready, J.N. 2002. Coincidence of radiometric anomaly with surface petroleum near Sale, East Gippsland, Victoria. Petroleum Exploration Society of Australia J., no. 29, 7-13.

Zahran, H.M., Stewart, I.C.F., Johnson, P.R. & Basahel, M.H. 2003. Aeromagnetic-anomaly maps of central and western Saudi Arabia. Scale 1:2 million. Saudi Geological Survey Open-File Report SGS-OF-2002-8, 6 p., 4 plates.

Stewart, I.C.F., Johnson, P.R. & Zahran, H. 2004. A new synoptic aeromagnetic view of the Arabian Shield. Fresh data with structural and tectonic implications. 32nd International Geological Congress, Florence, Italy, August 2004. Poster presentation.

Stewart, I.C.F. 2006. Earthquake occurrence in the Haradh area, eastern Saudi Arabia: Correlation with gravity data. Saudi Geological Survey Data-File Report SGS-DF-2006-3, 9 p., 6 figs.

Stewart, I.C.F. 2006. Gamma-ray exposure measurements in the vicinity of Jabal Hadb ash Sharar and Jabal Sayid. Saudi Geological Survey Data-File Report SGS-DF-2006-7, 13 p., 8 figs., 2 tables.

Stewart, I.C.F. & Zahran, H.M. 2006. Gamma-ray exposure maps from airborne spectrometric data, Kingdom of Saudi Arabia. Saudi Geological Survey Open-File Report SGS-OF-2006-9, 60 p., 40 figs., 3 tables.

Stewart, I.C.F. & Johnson, P.R. 2007. Spectral analysis of aeromagnetic data over the Precambrian shield and Phanerozoic cover rocks, Kingdom of Saudi Arabia. Saudi Geological Survey Technical Report SGS-TR-2007-2, 33 p., 26 figs.

Stewart, I.C.F. 2007. Earthquake risk in western Saudi Arabia and the Red Sea from seismic moment. Saudi Geological Survey Technical Report SGS-TR-2007-4, 41 p., 32 figs.

Shehata, W., Roobol, M.J., Stewart, I., Khiyami, H., al-Adwani, A., Sayed, S., Qadi, K., Tarabolsi, Y. & al Ahmadi, K. 2008. Evaluation of subsidence hazard in the al Khafji area. Saudi Geological Survey Confidential Report (3 volumes: Text, Appendices and Plates).

Hashem, H.I., Stewart, I.C.F., al Ashy, E.A., al Zahrani, I.S. & al-Theeban, M.A. 2008. Natural background radiation map of the Kingdom of Saudi Arabia. Saudi Geological Survey Confidential Report SGS-CR-2008-2, 9 p., 4 figs., 6 tables, 3 plates.

Roobol, M.J. & Stewart, I.C.F. 2009. Cenozoic faults and recent seismicity in northwest Saudi Arabia and the Gulf of Aqaba region. Saudi Geological Survey Technical Report SGS-TR-2008-7, 35 p., 35 figs., 2 apps., 10 plates.

Roobol, M.J. & Stewart, I.C.F. 2010. Cenozoic faults in northwest Saudi Arabia and the Gulf of Aqaba region. In: Pease, V., Kadi, K.A. & Kozdroj, W., 2010. JEBEL Project October 2009 field excursion to the Midyan terrane, Kingdom of Saudi Arabia with reports on research by participants of the JEBEL Project: Saudi Geological Survey Technical Report SGS-TR-2010-2, 95 p.

Pallister, J.S., McCausland, W.A., Jónsson, S., Lu, Z., Zahran, H.M., El Hadidy, S., Aburukbah, A., Stewart, I.C.F., Lundgren, P.R., White, R.A. & Moufti, M.R.H. 2010. Broad accommodation of rift-related extension recorded by dike intrusion in Saudi Arabia. Nature Geoscience, vol. 3, 705-712: DOI 10.1038/NGEO966, 8 p, with supplementary information, 5 p.