

Minerals and petroleum in Northern Ireland

A rich heritage

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Geological Survey of Northern Ireland

Northern Ireland is unlike the rest of the United Kingdom in many respects. One difference is that its minerals are state owned, whereas in Great Britain the majority of minerals remain in private ownership. The Mineral Development Act (Northern Ireland) 1969 vested mineral rights in what has become the Northern Ireland Department of Enterprise Trade & Investment (DETI). While there are some necessary exceptions to the range of minerals covered (gold is owned by the Crown Estates and private construction companies own the aggregates quarries), the benefit of this legislation is that explorers can gain exclusive licences for cost-effective exploration over large tracts of country. At the same time the licensing regime protects the rights of citizens and the original mineral owners. The DETI is also the licensing and regulatory body for onshore oil and gas exploration in Northern Ireland, and this activity is covered by separate legislation.

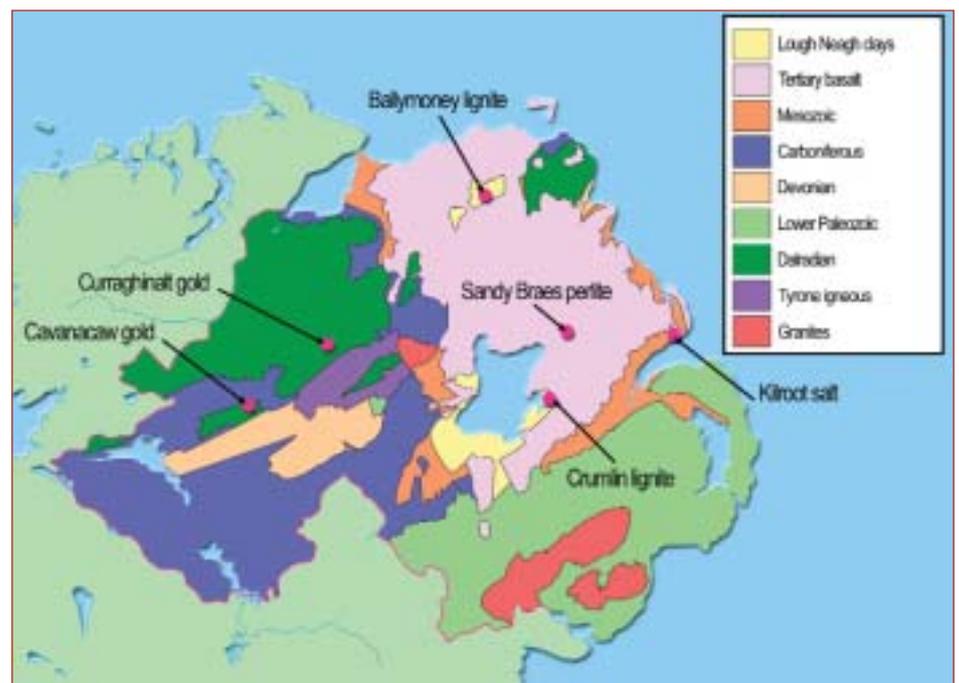
Since 1947, the BGS and the government of Northern Ireland have co-operated to provide a geological survey organisation. This arrangement was formalised by the Minerals (Miscellaneous Provisions) Act (Northern Ireland) 1959, which established the Geological Survey of Northern Ireland (GSNI) as an integral part of the then Ministry of Commerce (now DETI). The BGS and its predecessors provided the staff and

expert back-up needed. In particular, GSNI staff have been closely involved with the regulatory officials in the DETI to assess the technical aspects of new exploration proposals and monitor the work of all mineral and hydrocarbon exploration companies in Northern Ireland. As part of its role, the DETI (assisted by GSNI staff) promotes inward investment into the minerals and hydrocarbon resources of the province.

Northern Ireland has a diverse geology and a correspondingly varied mineral heritage. Over 2000 abandoned mine workings, most dating from the 19th and early 20th centuries, are known throughout the province. These were mostly for iron ore, coal, lead and salt. In recent decades, prospectors have been rewarded with discoveries of potentially economic deposits of lignite, gold, and a variety of industrial minerals. GSNI information has underpinned all of these discoveries.

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In 1976, the GSNI published a geochemical survey and appraisal of the mineral potential of the Sperrin Mountains in County Tyrone. This included a new map of alluvial gold distribution, although at that time gold exploration had not been considered anywhere in Ireland. In the early 1980s the international gold price rose dramatically. The international mining industry realised that mineralised quartz veins in



Geological map of Northern Ireland.

the Dalradian metamorphic rocks of Ireland resembled those in the famous gold camps of Canada. Based on the GSNI surveys, County Tyrone experienced an upsurge in exploration activity. Ulster Minerals Ltd discovered the Curraghinalt deposit with a minimum of about 500 000 ounces contained gold and Riofinex discovered a similar deposit at Cavanacaw. The DETI has continued to fund geochemical and geological surveys, the results of which clearly show the potential for further discoveries.

When fuel prices rose in the early 1980s, detailed analyses of the GSNI Borehole Database and geological maps directed prospectors to the area around Crumlin on the east shore of Lough Neagh where they discovered three mineable lignite seams between 11 and 63 metres thick. In 1981, a recently retired Director of the GSNI, Harry Wilson, was called in to examine an unusual report from water well drillers near Ballymoney, County Antrim. He identified over 70 metres thickness of lignite. This discovery initiated drilling programmes around Ballymoney and east Tyrone. The DETI subsequently licensed the ground to exploration companies and Northern Ireland's measured lignite resource now stands at over a billion tonnes of low sulphur, high-quality brown coal. Ballymoney Power Ltd have recently announced their intention to develop the Ballymoney deposit with a new mine and power station.

To assist hydrocarbon exploration, the GSNI make available the results of specialist reservoir, geophysical geochemical and biostratigraphical studies, together with exploration data released from old licences. Since 1965 a total of 14 exploration wells have been drilled and, although there has been no commercial production yet, several significant gas shows have been encountered. There are two main plays onshore in Northern Ireland — the Northwest Irish Carboniferous Basin and the concealed basins beneath the Antrim Plateau.

The Northwest Irish Carboniferous Basin straddles counties Fermanagh and Tyrone in Northern Ireland, and Cavan, Leitrim and Sligo in the Republic of Ireland. It has been the focus for renewed exploration in recent years.



Trenching and drilling of a gold prospect in South Armagh during recent exploration by Conroy Diamonds and Gold.

Evergreen Resources Inc. has recently adapted the drilling and production techniques they use successfully in Colorado to fracture and test the low-permeability 'tight gas sandstone' reservoirs in Fermanagh.

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Carboniferous-sourced oil and gas may be trapped in Permo-Triassic sandstone reservoirs in the concealed basins beneath the Antrim Plateau. The major obstacle to exploration here is the thick cover of up to 800 metres of hard Palaeogene basalt, and conventional seismic reflection methods have so far produced only poor imaging of the underlying geological structure. The best available approach involves the integration of different geophysical and geological exploration data; the GSNI commissioned the BGS to produce a Geophysical Image Atlas based on gravity and aeromagnetic data. This atlas includes a suite of colour and grey-scale

shaded-relief images processed to illustrate both major and subtle features related to deep geological structure. Combined 2.5- and 3-dimensional gravity and magnetic models can be compared with the seismic data and used to refine the geological interpretation.

Despite the wide range and large number of mineral occurrences discovered in Northern Ireland, only a restricted range, mostly aggregate and rock salt, are actually worked at present. Compared to other regions in western Europe, Northern Ireland is relatively under-explored. The reasons are mainly non-geological and relate to political and economic conditions. One reason is the civil unrest over the past three decades. The images broadcast in television news programmes deterred some overseas investors, although licensees working in the province continued with their exploration. However, as the situation improves and as modern exploration technology is increasingly applied, it is very likely that new economic discoveries will be made. Experience shows that a new economic cycle will begin and, with a rise in commodity values, exploration activity will increase. The Geological Survey will always be the first port of call for prospectors coming to Northern Ireland.