

MINFO

GLANGEVLIN GYPSUM DEPOSIT

INTRODUCTION

The Glangevlin gypsum deposit occurs in Prospecting Licence (PL) 2965. An in-situ resource estimate of 14.8Mt and a recoverable resource estimate of 8Mt grading 78.1% gypsum, 8.3% anhydrite, 8% CaCO₃, 0.05% NaCl and 3.8% insolubles has been calculated for the deposit.

LOCATION

PL 2965 covers an area of approximately 28.38 sq kms in the north western extremity of Co. Cavan. A portion of the northern boundary of the PL coincides with the border between the Republic and Northern Ireland (Fig. 1). The River Shannon rises within the PL and flows in a SW direction through the area. The Glangevlin gypsum deposit itself is sited in an enclosed glacial 'U' shaped valley which is bordered by high ground to the south and north. The valley floor is of undulating glacial till with drumlin features rising to several hundred metres. At its lowest point the site is approximately 80m above sea level, rising to 120m at the top of the higher drumlins. The impermeable nature of the boulder clay tends to render the site rather wet. The Owenmore, a tributary of the Shannon, runs through the deposit. At its widest point the river is approximately 15m. This river is fed by a series of smaller streams, many seasonal. Within the deposit area there are some small ponds and lakes, the largest being Drumhurrin Lough.

PL	County	6" Sheet	Area
2965	Cavan	3,4,5,6	28.38sq kms

PREVIOUS LICENSEES/OPERATORS

The Ambassador Irish Oil Company, Continental Oil Company of Ireland and Marathon Petroleum Ireland Ltd. jointly held PL 301, which includes areas covered by PL 2965 from 1963 - 1964. No exploration was conducted in this area during the period 1964 -1981. In 1981 the licence area was redefined and issued as PL 2965 to W.W. Wakefield Ltd. In 1983 North West Exploration Plc. took over operation of the PL until 1990, when their interest was assigned to National Gypsum Ltd who held the PL until 1995.

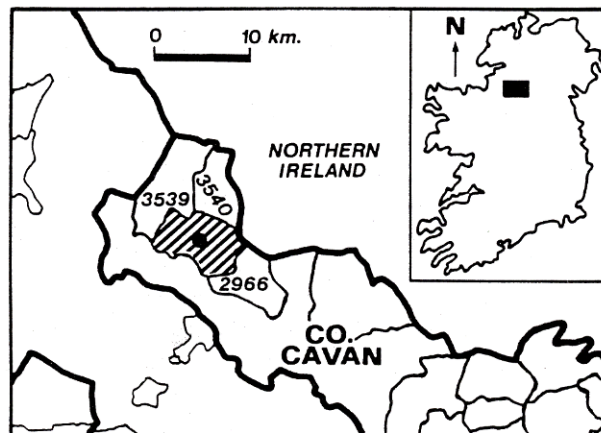


FIGURE 1. Map showing location of PL 2965 (shaded). Position of deposit marked.

TARGET

The Glangevlin gypsum deposit consists of three shallowdipping tabular beds of gypsum in Lower Carboniferous sediments which underlie at least 30m of Pleistocene sediments.

GEOLOGICAL SETTING

Information concerning the geology, geological cross section and stratigraphic sequence has been compiled from exploration data submitted by the licensees and the publication by Grennan (1992). The geology of the area consists of marine sedimentary strata of Carboniferous age, shallow dipping and gently folded, overlain by Pleistocene sediments (Fig.2). The gypsum beds, which do not outcrop, occur in the Meenymore Formation which is composed primarily of calcareous mudstones, siltstones interbedded with muddy limestones and calcareous sandstones of Asbian - Brigantian age. The gypsum occurs at the base of this Formation in three separate beds. Overlying the Meenymore Formation are the Glenade Sandstones, medium to coarse clean sandstones with some thin mudstone horizons towards the base. Beneath the Meenymore Formation and underlying the gypsum beds is the Dartry Limestone, a calcarenite with argillaceous limestone or highly



calcareous mudstone in the immediate footwall to the Lower Gypsum Bed. The lithologies present in the Meenymore Formation, which is gently folded into an anticline with minor faulting, reflect its near-shore depositional environment. They include mudstones, siltstones, sandstones, dolomites, limestones and evaporites (the gypsum beds). Within these lithologies three types of limestone are represented : medium grey argillaceous limestone, pale to medium grey pure limestones and a very distinctive striped limestone. The 'striped limestones' consist of thinly bedded pale grey algal limestones separated by thin laminae of dark shale. In places the shale contains up to 50% pyrite. Locally the limestones may be dolomitized. This lithology both overlies and interdigitates with the gypsum beds. In the deposit area dips are generally SW and strike NW. The deposit has been interpreted as being on the westerly flank of a small anticline which plunges NNW. Six faults occur in the neighbourhood of the deposit, three of which lie at the margins of the reserves while the other three partially intersect them. These faults appear to be near vertical hinge faults associated with the anticlinal folding, being either perpendicular or at approx. 45° to the fold axis. Throws vary from 6m to in excess of 50m.

Succession	Thickness (m)
PLEISTOCENE	0-34
CARBONIFEROUS	
Glenade Sandstone	95
Meenymore Formation	57
Dartry Limestone	> 60

FIGURE 2. Outline stratigraphy of the area (after Grennan 1992 and exploration data).

MINERALISATION

Gypsum occurs as a grey to white translucent coarse grained equiangular crystalline mineral comprising up to 90% of the evaporite beds of the Meenymore Formation. Since these beds generally consist of in excess of 70% gypsum, they have been termed gypsum beds. The gypsum has been altered in places to anhydrite and contains occasional bands of striped limestone. There are three discrete beds of gypsum, termed Upper, Middle and Lower (Fig.3). The Upper Gypsum Bed has a maximum thickness of 5m but it is more usually 2.3 - 4m thick. However, within the deposit this unit is not always present as it thins out to the N and NW. The striped limestones which always overlie the unit increase in thickness within this same area. The top 30-60 cms of the Upper Gypsum Bed usually has a number of thin (2-8 cms) bands of striped limestone. Towards the NW these bands increase in frequency down the Bed. In the NE of the deposit, above the 60m elevation contour and/or

within 30m of the surface, the Upper Gypsum Bed is not present. It is suggested that this may be due to dissolution of the gypsum by downward migration of groundwater, which in turn has given rise to an autobrecciated zone. Throughout the rest of the deposit the Glenade Sandstone overlies the Upper Gypsum Bed and acts as a barrier to percolating groundwater, not only preventing solution of the gypsum bed but also protecting the upper units of the Meenymore Formation from weathering. Approximately 1m below the footwall of the Upper Gypsum Bed the Middle Gypsum Bed occurs. In the center of the deposit this bed has a consistent thickness of 1m and is generally of high grade (approx. 84% gypsum). In the NW of the deposit the thickness of the bed increases in parallel with the decreasing thickness of the Upper Gypsum Bed. The Lower Gypsum Bed is the main ore bearing horizon. In places this bed occurs 6m below the base of the Upper Gypsum Bed but north westwards across the deposit the thickness between these two beds increases dramatically to more than 18m. In the SE of the deposit the Lower Gypsum Bed has a consistent thickness of 6m. Above the bed in the centre of the deposit there is a thin striped limestone band which disappears towards the NW where the bed thins. However at the NW margin of the deposit the striped limestones are again present and have the effect of lowering the gypsum grades in this area significantly. In general the Lower Gypsum Bed has only been drilled above the 16m datum. At this depth at the centre of the bed and increasing in width with depth the dominant mineral becomes anhydrite. This anhydrite is frequently traversed by gypsum veins. However it is noteworthy that at the extreme NW tip of the deposit one drill hole returned a high grade gypsum intersection (84% gypsum) at a depth of - 41m O.D.

A recoverable gypsum resource of 8 million tonnes has been calculated for the deposit based on a recovery factor of 60%, a minimum gypsum content of 70% and a minimum mining height of 2.5m. Studies indicate that 78% of the recoverable resources are within the Lower Gypsum Bed, 16% in the Upper Gypsum Bed and 6% in the Middle Gypsum Bed. These reserve estimates occur over a strike length of 2500m. The deposit remains open to south, southwest and northwest.

EXPLORATION HISTORY

The area was mapped by the Geological Survey of Ireland in the late nineteenth century. While no gypsum was noted in the Glangevlin area 'boulders of gypsum were observed in the Drift' further to the southwest to the west of Lough Allen. Chippings from a well spudded by the Ambassador Irish Oil Company/Marathon Petroleum Ireland Ltd. at Dowra in Co. Cavan in 1963 were identified as being gypsiferous. On the basis of this the Ambassador Irish Oil Company, Continental Oil Company of Ireland Ltd. and Marathon Petroleum Ireland Ltd. were granted three contiguous prospecting

licences, numbers 301 (now PL 2965) 302 and 303 for a period of one year from July 1963 to July 1964. Detailed geological mapping was carried over the three licences and three drill holes sited approx. 2.4km apart were drilled. Gypsum was intersected in all three holes. However based upon independent reports which concluded that the gypsum was unlikely to be continuous, the licences were surrendered. No further exploration was conducted in this area until PL 2965 was issued to W.W. Wakefield Ltd. in 1981. Exploration then commenced with 6 diamond drill holes being drilled in 1986 with encouraging results. 24 more holes were drilled in 1987, a further 44 in 1988 and 16 in 1989 bringing the total to 90 holes for a total of 7269m. The first six drill holes were widely spaced and identified an area of interest close to the Technical School to the north of Glangevlin village. The next 24 holes were drilled on an approximate 30m square grid. This drilling demonstrated a sufficient continuity and consistency of high grade gypsum to justify the expansion of the drilling grid to a 60m sq grid orientated NW - SE. All of these drill holes were drilled using NQ double tube wire line equipment and after the first 30 drill holes all holes were partially cemented upon completion to 15m above the Lower Gypsum Bed. Neither dip nor down hole surveys were completed due to the shallowness of

the holes and their orientation which was almost perpendicular to bedding. In 1990 a further 4 HQ holes were drilled for geotechnical and hydrological purposes. These drill holes intersected gypsum and lithologies consistent with the above 90 exploration drill holes.

An initial report on the ore resources was prepared by Mackay and Schnellman Ltd. in 1990 and the results of this report were incorporated into the Feasibility Study completed by Ortech MCS Ltd. in 1991. Gypsum resources at Glangevlin were calculated based on a recovery factor of 60%, a mining height of 2.5m and a minimum gypsum content of 70%. Demonstrated and Indicated categories for the three gypsum beds were calculated by Ortech MCS Ltd. (Table 1). The Ortech report supported the conclusion that mining of up to 500,000 tpa of gypsum was feasible and further that it was technically viable to produce from this gypsum plaster and board products of accepted quality using proven commercial equipment and techniques. The report also addressed the viability of marketing the products. The study set out the basis for underground extraction of this deposit and discussed the various techniques which might be employed. The study also included an assessment of the hydrogeological conditions of the site and the potential impact of those

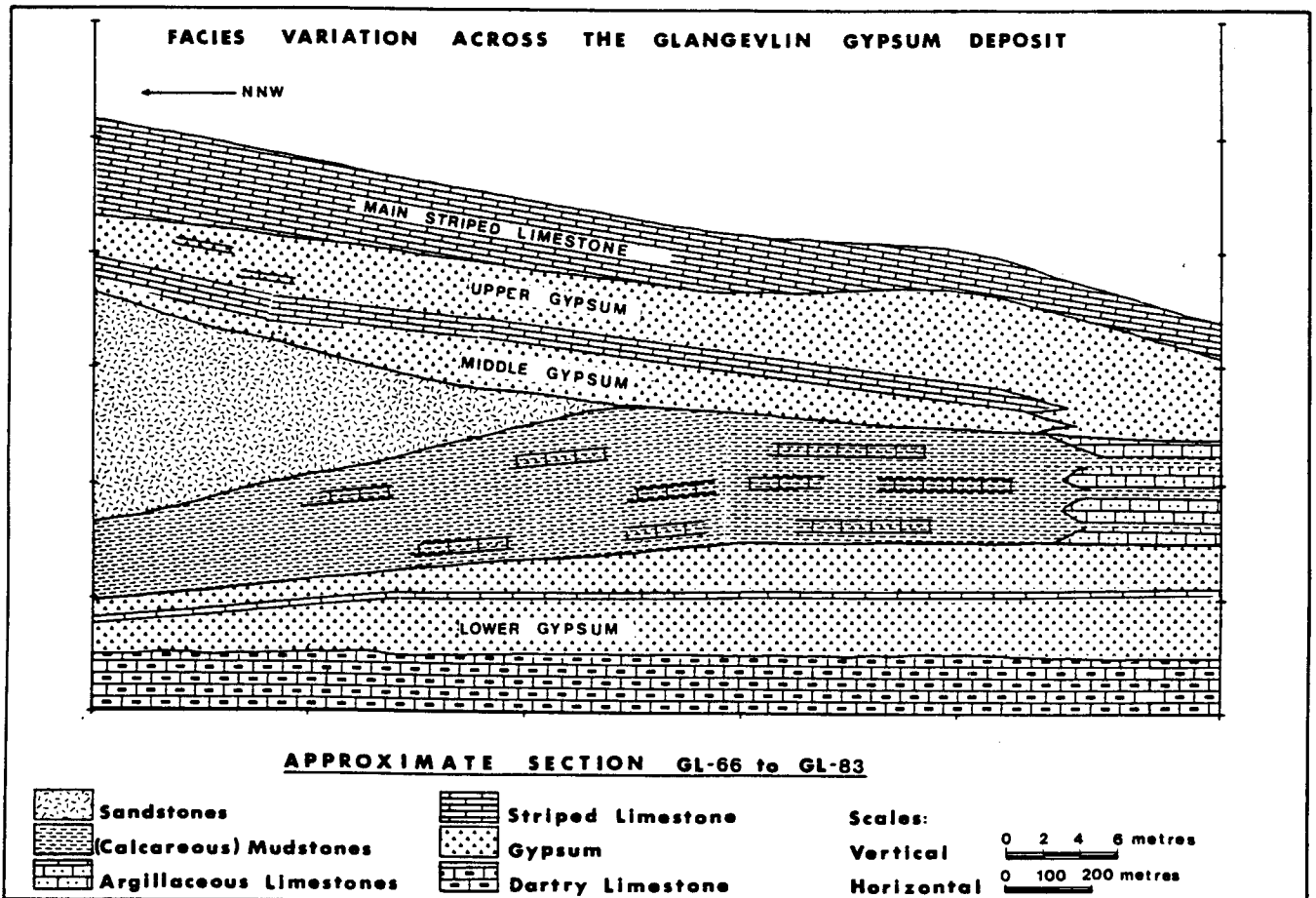


FIGURE 3. Facies variation across deposit (from Grennan 1992 and exploration data).

	Demonstrated		Indicated		Total	
	'000t	% Gypsum	'000t	% Gypsum	'000t	% Gypsum
Upper Gypsum	2226	78.1	337	77.7	2563	78.0
Middle Gypsum	887	78.8	62	78.9	949	78.9
Lower Gypsum	11226	79.5	430	78.9	11656	79.4
Total	14339	79.2	829	78.5	15168	79.1

TABLE 1: Gypsum resources at Glangevlin (from exploration data).

conditions upon any proposed mine development. This hydrogeological study was completed in 1990 by the licensee through the main consultants for the project (Ortech MCS Ltd), using data from the 1990 drilling of 4 HQ holes. Among the main conclusions of this study were:

- there are low flow rates into the proposed mine workings.
- a suspected autobrecciated zone was confirmed in a restricted area of the deposit.
- rock strengths, while variable, were considered to be adequate.
- ground water quality was of near neutral pH.
- gas emissions (hydrogen sulphide) were low.

During 1991-95 Environmental Impact Studies were undertaken in the area. As with all reports on exploration conducted in the PL since issue, portions of this EIS, including detailed transportation studies, were lodged with the Exploration and Mining Division of the Department of Transport, Energy and Communications and are available now on Open File at the Geological Survey of Ireland.

FURTHER INFORMATION

1. Open File Data on PL 301 and PL 2695 at the Geological Survey of Ireland, Department of Transport, Energy and Communications.
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This MINFO pamphlet may be referred to as follows:

FARRELL, L.P.C., 1995. Glangevlin Gypsum Deposit. MINFO 12/95, Exploration and Mining Division, Department of Transport, Energy and Communications. 4pp.