HOLLYFORD

Background information

Mine Name: Hollyford

Mine District: Tipperary

Alternative Names:
Holyford

Elements of interest:
Cu

Project Prefix: HFD-

County:	**Townland:**	**Grid Reference:**
Tipperary	Reafadda, Lackenacree	E193361, N154077

Hollyford mine is located 1km north of Hollyford village, 20km north of Tipperary town. This was a small mine that operated periodically in the middle of the 19th century.

Production and Mining History

According to Cole (1922), Hollyford mine was in operation periodically between 1837 and 1862. The Mining Company of Ireland (MCI) controlled operations from 1837 to 1839 but owing problems with water mining was suspended and the lease was eventually cancelled in 1840. The mine was reopened under private hands and was worked more or less continuously from the mid 1840s until 1862 when low copper prices forced closure. Recorded production of ore in the period 1845 to 1858 ranged between 8 and 841 tons for a total of 3917 tons with an average grade of 18% Cu (Daly 1917). Cole (1922) gives a value of £10,919 for the 555 tons raised in 1854.

Geology and Mineralization

The Hollyford deposit lies within the mid-Silurian Hollyford Formation of the Slieve Felim – Devil's Bit inlier in county Tipperary. The Hollyford Formation comprises turbiditic mudstones, siltstones and sand-grade greywackes. The host rock in the mine was described by Wynne (1860) as "hard grits [greywacke] and hard splintery shales". Three mineralized lodes or veins occur in the area and all were mined to some degree. Two veins trend northnorthwest and are linked by a cross vein trending roughly east-west (Fig. 1). The Ballycohen vein in the east was apparently the earliest worked; the Hollyford vein in the west was the one on which most

mining was carried out in the mid-19th century. Workings on this vein reached 90 fathoms (165m). The Hollyford vein is described as a near-vertical vein ranging from 0.15 to almost 2m in width (Wynne 1860). It is brecciated and contains "yellow pyrites ..[and] .. grey and peacock ores .. as well as … black ore" (Wynne 1860). The yellow pyrites is presumably chalcopyrite ($CuFeS_2$). Peacock ore is an old miner's term for bornite (Cu_5FeS_4). The grey ores is possibly tetrahedrite-tennantite ($Cu_{12}(Sb,As)_4S_{13}$) while the black ore may be an oxide of copper.

Site Description and Environmental Setting

The Hollyford site is located on the side of a valley and is largely wooded (Fig. 1). The site is surrounded by fields used almost exclusively as cattle pasture. Several original mine features still remain on the site (Fig. 1). Of the two chimneys, the one to the northwest remains standing but is showing signs of instability with fallen blocks around the base and erosion of mortar (photo, right). Only the base of the other chimney survives, covered in moss and surrounded by trees and shrubs. There is no obvious trace of most of the eight shafts that are marked on Fig. 1, drawn from old maps. However, the main shaft, close to the chimney, is still visible but blocked at a depth of 2m below the surface. Local people have indicated that most shafts are merely covered over and not properly sealed. The site of the adit beside the river is marked by a concrete cover that may have been emplaced as a seal. A line of reeds suggests the possibility of an adit drainage channel but do discharge was observed during the site visit. The mine manager's house and adjacent mine buildings have been restored as a dwelling. The field in which the chimney stands is used as pasture for cattle. The site is also used by playing children.

The solid waste heap in the centre of the site (photo, left), immediately below the main shaft, is partly grassed over but exposed on its faces. It has an estimated area of 411 m^2 and volume of 616m^3.

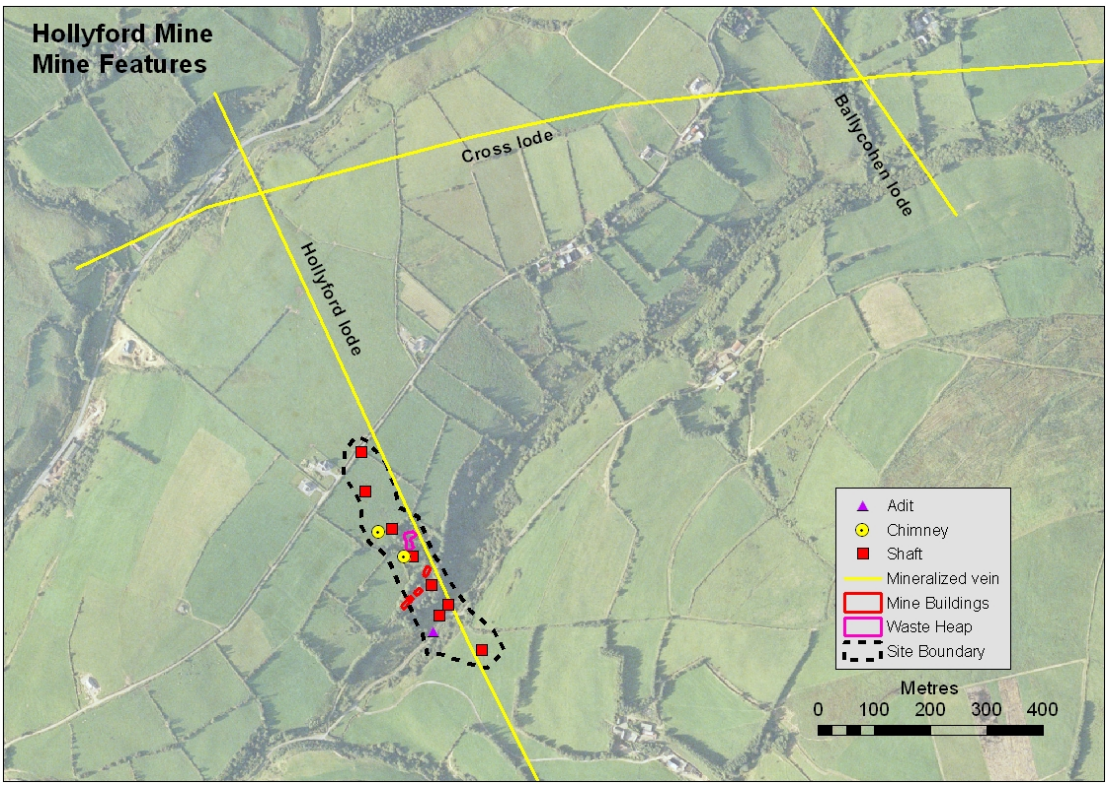

Fig. 1 Hollyford Mine Features

Geochemical Assessment

1. Surface water

A water sample was taken from the river upstream and downstream of the mine in summer 2007 and analysed for dissolved metals and other elements (Fig. 2). Both samples contained very low concentrations of all elements, with only Al (15 µg/l) and Ba (57 µg/l) significantly above the detection limit. There was no exceedance of any water standards downstream of the mine. was evident, thus suggesting relatively clean waters. No copper was detected.

2. Groundwater

Groundwater samples were not collected in the Hollyford area. Leachate from a composite sample of solid waste had 38 µg/l Cu and 87 µg/l Al but otherwise low levels of dissolved metals. The leachate test suggests very limited potential for contamination of groundwater by this waste heap.

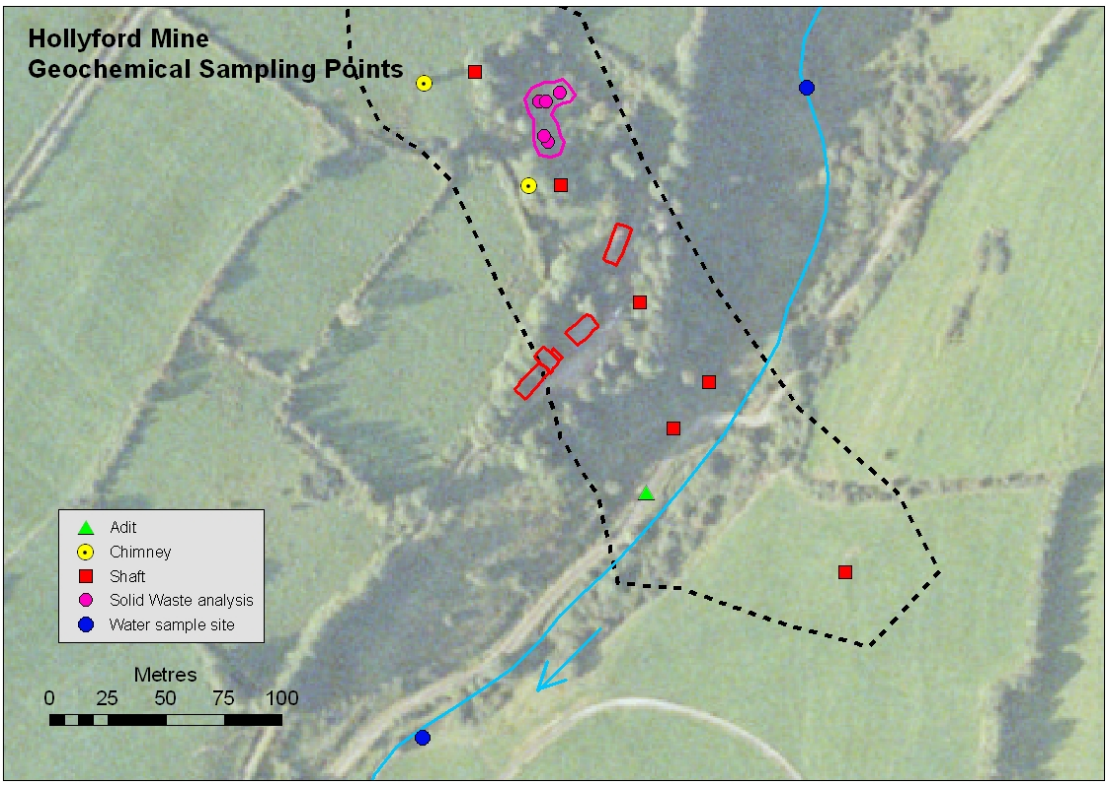

Fig. 2 Hollyford Geochemical sampling sites

3. Stream sediments

No stream sediment samples were collected in the vicinity of the Hollyford mine for the HMS-IRC project.

4. Solid waste

Five *in situ* XRF analyses were performed at Hollyford (Fig. 2). Only Cu was present in significant amounts, with a maximum measured concentration of 5720 mg/kg (Table. 1). Both Pb and As were also detected in all five samples but only at concentrations below 100 mg/kg.

Table. 1 Summary data, *in situ* XRF analyses, Hollyford

mg / kg	Cu	Pb	As
n	5	5	5
Minimum	1761	36	31
Maximum	5721	91	80
Median	4586	50	68
Mean	4291	59	61

5. HMS-IRC Site Score

The total HMS-IRC Site Score for Hollyford is 4, the lowest recorded site score in the HMS-IRC project. The small volume of waste, the low concentrations of high-relative toxicity elements in it, the lack of a mine water discharge, the lack of any exceedances of water standards either in surface water or in the leachate test and the absence of data for stream sediments all contribute to the low score. There is evidence to suggest there may have been some discharge from the adit and this, in turn, may have impacted on the stream sediment composition. If so, then stream sediment analysis may augment this score but given the low Cu concentration of the solid waste it is unlikely to increase it greatly.

Waste	**SP01**
1. Hazard Score	11
2. Pathway Score	
Groundwater	1.29
Surface Water	3.19
Air	0.00
Direct Contact	0.00
Direct Contact (livestock)	-
3. Site Score	4

6. Geochemical overview and conclusions

Hollyford mine was a small operation that produced several thousand tons of copper ore over a period of 20 years in the mid-19th century. It had a correspondingly limited impact on its surroundings and today only minor amounts of solid waste remain. This waste has, by comparison with solid mine waste elsewhere in the country, relatively low levels of Cu, Pb and As. The low site score reflects the small volume of waste remaining and the low measured concentrations of metals within it. It also reflects the absence of observed mine water discharge and, perhaps, the lack of stream sediment analyses.

References

Cole, G.A.C. (1922) Memoir and Map Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland. *Memoirs of the Geological Survey of Ireland*.

Daly, Herbert J., (1917) Report on Hollyford Copper Mines, Co. Tipperary. *Report made to the Ministry of Munitions, 1917 – 1918.*

Wynne, A.B. (1860) Explanations to accompany sheet 145 of the maps of the Geological Survey of Ireland illustrating part of the county of Tipperary. Geological Survey of Ireland, Dublin.