A guide and risk assessment for Hafna Mine, Gwydyr Forest, North Wales

Introduction

Hafna Mine has a long history, with the first references to it in the early 1800's through to its eventual closure in 1915. Yields of lead and zinc ore were modest and it is likely the mine did not generally cover its operating costs throughout its life. To an extent it is overshadowed by the massive ore dressing mill and smelter built nearby, the remains of which form an imposing backdrop to the Hafna car park. The mine worked a series of mineral lodes in the vicinity, the most important being Hafna lode which ran in an East-West direction, with Rabbit lode and Ffrith lode being shallower workings to the South and perpendicular to the main lode. Most of the mine adits are run in and so access is only available via the level 3 portal located near the top of the mill.

Level 4, which was probably served as a tramming level for the winding shaft, has a solid RSJ grille and probably is blocked inbye by a fall although it still drains the lower parts of the mine. The winding shaft, adjacent to the level 3 portal, has been capped with a substantial bat castle. It is likely that the upper workings extended all the way to High Hafna originally, but a through route is unlikely now due to various collapses. At present It is possible to explore most of level 3, an intermediate level below it and some areas of level 4. Access to higher levels might be possible with some effort. This mine has vertical sections and areas were traverse lines need to be rigged and it is essential that mine explorers take and are competent to use SRT equipment. Ropes, maillons and hangers will also be needed.

Description

The level 3 portal has been stabilised with a 500mm galvanised steel tube to permit water to drain out The bulk of the water in the mine drains via the level 4 grille, but there is still a flow from level 3 which increases with heavy rain. The tube leads into the level about 750mm above the floor and the passage is flooded to this height. Proceeding inbye the passage rises slowly and after a couple of hundred metres the water level is minimal as any excess drops down an old ladderway. The passage has a few short cross cuts, presumably dug to see if there were side splits to the lode. Level 3 continues for a considerable distance through some challenging ground before reaching a collapse. The aforementioned ladderway gives access to a sub-level running mid-way between level 3 and level 4. It has an intact platform partway down, but the ladders have rotted and fallen away. There are a couple of bolts to anchor a rope at the top and another bolt for a re-belay at the side of the platform and this drops you into the sub-level. Outbye there is sloping platform, part of an ore chute, with bolts to allow a safety line and a further re-belay to give a short vertical drop down to the level 4 passage. There is a nice example of an ore tub in the passage and to one side there is a cavity with an old wooden wheel barrow. While both these artifacts are in reasonable condition they should not be touched to avoid damage. Outbye the passage continues towards the surface, however there is deep water and this probably gets deeper as one proceeds further. It is likely that a collapse is causing the water to pond rather than freely flow out of the adit, but it is not known if this is before or after the winding shaft is met. A wet suit and flotation aid is recommended for further exploration. Inbye the passage is blocked by a collapsed ore chute and its contents.

Heading back up to the sub-level it is possible to continue inbye, to meet another timbered access to level 4. This may have originally been a ladderway, there are no platforms in evidence now. A selection of bolts allows a free rope hang down to level 4. This can be followed in either direction to collapses and it contains the remains of another wheelbarrow in poor condition and several cross cuts of varying lengths. There are some snottite formations and gypsum crystals, but very little evidence of lead or zinc ore. There are some areas with small sections of neat packwalling which might hide other side passages.

Returning to level 3 and heading inbye, leads to a section were there is a considerable collapse, most of the floor is missing having fallen into the lower passages. A constant shower of water from above has probably aided the collapse. There are bolts for a traverse line on the LHS and it is fairly easy to negotiate the difficulty. This leads to a section with a solid floor and an intact ore chute. The stope above this region ascends a considerable height at a modest angle with a solid looking rock face. Heading past the ore chute leads to an area with stacked deads piled on somewhat dodgy timberwork and care should be taken to avoid contact. This lasts for a hundred metres or so, then the passage opens out into the continuation of the stoping where there is the remains of a ladder heading upwards. This might provide a route to upper levels. Carrying on along the passage leads to deep water, some side passages and presumably a collapse. This marks the limit of exploration.

Risk Assessment

Hazard	Description	Mitigation
Falling rocks and timberwork	There is still a lot of timberwork left in the upper stopes and this sometimes falls down naturally due to rot, earth tremors or water flow. The timberwork may support piles of rock which can be displaced. Any timberwork or rock falling from upper levels may displace other material and this may then hit anyone who happens to be in the fall line.	Mine explorers should use their eyes and ears – often there will be warning signs of unstable areas. Be careful not to kick material down ladderways.
Structural collapses	There is a considerable volume and weight of deads (waste stone/choss) stacked on old timber stemples/sollars in level 3 after the first ladderway. If a collapse occurred then it could completely block the level.	Be especially aware of the risks if there has been recent heavy rain or seismic activity. Look for fresh falls/new splits in timberwork. If in doubt keep out of this area.
Failure of fixed aids	The ladder-ways, ore chutes etc. are no longer maintained. Decay and inherent weaknesses may result in failure even though they appear to be superficially sound. Ropes and slings suffer in a similar way especially if subject to acidic liquids.	Use your own known safety equipment and resist the temptation to use old ropes which may be damaged or inherently weak. Examine and carefully assess ladder-ways before use.
Hidden winzes and false flooring	Some areas may appear to be solid rock floors but, in fact, are weak timber floors in stopes with a rubble layer on top. There is an area like this near the ladderway down to level 4. The timber may be unsound and collapse without warning.	Use safety lines to protect explorers when traversing unknown or dangerous ground.
Bad air	Most of the mine appears to have a reasonable circulation of air but there may be places where there is a build up of carbon dioxide and a deficit of oxygen caused by rotting timber etc.	Explorers are advised to keep alert and take care in blind passages when air quality may be poorer than main passages. Check the air is OK with a gas meter.
Flooding and deep water	Sudden flooding is unlikely to occur, however various parts of the mine have deep water and this may conceal winzes (shafts in the floor). The water is cold and hypothermia is a risk on extended exploration tours.	Use a wet suit and buoyancy aid if exploring in deep water.