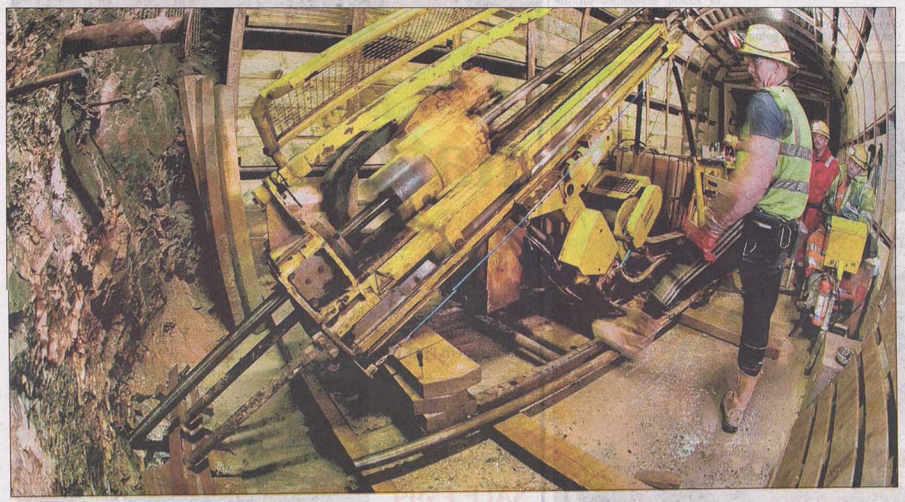
■ The business end of operations at South Crofty – surveying by laser scanning is undertaken through the mine workings.



■ Exploration rods being removed from a 500ft bore hole. Below, inspection holes are drilled into the walls of the Western Decline, 350ft underground.

■ Above, Gareth Joseph, of Camborne, uses a hand-held x-ray analyser to obtain mineral readings from the rock ore.

■ Below, the underground exploration team emptying the core barrel into sample boxes.

■ Andy Lloyd, from Hayle, helps with the drill rod removal.

■ John Webster explains the workings of the diamond drill to reporter Julian Ridge.

Today there's hi-tech mining deep beneath South Crofty

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SITTING in the back of a 4x4, my helmeted head bangs against the side of the vehicle as it descends quite sharply over the rough ground.

In the driver's rear view mirror in front of me, I can see daylight becoming a smaller and smaller speck in the distance and then suddenly it disappears.

The only light now comes from the beams of light projected by the headlamps.

It's dark, it's dirty and it's deep underground.

I've just made the short journey – several hundred yards – into South Crofty's 21st-century workings.

Overhead, it's business as usual. Motorists and pedestrians make their way through Tuckingmill, oblivious of what is going on underground, just 100 metres or so beneath them.

But down here, at the end of the Tuckingmill Decline, a team of miners is halfway through its shift.

Fortune

They and their colleagues have spent months carving huge tunnels through the rock to reach areas, where mine bosses believe a fortune is to be made.

But there are no picks, no shovels; this is a mine for the future.

A huge diamond drilling rig sits anchored to a specially built concrete base. Its mission is to drill unerringly into the rock and to locate not just tin, but copper, zinc, and other metals.

Skilled miners provide the brawn, but they have a new ally under ground – the computer. It monitors every twist and turn of the drill bit as it carves into the killas, providing samples which will be analysed and used to determine the best areas to exploit.

Modern machinery allows 3D imaging of the rock, and more importantly, the lodes of metallic ore.

Today 21st-century mining is a new ball game. It's quicker, more efficient and, say mine bosses, potentially very, very profitable.

Chief operations officer John Webster, a new member of the Western United Mines team, stands by his assertion that South Crofty has "world class mineral deposits".

He and Western United Mines chief executive Alan Shoesmith give a rare insight into the South Crofty vision.

First Alan: "The aim is quite simply to re-establish mine operations at South Crofty. The underlying mission is to create a 21st-century mine operation, a poly metallic mine operation.

"We intend to exploit the natural asset of the county to its fullest extent.

"The current operation has seen us predominantly driving an access tunnel underground, in preparation for the 'main event' which has really been to carry out exploration so that we know what resources we've got and what our targets are for future production.

"The whole thing is looking very exciting. The early results we are getting from our diamond drilling exercise are very, very encouraging and indicating that we are looking very seriously at a poly-metallic operation, with copper, zinc and tin as our primary targets.

"The project is moving on with its exploration phase which will be ramped up over the next six months to conclude that programme so that we can then start to organise our production facilities."

And John: "My role is to get the operation into production as quickly as possible. That relies on making the most of short term accessible ore. The mine is flooded to about 40 metres from the surface, which gives us quite limited access to the ore body. Drilling in this part of the mine is fraught with difficulties with underground water at high pressure and high flow rates.

"So we've brought the crews above the water table to be able to pattern drill a section of the ore body which showed very promising levels of mineralisation.

■ Some 350ft below ground, miners work the diamond drill to collect rock core.

"The area we are interested in was previously mined 150 years ago mostly for copper. However, the South Crofty group of deposits are quite complex. There are about six different phases of mineralisation.

"We are finding a combination of zinc, copper, and tin mineralisation in different ratios.

"If you put them all together, they actually make a very attractive mining package.

"What we are looking at are quite wide vein zinc deposits, predominantly zinc in some areas, up to 30% in fact, and up to about 10% in copper which is bonanza grades. You don't see that sort of stuff pretty much anywhere else in the world.

"We are very excited about some of these areas.

"We've already started doing some work with Camborne School of Mines about grade sizes of these minerals and how we would separate them.

"We're quite keen to get underground pre-concentration of the ore which would mean that instead of bringing 100 tonnes per hour to the surface, we would bring about four tonnes per hour to surface.

"So the footprint of the plant on the surface would be very small with a quite a sophisticated plant to be able to produce a number of different concentrates.

Copper

"From what we've seen the mine would be a significant producer of zinc, quite a large producer of copper, and about 1,000 tones a year of tin. We are also seeing quite high levels of silver and indium – which are worth about $500 to $600 a kilogram.

"The mineralisation that we are finding is in areas that were never previously exploited by the operators, and that goes back 300 years.

"We've always seen this as a base metal deposit, rather than a tin mine.

"By the time we get to the spring we should have a pretty good handle on both mineable resources and the method by which we are going to extract the ore.

"The idea of underground processing is quite new. It's a plant that will fit in a tunnel. It is skid mounted so you can drag it around the mine and take it to the face.

"You can pump the tailings back into the mine and just pump the ore concentrate to surface.

"The various minerals are then separated above ground and turned into saleable concentrates.

"We would be able to vary the location of the processing according to the metal prices at the time. So when tin prices were high, we could work in the areas where we know the tin is concentrated and vice versa."

The mine currently has around 60 staff, of which about 25 work underground, two shifts per day.

By November, there will be three shifts per day, five days a week.