THIS IS NOT A DRILL

Two gold prospectors, Westgold and Emmerson, are drilling around-the-clock in Tennant Creek. Will the red centre boom again? **Jeremy Chunn** reports.

Au, what a feeling: The rig at Emmerson's Ella site has pulled some promising core samples up from the underworld.

THE NORTHERN Star pit yawns before us like an ice-cream cone stuck into the Earth, its sides almost vertical. Even to stand five metres from its edge triggers a flash of suicidal ideation. There's more ore in there for sure, but this open-cut mine, which yielded 80,000 ounces of gold, is closed for business and has since become an Aboriginal heritage site. As the years pass, many hundreds of them, this hole will collapse and become filled with the dust that covers the boots of the stockbrokers and geologists who stand at its lip.

Northern Star is a relic of Tennant Creek's past gold glory. The big names – Warrego, Peko, Juno, Gecko, White Devil, Nobles Nob – roll off the tongue up here like Brando and Sinatra do in Hollywood. But the 1970s, when annual gold production sometimes exceeded 225,000 ounces, are over. The land rights years followed, when output struggled above 50,000 ounces a year. Today there are no working mines in Tennant Creek.

It's down there, somewhere

A short, shaky drive away is Rising Star, marked only by a PVC plug shoved into the ground and 10 metres of broken core on plastic trays. Geology manager Bretan Clifford is looking for hematitic ironstone and he's enthusiastic about the bornite veins that ripple through some of the core being passed around. (So are many of the brokers, nearly half of whom are former geologists.) Bretan's overseen diamond drilling of three holes at Rising Star for Perth-based company Emmerson Resources, looking for copper and gold. Emmerson is part of a new wave of exploration in Tennant Creek, along with

Dear departed: (top) Brokers and geos stand at the lip of the old Chariot mine with Emmerson's Rob Bills (in white cap).

Hard core: Geologist Barbara Duggan checks the latest samples at Emmerson's Ella site.

Perth-based Westgold Resources, but this time around the tools are far more powerful. On Bretan's patch, induced polarisation and (deep breath) controlled source audiomagnetotellurics technology have been used to "provide a depth limit on the hematite alteration encountered in the first round of drilling," he says. Further south, in the company's western project area (its tenement holdings cover about 3,000 square kilometres), vector residual magnetic intensity technology has been used to generate maps of subterranean magnetics that make old imaging efforts look wildly blurry. According to Rob Bills, the managing director and CEO of Emmerson, this is the first time such technology has been used to explore the region. His message is this: Tennant Creek is under-explored.

A program of gravity geophysics exploration and lots of drilling is costing Emmerson about $11 million, helped by a joint-venture with Ivanhoe (whose market cap is about 20 times Emmerson's). For Bills, the target is to better understand the relationship between magnetic and non-magnetic deposits, in particular their relative orientation – stacked on top or leaning against each other like drunks. "Previous explorers have been one-dimensional," Bills says. It's estimated there are 800 ironstones around Tennant Creek and that 8 percent of those are mineralised. Following the Zipf Law of natural populations, Bills reckons there's the statistical possibility a discovery could yield twice Warrego's output of more than 2.5 million ounces. (There's also the chance that mighty find was above ground and eroded away millions of years ago.)

When exploration turns to excavation, Emmerson will kick-start the old Warrego plant, which it owns outright. The plant is 35km north of Tennant Creek and can process 300,000 tonnes a year. About $2

THE NEW TOOLS OF THE TRADE

The underground potential of Tennant Creek is being revealed by new technology.

Most of Tennant Creek's past production was first revealed to prospectors after the release of an aeromagnetic survey in 1959, where a magnetometer onboard a light plane recorded changes in the magnetic field that correlated to magnetic minerals underground, especially magnetite. The data were used to plot a map which still has currency today. Fifty years later, the technology of detection has improved somewhat.

Predictive techniques: where is the next deposit

Vector residual magnetic intensity (VRMI) mapping is a more refined form of an aeromagnetic survey, the difference being that vector readings show magnetic fields in sharper relief. When a VRMI map of the Tennant Creek region is shown beside the 1959 aerial survey, the main deposits overlap but the out-of-focus penumbral areas around them are much more evident using the old technology. In short, you'll focus in far more quickly on your target using VRMI.

Detection technology: going underground

Back on the ground, detailed geophysics such as gravity and magnetics are modelled using 3-D software. Complementing these are new technologies such as induced polarisation (IP) and controlled source audiomagnetotellurics (CSAMT), which are used to model detailed structural and geological interpretations. RAB (rotary air blast) drilling then picks up any gold, copper or pathfinder elements above the geophysical anomalies, and the next step is deep diamond core drilling. Core samples and mineralised fluids from surrounding rocks are analysed to help plot a 3-D impression of a deposit. A down-hole probe is also used to detect anomalies away from the drill hole.

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million will be needed to bring it online. In terms of the joint venture with Ivanhoe, a find of more than 1 million ounces will be split 70:30 between Ivanhoe and Emmerson; if less than 250,000 ounces is the result, Emmerson gets the lot.

Warm and fuzzy

Barbara Duggan has a passion for jazz, soul and rock, which is why she's named her prospects Coltrane (after John), Ella (after Fitzgerald), Armstrong (for Louis) and Smokey (for Robinson) and why she says a 20cm core sample of peacock-coloured bornite makes her feel "all warm and fuzzy inside". The 32-year-old Canadian geologist is stretched across the trays of core at Ella, running a pen magnet along the samples and beaming as she feels attraction. Offcuts of these cylinders will be sent to Adelaide to be assayed (analysed) for gold, copper, zinc, silver and bismuth (which prompts a wag in the group to wonder aloud if this trip "is for bismuth or pleasure"). Next to us the "rotary lie detector" is drilling into the red ground at 60 degrees – day and night. Barb may have been more animated when she was charged by a black bear in a previous posting back home, but it's hard to tell. She has found her ironstone, now she needs mineralisation.

Bills says the Ella project is a close analogy to Warrego, the region's biggest deposit. Charts are unrolled that show computer renditions of deposits that look like standing rounds of puffed-up pita bread. Far to the east, old outcrop deposits have been identified not far from the Peko and Nobles Nob sites. Way out west, VRMI has been used at Red Bluff. A short drive south, geologist Dom Sadsad shows us core with ironstone and lots of hematite. The Emmerson prospects are looking juicy. Ivanhoe hopes so, too.

Crossed swords

Eighty kilometres southwest of Tennant Creek two drilling rigs are tilted at each other across a stretch of scrub. Westgold Resources and Adelaide Resources both want the same thing: vertical mineralisations. Both sides of the boundary that separate them could have been Westgold's, but things don't always work out the way you'd like, says Andy Beckwith, the company's managing director.

When Westgold arrived in 2007 this area had been off-limits for 25 years due to land rights issues. Westgold drilled a couple of holes to confirm mineralisation, found copper and cobalt, and has been drilling non-stop since then. Core samples from its Rover 1 site, where it's a third of the way into a 15,000-metre drilling program, are also showing gold and bismuth. (The area was originally targeted by Peko in the 1960s and '70s.) Copper is dominant at the top of the system, Beckwith says, but Westgold is targeting the gold.

The project is in pre-feasibility stage, but Beckwith says, "My gut feeling is we can probably start a mine now. The deposits are not big, generally, but they are juicy, and therefore cash-flow positive." High-grade copper is expected, and gold grades of more than 2.5 grams per tonne. Core results from the June quarter range from 12m at 17.5g/t to 7m at 0.48g/t. Westgold's strategy is to target higher grades initially: 10g/t to 20g/t. The trays at Westgold's Tennant Creek headquarters hold core samples ranging from 0.005g/t to 310g/t (from within 7m at 185g/t). Spots of visible gold circled with yellow wax pencil shine in the diffused light under the shade cloth.

Based on the results of a scoping study Westgold will enter a pre-feasibility or feasibility study and decide on funding. A plan is rolled out showing a deep figure-eight decline, which would cost about $15 million and take 12 to 18 months to complete. The footwall for the model happens to be on Adelaide's side of the boundary, and it's obvious we're looking at two companies pointing at what will become one mine. Negotiations with the Central Land Council for an exploration licence come first. Adelaide has hit 10g/t on its side of the boundary. "Potentially we've got a lifetime here if we find stuff," Beckwith reckons. His latest estimate is more than a million ounces.

In the Jupiter Zone of Rover 1 drilling will target high-grade gold below identified copper (results so far of between 1 and 2.8 percent copper). The Western Zone is showing strong copper. "Both of these deposits are very specific," Beckwith says. Next prospect by deposit for Westgold is Explorer 142, which lies west of Rover 1 on the edge of the Tanami Desert.

Camp life is established at Rover 1. It may look like a container terminal where the cargo is dusty field workers, but salmon quiche and a new copy of *Cuisine* magazine hint at a certain level of sophistication. It takes a lot more guts and gumption to strike gold in the middle of nowhere than it does to get on *MasterChef*. ■

FINDING THE FUNDING

Gold prospecting runs on money from many sources

WESTGOLD

Market capitalisation: about $83m.

Shares on issue: 227,900,000.

Cash on hand: $15m and 19.75% of Aragon Resources (about $9m).

Debt: $0.

Listed: More than 20 years ago.

Recent fund raisings: Rights issues in April 2009 raised $5.7m; in April 2008 raised $5.1m. An offering of 55m shares in October 2009 raised $22m.

Future raisings: None in the pipeline.

Major shareholders: Metals X owns 31.9% of Westgold.

Clawback: Anglo Resources, a former owner of the Rover 1 tenement, has options to earn back into future Westgold discoveries of more than 500,000 ounces. To do so, it must pay Westgold three-times the expenditure associated with the discovery then increase that to 2 million ounces within two years at its sole cost to earn 75 percent of the deposit.

EMMERSON

Market capitalisation: about $39m.

Shares on issue: 226,000,000.

Cash on hand: $11m.

Debt: $0.

Listed: 17 December 2007.

IPO raised: $20m.

Further raisings: Issued 22,610,000 shares Ivanhoe to raise $2,939,000.

Future raisings: Ivanhoe has 27.9m options with a 20c strike price due to expire 1 July 2011. Should it exercise, Ivanhoe will pay $5.6m and own 20 percent of Emmerson.

Joint venture: As part of a farm-in Ivanhoe must contribute $18m in exploration costs to Emmerson by the end of April 2012. Then a joint venture is formed with Ivanhoe to fund the first $10m in expenditure.