Saltbush exploration log.

Name: Class: Date:

Your record of the search for gold at Saltbush. Page 1 is the brief and how the gold formed, page 2 the map and your cross-section, page 3 what each method showed, page 4 your drilling and your plan for the land, and page 5 your target report.

SCREEN 1 The brief

You are a field assistant with a small exploration company that holds an exploration licence over the Saltbush prospect, an area 6 km by 4 km about 130 km north of Kalgoorlie. Prospectors dug a line of shafts in the north long ago, and most of the licence is covered in red sand. Your job is to find the gold under the sand and decide where to drill. Saltbush is made up for this lesson.

SCREEN 1 How deposits are found

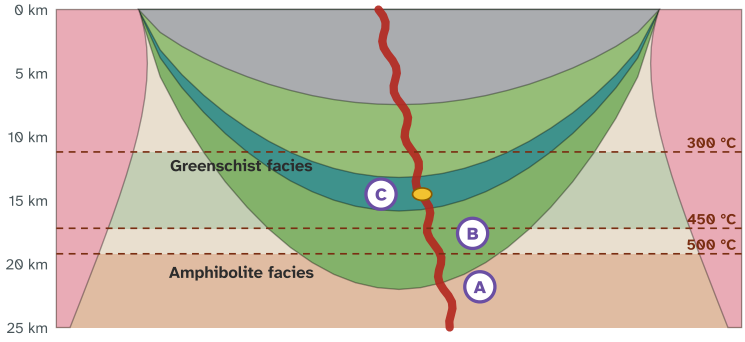
Five real discoveries. Fill in how each one was found, from the map on screen 1.

DISCOVERY	YEAR	WHAT WAS FOUND	HOW IT WAS FOUND
Kalgoorlie	1893	Gold	
Pilbara iron ore	1952	Iron ore	
Tropicana	2005	Gold	
Nova	2012	Nickel and copper	
Julimar	2020	Palladium, nickel and copper	

Why do explorers study maps and images of a whole region before they drill?

SCREEN 2 Gold from metamorphism

Label A, B and C on the drawing: where the fluid is given off, the path it takes, and where the gold is deposited.



A _____

B _____

C _____

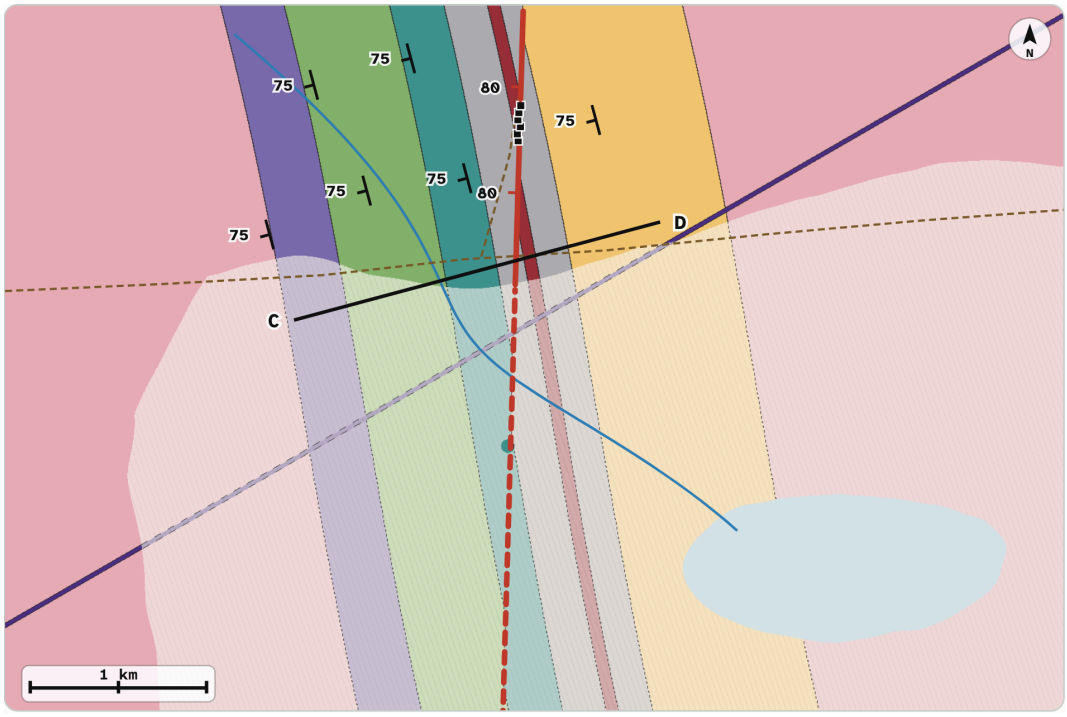
Why is gold found where a shear zone cuts dolerite? Use the words metamorphism, fluid and iron.

In the model, the temperature rises 25 °C for every kilometre down, from 20 °C at the surface. How deep is the rock when it reaches 500 °C? _____ km

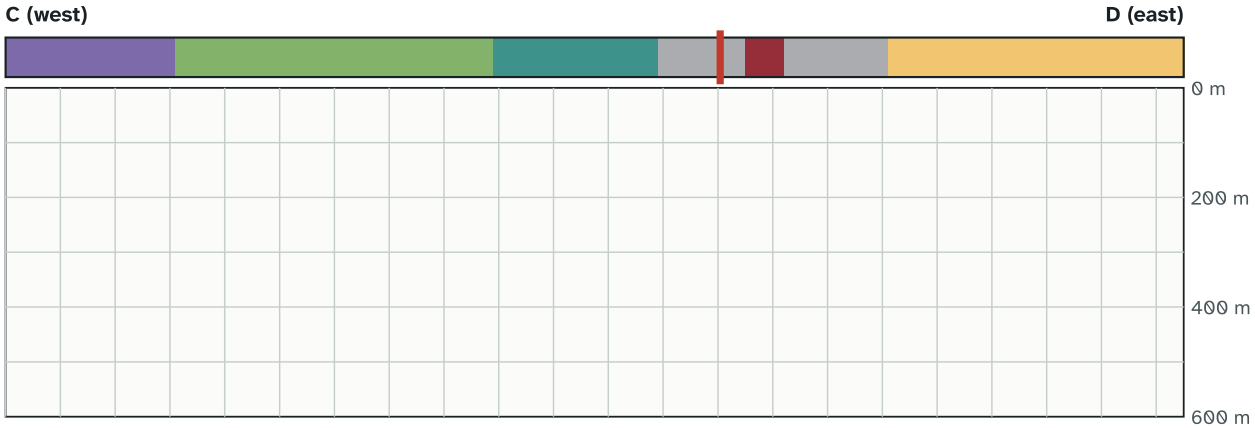
SCREEN 3

The map and a cross-section

The map shows the rocks at Saltbush, with strike and dip readings. Solid colour is rock seen at the surface, pale colour is rock interpreted under sand. Draw the cross-section along C to D.



Dolerite dyke Youngest: cuts across everything
Granite Intruded the belt
Felsic volcanic rocks
Banded iron formation
Shale and chert
Dolerite An iron-rich sill
Basalt
Komatiite Oldest
Under sand rock interpreted
Shear zone
Old shaft



Grid squares are 100 m. Same scale down as across.

1. Mark each contact on the strip at the top. 2. Draw each contact down into the ground at the dip of the layers. 3. Draw the shear zone at its dip. 4. Label the rocks.

Dip of the layers: _____° towards the _____ Dip of the shear zone: _____° towards the _____

On your section the dolerite is _____ m wide at the surface. Its true thickness is the width × sin(dip) = _____ m.

Why is the section line drawn at right angles to the strike?

SCREENS 4 TO 7

What each method showed

For each method, write what it showed at Saltbush, what it couldn't show, and the clue it gave you.

METHOD	WHAT IT SHOWED AT SALTBUSH	WHAT IT COULDN'T SHOW	THE CLUE IT GAVE
Satellite: natural and false colour Screen 4			
Satellite: iron oxide Screen 4			
Satellite: white mica and clay Screen 4			
Aerial photograph Screen 5			
Airborne magnetics Screen 6			
Potassium (radiometric survey) Screen 6			
Soil sampling Screen 7			
Aircore sampling Screen 7			

Our drill target, and the evidence for it

SCREEN 8 Drilling

Record each hole you drill on screen 8.

HOLE	WHERE IT STARTS	DIRECTION AND ANGLE	LENGTH	GOLD INTERCEPTS	ROCKS
1					
2					
3					
4					
5					
6					

Estimate the deposit

Strike length _____ m × true width _____ m × depth _____ m = _____ m^3

_____ m^3 × 2.8 t/m^3 = _____ t of ore

_____ t × _____ g/t ÷ 1,000 = _____ kg of gold

SCREEN 9 Treading lightly

Our plan for the land on screen 9

New track: _____ m Land cleared: _____ ha

What the track avoids, and how:

Number the steps for putting the land back, from 1 (first) to 7 (last).

NO.	STEP
	Scarify the drill pads so the topsoil mixes back in, and spread any topsoil that was pushed aside back on the tracks.
	Cut the hole's collar off at least 400 mm below the surface, take it out, and fit a cone-shaped plug.
	Send a rehabilitation report to the department when the work is finished.
	Put a temporary plug in each hole as soon as it is finished.
	Backfill the sumps and take out their liners.
	Block the entrance to the new track.
	Backfill the hole above the plug and mound the soil over it.

SCREEN 10

Our target report

1. The setting. What kind of gold deposit are you looking for at Saltbush, and how did it form?

2. The evidence. What did the map, the satellite and aerial images, the magnetics and the sampling each show, and what couldn't each one show?

3. The target. Where did you drill, what did you find, and how big and how rich do you think the deposit is?

4. The land. How does your plan protect heritage places, plants and animals, and how will the land be put back?

5. Next steps. What would you do next, and what are you least sure about?

6. Looking back. Which methods found the real deposits on screen 1, and how does your search compare? Read your idea from screen 1 for finding gold under sand. What would you change now?