

REGISTER NOMINATION REPORT      DATE: 10/8/87      ITEM REFERENCE: 6536-13957

COPPER KING COPPER & OCHRE MINE  
HISTORIC SITE  
VIA LEIGH CREEK

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HERITAGE SIGNIFICANCE

Historically, Copper King Historic Mine Site is significant as one of the four principal mines which produced coloured pigments for paint manufacture and industrial use in SA. The transition from copper to pigment production reflects the volatility of the copper price around the turn of the century as well as the economic and industrial development of the State which required pigment products.

Physically, the site has a high level of integrity in that much of the plant installed in 1924 is still intact. The arrangement of the plant and the layout of the site constitute important and rare physical evidence of this type of technology.

Environmentally, the site is fairly conspicuous in its setting. The underground workings are located in the side of a low hill with the plant arranged below them.

The integrity of the item is high.

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NOMINATION SOURCE/THREAT/OWNER

This report has been prepared as a result of a field trip to the Northern Flinders to inspect a number of small scale mining sites known to have plant or machinery still in situ.

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STATE HERITAGE BRANCH RECOMMENDATION: .....  
Manager

It is recommended that this item be included on the Register of State Heritage Items.

South Australian Heritage Act 1978-82	Register of State Heritage Items ITEM EVALUATION SHEET Historic Site	Ref. No. 6536-13957
	Item COPPER KING COPPER AND OCHRE MINE HISTORIC SITE	Status
Age 1899-1952	Subject PRESENT USE CODE: 0205 RUIN ORIGINAL USE CODES: 1103 UNDERGROUND WORKING 1104 SURFACE WORKING 1210 CRUSHING PLANT	Site Type

History

Physical

Environment

Integrity

Context	The mine site is typical of many which were established around the turn of the century in the Northern Flinders. The diversification from copper to pigment production ensured the life of the mine was not dependent on the wildly fluctuating copper price. The mine's proximity to the railway also helped its economic survival.	E	VG	AG	FP	NA
Person/Group	--		X			
Event	--					X
Natural Elements	Low, sparsely vegetated, hill slopes.			X		
Man-Made Elements	An open cut mine, mine shafts, diesel engine, friction winch, sieves, drive shafts and pulleys, tanks, floors, ore cars, headframe, water pipe, sheave wheels, floors, cylconic separator, furnace casings, all survived in good condition.	X				
Representation	One of the four major European coloured pigment sites in South Australia.	X				
Continuity						X
Local Character						X
Landmark						X
Alterations	Very few alterations to the plant erected in 1924 appear to have been made in the ensuing years.	X				
Condition	Ruinous.		X			
Compatibility	Disused.		X			

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	Item COPPER KING & OCHRE MINE HISTORIC SITE VIA LEIGH CREEK	Prepared By: J MCCARTHY

### Supplementary Information

#### Adaptation:

The site has little potential for any use other than as an archaeological research resource or perhaps limited tourist presentation.

#### Interpretation:

The site has interpretative potential for education and specialist research groups. A metal photo or enamel interpretive sign outlining the history of the site and asking visitors to respect its integrity will probably aid its preservation.

### History and Sources



## FLINDERS RANGES HERITAGE SURVEY

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Copper King Copper and Ochre Mine

UNM-SR-05

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### LOCATION

Pastoral Station	Puttapa Station
Owner(s)/Lessee(s)	R.W. and P.A. Ragless
Pastoral Lease	2498
Local Government Area	Unincorporated
AMG Reference	6536-1 561029

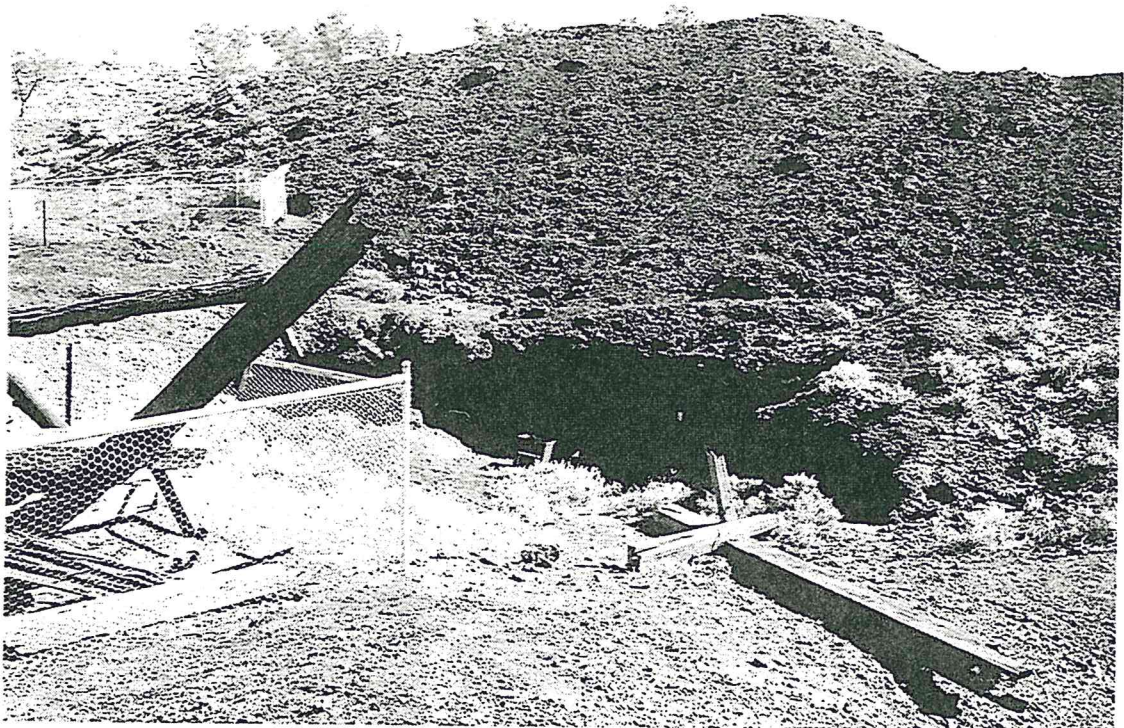
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State Heritage Status	State Heritage Register — 13957 — 23 November 1989
Other Assessments	Nil

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Film/Neg Number	30/33, 34, 35
Photographer	A. Jenner

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## FLINDERS RANGES HERITAGE SURVEY

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### Copper King Copper and Ochre Mine

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#### DESCRIPTION

The site is remarkably intact in that it has surviving machinery and well timbered shafts and open cuts still *in situ*. It has recently been fenced by the Department of Environment and Natural Resources. The following features were noted at the site:

- an Imperial Diesel single cylinder engine
- drive shafting and flywheels still *in situ*
- a winch or winder drum
- an Oliver Filter or similar
- a screw conveyor
- side tipping ore cars
- a partially collapsed headframe
- kibbles and ore buckets
- two sections of 20 inch rising main embossed 'Hawke & Co Kapunda'
- parts of a Kynoch Limited Birmingham single cylinder engine or compressor
- concrete and corrugated galvanized iron tanks and vats
- a horse buggy chassis and body
- Gartcraig firebricks
- a stone chimney base or forge
- an ore tramway and mullock heaps
- five mine shafts — some timber lined and in good condition
- four open cut pits

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#### HISTORY

##### Including State Heritage Branch Report: Justin McCarthy

This was a late starting copper mine for the Flinders Ranges, it being established almost forty years after the earliest ones. It appears that copper was first discovered there by J. and W. Hill in 1899. Although it operated until 1952, from 1924 it was more important as an ochre mine and much of the machinery on site dates from that later phase of the mine. 'The mine's significance in both economic and historic terms derives from the ochre mining operations.'

The first newspaper accounts of the copper discovery report it as 'an exceptionally good one, possessing as it does an enormous lode, the actual dimensions of which have not yet been ascertained.' Not long after the copper was first extracted it was found that the presence of oxides 'makes a very good paint ...' Apparently the operators of the mine never realised that the value of the oxides were worth thirty times the value of the copper over the life of the mine.

The main use of pigments from this site was in paint manufacture and, in the latter period, for gas purification. Natural pigments are used in industry to give colour, opacity, or body to paint, plaster, stucco, mortar, cement, linoleum, rubber.

Oxide mining appears to have commenced on a commercial basis but on a small scale in 1906 until 1912 when operations ceased until 1919. By 1924 a new phase of development began with plant and machinery being installed. Surviving components

## FLINDERS RANGES HERITAGE SURVEY

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### Copper King Copper and Ochre Mine

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include an 8 hp super diesel engine, a friction winch used for winding water, a mechanical or fine mesh shaking sieve, and a puddling machine used in the levigation of the oxides. Other intact features include concrete settling pits, a tramway, floors, a headframe, ore carts, sheave wheels, a Kynock gas engine, a forge, two furnace casings, some cast iron water pipe, and a clyclonic separator.

The 1924 and 1954 site plans show that few changes to the layout of the mine took place over this period and were easily related to an 1987 site plan. An inspector visiting the site in 1927 observed that if the plant had been better planned 'the same machinery, rearranged would do better work at considerably less cost ...'

Although ochre mining constitutes only a small part of the mining activities in South Australia's history, it is still an important part.

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### STATEMENT OF HERITAGE VALUE

One of the four major European coloured pigment sites in South Australia. The transition from copper to pigment production reflects the volatility of the copper price around the turn of the century as well as the economic and industrial development of the State which required pigment products.

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### RELEVANT CRITERIA

- (a) the site demonstrates important aspects of the evolution or pattern of the State's history, namely that of mining and the persistence of those involved to make it pay;
  - (c) archaeological evidence may yield information that will contribute to an understanding of the State's history.
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### REFERENCES

Department of Environment and Natural Resources, State Heritage Branch — 13957.  
There are many references included in this report.

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Site Surveyor	J. McCarthy	Date(s) of Survey	3.12.1994
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The Copper King Copper and Ochre Mine, located 16 km (10 miles) north of Beltana, was mined from 1899 to 1952 for copper and ochre. Its significance in both economic and historic terms derives from the ochre mining operations. Much of the machinery which is still on the site dates from 1924 when the major ochre mining phase commenced. Department of Mines site plans drawn in 1924 and 1954 reveal that little has changed at the site since 1924. No other ochre mine is listed on the State Heritage Register.

Although records pertaining to the early history of the mine are scant, it appears that copper was first discovered there by J and W Hill in 1889.<sup>1</sup> A newspaper report of October 1899 reported that the mine had been operating for two months by Messrs East, Pollard, Harvey and Company and that 40 tons of copper ore had been mined and sent to Port Adelaide (for smelting). The claim is somewhat ambivalently described as "an exceptionally good one, possessing as it does an enormous lode, the actual dimensions of which have not yet been ascertained"! Mining was being carried out on the open cut system with a predicted 20-30 tons weekly production. Transportation of the ore from the site was by waggon to Beltana and thence by rail to Port Adelaide.<sup>2</sup>

Newspaper reports through 1899 and 1900 add only a little information to the picture. It appears that the claim comprised six forty acre blocks numbered 2171, 1943, 1942, 1732, 1730 and 1731 held under miner's rights, with the principal workings on block 2171.<sup>3</sup> At that stage copper was the target commodity although it was not apparent in any quantity and was irregular in occurrence. Early reports stated that the deposit consisted of ironstone and iron oxide with pockets of green carbonates and grey ore<sup>4</sup> and that "the whole body is a mass of small leaders and nodules of ore, varying from the size of a pea to that of a man's fist ...".<sup>5</sup> Assays from these early reports range from 3% to 24½% copper. Handpicking of the copper ore probably gave a reasonable return as the world copper price fluctuated between 52 pounds and 88 pounds per ton over the 1899-1906 period.<sup>6</sup> A Department of Mines report states that total recorded production of copper was 27½ tons having a value in excess of 300 pounds,<sup>7</sup> but this seems to be a very conservative estimate of the value, if not the quantity.

The first reference to the presence of oxides and the recognition of their possible use occurs in a newspaper report of 8 December 1899. This relates that "some of the oxide makes a very good paint and mixed with oil is used for marking the bags" (of copper ore)<sup>8</sup>. Little did the operators appreciate that the value of the oxides would realize thirty times the value of the copper over the life of the mine.

The main use of pigments from this site was in paint manufacture and in the latter period, for gas purification. Natural pigments are used in industry to give colour, opacity, or body to paint, plaster, stucco, mortar, cement, linoleum, rubber etc. The iron oxide content, the state of hydration and particle size determine the difference in colour of the various ochres.<sup>9</sup> Yellow brown limonite containing at least 15 per cent ferrous oxide is marketed as yellow ochre. With an increase in iron oxide content (25-70 per cent) and brown colour, they are classified as pigments of the sienna class though there is no

sharp division between sienna and ochre either in hue or iron oxide content. The hue of natural red pigments is derived from hematite. They may be prepared from yellow ochres, sienna, etc, by calcining and dehydration, the shade depending on the intensity of calcination. A brown colour is common when manganese dioxide is present. Pigments of the umber class contain 10-25 per cent manganese dioxide with 25-50 per cent ferrous oxide.<sup>10</sup> Iron oxides find use in gasworks for the removal of hydrogen sulphide from coal gas. Samples tested from the Copper King mine were tested and found to be extremely reactive to hydrogen sulphide.<sup>11</sup>

Oxide mining appears to have commenced on a commercial basis in 1906. Returns for the six months ended 31 December, 1906 show that 16 tons 9 cwt of pigments valued at 47 pounds, 19 shillings 1 penny were produced. By July of 1908, the opencut measured 50 x 60 feet (15m x 18m) and 20 feet (6m) high at the face, with two tramlines going down into the pit. The mine was being worked principally for pigment and 17 tons of sienna had recently been sent to Adelaide. It is also reported that several shafts had been sunk on the property from 20 feet (6m) to 140 ft (43m) deep and that a small levigating (grinding) plant for experimenting purposes had been erected with the intention of installing an up-to-date plant if it proved successful.<sup>12</sup> As 60 tons were produced that year the experimental plant must have been reasonably successful.

Small scale production continued until 1912 when there was a cessation of activities until 1919, probably due to the war. The next major development phase occurred in 1924. A modern plant was erected and reported on in a detailed report to the Department of Mines.<sup>13</sup> The plant and machinery described in this report are probably those that survive on the site today. The site plan and photographs in the 1924 report provide an insight into how the plant worked. The main components which survive are the 8 hp super diesel engine, a friction winch used for winding water, a mechanical or fine mesh shaking sieve, and a puddling machine used in the levigation of the oxides. Other intact features include concrete settling pits, a tramway, floors, a headframe, ore carts, sheave wheels, a Kynoch gas engine, a forge, two furnace casings, some cast iron water pipe, and a cyclonic separator. Some of these features are later additions to the site and represent advances made in the technology of levigation and separation over the life of the mine. The introduction of modern technology obviously paid off as the tonnage produced in 1924 leapt up to 595 tons, an all-time high.<sup>14</sup>

The 1924 and 1954 site plans show that few changes to the layout of the mine took place over this period. Indeed, these plans are easily related to the 1987 site plan. It is interesting to note that the writer of the 1924 report revisited the site in 1927 to see what development had occurred in the intervening period. After noting that very little modification had taken place, the writer states: "The plant has been erected piecemeal, and in consequence too much handling is involved. The same machinery, rearranged, would do better work at considerably less cost ...."<sup>15</sup> Rearrangement of the plant seems never to have occurred. Some features noted in the 1987 survey suggest that



more plant was installed (furnaces, an engine and cyclonic separator) but that the original plant was maintained.

The attached table shows the recorded yearly production figures for ochre. The total tonnage of 1933 tons valued at 10,156 pounds represents a significant endeavour over a prolonged period. Although ochre mining constitutes only a small part of the mining activities in South Australia's history, it is, nevertheless, an important part and this site should be included on the Register of State Heritage Items.

#### References

- 1 SA Advertiser, 8 December 1899.
- 2 SA Advertiser, 11 October 1899.
- 3 SA Register, 19 December 1899.
- 4 SA Advertiser, 29 September 1908.
- 5 SA Advertiser, 8 December 1899.
- 6 Dept of Mines Drawing No S7931.
- 7 Mining Review 100, 1954, p. 44.
- 8 SA Advertiser, 8 December 1899.
- 9 Mining Review 100, 1954, P. 46.
- 10 *ibid*, p. 47.
- 11 *ibid*, p. 47.
- 12 Mining Review 9, 1908, p. 40.
- 13 Mining Review 41, 1924, pp. 65-69.
- 14 Mining Review 100, 1954, p. 44.
- 15 Geological Survey of South Australia Bulletin 13, 1928, p. 66.

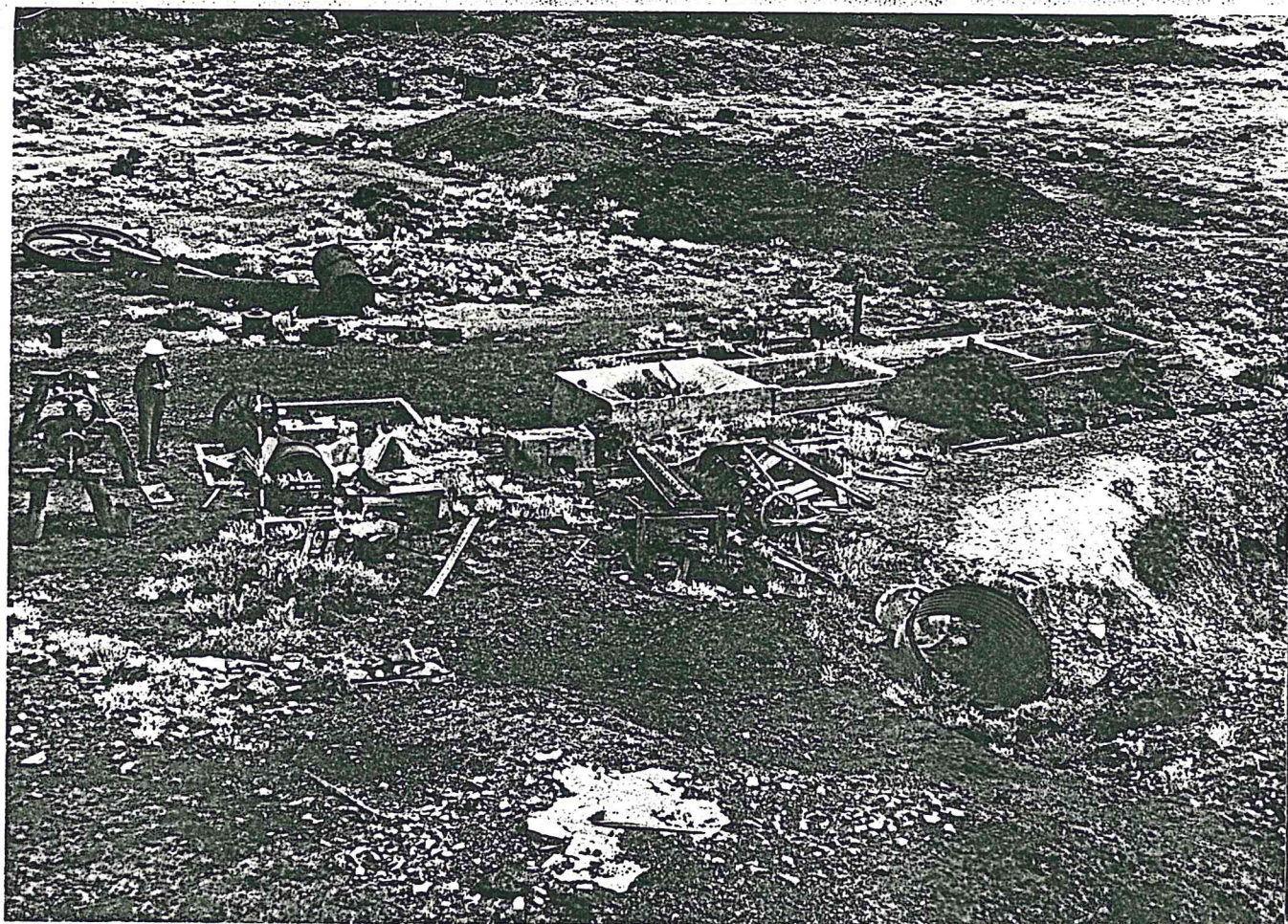






6. Treatment plant area.

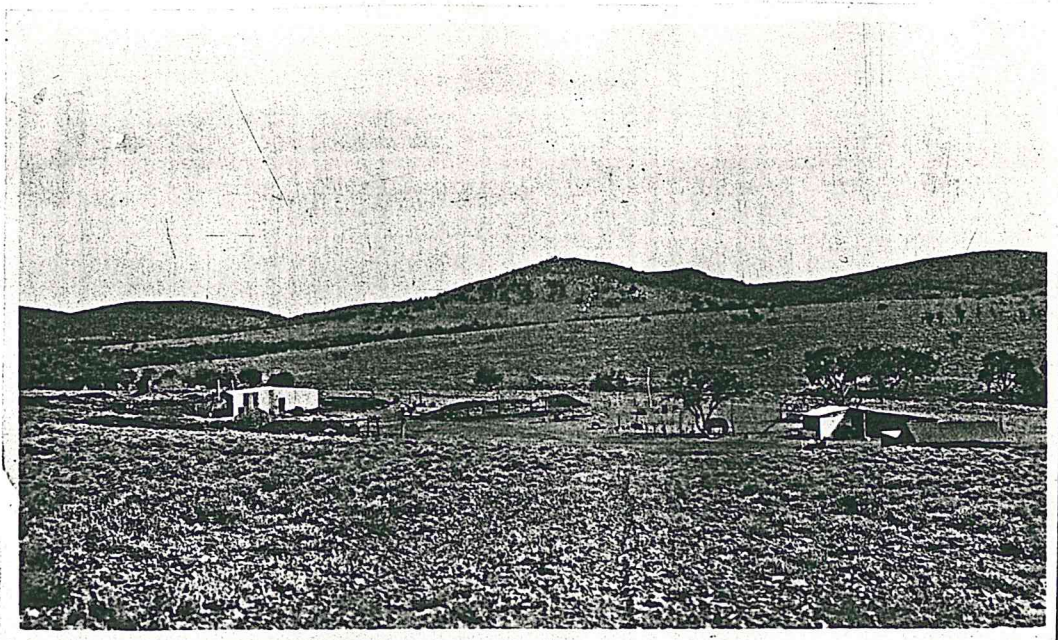
May 1987



7. Treatment plant area.

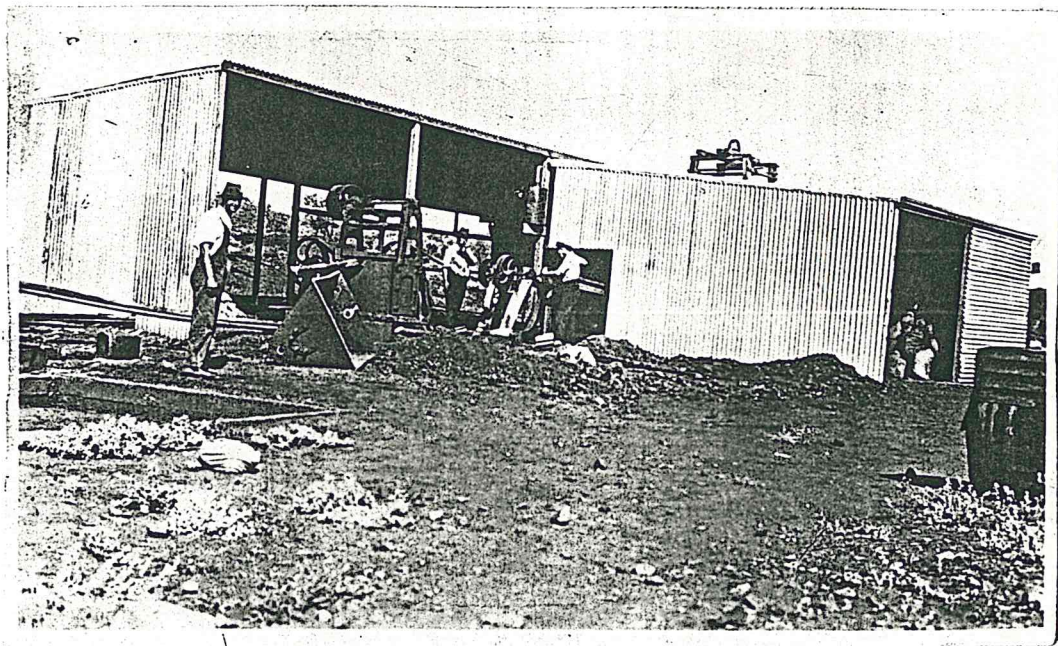
May 1987





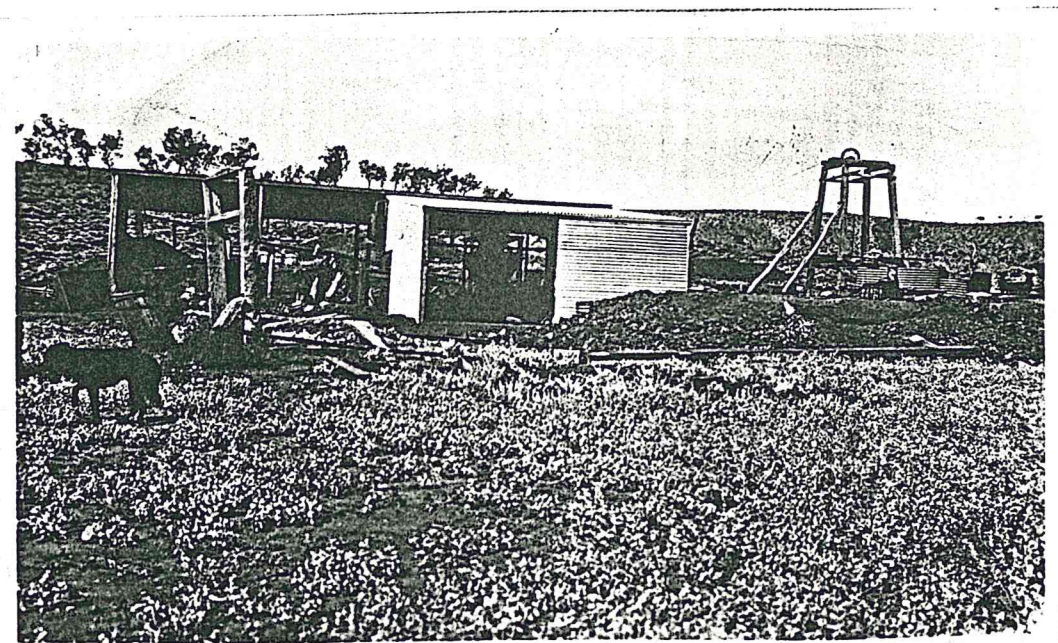
1. General view of the mine to the S.E.

Dec 1924



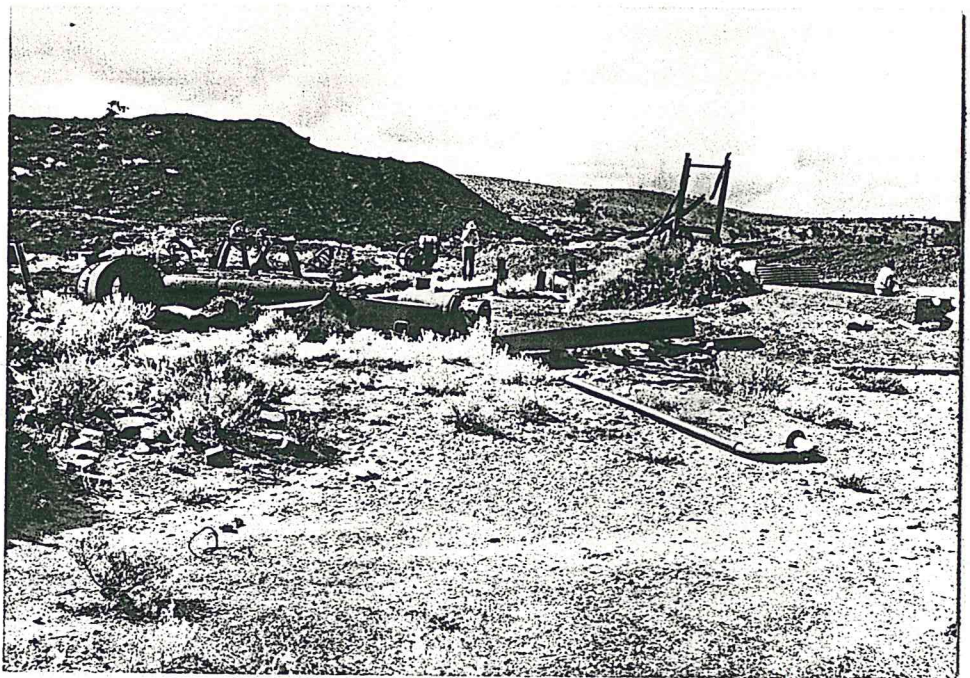
2. Treatment shed.

Dec 1924



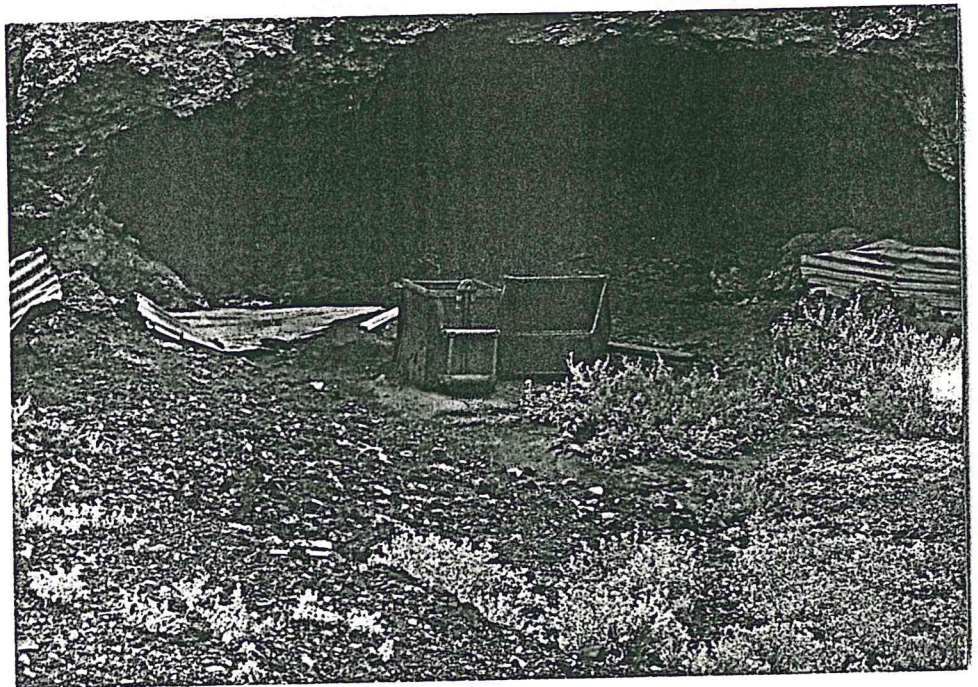
Dec 1924





4. Treatment plant - view to N.E.  
Compare with photo 3.

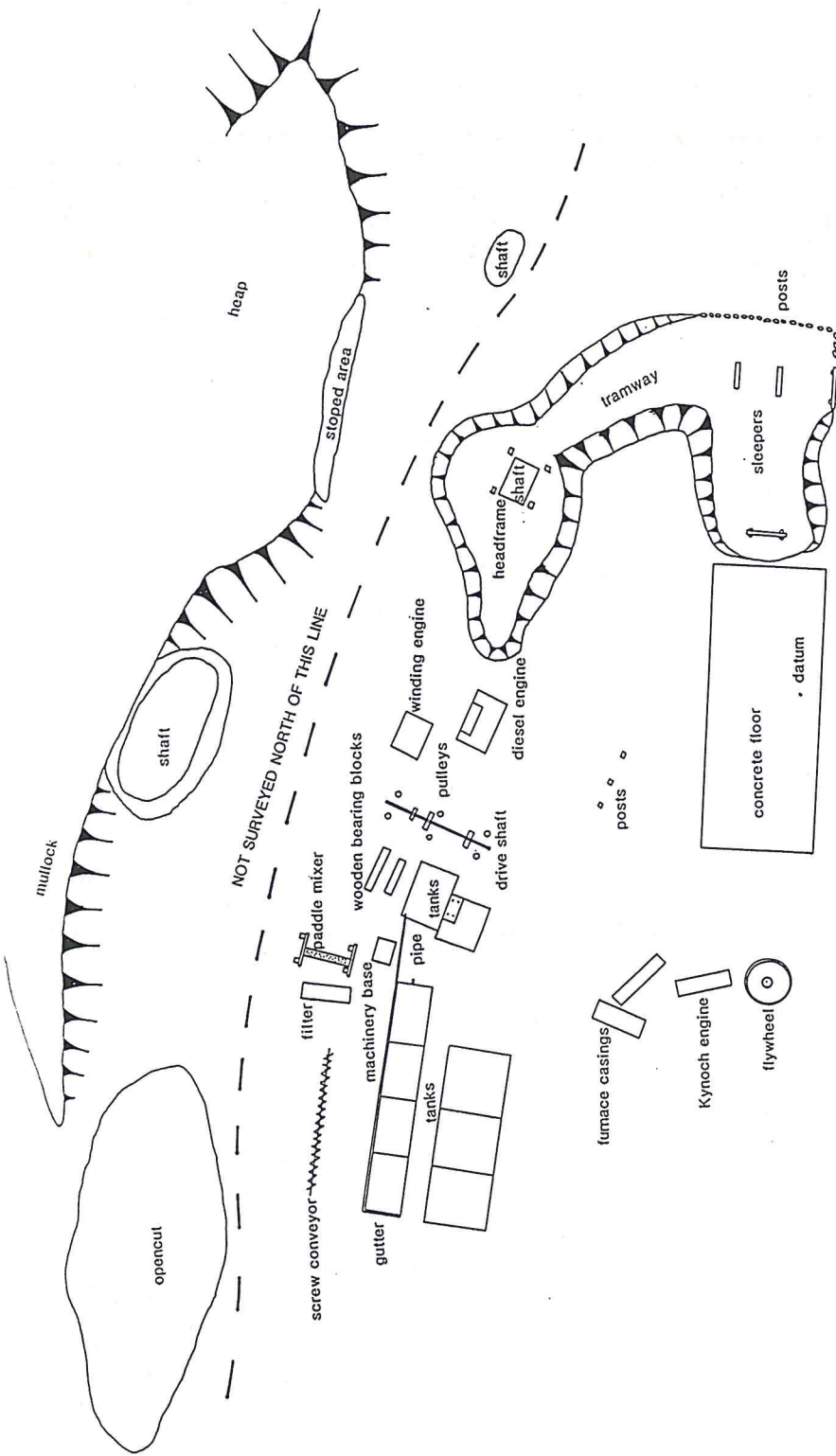
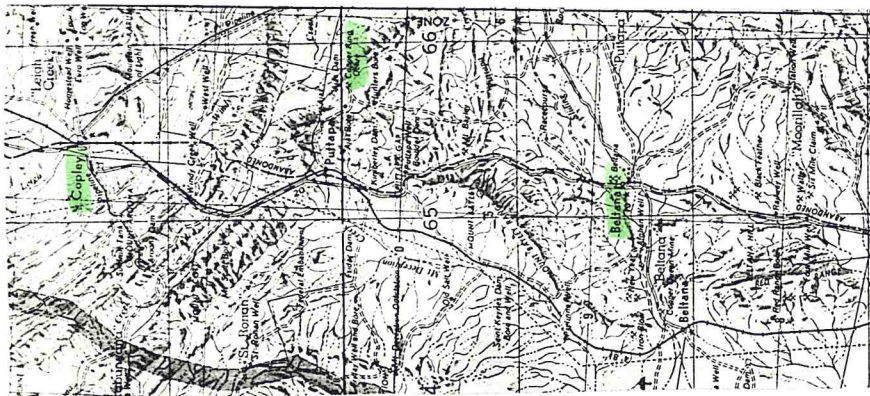
May 1987



5. Ore carts in open cut.

May 1987





# COPPER KING MINE

SCALE 5 10 15m

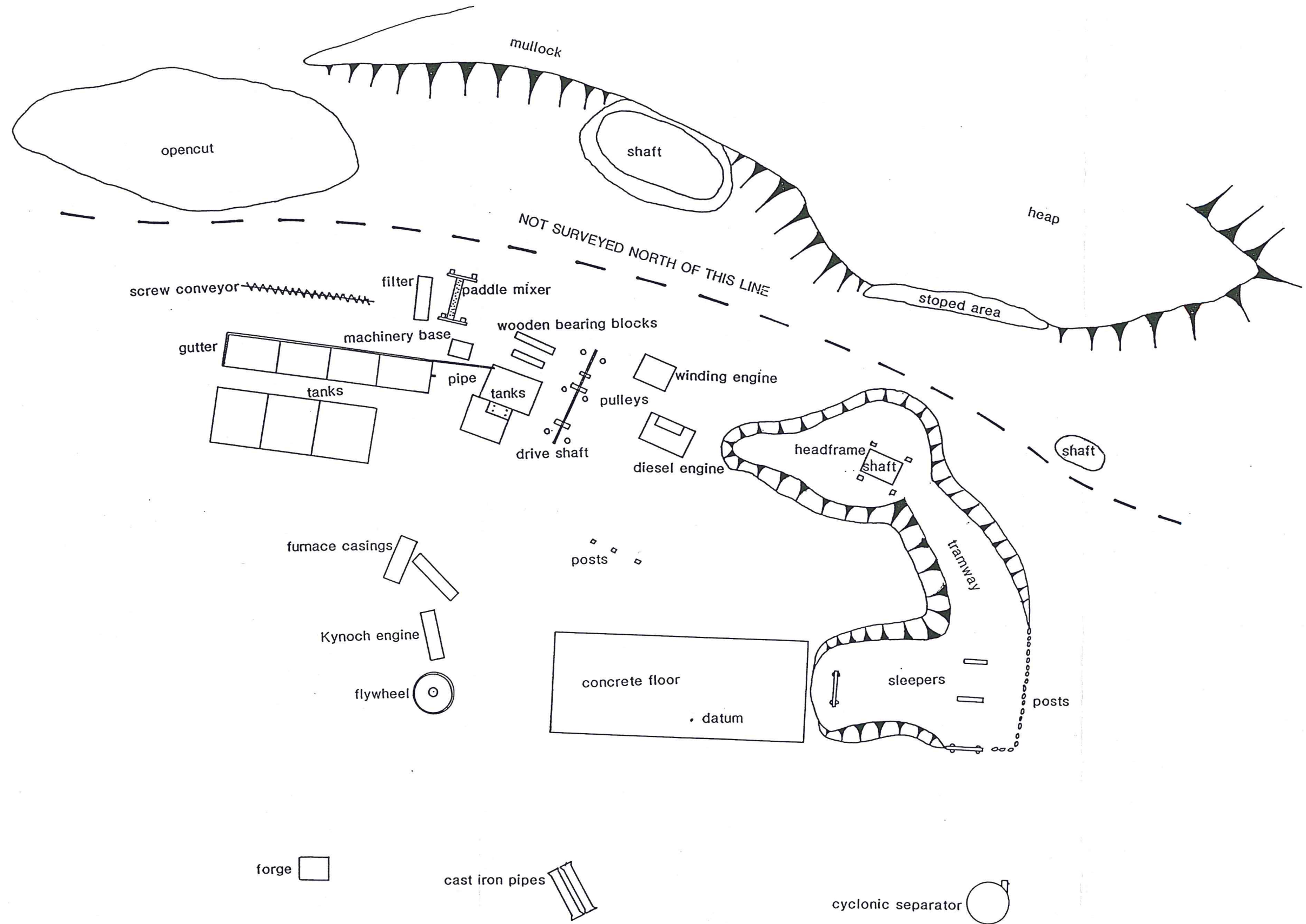


DATE 15-5-87 JPM

pipe assembly

ore truck





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ore truck

pipe assembly



SCALE 5 10 15m

COPPER KING MINE

DATE 15.5.87

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