Open File Envelope No. 8883

EL 1980

KAPUNDA

PROGRESS REPORT TO LICENCE EXPIRY FOR THE PERIOD 1/8/1994 TO 31/1/1995

Submitted by
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1995

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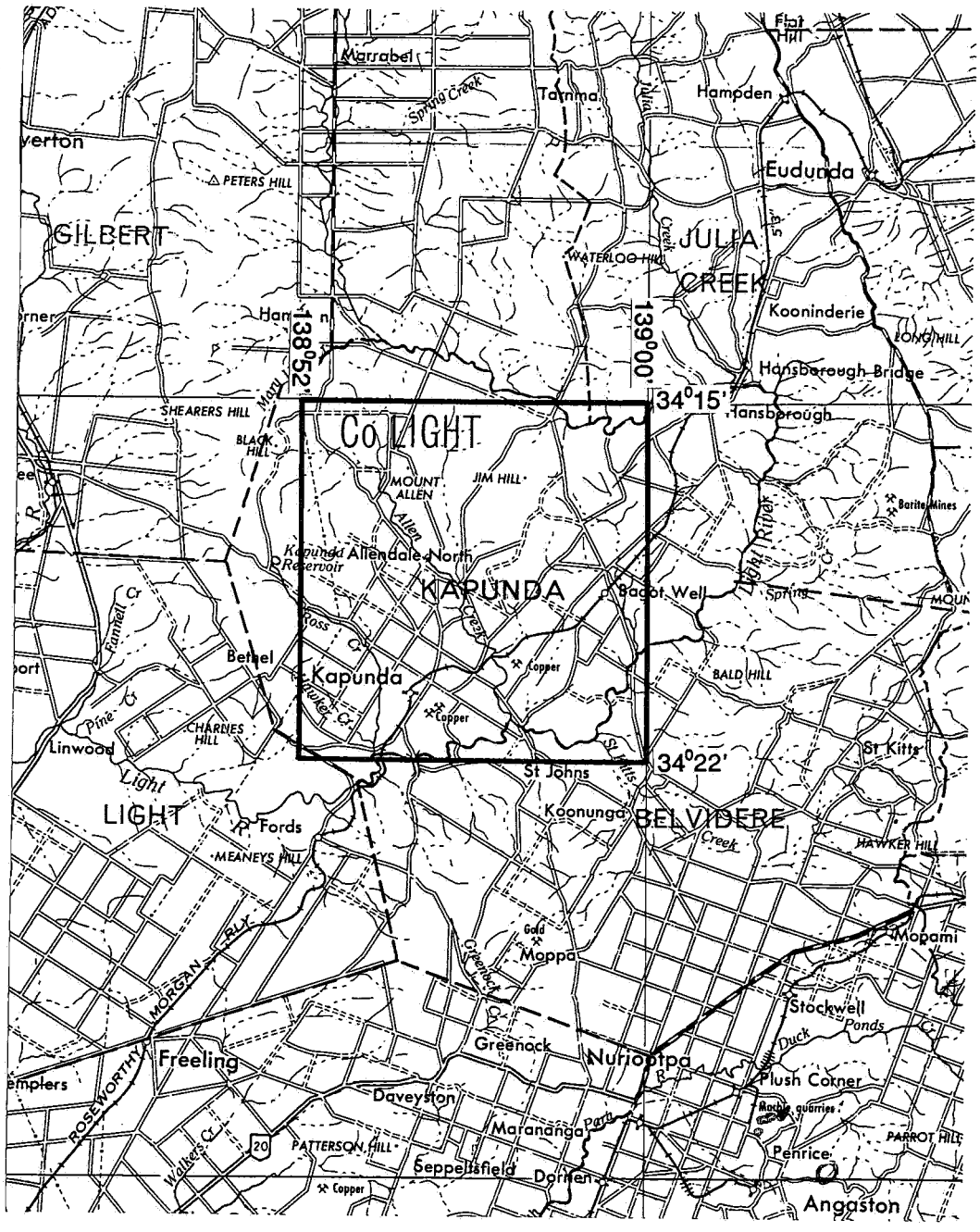
Government of South Australia
Primary Industries and Resources SA

SCHEDULE A



SCALE 1 : 250 000

5 0 5 10 15 20 25

KILOMETRES

EXPIRED

APPLICANT : **MARK SELGA**

DM : **535/93**

AREA : **159** square kilometres (approx.)

1:250 000 PLANS : **ADELAIDE**

LOCALITY : **KAPUNDA AREA - Approximately 70 km NE of Adelaide**

DATE GRANTED : **1.8.1994** DATE EXPIRED : **31.1.1995**

EL No : 1980

ENVELOPE 8883

TENEMENT: EL 1980 Kapunda

TENEMENT HOLDER: Mark Selga

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		MESA NO.
REPORT:	**JLC Exploration Services, 1995.** Kapunda EL 1980. Literature search notes (Prepared for Brukunga Services by JLC Exploration Services).	**8883 R 1** Pgs 3-16

END OF CONTENTS

KAPUNDA EL 1980

Literature Search Notes

Prepared for Brukunga Services

By

JLC Exploration Services

1.0 INTRODUCTION

The Kapunda area has received only one comprehensive examination that sought stratabound copper mineralisation by UTAH.
Considerable detailed work has been done however on the leased areas surrounding the Kapunda Mine.

The mine remains excluded from the EL being held by Adelaide Chemical Co and is managed by K. Bampton.

Ken whilst generally discussing environmetal aspects of mineral development has referred to a degree of NIMBY syndrome that appears to be well entrenched at Kapunda. (Ken is OS for a few weeks over Xmas period & early January)

2.0 DATA AQUISITION & SOURCES

The data was searched by applying a simple Keyword choice on SAMREF as supplied on CDROM, Dec 94 Update supplied through AMF.
Page references as they appear are the Open File Envelope serial page number. Whwn ordering request (Envelope No - Series Nos)

3.0 OVERVIEW of GEOLOGY & EXPLORATION POTENTIAL

3.1 GEOLOGY Regional

Examination of the stratigraphy at 1:250,000 Scale discloses some unusual features in the Adelaidean and overlying Cambrian Units.

Most evident is the sedimentological disharmony between the Umberatana and Wilpena Groups. On futher examination similar discordance is also present between the Farina and Yerelina Subgroups. An echo also occurs in the greatly reduced nature of the Cambrina sequence.

These disaharmonies are not entirely stratigraphic as detailed mapping indicates sgnificant faulting in the vicinity of the Kapunda Mine that is not shown on the regional sheet.

The degree of stratigraphic disharmony is strongest across the northern extent of the Bremmer Fault System which as it is currently expressed is clearly post depositional.

I am inclined to the view that the above features are due to a basin boundary feature that first became active during early Tapley Hill Formation deposition, and episodically thereafter.

It wouuld seem that this boundary zone is a fundamental structural entity that has been reactivated as the Brewmmer Fault ?hinge focus.

I have broached this subject with Dr. Preiss as part of this project and he also advises that the sedimentology of the rocks in

the neighbourhood is somewhat ambiguous.

The possibilities are that the Cox's Sandstone and Eudunda Arcose have been confused, the Cox's Sandstone and Eudunda Arcose are the one and same, the Tarcowie Siltstone and upper Tapley Hill Formation have been confused.

All this does is suggest that the well defined lithostratigraphic facies of the Upper Farina Subgroup are in dissaray because the enviroment is some near shore/shallow shelf environment that remains to be properly documented.

The inferred facies transition provides for basin de-watering models of stratabound base metal deposition a-la Zambian Copperbelt.

It is clear that UTAH was using a similar model that was focussed on the "Eudiunda Arkose" around the Mt. Allen Syncline. Their results were not encouraging.

3.2 GEOLOGY & MINERALISATION

Examination of the Kapunda Mine information demonstrates a complex interplay of strike faulting oriented parallel to the regiopnal fold axes, related oblique tensionally derived close spaced fractures which dominated ore shoot development, and bedding plane partings along the same zone which also became ore shoots.

The totality is currently enclosed within an envelope of kaolinitic alteration that has an overall basin like morphology with tooth like roots that follow local structures to depth before thinning and ?petering out downwards..

On the face of it it seems improbable that the kaolinisation is anyrtrhing other than deep Tertiary weathering arising from acid attack of country rock upon oxidation of proimary sulphides.

Redistribution of the mineralisation and supergene mineral species further confuse the original configuration of the deposit. It is reasonable to presume however that the sulphide had its primary source in the Tapley Hill Formation and that the Kapunda Ore was formed in response to deformation and faulting that probably gave rise to copper bearing veins in tension gashes that may have developed in resoponse to a shear couple

The origin of the copper being enigmatic but possibly from sedimentological dewatering.

Weathering impacts are so severe as to have probably destroyed any direct evidence regarding hydrothemal alteration. Only fluid inclusion and Isotopic studies are likel to resolve such a matter.

Exploration and Mine data give little information of consequence

concerning gold. Two localities outside the EL were identified. Base data in HYL Brown only. Moppa near Greenock suggests some possibility of Aplilla Tillite hosted epigenetic Au and Goddards Hill, due east of Hamilton is clearly an indurated tertiary placer deposit possibly derived from a semi-adjacent deposit of the above type.

3.3 EXPLORATION OPPORTUNITES

It would seem that exploration should focus on the coincidence of struture and favourable sedimentology if an epigenetically upgraded stratabound deposit of copper or gold is being sought.

There are some magnetic markers in the Tapley Hill Formation. It follows that the use of Aeromagnetic surveys could potentially enhance the possibility of identifying offsets and sedimentological irregularities that might be favourable for mineralisation as well as unravelling the overall stratigraphy.

The generally strongly reduced sulphidic Tindalpina Shale could be an important horison.

Dr. Preiss advises that the cores and samples supplied to the DME have by and large been discarded.

ENV 2706 EL's 239/240 Kapunda SA Utah Development Co P/L.

EL 240 coincides in lower half with current title at 34 18' and 34 19'Lat.

To the south the upper half of adjoining EL 239 is coincident with the curent title (includes Kapunda Mines). (see p15 ENV 2706)

EL 240 Mt. ALLEN ENV 2706, UTAH DEvelopment co.

Kapunda JV

Costening:undertaken later see plan 2706(1)-9. copied

Drilling: Auger, RAB, hammer, and precolled DDH

Auger -regional reconn traverses.

KD 021 at Bagot Well sub-parallel to dip -terminated minor ?cpy.

KD 028 at Mt. Allen a little Cu

kd 030 3km west of KD 028 no Cu

Detail - open hole drill logs pages 026-073

DDH Summary Pages 74-85 report no significant Cu intersections

Some Py & Phyr observed.

Detail - DDH logs pages 85-104

Detail more Open hole logs pages 104-278

fig 2706(1)-1 Rotary holes

Geochemistry of drill holes:

fig 2706(1)-1 Cu< 120, Zn <600 genrally <250

fig 2706(1)-2 Cu< 250, Zn <400

fig 2706(1)-3 Cu< 100, Zn <400, generally <300

fig 2706(1)-4 Cu< 400, Zn <400

Plans 2706(1)-7 and -8 clearly indicate that the target was stratigrpaphic. The 110 m thick unit designated "MHB" is phyrrohotite rich up to 5% or so with cpy traces over short intervals. It lies ?above "MHA" and below "HMB" get copies

Comparison with the DME 1:250,000 sheet suggests that this MINE series is probably the Eudunda Arkose member of the Tapley hill formation.

Weathering Effects:

PP 289 Traverses 6,10,14 found significant weathering impacts due to kaoliniosation, low Cu & Erratic Zn.

KD 031 -Bagot Well near 021 intersected monotonous muscovite-bioptite-metasiltstone. dolomite content appears to have been leached out in upper 200m +, traces graphite, rutile (??Hm) and py.

More Drilling Summaries - pp306-312

Detail -logs pp 313-335.

Costeans logs pp 336-338

General Geology:

General geological setting pp V3: 364-369

Shear Zone host environment

Main production 68,000 tons concentrate @ 19.9 % Cu.

Workings to 420 ft depth.

Shoots verticle, 18-24 ins wide, 150-200 ft strike

Present target is lower grade halo.

Exploration history

Brief summary of exploration history: p357 -360

DME investigation 1961-64 :

BHS delineated low grade sub economic resource 1965-69

Noranda Little advances, minor exploration drilling 1970

Emerald Copper Ind consolodated mineral rights over mine area in 1971

Northland Mins aquired PM titles for equity and expanded consolidated oqnwership - 1971. Conducted its own programe and negotited Utah JV

Northlands focussed on mine - mapping, auger geochem, 53 ddh woith very low recovery by current standards.

UTAH:

mapping, geochemistry, drilling

Cores and samples EL 239/240 should be in DME core library.

One hole left: very poor data (W. Preiss Pers. Comm.).

Exploration-overview.
Plates 1 & 4: 2706(111)-1 (1:25,000) Geol and -4 (1:50,000) get copies:

Descriptive geology - Nigel Rowlands pp 364-369, figures 394-398 get copies

Plate 1 geology subdivides the Tapley hill formation and includes evidence supporting the presence of slighlty oblique to paralllel strike faulting.

The model for mineralisdation adopted by Utah was "syn sedimentary" cum "strata bound". This I infer from the palaeostratigraphic reconstructions and the "sedimentological" nature of the mapping.

MHA & MHB (mineralised horisons A&B) are siltstones often strongly dolomitic 40-50% and 30-60% SiO2 with minor Kspar. Cpy <5%, Py =2%, Phyr <7%. They are of uniform character, intercalations of other lithologies are uncommon/rare.

Cu usually Cpy, (minor chalcocite & Bornite), Py is dominant over Phyr execpt in footwall lithologies. Sulphides are commonly associated with algal horisons.

Sulphide occurs bedded, dispersed and in veins/joints.

Veins may be both discordant and concordant (I assume that concordance refers to stratigraphy and infer that "discordant" veins exclude "discordant jointS" and must refer to oblique fault/shear related structures.

Sulphide is more commonly associated with Qtz sand rather than dolsand/silt laminae I infer that this means possible ?late diagenetic permeability control.

Concordant Vein walls are irregular reflecting cleavage - suggesting possible ?post mobility along cleavage

Discordant veins have by contrast have both diffuse and younger sharp contacts with the host rock. Based on the descri[ption I suspect a late digenetic to possible Delamarian age range.

The palaeostratigraphy needs to be revised.
listing of all holes with principal geol strat.pp 372 - 380
important intersections analytical data pp 381-383 get copies

ENV 2376 EL's 114/(65 Sucsr) Kapunda SA Utah Development Co P/L.

Became el 239 mt. Allen

Mineralised horison is Eudunda Arkose which is mainly silstone and has poorly defined outcrop signature in the field.

Useful data mainly in the form of maps:

2736(1)-:

*-6 is geochem Rock Chip and identifies possible anomalous -Cu localities. get copy

*-2 is "Objective" geology a fact map with outcrops marked with "note book type ref nos", dips etc. Illustrates poor exposure position get copy

*-3 is Geology Interpretation and leads to questioning of stratigaphic assignment of units. Superceded by map from ENV 2706/ EL 239. get copy

*-1 Explor summary map - not much value.

*-5 Geochem sample locality map

*-4 tectonic overlay - not of great value

*-7 Proposed drilling

Comment by the authors and follow-up considerations by Dr. W. Preiss suggest it is indeed possible that:-

The Lower part of the Tapley below the "Eudunda Arkose" seems to be correct but the Eudunda Arkose and above may be in part the Cox Sandstone/Tarcowies siltstone equivalents, possibly with some relict aspects of the Pepuata Tillite possibly a similar lithofacies to that of the Willyerpa Formation near Olary.

Petrology pp 26-36,

Geochemistry : pp 40-42 examine possability of strong influence on results from palaeowethering influences.

Rab programme drill logs pp 47-141.

Further consideration of palaeowethering aspects described pages 168-173.

Maps 2736(111)-

*-2,1 Total,A & C Horison soil geochem - RAB programme

*-3..13 Soil horison profiles.

*-14 Stratigraphy Interpretation

*-15..17 Geochemical probablility curves - multi population groups evident - supports weathering influence

Kapunda Mine & Environs: Northland minerals ENV 2260 Mls 3800-3822

Vols 1-10

Vol. 1 reports pp 0-60 get fiche

PP 17 Mineralisation in a steeply east dipping kalonised zone probably located in the footwall of a fault.

Sub adjacent and to the west is a bedded mineralised zone which is supergenely enriched above a pyritic protore horison.

Cu and Au analyses of DDH in mineralised zone:

Bedded zone up to 50 ft thick. with high grade horisons which were worked.

Suggested that kaoloinisation is an alteration associated with the supegene enrichment - clearly impling a palaeo weathring origin.

Structure pp 35-39 : Mineralised fractures St 300-320 deg, Dp. 60-70 E parallel to fault and en-eschelon set St. 5-20 deg, Dp. 60-80 W, Barren set with qtz St. 45-55 deg Dp. 60-70 S.

Fracture set @ 300 widely recognised but only locally dilated and mineralised at the 'mine' over max of 400 ft wide zone.

En-eschelon confined to main 300 fracture set -Implies genetic connection and direction of a shear couple operating along the 300 deg set with NE side south SW side north. The system could be sigmoidal. Some 300 deg fractureshave been observed to deviate into the bedding surfaces impling that some bedded mineralisation may have a stress induced fracture origin.

Mineralogy pp 40-46: one mineral species Macinawite a (Ni-Cu-Co)FeS2 substituted pyrite variant is known to be an asociate of high temp Cpy - this implies some of the present mineralogy is primary, being neither syngenetic or supergene

Gold pp 46-47: 0.6-10 dwt/lt av Au-2.5 dwt/lt, Ag-3.5 dwt/lt appears to be related with the 300 deg fracture zone system and not the bedded mineralisation. 24 of 254 samples yielded >= 0.01 ozs/lt sig results page 125-126, 135-136 get copies

Model: epigenetic copper introduced into a faulted sequence with syngenetic pyritic zones.

Sratigraphic column pp159

Vols II - VI data drilling, petrology and mettalurgy concerning mine and immediate vicinity.

Plans 2260(VI)-2,3 mine geology environs at 1":100' get

Plans 2260(VII)-4,7 general exploration around mine /auger drilling. etc

Plans 2260(VII)-8,16 geology plans at 1":40' 11,12, most useful get

Plans 2260(VII/VIII)-17,32 Plan *-25 has legend3

Cross sections - show flattish 20 deg bedding west dips.
Steep 80 deg W dip lodes with short verical extent and a 30 deg very flat main lode of considerable persistence

Kaolinitic alteration is very clearly a weathering impact being influnced by the steep and bedded mineralisation. It forms a basin like feature around the semi-oxidised mineralised system.

Plans 22 & 23 probably have all the essential features worthy of first pass examination get copies

Plans 2260(IX/X)-34,50 Assay X sects

Plans 2260(x)-51 costeans, 52+ old mine site & miscellaneous

ENV 980 (662) Kapunda SA, Mines Exploration P/L .

Report on mineral claims -1969 vintage

Main lode recorded St 10-20 W & Dp 30-45 W

limited geology on mine environs, describes a programme of work that focussed on IP surveys followed by drilling,

Drill cuttings were analysed but no intelligent use was made of any geolgical interpretation of these results. Generally low copper grades no gold analyses.

Vol 1 is main report, remainder dominated by plans mainly IP data.

Not of particular value for current project. IP probably out of date technology.

RB 89/44 Kapunda : Horn, Pain & Newton

Residual resource potential of 15Mt ore Av 1.2 % Cu

Gold reported from Moppa & Hamilton alluvial fields, possibilities in piedmont gravels (North) and apilla tillite hosted deposits.

ENV 8210 EL 1604 Kapunda Silverdust P/L

Moppa - Gold 1893 workings muscovite schists NS strike Au with Qtz veins for 220 m strike recent sampling .04 g/t. Sam,pling regarded as incomplete. Lode system reported as being <= 1m wide

Where is Moppa ? 8 km south of EL

Goddard's Hill may be related to High Piedmont gravels! if so then encouraging possability for palaeo-placers. Other possability is of course that Goddards hill is a tillite/diamictite duricrust. 0.47 g/t is encouraging. Photo suggests shallow dip on conglomertate

Where is Goddards Hill? presumably 3 km north of title, WSW of Waterloo Hill unamed on geolgy map.

END OF NOTES ON KAPUNDA

KAPUNDA.

00014

TI: Progress & final reports e.l.113,Kapunda,S.A. (17 vols,11 reps,108 figs,cyl)joint venture with utah,see also e.2272, 2705,2706.
DOCTYPE: Company rep
TN: EL113;
CO: Northland minerals;
AU: Lawton, J; Jarvis, D M; Rowlands, N J; Kitch, R B; utah;
SO: SADME:open:file, 251pages; maps,illust,
RE: Env 2362
BR: 1345
MI: Kapunda mine;
LO: Kapunda; Belvidere; Bagot well;
CNO: 1006168

TI: Progress reports e.l.239 Kapunda S.Aust.(joint venture with Northland 2362).
DOCTYPE: Company rep
TN: EL239;
CO: Utah;
AU: Drummond, A J; Jarvis, D M;
SO: SADME:open:file, 53 pages; maps,illust,
RE: Env 2705
BR: 1345
MI: Kapunda mine;
LO: Kapunda; Mount allen;
CNO: 1006172

TI: Surrender report-Kapunda joint venture e.l.239 & 240 S.Aust.period 29-4-74-14-2-78(see also e.2376,2705,2272).
DOCTYPE: Company rep
TN: EL240;
AU: Rowlands, N J;
SO: SADME:open:file, 16 pages; maps,
RE: Env 2706
BR: 1345
MI: Kapunda mine;
LO: Mount allen; Kapunda;
CNO: 1006173

TI: Report on the geology and mineralization of the Kapunda prospect for Northland minerals (including details of expl. drilling to mar 1973).
DOCTYPE: Company rep
TN: ML3800;
CO: Northland minerals;
AU: Hughes, M; Melville, P;
SO: SADME:open:file, vol 1-11, 153pages; maps, illust,
RE: * Env 2260
BR: 1345
MI: Kapunda mine;
LO: Hd Kapunda, secn127, secn1;
CNO: 1011699

TI: Final exploration report, Kapunda area, South Australia.
DOCTYPE: Company rep
TN: MC5034; MC5035; MC5036; MC5037; MC5038; MC5039; MC5040;
CO: Mines Exploration Pty Ltd; (Code: MEX)
AU: Roberts, J B;
SO: SADME:open:file, 23 fiche, 164 pages, 108 plans; 7 appx, 3 ref, 6 vol,
RE: * Env 0980
BR: 1345
1385
1230
1190

1090

00015

MI: Kapunda copper mine;
O: Hd Kapunda, secn1271, secn1284;
AB: TARGET:
Sulphide extensions and/or concealed ore bodies in mine area.
EXPLORATION:
Geophysical anomalies were followed-up by geochemical surveys. Two anomalies were tested by diamond drilling of 3 holes which revealed sub-economic oxidised sulphide mineralisation in 2 holes over the geophysical K1 anomaly.Follow-up rotary-percussion drilling over KI anomaly indicated 5.5 million tones of 0.74% Cu.
CNO: 1001596

TI: Reported copper occurrence in Sections 272, 355, 443, 581, 582, Hundred of Light - W.J. Meaney.
DOCTYPE: SADME rep
AU: Mason, M G; Miller, P G;
SO: SADME:Unpublished:Report, 1 fiche, 5 pages; 1 fig,
RE: RB 70/098
BR: 1345
LO: Spring Gully; Hd Light, secn272, secn355, secn443, secn581, secn582;
AB: The occurrence, 6 miles west of Kapunda in projected regional fault zone with copper association revealed no mineralization in situ. Minor amounts of barite were noted.
CNO: 0001225

TI: Mineral resources of the Kapunda District Council area.
DOCTYPE: SADME rep
AU: Horn, C M; Pain, A M; Newton, A W;
SO: SADME:Unpublished:Report, 2 fiche, 42 pages, 3 plans; 4 appx, 3 fig, 10 ref,
RE: * RB 89/044
BR: 1370
1250
1150
MI: Kapunda mine; Ford's aggregate quarry; Moppa gold deposit; Hamilton gold deposit; Tom's phosphate deposit; Saint John's phosphate deposit; Green's phosphate deposit; Carrara marble quarry;
LO: Kapunda DC;
AB: Kapunda DC is underlain by folded Adelaidean and Cambrian metasediments which host important mineral deposits in the area. An estimated 15 million tonnes of ore averaging 1.2% copper remains near the Kapunda mine, with potential for further discoveries to the north and NE.Two bands of Cambrian limestone and marble to the east of Kapunda have potential to support a significant stone industry. There is also a growing market for natural phosphate from associated deposits.Ford's dolomite quarry 5.5 km SW of Kapunda produces high quality aggregate,and extensions, if located, could become an important source of carbonate aggregate for northern Metropolitan Adelaide.Talc deposits in the Truro area will probably be re-opened at some future time.
Fine sand deposits along the western margin of the Barossa Valley and to the SE of Linwood are suitable for filling sand and cement manufacture.
CNO: 0004551

TI: Kapunda mines investigations Kapunda mine,East Kapunda mine, and South Kapunda (hillside)mine summary report (6-4-64).
DOCTYPE: SADME serial
AU: Nixon, L G B;
SO: Mining Review, Adelaide, maps,
RE: 120, p: 38-41; #RE=RB 58/091
CM: Compiled from RB 58/091
BR: 1345

KAPUNDA

00016

MI: Kapunda mine;
O: Hd Kapunda;
NO: 1004838

TI: Geology of the Kapunda mines and environs (7-10-63).
OCTYPE: SADME serial
U: Hillwood, E R;
SO: Mining Review, Adelaide, maps,
E: 119, p: 10-15; #RE=RB 57/060
M: Compiled from RB 57/060
BR: 1345
MI: Kapunda mine;
NO: 1005427

TI: The Kapunda mines-pt.6 in- the structural control of ore deposition in some S.A.copperfields no 2.
OCTYPE: SADME rep
AU: Dickinson, S B;
O: South Australia. geological survey. bulletin (sadme), vol. 21, p 6-27; maps,
RE: RB
18/237
BR: 1345
MI: Kapunda mine; Hillside mine;
CNO: 1009023