DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 88/83
APPRAISAL OF GOLD TAILINGS AT MONGOLATA BATTERY SITE, SECTION PT.36E, HUNDRED MONGOLATA, COUNTY BURRA

GEOLOGICAL SURVEY

by

C.M. HORN
PRINCIPAL GEOLOGIST
MINERAL RESOURCES

and

R.J. SOUTH
TECHNICAL OFFICER
MINERAL RESOURCES

NOVEMBER, 1988

DME.262/83

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ONLY COMPLETE RELEVANT CATEGORIES

SUBJECT TERMS (broad subjects, specific subjects, tectonic unit or basin)

Mineral Resources

STRATITIGRAPHIC NAMES (only when important subject of the report)

Tarcowie Siltstone, Tapley Hill Formation.

ELEMENTS ASSAYED (use chemical symbols)

Au, Cu, Pb, Zn, As, Ag

NAMES OR NUMBERS OF WELLS/DRILL HOLES

Hand Auger Holes EM 30 – 42

" " " MB 1 – 6

NAMES OF MINES, DEPOSITS, OR PROSPECTS

Mongolata Goldfield

MAP NOMENCLATURE (1:250 000 no. e.g. SI5409, 1:250 000 name e.g. ADELAIDE, 1:100 000 & 1:50 000 no. e.g. 6628IV)

1:250 000 Burra

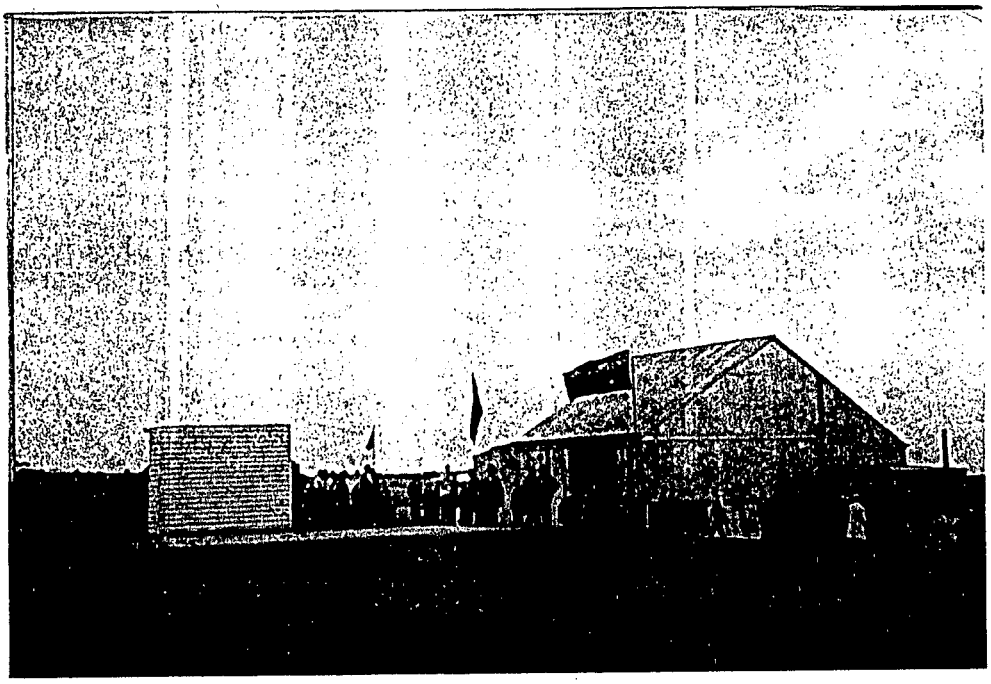
1:100 000 (6730)

GEOGRAPHIC CO-ORDINATES (use only for specific areas e.g. well completion report)

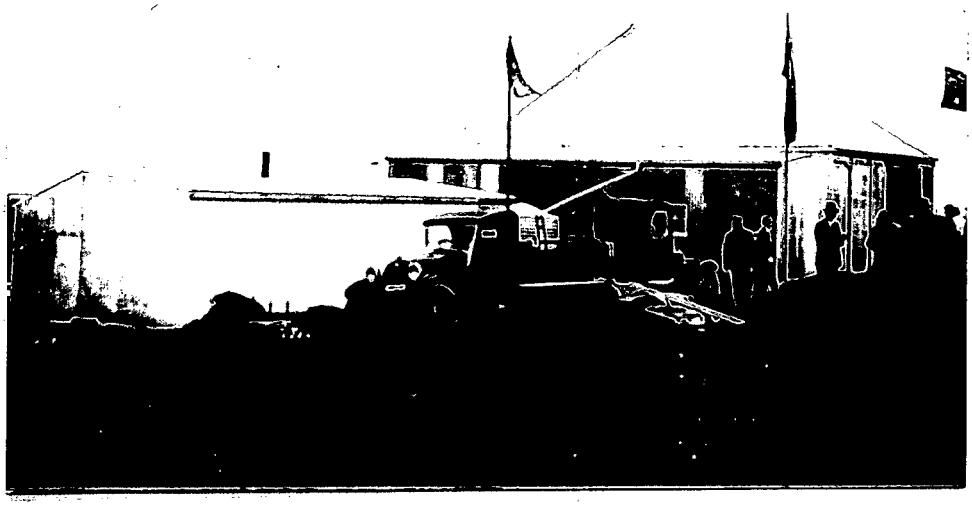
LAT(.....S) LONG(.....E)

GEOGRAPHIC LOCALITIES (nearest town, mountain, river, region etc)

Burra



FRONTISPIECE 1: Mongolata Battery on Opening Day, March 1933.
Slide No. 36642



FRONTISPIECE 2: Mongolata Battery on Opening Day, March, 1933.
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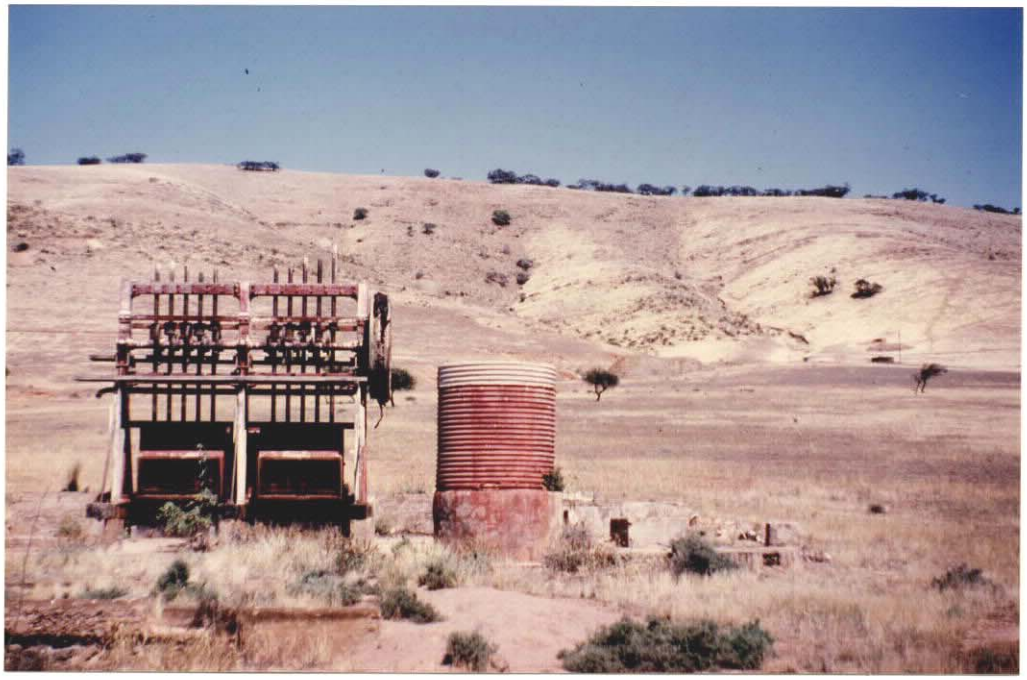

PLATE 1. Remains of Battery at Mongolata. Byles Mine workings located above tank in centre of picture.
Slide No. 36615

PLATE 2. View looking east from old Battery toward Tailings stockpiles and old cyanide tanks.
Slide No. 36616

PLATE 3. Hand auger drilling of tailings stockpile at old Mongolata Battery site.
Slide No. 36617

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 88/83
DME. NO. 263/83
DISK NO. 29

APPRAISAL OF GOLD TAILINGS AT MONGOLATA BATTERY SITE, PT. SECTION 36E, HUNDRED MONGOLATA, COUNTY BURRA

ABSTRACT

Gold was discovered at Mongolata late in 1930 by Henry A. Byles. A ten head gravity stamp battery was erected by the State Government and commenced crushing on 9 March 1933. Battery records show that 7 600 tonnes of ore from mines on the field was crushed for a yield of 319 246 grams of gold bullion. The average grade of tailings from battery assays is 2.80 g/t Au.

An estimated 3 120 tonnes of tailings averaging 1.69 g/t Au remain on site. These tailings also contain an average 230 ppm Cu, 10 ppm Pb, 85 ppm Zn, 660 ppm As and <1 ppm Ag. The tailings have been cyanided at least once in the past although the grade of stockpiles C&E (2.31 g/t and 3.68 g/t respectively) suggest not all tailings were cyanided. Stockpiles C and E represent 975 tonnes at a grade of 2.60 g/t Au.

INTRODUCTION

Mongolata battery commenced crushing on 9 March 1933 and treated 7 600 tonnes of ore up until closure in 1954. Battery tailings were cyanided and stockpiled on site. Water erosion has subsequently dispersed some of the tailings downslope from the stockpile and a survey was initiated in February 1987 to determine tonnage and gold content of the remaining tailings.

On 23 July, 1984 E.A. Dubowski (Geologist) and A.J. Smith (Field Assistant) drilled thirteen hand anger holes ranging from 0.5 m to 3.2 m in depth. Nineteen samples were collected over one metre intervals and submitted to Australian Mineral Development Laboratories (AMDEL) for analysis of gold by fire assay. Objection to the survey work by the then landowner, Mr. K.J. Cuthbertson, resulted in the Director-General, SADME, directing Mineral Resources to abandon the project.

The land was subsequently sold by Mr. Cuthbertson to Wylie Investments Pty. Ltd., and permission was granted to resume the geological survey of mines on the goldfield and to complete the appraisal of the battery trailings. An additional six hand auger holes were drilled and sampled by W.P. Fradd (Field Assistant) and logged by R.J. South (Technical Assistant) on 5 February, 1987. A stadia survey of stockpiles, drillhole locations (including those drilled by Dubowski) and remains of buildings and structures was completed by A.J. Smith and R.J. South (Fig 2). Eleven samples were analysed by AMDEL for gold by fire assay and copper, lead, zinc, arsenic and silver by atomic absorption spectroscopy.

LOCATION

Mongolata battery site is situated on pt. Section 36E, Hundred of Mongolata, County Burra, about 18 km north east of Burra Burra township (Fig 1). The land is within the District Council of Burra Burra, part of the Mid-North Planning Area.

TENURE

Mineral Lease (ML) 5466 comprising 2.05 hectares covers the tailings and includes all the former buildings and structures (Fig 2). ML 5466 is registered to G.H. Wilbe and expires on the 16th October, 1994.

Exploration Licence 1343 comprising 857 km2 covers all of the Mongolata Goldfield and includes ML 5466 within its boundaries. The exploration Licence is registered to Newmont Australia Limited and expires on the 28 July, 1989.

HISTORICAL REVIEW

Smith (in press) has prepared a comprehensive historical review and compilation of battery records for the Mongolata goldfield and only a brief summary is presented here.

Gold was discovered on Section 36W late in 1930 by Henry A. Byles who pegged an 18 acre (7.3 hectare) claim. An adit was driven into the hillside and 12 tons (12.2 tonnes) of ore sent to the Peterborough Battery for treatment returned 75 ounces (2.33 kg) of gold bullion.

The discovery sparked a spate of claim pegging and small mines were developed in Section 36W (East View, Golden Harp, Curlew and Hansel Mundy). In 1932 a payable reef was mined by the Pexton Brothers in Section 23, this mine being called Takati. Other discoveries were made adjacent to Takati and included Wildildie, Baldina, Mongolata South and Mongolata Central.

Morris (1978) records production from the Takati mine as 1 017 tonnes yielding 84 508 grams of gold and from Baldina - Mongolata mines, 580 tonnes yielding 42 523 grams of gold. Production from Wildildie mine is recorded at approximately 291 tonnes yielding 5 044 grams of gold. These figures include results of ore treated at the Peterborough and Mount Torrens batteries.

In early 1933 a ten head gravity stamp battery was erected by the State Government at a cost of £ 3 393 Smith (in press) provided the following production data for ore treated at the Mongolata battery from the Takati, Baldina and Wildildie mines.

Mine	Tonnes	Gold Recovered
Takati/Takati South	1 052	83 289 grams
Baldina/Mongolata	581	42 523 grams
Wildildie	296	5 004 grams

When the Government battery closed down in 1954 a total of 7 600 tonnes of ore had been treated yielding 319 246 grams (including 1 062 grams of smelted gold) of gold bullion, with an average grade of 41.9 g/t recovered.

Smith (in press), calculated from battey returns that 188 parcels of ore were cyanided totalling 4290 tonnes for a recovery of 32 000 grams of gold, averaging 7.46 g/t.

The field has been fossicked in a small way in recent years but there has been no serious mining since the closure of the battery.

In 1980-81 CRA Exploration Pty. Ltd., undertook geological mapping of the Byles and Golden Harp mines and drilled seven vertical diamond drill holes and one inclined hole. Little other exploration work has been undertaken in the area apart from some sampling in the Private Mine area (Morris, 1978).

GEOLOGICAL SETTING

Mongolata goldfield is situated in Proterozoic sediments on the eastern margin of the Adelaide Geosyncline. The sediments have been folded in a north south trending belt of large amplitude and wavelength folds.

The goldfield is on the eastern flank of a gently north plunging syncline within Umberatana Group rocks. East of the goldfield the basement rocks are covered by extensive Tertiary sediments of the Murray Basin.

Mine workings at Mongolata are generally confined to a feldspathic sandstone, quartzitic in places at the base of the grey-green, flaser-bedded, Tarcowie Siltstone. This sandstone unit correlates with the Cox Sandstone at Waukaringa goldfield (Townsend, 1987). Fine-grained, thinly laminated, highly-bleached, calcareous silstones of the Tapley Hill Formation underlie the sandstone unit and in some of the mine workings contains black manganiferous ironstone veins and joints which have been mined. Pyrite pseudomorphs are common throughout the Tapley Hill Formation siltstones.

Quartz-ironstone veins are generally more numerous in the feldspathic quartzite and strike north-south and east-west within the unit, seldom extending far into the overlying Tarcowie Siltstone. Most mining activity appears to have been confined to the contact between the feldspathic quartzite and the underlying Tapley Hill Formation. Gold distribution appears to have been sporadic (Ward, 1936) with rich patches of secondary gold irregularly distributed throughout the unit (Winton, 1938).

TAILINGS RESERVES

Reserves and grade are summarised in Table 1. Sample information and assay data for hand auger drill holes completed by E.A. Dubowski in 1984, are included in Appendix A. Logs and assays of hand auger holes completed in 1987 are included in Appendix B.

The following factors apply to the calculations of reserves:

- Area of each stockpile was determined by planimeter.
- Average depth of each stockpile was determined from hand auger holes and survey data.
- Batters were assumed to be triangular in shape. The area was determined by planimeter and calculated as half batter area x average depth of stockpile.
- Average specific gravity (S.G.) of tailings was assumed to be 1.7 which is that of loose quartz sand containing several percent heavy mineral.
- Average gold content of each stockpile was calculated as a weighted average from drill hole assays.
- Average gold content of the total tailings was calculated as a weighted average.
- Copper, lead, zinc, silver and arsenic values have been averaged arithmetically.

TABLE 1

Reserves of Tailings - Mongolata Battery Site

Stockpile	Holes	Area (m^2)	Av.Depth (m)	Volume (m^3)	Tonnes	Au Grade (g/t)	Au Content (grams)
A	EM30-35 MB 1-2	411	1.3	535	910	1.80	1 638
Batter		155	1.3	202	345	1.80	621
B	EM36-37 MB6	40	2.8	112	190	0.34	65
Batter		113	2.8	316	540	0.34	184
C	EM38-40 MB 4-5	530	0.8	424	720	2.31	1 663
Batter		83	0.8	66	110	2.31	254
D	EM41	120	0.5	60	100	1.92	192
Batter		68	0.5	34	60	1.92	115
E	EM42	118	0.5	59	100	3.68	368
Batter		52	0.5	26	45	3.68	166
TOTAL		1 690		1 834	3 120	1.69	5 266

CONCLUSIONS

Tailings remaining on site at the abandoned Mongolata battery are estimated at 3 120 tonnes containing 1.69 g/t Au with anomalous copper and arsenic contents. There is a considerable discrepancy (4 480 tonnes) between the estimated tonnage remaining (3 120 tonnes) and the tonnage recorded in the battery records (7 600 tonnes). There is also a discrepancy between the estimated grade of the tailings from hand auger drill holes (1.69 g/t Au) and the grade of the tailings as determined by battery assay data (2.80 g/t Au).

Although most of the tailings were cyanided at least once it appears that stockpiles C and E may have escaped cyanidation. These stockpiles represent some 975 tonnes at a grade of 2.60 g/t Au.

No metallurgical investigations have been carried out on these tailings.

However, grade is considered too low and tonnage insufficient to warrant either carbon-in-pulp or carbon-in-leach treatment. Gravity concentration is unlikely to be successful in recovering an appreciable amount of the gold.

Prior to any proposed treatment, sizing and cyanide leach tests should be undertaken.

C. M. HORN
PRINCIPAL GEOLOGIST
METALLIC MINERALS

for R.J. SOUTH
TECHNICAL OFFICER
MINERAL RESOURCES

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Morris, B. J., 1978. The Mongolata Goldfield Mineral Resour. Rev., S. Aust, 142: 109 - 114.

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Townsend, I. J., 1987. Waukaringa Goldfield Geological Investigations 1983 - 1985. S. Aust. Dept. Mines and Energy report 86/71 (unpublished).

Ward, L. K., 1936. Report on Byles Mongolata Gold Mine. Min. Rev. Adelaide 64: 46 - 47.

Winton, L. J., 1938. Report on Mongolata Goldfield. Min. Rev., Adelaide, 68 p 58.

APPENDIX A

Sample Information and Assays for
Auger Drillholes Completed by E.A. Dubowski
(AMDEL Report AC540/85)

APPENDIX A

Sample Information and Assays for Auger Drillholes
Completed by E.A. Dubowski

Hole No.	Depth (m)	Sample No.	Au (g/t)	Cu (ppm)	As (ppm)
EM30	0-1.0	1276/84	1.38	180	140
	1.0-1.5	1277/84	1.34	60	80
EM31	0-1.0	1278/84	1.52	175	180
EM32	0-0.7	1279/84	0.82	205	950
EM33	0-1.0	1280/84	0.54	225	620
	1.0-1.4	1281/84	0.48	115	330
EM34	0-0.5	1282/84	1.92	100	550
EM35	0-1.0	1283/84	0.44	220	810
EM36	0-1.0	1284/84	0.42	165	1180
	1.0-2.0	1285/84	0.29	130	820
	2.0-2.8	1286/84	0.30	170	1660
EM37	0-1.0	1287/84	0.58	185	960
	1.0-2.0	1288/84	0.52	185	980
	2.0-3.2	1289/84	0.40	185	950
EM38	0-0.75	1290/84	1.74	200	330
EM39	0-0.8	1291/84	2.30	340	310
EM40	0-0.75	1292/84	2.34	155	530
EM41	Composite	1293/84	1.92	150	350
EM42	Composite	1294/84	3.68	205	480

(AMDEL Report AC540/85)

APPENDIX B

Geological Logs of Hand Auger Holes Completed in 1987 with gold, copper, lead, zinc, arsenic and silver assay results.
(AMDEL Reports AC3896/87 and AC455/88)

APPENDIX B

Geological Logs of Hand Auger Holes completed in 1987 with gold, copper, lead, zinc, arsenic and silver assay results.

Hole No.	Depth (m)	Sample No.	Log	Au g/t	Cu ppm	Pb ppm	Zn ppm	As ppm	Ag ppm
MB1	0-1.0	A75/87	Brown sand	6.20	630	3700	580	1720	4
	1.0-2.0	A76/87	" "	2.05	1240	18	41	230	<1
	2.0-2.25	A77/87	" "	0.37	165	11	38	60	<1
MB2	0-1.0	A78/87	Light brown sand.	2.50	195	11	30	170	<1
	1.0-1.9	A79/87	Whitish brown sand becoming dark brown.	1.90	105	10	29	130	<1
MB3	0-0.61	A80/87	Brown sand in tank	0.43	130	9	280	500	<1
MB4	0-1.0	A81/87		2.15	365	10	46	500	<1
MB5	0-0.8	A82/87		3.00	385	10	46	520	<1
MB6	0-1.0	A83/87	Ferruginous to yellow sand.	0.14	105	<5	140	700	<1
	1.0-2.0	A84/87	Yellow + Brown Sand	0.31	155	<5	68	560	<1
	2.0-2.5	A85/87	" " " " "	0.63	170	9	130	720	<1

Holes logged by Technical Assistant, R.J. South.
Holes drilled by Field Assistant, W.P. Fradd.

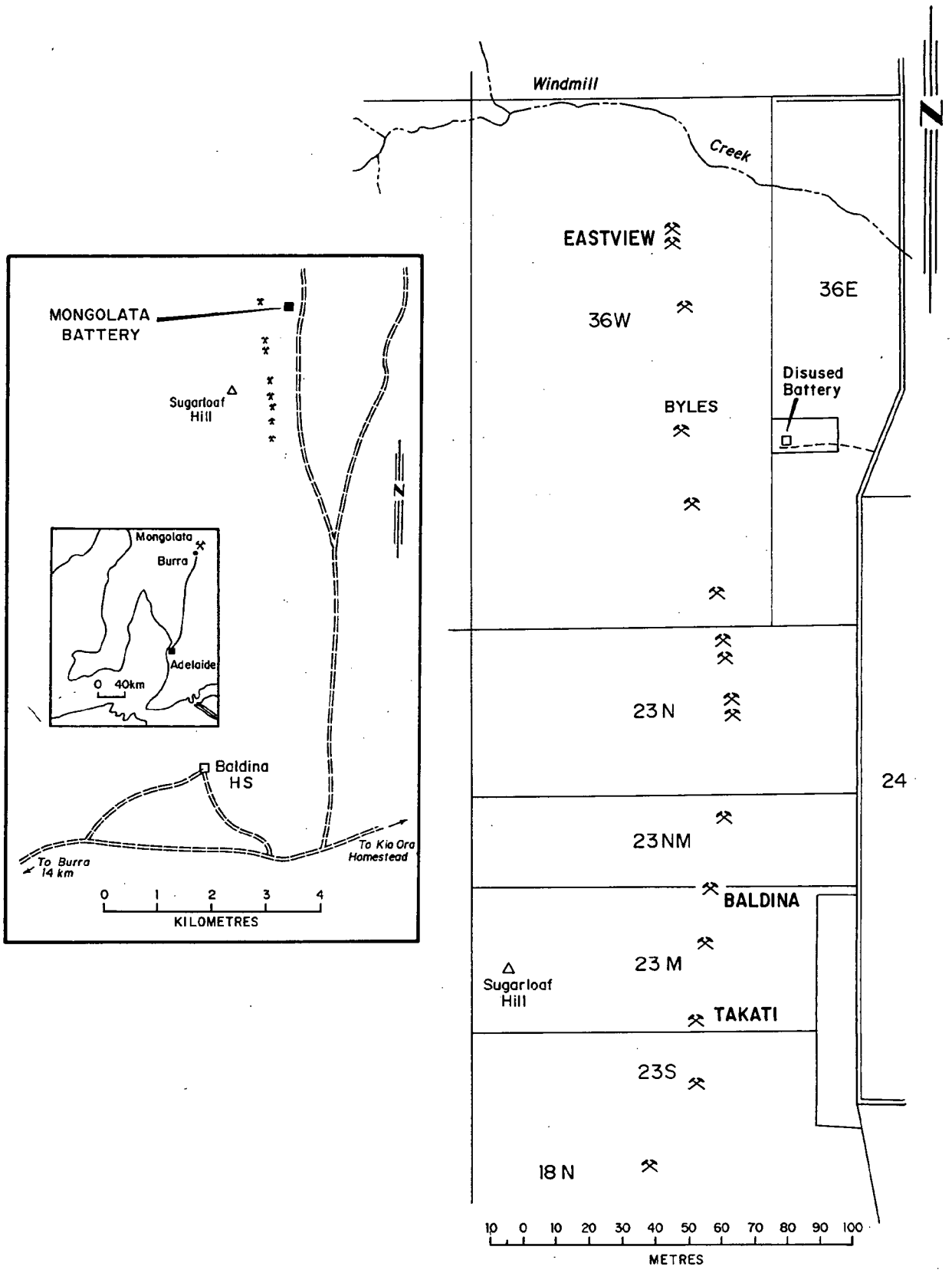
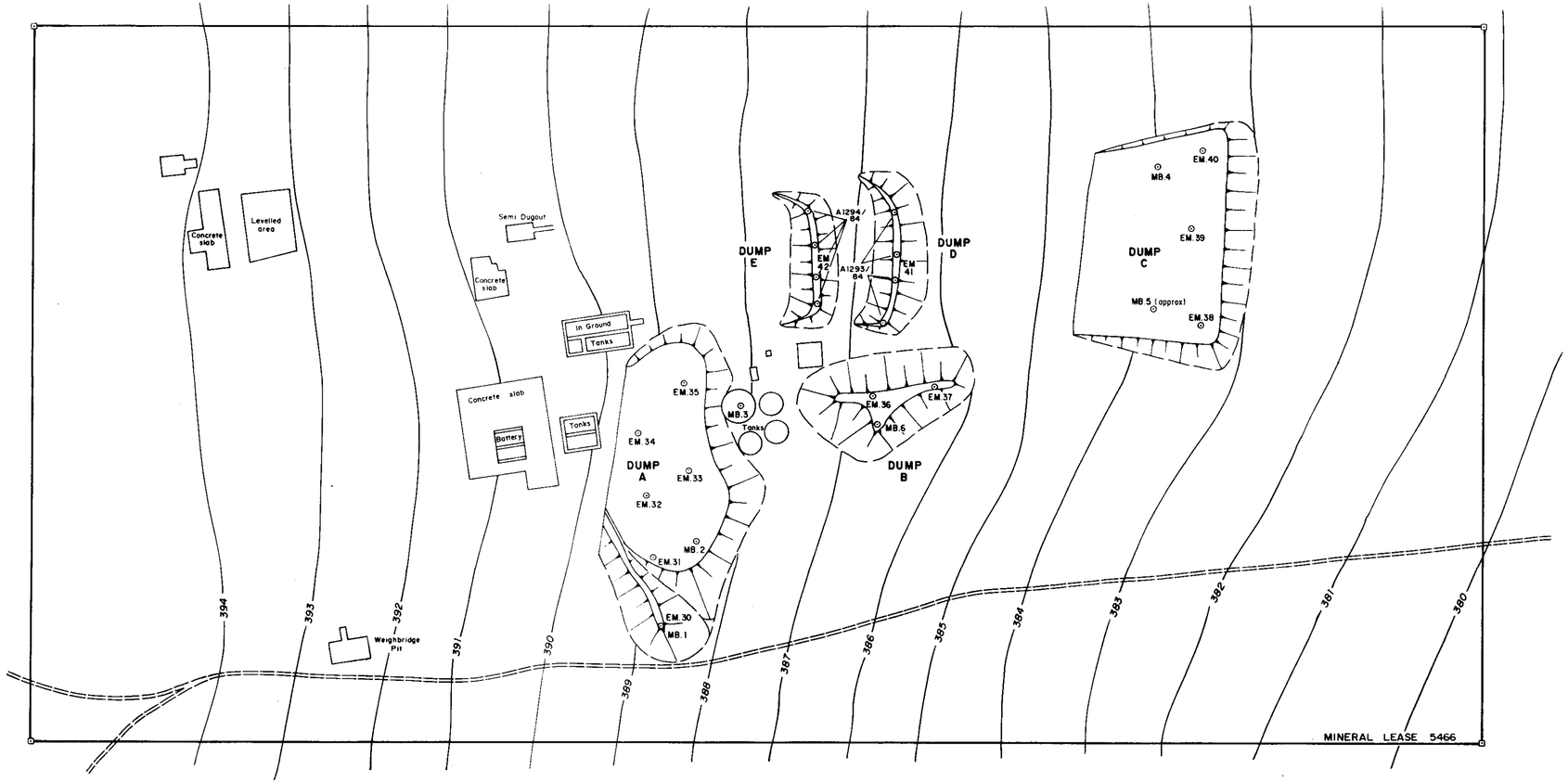


Figure..... 1

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED R. J. South	C.D.O. 5.12.88 DATE
MONGOLATA BATTERY SEC. 36E, HUNDRED OF MONGOLATA LOCALITY PLAN	DRAWN R. Bird	SCALE As shown
	DATE February '88	PLAN NUMBER S19828
	CHECKED	

4566



MIN 1987

FIELD NUMBER	ASSAY NUMBER	DEPTH (m)	GOLD g/t	Cu ppm	As ppm
EM30	A 1276/84	0 - 1·0	1·38	180	140
EM30	A 1277/84	1·0 - 1·5	1·34	60	80
EM31	A 1278/84	0 - 1·0	1·52	175	180
EM32	A 1279/84	0 - 0·7	0·82	205	950
EM33	A 1280/84	0 - 1·0	0·54	225	620
EM33	A 1281/84	1·0 - 1·4	0·48	115	330
EM34	A 1282/84	0 - 0·5	1·92	100	550
EM35	A 1283/84	0 - 1·0	0·44	220	810
EM36	A 1284/84	0 - 1·0	0·42	165	1180
EM36	A 1285/84	1·0 - 2·0	0·29	130	820
EM36	A 1286/84	2·0 - 2·8	0·30	170	1660
EM37	A 1287/84	0 - 1·0	0·58	185	960
EM37	A 1288/84	1·0 - 2·0	0·52	185	980
EM37	A 1289/84	2·0 - 3·2	0·40	185	950
EM38	A 1290/84	0 - 0·75	1·74	200	330
EM39	A 1291/84	0 - 0·8	2·30	340	310
EM40	A 1292/84	0 - 0·75	2·34	155	530
EM41	A 1293/84	COMPOSITE	1·92	150	350
EM42	A 1294/84	COMPOSITE	3·68	205	480

Samples collected by E.A. Dubowski, 1984
AMDEL Report AC 540/85

FIELD NUMBER	ASSAY NUMBER	DEPTH (m)	GOLD g/t	Cu ppm	As ppm	Pb ppm	Zn ppm	Ag ppm
MB1	A 240/87	0 - 1·0	0·48	36	100	24	9	<1
MB1	A 241/87	1·0 - 2·0	1·12	1080	220	13	21	<1
MB1	A 242/87	2·0 - 2·25	0·25	205	80	14	23	<1
MB2	A 243/87	0 - 1·0	1·46	185	180	<5	13	<1
MB2	A 244/87	1·0 - 1·9	1·40	100	140	16	11	<1
MB3	A 80/87	0 - 0·6	0·43	130	500	9	280	<1
MB4	A 81/87	0 - 1·0	2·15	365	500	10	46	<1
MB5	A 82/87	0 - 0·8	3·00	385	520	10	46	<1
MB6	A 83/87	0 - 1·0	0·14	105	700	<5	140	<1
MB6	A 84/87	1·0 - 2·0	0·31	155	560	<5	68	<1
MB6	A 85/87	2·0 - 2·25	0·63	170	720	9	130	<1

Samples collected by R.J. South, 1987
AMDEL Report AL 455/88 - MB 1 & 2, AC 3896/87 - MB 3,4,5 & 6

Stadia survey by R.J.South and A. Smith, February 1987.

LEGEND

Stockpile batter..... (Top / Bottom)

Hand auger hole..... ⊙MB 1

Contour interval 1m 386

Access track

10 0 10 20 30 40 50
METRES

Figure 2

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

MONGOLATA BATTERY

TAILINGS STOCKPILES, AUGER DRILLHOLE LOCATIONS AND ASSAY DATA

COMPILED R.J. South	C.D.O. 5.12.88 DATE
DRAWN R. Bird	SCALE As shown
DATE February '88	PLAN NUMBER 88-41
CHECKED	

4566