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GEOLOGY REVIEW - DOLPHIN OREBODY

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INTRODUCTION

The Dolphin Mine has been in production since June 1973 and the Main Decline has progressed to the -280 metre R.L.

Production is currently from the Upper Wedge, Upper Pit, Upper Central, Mid Wedge and Lower Pit cut and fill stopes. The Annual Production Budget is 260 500 tonnes.

C Lens oreblocking has been essentially completed as far west as 220 360E with the exception of the Southern area. Potential still exists south of 563 850N for additional C Lens ore. There is also the possibility of a small orebody east of 220 360E in the Decline area.

A total of 4 076 000 tonnes of Proven ore remains in C Lens. An additional 1 673 300 tonnes of ore is classified as Probable in B and C Lenses.

Large areas of pyroxene garnet hornfels, previously inferred from diamond drilling to be subgrade have been found, after openings have been mined into them, to contain a quartz and scheelite vein system. The veins carry sufficient tungsten to bring the unit into ore grade.

Diamond drilling is proposed to test the Southern area, from both surface and underground, and the area east of 220 360E. Fill in drilling is also proposed for Lower Central orebody.

The area lying between the Decline and Grassy River Fault has been named The Decline area. It contains a Probable B Lens resource and may also contain C Lens ore.

This report reviews developments in mine geology since the last review report (Brown and Potter 1980).

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SUMMARY

The underground oreblocking programme is continuing with a total of 352 holes being completed for 24 173 metres.

The underground drilling programme has proven a remaining resource of 4 076 000 tonnes of ore at 1.19% WO_3 to date. Total Proven and Probable resource is 5 749 300 tonnes at 1.08% WO_3. A further 305 500 tonnes is classified as Possible.

The presence of quartz and scheelite veins in the pyroxene garnet hornfels overlying the garnet hornfels has been documented sufficiently well for them to be included into Ore Resource calculations. This is a major factor in the resource being larger now than in March 1980 despite eighteen months of continuous mining.

Recent investigations at the south of the mine indicate the potential for significant additional resource in Southern Orebody.

Mine geological services have been successfully integrated with grade control duties and has allowed better than 70% recovery of ore from cut and fill stope.

An exploration drill hole from the -240 metre level penetrated the Grassy River Fault and continued to -550 metre R.L. in Upper Volcanics on the east side of the fault, before abandonment.

A prospective enviroment for a high grade orebody has been identified between the Decline and Grassy River Faults.

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CONCLUSIONS

The basic structure of the Dolphin orebody is a gentle anticline plunging to the south-east. Folding has been caused by downwarping on the Decline Fault and block faulting has modified the orebody.

Where quartz and scheelite veins are present in the pyroxene garnet hornfels, they carry sufficient tungsten to bring this unit to ore grade.

The granite contact defining the southern limit of the orebody has not yet been identified. There still exists significant potential for additional ore in the southern part of the mine.

An environment for a small high grade orebody has been identified at the east end of the orebody. Diamond drilling is planned to test it.

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RECOMMENDATIONS

It is recommended that development of the L6 diamond drill drive be continued as a priority to allow testing of the southern end of Southern orebody.

It is recommended that development of the S9 diamond drill drive be extended to allow drilling of the Decline area.

It is recommended that the future diamond drilling to oreblock pyroxene garnet hornfels should be planned with regard for the orientation of quartz and scheelite veins in the unit.

It is recommended that further work be carried out to determine the morphology of the granite contact in the Grassy area, particularly at the south end of the mine, and immediately east of the Grassy River Fault.

It is recommended that grade control be continued to be run by the mine geology section.

ACTION SHEET

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MINE DEVELOPMENT

In the period since the last review the Main Decline has advanced to the -280 metre R.L. mostly in granite, but encountering 30 metres of banded footwall beds, the Central Fault and 5 metres of pyroxene garnet hornfels in the Southern Orebody area. Ground conditions in the granite were excellent, no support was required.

The main development effort has been in the Lower Wedge area where strike drives have been established on the -200, -220 and -260 metre levels. Cross cuts into the orebody have been developed at 14 metres centres on all these levels and also on the previously developed -240 metre level. Ground conditions have been poor in the areas mined in footwall beds. Well developed jointing in the upper orebody made the use of grout bolting necessary. A major rock fall occurred in pyroxene garnet hornfels (mineralised) in W62 on the -200 metre level where a 20 metre span along strike was exposed for a short period (about four weeks) and was not fully bolted.

The P11 Mid Wedge access was completed in moderately poor ground, and the O13 access to the 3rd lift was completed, all of the northerly development was set in anticipation of deteriorating ground conditions as stoping progressed over the drive.

Access to the Pit Dag and Southern Orebody was achieved via the M9 which required setting for about 25 metres. The remaining 90 metres were in reasonable ground.

150 metres were mined to complete the N13 accesses to the Lower Pit. Most of the metreage was in B Lens which although initially supported by rockbolts has recently given trouble by rock falls that have broken back to the B Lens hangingwall.

A new access, the H16 is in use for the Upper Pit. This was developed 190 metres in banded footwall beds and quartzites. It services the 15th and all subsequent lifts.

To provide access to the east side of the Decline Fault and to allow installation of cable bolts, two hangingwall drill drives were mined. One of 125 metres on the -200 metre level and one of 80 metres on the -220 metre level. Virtually all of the distance has been in garnet pyroxene hornfels and marble of B Lens, but the southern 35 metres of the -200 metre level drives lies in sheared biotite hornfels and volcanics. Both these drives have been meshed, bolted and shotcreted.

A start was made on a drive to bypass the Main Decline between -240 and -250 metre R.L. This drive quickly encountered a serpentinised basalt dyke, causing severe ground problems and was abandoned.

Two drill drive, the L7 and L6 have been mined off the N13 drive. The L7 advanced 10 metres and the L6 50 metres. The last 22 metres of the L7 was in biotite hornfels, the remainder of the distance, in both drives, was in B Lens marble. Ground conditions were reasonable in both drives.

GEOLOGY REVIEW

B Lens

B Lens has been extensively mined in the period under review as shown by the production figures in the appendix. All areas mined were mineralised to some degree, and were located in the Decline area (-200 and -220 metre level) and Southern area (I12 and L6).

Apart from three holes drilled from the -75 metre level, all B Lens diamond drilling has been into B Lens east of the Decline Fault, now called the Decline orebody.

B Lens Decline is estimated to contain 337 700 tonnes at 0.74% WO_3 in a number of discrete lenses separated by barren marble or pyroxene hornfels. Subsequent mining of Lower Wedge hangingwall drives in these orebodies has shown that the mineralisation is spread erratically through the whole unit. This obviously results in a higher tonnage but lower grade. Mining grades for the -200 metre level (0.45%) and -220 metre level (0.61%), support the information gained from diamond drilling that grade increases with depth.

B Lens encountered in I12 is strongly banded and was initially taken to be banded footwall beds. Only a relatively small tonnage was mined from here to gain access to the rise from the M5. The structure of this area is complicated with tight folding and faulting. In some parts the rocks dip to the north in contrast to the south - easterly dip found everywhere else in the Dolphin orebody.

The L6 and L7 drill drives on the -200 metre level progressed most of their distance in B Lens marble. Networks of anastomising grossularite and andradite garnet veins carried sufficient scheelite in places for material to be trucked as development ore. This material had not been identified by diamond drilling as potential ore. This suggests that a considerable tonnage of low grade material exists here and possibly elsewhere in B Lens.

Ground conditions in the L6 and I12 drives have been good but the hanging-wall drives particularly on the -220 metre level have encountered many clay lined cavities. The cavities are often large (0.5 metre) and can be continuous for lengths of up to 20 metres. These have not caused severe ground problems but have hampered drilling and blasting operations, resulting in irregular backs.

It is highly probable that the network of cavities interconnect in a manner that isolates a number of blocks ranging from centimetres to tens of metres in size. This discovery must be viewed with concern in the light of the proposed open stoping of the Lower Wedge orebody that lies below it.

The hangingwall of the B Lens Decline orebody is formed by the Fulmar Fault, which is a weak fault zone about 1 metre wide that has caused considerable mining problems. A fault in this general position was first suspected from the stope section drilling. About 5 metres beyond the Decline Fault in the access to the -200 metre level hangingwall support drive, poor ground was encountered that continued to run after firing. It piped up about 2 metres above the back before stopping around some horizontal cable bolts previously installed. A small water flow is associated with this area. The fault dips at around 40^{o} to 105^{o} I.S.G. and downfaults the Upper Volcanics against B Lens hangingwall. Both rock units are extensively sheared within a few metres of the fault.

It is possible that the reason for the rock falls in W52 on the -240 metre level is the interaction of the Fulmar Fault with the Decline Fault.

C Lens Wedge Area

Extensive mining and considerable diamond drilling in the Wedge area have only resulted in minor changes to this orebody.

Upper Wedge

Stoping of the 14th lift has progressed via the L18 access off the Main Decline. This lift lies within the 10 metre sill pillar below the -75 metre level stope and so far about 85% of the available ore has been extracted.

Ground conditions are good. Current plans are for half filling of the Upper Orebody part of this lift in order to strip 2 metres of high grade garnet skarn from the backs.

Mid Wedge

The 3rd lift of this stope is currently being mined via both the O13 and P11 drives. Production figures for the undercut are not representative as this was only the ore encountered by the S11 Lower Wedge access. Both the 1st and 2nd lifts were mined via the P11. Although the O13 (north) end of the stope is technically part of the 3rd lift, production is from full face (development size) headings, thus giving a higher tonnage figure than for a lift which has been previously undercut. Mining of the southern side (P11) of the stope has been heavily influenced and slowed by the poor ground conditions. Here the footwall orebody is steeply dipping (up to 50°) and bedding planes are sharply defined by weak chlorite rich layers. Due to the proximity of the Central Fault, there is a marked change of dip from about 110° to 180° and this is thought to have contributed to the movement and hence chlorite development along bedding planes.

The result of these features have been the occasional fall of blocks (1-2 metres diameter) and very irregular backs. Mine grade to date for the southern (P11) end of the stope has been below reserve grade, the reason for which has not yet been fully ascertained.

Lower Wedge

This stope is still in its development stage, stope production is scheduled for early 1982.

Development required for the first stope (W62) is almost complete on the -200 metre, -220 metre, -240 and -260 metre level. The -280 metre level basal access has still to be developed. Considerable extra development has been carried out on the upper four levels in order to maintain budget tonnage and a reasonable grade to the mill. Diamond drilling has been carried out on all levels from most cross cuts, to determine the position, thickness and nature of the Decline Fault. Where feasible the drilling was continued to test B Lens in the Decline Orebody. In addition two holes were drilled on stope section (102^{o} I.S.G.) to accurately determine the footwall of the orebody.

The results from these investigations are detailed below:

Decline Fault

1. The Decline Fault trends essentially north south but has many small scale undulations on both sides.
2. Its thickness is variable but generally is widest at the north (10 metres) and narrowest to the south (2 metres).
3. The Fault consists mostly of angular fragments of biotite hornfels, generally 2 - 10 centimetres. It is characterised by a central zone made up of small (1.4 - 2 centimetres) biotite hornfels fragments set in a compacted clay matrix. This can usually be cored by diamond drills but is easily degradable. Thickness of the zone is variable and hard to determine accurately from drill core but is probably of the order of 10 centimetre.
4. Where fractured biotite hornfels, or biotite pyroxene hornfels, of B Lens lies on the east side of the fault it is hard to identify the boundary between the two. In some cases this material has been included into the Decline Fault as it has similar engineering properties. This accounts for some of the bulges seen in the fault on level plans.
5. Where the Decline Fault has been exposed, or mined through, it has been found to be dry and reasonably competent. Even where the fault has been exposed for a long time (over a year in W66 -240 metre level, over six months in W62 -220 metre level) little degradation has been observed.

6. The most severe ground problems associated with the fault were encountered in W52 on the -240 metre level where there was a series of falls leading to a chimneying effect up the faults. It seems that the end of this cross cut hit the Decline Fault where it is in conjunction with another fault, and that the falls were due to a combination of faults, not just the Decline Fault.

Internal Features

1. The west side of the Decline Fault carries a number of fault bounded slivers. The bounding fault on the west side rejoins the Decline Fault in all directions, these are generally 2 - 5 metre wide and have a strike extent of 1 - 20 metres. Lithologies in the slivers are biotite hornfels, pyroxene garnet hornfels and pyroxene garnet hornfels (mineralised) and the ground within them is generally fairly well jointed. (Refer to W62, W60, W58 stope section).
2. Considerable faulting occurs within the orebody, best illustrated on the -200 metre, -220 and -240 metre level plans. The dominant strike is south easterly, but other strikes also occur. As yet no coherent picture of the faulting in this orebody has been developed, but the major faults show a tendency to link the Decline Fault with the Northern Boundary Fault.
3. Faulting and major joints are better developed in the garnet hornfels and pyroxene garnet hornfels. Well developed chlorite slickenslides on most bedding planes in the lower orebody suggests that differential movement in this lithology was taken up by minor movements on the majority of bedding planes.
4. In some places (eg. pyroxene garnet hornfels/garnet hornfels contact -220 metre level) stratigraphic contacts are undulatory, and do not appear to be related to local faulting. This may be partly a result of differential response by the various lithologies to the deformation induced by the Decline Fault. It is clear from the extensive down-warping of the pyroxene garnet hornfels against the Decline Fault, shown best on the stope sections, that it behaved differently from the garnet hornfels and garnet hornfels (banded). This is best illustrated in W58 where the basal contact of the pyroxene garnet hornfels has a dip of 60° but the footwall contact of the Lower Orebody has a dip of 20°. This shallow dip at the base of the orebody is surprising and accounts for most of the decrease in the Ore Resource, since the March 1981 calculation.

5. Information from cross cuts and diamond drilling on stope section has shown that the majority of the pyroxene garnet hornfels below the -290 metre R.L. is cut by a quartz and scheelite vein system. Although there are minor variations, they essentially have the same strike as the Decline Fault but dip at around 50^{o} to the west. In general they make an angle of about 60 - 70^{o} to the Decline Fault. No regular variations in spacing have so far been determined, mean spacing appears to be of the order of 0.5 - 1 metre. The veins are about 10 centimetres wide, have a strike extent of 5 metres and are of sufficient density and grade to increase the overall grade of the unit from a background of about 0.4 - 0.5% WO_3 to about 1.0% WO_3. Initial oreblocking of the Lower Wedge on cross sections meant that holes were drilled subparallel to the veins and either missed them, or got long unrepresentative intersections. Hence initial resource calculations indicated a small tonnage of pyroxene garnet hornfels at high grade. Subsequent drilling on stope sections has yielded average grades that are similar to mined grades.
6. Similar veining also occurs in a limited form around the contact of the marble marker with the garnet hornfels, this is the reason that some of the upper contact of the marble marker is mineralised to ore grade.

C Lens Central Area

This orebody is being stoped in the Upper Central area and a diamond drill drive, the P10, was developed in the Lower Central area on the -230 metre level.

Upper Central

Upper Central stoping has now reached the -100 metre R.L. as mining of the 13th lift has just commenced. This stope has been the largest tonnage source for 1980/81 providing 35% of the total tonnage and 37% of the M.T.U.'s. The principal reason for the high tonnage was the additional ore grade material encountered in the pyroxene garnet hornfels. At the time this material was first encountered, on the 9th lift it was mostly outside resource. As this unit has been mined, more information became available and it was included initially in reserve as ore grade dilution and finially as part of the Ore Resource. The material was not encountered before the 9th lift, as it lay east of the rib pillar. Mineralisation in the pyroxene garnet hornfels is confined to its lower part, there is a clearly defined contact between mineralised and barren pyroxene garnet hornfels which appears to be a bedding plane and is lined with chlorite, it is a weak feature and allows easy separation of ore and waste. Pyroxene garnet hornfels above the contact is biotite hornfels rich and has a dominant black and green colour as opposed to the pyroxene garnet hornfels below this contact which is grossular rich and has a pinkish colour.

Mineralisation occurs in two ways. As an irregular dispersion of small to large scheelite crystals spread throughout the unit, sometimes concentrating in or around the calcite pods. This gives a background tungsten concentration of about 0.1 - 0.4% WO_3. On top of this is a quartz and scheelite vein system that is best developed within a few metres of the mineralised hangingwall. The veins are from 1 - 10 centimetres wide and contain only quartz and scheelite. It is this material which has provided the enrichment that brings the unit to ore grade. They have a strike length of about 10 metres and probably a similar extent in depth although no specific study has been made. Their orientation is roughly perpendicular to bedding and to faults (Cuckoo and Central) where the faults form the limits to the orebody.

The internal structure of the stope is complicated by internal faulting, of which the Galah Fault is the most significant. This Fault strikes approximately 025° I.S.G. and dips about 75° to the east. At about the -100 metre level it roughly bisects the stope, downfaulting the eastern part by about 5 metres. There is a strong possibility that the Galah Fault is the off-faulted continuation of the Noddy Fault.

Other faulting in the stope is relatively minor, with throws of a couple of metres, and strikes of approximately 100° I.S.G.

Narrow (0.5 metres) lamprophyre dykes striking parallel to the Galah Fault are a feature of this stope and have caused stability problems where they intersect post pillars.

Lower Central

Development of the P10 diamond drill drive has revealed high grade garnet skarn as expected in this area and has also shown the presence of ore grade mineralised pyroxene hornfels. Oreblocking of Lower Central has commenced with two holes drilled from the S9. These two holes were drilled on long section to give the best (near perpendicular) intersection of the orebody, which strikes north - south. Mineralised quartz and scheelite veins in the pyroxene garnet hornfels trend north - south and dip 80° to the west and these will have a major effect on grade estimates. The largest area of uncertainty is the southern contact which is defined by the Wedge and Swan Fault.

C Lens Pit Area

This orebody is currently being mined in three locations. The Upper Pit stope via the H16 access, the Lower Pit stope via the P7 and N7 accesses and the 010 access at the -195 metre R.L.

Upper Pit

The Upper Pit stope still has the complex structure as recorded by Brown, and Potter 1980, Bujtor 1978 and Danielson 1977. An additional fault named the Noddy Fault, trending north east - south west and down-throwing south east has been defined, it currently forms the hangingwall of the stope.

Definition of the Central Fault in the H16 access and in the stope itself has proved difficult. Current thinking is that this is because the movement is spread over number of smaller faults at the western end of Dolphin orebody. It is also possible that the structural model presently in use is incorrect to some extent.

A continuing feature of this stope is the additional tonnage of ore discovered each lift in lower orebody, and in the pyroxene garnet hornfels, this is a result of the vein type mineralisation in the pyroxene garnet hornfels and poor definition of the orebody due to the down dip drilling. The additional tonnage has a grade close to the resource grade. Analcite crystals have been identified on planes in the Noddy Fault zone (Pontifex and Associates, Mineralogical Report No. 3157).

010 Access to Lower Pit

This drive was originally mined as part of a scheme to separately mine upper orebody from lower orebody leaving marble marker as an inclined sill pillar. However, the lower strength of the marble marker did not allow this scheme to proceed. In order to maintain reasonable grade to the mill it has been neccessary to mine upper orebody material in 010 from time to time. This mining has shown that this part of the Lower Pit has the same structure as the Lower Pit currently being stoped and is described with it.

Lower Pit

The 5th lift is currently being mined in this stope which has been a good tonnage source and has a mining grade slightly above the current reserve grade. The principal change in the structure is the Booby Fault splaying off from the Wedge Fault and creating a small (20 metre wide) downfaulted block. The block at this level is mostly high grade garnet hornfels and therefore allows a higher percentage of garnet hornfels to be mined each lift.

The Booby Fault cuts the Swan Fault and contributes to the complicated nature of this and its associated faults. Refer cross section 220 240E. Although the Swan Fault normally has a southerly dip, it changes to a steep northerly dip as it approaches the Wedge Fault from the west.

One feature of this area which has only recently become apparent is the presence of sizeable areas (of the order of metres) of barren banded footwall beds in the lower orebody. This is having a two fold effect, firstly in reducing the ore tonnage available and secondly by increasing dilution, as it is not possible to clearly separate ore and waste faces within the post pillar pattern.

C Lens Pit Dag Area

The Pit Dag is an off faulted part of the Pit Orebody. Because of its structural complexity it is treated as a separate orebody and will be mined as such.

Since the last Dolphin geology review, access has been gained to the bottom of this orebody via the M9 drive.

Stripping out of the I12 top access has taken place and limited diamond drilling has been carried out.

Esentially the orebody consists of banded garnet skarn downfolded against the north side of the Swan Fault, which has been cut by the north dipping (45°) Skua Fault, then cut again by the vertical Pheasant Fault which trends 150° I.S.G. Because of the intensity of movement of the footwall, this contact is faulted and is named the Cygnet Fault. Movement is most marked on the upper level (-170 metre R.L.) and decreases with depth fading into bedding on the -195 metre level. The result of the heavy faulting is that the orebody is divided into three pods, and the majority of contacts are faulted. Sections 220 040, 050, 060, 070 080 and plans -170 metre -200 metre illustrate the structure, Memorandum number 674/80 gives a more detailed account.

Early diamond drilling indicated that a high grade low tonnage orebody was present. As the orebody was mined on the -195 metre level it became apparent that the mine grade was lower than the reserve grade and there was a significantly greater resource present than initially calculated. Subsequent investigations showed that many holes had been drilled parallel or subparallel to well mineralised banded footwall beds in the lower orebody. As a result drilling tended to indicate these were areas of high grade ore only, not mixed units of high ore grade interbedded with waste rock. However, a combination of the two were still ore grade.

As the resource grades derived from diamond drilling are suspect, the current resource grades for the Pit Dag are estimates based on experience gained from grab sampling and lamping of the development ore.

In the Pit Dag area aplite dykes intrude the mine series. Outside the orebody they can be identified as conventional aplite dykes but as they approach the orebody they become partially replaced by massive sulphides (pyrrhotite, pyrite and chalcopyrite) and contains some minor molybdenum-free scheelite. Near the sulphide contact the aplite become plagioclase rich and potassium content increases towards the sulphides. Within the orebody the aplite is hard to identify, becoming mostly a quartz and sulphide zone with minor pure scheelite. Around the dyke, marble beds have been altered to a plagioclase rich garnet hornfels. These beds have been interpreted to be tongues of diorite or syenite which have incorporated minor amounts of marble. (Pontifex and Associates Pty Ltd., Mineralogical Report No. 3157).

C Lens Southern Area

This area has been investigated by diamond drilling and now has two openings in it. The Main Decline has passed through the Central Fault into subgrade mineralised pyroxene garnet hornfels. In the H10 the footwall of the western off-faulted part, of Southern Orebody has been silled out on the -195 metre level. Diamond drilling has been carried out from the H10, L6 diamond drill drive, N13 Lower Pit access, and from the Q11 Lower Pit access. See Memorandum No. 743/80 for the background to present investigations.

Previously the orebody was thought to be a thin, shallow dipping, stratigraphically variable unit, that had been folded into a south - easterly plunging anticline. Recent information suggests the orebody is block faulted, terracing down southwards in the same manner as the other orebodies. It is postulated that the Wedge Fault continues south after being cut by the Swan Fault. As this fault downthrows north it throws the sequence back, giving a plan exposure similar to a plunging anticline.

Dips are now interpreted to be 20^{o} - 30^{o} but the stratigraphy is still incompletely known. In the thickest part of the orebody adjacent to the Swan Fault, lower orebody is absent, and this cannot at present be adequately explained by faulting.

Probable ore occurs in three areas. The largest lies between the Swan and Auk Faults and consists entirely of garnet hornfels. The western most part lies adjacent to part of the Pit Dag orebody. Unlike the Pit Dag it consist of a complete C Lens sequence, although thinner than normal. A low tonnage resource occurs between these two blocks, as a thin, flat lying body, consisting only of lower orebody. This appears to be fault truncated.

Recent diamond drilling from the L6 drill drive has proved the existence of ore grade C Lens material as far south as 563 750N. This unexpected result contradicts earlier theories that the granite rose steeply immediately south of the mine area. The granite outcrop on the break-water indicates that there must be a steep gradient to the granite contact at some point south of 563 750N. Obviously the position at which this rise starts will determine the southward extent of the orebody.

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THE GRASSY GRANITE CONTACT

Because of its relevance to the southward extensions of Southern Orebody work is in progress on producing a contour plan of the granite contact, based on diamond drill hole intercepts and contacts exposed in underground openings. The first draught showed that the Dolphin mine sits on a shelf in much the same manner as the Bold Head orebody. The major features of the contact are:

1. A steep 60° dip to the north east in the Open Cut area.
2. A shallow 15° dip to the south east under much of the orebody, which extends south to at least 563 750N to 220 160E.
3. A gradually steepening dip underneath the Lower Wedge orebody, apparently having the same strike as the orebody. A hole drilled from the S10 (D260/12) at 75° for 351.3 metres, failed to encounter granite, indicating that either the granite is down faulted by the Grassy River Fault or that the contact has a dip greater than 57°

FAULTING AND STRUCTURE

The comments of Bujtor (1978) as revised by Brown and Potter (1980) are still essentially valid except where updated below.

A throw of approximately 75 metres has been determined for the Decline Fault, which from evidence on the -240 metre level appears to be cut by the Swan Fault. The Swan Fault cuts the Duck and Wedge Fault, both of which are now interpreted to continue into Southern Orebody. In this area the Wedge Fault is a reverse fault. All information currently available indicates that the Grassy River Fault is the most recent fault, since it cuts every other geological feature, though its relationship with the granite is still ambiguous. Drill hole D360/12 successfully penetrated the fault and indicated a horizontal thickness of around 40 metres. Although it continues to -550 metre R.L. it remained in Upper Volcanics.

As discussed in the Lower Wedge section, there is considerable small scale faulting, most of it limited to structures joining the Northern Boundary and Decline Faults.

The structural model currently in use for the Upper Pit is becoming increasing difficult to reconcile with the geology in that area as it progresses upwards. It is suspected that the central Fault dies away in the west and its movement is taken up by a number of smaller faults.

Recent work has shown that the Swan Fault is one of the most complex in the mine area. Its effect, together with the other faults in the Pit Dag Orebody is described separately. The exact position of this fault and its movement between the Pit Dag and Lower Pit stopes is still unclear. It has been shown that a change of dip of the Swan Fault in the Lower Pit area changes the fault from a normal to a reverse fault.

The Wedge Fault also changes from the normal fault (in the west) to a reverse fault in the east of the mine. In this case the fault maintains a constant dip direction, the change in nature of the fault occurs where it cuts the Central Fault.

There is no evidence to suggest that the Swan Fault cuts the granite and since the Swan Fault is interpreted to cut the Decline Fault it is assumed that the Decline Fault does not cut the granite. Indeed there is no evidence anywhere in the Dolphin or No. 1 orebodies to suggest that any faults, except possibly the Grassy River Fault cut the granite. This means that all fault except the Grassy River Fault are pre-granite and therefore pre-ore.

It it is theorised that the Grassy River Fault is post ore then the question of its relative movement becomes cruicial. In which direction did the off faulted orebody move? Since the fault brings Upper Volcanics against mine series it must either downthrow east or have a sinistral (east side northwards) movement or a combination of both. Should an off-faulted orebody exist it is likely to be similar size to the Dolphin and No. 1 Orebody and would be a large and lucrative target.

Even if the Grassy River Fault was pre-ore then potential still exists for skarn replacement of the mine series in some other, nearby location. If the granite maintains a steep (60^{o} dip) to the east it could allow mine series to survive beneath the Upper Volcanic cover and above the granite or quartzite basement.

The discovery of well mineralised B Lens (1.5% WO_3) on the -240 metre level between the Grassy River and Decline Fault adds weights to the general theory that grades increase eastwards and with depth. Since the vee formed by the junction of the Grassy River and Decline Fault opens southwards there is the possibility that C Lens exists in this oreblock at depth in the area south of the Lower Wedge. If it does occur it would be expected to carry high tungsten values, but would probably be a low tonnage oreblock. Ground conditions would be expected to be poor.

ORE RESOURCE

In the period under review the total C Lens Proven and Probable resource has been increased from 5 197 900 at 1.14% WO_3 to 5 038 000 at 1.12% WO_3.

During this period 359 594 tonnes of C Lens ore has been mined at a grade of 0.79% WO_3, although a significant percentage of this material came from outside the resource. The new calculation therefore represents an overall decrease in the resource of 169 900 tonnes since the March 1980 calculation. This decrease can be mostly accounted for by mining. In real terms more ore was defined and then mined in the intervening period. Significant increases were in the pyroxene garnet hornfels of the Upper Central stope where the resource has decreased by 12 200 tonnes but 123 400 tonnes have been mined. The Wedge orebody has increased by 1 500 tonnes although 69 200 tonnes have been mined from it. Southern orebody has decreased by 70 100 tonnes mainly due to reinterpretation.

C Lens possible resource has increased from 58 000 tonnes to 178 500 tonnes principally due to reclassification of ore in Southern Orebody.

Probable ore in B Lens has increased from 543 600 tonnes at 0.83% WO_3 to 721 300 tonnes at 0.78% WO_3 mainly due to additional ore defined east of the Decline Fault.

B Lens Possible ore has decreased from 129 000 tonnes to 127 000 tonnes.

Because of the unusual nature of the mineralisation in the pyroxene garnet hornfels of the Upper Central and Lower Wedge stopes, a modified method of grade calculation was used. Where the pyroxene garnet hornfels was known to be ore grade, by means of underground openings, all drill core assays in that area were used. Whether above ore grade (0.3% WO_3) or not. The normal practise of truncating high values to 4% WO_3 was maintained. This system allows for the poorly mineralised areas between veins which make up a large part of the resource tonnage in this rock unit.

DIAMOND DRILLING 1981/82

The underground oreblocking programme has continued and a total 352 holes for 24 173 metres have been completed since oreblocking commenced in December 1973. 74 holes have been drilled for 3 381 metres since the last review report (Brown and Potter, 1981).

Figures for King Island Scheelite M5 and M10 rigs are included in the above total.

The diamond drilling programme for the current year is detailed below

C Lens oreblocking:

Southern	1 270 metres
Decline	1 000 metres
Lower Central	200 metres
Open Cut	430 metres
Structural	300 metres
3 Surface holes	1 400 metres
	4 600 metres

The Open Cut programme remains as described by Brown and Potter (1980).

C Lens oreblocking is required in Lower Central orebody, Underground drilling from L6 and S9 is proposed to fill in gaps in Southern orebody and define resource at the southern edge of the orebody, The three surface holes are designed to test the southern-most part of Dolphin accessible from surface. They will be used to evaluate future underground diamond drilling requirements.

No C Lens Mineralisation has yet been defined in the Decline orebody, but 1 000 metres of drilling has been allowed to test the potential of this area.

ENGINEERING GEOLOGY

Limited engineering geological studies continue to be made but have been limited due to lack of manpower.

A research team from C.S.I.R.O. used the engineering parameters recorded on all the drill logs to obtain overall estimates for rock unit stengths. They found that the data was inconclusive as results indicated a common strength for all rock units which is clearly at odds with observational experience. Since then engineering logging has been discontinued.

Pillar photography has been continued but photographs are not being printed. All relevant information is stored and properly labelled for future use.

A prototype model of the Upper Central stope was made using perspex at a scale of 1:250. Practical difficulties of representing geological data in three dimensions, together with doubts in the value of the exercise and lack of manpower led to the project being shelved.

Limited studies (Memorandum 710/80) of joint patterns in the Lower Wedge have been made and were successful in predicting rock falls. This work identified three joint sets:

a. Small joints dipping east at 40 - 70° averaging 23 metres apart,
b. A less numerous set dipping to the north west at 50 - 60°, averaging 2.9 metres apart.
c. The least common, but most persistent set (up to 20 metres) dipping at 60° to the south west. They have an average spacing of 90 metres.

Further work is required in this area.

COMPUTING

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The comments of Brown, Potter (1981) remain applicable, but the information is still not in a form, or of sufficient accuracy to be reliably used.

All geographical information on all underground diamond drill holes is now stored on disc using the HP 9825 computer on site. The programme is not yet complete and needs further refining. With the addition of the digitizer to the unit it is now possible to measure areas faster and more accurately than before. All ore resource area calculations are now done with this machine. The next logical step is to have a simple ore resource calculation programme.

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EXTRACTIONS

Lower Wedge

Level	U/C	L/C	Total
-200 m R.L.	20 160 @ 1.25%		20 160 @ 1.25%
-220 m R.L.	13 327 @ 1.22%	8 228 @ 0.80%	21 555 @ 1.06%
-240 m R.L.	12 307 @ 1.37%	14 989 @ 0.78%	27 296 @ 1.05%
-260 m R.L.		2 502 @ 0.85%	2 502 @ 0.85%
	45 794 @ 1.27%	25 719 @ 0.79%	71 513 @ 1.10%

B Lens

Wedge		4 134 @ 0.37%
Pit		4 515 @ 0.42%
Southern	I12	3 024 @ 0.41%
	N13 Area	4 828 @ 0.27%
Central		3 022 @ 0.47%
Decline	-150 level	657 @ 0.35%
	-200 level	3 564 @ 0.46%
	-220 level	1 526 @ 0.61%

SUMMARY OF DIAMOND DRILLING RESULTS

FOR UNDERGROUND HOLES COMPLETED SINCE FEBRUARY 1980

DRILLING SECTIONS	HOLE NO	BEARING	INCLIN -ATION	TOTAL DEPTH (m)	MINERALISATION	REMARKS
219 960	D960/6	00°	-62°	34.2	bfb C Lens Pit 3 - 13 m, 10 m @ 0.60% WO_3	
	D960/7	177°	-66°	25.2	Lower C Lens Pit 8 - 15 m, 7 m @ 0.71% WO_3	
	D960/8	-	+90°	20.0	Pgh 7 - 15 m, 8 m @ 2.59% WO_3	
220 000	D000/6	186°	-28°	22.3	Intersected B Lens	
	D000/7	59°	-86°	38.0	No economic mineralisation bfb	
	D000/8	181°	+134°	56.7	bfb 9 - 11 m, 2 m @ 0.37% WO_3 bfb 21 - 22 m, 1 m @ 0.49% WO_3 bfb 41 - 42 m, 1 m @ 0.58% WO_3	
	D000/9	1°	+131°	21.1	No economic mineralisation	
	D000/10	2°	+39°	39.0	Southern Orebody 7 - 16 m, 9 m @ 1.50% WO_3	
	D000/11	180°	+182°	140.0		
	D000/12	0°	+90°	19.6	No economic mineralisation	
	D000/13	0°	+39°	19	Lower Central Southern Orebody 11 - 14 m, 3 m @ 0.46% WO_3	
220 020	020/13	359°	+29°	23	Lower C Lens 4 m @ 0.53% WO_3 0.01% Mo	
	020/14	0°	-90°	33	No economic mineralisation	
	020/15	359°	-55°	21.3	Lower C Lens 0 - 2 m, 2 m @ 0.41% WO_3	
220 065	065/1	245°	+87°	17.9	B Lens No economic mineralisation	
	065/2	183°	-49°	20.5	No economic mineralisation	
220 070	070/1	1°	-44°	24.4	No economic mineralisation	
	070/2	215°	-89°	18	gh (b) Dag East 5 - 15 m, 10 m @ 1.06% WO_3	
	070/3	0°	-73°	16.9	B Lens No economic mineralisation	
220 075	075/1	313°	-88°	21.1	Lower Central Pit Dag East 2 - 18 m, 16 m @ 1.13% WO_3	
	075/2	178°	-50°	7.5		

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DRILLING SECTIONS	HOLE NO	BEARING	INCLIN -ATION	TOTAL DEPTH (m)	MINERALISATION		REMARKS
220 150	160/21	178°	-52°	84.5	B Lens	5 - 8 m, 3 m @ 0.33% WO_3	
					C Lens	53 - 60 m, 7 m @ 1.12% WO_3	
	160/22	179°	-44°	151.0	C Lens S.O.B.	88 - 131 m, 43 m @ 0.72% WO_3	
	160/23	181°	-56°	100	S.O.B.	70 - 82 m, 12 m @ 0.58% WO_3	
220 180	180/10	84°	-88°	63	No Economic Mineralisation		
	180/11	5°	-58°	89		29 - 41 m, 12 m @ 0.94% WO_3	
	180/12	171°	+48°	38.7	B Lens	21 - 28 m, 7 m @ 0.53% WO_3	
220 200	200/30	178°	-34°	78.6	No Economic Mineralisation		
	200/31	178°	177°	45.5	Lower Pit	40 - 46 m, 6 m @ 1.02% WO_3	
	200/32	2°	-70°	52.2	Southern Orebody	30 - 43 m, 13 m @ 0.85% WO_3	
220 220	220/20	120°	+1°	52.4	Mid Wedge	33 - 45 m, 12 m @ 0.97% WO_3	
	220/21	002°	+60°	35	Central	0 - 6 m, 6 m @ 2.06% WO_3	
						15 - 25 m, 10 m @ 0.69% WO_3	
						30 - 35 m, 5 m @ 0.84% WO_3	
	220/22	359°	+46°	41.07	No Economic Mineralisation		
	220/23	359°	-45°	63.0	Hole abandoned		
220 240	240/23	121°	+2°	20.0	No Economic Mineralisation		
	240/24	360°	-70°	47	No Economic Mineralisation		
	240/25	220°	+89°	50.0	No Economic Mineralisation		
	240/26	181°	-66°	61.0	No Economic Mineralisation		
	240/27	359°	-51°	72.0	No Economic Mineralisation		
220 260	260/4	359°	-48°	77.5	No Economic Mineralisation		
220 280	280/15	78°	-1°	49.0		21 - 26 m, 5 m @ 0.63% WO_3	
	280/16	103°	+00°	66.0	B Lens Decline	18 - 25 m, 7 m @ 0.63% WO_3	
						32 - 34 m, 2 m @ 2.32% WO_3	
						38 - 45 m, 7 m @ 0.43% WO_3	
220 300	300/1	270°	+1°	48.1	gh Lower Central	29 - 42 m, 13 m @ 1.05% WO_3	
	300/2	270°	+121°	70.5	Lower Central	21 - 30 m, 9 m @ 0.71% WO_3	

DRILLING SECTIONS	HOLE NO	BEARING	INCLIN -ATION	TOTAL DEPTH (m)	MINERALISATION		REMARKS
220 320	320/22	101°	00°	18.0	B Lens 1 m @ 0.33% No significant mineralisation		
	320/23	104°	00°	44.8	Pgh	5 - 8 m, 3 m @ 0.54% WO_3	
					Pgh	10 - 12 m, 2 m @ 0.99% WO_3	
					B Lens	21 - 24 m, 3 m @ 0.99% WO_3	
					B Lens	28 - 33 m, 5 m @ 0.74% WO_3	
	320/24	102°	00°	43.0	B Lens Decline	14 - 17 m, 3 m @ 0.70% WO_3	
						25 - 28 m, 3 m @ 0.70% WO_3	
						40 - 42 m, 2 m @ 1.54% WO_3	
	320/25	102°	00°	33.5	gph	9 - 14 m, 5 m @ 1.62% WO_3	@ 0.04% Mo
					B Lens	27 - 30 m, 3 m @ 0.48% WO_3	
	320/26	102°	00°	52.4	Pgh	1 - 4 m, 3 m @ 1.99% WO_3	
					B Lens	18 - 21 m, 3 m @ 0.83% WO_3	
					B Lens	23 - 25 m, 2 m @ 1.66% WO_3	
					B Lens	30 - 41 m, 11 m @ 0.66% WO_3	
	320/27	103°	0°	49.3	B Lens	28 - 31 m, 3 m @ 0.39% WO_3	
					B Lens	40 - 46 m, 6 m @ 1.18% WO_3	
	320/28	105°	+2°	26.3	Pgh Lower Wedge	0 - 7 m, 7 m @ 1.19% WO_3	
					Pgh Lower Wedge	13 - 20 m, 7 m @ 1.27% WO_3	
	320/29	104°	0°	20.0	Pgh Lower Wedge	0 - 14 m, 14 m @ 1.15% WO_3	
	320/30	102°	+58°	27.6	Pgh Lower Wedge	0 - 15 m, 15 m @ 1.06% WO_3	
320 340	340/24	104°	-0°	38.0	B Lens	0 - 2 m, 2 m @ 0.72% WO_3	
					B Lens	13 - 28 m, 15 m @ 1.68% WO_3	
	340/25	100°	+1°	46.2	C Lens	0 - 7 m, 7 m @ 2.79% WO_3	
					B Lens	18 - 46 m, 28 m @ 0.62% WO_3	
	340/26	0°	+102°	48.0	C Wedge	0 - 4 m, 4 m @ 3.9% WO_3	
					B Lens Decline	26 - 43 m, 17 m @ 0.58% WO_3	
	340/27	102°	+1°	43.3	B Lens Decline	25 - 34 m, 9 m @ 0.79% WO_3	
	340/28	104°	0°	49.0	Lower Central Lens Wedge	0 - 14 m, 14 m @ 2.29% WO_3	
					Upper Central Wedge	17 - 22 m, 5 m @ 1.00% WO_3	
					B Lens Decline	33 - 44 m, 11 m @ 1.05% WO_3	
	340/29	103°	+89°	32.0	C Lens Wedge	0 - 19 m, 19 m @ 1.44% WO_3	

DRILLING SECTIONS	HOLE NO	BEARING	INCLIN -ATION	TOTAL DEPTH (m)	MINERALISATION	REMARKS
320 340	340/30	103°	+1°	58.0	Upper Central pgh 0 - 19 m, 19 m @ 1.07% WO_3 Lower Wedge	
	340/31	103°	+1°	14.2	gh and pgh 0 - 13 m, 13 m @ 2.16% WO_3 Lower Wedge	
	340/32	100°	0°	34.6	Lower Wedge pgh 1 - 14 m, 13 m @ 0.80% WO_3 B Lens Decline 21 - 26 m, 5 m @ 1.19% WO_3	
	340/33	100°	+1°	13.0	gh (b) Lower 0 - 9 m, 9 m @ 0.96% WO_3 Wedge	
	340/34	106°	+2°	19.0	Pgh Lower Wedge 0 - 6 m, 6 m @ 1.32% WO_3 B Lens Decline 14 - 16 m, 2 m @ 0.95% WO_3	
	340/35	98°	+89°	27.0	Pgh 1 - 7 m, 6 m @ 1.61% WO_3	
	340/36	103°	90°	33.0	B Lens Decline 25 - 28 m, 3 m @ 1.33% WO_3	
	340/37	101°	90°	31.5	Pgh (min) 6 - 9 m, 3 m @ 0.5% WO_3 22 - 30 m, 8 m @ 0.42% WO_3	
	340/38	102°	90°	23.0	gh, Lower Wedge 0 - 6 m, 6 m @ 0.96% WO_3	
	340/39	44°	0°	15.0	gh, Lower Wedge 0 - 9 m, 9 m @ 2.22% WO_3	
	340/40	101°	-64°	18.0	Lower Wedge 1 - 10 m, 9 m @ 0.62% WO_3	
	340/41	103°	89°	17.3	gh (b) Lower Wedge 0 - 3 m, 3 m @ 1.33% WO_3	
	340/42	102°	168°	48.5	C Lens Lower Wedge 0 - 40 m, 40 m @ 1.38% WO_3	
	360/12	85°	-57°	351.3	No Economic Mineralisation	
	360/13	192°	-88°	13.5	Hole abandoned No Economic Mineralisation	

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KING ISLAND SCHEELITE

UNDERGROUND TECHNICAL SERVICES

EXTRACTION TABLE

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ISG REFER REPORT 70-0676

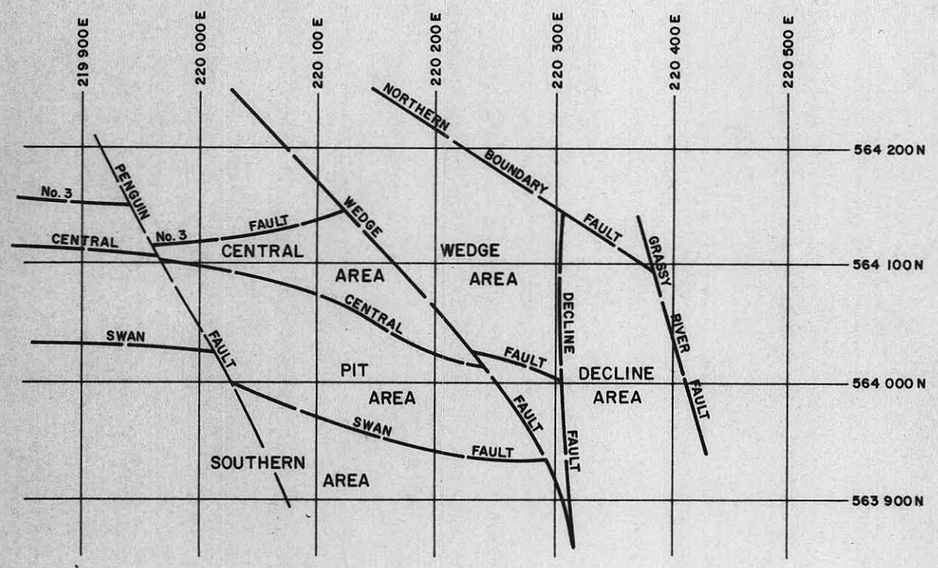
'C' LENS EXTRACTION

	WEDGE		CENTRAL		PIT		PIT DAG		SOUTHERN		DECLINE		TOTAL	
	53,521	1·11	16,863	1·17	3,604	0·85							93,988	1·11
	11,756	0·74			32,207	0·53							43,963	0·59
-75	65 277	1·04	16 863	1·17	35 811	0·56							117 951	0·92
	51,053	1·00	9,097	1·22									60,150	1·03
	50,762	0·76	923	1·00	10,280	0·48							61,965	0·72
-100	101,815	0·88	10,020	1·20	10.280	0·48							122,115	0·87
	191,522	1·07	88,106	0·98	39,643	0·65							319,271	0·99
	56, 866	0·72	90,224	0·66	47.991	0·58							298,081	0·68
-125	348,388	0·91	178,330	0·82	87 634	0·61							614,352	0·84
	13,800	1·13	30,624	1·09	92,393	0·99							136,816	1·03
	4,505	0·61	103,254	0·75	62,931	0·67							170,690	0·72
-150	18,305	1·00	133, 878	0·83	155,324	0·86							307,507	0·86
	7,392	1·41			1,981	1·58							9,373	1·45
	15, 827	0·52	4,169	0·55	22,416	0·68	13,968	0·56	4,329	0·60			60, 709	0·60
-200	23,219	0·80	4,169	0·55	21,392	0·78	13,968	0·56	4,329	0·60			70,082	0·71
	36,988	1·25			36,893	1·07							73,881	1·16
	34,030	0·78	3,283	1·03	90,161	0·64							127, 474	0·69
	71, 018	1·02	3, 283	1·03	90,161	1·08							201,355	0·86
TOTAL	354,276	1·09	144,690	1·04	174,514	0·93						UPPER "C":	673,480	1·04
	273,746	0·72	201,853	0·71	265,986	0·62	13,968	0·56	4,329	0·60		LOWER "C":	759,882	0·68
	628,022	0·93	346,543	0·85	440,500	0·74	13,968	0·56	4,329	0·60		TOTAL:	1,433,362	0·85

'B' LENS EXTRACTION

-50	4,134	0·37	3,022	0·47	4,370	0·43			7,584	0·33	5,747	0·49	24,857	0·41

(Figures adjusted to mill weightometer)



DOLPHIN EXTRACTION SUMMARY

ORE MINED: C LENS

UPPER C	673,480	TONNES	at 1·04	%WO_3
LOWER C	759,882	TONNES	at 0·68	%WO_3
TOTAL C LENS	1,433,362	TONNES	at 0·85	%WO_3
ORE MINED: B LENS	24,857	TONNES	at 0·41	%WO_3
TOTAL ORE MINED:	1,458,219	TONNES	at 0·84	%WO_3

COMPILED BY: H.G.
DRAWN BY: C.W.
CHECKED BY: RESD
DATE: OCT, 1981

163038

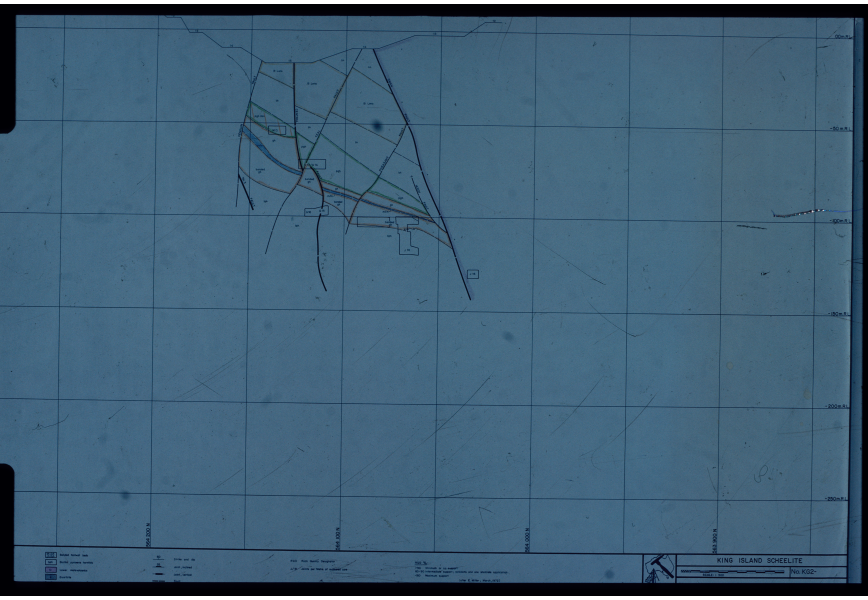
KING ISLAND SCHEELITE - UNDERGROUND TECHNICAL SERVICES

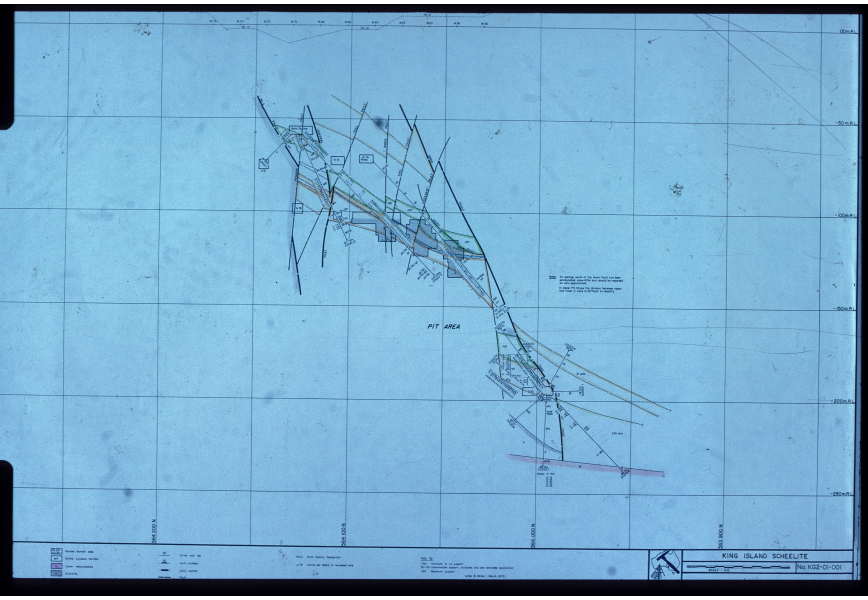
DOLPHIN OREBODY ORE RESOURCE AND MINING RESERVE TABLE AS AT 31-7-81.

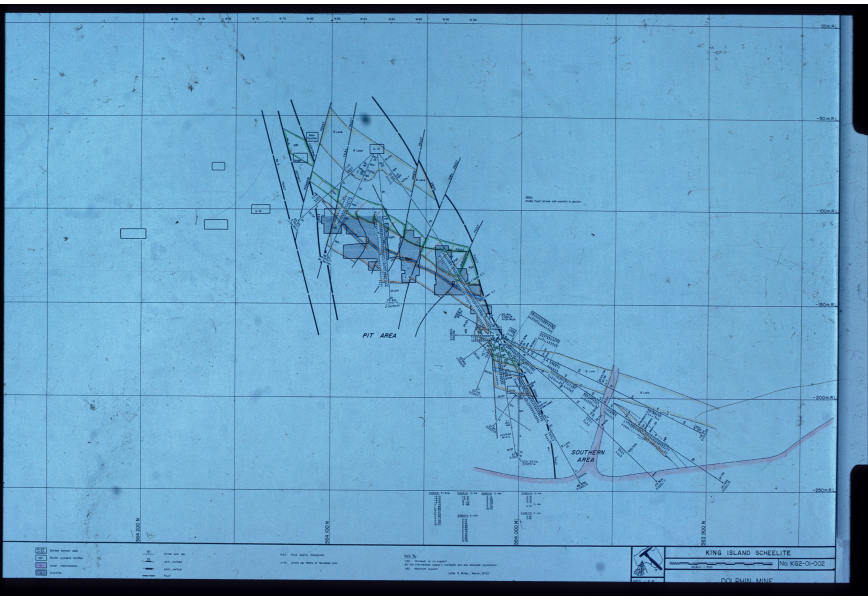
METHOD OF GRADE CALCULATION: Modified polygonal method of weighted arithmetic means.
METHOD OF TONNES CALCULATION: Truncated cone formula using geological floor plans.

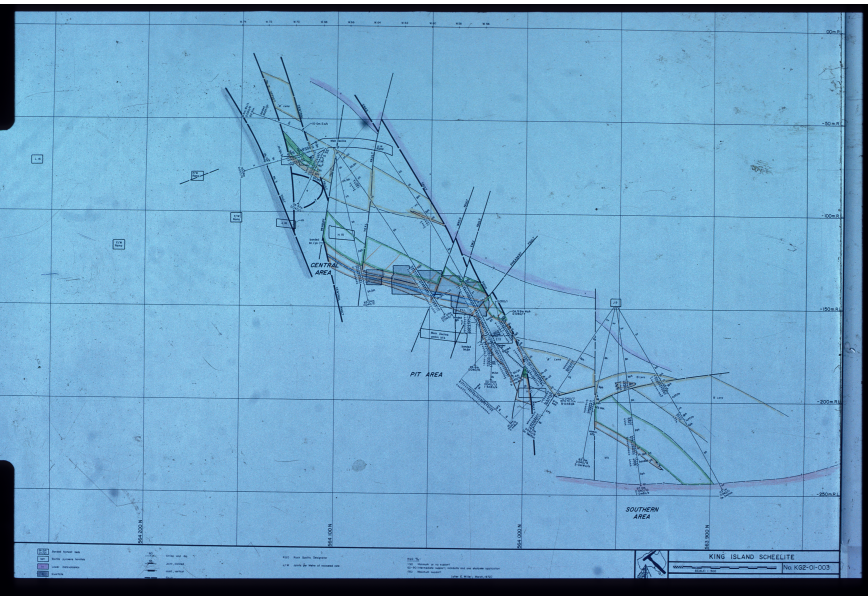
COMPILED BY: R.E.S.D. / W.G.
DRAWN BY: R.F.
CHECKED BY: S.G.B./ W.G.
DATE: SEPT., 1981

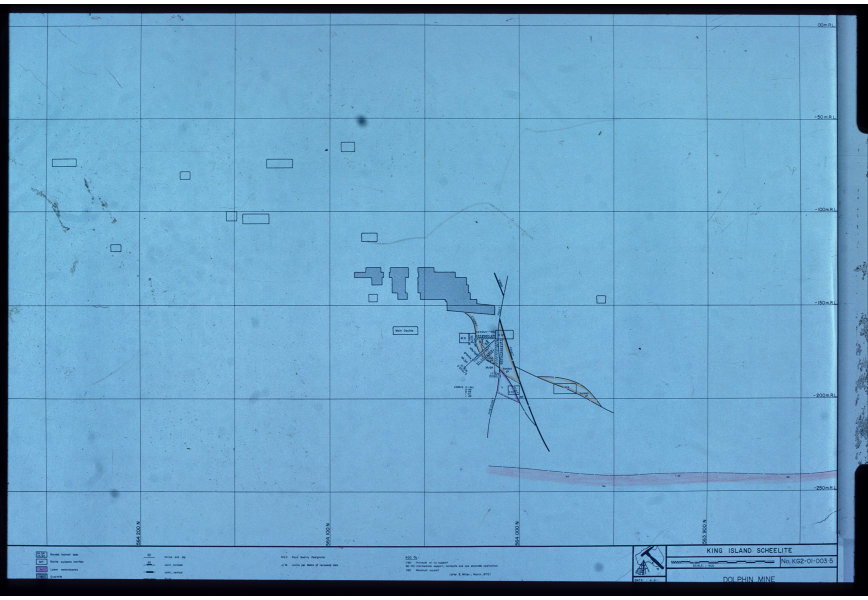
AREA	PROVEN						PROBABLE						POSSIBLE	TOTAL PROVEN + PROBABLE			
	GEOLOGICAL RESOURCE		RESOURCE IN MAJOR PILLARS		MINING RESERVE		GEOLOGICAL RESOURCE		RESOURCE IN MAJOR PILLARS		MINING RESERVE		GEOLOGICAL RESOURCE	GEOLOGICAL RESOURCE		MINING RESERVE	
UPPER WEDGE [-50 to -125mR.L.]	129 900	0·90	93 900	0·90	17 300	0·74								129 900	0·90	17 300	0·74
MID WEDGE [-125 to -220mR.L.]	1 184 300	1·10	266 400	1·16	742 000	0·99								1 184 300	1·10	742 000	0·99
LOWER WEDGE OPEN STOPE	769 000	1·28			821 900	1·14	15 100	1·14			14 500	1·01		784 100	1·28	836 400	1·14
BARRIER PILLAR 1	370 500	1·36			393 700	1·09								370 500	1·36	393 700	1·09
BARRIER PILLAR 2	446 900	1·41			262 700	1·18								446 900	1·41	262 700	1·18
REMNANT							35 100	1·14			17 000	1·04		35 100	1·14	17 000	1·04
UPPER CENTRAL [-50 to -150mR.L.]	157 700	1·35	58 900	1·33	63 700	1·22	127 200	0·56	17 600	0·56	56 300	0·51		284 900	1·00	120 000	0·89
MID CENTRAL [-150 to -200mR.L.]	117 900	1·36	80 100	1·39	27 800	1·08	34 700	1·60	5 900	1·84	19 000	1·29	6 600	152 600	1·41	46 800	1·17
LOWER CENTRAL [-200 to -270mR.L.]	39 900	0·96			35 900	0·80							20 400	39 900	0·96	35 900	0·80
UPPER PIT [-50 to -150mR.L.]	46 500	1·18	3 400	1·90	37 400	0·90	409 100	0·79	316 800	0·75	72 100	0·48	10 000	455 600	0·83	109 500	0·62
LOWER PIT [-150 to -270mR.L.]	794 100	1·03	172 500	1·14	525 300	0·87	48 900	0·97	3 500	0·40	34 000	0·84	6 000	843 000	1·03	559 300	0·87
PIT DAG	19 300	0·80			18 200	0·70	42 000	0·64	2 300	0·62	37 000	0·56		61 300	0·69	55 200	0·61
SOUTHERN							239 900	1·00			172 400	0·83	136 000	239 900	1·00	172 400	0·83
TOTAL C LENS:	4 076 000	1·19	675 200	1·16	2 945 900	1·04	952 000	0·86	346 100	0·75	422 300	0·74	179 000	5 028 000	1·13	3 368 200	1·00
B LENS: WEDGE							240 000	0·75	55 400	0·57	89 500	0·72	20 000	240 000	0·75	89 500	0·72
DECLINE							337,700	0·74			232 500	0·62	107 000	337 700	0·74	232 500	0·62
CENTRAL							110 200	0·97	7 000	0·95	66 500	0·80		110 200	0·97	66 500	0·80
PIT							9 000	0·94			5 500	0·85		9 000	0·94	5 500	0·85
SOUTHERN							24 400	0·80			16 800	0·67		24 400	0·80	16 800	0·67
TOTAL B LENS:							721 300	0·78	62 400	0·61	410 800	0·68	127 000	721 300	0·78	410 800	0·68
TOTAL DOLPHIN MINE	4 076 000	1·19	675 200	1·16	2 945 900	1·04	1 673 300	0·83	408 500	0·73	833 100	0·71	306 000	5 749 300	1·08	3 779 000	0·97

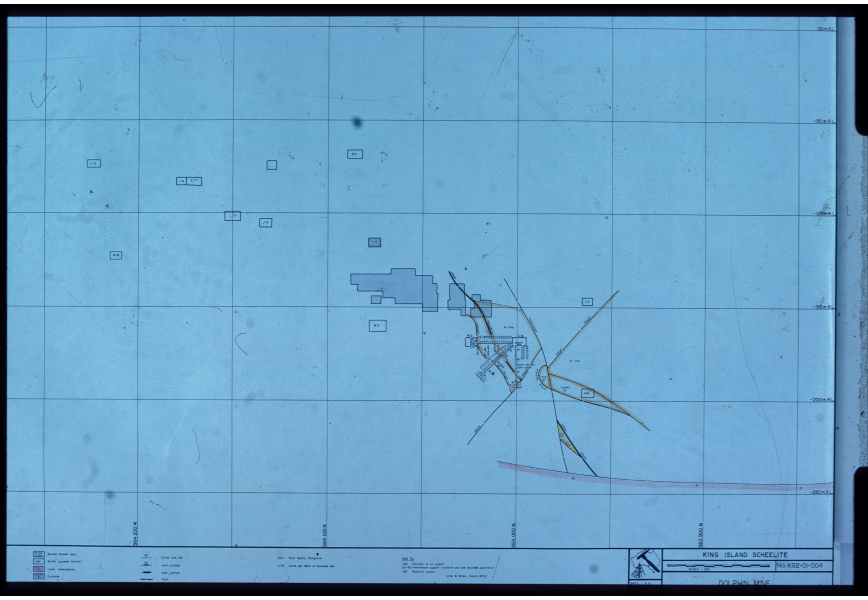

KING ISLAND SCHEELITE
No. KIS2-
360,200 N
360,400 N
360,600 N
360,800 N
-100m R.L.
-150m R.L.
-200m R.L.
-250m R.L.

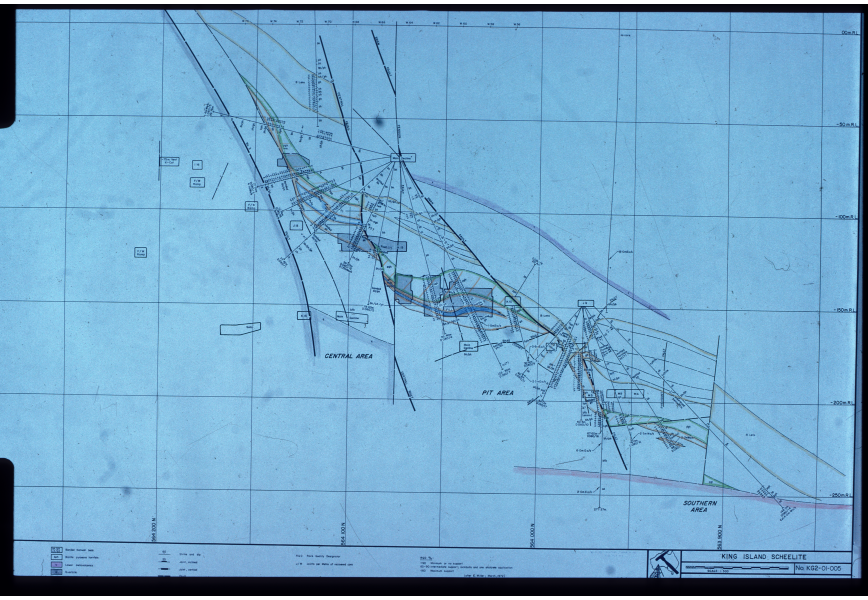

PIT AREA
Note: All geology south of the Fault Fault has been removed during mining and should not appear on this plan.
Geology north of the Fault Fault is based on Phase 1 mine & drillhole mapping.
10cm R.L.
-50cm R.L.
-100cm R.L.
-150cm R.L.
-200cm R.L.
-250cm R.L.
5565 500 N.
5565 600 N.
5565 700 N.
5565 800 N.
KING ISLAND SCHEELITE
No. KGZ-01-001

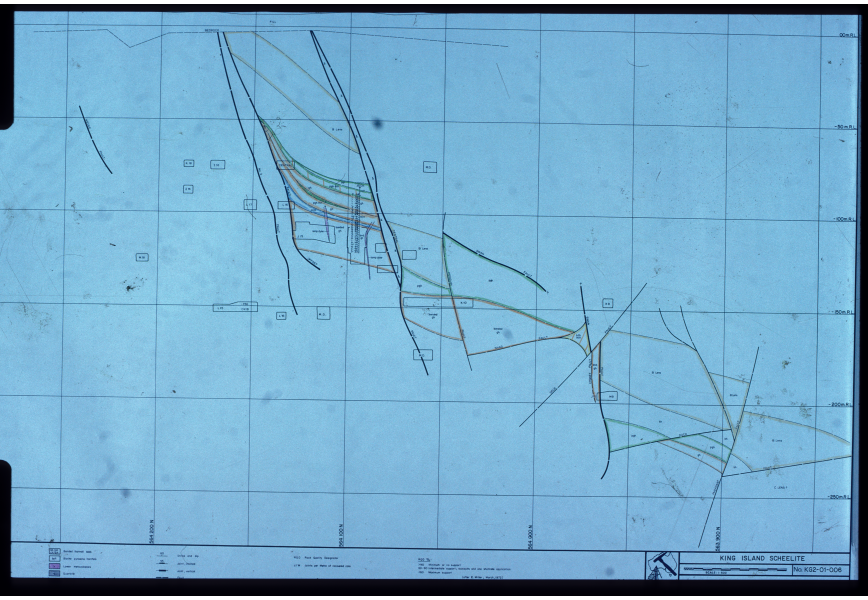

PIT AREA
SOUTHERN AREA
KING ISLAND SCHEELITE
No. KIS2-01-002
DOLPHIN MINE

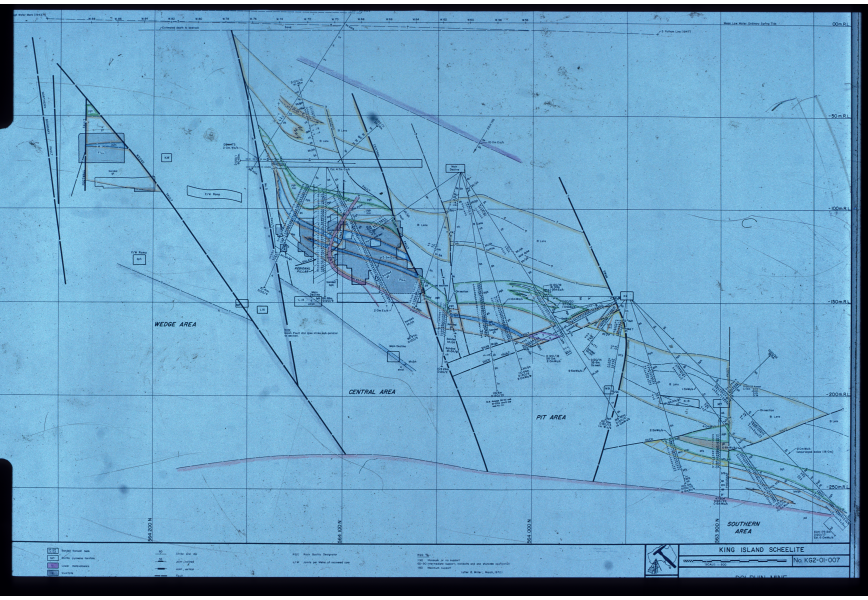

CENTRAL AREA
PIT AREA
SOUTHERN AREA
KING ISLAND SCHEELITE
No. KGZ-01-003

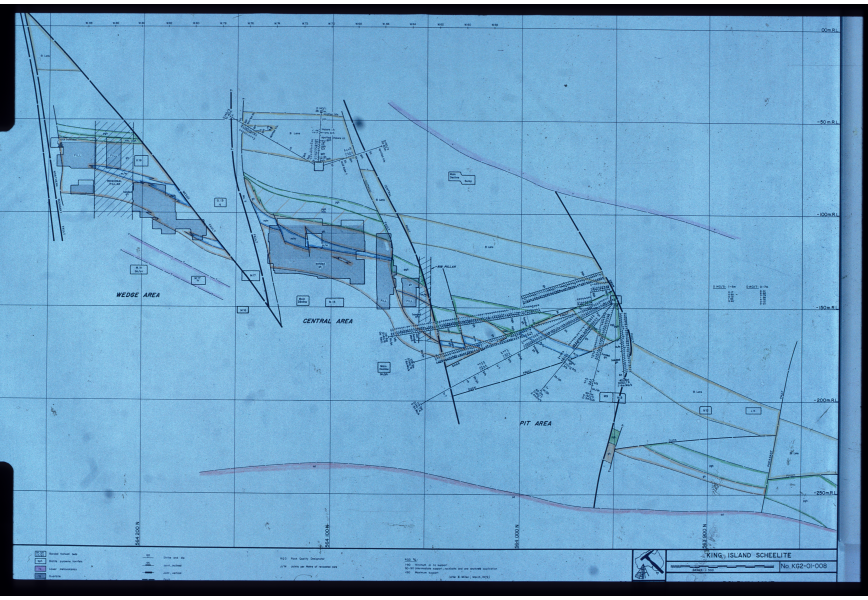

KING ISLAND SCHEELITE
DOLPHIN MINE
No.KGZ-01-003.5

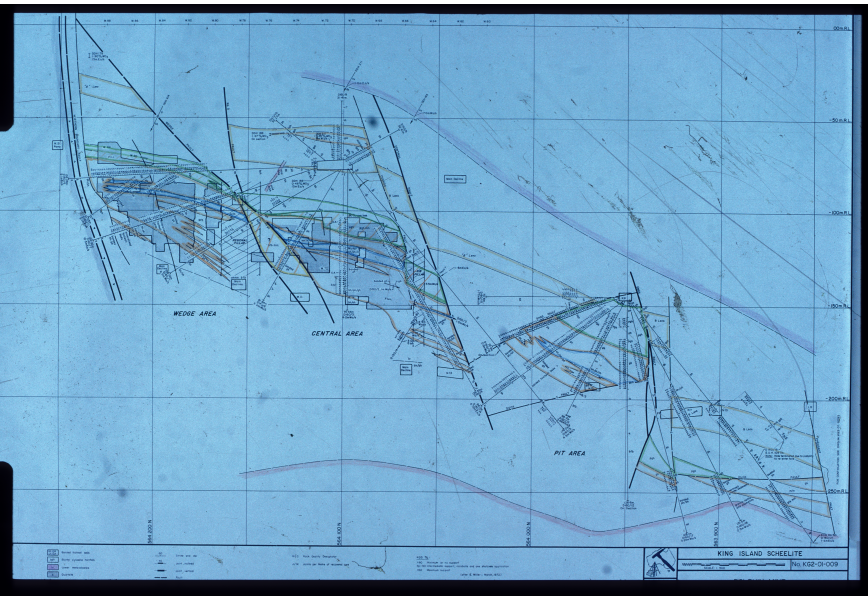

KING ISLAND SCHEELITE
DOLPHIN MINE


CENTRAL AREA
PIT AREA
SOUTHERN AREA
KING ISLAND SCHEELITE
No. KGZ-01-005


KING ISLAND SCHEELITE
No KGE-01-006
Rock quality Designation
Drill core and Rock of recovered core
Drill Intersection of a fault(s)
Drill intersection of a quartz fracture and vein stockwork mineralization
Drill intersection of a quartz vein
Lithos & Mineral Resources
Scale 1:500
Normal fractured rock
Rock contains veining
Contact Metasediments
Granite
Strike and dip
Strike vertical
Bedding
Fault
Fault vertical
Vein
Vein vertical
Joint
Joint vertical
Shear
Shear vertical
Stockwork
Stockwork vertical
Breccia
Breccia vertical
Dyke
Dyke vertical
Contact
Contact vertical
Foliation
Foliation vertical
Cleavage
Cleavage vertical
Lineation
Lineation vertical
Fold axis
Fold axis vertical
Fold axial plane
Fold axial plane vertical
Bedding
Bedding


WEDGE AREA
CENTRAL AREA
PIT AREA
SOUTHERN AREA
KING ISLAND SCHEELITE
No. KGZ-01-007


WEDGE AREA
CENTRAL AREA
PIT AREA
KING ISLAND SCHEELITE
No. KG2-01-008


WEDGE AREA
CENTRAL AREA
PIT AREA
KING ISLAND SCHEELITE
No. KGI-11-009