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BV 1656

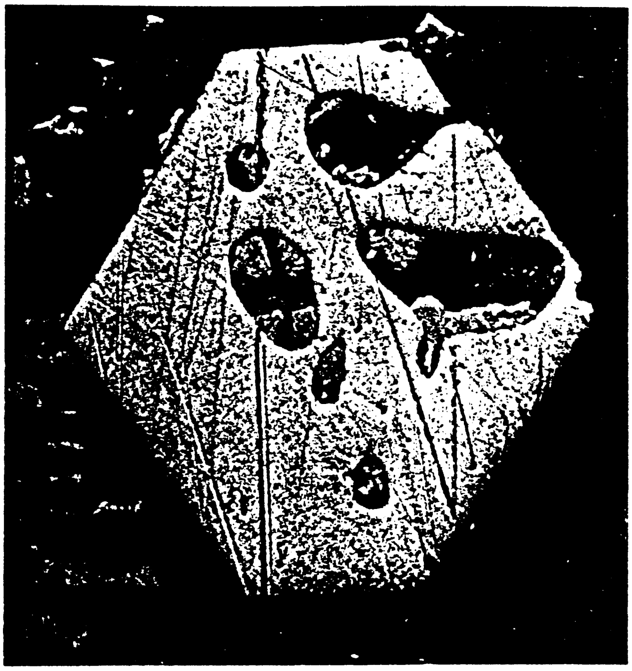
NORSK HYDRO A/S

GOLD EXPLORATION IN THE BLEKA FOLD AREA, TELEMARK.

BY

O. HARPØTH

J. L. GREGERSEN



O. Harpøth

COPENHAGEN 1984

SUMMARY.

The gold-bismuth bearing Bleka-type veins of the Bleka Fold area (170 km^2) of central Telemark have been investigated in detail. The investigation was concentrated partly in the Bleka Mine area and in the Espelid area 2-3 km north of Bleka where the hitherto largest vein swarm of the area was found and mapped at scale 1:1000. Apart from this, reconnaissance investigations of other known vein occurrences include Nystaul, Barstad, Blengsdalen and Gjuv.
The results of this investigation strongly indicate that all of the known occurrences including the newly discovered Espelid vein swarm have a common ore genesis and a conceptual model for the veins is proposed. This concludes that the 40°-90° striking gold-bismuth bearing quartz-tourmaline-carbonate veins were emplaced in their amphibolite host rock along ENE-WSW dextral shear faults resulting from ESE-WNW max compression during N-S to NNE-SSW folding in the Sveconorwegian orogenic period. Major ore lenses seem to be located in areas where max tension and dilation occurs e.g. merging en echelon vein segments. Pronounced hydrothermal alteration envelopes characterize the mineralization and also, together with the mineral assembly of the veins, indicate the high temperature nature of the veins. In summary, the location of the Bleka-type veins is a result of regional tectonics combined with favorable host rock lithology whereas the high temperature nature and to some degree the mineral assembly is controlled by the intrusion of underlying granite. Due to the high-grade nature of the known ore lenses (25 ppm Au and 0.5 % Bi) and due to the significant size of the Espelid vein swarm as compared with that of Bleka the economic potential is considered good here. Furthermore, a bismuth (locally gold) halo is observed in the northern end of the vein swarm probably indicative of deeper-lying gold-bismuth mineralization. In conclusion the Espelid vein swarm is considered a prime drilling target for a small to medium sized gold-bismuth deposit.

RECOMMENDATIONS.

Prime importance - the Espelid vein swarm.

1) It is recommended to carry out drilling on the Espelid vein swarm. It is suggested that gold-bismuth mineralization is located 200-300 m below the present surface and this should be tested in a first step by drilling of two or three holes totalling in the order of 500-1000 m from one drill location provisionally situated in the northern part of the vein swarm just south of Nystaul (see enclosed Map 3). The exact position of this locality and the details of this drilling programme would benefit from the following additional investigations:

   a) analysis of all remaining chip samples from the area for bismuth in order to get a more precise outline of Bi-halos.

   b) fluid-inclusion studies on quartz-(tourmaline)-(carbonate) which could indicate whether the Espelid veins are located at a 200-300 m higher level than the known gold-bearing veins of the Bleka Fold area as suggested by present day position.

   c) a detailed microscopic investigation of the gold and bismuth minerals and their paragenetic position in the different occurrences might also help in the interpretation of relative levels.

   d) local trenching partly along and partly across the veins in the more promissing areas to identify areas of max dilation e.g. merging between en echelon vein segments.

Secondary importance - Bleka-Blengsdalen-Gjuv.

2) Further detailed geological investigations around Blengsdalen and Gjuv are recommended in order to be able to make a better estimate of the economic potential of these.

3) On a long-term basis it is suggested to investigate further the merge zone at the bleka Mine possibly by drilling. In this context the area NE of Sverveli should also be investigated.

4) The SW and NE continuation of the recognized gold-anomalous belt (outlined from stream-sediment survey) stretching from Espelid-Bleka-Blengsdalen to NE of Gjuv should be tested by supplementary stream-sediment sampling.

TABLE OF CONTENTS.

1. INTRODUCTION.

The investigated area covers approximately 170 km^2 of the Bleka Fold in central Telemark, Norway (Fig.1).
The main aim of the project was to carry out detailed investigations on gold-bismuth mineralized veins in order to propose a mineralization model for the area.
The work was carried out during a seven-week period from late May untill early July. It comprises a photogeological interpretation (lineament analysis + limited photogeologicl mapping) of the entire area as well as five weeks of detailed field work in selected areas.
The field work comprises:

1) Detailed mapping and sampling of the Bleka Mine area (0.5 km^2). This includes both surface and subsurface investigations.
2) Detailed mapping and sampling of the Espelid area.
3) Investigations of other known vein occurrences.
4) Reconnaissance for gold-bearing veins in unknown areas.

Due to the finding of a previously unrecognized vein swarm in the Espelid area approximately half of the time was spent on detailed investigations in this area.
The field work was coordinated with stream-sediment sampling for gold in central Telemark conducted by B. Sieborg.
A total of 203 litho-samples (Appendix I) comprising 145 chip samples (1-10 kg according to vein thickness) and 58 grab samples (0.2-2 kg) were collected. Of these 193 have been analyzed for gold and 57 for one or more associated elements (Bi-Ag-Cu-Pb) (Appendix II).
Finally, two polished sections (one rock chip and one pan concentrate of ore) have been investigated ore microscopically.
We acknowledge the fruitfull discussions in the field with P.A.Lindberg, F.D.Pedersen, L.Rasmussen, B.Sieborg and T.Vrålstad.

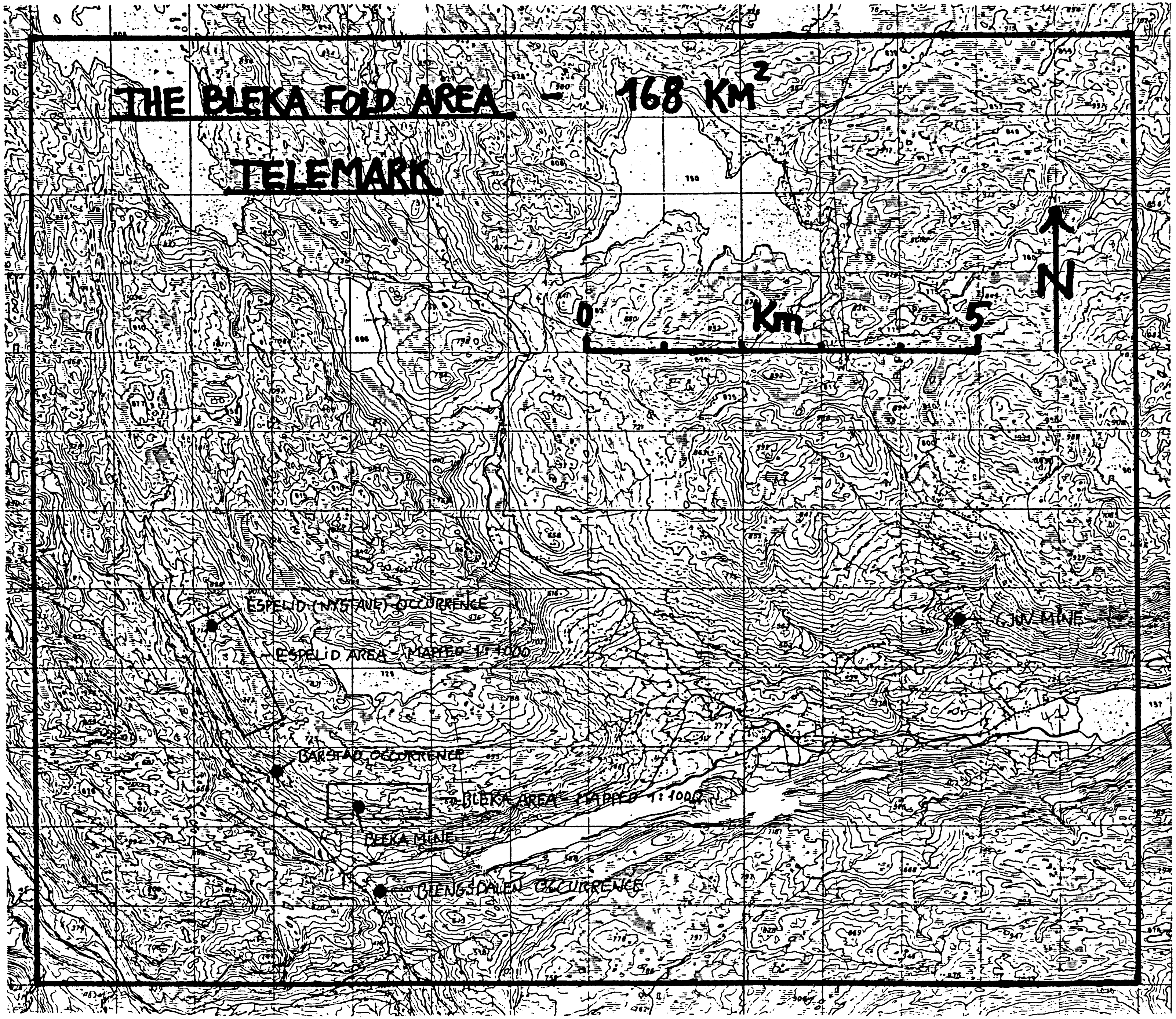


Fig.1. Location map.

2. GEOLOGICAL SETTING.

In a regional context the Bleka Fold area of central Telemark belongs to the Southern Precambrian Province of Norway.This province is bounded by the coast of Southern Norway to the south, by the Cambro-Silurian of the Oslo Region to the east and by overlying Cambrian autochton or Caledonian thrust nappes to the north and northwest. Traditionally, the province has been subdivided into : the Egersund Anorthosite Province of Rogaland in the extreme southwest, the southern basement gneisses with post-tectonic granites, the Kongsberg-Bamble Complex along the eastern margin and the Telemark Supracrustal Suite of the central area.
In a semi-regional context the geology of central Telemark is dominated by the Proterozoic supracrustals of the Telemark Supergroup which comprise an up to 7 km thick sequence of felsic and mafic volcanics, quartzites, conglomerates, schists and subordinate marbles. The supracrustals of the Telemark Supergroup have been divided into four groups : the Rjukan Group, the Seljord Group, the Bandak Group and the Heddevatn Group. The Rjukan Group (predominantly felsic and mafic volcanics - up to 1000 m thick) and the Seljord Group (predominantly quartzites, conglomerates and schists - up to 4000 m thick) have been folded and eroded before the deposition of the overlying Bandak Group (dominated by a mixed sequence of felsic and mafic volcanics and clastic sediments with subordinate calcareous sediments - up to 2200 m). The western continuation of the Bandak Group called the Blåbergås Group is conformably overlain by the Heddevatn Group (predominantly andesitic flows - up to 3200 m) which comprises the youngest deposits of the area.
Fig.2 shows a schematic representation of the stratigraphy of the Telemark Supergroup.
The last registered major geological event was the intrusion of a suite of postkinematic granitics during the period 1100-850 ma. In the central Telemark area the granites are of calc-alkaline affinity.

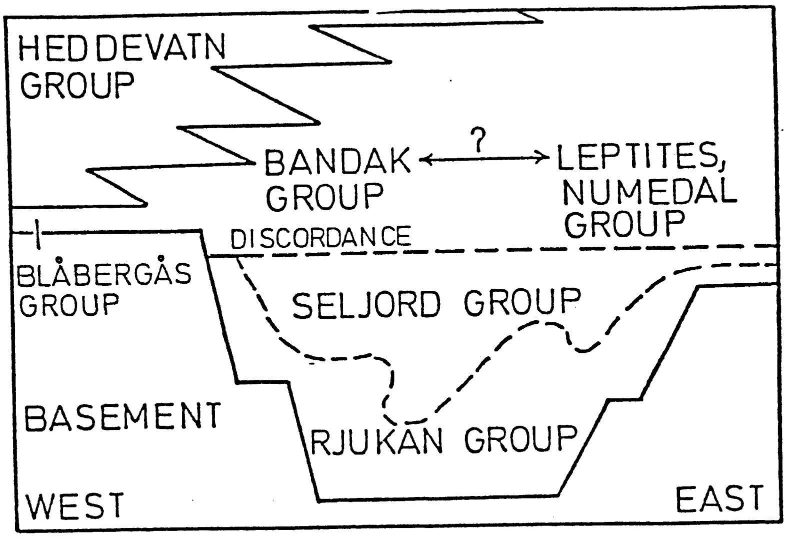


Fig.2. Schematic representation of the stratigraphy of the Telemark Supergroup. From Pedersen (1984).

A tentative scheme of the tectonic development of the central Telemark area has been proposed by Pedersen (1984):

~ 800 ma.	8) Drag folding by late faults
	7) Doming around granite diapirs
	6) Folding around N-S axes
	5) Granitization
non-linear time scale	4) Deposition of the Bandak and Heddevatn Groups
	3) Uplift and erosion
	2) Folding around E-W to ENE-WSW axes
~ 1650 ma.	1) Deposition of the Rjukan and Seljord Groups

The summary description of the regional to semi-regional geological setting as outlined above is mainly based on a recent comprehensive study by Pedersen (1984) who has interpreted the geology and proposed some conceptual models for the Southern Precambrian Province.

In a local context the geology of the investigated area of the Bleka Fold is dominated by a prominent NNE-SSW trending anticlinal fold structure which in the core towards NNE exposes felsic volcanics of the Tuddal Formation (Rjukan Group) and at the flanks exposes quartzites and conglomerates of the Seljord Quartzite (Seljord Group), schists of the Bondal Schist (Seljord Group and calcareous schists of the Lauvhovd Schist (Seljord Group).Furthermore, the rocks of the Rjukan and Seljord Groups have been intruded by thick mafic sills and dykes which have been folded as well. Finally, minor granite intrusions occur in the area. A geological sketch map of the area is shown in Fig.3.
A detailed description of the geology of the Bleka Fold area is given by Svinndal (1952).

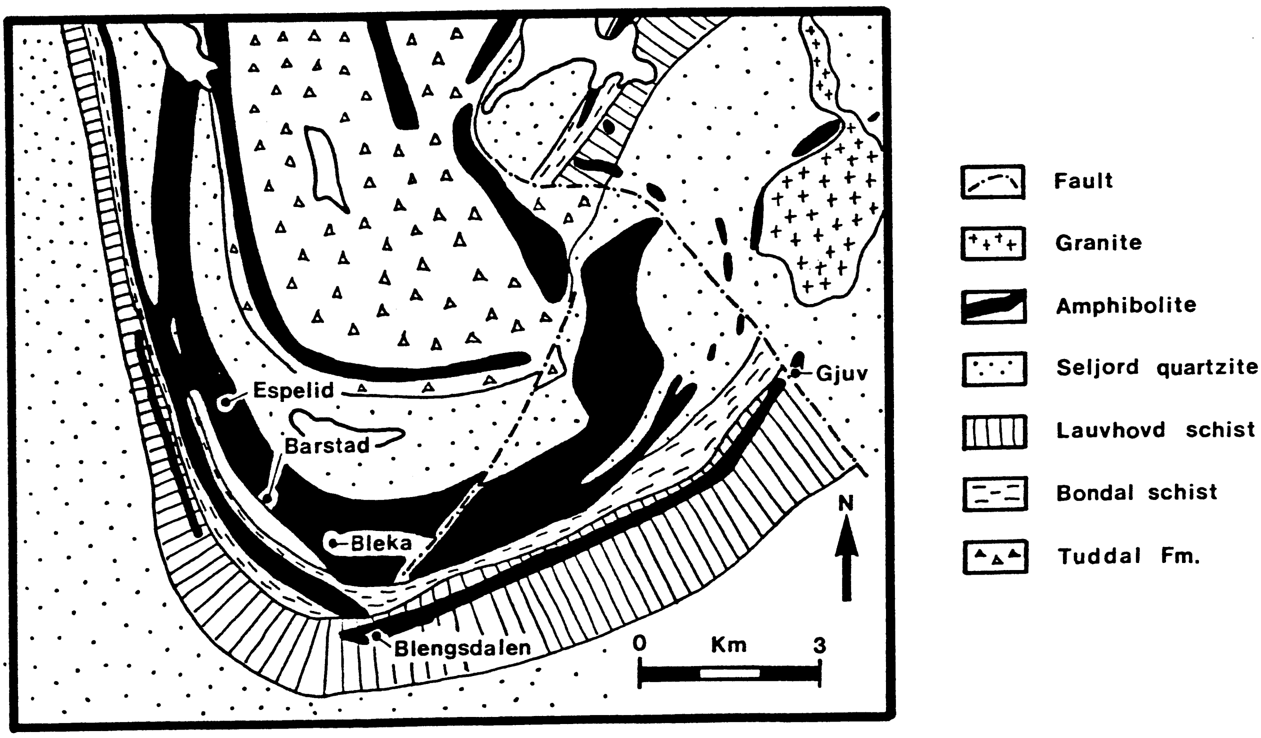


Fig.3. Geological sketch map of the Bleka Fold area. Map mainly bases on Neumann and Dons' map at scale 1:100,000 and on Svinndal (1952).

3. RESULTS.

The investigations performed comprise in addition to a photogeological interpretation detailed field work in selected areas as well as reconnaissance exploration throughout the Bleka Fold area. The work was initially concentrated on investigations in the Bleka Mine area in order to achieve a better understanding of the gold-bismuth bearing vein system, but was later concentrated in the Espelid area due to the finding of a significant vein swarm. The work is described in the following order:

1) Lineament analysis of the Bleka Fold area.
2) The Bleka Mine area.
3) The Espelid area.
4) Investigations of other known vein occurrences.
5) Reconnaissance for Au-bearing veins in unknown areas.

3.1. Lineament analysis of the Bleka Fold area.

Prior to field work a photogeological interpretation of the area was carried out. The basis of this interpretation is a series of air photos at scale 1:30,000 from Norsk Luftfoto og Fjernmåling I/S (H76 1642 - Lines A-F).
A photomosaic was constructed and two types of lineaments - major distinct lineaments and unspecified lineaments - were interpreted. Furthermore, a few circular features were outlined. In addition to the lineament/circular feature interpretation the amphibolite sills and dykes, which host the Au-Bi veins, were provisionally outlined. This was possible in particular in the western part of the area where a lithologically based vegetation difference is pronounced.
The lineament interpretation is biased in the way that more subtle lineaments have been included from amphibolitic areas. This is due to a hope that even the most insignificant lineament could be a guide to a vein system.
The result of the interpretation is shown in the enclosed Map 1 (scale ~1:20,000) and in Fig.4 (scale ~1:80,000).

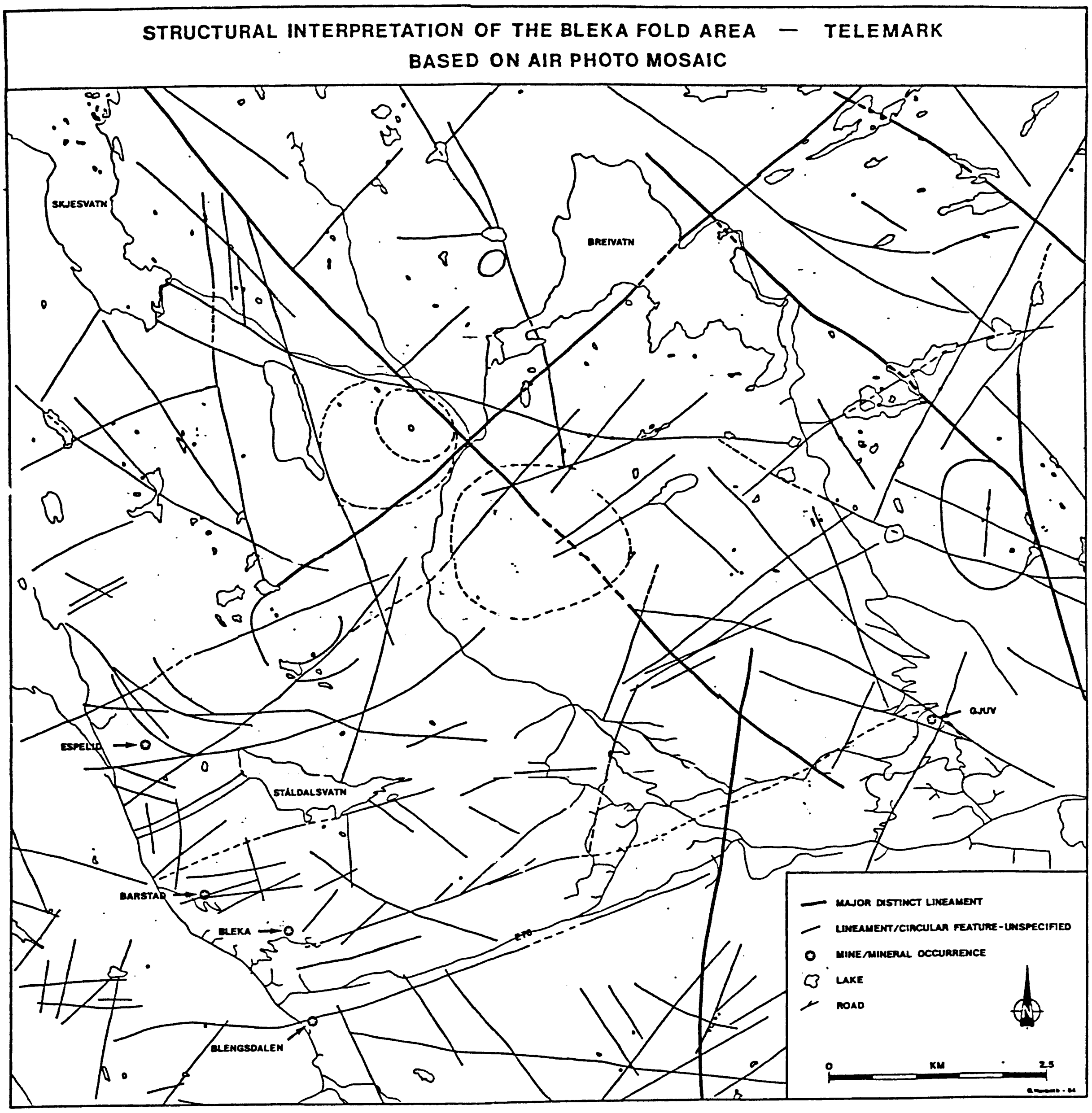


Fig.4.

It is seen that the major distinct lineaments are represented by three main directions:

a) appr. NW-SE
b) appr. NE-SW
c) appr. N-S

Including all interpreted lineaments the two directions - NW-SE and NE-SW are the dominating ones with minor directions NNW-SSE, NNE-SSW, E-W and N-S. This is in accordance with mapped faults of the Telemark area (Sigmond et al., 1984) where in particular the NW-SE faults are prominent structural features. Movement along the three prominent directions seems to be sinistral for the NW-SE and N-S faults and dextral for the NE-SW faults. The N-S faults are clearly the oldest features as they are cut by both the NW-SE and the NE-SW fractures. The NW-SE/NE-SW faults could be interpreted as a conjugate fracture system resulting from E-W compression contemporaneous with the N-S folding of the central Telemark area. If this is to hold true it means that the level in the crust in which the fracturing/shearing is observed was located somewhere close to the boundary zone between the ductile and the brittle regime since the angle between the two fracture directions in the plane of max stress is 60°-90° (Ramsay, 1980). This means that the gold-bismuth bearing Bleka-type veins which strike 40°-90° could be related to dextral shear faults associated with E-W to ESE-WNW compression. In fact, as will be demonstrated later this is the actual case.
However none of the more pronounced interpreted lineaments (40°-90°) within amphibolitic terrain which were investigated in the field could be directly related to vein systems. This is probably mainly due to the very low overall exposure (5%), but could as well be due to lack of relation as implied by the known and newly discovered veins which do not show up as lineaments on air photos.
In summary, it can be concluded that there is no direct relationship between interpreted lineaments and observed vein systems. However, the lineament analysis is a powerful means of unraveling the structural evolution of the area and as such an indirect guide to vein mineralization.

3.2. The Bleka Mine area.

The Bleka Mine area as defined by this investigation is outlined in the enclosed Map 2. It covers an area of approximatelt ½ km^2 and includes the 1100 m known strike length of the Bleka Main Vein System as well as associated veins.

The area has been covered by both surface and subsurface investigations as outlined below.
The history of the mine and the previous work carried out is reported by Vogt (1886, 1888), Kostke (1902), Wielgolaski (1918), Bugge (1935), Horvarth (1943), Hake (1943a, 1943b), Lauer (1943), Svinndal (1952) and Pedersen (1984).The work by Vogt and by Kostke is by far the most comprehensive and in particular the early work of Vogt gives and exellent description of the geology of the mineralized veins. A summary of the most important reported results is presented in Table 1.

<u>The surface investigations</u> carried out include mapping and detailed sampling of the Bleka Main Vein System along the known 1100 m strike length as well as mapping and detailed chip sampling of associated veins. The main results of this are presented in the enclosed Map 2. The area has been mapped at a scale of 1:1000 based on enlargement of 1:5000 maps from Økonomisk Kartverk. As the overall exposure of the amphibolite is as low as 5-10% probably only a small portion of the existing veins and veinlets have been located in the area (Vogt (1888) notes that appr. 20 veins were known in the Bleka area). The trace of the Bleka Main Vein is only mappable due to old trenching of the vein. Most of the other veins indicated on the map were also located due to trenching and blasting. As it is seen in Map 2 the Bleka Main Vein is only exposed in a few localities (less than 10) otherwise covered by filled-in material along the old trench or not exposed. The vein is estimated to exhibit an average surface thickness in the range of 20-25 cm over a total length of more than one km. From the map it is obvious that a major shift in orientation occurs along a 300 m long part centered around the old workings. This is probably due to the convergence of two en echelon fractures. This point is further elaborated in section 4. The mean orientation of the vein is 71°/73°N (43 measurements) which is in accordance with earlier results. Macroscopically, the main vein is a quartz-tourmaline-ankerite vein with minor calcite, dolomite, epidote, muscovite and chlorite. The ore minerals which in general constitute around 1%, but occasionally up

YEARS	ACTIVITIES	IMPORTANT NOTES AND RESULTS	REFERENCES
1880-1900	Mining	Small scale mining by Compagnie Francaise des Mines de Bamble. No detailed report exists on the results of the mining activity. Excellent geological description of the veins.	Dons (1963) Vogt (1886,1888)
1900-1935	Sporadic geological investigations and feasibility studies.	Geology: The Bleka Main Vein is an irregular vein, which has been followed along 1100 m's length. The average thickness - 35 cm and the average orientation 74°/70°N. The vein often exhibits a banded structure with tourmaline towards the margins and carbonates in the centre. Late often cross-cutting quartz veinlets carry bismuthinite and visible gold. There is clearly an intimate relationship between bismuth and gold. Mine data: In 1901 a total of 701 m of drifts existed. An estimate of the <u>vein</u> tonnage above mine level 525 amount to appr. 50,000 t. A very thorough sampling programme carried out in the mine in 1901 totalling appr. 1800 kg of vein material an split into several representative samples totalling 150-200 kg yields an average grade of the undiluted vein of 25 ppm Au, 43 ppm Ag, 0.8% Bi (a more realistic value according to the analysis results is 0.3-0.4% - see Kostke) and 1.4% Cu. This average estimate is calculated on a tonnage of 16,000 t of ore. Older analyses (1880-1890) show the high grade nature of the vein as selected samples yield values in the range 50-700 ppm Au (one sample - 5.3%: - possibly a sort of concentrate) and 100-2000 ppm Ag.	Kostke (1902)
		A feasibility study in 1918 does not include any important new information.	Wielgolaski (1918)
		In a publication by Bugge an assay of a 12 kg sample shows 14.5 ppm Au, 30 ppm Ag, 0.42% Bi, 0.23% Pb and 275 ppm Cu. Bugge suggests that galenobismuthite is the main bismuth mineral of the ore.	Bugge (1935)
1935-1939	Mining.	Mining was carried out by A/S Bleka Gruber. No reports exist on this activity. According to Halvor Johnsen Svartdal (personal communication, 1984) 40 t of ore concentrate (from jigging) were send to Germany during this period. A shaft was made 70 m down from from mine level 525 (drift F of Kostke (1902)) and three lower levels were investigated. According to Halvor Johnsen Svartdal very low gold values were encountered.	Dons (1963)
1940-present	Feasibility studies and geological investigations	During the Second World War the Germans showed renewed interest in the Bi-potential of the Bleka Mine. A report by Horvarth includes a very optimistic ore estimate of 60,000 t with a grade of 0.7% Bi, 0.6% Cu, 11 ppm Au and 40 ppm Ag. Two reports by Lauer and Hake downgrades this estimate drastically. Lauers geological investigations of the underground workings conclude the following: the gold-bismuth mineralized lenses (mainly the thicker parts of the veins) within the Bleka Main Vein in general have a strike length of 20-50 m with thin barren parts inbetween. They are mainly composed of tourmaline and ankerite with only minor amounts of quartz. From the description it seems as if there is a distinct zonation with predominantly quartz in the lower and western parts of the mine and predominantly tourmaline-ankerite in the upper and eastern parts. The major stoped-out lens of level 560-580 (drift B and A) and the stoped-out lens of level 525 (drift F) are not interconnected and thus represent individual lenses. The inner part of the four major drifts (A-B-C-F) are all very low grade with respect to gold and bismuth. Of the 615 m drift which could be investigated, 120 m were stoped out (the main ore lenses), 307 m were unmineralized (mainly developed as a very thin veinlet or as a fault plane) and 190 m represented a true, but thin vein without any visible gold and bismuth mineralization. This last part representing approximately 200 m of weakly mineralized vein was thoroughly sampled and split into 37 representative samples (each representing from 3-10 m strike of vein). A total of 2.5 t of vein material was sampled. The samples were crushed and split into 2-3 kg samples which were analyzed at Kongsberg Silvermines for Au, Bi and Cu. The average grade of this left-over part of the vein system is 1 ppm Au, 400 ppm Bi and 0.25% Cu. The individual analyses and a sketch of the mine with indicated sample points are shown by Pedersen (1984 Fig.58). On the basis of this discouraging result no further recommendations are made for the Bleka Mine by the Germans.	Horvarth (1943) Lauer (1943) Hake (1943)
		The work by Svinndal adds no new information on the Bleka Mine, but mentions that pure tourmaline veinlets are found in the area.	Svinndal (1952)
		Pedersen visited the mine on a reconnaissance basis and stresses the potential of the mineralizationn because of the steep dip of both the veins and the anphibolite. Furthermore, prominent stream-sediment anomalies of gold were outlined in the Bleka Fold area.	Pedersen (1984)

Table 1. Summary of the history of the Bleka Mine.

to several per cent, comprise chalcopyrite and pyrite with subordinate bismuthinite, Bi-sulfosalts, gold, galena and scheelite. The economically interesting minerals gold, bismuthinite and Bi-sulfosalts are in particular concentrated in the eastern part of the vein, but the Bi-minerals are also quite widespread in the Sverveli area in the westernmost part (Map 2). Visible gold was only observed in two samples (2110061 and 2110062) both originating in the central mine area around drifts 560 and 580 (B + A according to Kostke (1902)). The gold grains observed are up to 1 mm in the greatest dimension and occur partly in late quartz veinlets and partly intergrown with tourmalin-quartz, in both cases associated with bismuthinite. Galena was only observed in the Sverveli area where it occurs in both the main vein and in adjoining feather veins. The Sverveli area is situated at a level approximately 100 m higher than the main ore lenses of the vein system and thus could represent a lower temperature ore assembly.
Pronounced hydrothermal alteration is associated with the veins. This alteration has been thoroughly investigated by Vogt (1888) who describes it as a zone of appr. 0.5 m´s thickness on either side of the veins. Mineralogically, the amphibolite host rock increases its muscovite and calcite content towards the vein, whereas the hornblende and feldspar content decreases. This results in an overall bleaching of the rock towards the vein. Eventually, the altered amphibolite is transformed into a quartz-muscovit-calcite rock. Furthermore, development of idiomorphic pyrite cubes and magnitite octahedrons as well as occasional tourmalinization and ankeritization is a characteristic feature. Minor chalcopyrite impregnation is locally developed. This progressive hydrothermal alteration process is almost identical with alteration phenomena described by Robert and Brown (1984) who investigated gold-bearing quartz-tourmaline veins at the Sigma Mine in Canada. Figs. 5-7 exemplify the progressive alteration observed at the Sigma Mine. The processes observed are virtually identical to those identified at Bleka. However, an important difference seems to be the distribution of gold within the altered zones. At Sigma, gold enrichment is associated with intense carbonatization in the zone of visible alteration. At Bleka this has not yet been observed,

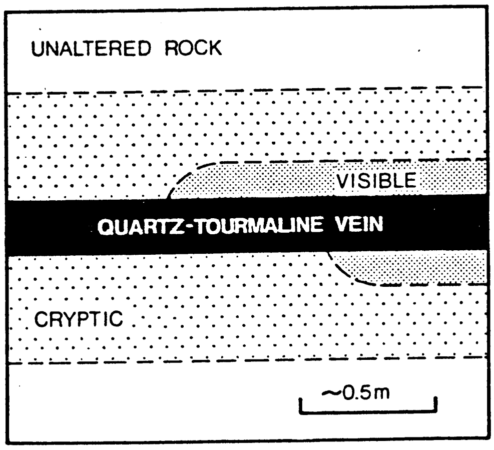


Fig.5. Schematic representation of distribution of cryptic and visible alteration zones around veins and stringers at the Sigma Mine. Visible alteration may be absent and grade laterally to asymmetrical or to symmetrical alteration envelopes. From Robert and Brown (1984).

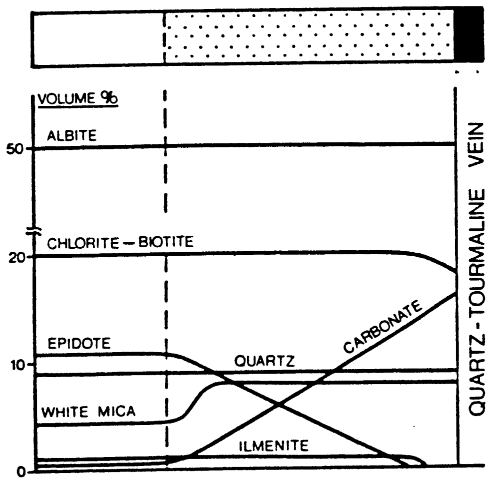


Fig.6. Idealized semiquantitative distribution of minerals involved in cryptic alteration. From Robert and Brown (1984).

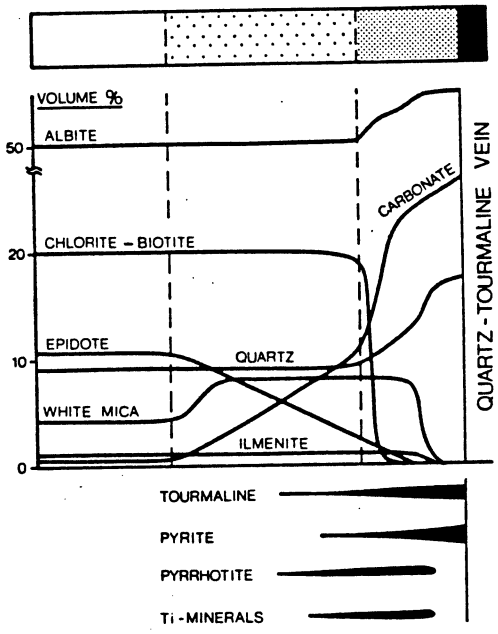


Fig.7. Idealized semiquantitative distribution of minerals involved in visible alteration superimposed on cryptic alteration. From Robert and Brown (1984).

although several samples of the alteration zones have been analyzed for gold. Fig.8 shows visible alteration around a small Bleka-type vein.
The macroscopic appearance of the exposed main vein is shown in Figs.9-12.
The other veins found in the Bleka Mine area are probably all associated with the fracture system of the Bleka Main Vein. Most of these veins occur within a short lateral distance (<100 m) from the main vein and are relatively thin (2-20 cm). In only one of the veins visibly Bi-mineralization was observed (sample 2110046 - Map 2) whereas the rest mainly represent quartz-tourmaline veins with minor pyrite and chalcopyrite.

Fig.8. Visible alteration (bleaching) around a small Bleka-type vein. Locality close to sample 2110046 (Map 2).

Fig.9. Outcropping 10-20 cm thick Bleka Main Vein at the entrance to mine level 530.

Fig.10. Outcropping 20-30 cm thick Bleka Main Vein close to the shaft level 595. Contains locally abundant Bi-Au mineralization.

Fig.11. 30 cm thick Bleka Main Vein at the entrance to mine level 560. Mainly composed of ankerite and tourmaline.

Fig.12. 10 cm thick vein of the Bleka Main Vein System close to mine entrance 550. Swelling of the vein due to dextral shear movement is evident.

The subsurface investigations carried out include inspection of approximately 300 m of accessible drifts and sampling of selected vein sections. Only mine levels 610, 560, 550 and 525 were accessible for inspection. The results of the inspection are in good agreement with those of Kostke (1902) and Lauer (1943) (see Table 1). As could be expounded from Lauers descriptions there is a distinct zonation with predominantly quartz in the lower and western parts of the mine and predominantly tourmaline-ankerite in the upper and eastern parts. Figs.13-15 exemplify this.
In the upper mine levels the vein often exhibits a banded appearance with tourmaline rimming ankerite (Fig.15).
No visible gold mineralization and only very minor visible bismuth mineralization was observed in the mine. However, the stoped areas were not accessible thus only the poorly deleloped and weakly mineralized vein sections could be investigated.

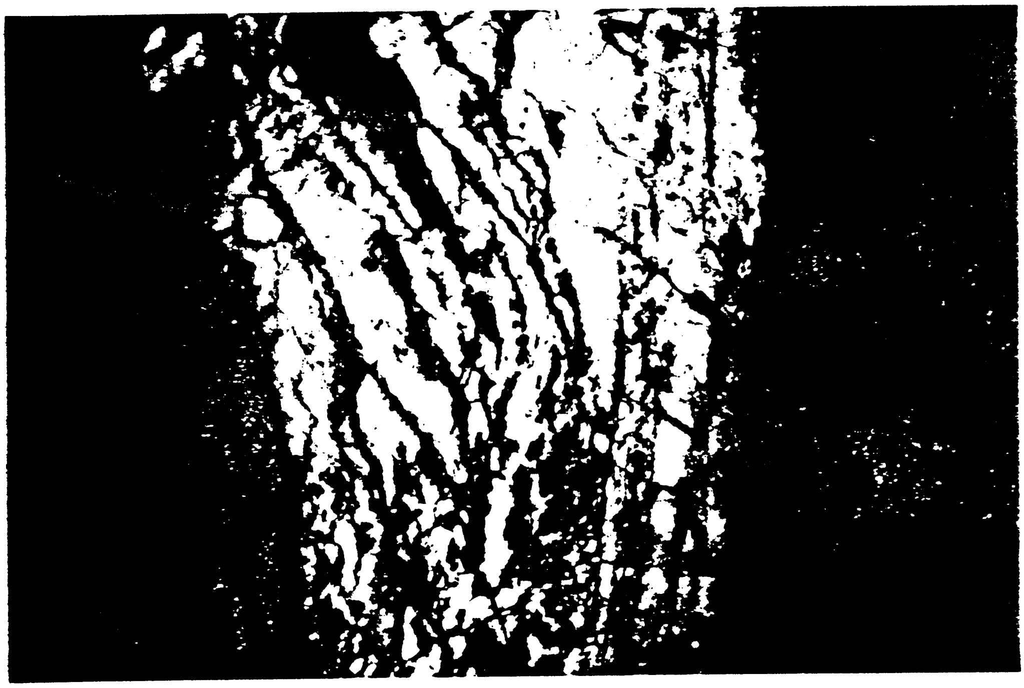


Fig.13. One metre thick quartz-tourmaline vein from stoped area of level 525 (drift F). Note internal Riedel shear planes with tourmaline and sulphides. The shear planes are a result of dextral shear movement and the seeming sinistral appearance is because the photo is taken of a roof exposure.

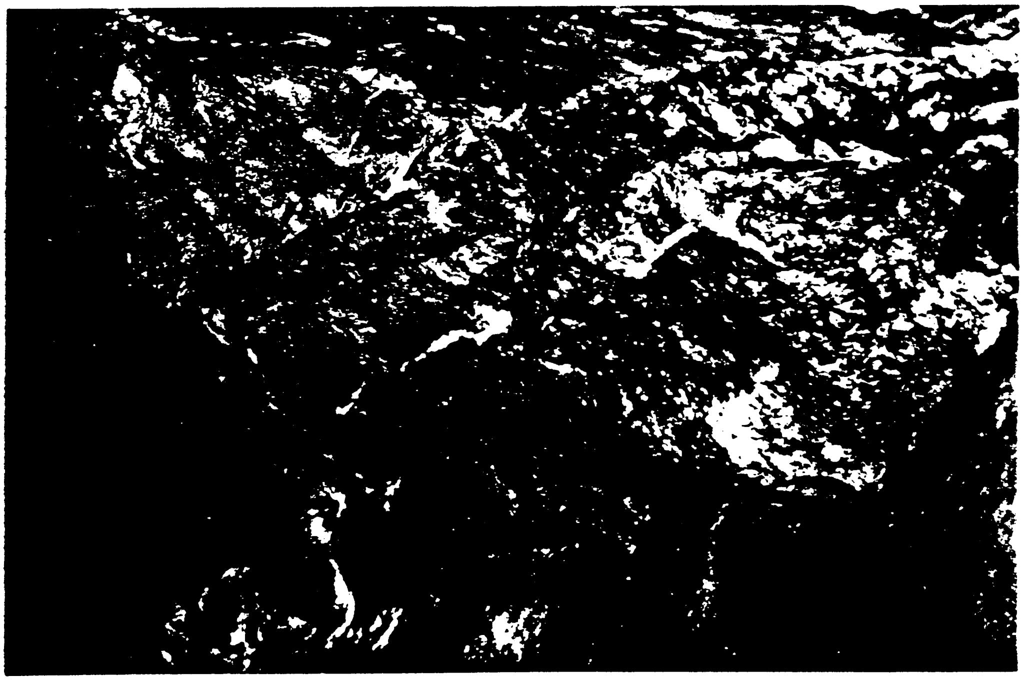


Fig.14. 30-50 cm thick tourmaline-ankerite vein with with late quartz veinlets. From the upper mine level 610 (drift C)

Fig.15. Quartz-ankerite-tourmaline vein from mine level 560 (drift B). Note rimming tourmaline around ankerite veinlets.

Structurally, the vein is complex. It pinches and swells over short distances and locally disappears laterally into a 5-10 cm mylonitic fault plane with abundant chlorite and calcite. The shear movement associated with the vein emplacement is clearly dextral (Figs.16-17) and a detailed study of the geometry of the feather joints demonstrates that shear faulting took place within the brittle-ductile shear regime (Fig.17).

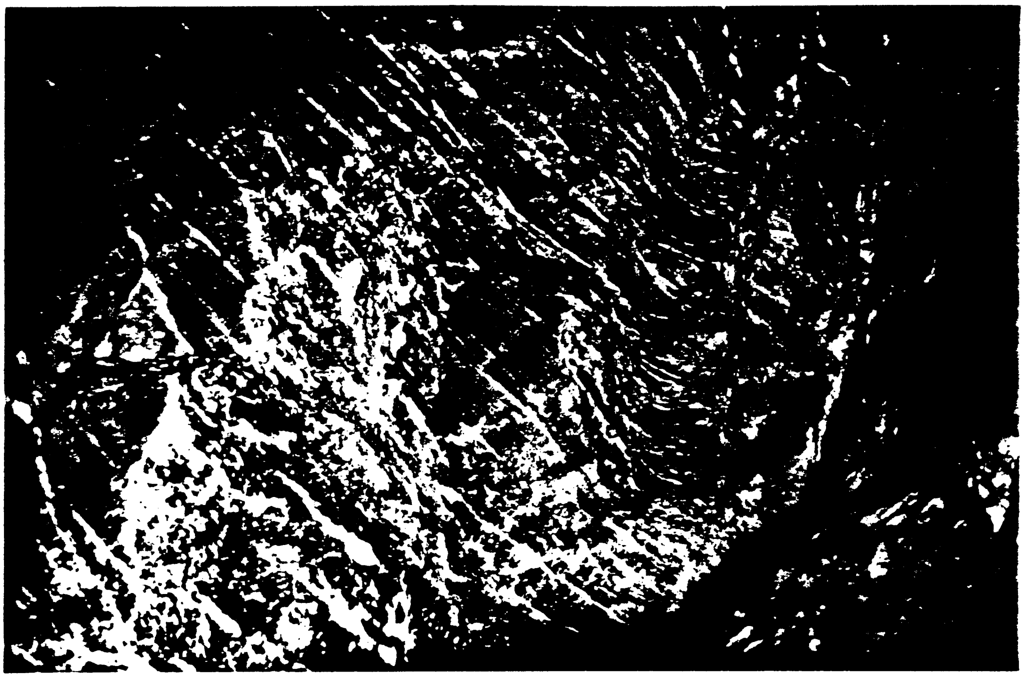


Fig.16. Major system of pinnate calcite veinlets associated with the Bleka Main Vein. The measured strike of the Bleka vein is 50° and the strike of the joints is 85° - indicative of dextral shear. From mine level 560 (drift B). Photo from roof exposure.

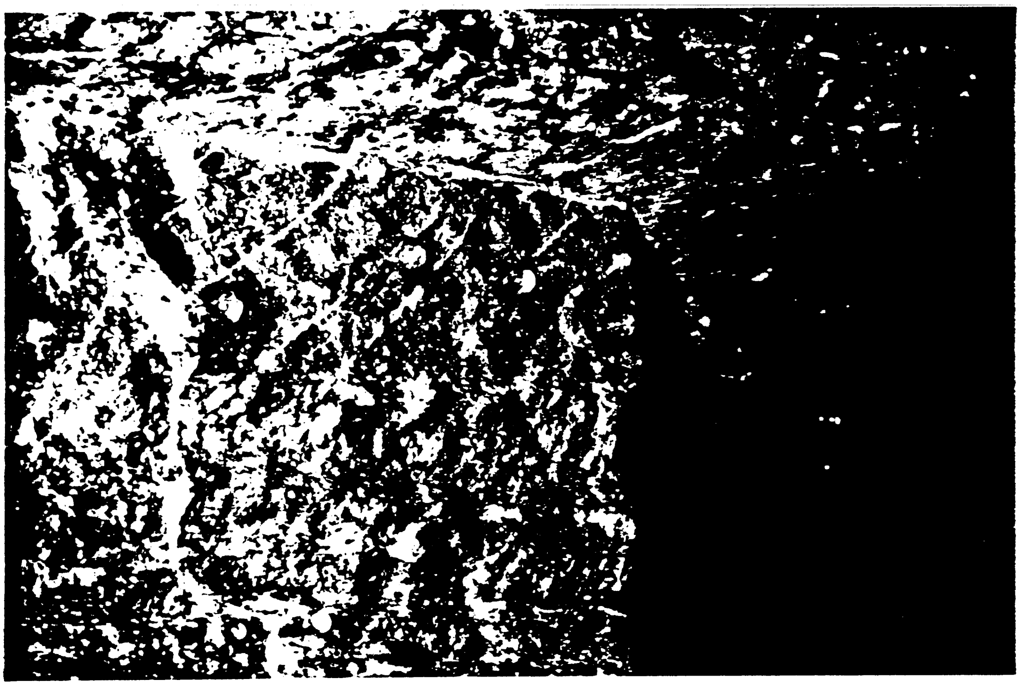


Fig.17. Minor system of calcite veinlets associated with the Bleka Main Vein. Exemplifies dextral shear within a brittle-ductile shear regime. The seeming sinistral appearance is because the photo is taken of a roof exposure. From mine level 560 (drift B).

Ore microscopy. Only two polished sections have been prepared and investigated. Prior to the field work a section was prepared from litho-sample 020107A (Pedersen, 1984) with a gold content of 72.7 ppm (average of four analyses). The primary ore minerals identified include chalcopyrite and bismuthinite (both intergrown with cpy and as isolated grains) and subordinate pyrite, sphalerite, rutile and native gold. Only two small (lo·20 μ) grains of gold were found isolated in microfractures in quartz. The observed amount of gold only corresponds to a gold content of 1-2 ppm and clearly illustrates the nugget effect of the Bleka vein mineralization even on a small scale.

A polished section of a highgraded pan concentrate of crushed ore from the jigging table of the old milling plant has also been prepared. The ore minerals identified include the major constituents native gold, bismuthinite and native bismuth and subordinate chalcopyrite, pyrite, Bi-sulfosalts (cosalite?, aikinite?, galenobismuthite?, emplectite?), maldonite?, bornite and galena? (probably galena with a high Bi-Ag content). In addition, a UV-light examination showed a high content of scheelite.

Native gold occurs mostly as anhedral grains and aggregates (Figs.18-19), but subhedral and euhedral crystals occur as well (Figs.20-23). The observed grain size (of single grains or aggregates) varies considerably from <10 μ up to 2.5 mm. The luminous golden yellow colour of the gold also varies considerably (Figs.18, 19 and 27) indicative of a great variation in the silver content. A few more reddish gold grains could be indicative for a high bismuth content. Gold is observed intergrown with native bismuth (Figs.20-23), with bismuthinite and or Bi-sulfosalts (Figs.24-26), with chalcopyrite (Fig.26), with maldonite? (Fig.21), with Bi-bearing galena? and with tourmaline (Fig.27). A genetically very interesting feature is the common coarse myrmekitic intergrowth between gold and bismuth (Figs.20-21). The probable occurrence of maldonite (Au_2Bi) associated with the myrmekitic intergrowth is limited to a narrow margin within the high temperature range (Ramdohr, 1980). This texture is observed at the classical occurrence of maldonite (Maldon Mine, Australia) which is a very high temperature gold-quartz vein.

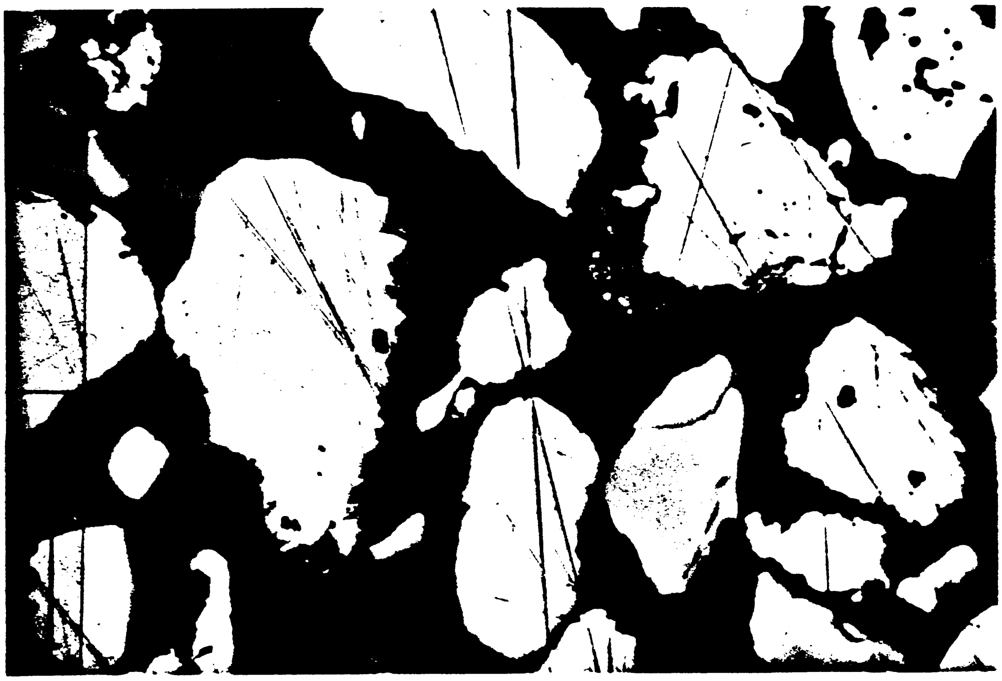


Fig.18. Photomicrograph showing anhedral gold grains. Varying Ag-content is reflected by the colour differences. Oil immersion. Bar scale 0.1 mm.

Fig.19. Photomicrograph showing anhedral-subhedral gold grains. Varying Ag-content is reflected by the colour differences. Native bismuth and bismuthinite occur as well. Oil immersion. Bar scale 0.1 mm.

Fig.20. Photomicrograph showing myrmekitic intergrowth between native gold and native bismuth. Oil immersion. Largest dimension of grain - 0.3 mm.

Fig.21. Photomicrograph showing myrmekitic intergrowth between native gold, native bismuth and maldonite? (bluish). Oil immersion. Largest dimension of grain - 0.2 mm.

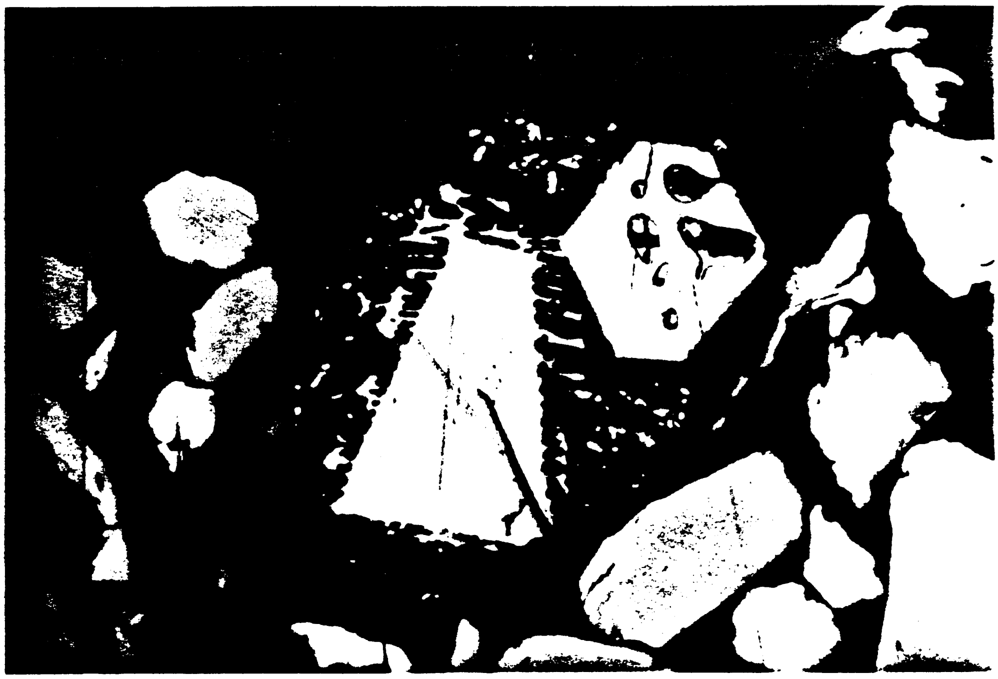


Fig.22. Photomicrograph showing aggregate with euhedral gold dodecahedron and native bismuth crystal with "feathers". Oil immersion. Largest dimension of gold crystal - 0.1 mm.

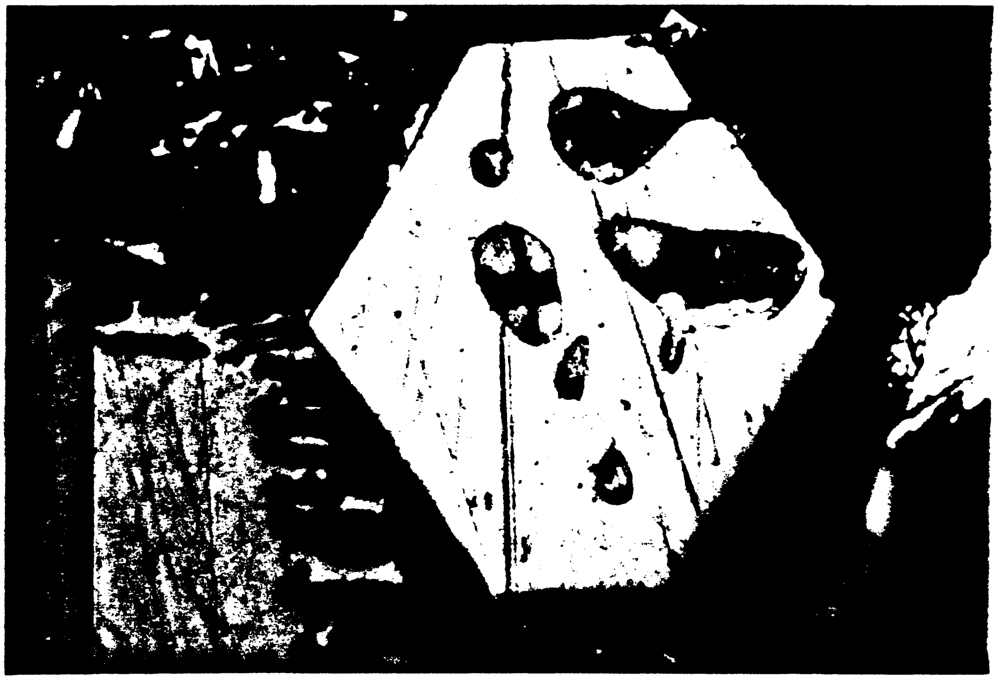


Fig.23. Enlargement of part of Fig.22. Euhedral gold dodecahedron with trapped bismuth droplets. Oil immersion. Largest dimension of gold crystal - 0.1 mm.

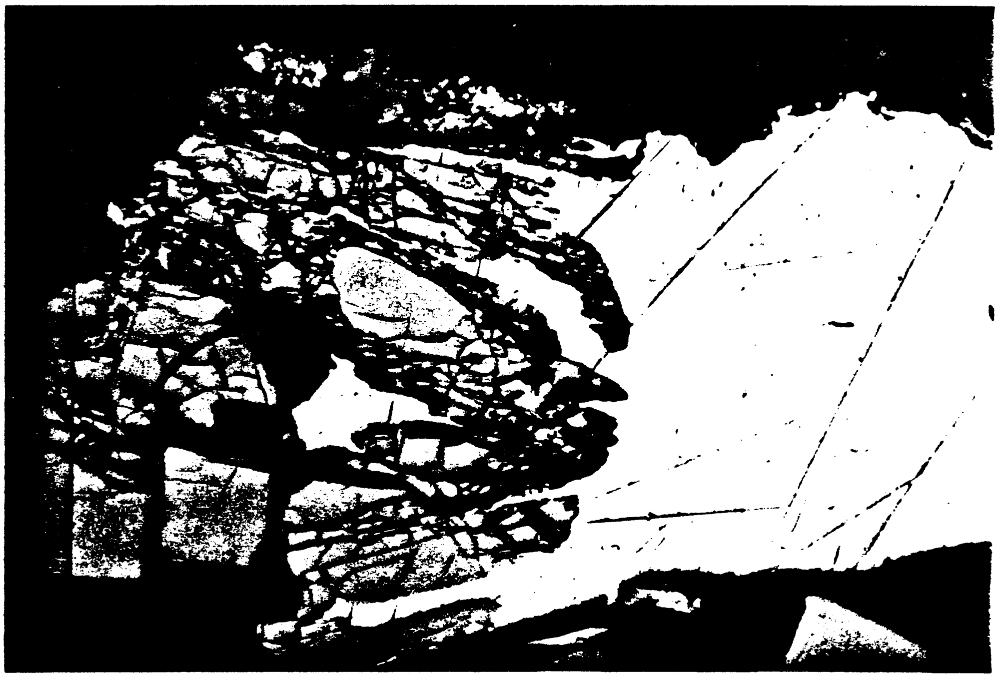


Fig.24. Photomicrograph showing intergrown gold and bismuthinite. Oil immersion. Size of gold grain 0.2·0.5 mm.

Fig.25. Photomicrograph showing intergrown gold, bismuthinite and Bi-sulfosalts. Oil immersion. Size of gold grain 0.1·0.5 mm.

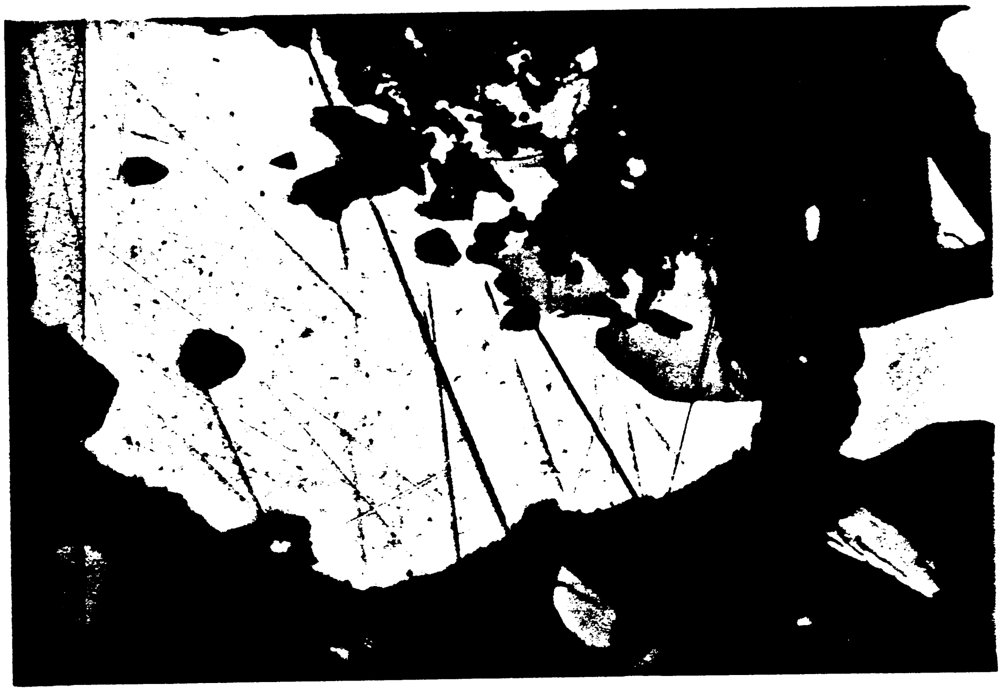


Fig.26. Photomicrograph showing intergrown gold, bismuthinite and chalcopyrite. Oil immersion. Size of gold grain 0.2·0.5 mm.

Fig.27. Photomicrograph showing gold with inclusions of tourmaline. Note varying Ag-content of the two major gold grains. Oil immersion. Size of major gold grain 0.2·0.4 mm.

The occurrence of native bismuth and maldonite (?) and the intimate myrmekitic intergrowth with gold has not been reported elsewhere. However, the intimate relationship between gold and bismuth minerals reported as early as 1886 is further supported by this preliminary microscopic investigation.

Analysis results.

In summary, the old analyses indicate the following undiluted grades:

High grade ore lenses (- 10,000 t) :

Au - 25 ppm
Ag - 43 ppm
Bi - 0.4 %
Cu - 1.4 %

Low grade vein mineralization (- 15000 t) :

Au - 1 ppm
Ag - -
Bi - 400 ppm
Cu - 0.25 %

Geochemically, this means that the Bleka Vein is a bismuth-gold vein as indicated by the following enrichment factors for the high-grade lenses:

Enrichment factor	Element
500,000	Bi
10,000	Au
500	Ag-Cu
10-100	W-Pb-Zn

The analysis results of grab and chip samples from both surface and subsurface investigations are presented in Appendix II and the gold analyses are plotted in the enclosed Map 2. Analysis of selected samples from the Bleka Main Vein confirms the mapping results. Only samples from the central mine area have high gold contents (up to 94 ppm) whereas samples from outside this area only show gold values

in the range of < 20 ppb to 1.7 ppm. Besides gold, interesting Ag-values are encountered in sample 2110061 (> 250 ppm) of the mine area, but in particular the western (and higher) area around Sverveli exhibits interesting silver values (100- > 250 ppm). Silver is clearly associated with high lead and bismuth values and is probably contained within galena (in particular in the Sverveli area) and in Bi-sulfosalts (e.g. sample 2110001).
In general, bismuth seems to be a much more efficient element in delineating mineralized vein systems than gold. Most of the veins analyzed for both gold and bismuth in the Bleka area show distinct bismuth enrichment (10-100 ppm) without any detectable gold (< 10-20 ppb). This means that the bismuth halo within the vein system is much more pronounced and extensive than that of gold. Thus, Bleka-type veins of the fold area should preferably be analyzed for both gold and bismuth and any encountered bismuth anomalies without gold would probably be indicative for a close gold-bismuth mineralization.

3.3. The Espelid area.

The Espelid area is outlined in Fig.1 and in the enclosed Map 3. It covers an area of approximately 3/4 km^2 from the Espelid Farm in the NW to just north of Livsengåsen in the SE and is situated from 2-3½ km NNW of the Bleka Mine. Geologically, the setting is similar to that of the Bleka area exept for one important difference - the Bleka area is situated close to the axis of the fold whereas the Espelid area is located at the western limb of the fold. This means that the 40°-90° striking veins of the area are virtually perpendicular to the strike of the amphibolite sill (Fig.28). Furthermore, the thickness of the sill is only half of that observed in the Bleka area where it reaches a max thickness around 1000 m. This may partly be a result of primary variation in thickness and partly a result of boudinage which may also have effected the degree of dilation in the Espelid area (Fig.28). However, the steep dip of both the veins and the amphibolite sill makes room for a significant tonnage at depth.

The area was investigated on a reconnaissance basis partly due to an old (1880) Cu-bearing quartz vein occurrence (Espelid) and partly due to stream sediment anomalies of Au-Bi-Pb-Zn-Co reported by Pedersen (1984).
The old trenching which seemed to have been left untouched for a great many years occurs approximately 500 m SE of the Espelid Farm and only 25 m N of the Nystaul saeter cottage. The occurrence is exemplified by samples 2110033-36 on the enclosed Map 3. The Espelid veins seem to be part of a major vein swarm identified during reconnaissance exploration of the area. Due to this encouraging find the area was mapped at scale 1:1000 (based on enlargement of 1:5000 maps from Økonomisk Kartverk) and the results of this are presented in the enclosed Map 3. As it is seen in Fig.28 and in Map 3 an area of $1000 \cdot 500 = \frac{1}{2}\ km^2$ contains in the order of 10 veins with locally more than ½ m's thickness (max observed thickness = 2 m - Fig.29), 20 veins with a max thickness of 10-50 cm and a greater number of veins with max thickness of 1-10 cm. The veins are assumed to have a strike length of 400-500 m which is the approximate thickness of the sill. One of the major veins (samples 2110116-133, Map 3 - Fig.30) could be followed more or less continuously over 250 m laterally and 75 m vertically with an average thickness of 75 cm. Due to the very low exposure (~ 5%) of the amphibolite the estimated amount of veins and the length of these is very uncertain, but it is assumed that additional medium sized veins occur in the area. In general, the size of the hydrothermal vein system indicates an overall dilation much greater than observed elsewhere in the Bleka Fold area.
The veins are very similar to those of the Bleka mine area. The average orientation of the veins is 68°/78°N (average of 141 measurements - standard deviation of strike = 15°) with most of the veins striking 40°-90°. The veins consist predominantly of quartz and tourmaline with varying amounts of ankerite-sericite-pyrite and locally chalcopyrite (Figs.31-32). In general, the overall sulphide content is lower than in the Bleka Main Vein. Pronounced hydrothermal alteration similar to that described from Bleka is ubiquitous.
Characteristically, evidence of dextral shear movements are found throughout the vein swarm. As seen in Fig.34 much of the observed shear movement is lateral due to the frequent

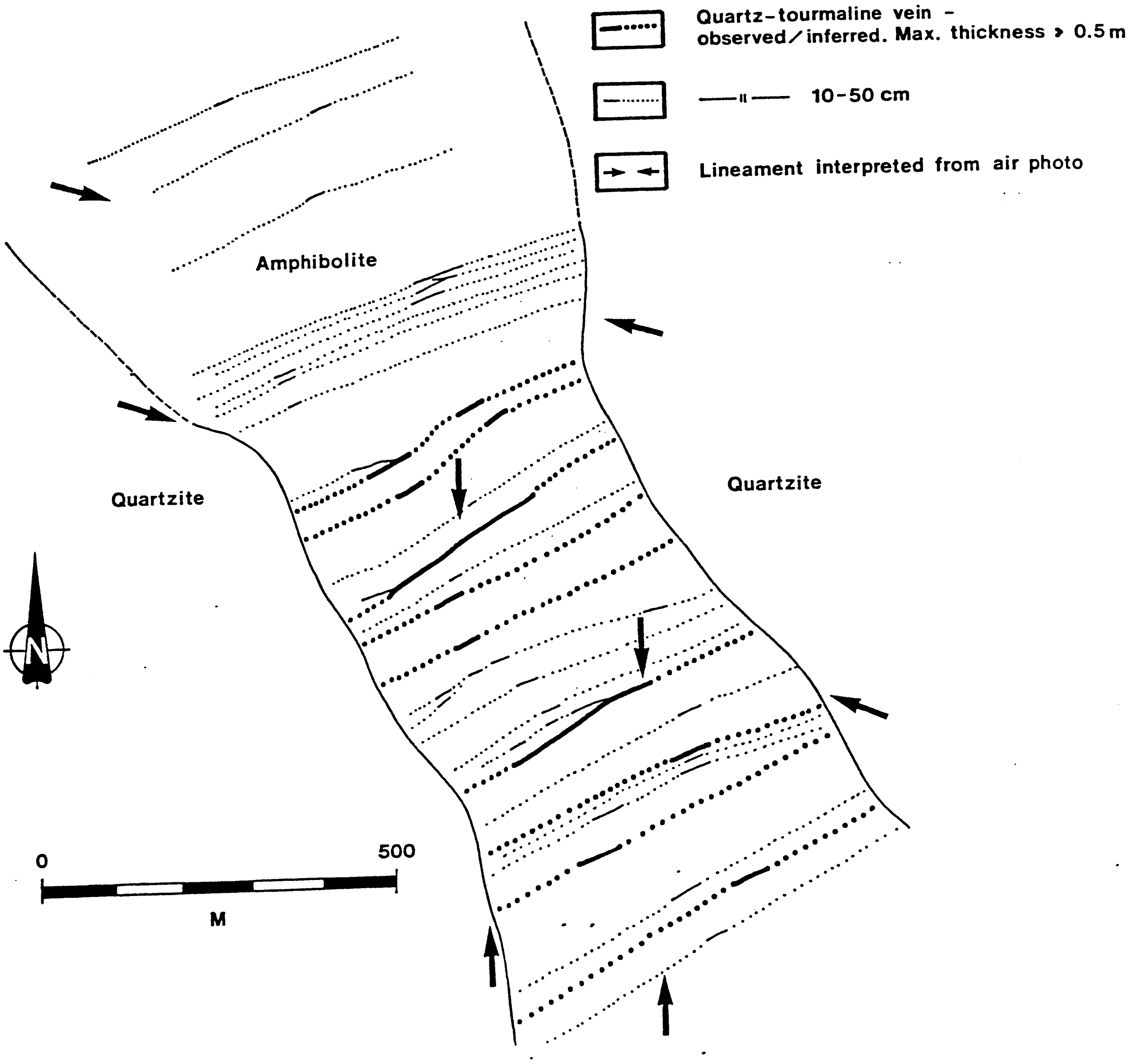


Fig.28. Simplified sketch of the Espelid vein swarm.

occurrence of horizontal slickensides. The dextral nature of the shear movement is seen as widespread feather or pinnate veins (Figs.35-37).

Due to the great similarity with the veins of the Bleka Mine area a detailed chip sampling programme was carried out covering almost all outcrops of veins with a thickness greater than five cm. The locations of the sampled outcrops are all shown on Map 3. More than 110 chip samples (1-10 kg according to vein thickness) and supplementary grab samples were collected. All of these samples have been analyzed for gold and

Fig.29. Up to 2 m thick quartz-tourmaline vein of the Espelid Vein Swarm. Sample 2110231 - Map 3

Fig.30. 1½ m thick quartz-tourmaline vein of the Espelid Vein Swarm. Sample 2110121 - Map 3.

Fig.31. Close-up of 30 cm thick quartz-tourmaline vein with abundant pyrite. From the Espelid Vein Swarm. Sample 2110105 - Map 3.

Fig.32. Close-up of a 10 cm thick quartz tourmaline-ankerite vein with pyrite-chalcopyrite and probably Bi-sulfosalts. From the Espelid Vein Swarm. Samples 2110141 and 2110201-202. Note wrong sample number!

Fig.33. Thin tourmaline vein in amphibolite in the northern part of the Espelid Vein Swarm where these are quite widespread.

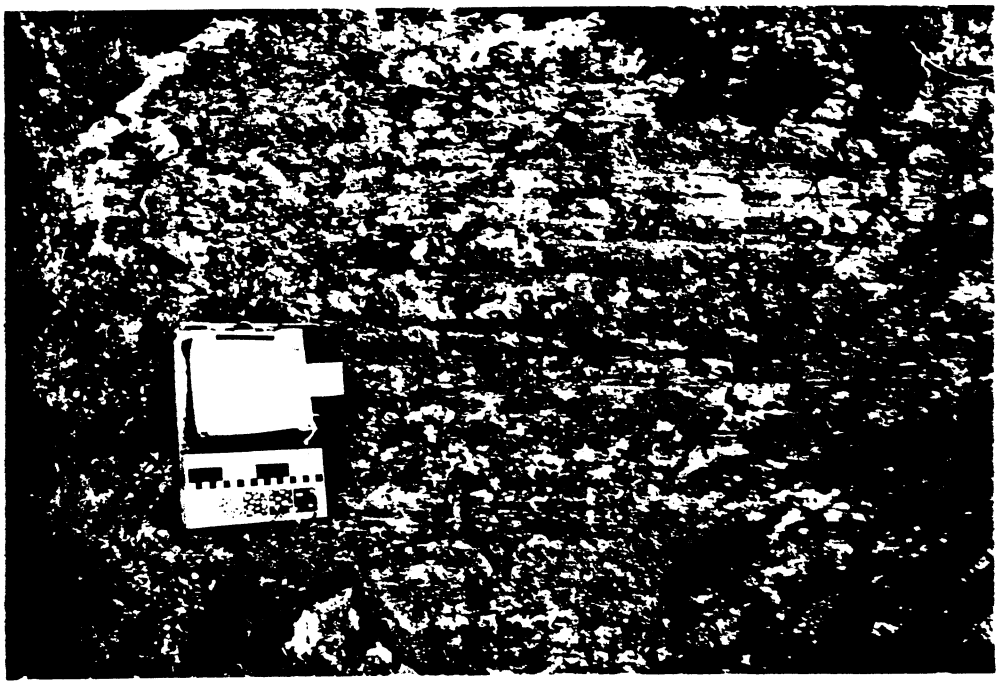


Fig.34. ½ m thick quartz-tourmaline vein with pronounced horizontal slickensides. From the southern part of the Espelid Vein Swarm. Sample 2110220 - Map 3.

Fig.35. 10 cm thick quartz-tourmaline vein with adjoining feather veins indicative of dextral shear. From the Nystaul occurrence. Sample 2110038 - Map 3.

Fig.36. 80 cm thick quartz tourmaline vein with feather veins indicative of dextral shear. From the Espelid Vein Swarm. Sample 2110228 - Map 3.

Fig.37. 25 cm thick quartz-tourmaline vein with feather veins indicative of dextral shear. From the Espelid Vein Swarm. Samples 2110237-238 - Map 3.

approximately 20 samples for the additional elements Bi-Ag-Cu-Pb.
The analysis results indicate that a Au-Bi anomalous area covering $\frac{1}{2}\cdot\frac{1}{2}$ = 1/4 km^2 occurs around Nystaul-Reiustaulhaugen (Map 3). Although the values are low compared with the contents of the Bleka Main Vein a distinct enrichment in both gold (20-210 ppb) and bismuth (2-144 ppm) is observed. Samples from outside this area are low in both elements. Also lead seems to be relatively enriched, whereas copper does not show any particular enrichment in this area.

On the basis of these results it is suggested that the gold-bismuth enrichment represents a halo-phenomena to a deeper-lying gold-bismuth mineralization. The low Au-Bi contents observed in the SE part of the vein swarm do not necessarily imply barren vein mineralization, but could as well be a result of even deeper Au-Bi mineralization.

3.4. Investigations of other known vein occurrences.

Barstad.

The location of the Barstad occurrence is shown in Fig.1. More precisely the old drift is located 150 m NW of the farm Barstad øvre close to the stream at 550 masl (samples 2110010-12 - Sample Map 5). The entrance to the drift is seen in Fig 38.

Fig.38. Entrance to the 15 m drift at the Barstad occurrence.

The geological setting is similar to that of Bleka and Espelid.
The drift was investigated all along the 15 m length. The vein which is oriented 90°/60°N is locally up to 60 cm thick, but the average is much lower. It consist of quartz, tourmaline (locally very rich with up to 2 cm long crystals) and ankerite with subordinate pyrite, chalcopyrite and possibly bismuthinite. According to Kostke (1902) later quartz veinlets with bismuthinite and visible gold was observed during drifting. This was not observed neither in the tunnel nor in mineralized vein samples of the old dump. At the end of the drift the vein is displaced by a 145° fault.
Two chip samples and one grab sample were collected at the occurrence. Analyses show gold (up to 30 ppb) and bismuth (up to 12 ppm) enrichment.

Blengsdalen.

The location of the Blengsdalen occurrence is shown in Fig.1. More precisely two different veins (150 m apart) have been trenched and blasted over a composite length of 50-100 m.
The southern vein is located close to the Blengsdalen farm and is exposed in the small road between the lower and the upper buildings whereas the northern vein is located 150 m NNW of the main building. According to Vogt (1888) the occurrence was discovered in 1884 and tested in 1896.
The geological setting is slightly different from the Bleka area. The amphibolite sill hosting the veins (the Kasin amphibolite according to Svinndal,1952) is only 100-200 m thick and has intruded the Lauvhovd limey quartz schists, whereas the Bleka amphibolite has intruded the quartzites. However, the Kasin amphibolite host is just a higher level sill of the Bleka amphibolite (Fig.3).
The northern vein has been trenched and blasted over a length of 50-60 m. Only very limited exposure is seen. The vein is oriented 70°/subvertical S and consists of quartz and ankerite with minor tourmaline, chalcopyrite, pyrite and bismuthinite. Pronounced hydrothermal wall rock alteration occurs. The vein probably pinches and swells over short distances and at the southern end a width of one metre was measured. One bulk chip sample of both visibly mineralized and unmineralized chips

was collected from the old dump. Further, two mineralized grab samples were collected. The analysis results indicate surprisingly high gold contents. The two grab samples have gold values of 103 ppm and 1.8 ppm respectively whereas the bulk chip sample shows 0.31 ppm Au, 84 ppm Bi, 0.28% Cu and 3 ppm Ag. The southern vein has been blasted at several locations over a length of 50-75 m. The vein is very irregular and has an average orientation of 70°/ subvertical. In the road cut the vein has a thickness of 20 cm and consists of quartz,tourmaline and ankerite with pyrite, chalcopyrite and bismuthinite (or Bi-sulfosalts). The wall rock alteration is very pronounced with extensive brecciation and bleaching as well as pyrite and chalcopyrite impregnation. A chip sample of the vein exhibits raised values of gold (60 ppb) and bismuth (5 ppm). A chip sample of the hydrothermally altered zone also shows raised values of gold (30 ppb) and bismuth (30 ppm).

The area just west of Blengsdalen was also investigated on a reconnaissance basis. The area mainly consists of quartzitic and arkosic rocks, but an amphibolite dyke or sill has intruded the sediments. A minor area with widespread quartz-tourmaline-ankerite-pyrite veinlets was located (samples 2110073-74 - Sample Map 2). Analysis of these showed no gold enrichment. 200 m NE of this area abundant boulders of quartz-tourmaline veins (2-5 cm) were located (sample 2110075 - Sample Map 2). Analysis of these shows a content of 0.1 ppm Au, 7 ppm Bi, 3 ppm Ag and 620 ppm Cu.

Gjuv.

The location of the Gjuv Mine (occurrence) is shown in Fig.1. More precisely the old drift is located 100 m SE of the farm nedre Gjuv (sample 2110003 - Sample Map 10). According to Dons (1963), the occurrence was found before 1862. It has been described by Bagstevold (1918), Busvold (1919), Dokken (1943) and Pedersen (1984). In summary, the old workings (Fig.39) consist of an open pit with a lower 50 m long drift. The quartz-tourmaline-calcite veins have reported orientations of 0°-20°/ subvertical, 135°/weakly NE dip and 90°/30°-40°N which seems to reflect a complex vein pattern. The N-S veins seem to be the Thickest (> 1 m) whereas the NW-SE veins (up to four pa-

Fig.39. The mine dump and old workings of Gjuv.

rallel veins (~30 cm) over a width of 15 m) seem to be thinner. The ore minerals are mainly bismuthinite and associated Bi-sulfosalts (cosalite, galenobismuthite etc.) and subordinate chalcopyrite, pyrite and gold. Pronounced hydrothermal wall rock alteration of the amphibolite similar to that of Bleka occurs.

The grade of the ore lenses seems to be 1-2% Bi, 5-10 ppm Au and minor Pb-Cu-Ag-Te. All of the mined vein ore has been thoroughly hand sorted and a total of 5-10 t of concentrated ore have been produced. This should amount to 300-500 kg of Bismuth.

The veins all occur in a 100 m thick amphibolite (the Kasin amphibolite) occurring parallel to and at a level above the Bleka amphibolite. It is possible that the complex vein pattern is a result of the position close to a major fault.

The old workings are now more or less inaccessible, thus only a single grab sample from the mine dump was collected. It contains 0.16% Bi and 19 ppb Au.

3.5. Reconnaissance for Au-bearing veins in unknown areas.

Reconnaissance exploration for Bleka-type veins was also carried out in the Bleka amphibolite outside areas with known vein mineralization. The reconnaissance was mainly concentrated in areas with stream-sediment anomalies or in important lineament areas. A more or less continous area of the Bleka amphibolite stretching from Skjesvatn in the NW to Hjartdal in the SE was traversed. In addition to the known vein occurrences, Bleka-type quartz-tourmaline veins were found in the area between Barstad and Bleka (Steinsruddalen - samples 2110083-85 - Sample Map 5), NE of Bleka (Ormemyre - sample 2110088 - Sample Map 6), in the area between Sverveli and Hjartdal (Mølledammen - sample 2110226 - Sample Map 2 and Vrestebakken - sample 2110225 - Sample Map 6), in the Hjartdal area and in the Blengsdalen area west of the known occurrences. Only the veins of Ormemyre and Steinsruddalen are of important size. At Steinsruddalen a 20 cm thick quartz-tourmaline vein (55°/70°N) composed of quartz, very abundant tourmaline minor ankerite, pyrite and chalcopyrite is located. Very pronounced brecciation with quartz fragments in a tourmaline matrix as well as very strong hydrothermal wall rock alteration is observed.

Only the veins west of Blengsdalen are enriched in gold (0.1 ppm).

Apart from samples of Bleka-type veins, sampling of a major altered mylonite zone in the Bleka amphibolite at Brekka ytre in Ambjørndalen was performed. The mylonite zone which is 50-100 m wide and of unknown strike length exhibits pronounced epidotization, chloritization, calcite vening and pyrite impregnation. Bulk chip samples show low to raised gold contents (up to 29 ppb).

Reconnaissance for gold mineralization was also carried out in <u>areas of acid volcanics and metasediments</u>. No interesting alteration or mineralization was observed in the acid volcanics and no Bleka-type veins were seen in the metasediments. However, several quartz veins were chip sampled. Only one of the veins has gold values above the detection limit of 20 ppb.

This vein which has a gold content of 0.35 ppm is a 40 cm thick quartz vein with minor hematite. It occurs in quartzite and could be followed over more than 25 m (both ends open). It is located at Kåsastul north of Hjartdal (sample 2110017 - Sample Map 8).

4. DISCUSSION OF RESULTS.

The gold-bismuth veins of the Bleka Fold area occur geologically in a setting similar to known gold producing areas of the world. Some of the gold mines (e.g. the Sigma Mine) of the Val d'Or district, Abitibi Greenstone Belt of Canada are good examples as they are very similar to the Bleka-type veins.
The results of this investigation strongly indicate that all of the known occurrences of the Bleka Fold area (Bleka,Barstad, Nystaul, Blengsdalen and Gjuv) and the newly discovered Espelid vein swarm have a common ore genesis.
On the basis of the results from detailed investigations of the Bleka Mine area and the Espelid area a conceptual model for the Bleka-type veins of the Bleka Fold area is proposed (Fig.40).
During the Sweconorwegian orogeny, which was the last to affect the rocks of the Telemark area, the host rocks of the veins were tectonically deformed and metamorphosed to the amphibolite facies whereas the mineralized veins have not been subject to pervasive postore deformation and metamorphism. Thus, the veins were emplaced late in the geological history of the region.
As seen in Fig.40A the late folding around N-S to NNE-SSW axes in the area is a result of E-W to ESE-WNW max compression.
Assuming a level of the crust located somewhere close to the boundary zone between the ductile and the brittle regime (brittle-ductile regime) which is indicated by mapped tectonic structures (e.g.Fig.17) and by the metamorphic grade, a conjugate fracture system with an angle of 60°-90° would develop.
Actually, the lineament analysis shows a set of prominent ~NE-SW and ~ NW-SE fractures to be present. The observed movement along the two prominent directions are also in agreement with the teoretical movements resulting from ESE-WNW compression. The NW-SE sinistral faults are the better developed

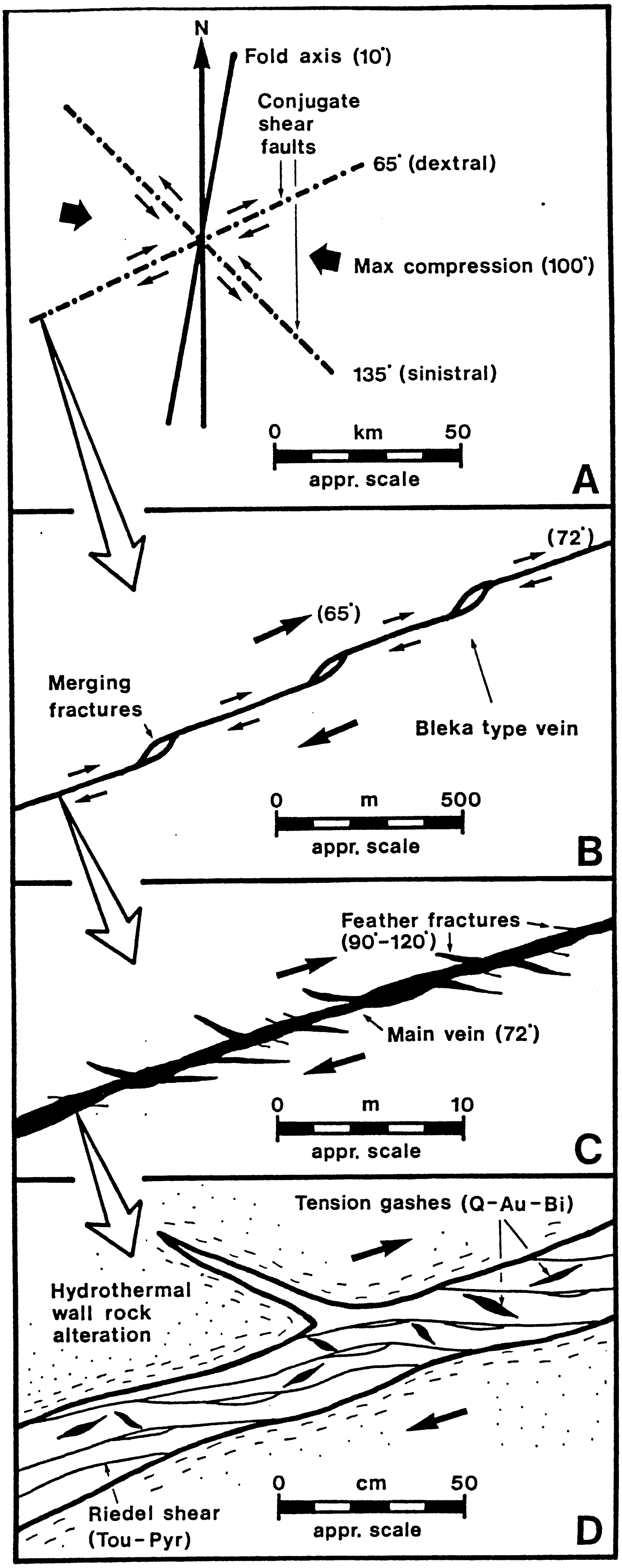


Fig.40. Sketch of conceptual model for the Bleka-type veins of the Bleka Fold area.
A-D show various scales.

of the two conjugate fault directions in the central Telemark area and thus have taken up most of the shear movement. However, as seen in Fig.40B gold-bismuth bearing quartz-tourmaline-carbonate veins have been emplaced along the 65°-striking dextral shear zones (faults) where these intersect the mafic sills and dykes of the area. Bleka-type veins have not been located outside the amphibolites.

The individual dextral shear zones may be developed as shown in Fig.40B consisting of merging vein segments (fracture segments). From an economic point of view these areas of merging are very attractive because max tension and dilation occurs in these zones. A very strong support for this is seen in the enclosed Map 2 which shows the Bleka Main Vein System. It is evident that the major ore lenses occur in an area of merging between two en echelon veins. No significant gold-bismuth mineralization is observed outside this 300·75 m^2 surface area. Assuming a depth of 150 m this implies that individual rock volumes potential for hosting high grade ore lenses are estimated to be in the order of 10 mill. t. Surface investigations indicate dilation in these zones in the order of 1-2%.

In a more detailed scale (Fig.40C) the veins may exhibit pronounced pinch and swell structures and very characteristic feather fractures arranged parallel to max compression (100°) and perpendicular to max tension (Figs.35-37). These phenomena are a result of a slightly irregular fault plane and a shear movement in the brittle-ductile regime. As indicated, the shear movement is clearly dextral.

On a very detailed scale (Fig.40D) it can be observed how internal Riedel shear planes often expressed as tourmaline-sulphide veinlets occur in the main quartz vein (Fig.13). Teoretically, a set of late tension gashes should be developed. From the old reports of Kostke (1902) and Lauer (1943) it can be concluded that their observations on late cross-cutting quartz veins with visible gold and Bi-minerals can be related to these tension gashes. Other evidense of this is observed locally as open space filling of quartz crystals.

Pronounced hydrothermal alteration envelopes (Fig.40D) are developed throughout the area. Mineralogically, the amphibolite host rock increases its muscovite and calcite content towards the vein, whereas the hornblende and feldspar content decreases.

This results in an overall bleaching of the rock towards the vein and eventually, the altered amphibolite is transformed into a quartz-muscovite-calcite rock (Figs.5-8). This is indicative of percolating hydrothermal solutions causing the precipitation of the Au-Bi bearing quartz-tourmaline-carbonate veins in areas of max dilation. The mineral assembly of the veins: quartz-tourmaline-ankerite and subordinate calcite-dolomite-muscovite-epidote-chlorite-chalcopyrite-pyrite-bismuthinite-Bi-sulfosalts (cosalite?, galenobismuthite?, aikinite?, emplectite?)-native bismuth-native gold-maldonite?-bornite-galena-scheelite is indicative of a high temperature hydrothermal mineralization. In particular the symplectic intergrowths of gold and bismuth and the occurrence of maldonite indicate this. Zoning is observed both laterally and vertically. The lateral zoning is characterized by enrichment of tourmaline, carbonates and gold-bismuth minerals in the zones of merging (Fig.40B) and predominantly quartz with subordinate tourmaline and pyrite in veins outside these areas of max dilation. Vertical zoning is probably observed as introduction of galena at higher levels (Sverveli). The present relative levels of the known occurrences are so that the Espelid vein swarm occurs appr. 200 m above Bleka and Barstad and 300 m above Gjuv and Blengsdalen. As the veins were emplaced during the last period of major tectonic movements and assuming no later tilting there is reason to believe that the Espelid vein swarm contains Au-Bi mineralization at depth. This is further supported by the local enrichment of both elements which is interpreted as a halo phenomena.
The high temperature nature of the veins is probably due to underlying granite(s) which is exposed locally (Fjellstadfjell Granite N of Gjuv and a small granite plug SW of Bleka).
Thus, the location of the Bleka-type veins is a result of regional tectonics combined with favorable host rock lithology (amphibolite) whereas the high temperature nature and to some degree the mineral assembly is controlled by underlying intrusions.

Impact on further exploration.

On a local scale the establishment of the conceptual model implies that zones of merging or other areas of max dilation are the main targets for gold-bismuth exploration. In the Bleka area one such zone (300·75 m^2 surface area) has already been outlined. The area just north of Sverveli could also represent the one end of such a zone, but this would have to be investigated in more detail. In the Espelid area which exhibits a large overall dilation the low exposure (5%) impedes detailed investigations. However, two areas (A - around samples 2110091-93, 95-98 and 100-115 and B - around samples 2110231-244 - Map 3) might represent zones of merging fracture segments.

Another impact on further exploration is the rekognized Bi-halo. This means that future samples should be analyzed for both gold and bismuth.

On a larger scale it should also be noted that the Bleka-type veins seem to have a low, but widespread scheelite content. This seems to hold true for many gold-quartz veins in greenstones (e.g. Sigma Mine, Canada and Ædelfors, Sweden). The occurrence of scheelite in particular in pan concentrates from areas of volcanic rocks should be checked for gold-quartz veins. This is as relevant for other areas in Norway as for the Telemark area.

Another point of interest is the result of the 1984 stream sediment sampling programme in central Telemark. In an area covering appr. 600 km^2, 85% of the significant gold anomalies (> 50 ppb) occur within a belt covering only 15% of the area. This belt which seems to be 5-10 km wide and has a strike similar to that of the Bleka veins runs from the Espelid-Bleka-Blengsdalen area in the SW to beyond Gjuv in the NE. The significance of this anomalous belt is uncertain, however, on a very large scale it could be postulated (mainly from interpretation of the 1:1,000,000 geological map) that a major fracture zone stretches all across the Southern Precambrian Province from the Stavanger area over Bykle-Dalen-Bleka-Kongsberg to the Oslo Rift and acted as a major channelway for hydrothermal solutions. However, this postulate is by no means supported by further investigations.

Economic potential.
The inferred reserves and metal productions from both the Bleka and the Gjuv Mines are small. The inferred original ore reserve of the Bleka Mine amounts to 50,000 t of vein material with a grade of 5 ppm gold or a diluted ore reserve of 250,000 t with 1 ppm gold. This includes a high grade part of ~ 10,000 t with 25 ppm, 15,000 t with 1 ppm and 25,000 t with appr. 0.1 ppm. Metal production includes 125 kg Au, 225 kg Ag, 20 t Bi and 70 t Cu from the early production period before year 1900 and 40 kg Au, 80 kg Ag, 6 t Bi and 10 t Cu from the 1935-39 production period.
Total metal production from ~ 7000 t of vein material:

Au - 165 kg
Ag - 300 kg
Bi - 25 t
Cu - 80 t

The figures for the Gjuv Mine are much more speculative, but only amount to 0.3-0.5 t of bismuth produced.
However, the actual economic potential is considered much better for the following reasons:

a) the Bleka-type veins are kown to contain ore lenses with very attractive grades - 25 ppm Au, 0.5% Bi, 45 ppm Ag and 1.5% Cu.
b) known ore lenses occur in areas of merging between en echelon veins where max dilation occurred. The bulk volume of such zones is estimated to be in the order of 3-5 mill m^3 = 10-15 mill t and no drilling has been performed.
c) the located Espelid vein swarm represents a much larger hydrothermal system than the Bleka Main Vein System and exhibits a high overall dilation. 5-10 of the mapped veins exhibit average thicknesses of up to three times larger than the Bleka Vein. Assuming a similar grade the expected size of potential individual ore lenses of the Espelid vein swarm would be 50,000-100,000 t.

d) bismuth and gold enrichment is observed locally within the Espelid vein swarm. This is believed to represent a halo phenomena from deeper-lying mineralization.

e) assuming the observed high grade and minable widths for the ore lenses an ore reserve of only 150,000-200,000 t would be sufficient for a profitable small scale mining project (total revenue - 300-400 mill 1984-NoK).

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APPENDIX I.

ROCK SAMPLE DESCRIPTION LIST :

2110001 - Hydrothermally altered amphibolite with coarse-grained calcite/ ankerite veinlets with bismuthinite,chalcopyrite and pyrite. From Bleka main vein at Sverveli.

2110002 - Quartz vein with abundant chalcopyrite and minor pyrite and bismuthinite.Chlorite bearing.From upper Bleka mine dump.

2110003 - Quartz vein with pyrite and bismuthinite.Slickensides. From main mine dump at Gjuv.

2110004 - Quartz-ankerite vein with chalcopyrite,pyrite and bismuthinite. Chip sample from mine dump at Blengsdalen occurrence.

2110005 - Quartz vein with chalcopyrite and minor pyrite and bismuthinite. From mine dump at Blengsdalen occurrence.

2110006 - Quartz-ankerite vein with chalcopyrite,pyrite and bismuthinite. From mine dump at Blengsdalen occurrence.

2110007 - Quartz-ankerite-tourmaline vein with pyrite-chalcopyrite-bismuthinite.Rich ore from dump at Bleka.

2110008 - Quartz-ankerite vein with pyrite-chalcopyrite-bismuthinite. Rich ore from dump at Bleka.

2110009 - Quartz-carbonate vein with pyrite-chalcopyrite-bismuthinite? Rich ore from dump at Bleka.

2110010 - Quartz-tourmaline-ankerite vein with minor pyrite-chalcopyrite. Chip sample of mineralized vein material from main dump at Barstad occurrence.

2110011 - Quartz-tourmaline-ankerite vein with pyrite and minor chalcopyrite and bismuthinite? From main dump at Barstad occurrence.

2110012 - Quartz-tourmaline-ankerite vein with minor pyrite.Chip sample of 60 cm vein in the Barstad tunnel.

2110013 - Tourmaline-ankerite-quartz vein with abundant chalcopyrite. From mine level 610 at Bleka.

2110014 - Quartz-carbonate-tourmaline vein with chalcopyrite-bismuthinite veinlets.Rich outcropping ore from shaft level 595 at Bleka.

2110015 - Calcareous schist with pyrite pseudomorphoses.From Kivikdalen.

2110016 - Fine-grained amphibolite with quartz veinlets.From Øygården area.

2110017 - Quartz vein with minor hematite? From Kåsastul.

2110018 - Quartz-tourmaline vein with minor pyrite.From Espelid area.

2110019 - Hydrothermally altered amphibolite with pyrite and magnetite. Chip sample from Espelid area.

2110020 - Quartz vein with minor pyrite.Chip sample from Espelid area.

2110021 - Quartz-tourmaline-ankerite vein with minor pyrite and chalcopyrite. Chip sample from Espelid area.

2110022 - Hydrothermally altered amphibolite with pyrite and magnetite. Chip sample from Espelid area.

2110023 - Quartz-tourmaline vein with abundant pyrite and minor chalcopyrite. Sample from vein in Espelid area.

2110024 - Quartz-tourmaline vein with pyrite.Chip sample from Espelid area.

2110025 - Quartz-tourmaline-pyrite vein with tourmalinitized wall rock (amphibolite).From Espelid area.

2110026 - Quartz-tourmaline-pyrite-wollastonite? veins.Chip sample of four minor veins in Espelid area.

2110027 - Hydrothermally altered wall-rock amphibolite with pyrite-magnetite tourmaline-apatite.Chip sample from Espelid area.

2110028 - Quartz-wollastonite vein.From Espelid area.

2110029 - Tourmaline-quartz vein with pyrite.From Espelid area.

2110030 - Quartz-tourmaline-ankerite vein with minor pyrite.Chip sample from Espelid area.

2110031 - Hydrothermally altered wall-rock amphibolite with pyrite.Chip sample from Espelid area.

2110032 - Silicified breccia with quartz and chlorite veinlets.Chip sample from Nystaul area.

2110033 - Quartz-tourmaline-ankerite vein with pyrite.Chip sample from Nystaul occurrence.

2110034 - Hydrothermally altered wall-rock amphibolite with pyrite.Chip sample from Nystaul occurrence.

2110035 - Quartz-tourmaline-ankerite vein with pyrite and euhedral magnetite octahedrons.Chip sample from Nystaul occurrence.

2110036 - Hydrothermally altered wall-rock amphibolite with pyrite.Chip sample from Nystaul occurrence.

2110037 - Quartz-hematite-sericite vein.From Nystaul area.

2110038 - Quartz-tourmaline-ankerite vein with minor pyrite.Chip sample from Nystaul occurrence.

2110039 - Coarse-grained hornblenditic amphibolite with disseminated pyrite. From Espelid-Nystaul area.

2110040 - Amphibolite with disseminated pyrite.From Espelid-Nystaul area.

2110041 - Amphibolite with disseminated pyrite. From Espelid-Nystaul area.

2110042 - Amphibolite with disseminated pyrite and magnetite. From Espelid area.

2110043 - Altered amphibolite with calcite-pyrite-chalcopyrite veinlet. From Haugstøl area.

2110044 - Quartz vein with abundant chalcopyrite. Chip sample from Haugstøl area.

2110045 - Tourmaline-quartz-ankerite vein with chalcopyrite and pyrite. Chip sample from Haugstøl area.

2110046 - Quartz vein with abundant chalcopyrite and minor bismuthinite. Chip sample from Bleka area.

2110047 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110048 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110049 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110050 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110051 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110052 - Chlorite-calcite mylonite. From level 610 of Bleka mine.

2110053 - Ankerite-tourmaline vein with minor pyrite and chalcopyrite. From level 610 of Bleka mine.

2110054 - Quartz vein with minor tourmaline-ankerite-pyrite. Chip sample from level 550 of Bleka mine.

2110055 - Quartz vein with minor tourmaline-ankerite-pyrite-chalcopyrite. Chip sample from level 550 of Bleka mine.

2110056 - Quartz-tourmaline-ankerite vein with pyrite and chalcopyrite. Chip sample from level 525 of Bleka mine.

2110057 - Quartz-tourmaline-ankerite vein. From Bleka area.

2110058 - Quartz-tourmaline-ankerite vein with pyrite, chalcopyrite and bismuthinite. Chip sample from Blengsdalen area.

2110059 - Hydrothermally altered wall-rock amphibolite with abundant pyrite and chalcopyrite. Chip sample from Blengsdalen area.

2110060 - Quartz-tourmaline-ankerite vein with chalcopyrite and bismuthinite. From Bleka main vein.

2110061 - Ankerite-tourmaline vein with late quartz veinlets with abundant bismuthinite and chalcopyrite. One grain of native gold (1·1 mm) was observed in the quartz. From Bleka mine dump level 560.

2110062 - Quartz-tourmaline vein with abundant chalcopyrite and visible gold.Three to four grains of gold were observed (max 1 mm). From Bleka mine dump level 585.

2110063 - Quartz vein with minor tourmaline and pyrite.Chip sample from Bleka area.

2110064 - Quartz-tourmaline vein with minor pyrite.Chip sample from Bleka area.

2110065 - Quartz-tourmaline vein with minor pyrite.Chip sample from Bleka area.

2110066 - Quartz-tourmaline-ankerite vein with minor pyrite and chalcopyrite. Chip sample from Bleka area.

2110067 - Hydrothermally altered wall-rock amphibolite with pyrite and chalcopyrite.Chip sample from Bleka area.

2110068 - Quartz-pyrite-tourmaline vein.From Bleka area.

2110069 - Quartz vein with abundant chalcopyrite and minor pyrite and bismuthinite.From bleka area.

2110070 - Quartz-tourmaline vein.Chip sample from Bleka area.

2110071 - Quartz vein with minor feldspar.Chip sample from Bleka area.

2110072 - Quartz-tourmaline vein with minor pyrite.Chip sample from Bleka area.

2110073 - Tourmaline-quartz-carbonate-pyrite veinlets.Bulk chip sample from Blengsdalen area.

2110074 - Amphibolite with coarse-grained tourmaline veinlets.From Blengsdalen area.

2110075 - Quartz-tourmaline vein with pyrite and chalcopyrite.From Blengsdalen area.

2110076 - Quartz-pyrite vein in quartzitic host rocks.From Nutheim area.

2110077 - Quartz-ankerite vein with abundant chalcopyrite-pyrite and minor galena and bismuthinite.Chip sample from dump at Sverveli occurrence.

2110078 - Hydrothermally altered wall-rock amphibolite with pyrite and minor chalcopyrite.Chip sample from Sverveli area.

2110079 - Quartz-ankerite vein with pyrite-chalcopyrite and bismuthinite. From main vein at Sverveli.

2110080 - Quartz vein with abundant pyrite and galena.From Sverveli area.

2110081 - Quartz-ankerite vein with chalcopyrite,pyrite and galena.From Sverveli area.

2110082 - *Quartz-tourmaline vein with chalcopyrite,galena and bismuthinite? Chip sample from Sverveli area.*

2110083 - *Quartz-tourmaline vein with minor ankerite and pyrite.Chip sample from Steinsruddalen area.*

2110084 - *Tourmaline-quartz-ankerite vein with minor pyrite and chalcopyrite.Chip sample from Steinsruddalen area.*

2110085 - *Hydrothermally altered wall-rock amphibolite with sericite. Extremely bleached.Chip sample from Steinsruddalen area.*

2110086 - *Quartz-tourmaline vein with minor pyrite.Chip sample from Livsengåsen area.*

2110087 - *Quartz-tourmaline vein with minor pyrite.Chip sample from Livsengåsen area.*

2110088 - *Brecciated quartz vein with minor tourmaline.Chip sample from Ormemyre area.*

2110089 - *Chlorite schist with ankerite and chalcopyrite-pyrite veinlets. From Blengsdalen area.*

2110090 - *Quartz vein with pyrite.In amphibolite sill.From north of Seljord along E76.*

2110091 - *Quartz-tourmaline-ankerite vein with abundant pyrite and minor chalcopyrite.Chip sample from Reiustaulhaugen area.*

2110092 - *Tourmaline-quartz vein with pyrite.Fine tourmaline-quartz banding. Chip sample from Reiustaulhaugen area.*

2110093 - *Quartz-tourmaline vein with abundant pyrite.Chip sample from Reiustaulhaugen area.*

2110094 - *Quartz-tourmaline vein with abundant pyrite.Chip sample from Reiustaulhaugen area.*

2110095 - *Quartz vein with minor tourmaline and pyrite.Chip sample from Reiustaulhaugen area.*

2110096 - *Quartz vein with minor tourmaline and pyrite.Chip sample from Reiustaulhaugen area.*

2110097 - *Quartz vein with minor tourmaline and pyrite.Chip sample from Reiustaulhaugen area.*

2110098 - *Quartz-tourmaline vein with minor pyrite.Chip sample from Reiustaulhaugen area.*

2110099 - *Quartz-tourmaline-pyrite vein.From Reiustaulhaugen area.*

2110100 - *Quartz vein with minor tourmaline and pyrite.Chip sample from Reiustaulhaugen area.*

2110101 - *Hydrothermally altered wall-rock amphibolite with abundant pyrite.Chip sample from Reiustaulhaugen area.*

2110102 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110103 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110104 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110105 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110106 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110107 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110108 - Quartz vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110109 - Quartz-tourmaline-pyrite vein. Chip sample from Reiustaulhaugen area.

2110110 - Quartz vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110111 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110112 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110113 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110114 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Reiustaulhaugen area.

2110115 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110116 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110117 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110118 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110119 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110120 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110121 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110122 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110123 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110124 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Reiustaulhaugen area.

2110125 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110126 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110127 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110128 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110129 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110130 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110131 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110132 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110133 - Quartz vein with minor tourmaline and pyrite. Chip sample from Reiustaulhaugen area.

2110134 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110135 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110136 - Quartz-tourmaline vein with minor pyrite. Chip sample from Reiustaulhaugen area.

2110137 - Quartz-tourmaline vein with minor pyrite. Chip sample from Bølskveven area.

2110138 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110139 - Quartz vein. Chip sample from Bølskveven area.

2110140 - Quartz vein. Chip sample from Bølskveven area.

2110141 - Quartz-tourmaline-pyrite vein with minor chalcopyrite. Chip sample from Reiustaulhaugen area.

2110142 - Quartz-tourmaline-pyrite vein with minor chalcopyrite. Chip sample from Reiustaulhaugen area.

2110143 - Quartz-tourmaline-pyrite vein. Chip sample from Reiustaulhaugen area.

2110144 - Quartz vein. Chip sample from Nystaul area.

2110145 - Quartz-tourmaline vein with pyrite-chalcopyrite and bismuthinite? From Reiustaulhaugen area.

2110146 - Mylonitized amphibolite with pronounced epidotization and chloritization. Pyritiferous. Chip sample from Brekka Ytre along E76.

2110147 - Mylonitized amphibolite with pronounced epidotization and chloritization. Pyritiferous and calcite bearing. Chip sample from Brekka Ytre along E76.

2110148 - Mylonitized amphibolite with pronounced epidotization and chloritization. Pyritiferous and calcite bearing. Chip sample from Brekka Ytre along E76.

2110201 - Quartz-tourmaline-ankerite vein with minor pyrite.From Nystaul area.

2110202 - Quartz-tourmaline-ankerite vein with minor pyrite.Chip sample from Nystaul area.

2110203 - Quartz-tourmaline-ankerite vein with minor pyrite.From Nystaul area.

2110204 - Quartz-tourmaline-ankerite vein with pyrite and chalcopyrite. Chip sample from Nystaul area.

2110205 - Quartz-tourmaline vein.Chip sample from Nystaul area.

2110206 - Quartz-tourmaline vein with pyrite.Chip sample from Nystaul area.

2110207 - Hydrothermally altered wall-rock amphibolite with pyrite and magnetite.Chip sample from Nystaul area.

2110208 - Quartz-tourmaline vein with pyrite.Chip sample from Nystaul area.

2110209 - Hydrothermally altered wall-rock amphibolite with pyrite and magnetite.Chip sample from Nystaul area.

2110210 - Quartz-tourmaline-ankerite vein with pyrite.From Reiustaulhaugen area.

2110211 - Quartz-tourmaline-ankerite vein with pyrite.Chip sample from Reiustaulhaugen area.

2110212 - Quartz-tourmaline vein with pyrite and mica.From Reiustaulhaugen area.

2110213 - Quartz vein.From Bølskveven area.

2110214 - Quartz vein with minor tourmaline-ankerite-muscovite and pyrite. From Bølskveven area.

2110215 - Quartz-tourmaline vein.Chip sample from Bølskveven area.

2110216 - Quartz vein with minor tourmaline.Chip sample from Bølskveven area.

2110217 - Hydrothermally altered wall-rock amphibolite with pyrite and magnetite.Extremely bleached.Chip sample from Bølskveven area.

2110218 - Quartz-tourmaline vein.Chip sample from Bølskveven area.

2110219 - Quartz vein with minor tourmaline.Chip sample from Bølskveven area.

2110220 - Quartz vein with slickensides.From Bølskveven area.

2110221 - Hydrothermally altered wall-rock amphibolite with slickensides. From Bølskveven area.

2110222 - Quartz-tourmaline vein with pyrite and chalcopyrite.Boulder from Livsengåsen area.

2110223 - Quartz veinlets.Chip sample from Langedal area.

2110224 - Quartz-sericite-chlorite-pyrite vein. From Skvevsvatn area.

2110225 - Quartz-tourmaline vein. Chip sample from Vrestebakken area.

2110226 - Quartz-tourmaline vein with minor pyrite. Chip sample from Mølledammen area.

2110227 - Quartz vein with minor tourmaline. Chip sample from Bølskveven area.

2110228 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110229 - Quartz-tourmaline vein with minor pyrite. Chip sample from Bølskveven area.

2110230 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110231 - Quartz vein with minor ankerite. Chip sample from Bølskveven area.

2110232 - Quartz vein with minor tourmaline and sericite. Chip sample from Bølskveven area.

2110233 - Quartz-tourmaline vein. Chip sample from Bølskveven area.

2110234 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110235 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110236 - Quartz vein with minor sericite and ankerite. Chip sample from Bølskveven area.

2110237 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110238 - Quartz vein with minor tourmaline, sericite and ankerite. Chip sample from Bølskveven area.

2110239 - Quartz vein. Chip sample from Bølskveven area.

2110240 - Quartz-tourmaline-sericite vein. Chip sample from Bølskveven area.

2110241 - Quartz-tourmaline-pyrite vein. Chip sample from Bølskveven area.

2110242 - Quartz vein. Chip sample from Bølskveven area.

2110243 - Quartz vein with minor ankerite. Chip sample from Bølskveven area.

2110244 - Quartz vein with minor ankerite. Chip sample from Bølskveven area.

2110245 - Quartz vein with minor sericite. Chip sample from Bølskveven area.

2110246 - Quartz vein with minor sericite,chlorite and pyrite.Chip sample from Bølskveven area.

2110247 - Hydrothermally altered wall rock amphibolite with abundant pyrite.Chip sample from Bølskveven area.

2110248 - Quartz vein with minor tourmaline.Chip sample from Bølskveven area.

2110249 - Quartz vein with minor ankerite and sericite.Chip sample from Bølskveven area.

2110250 - Quartz-tourmaline-pyrite vein.Chip sample from Bølskveven area.

2110251 - Hydrothermally altered wall-rock amphibolite with abundant pyrite. Chip sample from Bølskveven area.

2110252 - Quartz vein with minor tourmaline and sericite.Chip sample from Bølskveven area.

2110253 - Quartz-tourmaline vein with minor pyrite.Chip sample from Bølskveven area.

2110254 - Quartz vein with tourmaline and pyrite.Chip sample from Bøl-skveven area.

2110255 - Hydrothermally altered wall-rock amphibolite with abundant pyrite.Chip sample from Bølskveven area.

APPENDIX II :

ANALYSIS RESULTS - LITHOSAMPLES.

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM	Zn PPM	As PPM
2110001	73	6000	>250	240	-	-	-
2110002	-	-	-	-	-	-	-
2110003	19	1600	1	-	-	-	-
2110004	310	84	3	2760	-	-	-
2110005	103000	-	-	-	-	-	-
2110006	1800	-	-	-	-	-	-
2110007	5100	600	-	-	-	-	-
2110008	1350	2700	-	-	-	-	-
2110009	300	1000	-	-	-	-	-
2110010	<20	12	<1	412	-	-	-
2110011	30	12	-	-	-	-	-
2110012	<20	.3	<1	25	-	-	-
2110013	240	-	-	-	-	-	-
2110014	1600	2300	22	>10000	680	-	-
2110015	29	-	-	-	-	106	3
2110016	20	-	-	-	-	-	-
2110017	350	3	-	-	-	-	-
2110018	<10	-	-	-	-	-	-
2110019	<10	-	-	-	-	-	-
2110020	<10	-	-	-	-	-	-
2110021	<20	.2	<1	140	-	-	-
2110022	<20	-	-	-	-	-	-
2110023	15	<1	1	320	14	-	-
2110024	<10	-	-	-	-	-	-
2110025	-	-	-	-	-	-	-
2110026	<20	-	-	-	-	-	-
2110027	<20	-	-	-	-	-	-
2110028	-	-	-	-	-	-	-
2110029	-	-	-	-	-	-	-
2110030	<20	-	-	-	-	-	-

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM
2110031	<10	-	-	-	-
2110032	<10	-	-	-	-
2110033	<20	.1	-	40	20
2110034	<20	-	-	-	-
2110035	<20	6.2	<1	60	30
2110036	<20	-	-	-	-
2110037	<10	-	-	-	-
2110038	37	-	-	-	-
2110039	-	-	-	-	-
2110040	-	-	-	-	-
2110041	-	-	-	-	-
2110042	-	-	-	-	-
2110043	<10	-	-	-	-
2110044	140	80	22	>10000	72
2110045	160	100	5	680	80
2110046	530	600	5	9200	236
2110047	<10	-	-	-	-
2110048	<10	-	-	-	-
2110049	<10	-	-	-	-
2110050	<20	-	-	-	-
2110051	60	-	-	-	-
2110052	<10	-	-	-	-
2110053	40	78	8	1050	-
2110054	<10	15	<1	23	-
2110055	<10	8	<1	40	-
2110056	2500	>1000	7	175	-
2110057	<20	-	-	-	-
2110058	60	5	<1	62	12
2110059	30	30	-	81	-
2110060	1680	72	2	135	66
2110061	68000	>1000	>250	6900	>10000
2110062	94000	>1000	41	5300	>10000
2110063	<20	-	-	-	-
2110064	<20	-	-	-	-
2110065	<20	-	-	-	-

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM
2110066	<20	52	3	800	66
2110067	<20	-	-	-	-
2110068	70	260	19	1930	270
2110069	770	244	43	>10000	282
2110070	<20	-	-	-	-
2110071	<20	-	-	-	-
2110072	<20	-	-	-	-
2110073	<10	-	-	-	-
2110074	-	-	-	-	-
2110075	100	7	2	620	36
2110076	<20	-	-	-	-
2110077	115	126	73	3790	910
2110078	<20	-	-	-	-
2110079	280	>1000	89	5000	>10000
2110080	80	244	162	118	>10000
2110081	<10	22	12	2660	502
2110082	300	292	221	5200	>10000
2110083	<20	-	-	-	-
2110084	<20	-	-	-	-
2110085	<20	-	-	-	-
2110086	<20	-	-	-	-
2110087	<20	-	-	-	-
2110088	<20	-	-	-	-
2110089	<20	20	3	2300	36
2110090	87	-	-	-	-
2110091	29	.4	1	78	12
2110092	<20	-	-	-	-
2110093	<20	-	-	-	-
2110094	<20	-	-	-	-
2110095	<20	-	-	-	-
2110096	<20	-	-	-	-
2110097	<20	-	-	-	-
2110098	<20	-	-	-	-
2110099	38	-	-	-	-
2110100	<20	.7	1	8	8

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM
2110101	<20	-	-	-	-
2110102	<20	-	-	-	-
2110103	<20	-	-	-	-
2110104	<20	-	-	-	-
2110105	<20	-	-	-	-
2110106	<20	-	-	-	-
2110107	<20	-	-	-	-
2110108	<20	-	-	-	-
2110109	<20	-	-	-	-
2110110	<20	-	-	-	-
2110111	<20	-	-	-	-
2110112	<20	-	-	-	-
2110113	<20	2	<1	40	8
2110114	<20	-	-	-	-
2110115	<20	-	-	-	-
2110116	<20	-	-	-	-
2110117	<20	-	-	-	-
2110118	<20	-	-	-	-
2110119	<20	-	-	-	-
2110120	<20	-	-	-	-
2110121	<20	1	<1	9	6
2110122	<20	-	-	-	-
2110123	<20	-	-	-	-
2110124	<20	-	-	-	-
2110125	<20	-	-	-	-
2110126	<20	-	-	-	-
2110127	<20	-	-	-	-
2110128	<20	-	-	-	-
2110129	<20	-	-	-	-
2110130	<20	-	-	-	-
2110131	<20	-	-	-	-
2110132	<20	-	-	-	-
2110133	<20	-	-	-	-
2110134	<20	-	-	-	-
2110135	<20	-	-	-	-

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM
2110136	<20	.7	<1	58	4
2110137	<20	.9	<1	18	4
2110138	<20	-	-	-	-
2110139	<20	-	-	-	-
2110140	<20	-	-	-	-
2110141	28	24	3	242	18
2110142	28	55	1	32	56
2110143	<20	-	-	-	-
2110144	84	-	-	-	-
2110145	<20	144	3	10	140
2110146	<20	-	-	-	-
2110147	<20	-	-	-	-
2110148	29	-	-	-	-
2110201	<10	-	-	-	-
2110202	90	-	-	-	-
2110203	210	-	-	-	-
2110204	80	80	2	210	46
2110205	55	-	-	-	-
2110206	<10	-	-	-	-
2110207	<10	-	-	-	-
2110208	<10	-	-	-	-
2110209	50	-	-	-	-
2110210	<10	-	-	-	-
2110211	<10	2	<1	35	16
2110212	<10	2	<1	5	6
2110213	15	-	-	-	-
2110214	15	1	<1	5	6
2110215	<10	-	-	-	-
2110216	<10	-	-	-	-
2110217	<10	-	-	-	-
2110218	<10	-	-	-	-
2110219	<10	-	-	-	-
2110220	<10	-	-	-	-

SAMPLE NO.	Au PPB	Bi PPM	Ag PPM	Cu PPM	Pb PPM
2110221	-	-	-	-	-
2110222	<10	4	2	490	46
2110223	20	-	<1	-	-
2110224	<20	-	-	-	-
2110225	<32	2	<1	45	20
2110226	<20	-	-	-	-
2110227	<20	.2	<1	25	6
2110228	<20	-	-	-	-
2110229	<20	-	-	-	-
2110230	<20	-	-	-	-
2110231	<20	-	-	-	-
2110232	<20	<.1	<1	29	6
2110233	<20	-	-	-	-
2110234	<20	-	-	-	-
2110235	<20	-	-	-	-
2110236	<20	-	-	-	-
2110237	<20	-	-	-	-
2110238	<20	-	-	-	-
2110239	<20	<.1	<1	8	4
2110240	<20	-	-	-	-
2110241	28	-	-	-	-
2110242	<20	-	-	-	-
2110243	<20	-	-	-	-
2110244	<20	-	-	-	-
2110245	<20	-	-	-	-
2110246	<20	<.1	<1	8	4
2110247	<20	-	-	-	-
2110248	<20	-	-	-	-
2110249	<20	-	-	-	-
2110250	<20	-	-	-	-
2110251	<20	-	-	-	-
2110252	<20	.4	<1	72	4
2110253	<20	-	-	-	-
2110254	<20	-	-	-	-
2110255	<20	-	-	-	-

LITHOGEOKEMI HOVIN KOBBERVERK, TELEMARK.

Indeledning.

På basis af feltarbejde og påfølgende mikroskopering (Schønwaadt, 1983 & Schønwnadt, 1984) blev det besluttet at foretage en mindre feltaktion i 1984 med henblik på at etablere et lithogeokemisk kort over amfiboliten (malmzone-amfiboliten i tidligere rapporter) ved Hovin Kobberverk.

Idéen med at foretage den lithogeokemiske kortlægning var primært:

i) At forsøge at verificere det på gamle analyser etablerede Cu-anomalimønster i amfiboliten (kort 4 i Schønwandt, 1983).

ii) at undersøge om amfiboliten ved Hovin Kobberverk var anormal i metal-indhold set i forhold til de omkringliggende amfiboliter.

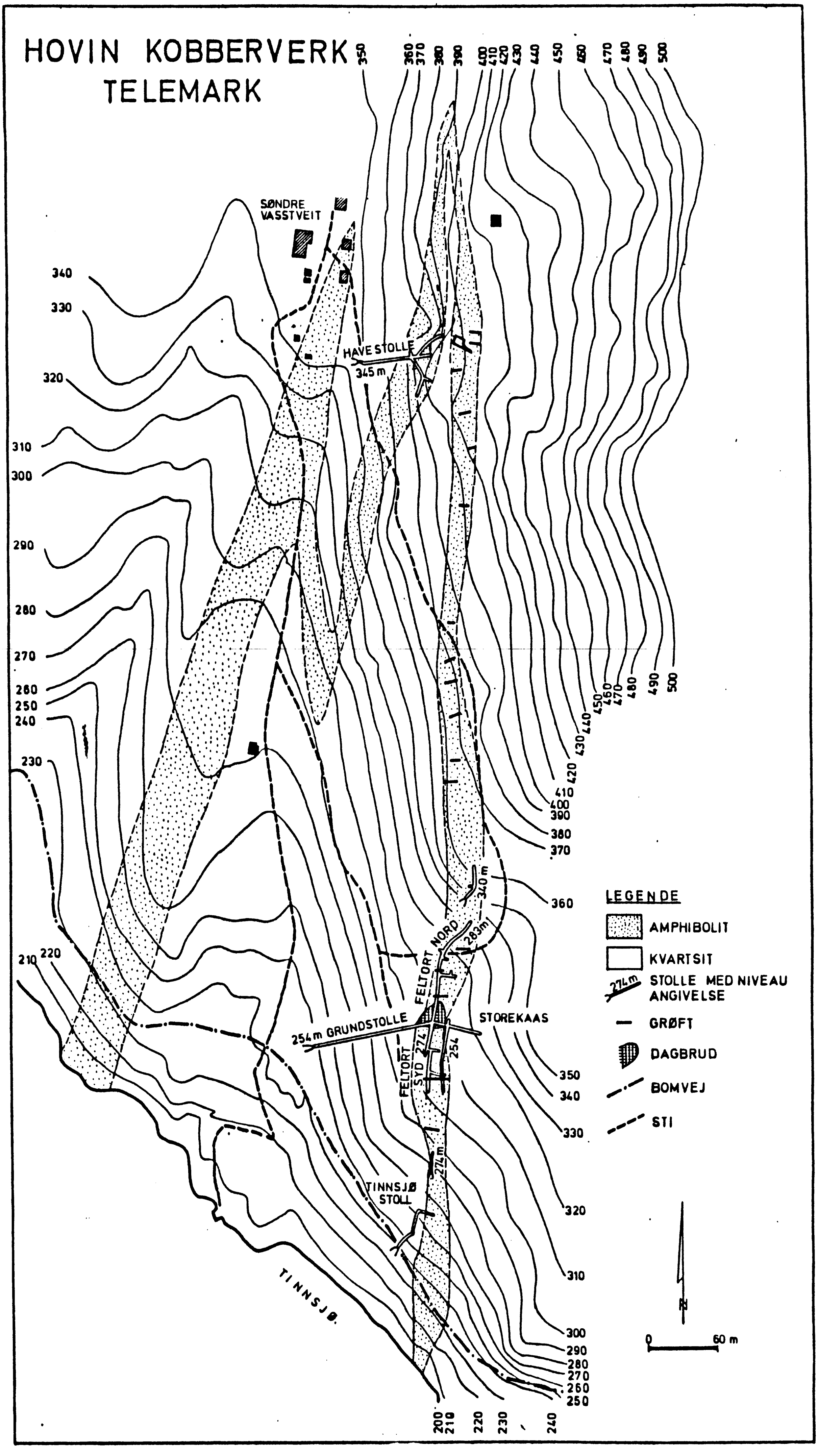
I anden række at få bragt klarhed over feldspat-porfyrens relation til amfiboliten, idet mikroskoperingen havde sandsynliggjort, at denne bjergart ikke havde det i feltrapporten (Schønwnadt, 1983) foreslåede slægtskab til amfiboliten.

Geologisk kortlægning.

Den detaljerede kortlægning har vist, at de tidligere 3 amfiboliten omkring Hovin Kobberverk (malmzone-amfiboliten(østligst), Havestolle-amfiboliten og imprægnations-amfiboliten(vestligst)) udgør én og samme amfibolit (fig. 1). Amfiboliten, der ligger i en kvartsit sekvens, er isoklinalt foldet og har form som en zik-zak fold.

Alle målte småfolder har et N-S-gående aksialplan, der hælder stejlt mod øst (ca. 85°) og en mod nord dykkende (ca. 30°) foldeakse. På basis af småfolderne må man formode, at zik-zak folden består af en østlig og en vestlig antiform med en mellemliggende synform.

Amfiboliten varierer i bredde fra 10-15 m og op til ca. 50 m. Ombøjningen i den østlige og vestlige anti-


HOVIN KOBBERVERK
TELEMARK
SØNDRE VASSTVEIT
HAVE STOLLE
345 m
340 m
283 m
FELTORT NORD
254 m GRUNDSTOLLE
STOREKAAS
FELTORT SYD
274
254
274 m
TINNSJØ STOLL
TINNSJØ
LEGENDE
AMPHIBOLIT
KVARTSIT
274 m STOLLE MED NIVEAU ANGIVELSE
GRØFT
DAGBRUD
BOMVEJ
STI
0
60 m
350
360
370
380
390
400
410
420
430
440
450
460
470
480
490
500
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200

form ligger henholdsvis 1100 m og 800 m i strøgretning fra Finnsjøen (fig. 1).
Lithologisk er der en variation i amfiboliten. Den østlige flanke af zik-zak folden består helt overvejende af en amfibol-porfyroblastisk amfibolit med varierende konkordante zoner af biotit-førende amfibolit. Der er både skarp og glidende kontakt mellem disse to bjergarter.
I den nordlige trediedel af den østlige flanke glider amfiboliten jævnt over i en melanokratisk biotit-gneis. Biotit-genisen har konkordante zoner af varierende bredde af amfibolit og/eller porfyroblastisk amfibolit.

Den resterende del af zik-zak folden domineres af den melanokratiske biotit-gneis, der dog stedvis bliver mindre melanokratisk. I den sydligste del af zik-zak foldens vestflanke bliver amfiboliten igen den dominerende bjergart.
Den eneste bjergart inden for amfiboliten, der klart skiller sig ud er dioriten i dagbruddet Storekaas' østlige del. Dioriten fører, som tidligere omtalt (Schønwandt, 1983 &1984), dissemineret chalcocit og bornit. Til trods for at dioriten fører disseminerede sulfider svarende til ca. 1% Cu og ca. 100 ppm Ag, så er denne bjergart ikke blevet betragtet som malm, da brydning fandt sted i århundredets begyndelse, idet bjergarten i det store og hele er blevet ladt tilbage i dagbruddet.

Dioriten skønnes at have udgjort et ellipseformet areal med en storakse på ca. 20 m og en lilleakse på ca. 7-8 m. Storaksen i ellipsen stryger næsten N-S og er således konform med amfiboliten. Dioriten er i kontaktzonen til amfiboliten kraftig sheared og får her et gneis-agtigt udseende. Dette medfører, at der er en glidende overgang mellem den gneis-agtige diorit og den shearede amfibolit. Den shearede kontakt samt dagbruddets stejle vægge har begrænset yderligere information om relationen mellem amfiboliten og dioriten.

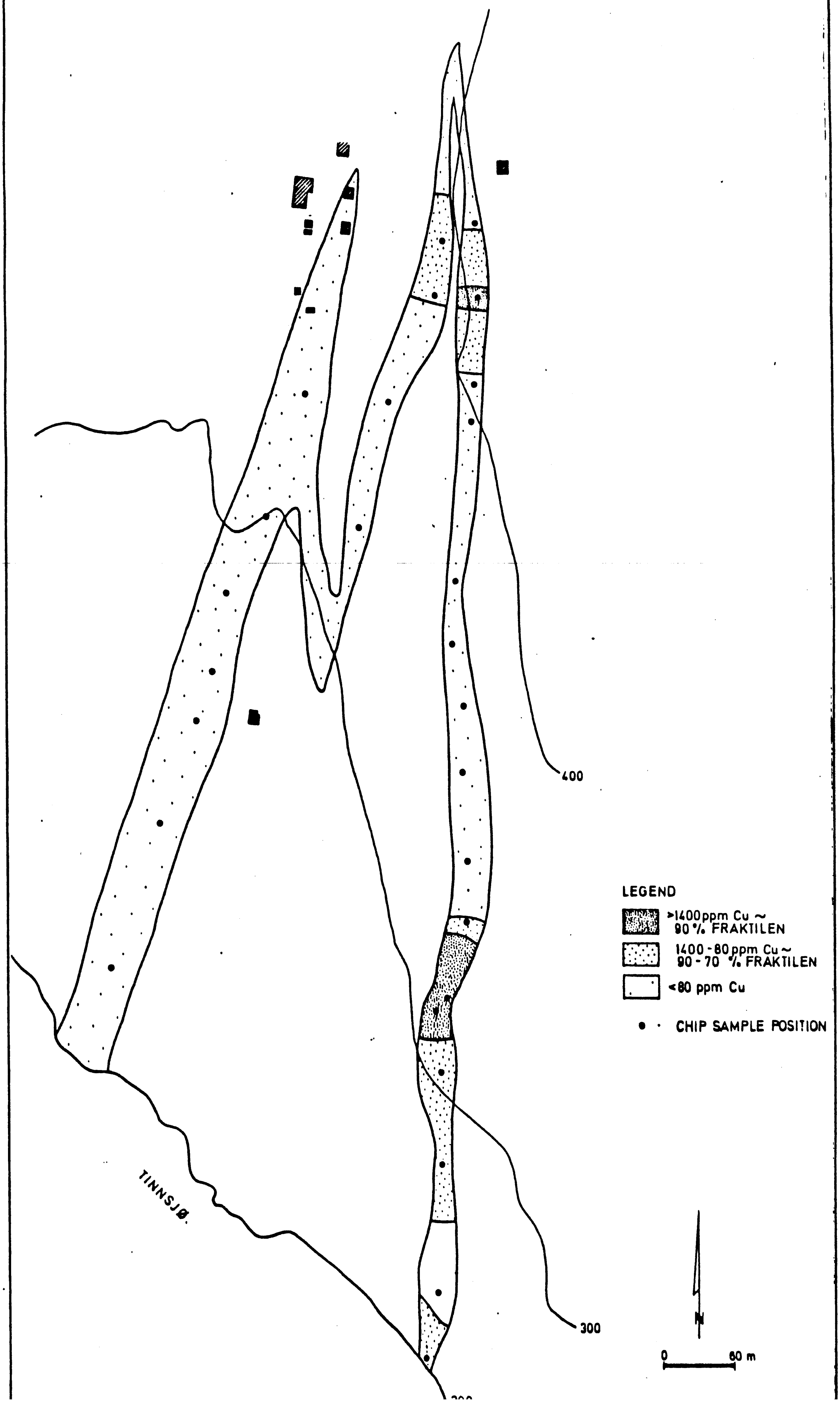
En fornyet undersøgelse af de to feldspat-porfyr lokaliteter i det stærkt overdækkede område nord for dagbruddet har sandsynliggjort, at det drejer sig om løsblokke.

Sammenfattende kan man herefter om geologien ved Hovin Kobberverk sige, at mineraliseringen er knyttet til en amfibolit, der ligger i en kvartsit sekvens. Amfiboliten er foldet og har et vertikalt N-S-gående aksialplan. Baseret på småfolder antages det, at foldeaksen dykker ca. 30° mod nord. Folden har zik-zak form og består af en østlig og vestlig antiform med en mellemliggende synform. Kinematisk repræsenterer deformationen en shear-foldning. Den lithologiske variation inden for amfiboliten, repræsenteret ved bjergarter fra porfyroblastisk amfibolit til melanokratisk biotitgneis, repræsenterer formodentlig mere et resultat af deformation og metamorfose end en oprindelig lithologisk variation i amfiboliten.
Dioriten i Storekaas dagbrud skiller sig ud fra de andre bjergarter i amfibolitkomplekset ved bl. a. strukturelt ikke at være konform med amfiboliten i mesoskala, hvorimod den i håndstyksskala er konform med amfiboliten på grund af kontakt-zonens stærke shear deformation.

Lithogeokemi.

Der blev indsamlet 27 chip samples rimelig jævnt fordelt over den zik-zak foldede amfibolit. Prøvepunkterne er markeret med en prik på fig. 2, men repræsenterer, i den udstrækning blotningsgraden tillod, et tværprofil af amfiboliten. I alle chip samples er epigenetiske mineraliseringer i form af kvarts-kalcit årer undgået. Prøvestørrelsen varierer alt afhængig af amfibolittens bredde og/eller blotningsgrad fra ca. 1 til 5 kg. Prøve-forberedelsen har været prospekteringsafdelings standard procedure for lithoprøver og prøverne

LITHOGEOKEMISK KORT OVER AMFIBOLITEN VED HOVIN KOBBERVERK TELEMARK



er blevet analyseret for Cu og Ag (tabel 1).
Fig. 5 viser Cu-analyserne plottet på sandsynligheds-papir. Den beskedne prøvemængde taget i betragtning, så kan plottet tolkes som repræsenterende to lognormale fordelinger. Der er her valgt at lade de to bøjninger i kurveforløbet ved 80 og 1400 ppm Cu repræsentere henholdsvis tærskelværdien for amfibolitens normale Cu-indhold og den nedre grænse for hvad der kan betragtes som diorit-mineraliseringen og dens umiddelbare mineraliserings-aureole. Værdierne mellem 80 og 1400 ppm repræsenterer i bredere forstand den mineraliserings-aureole, der ligger omkring dioriten.

Værdierne på 80 og 1400 ppm svarer til henholdvis 70% og 90% fraktilen. Den fundne baggrundsværdi for Cu i amfiboliten svarer til niveauet i tilsvarende bjergarter andre steder.
Chip sample analysen af dioriten (større end 1% Cu og 86 ppm Ag) svarer til hvad man kunne forvente på basis af tidligere analyser af godt mineraliserede enkelt prøver. Vigtigt i denne sammenhæng er også at analyseresultatet bekræfter den tidligere påpegede korrelation mellem Cu- og Ag-indholdet i chalcocit-bornit paragenesen (Schønwandt, 1985).

TABEL 1

Prøve nr.	ppm Cu	ppm Ag	Prøve nr.	ppm Cu	ppm Ag
2110370	360	1	2110371	27	1
2110372	10.000	86	2110373	2080	8
2110374	480	1	2110375	125	1
2110376	80	1	2110377	26	1
2110378	21	1	2110379	30	1
2110380	33	1	2110381	[illegible]	1
2110382	[illegible]	1	2110383	[illegible]	1
2110384	[illegible]	1	2110385	550	4
2110386	29	1	2110387	1310	9
2110388	[illegible]	1	2110389	[illegible]	1
2110390	[illegible]	1	2110391	47	1
2110392	44	1	2110393	40	1
2110394	52	1	2110395	13	1
2110396	56	1			

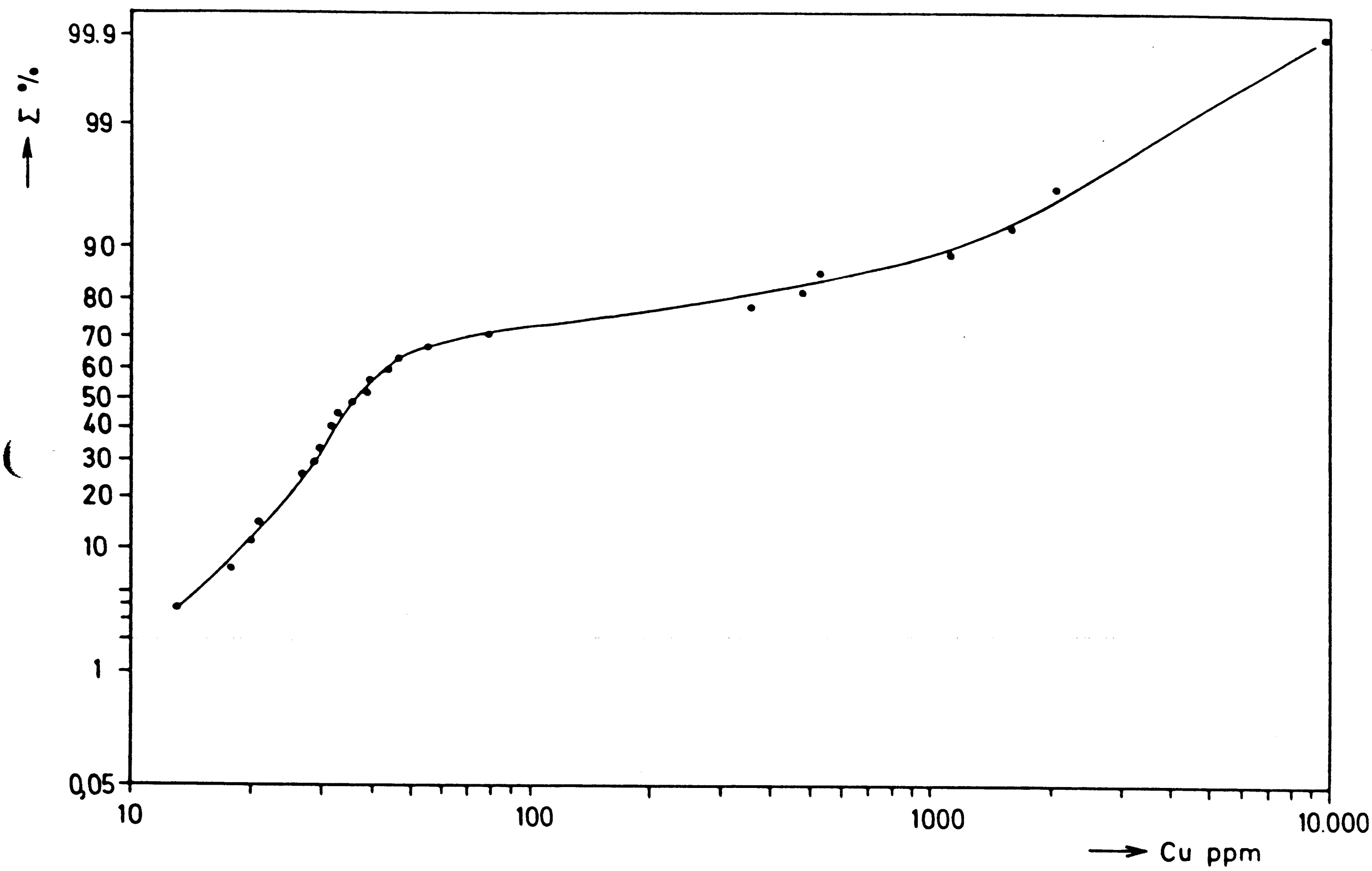


FIG. 3. FOR NÆRMERE FORKLARING SE TEKST.

Analyseresultaterne er plottet på kort (fig.2). Kortet viser fordelingen af prøverne over 1400 ppm Cu (svarende til mere end 90% fraktilen) og mellem 1400 og 80 ppm Cu (svarende til 90%-70% fraktilen) samt prøver med et Cu-indhold under 80 ppm (svarende til amfibolitens baggrundsværdi). Grænsedragningen mellem de forskellige Cu-intervaller er fundet ved liniær interpolation.

Af det lithologiske kort fremgår, at der inden for zik-zak foldens østlige flanke findes to anormale områder i) et mod syd omkring Storekaas dagbrud og ii) et mod nord omkring Have stollen. Begge anomaliområder er bygget op af flere anormale prøver og i begge tilfælde er anomaliområdet zonert opbygget med de højeste værdier i den centrale del af anomalien. For det nordlige anomaliområdes vedkommende strækker den ydre aureole sig også over på den østlige antiforms vestlige flanke.
Det lithogeokemiske kort (fig.2) verificerede de to anomaliområder omkring Storekaas og Have stollen, som var blevet etableret på basis af gamle analyser. Derimod kunne det tredie anomaliområde (se fig. 4 i Schønwandt, 1983) ikke bekræftes. Det lithogeokemiske kort viser også, at amfibolitten i zik-zak foldens østlige flanke (tidligere rapporters malmzone-amfibolit) ikke er anormal i Cu-indhold set i forhold til amfibolitten i den øvrige del af zik-zak folden. Endvidere at anomaliområderne optræder som veldefinerede partier inden for en i Cu-indhold iøvrigt normal amfibolit.
Dette lithogeokemiske billede understøtter yderligere antagelsen af dioritten som årsag til det koncentrerede mineraliseringsmønster (Schønwandt,19[illegible]).

[illegible]

[illegible] ineraliseringen [illegible], at chalcocit-bornit findes dissemineret i dioriten og at denne mineralisering er omgivet af en epigenetisk mineraliseringsaureole hvis paragenese ændre sig med afstanden fra dioriten. Nærmest dioriten består paragenesen af bornit-chalcocit, dernæst kommer en zone med bornit-kobberkis og yderst en ren kobberkis paragenese. Mineraliseringerne er næsten hundrede procent knyttet til amfibolit komplekset.

Ser man på anomalimønsteret omkring Storekaas (fig. 2) så viser det, at anomalien er trukket ud i sydlig retning. Denne skævhed kan have mange årsager, som f.eks.

i) At den epigenetiske mineraliseringsaureole ikke er koncentrisk omkring primærmineraliseringen (dioriten)

ii) at en ~~begrænset prøvemængde kombineret med~~ at linie[r] interpolation har været anvendt ved grænsedragningen mellem de forskellige Cu-intervaller

iii) en topografieffekt d.v.s. primærmineraliserings forløb i forhold til terrænet.

Man kan forestille sig andre årsager, men de nævnte eller en kombination af disse skønnes at have været en dominerende årsag til skævheden i anomalimønsteret.

For at variere disse faktorer er der fremstillet et N-S-gående profil i amfibolitten fra Tinnsjøen til lidt nord for Storekaas (fig. 4). I dette profil er vist udstrækningen af de lithogeokemiske aureoler samt Cu-profilet igennem aureolerne. Endvidere er vist stoller og tverslag fra [illegible]54m , [illegible]74 m samt [illegible]3[illegible] m niveauerne.

Sammenholder man de gamle Cu-analyser fra stoller og tverslag (Schønwandt, 1[illegible] fig.5) med de fundne lithogeokemiske aureoler, så forstærkes indtrykket af at aureolerne har et dyk mod syd. Desuden er Cu-værdierne i det sydligste tverslag i [illegible]74 m niveauet så store, at de godt kunne repræsentere den mineraliserede diorit.

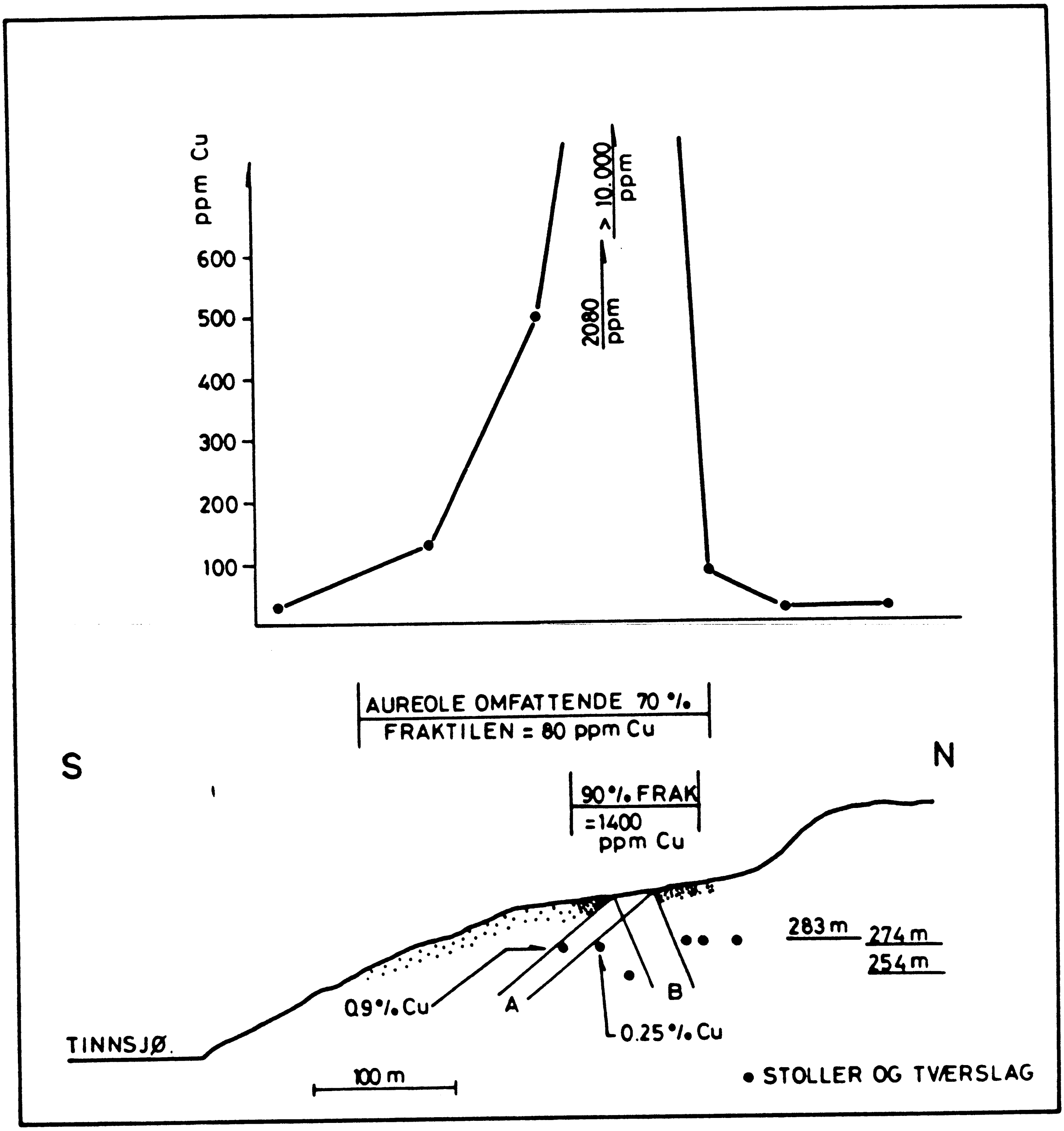


FIG. 4. FOR NÆRMERE FORKLARING SE TEKST.

Det skal her indskydes, at de gamle analyser fra stoller og tværslag (fig. 3 i Schønwnadt,1983) viser højere værdier, end de der er fundet ved denne undersøgelse. Dette hænger formodentlig sammen med, at epigenetiske årer bevidst er undgået i denne undersøgelse. Man kan derfor ikke bruge de gamle analyser til at komplimentere denne undersøgelses aureolemønster med. Imidlertid må så store værdier, som det sydligste tværslag i niveau 274 m viser, enten henføres til dioriten eller til en usædvanlig stor koncentration af epigenetiske årer.

Diskussion.

Med de oplysninger der på nuværende tidspunkt er tilgængelig så er det muligt, at dioriten har det mod syd dykkende forløb som er indikeret med A på fig. 4. Et sådant forløb af dioriten vil i meget høj grad give en tilfredsstillende forklaring på det fundne aureolemønster, når man tager topografien og prøvepunkterne i betragtning.

Det kan imidlertid ikke udelukkes at dioriten har det med B indikerede forløb. Et sådant forløb, med stejlt dyk mod nord, vil imidlertid ikke umiddelbart kunne forklare aureolmønsteret uden samtidig at acceptere en relativ stor primær skævhed i dette mønster.

Det samme problem vil man ryge ind i, hvis man antager at dioriten er et meget lokalt fenomen, der ikke strækker sig mange 10-tals meter under overfladen.

Et relativt fladt dyk af dioriten imod nord, vil også kunne forklare aureolmønsteret, hvis man samtidig antager, at dioriten i Stor[illegible] udgør en lille rest af et større diorit[illegible], der i det store og hele er bort-eroderet, i[illegible] i niveau [illegible] ikke till[illegible] dioriten at [illegible] i [illegible].

Alle o[illegible] for-[illegible], at dioriten ligger på kontakten [illegible]l-[illegible] i [illegible]-ak fol[illegible] flanke. Der er intet der tyder på, at dette ikke skulle være tilfældet. Denne specielle position kan umiddelbart forklares på idet mindste to måder:

i. Dioriten, der som tidligere omtalt petrografisk er nært beslægtet med amfiboliten, kan være et differentiat af amfiboliten efter dens enplacering. Dette vil, amfibolitens størrelse taget i betragtning, resulterer i en meget beskeden størrelse af dioriten.

ii. Dioriten repræsenterer en selvstændig intrusion, men fra det samme magmakammer. Denne mulighed vil kunne give en betragtelig størrelse på dioriten.

Størrelsen på den lithogeokemiske aureole tyder på, at dioriten har/eller har haft en betragtelig størrelse, hvorfor det er mest sandsynlig at dioriten repræsenterer en selvstændig intrusion.
Forløbet af denne intrusion set i lyset af aureolemønsteret, kan enten være et relativt fladt dyk mod syd eller nord. Er dykket forløbet mod nord, så må hovedparten af dioriten være bort-eroderet. Har dykket været mod syd, så har dioriten formodentlig et forløb nær det, der er indikeret med A på fig. 4.

Konklusion og anbefalinger.

Den lithogeokemiske undersøgelse tyder på, at dioriten repræsenterer en selvstændig intrusion, der er nært beslægtet med amfiboliten.
Det er mest sandsynlig at dioriten har et dyk mod syd nogenlunde svarende til det, der er indikeret med A på fig. 4. Et fladt dyk mod nord er mindre sandsynligt på grund af de høje Cu-værdier i det sydlige tværslag i niveau 274 m.
En mere detaljeret lithogeokemisk undersøgelse på overfladen vil sandsynligvis ikke bringe større klarhed over dioritens forløb, dels fordi den epigenetiske mineraliseringsaureole må forventes at give en del "geokemisk støj" og dels fordi blotningsgraden er ringe.

Det kan derimod anbefales :

at foretage en kortlægning og prøveindsamling af niveau 274 m. Adgang til niveauet vil formodentlig kunne ske gennem skakten i Storekaas dagbrud. Niveau 274 m ligger ca. 34 m under dagbrudsniveauet.

at det overvejes hvilke geofysiske metoder, der bedst vil kunne afsløre om dioriten har det med A indikerede forløb i fig. 4.

at økonomiske overslag foretages på basis af en malmværdi på 1% Cu og 90 ppm Ag med henblik på at få en minimums størrelse på malmen. Dette tal bør indgå i de geofysiske overvejelser.

Når prospekteringsafdelingens medarbejdere har foretaget de geofysiske og økonomiske overvejelser vil det være hensigtsmæssigt, at der i fællesskab udarbejdes et notat vedrørende disse overvejelser.

Referencer.

Schønwandt, 1983 : Feltrapport over Hovin Kobberverk, Telemark. Intern Hydro Rapp.

Schønwandt, 1984 : Notat vedrørende mikroskopering af tyndslib og polerprøver fra Hovin Kobberverk, Telemark. Intern Hydro Rapp.

marts-85

hanskristianschønwandt

hanskristianschønwnadt....

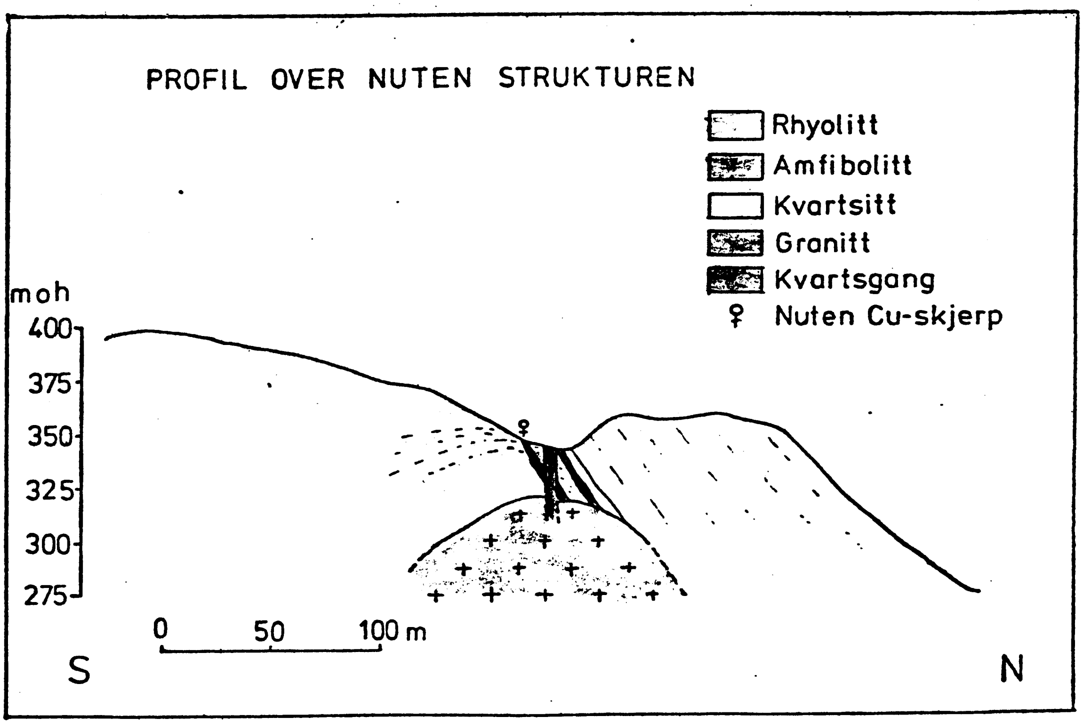
Nuten Cu-Bi skjerp.

Beliggenhed.

Nuten Cu-Bi skjerp ligger ca. 5oo m SØ for Neshaug gård ved Hjartsjå på kartblad Flatdal (1614 III) i 1:5oooo, UTM-koordinater (8635,o725). Yderligere 5oo m SØ for Nuten er registreret et skjerp (Bergstul), som har været skjerpet på Cu. Bergstul skjerp blev ikke lokaliseret, men ved lokaliteten UTM (8665, o725)(se kort) blev observeret en mineraliseret kvartsåre med orienteringen N 5o^{o}/85^{o}, som blev forkastet af en mineraliseret sprække med orienteringen N 15^{o}/15^{o}. Denne lokalitet formodes at ækvivalere Bergstul efter de beskrivelser der forelå. Nuten skjerp nås ved at dreje til venstre ad vejen ved savværket ca. 2oo m øst for Hjartsjå gård i den østlige ende af Hjartsjå. Derefter fortsættes 2oo m ad vejen til den deler sig. Ad den vej der går til højre fortsættes 135o m til vejen i 35o moh deler sig : I T-krydsets SV-lige hjørne findes skjerpet, som måler 2x3 m i overfladen og 1-1½ m i dybden.

Geologisk beskrivelse.

Nuten Cu-Bi skjerp sidder i en o,5-3,5 m tyk kvartsgang 35o moh i et topografisk markeret skar med samme orientering som kvartsgangen : N 82^{o} (se kort). Området består geologisk af metasedimentære bjergarter tilhørende Rjukan og Seljord gruppen (skillelinien mellem de to grupper formodes at ligge indenfor de samme horisonter som kvartsgangen er afsat i). Stratigrafisk nedefra og op er der i området først afsat (se kort og skitse) en rhyolitisk bjergart derpå er afsat o,1-1 m tyk basalt. Denne er overlejret af 1-2 m tyk rhyolit, hvorpå er afsat en ny



basaltisk lava, denne er i toppen brecciert af en ca. o,5 m tyk rhyolit som i kontakten til de basaltiske xenolither får et storkornet amfibolitisk udseende, idet rhyoliten assimilerer basaltisk materiale. Denne extrusive lagpakke formodes at tilhøre Rjukan gruppen og er overlejret af en tæt grå massiv kvartsit tilhørende Seljord gruppen. Lagpakken stryger N 5o^{o}-6o^{o} og hælder 4o^{o}-35^{o} mod nord. Den rhyolitiske bjergart afviger lokalt fra denne orientering, på grund af dens fluktuerende flydebånding (muligheden af at bjergarten også er småfoldet kan ikke afvises).

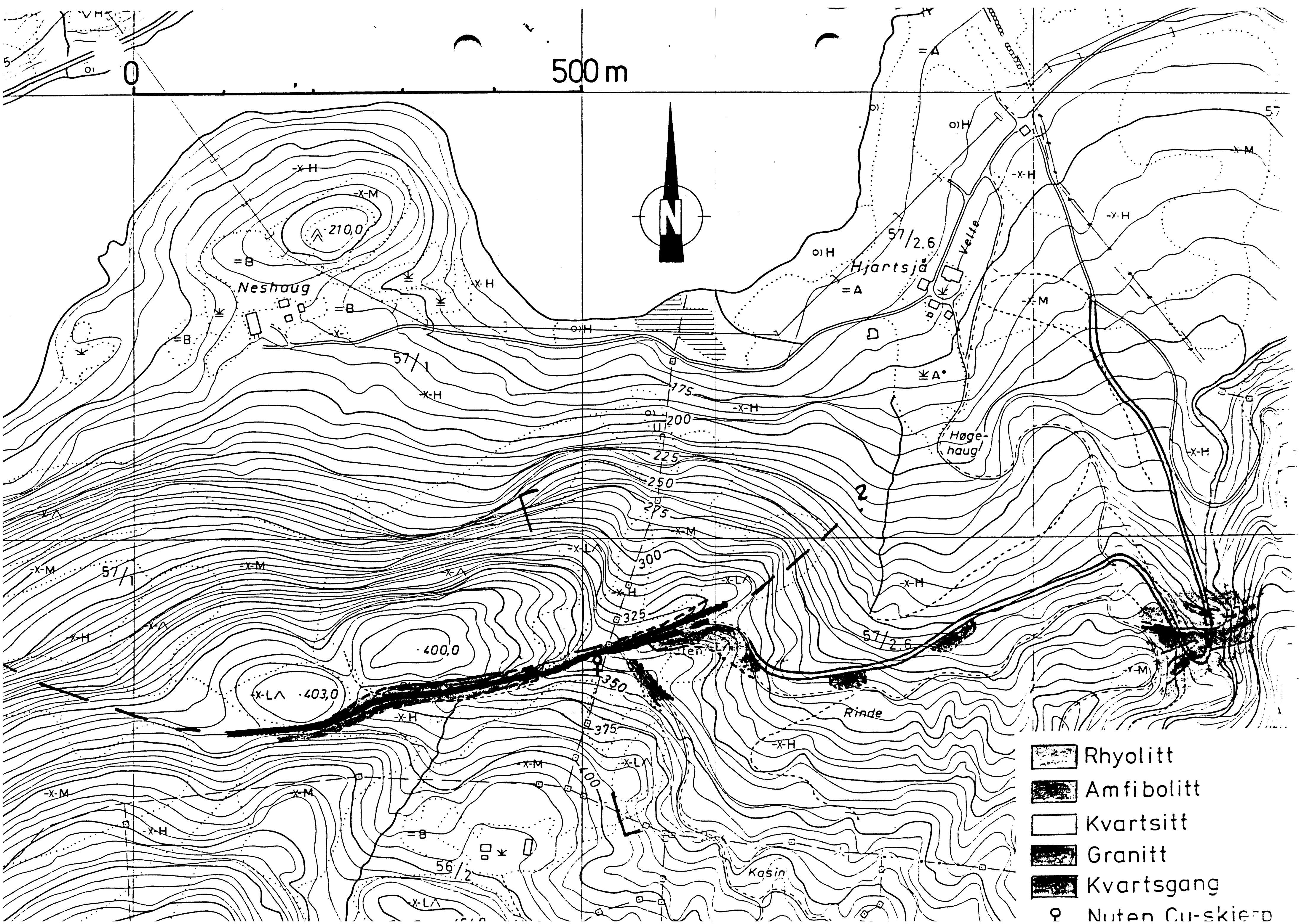
Denne metasedimentære lagpakke er først intruderet af en granitisk bjergart, som indenfor det undersøgte område er set med både vandrette og lodrette kontakter til de omgivende bjergarter. Denne mellemkornede rød/grønplettede granit formodes derfor at udgøre toppen af et granitisk legeme. Op gennem disse bjergarter er intruderet en o,5-3,5 m tyk kvartsgang som stryger N 82^{o} og står subvertikalt. Kontakten til de omgivende bjergarter er ikke skarpt diskordant, men nærmest migmatitisk af udseende. De omgivende bjergarter er stærkt omdannede og shearede i kontakten til kvartsgangen. Sålede optræder graniten som grøn augengnejs (211o313) med chlorit langs shearflader i en 1-2 m tyk zone nær kvartsgangen, bjergarten er desuden silicificeret i kontakten (o,1-o,5 m til kvartsgangen. Den rhyolitiske bjergart er i lighed med graniten sheareret og silicificeret i en zone nær kvartsgangen. Langs shear- og sprækkeflader er afsat chlorit og af og til ses også chalcopyrit.

Mineralisering.

I forbindelse med kvartsgangen ses i området malmmineralerne pyrit, chalcopyrit og galena (bismuthholdig? Se 211o334). Chalcopyrit og pyrit er set sammen med chlorit som sprækkebelæg både i den shearede granit (se 211o31o) og i den shearede rhyolit. Men langt den overvejende del af mineraliseringen findes i kvartsgangen. Årsagen til de rige pyrit- og chalcopyrit partier i kvartsgangen skal muligvis søges i den svage diskordans mellem kvartsåren og de amfibolitiske lag , hvorved der over en strækning på over 2oo m sker en kraftig assimilering af basaltisk materiale. Dette medfører kraftig chloritisering samt pegmatitisk udvikling af det assimilerede materiale, ligesom dette fænomen også kan ses langs kontakten mellem kvartsgangen og graniten. Samtidig sker en koncentrering af især pyrit og chalcopyrit og muligvis også galena (bismuthholdig?). Kvartsgangen sensu stricto optræder derimod altid med mælkehvid kvarts og små miarolitiske hulrum med pyrit.

Udført arbejde.

Der er i området omkring Nuten udført geologisk kortlægning (se kort) samt indsamlet 9 lithoprøver deraf 5 chipsamples af både kvartsgangen og sidestensomdannelser. I området ved Bergstul er indsamlet 2 mineraliserede lithoprøver. Ved Nuten er desuden indsamlet 2 geokemiske prøver fra bække, som dræner kvartsgangen i hele dens længde. De 2 prøver udgøres af et bækkesediment og en vaskeprøve.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225
250
275
300
325
350
375
400
Rinde
Kasin
57/1
57/2.6
56/2
Rhyolitt
Amfibolitt
Kvartsitt
Granitt
Kvartsgang
Nuten Cu-skjerp

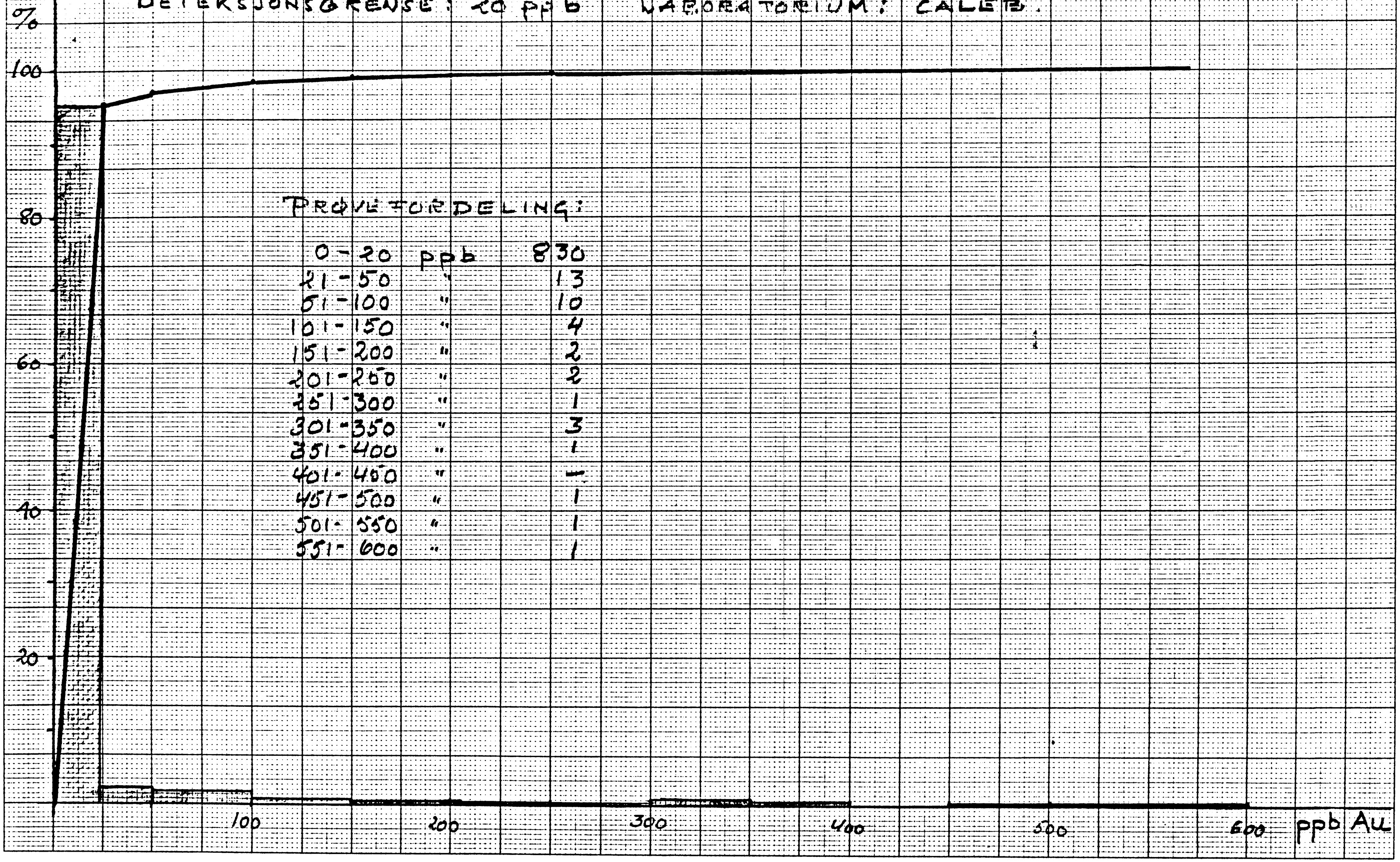
HISTOGRAM, FORDELING AV VERDIER FOR AU, TELEMARK

ANTALL PRØVER: 869   PRØVETYPE: BEKKESED.

DETEKSJONSGRENSE: 20 ppb   LABORATORIUM: CALEB.

PRØVEFORDELING:

0 - 20	ppb	830
21 - 50	"	13
51 - 100	"	10
101 - 150	"	4
151 - 200	"	2
201 - 250	"	2
251 - 300	"	1
301 - 350	"	3
351 - 400	"	1
401 - 450	"	—
451 - 500	"	1
501 - 550	"	1
551 - 600	"	1



EMO A 3

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3	74750	6420	2130603	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	74770	6500	2130604	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	74720	6600	2130605	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	76420	5580	2130606	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	76300	5630	2130607	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	76360	5720	2130608	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	77340	6000	2130609	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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11	75740	5750	2130611	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	74780	5380	2130612	66.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	74840	5340	2130613	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	74710	5570	2130614	54.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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17	73920	5720	2130617	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	78060	9260	2130618	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	78040	9560	2130619	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	78170	9580	2130620	307.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	78150	9280	2130621	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	78050	10900	2130622	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	78100	10920	2130623	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	78260	10340	2130624	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	78220	10360	2130625	114.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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56	71340	8700	2130656	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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66	72[illegible]00	8600	2130666	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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69	72780	11300	2130669	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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77	71700	12820	2130677	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
78	71160	12660	2130678	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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85	73100	13500	2130685	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
86	72940	13540	2130686	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
87	72350	13600	2130687	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
88	72460	14320	2130688	45.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
89	72780	14060	2130689	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
90	73350	6600	2130690	28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
91	71100	14100	2130691	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
92	71000	14540	2130692	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
93	71500	15540	2130693	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
94	71540	15220	2130694	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
95	71600	15180	2130695	314.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
96	75400	16860	2130696	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
97	75300	16900	2130697	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
98	75340	16860	2130698	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
99	76250	13340	2130699	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100	76300	14340	2130700	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
101	75400	6500	2130701	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
102	75520	6540	2130702	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
103	75520	6420	2130703	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
104	75660	6500	2130704	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
105	75260	6400	2130705	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
106	74430	8400	2130706	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
107	74160	6380	2130707	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
108	74580	5560	2130708	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
109	81300	8140	2130709	79.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
110	80510	8450	2130710	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
111	81440	8680	2130711	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
112	80260	8920	2130712	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
113	80090	9100	2130713	75.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
114	79920	9280	2130714	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
115	79670	9460	2130715	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
116	73300	8360	2130716	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
117	73460	6360	2130717	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
118	74660	9000	2130718	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
119	74740	9300	2130719	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
120	73700	9750	2130720	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
121	73600	10150	2130721	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
122	74550	10100	2130722	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
123	74650	10270	2130723	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
124	74280	10300	2130724	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
125	74000	10970	2130725	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
126	72990	11300	2130726	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

127	7[illegible]0	11400	2130727	10.00	.00	.00	.00	.00	.00	.00	.00		.00	.00	.00	.00
128	75580	8100	2130728	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
129	75640	8400	2130729	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
130	75590	8450	2130730	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
131	76940	9020	2130731	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
132	77450	8060	2130732	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
133	78120	8020	2130733	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
134	77420	8300	2130734	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
135	78330	7850	2130735	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
136	78340	7920	2130736	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
137	78420	8070	2130737	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
138	78380	8100	2130738	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
139	78560	8120	2130739	24.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
140	78740	8000	2130740	19.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
141	78720	7720	2130741	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
142	78550	7400	2130742	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
143	78300	7340	2130743	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
144	77940	7120	2130744	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
145	80780	12250	2130745	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
146	80360	12320	2130746	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
147	80000	12080	2130747	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
148	79400	12680	2130748	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
149	79530	12500	2130749	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
150	79460	12580	2130750	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
151	77020	5700	2130751	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
152	77920	6250	2130752	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
153	77600	6110	2130753	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
154	78600	6470	2130754	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
155	79600	6960	2130755	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
156	80900	6910	2130756	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
157	82060	7300	2130757	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
158	76740	9870	2130758	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
159	75960	10200	2130759	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
160	75060	9950	2130760	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
161	76280	9590	2130761	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
162	75660	9820	2130762	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
163	75660	9750	2130763	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
164	76480	9180	2130764	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
165	76600	9160	2130765	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
166	76900	9480	2130766	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
167	76940	11300	2130767	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
168	75780	11220	2130768	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
169	75320	10910	2130769	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
170	74920	10740	2130770	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
171	77080	9560	2130771	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
172	77150	12080	2130772	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
173	77100	12080	2130773	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
174	77050	12500	2130774	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
175	76500	12660	2130775	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
176	76300	12820	2130776	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
177	76220	12460	2130777	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
178	75300	13070	2130778	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
179	77300	12000	2130779	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
180	77190	12780	2130780	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
181	77530	13120	2130781	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
182	77460	13430	2130782	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
183	77290	13600	2130783	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
184	77200	13920	2130784	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
185	77660	12200	2130785	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
186	75340	12400	2130786	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
187	75260	12930	2130787	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
188	74860	12950	2130788	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
189	74860	12380	2130789	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

190	74000	12520	2130790	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
191	74400	11950	2130791	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
192	74250	12980	2130792	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
193	74700	13350	2130793	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
194	75060	13540	2130794	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
195	74360	13870	2130795	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
196	74310	14010	2130796	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
197	74280	13750	2130797	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
198	75020	14910	2130798	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
199	75500	15040	2130799	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
200	74150	15600	2130800	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
201	74400	15340	2130801	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
202	74350	14840	2130802	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
203	80080	14560	2130803	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
204	80650	14640	2130804	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
205	80760	14960	2130805	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
206	80550	14450	2130806	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
207	81090	14730	2130807	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
208	81550	14790	2130808	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
209	81610	15320	2130809	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
210	81950	15340	2130810	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
211	82320	15700	2130811	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
212	82730	16080	2130812	31.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
213	73200	16000	2130813	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
214	73230	16570	2130814	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
215	72840	16560	2130815	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
216	72730	16840	2130816	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
217	72420	16900	2130817	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
218	72300	16750	2130818	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
219	72550	17250	2130819	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
220	74720	16380	2130820	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
221	74230	17340	2130821	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
222	75200	17180	2130822	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
223	75300	16930	2130823	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
224	75130	17630	2130824	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
225	74660	17760	2130825	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
226	73940	18350	2130826	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
227	73600	18230	2130827	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
228	73660	18740	2130828	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
229	73600	18740	2130829	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
230	73420	18440	2130830	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
231	72630	19140	2130831	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
232	72490	19320	2130832	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
233	72950	20300	2130833	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
234	71480	17320	2130834	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
235	71230	17410	2130835	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
236	71750	18210	2130836	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
237	70460	18620	2130837	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
238	70330	18550	2130838	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
239	71640	18580	2130839	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
240	71280	19000	2130840	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
241	71300	19740	2130841	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
242	71250	19220	2130842	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
243	71980	18480	2130843	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
244	90900	23100	2130844	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
245	90770	22940	2130845	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
246	90650	24810	2130846	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
247	90740	23900	2130847	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
248	90470	23940	2130848	44.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
249	90460	23150	2130849	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
250	90370	21380	2130850	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
251	83100	7020	2130851	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
252	82580	7000	2130852	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

253	82010	6980	2130853	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
254	83290	7500	2130854	222.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
255	83080	7650	2130855	275.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
256	82530	8720	2130856	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
257	82920	8660	2130857	76.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
258	82920	8350	2130858	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
259	82960	8300	2130859	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
260	83020	8060	2130860	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
261	83150	9040	2130861	125.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
262	83240	9400	2130862	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
263	83180	9460	2130863	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
264	83080	9850	2130864	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
265	83430	9500	2130865	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
266	83830	8570	2130866	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
267	84000	9230	2130867	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
268	84030	9700	2130868	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
269	83630	9600	2130869	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
270	83400	10210	2130870	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
271	82780	10250	2130871	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
272	82730	10320	2130872	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
273	83140	10550	2130873	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
274	82400	9750	2130874	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
275	82310	9800	2130875	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
276	82480	10110	2130876	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
277	82100	10280	2130877	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
278	82040	10280	2130878	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
279	82480	10800	2130879	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
280	82440	10980	2130880	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
281	82210	10910	2130881	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
282	81850	10760	2130882	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283	79800	15330	2130883	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
284	78600	15360	2130884	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
285	78420	15740	2130885	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
286	79080	15670	2130886	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
287	78940	16180	2130887	315.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
288	78750	15700	2130888	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
289	78420	15810	2130889	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
290	78410	15920	2130890	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
291	75700	15330	2130891	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
292	76000	15580	2130892	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
293	76260	15940	2130893	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
294	76300	16900	2130894	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
295	75930	16150	2130895	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
296	76370	15750	2130896	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
297	76400	15420	2130897	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
298	76630	15400	2130898	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
299	76400	16650	2130899	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
300	76000	18850	2130900	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
301	75700	17790	2130901	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
302	75750	17830	2130902	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
303	76200	18150	2130903	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
304	76120	18850	2130904	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
305	76580	19000	2130905	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
306	76980	18610	2130906	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
307	77700	19100	2130907	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
308	77380	19050	2130908	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
309	77580	18540	2130909	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
310	77110	17700	2130910	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
311	82410	14380	2130911	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
312	83420	14910	2130912	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
313	82940	15330	2130913	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
314	83120	15370	2130914	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
315	83940	15610	2130915	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

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316	[illegible]	23100	2130916	10.00	.00	.00	.00	.00	.00	.00	.00	[illegible]	.00	.00	.00	.00
317	77660	27400	2130917	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
318	75610	27400	2130918	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
319	75440	27280	2130919	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
320	73950	27560	2130920	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
321	79270	27210	2130921	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
322	80670	27140	2130922	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
323	80520	27780	2130923	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
324	80600	27400	2130924	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
325	79740	27260	2130925	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
326	79490	27270	2130926	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
327	79400	27170	2130927	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
328	75500	26900	2130928	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
329	75270	27170	2130929	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
330	75160	28170	2130930	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
331	74520	27910	2130931	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
332	74000	28010	2130932	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
333	74140	28000	2130933	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
334	79230	30260	2130934	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
335	80830	25560	2130935	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
336	82350	26520	2130936	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
337	80300	27090	2130937	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
338	75650	26030	2130938	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
339	76320	25880	2130939	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
340	72900	28640	2130940	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
341	72840	28680	2130941	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
342	72550	28770	2130942	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
343	72040	29630	2130943	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
344	72330	29200	2130944	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
345	72710	29060	2130945	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
346	77540	26760	2130946	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
347	77200	26250	2130947	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
348	78010	27240	2130948	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
349	78000	27170	2130949	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
350	78190	27320	2130950	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
351	85520	13900	2130951	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
352	84980	14020	2130952	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
353	84980	14000	2130953	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
354	84900	13940	2130954	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
355	85090	14660	2130955	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
356	85400	13700	2130956	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
357	85250	13480	2130957	166.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
358	85330	13300	2130958	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
359	86500	12980	2130959	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
360	86200	13520	2130960	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
361	84500	13700	2130961	81.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
362	84700	14250	2130962	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
363	83940	14600	2130963	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
364	84000	14500	2130964	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
365	85780	2000	2130965	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
366	93200	21660	2130966	41.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
367	90530	21520	2130967	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
368	89940	20550	2130968	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
369	88950	20480	2130969	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
370	88310	20340	2130970	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
371	87320	20070	2130971	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
372	85990	20250	2130972	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
373	86930	20180	2130973	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
374	86020	19450	2130974	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
375	85730	19420	2130975	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
376	85360	19320	2130976	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
377	84700	20120	2130977	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
378	85180	20830	2130978	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

379	84[illegible]0	17970	2130979	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
380	85700	18200	2130980	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
381	86700	17260	2130981	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
382	86570	17160	2130982	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
383	86100	16600	2130983	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
384	85600	16370	2130984	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
385	83740	18260	2130985	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
386	83150	17390	2130986	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
387	83420	16330	2130987	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
388	83940	16350	2130988	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
389	84630	17110	2130989	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
390	84270	17350	2130990	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
391	84360	18600	2130991	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
392	84590	18980	2130992	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
393	84500	20450	2130993	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
394	84400	19540	2130994	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
395	83760	20080	2130995	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
396	82300	19320	2130996	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
397	82310	19230	2130997	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
398	82370	22120	2130998	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
399	82150	20180	2130999	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
400	81060	20180	2131000	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
401	80670	20000	2131001	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
402	81060	19640	2131002	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
403	81560	19540	2131003	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
404	84980	33960	2131004	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
405	85580	33620	2131005	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
406	85730	33530	2131006	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
407	86750	32480	2131007	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
408	85250	32370	2131008	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
409	89930	27800	2131009	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
410	90240	27850	2131010	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
411	90550	27840	2131011	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
412	90350	27080	2131012	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
413	89900	26110	2131013	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
414	89620	25910	2131014	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
415	89750	25910	2131015	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
416	89950	26880	2131016	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
417	86450	34780	2131017	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
418	87900	34240	2131018	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
419	87900	34150	2131019	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
420	89050	33960	2131020	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
421	83060	33540	2131021	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
422	86700	32780	2131022	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
423	88700	32670	2131023	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
424	70080	19960	2131024	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
425	70900	19900	2131025	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
426	86600	31940	2131026	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
427	86600	31100	2131027	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
428	86540	30800	2131028	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
429	86680	30600	2131029	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
430	86600	30600	2131030	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
431	87600	30150	2131031	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
432	87620	30230	2131032	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
433	88100	30500	2131033	50.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
434	88450	29200	2131034	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
435	88530	29240	2131035	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
436	88500	28530	2131036	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
437	88450	28510	2131037	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
438	87800	29060	2131038	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
439	87660	29200	2131039	41.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
440	71980	20430	2131040	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
441	71870	20440	2131041	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

442	[illegible]30	20880	2131042	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
443	70800	19960	2131043	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
444	70930	20800	2131044	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
445	69050	20600	2131045	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
446	69080	20660	2131046	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
447	70200	19740	2131047	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
448	76300	8600	2131048	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
449	76150	6770	2131049	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
450	84920	7760	2131050	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
451	81680	9970	2131051	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
452	81100	12580	2131052	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
453	80950	11550	2131053	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
454	81240	11900	2131054	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
455	81080	12260	2131055	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
456	80900	12570	2131056	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
457	80680	12450	2131057	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
458	80620	12440	2131058	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
459	81130	12750	2131059	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
460	82000	11570	2131060	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
461	82400	12150	2131061	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
462	82500	12150	2131062	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
463	83000	12250	2131063	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
464	83020	12280	2131064	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
465	83340	12350	2131065	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
466	79180	15300	2131066	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
467	79030	15540	2131067	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
468	79930	14520	2131068	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
469	79670	14740	2131069	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
470	80060	15900	2131070	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
471	79830	16190	2131071	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
472	80200	16720	2131072	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
473	80330	17100	2131073	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
474	73780	7410	2131074	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
475	73780	7200	2131075	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
476	80030	17250	2131076	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
477	80390	17150	2131077	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
478	80650	17360	2131078	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
479	81360	17810	2131079	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
480	82630	16580	2131080	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
481	82350	16710	2131081	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
482	83160	17330	2131082	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
483	83690	18260	2131083	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
484	84250	18680	2131084	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
485	86020	23680	2131085	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
486	86100	24010	2131086	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
487	85960	24430	2131087	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
488	86530	24920	2131088	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
489	85960	25320	2131089	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
490	88430	21310	2131090	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
491	91040	21650	2131091	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
492	89120	25250	2131092	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
493	89370	25370	2131093	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
494	79980	24700	2131094	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
495	81620	24170	2131095	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
496	81350	24250	2131096	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
497	80260	23960	2131097	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
498	80030	23900	2131098	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
499	80130	23600	2131099	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
500	81360	24320	2131100	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
501	75610	23310	2131101	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
502	75560	23410	2131102	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
503	76080	23400	2131103	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
504	76050	23600	2131104	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

505	[illegible]	24710	2131105	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
506	75900	24890	2131106	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
507	75350	24700	2131107	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
508	77400	25700	2131108	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
509	77960	25500	2131109	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
510	76100	25170	2131110	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
511	78150	24350	2131111	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
512	78150	24760	2131112	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
513	77920	24860	2131113	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
514	77030	24660	2131114	350.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
515	75450	24500	2131115	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
516	75500	24240	2131116	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
517	75700	24110	2131117	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
518	78350	23720	2131118	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
519	75010	25310	2131119	44.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
520	79170	26220	2131120	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
521	79120	26140	2131121	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
522	79100	26190	2131122	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
523	79050	26230	2131123	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
524	78950	26100	2131124	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
525	78390	25920	2131125	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
526	78390	25540	2131126	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
527	79000	26080	2131127	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
528	76580	28670	2131128	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
529	75700	28650	2131129	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
530	77530	29100	2131130	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
531	77940	29530	2131131	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
532	77360	30300	2131132	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
533	84360	26670	2131133	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
534	83930	26330	2131134	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
535	84650	27120	2131135	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
536	84900	26210	2131136	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
537	78060	29870	2131137	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
538	76930	30200	2131138	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
539	76350	30760	2131139	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
540	77200	30300	2131140	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
541	77200	30360	2131141	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
542	77250	31130	2131142	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
543	72350	31570	2131143	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
544	73260	32220	2131144	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
545	73900	31410	2131145	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
546	75020	31560	2131146	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
547	76900	33310	2131147	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
548	75100	33800	2131148	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
549	75100	34070	2131149	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
550	75020	34040	2131150	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
551	75270	14620	2131151	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
552	70700	15660	2131152	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
553	71070	16380	2131153	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
554	71900	14310	2131154	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
555	73950	6600	2131155	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
556	74060	6350	2131156	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
557	74060	7060	2131157	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
558	74150	7420	2131158	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
559	83950	13030	2131159	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
560	84150	13550	2131160	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
561	84240	13490	2131161	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
562	83820	12680	2131162	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
563	72500	12650	2131163	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
564	73030	12800	2131164	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
565	73520	12500	2131165	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
566	73600	12200	2131166	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
567	83700	12340	2131167	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

568	8__60	12380	2131168	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
569	83280	12440	2131169	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
570	83650	11350	2131170	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
571	84500	10800	2131171	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
572	83990	10700	2131172	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
573	84750	11060	2131173	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
574	85000	12750	2131174	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
575	84930	12100	2131175	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
576	83050	19710	2131176	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
577	83280	19700	2131177	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
578	82770	19250	2131178	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
579	74400	24580	2131179	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
580	74700	24870	2131180	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
581	74630	25040	2131181	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
582	74230	25160	2131182	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
583	73630	24510	2131183	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
584	73990	24250	2131184	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
585	74510	24270	2131185	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
586	82470	28250	2131186	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
587	82970	28020	2131187	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
588	82940	27950	2131188	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
589	83450	28650	2131189	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
590	83650	28740	2131190	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
591	83290	27860	2131191	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
592	82700	28180	2131192	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
593	72380	26420	2131193	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
594	72500	26260	2131194	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
595	72900	26160	2131195	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
596	73970	26400	2131196	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
597	73250	27060	2131197	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
598	73740	26410	2131198	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
599	80000	28300	2131199	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
600	80740	28430	2131200	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
601	83130	26060	2131201	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
602	80340	27260	2131202	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
603	75710	25820	2131203	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
604	76800	26820	2131204	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
605	73890	29800	2131205	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
606	73630	29350	2131206	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
607	72800	30160	2131207	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
608	73330	29920	2131208	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
609	73300	29980	2131209	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
610	85340	29300	2131210	75.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
611	84780	29140	2131211	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
612	84890	29320	2131212	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
613	84950	29320	2131213	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
614	87350	25980	2131214	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
615	82650	27200	2131215	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
616	74160	26280	2131216	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
617	72450	25660	2131217	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
618	72650	25470	2131218	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
619	72520	25080	2131219	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
620	72640	24970	2131220	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
621	72800	24870	2131221	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
622	73370	24870	2131222	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
623	73400	24920	2131223	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
624	76470	29070	2131224	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
625	75900	29160	2131225	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
626	77010	29080	2131226	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
627	77980	29000	2131227	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
628	77920	29000	2131228	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
629	83670	30150	2131229	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
630	83620	30200	2131230	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

631	[illegible]	29510	2131231	10.00	.00	.00	.00	.00	.00	.00	.00		.00	.00	.00	.00
632	84020	29510	2131232	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
633	78120	32280	2131233	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
634	77290	32640	2131234	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
635	76520	32550	2131235	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
636	76130	32580	2131236	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
637	75780	32670	2131237	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
638	76000	32220	2131238	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
639	72750	31820	2131239	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
640	73100	32490	2131240	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
641	73590	31860	2131241	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
642	74000	31930	2131242	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
643	74670	34370	2131243	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
644	74520	34570	2131244	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
645	74450	34500	2131245	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
646	74000	34400	2131246	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
647	74420	33800	2131247	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
648	73750	33530	2131248	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
649	73250	33520	2131249	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
650	73130	33500	2131250	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
651	81100	13700	2131251	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
652	81140	13760	2131252	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
653	81530	13680	2131253	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
654	81350	13760	2131254	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
655	81750	14100	2131255	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
656	81220	13370	2131256	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
657	81100	13100	2131257	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
658	77920	12900	2131258	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
659	79080	12600	2131259	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
660	78760	12350	2131260	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
661	79160	12400	2131261	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
662	78330	11720	2131262	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
663	78300	11500	2131263	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
664	79230	6900	2131264	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
665	78860	6920	2131265	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
666	73500	6960	2131266	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
667	78280	6900	2131267	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
668	77950	6870	2131268	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
669	82800	13140	2131269	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
670	83550	13820	2131270	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
671	84180	13500	2131271	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
672	81160	17330	2131272	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
673	81950	17220	2131273	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
674	81770	17210	2131274	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
675	82080	17500	2131275	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
676	82560	17730	2131276	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
677	87600	25150	2131277	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
678	87480	25060	2131278	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
679	86960	25200	2131279	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
680	87180	24120	2131280	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
681	87150	23500	2131281	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
682	87650	23230	2131282	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
683	85600	22950	2131283	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
684	84960	22200	2131284	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
685	84860	22000	2131285	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
686	84540	22180	2131286	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
687	83730	21930	2131287	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
688	83840	22150	2131288	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
689	83720	22140	2131289	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
690	83600	22130	2131290	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
691	83400	22120	2131291	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
692	83000	22290	2131292	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
693	83110	22320	2131293	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

694	[illegible]	24340	2131294	10.00	.00	.00	.00	.00	.00	.00	.00	[illegible]	.00	.00	.00	.00
695	83200	24230	2131295	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
696	83900	24080	2131296	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
697	83480	23360	2131297	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
698	83550	23420	2131298	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
699	82750	23650	2131299	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
700	82750	24480	2131300	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
701	82500	24650	2131301	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
702	82230	24700	2131302	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
703	81320	24560	2131303	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
704	81350	24620	2131304	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
705	81250	24870	2131305	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
706	76430	20300	2131306	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
707	75950	20400	2131307	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
708	75940	20120	2131308	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
709	76330	19500	2131309	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
710	75420	19750	2131310	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
711	75410	19020	2131311	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
712	75500	20020	2131312	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
713	75400	20020	2131313	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
714	78250	20150	2131314	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
715	78730	20090	2131315	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
716	78470	20110	2131316	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
717	79450	19550	2131317	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
718	79760	19440	2131318	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
719	79920	19200	2131319	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
720	79560	19160	2131320	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
721	79280	18980	2131321	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
722	78900	19320	2131322	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
723	77550	20340	2131323	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
724	77190	22950	2131324	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
725	77130	23400	2131325	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
726	77360	23770	2131326	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
727	77000	21380	2131327	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
728	78100	20000	2131328	46.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
729	79230	20500	2131329	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
730	79500	20600	2131330	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
731	80900	20800	2131331	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
732	81790	23000	2131332	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
733	78720	30910	2131333	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
734	73600	24150	2131334	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
735	73550	24190	2131335	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
736	73360	23800	2131336	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
737	73350	23870	2131337	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
738	72200	24060	2131338	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
739	72260	23450	2131339	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
740	72170	23350	2131340	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
741	75340	30030	2131341	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
742	75730	30000	2131342	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
743	76020	30060	2131343	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
744	75020	30240	2131344	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
745	76190	30340	2131345	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
746	76060	30300	2131346	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
747	74920	23350	2131347	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
748	73940	23200	2131348	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
749	73700	23450	2131349	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
750	80200	25500	2131350	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
751	77170	6130	2131351	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
752	76950	6330	2131352	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
753	76550	6430	2131353	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
754	76550	6510	2131354	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
755	78330	14150	2131355	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
756	77540	14520	2131356	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

757	60	14500	2131357	10.00	.00	.00	.00	.00	.00	.00	.00	0	.00	.00	.00	.00
758	76410	14400	2131358	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
759	76420	14580	2131359	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
760	76420	14520	2131360	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
761	75600	13940	2131361	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
762	76080	13640	2131362	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
763	80460	24750	2131363	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
764	76690	24350	2131364	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
765	78810	24700	2131365	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
766	79170	23570	2131366	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
767	86710	25190	2131367	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
768	85280	25060	2131368	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
769	84620	32700	2131369	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
770	84510	33280	2131370	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
771	83660	34040	2131371	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
772	83600	34300	2131372	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
773	73450	35900	2131373	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
774	73550	34950	2131374	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
775	71150	35400	2131375	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
776	70720	35475	2131376	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
777	79650	22170	2131377	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
778	80650	21800	2131378	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
779	81630	21980	2131379	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
780	78270	21560	2131380	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
781	78890	21660	2131381	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
782	78040	21560	2131382	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
783	78020	21890	2131383	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
784	77070	21590	2131384	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
785	76980	21630	2131385	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
786	75780	20860	2131386	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
787	75550	20820	2131387	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
788	75750	21120	2131388	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
789	75980	21440	2131389	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
790	75780	21700	2131390	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
791	75340	21950	2131391	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
792	74900	21760	2131392	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
793	75170	22110	2131393	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
794	77090	21200	2131394	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
795	74950	21050	2131395	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
796	74330	21480	2131396	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
797	74100	21620	2131397	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
798	73740	21360	2131398	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
799	73650	20620	2131399	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
800	72900	20780	2131400	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
801	73500	22440	2131401	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
802	73180	21820	2131402	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
803	76100	22840	2131403	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
804	75430	22750	2131404	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
805	74430	22750	2131405	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
806	81530	27600	2131406	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
807	81480	27120	2131407	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
808	81370	27670	2131408	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
809	82110	29100	2131409	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
810	81970	30010	2131410	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
811	81200	30000	2131411	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
812	82090	26410	2131412	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
813	81610	30780	2131413	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
814	81000	30620	2131414	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
815	80900	31860	2131415	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
816	80370	32680	2131416	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
817	80150	33140	2131417	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
818	79750	34200	2131418	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
819	80000	31750	2131419	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

820	8[illegible]0	31000	2131420	10.00	.00	.00	.00	.00	.00	.00	.00	[illegible]	.00	.00	.00	.00
821	84750	7060	2131421	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
822	81730	21260	2131422	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
823	82230	20920	2131423	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
824	85080	7200	2131424	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
825	85720	7540	2131425	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
826	86360	7630	2131426	226.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
827	86680	7580	2131427	19.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
828	87030	7420	2131428	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
829	87100	7130	2131429	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
830	86360	8200	2131430	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
831	86120	8250	2131431	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
832	86040	8200	2131432	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
833	72650	37000	2131433	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
834	74250	36900	2131434	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
835	73850	36550	2131435	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
836	73900	36450	2131436	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
837	74100	36450	2131437	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
838	74350	36010	2131438	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
839	75050	36250	2131439	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
840	74750	37150	2131440	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
841	75300	37150	2131441	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
842	75900	37050	2131442	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
843	76050	37050	2131443	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
844	76600	36850	2131444	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
845	76500	36300	2131445	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
846	77450	35900	2131446	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
847	77600	35100	2131447	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
848	77700	35050	2131448	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
849	77650	35300	2131449	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
850	69950	35800	2131450	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
851	63600	34900	2131451	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
852	67750	34250	2131452	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
853	83650	39000	2131453	21.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
854	81900	37600	2131454	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
855	82300	37500	2131455	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
856	82800	37650	2131456	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
857	83400	37850	2131457	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
858	84100	37250	2131458	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
859	84700	37350	2131459	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
860	87200	37350	2131460	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
861	87700	36250	2131461	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
862	87700	35750	2131462	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
863	86700	37150	2131463	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
864	85800	37500	2131464	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
865	87100	37600	2131465	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
866	87400	36500	2131466	10.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

EXHIBIT MAP - CONTENTS:

SAMPLE MAP 1 - Svartdal BP037-5-1.
Samples represented - 2110043-46, 60.

SAMPLE MAP 2 - Ambjørndalen BP037-5-2.
Samples represented - 2110001-2, 4-9, 13-14, 47-59, 61-75, 77-82, 89, 146-148, 226.

SAMPLE MAP 3 - Nutheim BP037-5-3.
Samples represented - 2110076.

SAMPLE MAP 4 - Ståldalen BP038-5-1.
Samples represented - 2110223.

SAMPLE MAP 5 - Barstadhovi BP038-5-3.
Samples represented - 2110010-12, 18-42, 83-87, 91-145, 201-222,227-255.

SAMPLE MAP 6 - Hovdejord BP038-5-4.
Samples represented - 2110088, 225.

SAMPLE MAP 7 - Svinom BP039-5-3.
Samples represented - 2110224.

SAMPLE MAP 8 - Bisminuten BQ038-5-1.
Samples represented - 2110017.

SAMPLE MAP 9 - Hjartdal BQ038-5-3.
Samples represented - 2110016.

SAMPLE MAP 10 - Gvammen BQ038-5-4.
Samples represented - 2110003.

SAMPLE MAP 11 - Kivikdalen BQ039-5-3.
Samples represented - 2110015.

SAMPLE MAP 12 - "Flatdal"
Samples represented - 2110090.