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Tittel

Ore Reserve Statment of Nikkel & Olivin Mine - Prepared using data available 31.12.1998

Forfatter

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Dato År

25.01 1999

Bedrift (Oppdragsgiver og/eller oppdragstaker)

Nikkel og Olivin A/S

Kommune Ballangen	Fylke Nordland	Bergdistrikt	1: 50 000 kartblad 13311	1: 250 000 kartblad Narvik
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Fagområde Malmberegning	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt) Bruvannsfeltet Råna Østmalmen Vestmalmen Dypmalmen Elefantmalmen Dinosaurmalmen
Råstoffgruppe Malm/metall	Råstofftype Ni, Cu	

Sammenheng, innholdsfortegnelse eller innholdsbeskrivelse

Beskriver kort geologisk setting med mineraliseringen og malmtyper. Lokalisering av de forskjellige malmkropper og linser. Avslutningsvis beskrives gruve og oppredningsmetoden. Videre blir kjerneboring/slamboring, prøvetaking og kalkulasjonsmetode beskrevet. Grunnlaget for beregningene er den Australske coden.

Ved en cut-off på 0,45% Ni, er den totale malmreserve beregnet til 1,148 Mt med 0,51% Ni når det antas en utvinning på 70% og sidebergfortynning (med 0,15% Ni) på 10%.

I tillegg finnes in situ mineralske ressurser på 0,525 Mt med 0,53% Ni.

Vedlagt plankart, datatabeller, gruvekostnader, break-even og diverse statistikkdiagram.

J.Reino, Kalle Vaajoensuu, Pertti Koivistoinen 20.9.1999

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Audit visit to Nikkel og Olivin Mine

7 September 1999

J. Reino
K. Vaajoensuu
P. Koivistoinen

Distribution:

Nikkel og Olivin
OM

Ore Reserve
Committee

Henriksen, Ekberg, Tuvehed, Storhaug, Brusila
Laatio, Alopaeus, Brown, Mansikka, Pitkänen,
Lappalainen
Isohanni, Grahn, Koivistoinen, Reino, Vaajoensuu

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1. Summary

- Actual production has suffered from the damages at the concentrator. The nickel production is 7 % (136 tonnes) under the budget.
- Intensive geological investigations are needed because of the irregular shape of the ore lenses, as the mine has been done.
- Mineral resource estimate has been done using good industrial practise.
- Remaining ore reserves 0.9 Mt (at June 30,1999) support about one year production. There are limited possibilities to extend the mine life about 2-4 months, at the maximum.
- Mining has succeeded well despite the complex geology of the ore blocks.
- The life time of the mine is about one year for that reason the closing works must be started in the near future.

2. Actual production

Production in 1999 until the end of August:

	ktonnes Actual	Budget	%Ni Actual	Budget
Ore milled	434	494	0.56	0.53
Ni % in conc.			12.8	13.0
Ni recovery			74.4	74.0
Ni tonnes produced	1810	1946		

- Milled ore tonnes are 12% under the budget due to mechanical problems at the concentrator
- Nickel grade is 6% higher than budgeted
- Ni tonnes produced are 7% under the budget due to damages at the concentrator

3. Geological database

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Diamond drilling and sludge drilling are the methods used in the delineation of the orebody. Due to the irregular nature of the ore, the annual amount has been on the high level. In 1998, the amount of diamond drilling was 8076 m and sludge drilling 12012 m respectively.

For final stoping the needed drilling density has been 6.25 - 12.5 meters.

4. Mineral Resource Estimate

The parameters used and the estimation procedure are in detail given in the Ore Reserve Statement.

The mineral resources and ore reserves have been updated on June 30th, 1999. The remaining total mineral resources at 0.45% Ni cut-off were the following:

Ore lense	Tonnes	%Ni	Category
Östmalmen			
Kronpillar	77,000	0.49	Measured
385-nivå	144,000	0.54	"
Vestmalmen			
Sydmalmen	442,000	0.52	"
Pillar around the ramp	69,000	0.54	"
Nordmalmen	829,000	0.54	"
Subtotal	1,561,000	0.53	"
Östmalmen			
Dypmalmen	90,000	0.52	Indicated
Vestmalmen			
Nordmalmen (+0 lev.)	68,000	0.59	"
Övre mineralisering	36,000	0.53	"
Subtotal	194,000	0.55	"
Östmalmen			
Sydost dagbrudd	154,000	0.49	Inferred
Vestmalmen			
Sydmalmen	12,000	0.52	"
Subtotal	166,000	0.49	"
TOTAL	1,920,000	0.53	

At December 31st, 1998 the total mineral resource was respectively 2,32 Mtonnes @ 0.55% Ni . The reduction of 400,000 tonnes took place in measured and indicated resources. Actual production during January-June 1999 was 312,000 tonnes.

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5. Cut-off

Cut-off calculations have been made for different decision making situations. The principal cut-off is 0.45% Ni and the so called marginal cut-off as low as 0.3% Ni.

In principle, because Harjavalta has lack of concentrates the cut-off should be calculated together with the smelter as mentioned in the previous auditing report. However in practice the benefit would be small because the lifetime of the mine is short in any case.

6. Ore Reserves

When converting the mineral resources to ore reserves, the mine recovery has varied from 50% to 70% and the dilution from 5% to 10% at diluting grade 0.15%Ni to 0.25% Ni.

Ore reserves in proven category at June 30,1999 were the following:

899,000 tonnes@ 0.50 % Ni

As a comparison the ore reserves at December 31st ,1998 were the following:

1,148,000 tonnes @ 0.51% Ni

The difference of 249,000 t is less than the production of 312,000 t meaning that some tens of thousands of tonnes extra ore has been found.

There are limited possibilities to extend the mine life some months. The most encouraging blocks are Dypmalmen(in Östmalm lense) with the mineral resource of 90,000 t @ 0.52% Ni and Normalmen (in Vestmalm lense) with the mineral resource of 67,000t @ 0.59% Ni. The decision to start the geological investigation and development work should be based on the latest official nickel price forecast and discussions with Harjavalta. Using actual price forecasts for the next year mining of these blocks is not profitable.

7. Mining

Generally speaking the mining has succeeded well despite the complex geology of the ore blocks. Just now there are two stopes in production which are bigger than on the average. Thus the productivity is good. A risk is the stability of the stopes.

Mining costs have gone down due to reduced amount of drifting. The need for drifting will increase if the new ore blocks, not included in the actual production plan, are decided to be taken into production.

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The mining costs (\$/ kg Ni) of the possible new mining blocks have been calculated by a conservative way. The deciding factor for the profitability is the price forecast of Ni to the end of the year 2000. A certain amount of diamond drilling before the final decision is also warranted. However, the possible additional lifetime would be only a few months.

8. Processing

The only essential change in the processing has been the increase of the concentrate grade up to 13% Ni from the previous level of 11,5%. This has resulted in the reduction of the nickel recovery by 1-2%-unit. There have been several stoppages at the concentrator because of damages. The most serious maintenance problems has been in the power transmission axis of the mill. Repairing of the axis means a production stoppage of one week. Just now there is under consideration an alternative to help the startup of the mill by an assisting motor having a slow rotative speed.

The actual processing costs in 1999 have been 41 NOK/t ore (9,8 NOK/kg Ni) vs. the budget 33 NOK/t (8,4 NOK/kg Ni) exluding tailings disposal.

Tailings deposing is well under control and generally there are no problems with the authorities or private persons concerning the operation of the mine. The costs of tailings deposing have been 9,7 NOK/t (2,3 NOK/kg Ni).

9. Closure plan

According to the mine closure plan the closing costs have been estimated to be about 12 MNOK. The execution of the plan for the open pit and waste rock areas should have been started already this summer but it has been delayed.

ORE RESERVE STATEMENT

of

NIKKEL OG OLIVIN A/S

Prepared using data available 31.12.1998

Nikkel og Olivin A/S

25.1.1999

Markus Ekberg

Lisbeth Storhaug

Distribution: Markku Isohanni, Outokumpu Mining (full set)
Jouni Reino, Outokumpu Mine Technology Group (full set)
Vidkun Henriksen, Nikkel og Olivin AS (no profiles)
Markus Ekberg, Nikkel og Olivin AS (no profiles)
Lisbeth Storhaug, Nikkel og Olivin AS (full set)

Nikkel og Olivin AS - Ore Reserve Statement

Summary

This ore reserve statement of Nikkel og Olivin mine has been prepared using data available 31.12.1998.

The in-situ mineral resources of all Nikkel og Olivin mineralisations have been calculated using conventional profile method. Diamond drill hole and sludge hole data have been used equal manner. The calculations have been made using Outokumpu's Minenet programme.

Results are as follows (cut-off grade 0.45 % Ni):

Proven ore reserves (total ore reserves)	1.148 Mt	0.51 % Ni
Measured mineral resources	0.145 Mt	0.51 % Ni
Indicated mineral resources	0.215 Mt	0.55 % Ni
Inferred mineral resources	0.165 Mt	0.51 % Ni
Total mineral resources	0.525 Mt	0.53 % Ni

Mineral resources are additional to total ore reserves.

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1. Introduction

This ore reserve statement has been prepared by mine manager Markus Ekberg and mine geologist Lisbeth Storhaug. The document is prepared using instructions given in Outokumpu's "Evaluation procedures manual 1996/1998" according to the "Australasian code for reporting of identified mineral resources and ore reserves 1996".

All data available by 31.12.1998 has been used when preparing this document.

Nikkel og Olivin AS is a 70% owned subsidiary of Outokumpu Harjavalta Metals Oy, with the remaining 30 % of the shares owned by Nordlandsbanken AS. Outokumpu has the full economical and technical responsibility of the mine.

The mine started production in 1989 and had by 31.12.1998 produced a total of 5.910 Mt of ore with a grade of 0.53 % Ni.

The ore reserves and the production plan allows mining until the beginning of the year 2000, when the tailing deposit dam is filled as regulated.

2. Geology of the deposit

The Bruvann nickel deposit is a part of the Rana mafic-ultramafic intrusion which was emplaced during the Caledonian orogeny at about 436 My ago. The intrusion is surrounded by various types of gneisses, and the nickel mineralisation occurs in the ultramafic rocks close to the contact with the surrounding gneisses. The nickel mineralisation is cut by the main fault zone so that the deposit is divided into the Østmalm and the Vestmalm. Østmalmen crops out at the surface and the vertical distance between the orebodies varies between 75 m and 200 m, increasing towards north. The mineralised zone extends for approximately 900 m in the east-west direction and 600 m in the north-south direction.

3. Mineralisation and Ore types

The Bruvann Deposit consists of several lenses which are separated by faulting and probably by original crystallisation stages. The main lenses are Østmalmen og Vestmalmen which are separated by a scissor (hinge) fault (Boyd 1980).

The Dypmalm mineralisation is a part of the Østmalm and seems to be separated from the main lense.

The main parts of the orebody are made up of disseminated mineralisation in peridotite (dunite). The main nickel carrier is pentlandite, other sulphide minerals are pyrrhotite and chalcopyrite. Olivine contains approximately 0.09 % Ni in its lattice (Palosaari and Jounela 1994). Nickel content in the sulphide phase in the disseminated mineralisation is 7 - 8 %.

Massive and semi massive ore exists near the southern contact to the gneisses. This mineralisation type has been discovered on both sides of the main fault zone. In the Østmalm the Elefant ore and the 246-inngang are of massive type. In the Vestmalm the Dinosaur ore is of massive type.

The massive mineralisation occurs in peridotite, pyroxenite, norite and calcisilicate gneiss. Nickel content in the sulphide phase in massive and semi massive ore is 4.5 %.

4. Investigations Procedures and Assaying

4.1 Diamond drilling

Vestmalmen consists of three ore bodies, Dinosaurmalmen, Sydmalmen and Nordmalmen. Vestmalmen (Sydmalmen and Nordmalmen) was found in 1972 by NGU (Norges Geologiske Undersøkelser) by diamond drilling and the Dinosaurmalm was found in 1996 by mine organisation with diamond drilling southwards from the 100 level.

The mineral resource calculation for the Vestmalm includes drillholes made by NGU in the 1970ies, drillholes made from the ramp during the investigation program for the Feasibility study of the Vestmalm in 1993 and 1994 and drillholes made by Nikkel og Olivin AS from drifts in the Vestmalm during 1995 - 1998.

Østmalmen is close to exhaustion, but a minor part of the massive ore (Elefantmalmen) and some disseminated ore still remains to be mined. There are also two separate orebodies in the east, Dypmalmen and Sydøst dagbruddet. Kronpillaren has been denied to be mined by the Norwegian authorities. Some ore is left around the drift at the 385-level.

The mineral resource calculations for the Østmalm are based on diamond drillholes by Bjørkåsen Gruber, German occupants, NGU, LKAB and Nikkel og Olivin AS.

The assay intervals of the NGU drillholes are always 2 meters irrespective of lithological changes. Most of the drillholes done by NGU have collar coordinates measured using tachymeter. Deviation measurements have been done in some of the drillholes using Eastco method.

The assay samples from the drillholes done by Nikkel og Olivin AS are normally about 2 meters. Lithological boundaries and mineralisation grade variations were used when determining drill core to the assay intervals. In case of grade variation, shorter assay intervals than 2 meters were used.

Drill-hole collar coordinates and start azimuths are measured using electronic tachymeter. Survey points used in the measurements are normal mine survey points which are connected to the state survey net. Drill hole start azimuths are measured using special drillrod with a survey prism. This rod is installed to the hole and two points are measured. Start azimuth is later calculated by a mine survey ADP-program. Drill hole dip deviation is measured in the hole each 10 meter using electric inclinometer (Pietari Peltonen). This information is stored to the geological database and later used when drill holes are plotted to the profiles.

Drill core recovery is normally 100% and RQD-values usually over 90% so these have not been calculated earlier. During the last one and a half years RQD has been calculated to test the benefit of this information. Core loss is reported only rarely in some drill holes. These areas as well as "weathered peridotite" are reported separately. "Weathered peridotite" is an especially weak altered peridotite, which contains a swelling clay mineral, most probably saponite.

Sampling of diamond drill holes made by other parties is not clear.

4.2 Sludge drilling

Sludge drilling has been done systematically in the Vestmalm and in certain areas in the Östmalm, that is in all production areas. The current amount of sludge drilling per year is 12 000 meters and is done by the mine contractor. Each sample is 1.8 meters (one rod length). Sludge drilling profiles are usually at 12.5 meters spacing, but in the massive ore also 6.25 meters spacing has been used.

4.3 Assaying

Drill cores are split in half using a hydraulic splitter. One half is stored at the mine site. The assaying half is crushed using two crusher stages to -5 mm. The crushed sample with assay number is later delivered to the Nikkel Og Olivin AS laboratory. Some assaying has been carried out in Outokumpu's Geoanalytical Laboratory, Outokumpu, Finland.

At the laboratory samples were analyzed for total-Ni (HNO₃-soluble) using normal analyzing routines.

Some 40 density determinations have been done at the Geoanalytical laboratory, Outokumpu. The density determinations were done from pieces of drill core. According to these determinations the average density of the Vestmalm is 3.39.

4.4 Geological database

Assay results, lithological abbreviations, drill hole collar coordinates, azimuths and dip deviation measurements and all assay results are fed to the Minenet-program. This program is Outokumpu's mine-CAD for geological resource and reserve estimations and mine planning.

5. Mineral Resource Calculation Methods and Results

5.1 Cut-off grade

Cut-off grade in this mineral resource estimation is 0.45 % Ni (total-Ni). This decision is based on economical evaluation of the whole Vestmalm. In this evaluation (Ekberg and Alaniska 1994) mineral resources of the whole deposit were calculated using different cut-off grades (0.30, 0.40, 0.50 and 0.60 % Ni). Ore reserves were derived using different

grades for diluting material as well as different waste rock dilution percentage for each cut-off grade.

Annual production rate and total production period were calculated for each cut-off grade tonnage. Production costs for each production rate were estimated and investments were estimated. The nickel-price used in these economical simulations was 10 % higher than planning price due to estimate benefits of the whole production chain of Nikkel og Olivin and Harjavalta.

According to these simulations the best economical result when exploiting the Vestmalm will be achieved using a cut-off grade of 0.45 % Ni.

Cut-off grade calculations at the moment are difficult due to necessity to continue production until the tailing dam area at Ballangslaira is filled with tailings as regulated by the authorities. This alternative has been calculated the most economical due to the assessed high costs of filling the tailing deposits with other materials than waste. Until the end of November 1999 it is also necessary to pay compensation to the mine contractor if the contract is to cease. Anyway there has been made cut-off calculations using Outokumpu's budget prices, realistic payment-percentage of Ni-concentrate, present mining costs and subtracting the stop costs (appendix 11). The cut-off grade 0.45 % Ni is appropriate for the mine production.

5.2 Calculation methods

The mineral resources are based on diamond drill holes and sludge drill holes. A minimum ore thickness of four meters was used in the resource estimate for disseminated ore. In massive and semi massive ore the minimum ore thickness used was 1.5 meters. The used density of ore is 3.39. Waste rock inclusions inside the mineral resource were included into the grade and the tonnage.

The calculation method used in this mineral resource estimation was the conventional section method. The estimate for Vestmalmen is based on 55 sections at 6.25 and 12.5 m intervals in the Dinosaurmalm and at 12.5 m intervals in the Sydmalm and the Nordmalm. The weighted distance of influence for each section is thus 3.125 and 6.25 respectively on both sides.

The mineralised area in each section was divided into sub polygons between the levels 140, 120, 100, 80, 60, 40, 20, 0, -20, -40. 3-D models for mined stopes were created, and the areas of mined stopes were subtracted from the conventional estimation.

The grade of each subpolygon is the weighted average of all samples inside the subpolygon. The weighting method for samples was assay length, density was not used. The grade of each section is the weighted average of each subpolygon and the tonnage is the sum of tonnages of the incorporated subpolygons.

A conventional sectional estimate was prepared for Vestmalmen. In this estimation the Vestmalm was divided into the following areas:

Dinosaurmalm, sections $x=1125 - x=1237.5$

Sydmalmen, sections $x=1250 - x=1537.5$

Nordmalmen, sections $x=1550 - x=1750$

The grade estimations are reliable because all assays are quite low. There is no reason for cutting high grade assays.

Similar conventional method was used in the Østmalmen (Elefanten, Kronpillar/385, Dypmalmen and Sydøst dagbrudd).

Measured mineral resources includes those parts of the mineralisation which have been investigated with profile distance 12.5 meters, and where the geological structures are well known and the geological interpretation is fairly confident.

Measured mineral resources 31.12.1998, cut-off 0.45 % Ni, density 3.39

	Grade (% Ni)	Tonnage
Østmalmen		
Kronpillar	0.49	76734
Elefantmalmen	0.90	40310
385-nivå	0.54	143706
Vestmalmen		
Sydmalmen	0.53	738642
Pillar around the ramp	0.54	69161
Dinosaurmalmen	0.67	57673
Nordmalmen	0.54	812965
Subtotal	0.55	1939191

Indicated mineral resources are those parts of the mineralisation which has been investigated with profile distance 25 meters. The geological interpretations have a certain confidence.

Indicated mineral resources 31.12.1998, cut-off 0.45 % Ni, density 3.39

	Grade (% Ni)	Tonnage
Østmalmen		
Dypmalmen	0.52	90000
Vestmalmen		
Nordmalmen (below 0)	0.59	67692
Øvre mineralisering	0.53	36000
Sydmalmen	0.59	21720
Subtotal	0.55	215412

Inferred mineral resources comprises those parts of the mineralisation where there are only NGU-diamond drillholes, and where it is not possible to make a confident geological interpretation.

Inferred mineral resources 31.12.1997, cut-off 0.45 % Ni, density 3.39

	Grade (% Ni)	Tonnage
Ostmalmen		
Sydöst dagbrudd	0.49	154000
Vestmalmen		
Sydmalmen	0.76	11621
Subtotal	0.51	165621

6. Ore Reserve Calculation Methods and Results

The minable reserves have been prepared using the previously presented in-situ mineral resource estimation as a basis.

Mining recovery has been estimated to be 70% from the in-situ mineral resources. This estimation is based on experience from similar production situation in Ostmalmen. The mine recovery in Ostmalmen is estimated to 85 - 90 %, but a more complex geology together with rock mechanical problems in Vestmalmen has resulted in decreased mining recovery. In the Sydmalm mining recovery has been set to 50% due to the fact that some of the mineral resources are pillars towards big open stopes and are not possible to mine with current mining methods.

Waste rock dilution has been estimated to be 10% in disseminated ore. This is based on the calculated waste rock dilution during 1995 - 1998. The waste rock dilution in massive ore is estimated to be 20%. The grade of waste rock during 1995 - 1998 has been 0.15 % Ni, this grade has been used in the present ore reserve estimation with some exceptions, see table with Proven Ore Reserves.

Proven Ore Reserves, cut-off 0.45 % Ni, derived from measured mineral resources

	Grade (% Ni)	Tonnage	Mine recovery	Dilution	Dilution grade
Ostmalmen					
Elefantmalmen	0.73	38600	80%	20%	0.05% Ni
385-nivå	0.53	75400	50%	5%	0.25% Ni
Vestmalmen					
Sydmalmen	0.49	406200	50%	10%	0.15% Ni
Dinosaurmalmen	0.55	58800	85%	20%	0.05% Ni
Nordmalmen	0.50	569000	70%	10%	0.15% Ni
Subtotal	0.51	1148000			

Grand total ore reserves

0.51 1148000

7. Mining

The mining methods are normal sublevel stoping and "top slicing". In top slicing the drilling and loading drift is developed in the middle of the planned stope. The stope is opened using a transverse drive and an opening slot at one end of the stope. Ore is blasted towards this opening slot using drilling fans with a spacing 2 -2.5 meters. The distance between levels is normally 20 metres and the drift size for drilling drifts is 5 x 5 meters. The small distance between the levels is due to shallow dip of the ore body.

The mucking of ore is carried out using a remote controlled LHD or a conventional wheel loader. Ground support with cable bolting has not been utilised before the autumn of 1997 when stope stability in bigger stopes was so poor that manually installed cable bolting was started.

Mine production planning is based on a 15 months plan, which is updated every month. Also more detailed 4(5) week and weekly plans are in use. These plans are discussed in weekly and monthly meetings with the contractor and is signed and binding.

The 15-month plan is the long term plan for the remaining mine lifetime.

8. Milling

The contractor transports the ore to the surface via decline using 4-axel, 12 wheel highway trucks, each carrying 35 tonnes to a three-stage crushing plant. The silo capacity is about 1800 tonnes which means that ore hauling during weekends is necessary. Grinding is carried out with one ball mill (4x6 meters) in closed circuit. Grinding fineness is some 70% - 150 μm and 44 % -75 μm . In the grinding circuit there are two flash flotation cells (Outokumpu Skim-Air 80), which produces concentrate with a grade of 15-20 % Ni. These cells are used when mill feed grade is higher than 0.5-0.55 % Ni.

The flotation is carried out in an open circuit using second-hand equipment purchased from different mines in Nordic countries. These flotation machines have partly been rebuilt using OK-mechanisms. The total flotation volume is 54 m^3 and the flow rate of the pulp is 190 m^3/h . The chemicals used in the flotation are xanthate (fed into the mill), DOW-200 (fed in the flash flotation), xanthate and waterglass (fed into the flotation) and frother MIBC (fed into the rougher and scavenger flotation).

The flotation process is controlled manually using a Courier-30 analyser.

Dewatering is done with a thickener and two vacuum filters. The moisture of the final concentrate is about 8 % and is thus suitable for shipping to Outokumpu's Harjavalta smelter, which is the only customer of Nikkel og Olivin AS.

The final concentrate has a grade of 13 % Ni, 3.5 % Cu and 0.5 % Co. Ni recovery is 74 % of total nickel assay, which includes 0.09% silicate nickel in olivine (Palosaari and Jounela 1994). This recovery and concentrate have been constant for the whole operation period.

When massive and semi-massive ore have been fed in to the production it has been sometimes problematic to achieve concentrate grade of 13 %.

According to previously prepared mineralogical studies the whole Vestmalm consists of homogenous disseminated mineralisation (Sotka and Huhtelin 1993) and thus problems in the processing are not expected in the future.

9. References

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10. Appendices

1. Lay-out map of the mine.
2. Outokumpu Reserve/Resource Reporting 31.12.1998 - Nikkel og Olivin AS.
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 - 5.3 Østmalmen, Dypmalmen
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 - 5.5 Vestmalmen, Dinosaurmalmen
 - 5.6 Vestmalmen, Sydmalmen
 - 5.7 Vestmalmen, Nordmalmen
6. Profiles
 - 6.1 Østmalmen, Sydøst dagbrudd
 - 6.2 Østmalmen, Kronpillar and 385-level
 - 6.3 Østmalmen, Dypmalmen
 - 6.4 Østmalmen, Elefantmalmen
 - 6.5 Vestmalmen, Dinosaurmalmen
 - 6.6 Vestmalmen, Sydmalmen
 - 6.7 Vestmalmen, Nordmalmen
7. Histogram and distribution of Ni, basic statistics
8. Density measurements
9. Investigation activity 1990 -1998
10. 18 month production plan 1999-2000
11. Cut-off grades for different decision making situations
12. Ore reserves and mineral resources at the end of the year 1989-98.
Production 1989-1998.

X=1800
Y=2250
Z=-100

X=1750

X=1500

X=1250

X=1100
Y=2250
Z=-100

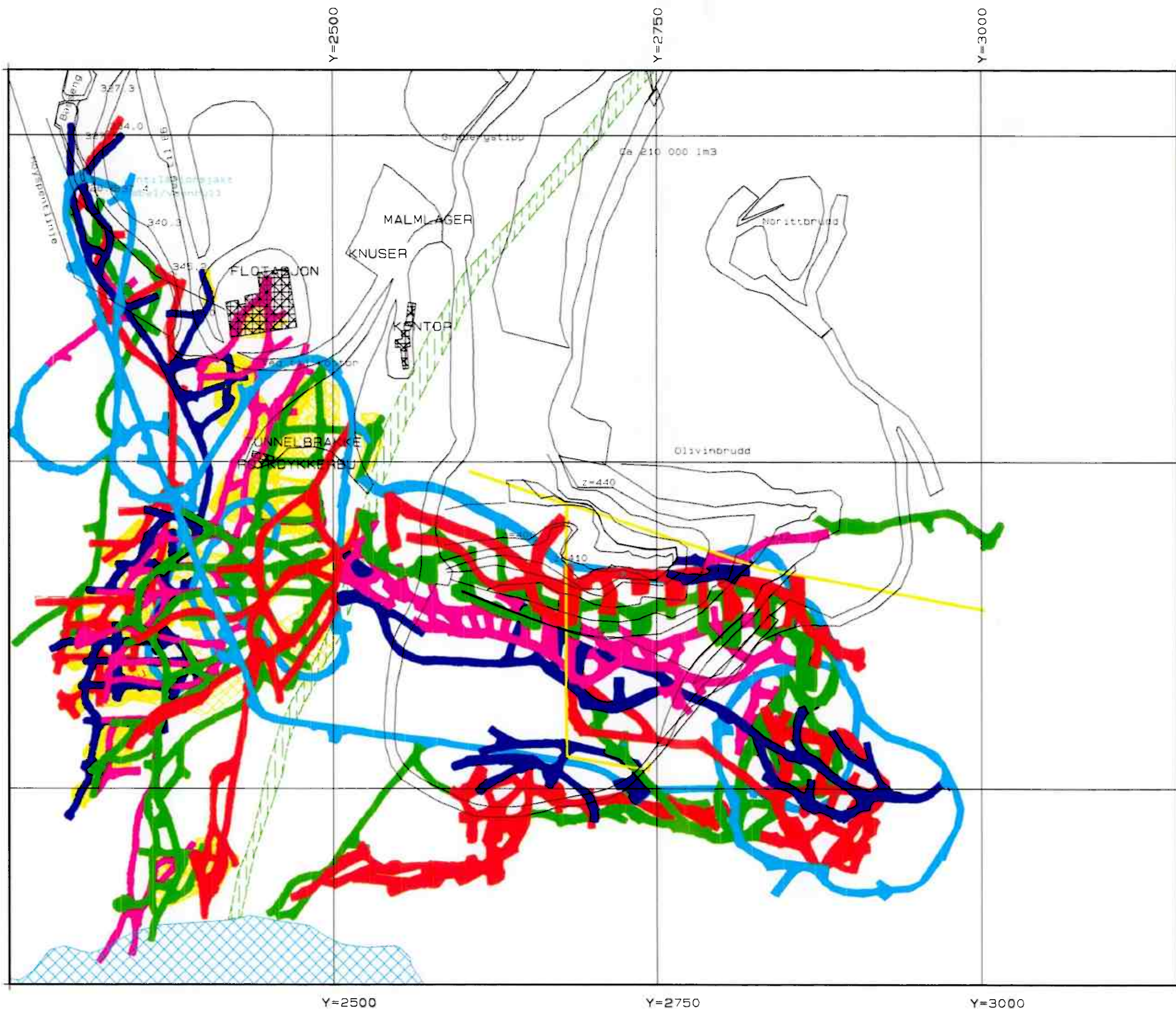
X=1800
Y=3150
Z=-100

X=1750

X=1500

X=1250

X=1100
Y=3150
Z=-100



DD SD S P OB RB EX GS CS

Outokumpu
Nikkel og Olivin

1: 3000

8.1.1998

Z=-400

OUTOKUMPU RESERVE/RESOURCE REPORTING at 31.12.1998

ORE RESERVES

INVENTORY NAME: Nikkel og Olivin AS

COUNTRY: Norway

COMPANY: Nikkel og Olivin AS

OK'S SHARE: 70%

STATUS: In operation

DATE: 04.01.98

PREPARED BY: L.Storhaug/M.Ekberg

DATA GIVEN BY: M.Ekberg/V.Henriksen

ORE RESERVES

PROVEN TONNES	1148000	METAL TONNES
PROVEN Cu%	0,10	1148
PROVEN Ni%	0,51	5855
PROVEN Zn%		
PROVEN Pb%		
PROVEN S%		
PROVEN Au g/t		
PROVEN Ag g/t		
PROBABLE TONNES		METAL TONNES
PROBABLE Cu%		
PROBABLE Ni%		
PROBABLE Zn%		
PROBABLE Pb%		
PROBABLE S%		
PROBABLE Au g/t		
PROBABLE Ag g/t		
TOTAL TONNES	1148000	METAL TONNES
TOTAL Cu%	0,10	1148
TOTAL Ni%	0,51	5855
TOTAL Zn%		
TOTAL Pb%		
TOTAL S%		
TOTAL Au g/t		
TOTAL Ag g/t		

NOTE!

- * Ore Reserve data at 31st December 1998
- * The reported Mineral Resources are additional to the Ore Reserves
- * Total tonnes in JV project

OUTOKUMPU RESERVE/RESOURCE REPORTING at 31.12.1998
MINERAL RESOURCES

INVENTORY NAME: Nikkel og Olivin AS
COUNTRY: Norway
COMPANY: Nikkel og Olivin AS
OK'S SHARE: 70%
STATUS: In operation
DATE: 04.01.98
PREPARED BY: L.Storhaug/M.Ekberg
DATA GIVEN BY: M.Ekberg/V.Henriksen

MINERAL RESOURCES

MEASURED TONNES	145895	METAL TONNES
MEASURED Cu%	0,10	146
MEASURED Ni%	0,51	749
MEASURED Zn%		
MEASURED Pb%		
MEASURED S%		
MEASURED Mo%		
MEASURED Au g/t		
INDICATED TONNES	215412	METAL TONNES
INDICATED Cu%	0,10	215
INDICATED Ni%	0,55	1 185
INDICATED Zn%		
INDICATED Pb%		
INDICATED S%		
INDICATED Mo%		
INDICATED Au g/t		
INFERRED TONNES	165621	METAL TONNES
INFERRED Cu%	0,10	166
INFERRED Ni%	0,51	845
INFERRED Zn%		
INFERRED Pb%		
INFERRED S%		
INFERRED Mo %		
INFERRED Au g/t		
TOTAL TONNES	526928	METAL TONNES
TOTAL Cu%	0,10	527
TOTAL Ni%	0,53	2 773
TOTAL Zn%		
TOTAL Pb%		
TOTAL S%		
TOTAL Mo%		
TOTAL Au g/t		

NOTE!

- * Mineral Resource data at 31.12.1998
- * Total tonnes in JV project

Mineral resources and Ore Reserves 31.12.1998

28-jan-99

Measured mineral resources, cut-off 0.45% Ni, density 3.39

	Grade (% Ni)	Tonnage	
Ostmalmen			
Kronpillær	0.49	76734	Not allowed mined by authorities. Excluded from the ore reserves
Elefantmalmen	0.90	40310	3700 t drifting in ore subtracted. Included to the ore reserves
385-nivå	0.54	143706	Included to the ore reserves
Vestmalmen			
Sydmalmen	0.53	738642	60000 t drifting in the ore subtracted. Included to the ore reserves
Pillar around the ramp	0.54	69161	Excluded from the ore reserves. mineable at the end of operations
Dinosaurmalmen	0.67	57673	12000 t drifting in the ore subtracted. Included to the ore reserves
Nordmalmen	0.54	812965	97500 t drifting in the ore subtracted. Included to the ore reserves
Subtotal	0.55	1939191	

Indicated mineral resources, cut-off 0.45% Ni, density 3.39

	Grade (%Ni)	Tonnage
Ostmalmen		
Dypmalmen	0.52	90000
Vestmalmen		
Nordmalmen (below 0)	0.59	67692
Øvre mineralisering	0.53	36000
Sydmalmen (below 0)	0.59	21720
Subtotal	0.55	215412

Inferred mineral resources, cut-off 0.45 % Ni, density 3.39

	Grade (%Ni)	Tonnage
Ostmalmen		
Sydøst dagbrudd	0.49	154000
Vestmalmen		
Sydmalmen	0.76	11621
Subtotal	0.51	165621
Grand total mineral resources	0.54	2320224

Ore reserves are derived from measured and indicated mineral resources using presumed mine recovery and adding dilution.

Proven ore reserves, cut-off 0.45 %Ni, derived from measured mineral resources

	Grade (%Ni)	Tonnage	Mine recovery	Dilution	Dilution grade (%Ni)
Ostmalmen					
Elefantmalmen	0.73	38600	80%	20%	0.05
385-nivå	0.53	75400	50%	5%	0.25
Vestmalmen					
Sydmalmen	0.49	406200	50%	10%	0.15
Dinosaurmalmen	0.55	58800	85%	20%	0.05
Nordmalmen	0.50	569000	70%	10%	0.15
Subtotal	0.51	1148000			

Probable ore reserves, cut-off 0.45 %Ni, derived from indicated mineral resources

	Grade (%Ni)	Tonnage	Mine recovery	Dilution	Dilution grade (%Ni)
Vestmalmen					
Nordmalmen	0.55	0	0%	10%	0.15
Sydmalmen	0.55	0	0%	10%	0.15
Subtotal	0.55	0			
Grand total ore reserves	0.51	1148000			

Codes for mineral resource estimation with cut-off 0.45, Nikkel og Olivin AS

		Code
Vestmalmen		
Sydmalmen x=1250 - x=1537.5, profile distance 12.5 m		
above z=140	indicated	21
120 - 140	measured	22
100 - 120	measured	23
80 - 100	measured	24
60 - 80	measured	25
40 - 60	measured	26
20 - 40	measured	27
0 - 20	indicated	28
Sydmalmen, x=1462.5		
0 - 20	inferred	61
-20 - 0	inferred	62
Nordmalmen main lense x=1550-1750, profile distance 12.5 m		
above z=100	measured	31
80 - 100	measured	32
60 - 80	measured	33
40 - 60	measured	34
20 - 40	measured	35
0 - 20	measured	36
-20 - 0	indicated	37
-40 - -20	indicated	38
Dinosaurnalmen x=1125 - 1237.5, profile distance 6.25 and 12.5 m		
above z=140	measured	51
120 - 140	measured	52
100 - 120	measured	53
80 - 100	measured	54
60 - 80	measured	55
Other categories		
mined areas		99
abandoned areas		98
pillar around the ramp		97
mineralisation, no value		96

Sydøst for dagbrudd

IN SITU ORE RESERVE ESTIMATION 29.8.1994

polygons: s_m_ni_45_sydoest
 profile : Y=2900 - 3000
 code(s) : 1

profile	intersection length	ni	area m2	density	projection range	tons
Y=2900	84.35	0.35	356	3.390	25.0	30180
Y=2925	47.05	0.44	479	3.390	25.0	40623
Y=2950	16.60	0.63	223	3.390	25.0	18661
Y=2975	29.10	0.56	669	3.390	25.0	56721
Y=3000	4.00	0.51	97	3.390	25.0	8251
total	181.10	0.49	1825	3.3900	125.0	154636

IN STIU ORE RESERVE ESTIMATION 17.12.1998

385-ni m³

polygons: s m ni 0.45 385

profile : Y=2550 - 2650

code(s) : 1

profile intersection	ni	area	density	projection	tons
length		m2		range	
Y=2550 55.90	0.65	440	3.390	12.5	18626
Y=2562 19.80	0.54	297	3.390	12.5	12581
Y=2575 32.40	0.51	342	3.390	12.5	14498
Y=2587 38.40	0.45	392	3.390	12.5	16604
Y=2600 32.70	0.52	222	3.390	12.5	9396
Y=2612 43.20	0.58	419	3.390	12.5	17765
Y=2625 34.20	0.54	464	3.390	12.5	19644
Y=2637 53.40	0.52	274	3.390	12.5	11623
Y=2650 33.50	0.54	361	3.390	18.8	22969
total 343.50	0.54	3211	3.3900	118.8	143706

Krnpillar

IN STIU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 45 dondd

profile : Y=2675 - 2775

code(s) : 0+3

profile	intersection length	ni	area m2	density	projection range	tons
Y=2675	7.50	0.47	218	3.390	25.0	18497
Y=2700	38.60	0.45	205	3.390	25.0	17353
Y=2725	0.00	0.47	59	3.390	25.0	4974
Y=2750	64.01	0.51	208	3.390	25.0	17589
Y=2775	13.05	0.56	216	3.390	25.0	18322
total	123.16	0.49	905	3.3900	125.0	76734

Dypmalmen

IN SITU ORE RESERVE ESTIMATION

4.11.1994

polygons: s_m_ni_45_dyp
 profile : Y=2712 - 2762
 code(s) : 1

profile	intersection length	ni	area m ²	density	projection range	tons
Y=2712	62.95	0.52	516	3.390	15.3	26681
Y=2725	60.65	0.49	271	3.390	18.8	17246
Y=2737	0.00		0	0.000	0.0	0
Y=2750	35.50	0.53	287	3.390	16.3	15808
Y=2762	44.15	0.59	594	3.390	12.5	25185
total	203.25	0.54	1669	3.3900	62.8	84921

hovedlinse

IN SITU ORE RESERVE ESTIMATION

4.11.1994

polygons: s_m_ni_45_dyp
profile : Y=2712 - 2762
code(s) : 1+2+3

profile	intersection length	ni	area m2	density	projection range	tons
Y=2712	62.95	0.52	516	3.390	15.3	26681
Y=2725	68.95	0.46	360	3.246	18.8	21908
Y=2737	0.00		0	0.000	0.0	0
Y=2750	40.85	0.50	314	3.390	16.3	17276
Y=2762	63.40	0.58	821	3.390	12.5	34776
total	236.15	0.52	2010	3.3576	62.8	100642

alle linser
og forklæringer i tillæg

Dypmalmen

IN SITU ORE RESERVE ESTIMATION 4. 11. 1994

polygons: s_m_ni_45_dyp
profile : Y=2712 - 2762
code(s) : 1+2

profile	intersection length	ni	area m2	density	projection range	tons
Y=2712	62.95	0.52	516	3.390	15.3	26681
Y=2725	68.95	0.46	360	3.246	16.8	21908
Y=2737	0.00		0	0.000	0.0	0
Y=2750	40.85	0.50	314	3.390	16.3	17276
Y=2762	44.15	0.59	594	3.390	12.5	25165
total	216.90	0.52	1784	3.3542	62.8	91051

hovedlinier og
forkastninger

IN SITU ORE RESERVE ESTIMATION 18.12.1998

polygons: s_m_ni_1_mas
 profile : Y=2462 - 2507
 code(s) : 21

profile	intersection length	ni	area m2	density	projection range	tons
Y=2462	69.70	0.98	248	3.390	12.5	10506
Y=2470	0.00		0	0.000	0.0	0
Y=2475	191.95	0.90	411	3.390	12.5	17401
Y=2487	45.30	0.87	165	3.390	12.5	6978
Y=2500	33.55	0.69	154	3.390	9.8	5098
Y=2507	27.00	1.02	158	3.390	7.5	4028
total	367.50	0.90	1136	3.3900	54.8	44010

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1125 - 1237

code(s) : 54

profile	intersection length	ni	area m2	density	projection range	tons
x=1125	37.80	0.56	121	3.390	12.5	5131
x=1137	36.70	0.58	131	3.390	12.5	5568
x=1150	61.20	0.51	178	3.390	12.5	7530
x=1162	44.25	0.56	275	3.390	9.4	8732
x=1169	23.40	1.41	175	3.390	6.3	3710
x=1175	20.35	1.83	90	3.390	6.3	1908
x=1181	25.20	0.68	102	3.390	6.3	2155
x=1187	75.55	0.72	293	3.390	6.3	6204
x=1192	50.40	0.66	295	3.390	6.3	6244
x=1200	16.30	0.56	181	3.390	6.3	3842
x=1206	19.80	0.56	113	3.390	6.3	2402
x=1212	31.55	0.60	149	3.390	9.4	4722
x=1225	39.35	0.66	126	3.390	12.5	5325
x=1237	39.75	0.56	146	3.390	12.5	6199
total	521.60	0.67	2375	3.3900	125.0	69673

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1125 - 1237

code(s) : 55

profile	intersection length	ni	area m2	density	projection range	tons
x=1125	26.75	0.75	158	3.390	12.5	6707
x=1137	19.55	0.54	48	3.390	12.5	2023
x=1150	13.75	0.55	72	3.390	12.5	3030
x=1162	23.15	0.72	105	3.390	9.4	3337
x=1169	12.65	0.72	109	3.390	6.3	2299
x=1175	19.00	0.96	137	3.390	6.3	2904
x=1181	0.00		0	0.000	0.0	0
x=1187	11.55	0.89	82	3.390	6.3	1739
x=1192	0.00		0	0.000	0.0	0
x=1200	0.00		0	0.000	0.0	0
x=1206	0.00		0	0.000	0.0	0
x=1212	0.00		0	0.000	0.0	0
x=1225	0.00		0	0.000	0.0	0
x=1237	0.00		0	0.000	0.0	0
total	126.40	0.73	710	3.3900	65.6	22040

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1125 - 1237

code(s) : 54+55+96+99

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1125 64.55	0.67	279	3.390	12.5	11838
x=1137 56.25	0.57	179	3.390	12.5	7591
x=1150 97.85	0.50	298	3.390	12.5	12621
x=1162 140.55	0.61	615	3.390	9.4	19557
x=1169 95.30	0.87	635	3.390	6.3	13458
x=1175 137.00	0.93	711	3.390	6.3	15059
x=1181 113.50	0.74	796	3.390	6.3	16872
x=1187 215.28	0.97	953	3.390	6.3	20201
x=1192 176.55	0.99	1211	3.390	6.3	25668
x=1200 250.83	1.36	1043	3.390	6.3	22099
x=1206 49.20	0.67	319	3.390	6.3	6761
x=1212 31.55	0.60	149	3.390	9.4	4722
x=1225 87.65	0.63	242	3.390	12.5	10252
x=1237 81.75	0.54	246	3.390	12.5	10405
total 1597.81	0.83	7677	3.3900	125.0	197105

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1125 - 1237

code(s) : 96

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1125 0.00		0	0.000	0.0	0
x=1137 0.00		0	0.000	0.0	0
x=1150 22.90	0.39	49	3.390	12.5	2061
x=1162 0.00		0	0.000	0.0	0
x=1169 3.60	0.70	46	3.390	6.3	981
x=1175 4.80	0.66	8	3.390	6.3	168
x=1181 9.00	0.54	77	3.390	6.3	1627
x=1187 0.00		0	0.000	0.0	0
x=1192 0.00		0	0.000	0.0	0
x=1200 13.40	0.48	39	3.390	6.3	823
x=1206 0.00		0	0.000	0.0	0
x=1212 0.00		0	0.000	0.0	0
x=1225 5.00	0.55	32	3.390	12.5	1350
x=1237 42.00	0.52	99	3.390	12.5	4207
total 100.70	0.52	350	3.3900	62.5	11217

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1125 - 1237

code(s) : 99

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1125 0.00		0	0.000	0.0	0
x=1137 0.00		0	0.000	0.0	0
x=1150 0.00		0	0.000	0.0	0
x=1162 73.15	0.62	236	3.390	9.4	7488
x=1169 55.65	0.63	305	3.390	6.3	6468
x=1175 92.85	0.76	476	3.390	6.3	10078
x=1181 79.30	0.77	618	3.390	6.3	13090
x=1187 128.18	1.11	579	3.390	6.3	12257
x=1192 126.15	1.10	917	3.390	6.3	19424
x=1200 221.13	1.58	823	3.390	6.3	17433
x=1206 29.40	0.73	206	3.390	6.3	4359
x=1212 0.00		0	0.000	0.0	0
x=1225 43.30	0.64	84	3.390	12.5	3577
x=1237 0.00		0	0.000	0.0	0
total 849.11	1.00	4243	3.3900	65.6	94174

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1125

code(s) : -1+1+54+55

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	26.75	0.75	158	3.390	12.5	6707
vest/3	10.10	0.66	48	3.390	12.5	2023
vest/4	0.00		12	0.000	12.5	0
vest/5	27.70	0.50	73	3.390	12.5	3108
Total	64.55	0.67	291	3.255		11838

polygons: s_m_ni_0.45_vest
profile : x=1137
code(s) : -1+1+54+55

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	21.10	0.71	61	3.390	12.5	2589
vest/3	19.55	0.54	48	3.390	12.5	2023
vest/4	0.00		1	0.000	12.5	0
vest/5	15.60	0.46	70	3.390	12.5	2979
Total	56.25	0.57	181	3.362		7591

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s m ni_0.45_vest

profile : x=1150

code(s) : 1+54+55+96

name/num	inters. length	ni	area m2	density	projection range	tons		
vest/1	8.95	0.51	38	3.390	12.5	1629		
vest/3	4.80	0.61	33	3.390	12.5	1401		
vest/4	61.20	0.51	178	3.390	12.5	7530		
vest/5	22.90	0.39	49	3.390	12.5	2061	?	46
Total	97.85	0.50	298	3.390		12621		

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1162

code(s) : -1+1+54+55+99

name/nm	inters. length	ni	area m2	density	projection range	tons
vest/1	8.90	0.49	103	3.390	9.4	3264
vest/5	23.15	0.72	105	3.390	9.4	3337
vest/6	49.65	0.64	165	3.390	9.4	5234
vest/7	23.50	0.59	71	3.390	9.4	2254
vest/8	35.35	0.60	172	3.390	9.4	5468
vest/9	0.00		3	0.000	9.4	0
Total	140.55	0.61	618	3.376		19557

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_mni_0.45_vest

profile : x=1169

code(s) : -1+1+54+55+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	1.80	0.30	3	3.390	6.3	60
vest/2	12.65	0.72	109	3.390	6.3	2299
vest/3	7.05	1.15	24	3.390	6.3	515
vest/4	9.00	0.64	56	3.390	6.3	1197
vest/5	48.60	0.58	281	3.390	6.3	5953
vest/6	14.40	1.78	119	3.390	6.3	2513
vest/8	3.60	0.70	46	3.390	6.3	981
Total	97.10	0.86	638	3.390		13518

? -1

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1175

code(s) : -1+1+54+55+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	1.25	0.18	3	3.390	6.3	58
vest/2	19.00	0.96	137	3.390	6.3	2904
vest/3	20.35	1.83	90	3.390	6.3	1908
vest/4	89.85	0.69	417	3.390	6.3	8843
vest/5	3.00	1.27	58	3.390	6.3	1236
vest/9	4.80	0.66	8	3.390	6.3	168
Total	138.25	0.93	713	3.390		15117

2 -1

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1181

code(s) : 1+54+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	9.00	0.54	77	3.390	6.3	1627
vest/3	25.20	0.68	102	3.390	6.3	2155
vest/4	57.70	0.73	515	3.390	6.3	10916
vest/5	21.60	1.00	103	3.390	6.3	2174
Total	113.50	0.74	796	3.390		16872

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m ni_0.45_vest

profile : x=1187

code(s) : -1+1+54+55+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	20.20	0.67	144	3.390	6.3	3046
vest/2	55.15	1.73	177	3.390	6.3	3752
vest/5	12.03	0.64	107	3.390	6.3	2262
vest/6	0.00		5	0.000	6.3	0
vest/7	5.40	0.47	6	3.390	6.3	117
vest/8	55.35	0.77	149	3.390	6.3	3158
vest/9	49.60	0.76	239	3.390	6.3	5065
vest/17	11.55	0.89	82	3.390	6.3	1739
vest/22	11.40	1.49	56	3.390	6.3	1179
Total	220.68	0.97	964	3.371		20318

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1192

code(s) : -1+54+55+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	16.20	0.62	152	3.390	6.3	3213
vest/3	23.55	0.51	297	3.390	6.3	6287
vest/4	28.80	0.59	150	3.390	6.3	3169
vest/5	0.00		7	0.000	6.3	0
vest/6	46.80	1.70	360	3.390	6.3	7617
vest/9	34.20	0.71	143	3.390	6.3	3032
vest/11	27.00	1.42	111	3.390	6.3	2351
Total	176.55	0.99	1218	3.371		25668

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s m ni 0.45 vest

profile : x=1200

code(s) : -1+54+96+99

name/num	inters. length	ni	area m2	density	projection range	tons	
vest/1	13.40	0.48	39	3.390	6.3	823	
vest/3	0.00		11	0.000	6.3	0	- 1
vest/4	2.30	0.11	9	3.390	6.3	197	? - 1
vest/5	16.30	0.56	181	3.390	6.3	3842	
vest/6	19.48	0.60	84	3.390	6.3	1771	
vest/7	3.90	0.61	14	3.390	6.3	301	
vest/8	27.30	0.34	48	3.390	6.3	1025	? 99
vest/9	0.00		2	0.000	6.3	0	- 1
vest/10	18.90	1.57	79	3.390	6.3	1676	
vest/11	151.55	1.84	598	3.390	6.3	12661	
Total	253.13	1.35	1065	3.350		22296	

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1206

code(s) : -1+1+54+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	19.80	0.56	113	3.390	6.3	2402
vest/3	3.60	0.56	23	3.390	6.3	483
vest/4	15.00	0.47	47	3.390	6.3	990
vest/5	0.00		7	0.000	6.3	0
vest/6	0.00		15	0.000	6.3	0
vest/7	10.80	0.85	136	3.390	6.3	2887
Total	49.20	0.67	341	3.174		6761

IN SITU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1212

code(s) : 1+54

name/num	inters. length	ni	area m2	density	projection range	tons
vest/3	31.55	0.60	149	3.390	9.4	4722
Total	31.55	0.60	149	3.390		4722

IN STIU ORE RESERVE ESTIMATION 10.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1225

code(s) : -1+1+54+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	39.35	0.66	126	3.390	12.5	5325
vest/4	1.80	0.18	11	3.390	12.5	470 ? -1
vest/5	5.00	0.55	32	3.390	12.5	1350
vest/6	43.30	0.64	84	3.390	12.5	3577
Total	89.45	0.61	253	3.390		10722

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1237

code(s) : -1+1+54+96

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	39.75	0.56	146	3.390	12.5	6199
vest/3	0.60	0.37	8	3.390	12.5	353
vest/4	42.00	0.52	99	3.390	12.5	4207
Total	82.35	0.54	254	3.390		10759

IN SITU ORE RESERVE ESTIMATION

18.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 23+24+25+26+27

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 28.80	0.55	129	3.390	12.5	5454
x=1262 70.30	0.59	327	3.390	12.5	13836
x=1275 76.95	0.48	304	3.390	12.5	12862
x=1287 97.15	0.56	436	3.390	12.5	18487
x=1300 111.95	0.52	736	3.390	12.5	31187
x=1312 181.50	0.53	704	3.390	12.5	29816
x=1325 148.70	0.60	985	3.390	12.5	41739
x=1337 224.75	0.55	1495	3.390	12.5	63353
x=1350 168.65	0.53	1784	3.390	12.5	75579
x=1362 490.20	0.55	3128	3.390	12.5	132544
x=1375 177.35	0.58	1146	3.390	12.5	48579
x=1387 145.00	0.49	706	3.390	12.5	29897
x=1400 469.01	0.49	2837	3.390	12.5	120199
x=1412 62.35	0.58	309	3.390	12.5	13106
x=1425 103.20	0.49	1109	3.390	12.5	46981
x=1437 69.70	0.50	570	3.390	12.5	24164
x=1450 166.75	0.50	753	3.390	12.5	31917
x=1462 144.72	0.51	868	3.390	12.5	36780
x=1475 25.80	0.47	233	3.390	12.5	9889
x=1487 0.00	0.45	135	3.390	12.5	5737
x=1500 0.00		0	0.000	0.0	0
x=1512 6.40	0.45	22	3.390	12.5	942
x=1525 18.20	0.45	33	3.390	12.5	1419
x=1537 9.30	0.45	99	3.390	12.5	4176
total 2996.73	0.53	18847	3.3900	287.5	798642

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest
 profile : x=1250 - 1537
 code(s) : 23+24+25+26+27+28

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 28.80	0.55	129	3.390	12.5	5454
x=1262 70.30	0.59	327	3.390	12.5	13836
x=1275 76.95	0.48	304	3.390	12.5	12862
x=1287 97.15	0.56	436	3.390	12.5	18487
x=1300 111.95	0.52	736	3.390	12.5	31187
x=1312 181.50	0.53	704	3.390	12.5	29816
x=1325 148.70	0.60	985	3.390	12.5	41739
x=1337 224.75	0.55	1495	3.390	12.5	63353
x=1350 168.65	0.53	1784	3.390	12.5	75579
x=1362 494.20	0.56	3262	3.390	12.5	138237
x=1375 177.35	0.58	1265	3.390	12.5	53588
x=1387 148.80	0.50	748	3.390	12.5	31694
x=1400 471.66	0.49	2885	3.390	12.5	122238
x=1412 62.35	0.58	309	3.390	12.5	13106
x=1425 103.20	0.49	1109	3.390	12.5	46981
x=1437 69.70	0.50	570	3.390	12.5	24164
x=1450 199.90	0.49	923	3.390	12.5	39099
x=1462 144.72	0.51	868	3.390	12.5	36780
x=1475 25.80	0.47	233	3.390	12.5	9889
x=1487 0.00	0.45	135	3.390	12.5	5737
x=1500 0.00		0	0.000	0.0	0
x=1512 6.40	0.45	22	3.390	12.5	942
x=1525 18.20	0.45	33	3.390	12.5	1419
x=1537 9.30	0.45	99	3.390	12.5	4176
total 3040.33	0.53	19360	3.3900	287.5	820362

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 23+24+25+26+27+28+61+62

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 28.80	0.55	129	3.390	12.5	5454
x=1262 70.30	0.59	327	3.390	12.5	13836
x=1275 76.95	0.48	304	3.390	12.5	12862
x=1287 97.15	0.56	436	3.390	12.5	18487
x=1300 111.95	0.52	736	3.390	12.5	31187
x=1312 181.50	0.53	704	3.390	12.5	29816
x=1325 148.70	0.60	985	3.390	12.5	41739
x=1337 224.75	0.55	1495	3.390	12.5	63353
x=1350 168.65	0.53	1784	3.390	12.5	75579
x=1362 494.20	0.56	3262	3.390	12.5	138237
x=1375 177.35	0.58	1265	3.390	12.5	53588
x=1387 148.80	0.50	748	3.390	12.5	31694
x=1400 471.66	0.49	2885	3.390	12.5	122238
x=1412 62.35	0.58	309	3.390	12.5	13106
x=1425 103.20	0.49	1109	3.390	12.5	46981
x=1437 69.70	0.50	570	3.390	12.5	24164
x=1450 199.90	0.49	923	3.390	12.5	39099
x=1462 160.67	0.57	1142	3.390	12.5	48401
x=1475 25.80	0.47	233	3.390	12.5	9889
x=1487 0.00	0.45	135	3.390	12.5	5737
x=1500 0.00		0	0.000	0.0	0
x=1512 6.40	0.45	22	3.390	12.5	942
x=1525 18.20	0.45	33	3.390	12.5	1419
x=1537 9.30	0.45	99	3.390	12.5	4176
total 3056.28	0.53	19634	3.3900	287.5	831983

IN STIU ORE RESERVE ESTIMATION 18.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 97

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 0.00		0	0.000	0.0	0
x=1262 0.00		0	0.000	0.0	0
x=1275 0.00		0	0.000	0.0	0
x=1287 0.00		0	0.000	0.0	0
x=1300 0.00		0	0.000	0.0	0
x=1312 0.00		0	0.000	0.0	0
x=1325 0.00		0	0.000	0.0	0
x=1337 0.00		0	0.000	0.0	0
x=1350 0.00		0	0.000	0.0	0
x=1362 0.00		0	0.000	0.0	0
x=1375 0.00		0	0.000	0.0	0
x=1387 0.00		0	0.000	0.0	0
x=1400 12.60	0.51	91	3.390	12.5	3859
x=1412 27.60	0.49	210	3.390	12.5	8913
x=1425 5.40	0.60	82	3.390	12.5	3491
x=1437 14.40	0.47	113	3.390	12.5	4784
x=1450 25.15	0.50	171	3.390	12.5	7226
x=1462 56.50	0.53	303	3.390	12.5	12852
x=1475 18.40	0.55	160	3.390	12.5	6760
x=1487 27.00	0.63	146	3.390	12.5	6208
x=1500 28.35	0.51	125	3.390	12.5	5278
x=1512 34.28	0.57	231	3.390	12.5	9791
x=1525 0.00		0	0.000	0.0	0
x=1537 0.00		0	0.000	0.0	0
total 249.68	0.54	1632	3.3900	125.0	69161

IN SITU ORE RESERVE ESTIMATION

17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 23

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 16.05	0.54	58	3.390	12.5	2442
x=1262 56.50	0.60	239	3.390	12.5	10121
x=1275 55.35	0.47	195	3.390	12.5	8265
x=1287 54.30	0.53	263	3.390	12.5	11126
x=1300 0.00		0	0.000	0.0	0
x=1312 0.00		0	0.000	0.0	0
x=1325 0.00		0	0.000	0.0	0
x=1337 71.20	0.51	306	3.390	12.5	12965
x=1350 64.65	0.54	371	3.390	12.5	15716
x=1362 0.00		0	0.000	0.0	0
x=1375 5.90	0.50	70	3.390	12.5	2974
x=1387 37.80	0.45	264	3.390	12.5	11178
x=1400 127.41	0.45	860	3.390	12.5	36443
x=1412 0.00		0	0.000	0.0	0
x=1425 25.80	0.43	421	3.390	12.5	17823
x=1437 0.00	0.45	33	3.390	12.5	1416
x=1450 0.00		0	0.000	0.0	0
x=1462 3.60	0.49	19	3.390	12.5	811
x=1475 22.20	0.49	97	3.390	12.5	4102
x=1487 0.00		0	0.000	0.0	0
x=1500 0.00		0	0.000	0.0	0
x=1512 0.00		0	0.000	0.0	0
x=1525 0.00		0	0.000	0.0	0
x=1537 0.00		0	0.000	0.0	0
total 540.76	0.49	3195	3.3900	162.5	135382

IN STIU CRE RESERVE ESTIMATION 17.12.1998

polygons: s_m ni_0.45_vest

profile : x=1250 - 1537

code(s) : 24

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 12.75	0.57	71	3.390	12.5	3012
x=1262 13.80	0.57	88	3.390	12.5	3715
x=1275 21.60	0.49	108	3.390	12.5	4597
x=1287 42.85	0.61	174	3.390	12.5	7362
x=1300 48.80	0.53	468	3.390	12.5	19823
x=1312 181.50	0.53	704	3.390	12.5	29816
x=1325 125.70	0.61	719	3.390	12.5	30461
x=1337 103.40	0.57	704	3.390	12.5	29830
x=1350 33.80	0.52	603	3.390	12.5	25547
x=1362 174.20	0.51	1179	3.390	12.5	49968
x=1375 25.60	0.55	276	3.390	12.5	11687
x=1387 0.00		0	0.000	0.0	0
x=1400 48.00	0.48	333	3.390	12.5	14096
x=1412 0.00		0	0.000	0.0	0
x=1425 77.40	0.53	688	3.390	12.5	29158
x=1437 57.10	0.48	468	3.390	12.5	19831
x=1450 72.50	0.51	526	3.390	12.5	22271
x=1462 41.12	0.54	272	3.390	12.5	11529
x=1475 0.00		0	0.000	0.0	0
x=1487 0.00		0	0.000	0.0	0
x=1500 0.00		0	0.000	0.0	0
x=1512 0.00		0	0.000	0.0	0
x=1525 0.00		0	0.000	0.0	0
x=1537 0.00		0	0.000	0.0	0
total 1080.12	0.53	7379	3.3900	200.0	312703

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1250 - 1537

code(s) : 25

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 0.00		0	0.000	0.0	0
x=1262 0.00		0	0.000	0.0	0
x=1275 0.00		0	0.000	0.0	0
x=1287 0.00		0	0.000	0.0	0
x=1300 63.15	0.49	268	3.390	12.5	11363
x=1312 0.00		0	0.000	0.0	0
x=1325 18.00	0.59	180	3.390	12.5	7633
x=1337 34.40	0.60	250	3.390	12.5	10603
x=1350 31.00	0.56	372	3.390	12.5	15766
x=1362 166.90	0.54	1045	3.390	12.5	44281
x=1375 4.00	0.52	55	3.390	12.5	2337
x=1387 31.00	0.50	145	3.390	12.5	6158
x=1400 90.50	0.52	1032	3.390	12.5	43738
x=1412 24.00	0.61	211	3.390	12.5	8948
x=1425 0.00		0	0.000	0.0	0
x=1437 0.00		0	0.000	0.0	0
x=1450 0.00		0	0.000	0.0	0
x=1462 39.80	0.50	319	3.390	12.5	13516
x=1475 3.60	0.45	137	3.390	12.5	5787
x=1487 0.00	0.45	135	3.390	12.5	5737
x=1500 0.00		0	0.000	0.0	0
x=1512 6.40	0.45	22	3.390	12.5	942
x=1525 18.20	0.45	33	3.390	12.5	1419
x=1537 0.00		0	0.000	0.0	0
total 530.95	0.53	4206	3.3900	175.0	178228

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 26

profile	intersection length	ni	area m2	density	projection range	tons
x=1250	0.00		0	0.000	0.0	0
x=1262	0.00		0	0.000	0.0	0
x=1275	0.00		0	0.000	0.0	0
x=1287	0.00		0	0.000	0.0	0
x=1300	0.00		0	0.000	0.0	0
x=1312	0.00		0	0.000	0.0	0
x=1325	0.00		0	0.000	0.0	0
x=1337	0.00		0	0.000	0.0	0
x=1350	0.00		0	0.000	0.0	0
x=1362	11.65	0.45	40	3.390	12.5	1708
x=1375	0.00		0	0.000	0.0	0
x=1387	5.10	0.51	22	3.390	12.5	916
x=1400	40.00	0.46	186	3.390	12.5	7871
x=1412	0.00		0	0.000	0.0	0
x=1425	0.00		0	0.000	0.0	0
x=1437	0.00		0	0.000	0.0	0
x=1450	0.00		0	0.000	0.0	0
x=1462	60.20	0.51	248	3.390	12.5	10519
x=1475	0.00		0	0.000	0.0	0
x=1487	0.00		0	0.000	0.0	0
x=1500	0.00		0	0.000	0.0	0
x=1512	0.00		0	0.000	0.0	0
x=1525	0.00		0	0.000	0.0	0
x=1537	9.30	0.45	99	3.390	12.5	4176
total	126.25	0.48	594	3.3900	62.5	25190

IN SITU ORE RESERVE ESTIMATION

17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 27

profile	intersection	ni	area	density	projection	tons
	length		n2		range	
x=1250	0.00		0	0.000	0.0	0
x=1262	0.00		0	0.000	0.0	0
x=1275	0.00		0	0.000	0.0	0
x=1287	0.00		0	0.000	0.0	0
x=1300	0.00		0	0.000	0.0	0
x=1312	0.00		0	0.000	0.0	0
x=1325	5.00	0.56	86	3.390	12.5	3644
x=1337	15.75	0.47	235	3.390	12.5	9954
x=1350	39.20	0.52	438	3.390	12.5	18550
x=1362	137.45	0.64	863	3.390	12.5	36587
x=1375	141.85	0.60	745	3.390	12.5	31581
x=1387	71.10	0.52	275	3.390	12.5	11646
x=1400	163.10	0.52	426	3.390	12.5	18051
x=1412	38.35	0.52	98	3.390	12.5	4158
x=1425	0.00		0	0.000	0.0	0
x=1437	12.60	0.62	69	3.390	12.5	2917
x=1450	94.25	0.45	228	3.390	12.5	9646
x=1462	0.00	0.50	10	3.390	12.5	404
x=1475	0.00		0	0.000	0.0	0
x=1487	0.00		0	0.000	0.0	0
x=1500	0.00		0	0.000	0.0	0
x=1512	0.00		0	0.000	0.0	0
x=1525	0.00		0	0.000	0.0	0
x=1537	0.00		0	0.000	0.0	0
total	718.65	0.56	3472	3.3900	137.5	147137

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 28

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1250 0.00		0	0.000	0.0	0
x=1262 0.00		0	0.000	0.0	0
x=1275 0.00		0	0.000	0.0	0
x=1287 0.00		0	0.000	0.0	0
x=1300 0.00		0	0.000	0.0	0
x=1312 0.00		0	0.000	0.0	0
x=1325 0.00		0	0.000	0.0	0
x=1337 0.00		0	0.000	0.0	0
x=1350 0.00		0	0.000	0.0	0
x=1362 4.00	0.74	134	3.390	12.5	5693
x=1375 0.00	0.61	118	3.390	12.5	5009
x=1387 3.80	0.62	42	3.390	12.5	1797
x=1400 2.65	0.65	48	3.390	12.5	2039
x=1412 0.00		0	0.000	0.0	0
x=1425 0.00		0	0.000	0.0	0
x=1437 0.00		0	0.000	0.0	0
x=1450 33.15	0.45	169	3.390	12.5	7182
x=1462 0.00		0	0.000	0.0	0
x=1475 0.00		0	0.000	0.0	0
x=1487 0.00		0	0.000	0.0	0
x=1500 0.00		0	0.000	0.0	0
x=1512 0.00		0	0.000	0.0	0
x=1525 0.00		0	0.000	0.0	0
x=1537 0.00		0	0.000	0.0	0
total 43.60	0.59	513	3.3900	62.5	21720

IN STIU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1250 - 1537

code(s) : 61+62

profile	intersection length	ni	area m2	density	projection range	tons
x=1250	0.00		0	0.000	0.0	0
x=1262	0.00		0	0.000	0.0	0
x=1275	0.00		0	0.000	0.0	0
x=1287	0.00		0	0.000	0.0	0
x=1300	0.00		0	0.000	0.0	0
x=1312	0.00		0	0.000	0.0	0
x=1325	0.00		0	0.000	0.0	0
x=1337	0.00		0	0.000	0.0	0
x=1350	0.00		0	0.000	0.0	0
x=1362	0.00		0	0.000	0.0	0
x=1375	0.00		0	0.000	0.0	0
x=1387	0.00		0	0.000	0.0	0
x=1400	0.00		0	0.000	0.0	0
x=1412	0.00		0	0.000	0.0	0
x=1425	0.00		0	0.000	0.0	0
x=1437	0.00		0	0.000	0.0	0
x=1450	0.00		0	0.000	0.0	0
x=1462	15.95	0.76	274	3.390	12.5	11621
x=1475	0.00		0	0.000	0.0	0
x=1487	0.00		0	0.000	0.0	0
x=1500	0.00		0	0.000	0.0	0
x=1512	0.00		0	0.000	0.0	0
x=1525	0.00		0	0.000	0.0	0
x=1537	0.00		0	0.000	0.0	0
total	15.95	0.76	274	3.3900	12.5	11621

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1250 - 1537

code(s) : 23+24+25+26+27+28+61+62+96+97+98+99

profile	intersection length	ni	area m2	density	projection range	tons
x=1250	123.25	0.58	468	3.390	12.5	19842
x=1262	186.90	0.57	817	3.390	12.5	34624
x=1275	293.20	0.58	1160	3.390	12.5	49161
x=1287	366.36	0.60	1464	3.390	12.5	62036
x=1300	368.84	0.51	2004	3.390	12.5	84931
x=1312	474.93	0.54	2408	3.390	12.5	102035
x=1325	633.09	0.57	3578	3.390	12.5	151610
x=1337	823.84	0.54	5361	3.390	12.5	227152
x=1350	791.03	0.55	6384	3.390	12.5	270506
x=1362	1036.00	0.56	6427	3.390	12.5	272357
x=1375	723.45	0.52	4737	3.390	12.5	200713
x=1387	475.15	0.48	1989	3.390	12.5	84277
x=1400	794.16	0.50	4436	3.390	12.5	187992
x=1412	528.35	0.50	3178	3.390	12.5	134649
x=1425	648.75	0.52	4275	3.390	12.5	181169
x=1437	555.65	0.53	3603	3.390	12.5	152669
x=1450	678.85	0.50	3628	3.390	12.5	153719
x=1462	504.73	0.54	2986	3.390	12.5	126533
x=1475	222.08	0.53	1439	3.390	12.5	60994
x=1487	119.06	0.51	1124	3.390	12.5	47623
x=1500	143.85	0.55	866	3.390	12.5	36685
x=1512	196.35	0.55	1425	3.390	12.5	60394
x=1525	269.15	0.53	1734	3.390	12.5	73457
x=1537	223.45	0.54	1453	3.390	12.5	61589
total	11180.47	0.53	66943	3.3900	300.0	2836717

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1250

code(s) : -1+23+24+25+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	5.80	0.67	45	3.390	12.5	1901
vest/3	85.05	0.58	280	3.390	12.5	11882
vest/4	27.10	0.35	168	3.390	12.5	7126
vest/5	5.75	0.37	8	3.390	12.5	319
vest/6	12.75	0.57	71	3.390	12.5	3012
vest/7	16.05	0.54	58	3.390	12.5	2442
vest/8	3.60	0.57	14	3.390	12.5	605
Total	156.10	0.52	644	3.390		27287

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1262

code(s) : -1+1+23+24+96+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	7.30	0.73	30	3.390	12.5	1280
vest/3	57.05	0.57	269	3.390	12.5	11387
vest/4	0.00		5	0.000	12.5	0
vest/5	13.80	0.57	88	3.390	12.5	3715
vest/6	18.15	0.54	52	3.390	12.5	2212
vest/7	0.00		2	0.000	12.5	0
vest/8	13.80	0.47	75	3.390	12.5	3183
vest/9	56.50	0.60	239	3.390	12.5	10121
vest/10	20.30	0.54	64	3.390	12.5	2728
Total	186.90	0.57	823	3.364		34624

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1275

code(s) : -1+1+23+24+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	199.85	0.63	805	3.390	12.5	34100
vest/3	21.60	0.49	108	3.390	12.5	4597
vest/4	16.40	0.45	52	3.390	12.5	2199
vest/5	0.00		9	0.000	12.5	0
vest/6	55.35	0.47	195	3.390	12.5	8265
Total	293.20	0.58	1169	3.363		49161

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1287

code(s) : -1+1+23+24+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	3.30	0.58	13	3.390	12.5	553
vest/3	0.00		3	0.000	12.5	0
vest/4	11.30	0.65	22	3.390	12.5	924
vest/5	0.00		10	0.000	12.5	0
vest/6	6.95	0.52	88	3.390	12.5	3742
vest/7	247.66	0.62	905	3.390	12.5	38330
vest/8	0.00		3	0.000	12.5	0
vest/9	31.59	0.54	153	3.390	12.5	6485
vest/10	22.71	0.52	110	3.390	12.5	4641
vest/11	42.85	0.61	174	3.390	12.5	7362
Total	366.36	0.60	1480	3.353		62036

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1300

code(s) : 1+24+25+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	1.65	0.70	25	3.390	12.5	1054
vest/3	45.55	0.52	184	3.390	12.5	7807
vest/4	16.55	0.60	157	3.390	12.5	6658
vest/5	64.10	0.57	331	3.390	12.5	14011
vest/6	15.50	0.51	84	3.390	12.5	3560
vest/7	63.15	0.49	268	3.390	12.5	11363
vest/8	48.80	0.53	468	3.390	12.5	19823
vest/9	113.54	0.42	487	3.390	12.5	20653
Total	368.84	0.51	2004	3.390		84931

IN STIU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1312

code(s) : -1+1+24+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	0.00	0.68	44	3.390	12.5	1848
vest/3	26.65	0.67	230	3.390	12.5	9741
vest/4	0.00	0.51	53	3.390	12.5	2231
vest/5	12.60	0.58	54	3.390	12.5	2307
vest/6	46.80	0.58	296	3.390	12.5	12546
vest/7	46.80	0.51	355	3.390	12.5	15038
vest/8	95.50	0.53	249	3.390	12.5	10546
vest/9	24.80	0.45	170	3.390	12.5	7185
vest/10	61.20	0.57	285	3.390	12.5	12085
vest/11	1.80	0.05	6	3.390	12.5	260
vest/12	61.35	0.45	198	3.390	12.5	8408
vest/13	4.65	0.64	110	3.390	12.5	4653
vest/14	0.00	0.48	14	3.390	12.5	613
vest/15	21.28	0.48	56	3.390	12.5	2376
vest/16	73.30	0.48	294	3.390	12.5	12457
vest/17	0.00		7	0.000	12.5	0
Total	476.73	0.54	2421	3.381		102295

IN STIU CRE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1325
 code(s) : -1+1+24+25+27+98+99

name/nm	inters. length	ni	area m2	density	projection range	tons
vest/2	5.00	0.56	86	3.390	12.5	3644
vest/3	29.55	0.62	342	3.390	12.5	14489
vest/4	33.00	0.71	374	3.390	12.5	15842
vest/5	184.40	0.51	539	3.390	12.5	22828
vest/7	23.40	0.52	195	3.390	12.5	8269
vest/8	27.00	0.47	177	3.390	12.5	7503
vest/9	18.00	0.59	180	3.390	12.5	7633
vest/11	155.54	0.45	701	3.390	12.5	29694
vest/12	125.70	0.61	719	3.390	12.5	30461
vest/13	0.00		17	0.000	12.5	0
vest/14	20.70	0.61	96	3.390	12.5	4051
vest/16	10.80	0.72	170	3.390	12.5	7195
Total	633.09	0.57	3595	3.374		151610

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1337

code(s) : -1+1+23+24+25+27+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	12.15	0.45	121	3.390	12.5	5133
vest/3	3.60	0.50	114	3.390	12.5	4821
vest/4	0.00		8	0.000	12.5	0
vest/5	0.00		7	0.000	12.5	0
vest/6	9.50	0.49	178	3.390	12.5	7562
vest/7	36.90	0.50	363	3.390	12.5	15365
vest/8	12.60	0.31	177	3.390	12.5	7505
vest/10	90.70	0.69	488	3.390	12.5	20696
vest/11	23.40	0.48	148	3.390	12.5	6274
vest/12	103.40	0.57	704	3.390	12.5	29830
vest/13	71.20	0.51	306	3.390	12.5	12965
vest/14	6.60	0.48	19	3.390	12.5	822
vest/15	303.59	0.51	1723	3.390	12.5	72992
vest/16	115.80	0.56	769	3.390	12.5	32582
vest/17	34.40	0.60	250	3.390	12.5	10603
Total	823.84	0.54	5375	3.381		227152

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1350

code(s) : -1+1+23+24+25+27+96+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	39.20	0.52	438	3.390	12.5	18550
vest/4	0.00	0.51	34	3.390	12.5	1439
vest/5	18.00	0.55	268	3.390	12.5	11355
vest/6	76.60	0.56	811	3.390	12.5	34363
vest/7	30.80	0.55	95	3.390	12.5	4018
vest/8	13.00	0.59	104	3.390	12.5	4410
vest/9	7.20	0.62	81	3.390	12.5	3453
vest/10	73.80	0.68	762	3.390	12.5	32280
vest/11	17.88	0.48	82	3.390	12.5	3465
vest/12	6.00	0.55	67	3.390	12.5	2854
vest/13	3.62	0.43	20	3.390	12.5	862
vest/14	11.60	0.56	210	3.390	12.5	8916
vest/15	0.00		3	0.000	12.5	0
vest/16	22.20	0.50	392	3.390	12.5	16631
vest/17	0.00		6	0.000	12.5	0
vest/18	29.75	0.50	275	3.390	12.5	11666
vest/19	86.55	0.58	868	3.390	12.5	36777
vest/20	64.65	0.54	371	3.390	12.5	15716
vest/21	97.60	0.48	571	3.390	12.5	24200
vest/23	196.20	0.51	954	3.390	12.5	40411
Total	794.65	0.55	6412	3.385		271368

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1362

code(s) : -1+1+24+25+26+27+28+96+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	4.00	0.74	134	3.390	12.5	5693
vest/2	7.20	0.21	18	3.390	12.5	760
vest/3	137.45	0.64	863	3.390	12.5	36587
vest/4	25.60	0.66	220	3.390	12.5	9305
vest/5	11.65	0.45	40	3.390	12.5	1708
vest/6	159.55	0.63	661	3.390	12.5	28009
vest/7	166.90	0.54	1045	3.390	12.5	44281
vest/8	37.80	0.45	285	3.390	12.5	12087
vest/10	174.20	0.51	1179	3.390	12.5	49968
vest/11	0.00		21	0.000	12.5	0
vest/12	16.20	0.62	105	3.390	12.5	4446
vest/14	21.60	0.52	85	3.390	12.5	3608
vest/15	136.00	0.57	1188	3.390	12.5	50338
vest/16	37.45	0.51	180	3.390	12.5	7607
vest/17	0.00		6	0.000	12.5	0
vest/18	73.40	0.50	292	3.390	12.5	12379
vest/19	0.00		19	0.000	12.5	0
vest/21	34.20	0.50	150	3.390	12.5	6340
Total	1043.20	0.56	6491	3.366		273118

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1375

code(s) : -1+1+23+24+25+27+28+96+98+99

name/nm	inters. length	ni	area m2	density	projection range	tons
vest/3	0.00	0.61	118	3.390	12.5	5009
vest/5	12.60	0.45	91	3.390	12.5	3867
vest/6	1.80	0.28	24	3.390	12.5	1013
vest/7	198.95	0.47	1005	3.390	12.5	42601
vest/8	39.55	0.47	257	3.390	12.5	10903
vest/9	0.00		5	0.000	12.5	0
vest/10	4.00	0.52	55	3.390	12.5	2337
vest/11	57.25	0.50	164	3.390	12.5	6954
vest/12	0.00		14	0.000	12.5	0
vest/13	25.60	0.55	276	3.390	12.5	11687
vest/14	0.00		14	0.000	12.5	0
vest/15	118.80	0.54	1132	3.390	12.5	47974
vest/16	5.90	0.50	70	3.390	12.5	2974
vest/18	14.40	0.51	89	3.390	12.5	3755
vest/19	0.00		15	0.000	12.5	0
vest/21	141.85	0.60	745	3.390	12.5	31581
vest/22	104.55	0.50	733	3.390	12.5	31071
Total	725.25	0.52	4808	3.357		201726

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1387

code(s) : -1+1+23+25+26+27+28+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	3.80	0.62	42	3.390	12.5	1797
vest/5	31.00	0.50	145	3.390	12.5	6158
vest/6	125.70	0.47	465	3.390	12.5	19696
vest/7	32.40	0.48	111	3.390	12.5	4702
vest/8	105.90	0.46	258	3.390	12.5	10944
vest/9	6.00	0.40	25	3.390	12.5	1069
vest/10	37.80	0.45	264	3.390	12.5	11178
vest/11	3.60	0.47	7	3.390	12.5	312
vest/12	35.15	0.47	304	3.390	12.5	12900
vest/14	4.60	0.40	22	3.390	12.5	947
vest/15	15.40	0.52	84	3.390	12.5	3574
vest/16	5.30	0.43	9	3.390	12.5	375
vest/17	5.10	0.51	22	3.390	12.5	916
vest/18	27.20	0.45	102	3.390	12.5	4341
vest/19	55.70	0.53	190	3.390	12.5	8072
Total	494.65	0.48	2053	3.390		86980

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1400

code(s) : -1+23+24+25+26+27+28+96+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	4.35	0.48	42	3.390	12.5	1799
vest/3	2.65	0.65	48	3.390	12.5	2039
vest/4	8.40	0.41	45	3.390	12.5	1892
vest/5	0.00		13	0.000	12.5	0
vest/6	11.30	0.46	113	3.390	12.5	4774
vest/7	1.80	0.26	30	3.390	12.5	1264
vest/8	12.60	0.51	91	3.390	12.5	3859
vest/10	4.25	0.07	7	3.390	12.5	286
vest/11	13.35	0.38	37	3.390	12.5	1550
vest/12	5.30	0.45	20	3.390	12.5	853
vest/13	14.35	0.38	70	3.390	12.5	2952
vest/14	3.45	0.52	14	3.390	12.5	609
vest/15	163.10	0.52	426	3.390	12.5	18051
vest/17	72.40	0.48	210	3.390	12.5	8901
vest/19	68.00	0.54	743	3.390	12.5	31464
vest/20	22.50	0.46	290	3.390	12.5	12275
vest/22	43.65	0.47	290	3.390	12.5	12297
vest/24	96.80	0.54	542	3.390	12.5	22988
vest/27	88.99	0.45	561	3.390	12.5	23791
vest/28	41.90	0.54	246	3.390	12.5	10418
vest/29	41.40	0.47	118	3.390	12.5	4983
vest/30	34.17	0.47	292	3.390	12.5	12366
vest/31	19.60	0.56	143	3.390	12.5	6050
vest/32	20.00	0.47	88	3.390	12.5	3730
vest/33	0.00	0.51	30	3.390	12.5	1263
vest/34	23.40	0.47	53	3.390	12.5	2244
Total	817.71	0.50	4560	3.380		192698

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest
 profile : x=1412
 code(s) : -1+1+25+27+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	38.35	0.52	98	3.390	12.5	4158
vest/3	3.60	0.40	15	3.390	12.5	630
vest/4	64.30	0.51	255	3.390	12.5	10820
vest/5	24.00	0.61	211	3.390	12.5	8948
vest/7	47.60	0.48	231	3.390	12.5	9805
vest/8	7.40	0.49	82	3.390	12.5	3484
vest/9	177.83	0.48	1425	3.390	12.5	60377
vest/10	0.00		4	0.000	12.5	0
vest/11	0.00		15	0.000	12.5	0
vest/12	12.60	0.44	65	3.390	12.5	2769
vest/13	32.64	0.46	133	3.390	12.5	5623
vest/14	0.00		6	0.000	12.5	0
vest/15	27.60	0.49	210	3.390	12.5	8913
vest/16	88.80	0.54	423	3.390	12.5	17944
vest/17	7.20	0.25	19	3.390	12.5	823
vest/19	7.23	0.46	43	3.390	12.5	1807
Total	539.15	0.50	3237	3.364		136102

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1425
 code(s) : -1+23+24+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	21.60	0.52	129	3.390	12.5	5446
vest/3	67.30	0.50	271	3.390	12.5	11489
vest/4	35.20	0.49	332	3.390	12.5	14061
vest/5	376.05	0.54	2405	3.390	12.5	101932
vest/6	9.00	0.43	330	3.390	12.5	14003
vest/7	42.20	0.56	356	3.390	12.5	15096
vest/8	16.80	0.42	90	3.390	12.5	3820
vest/9	3.60	0.41	34	3.390	12.5	1456
vest/13	5.40	0.60	82	3.390	12.5	3491
vest/14	12.60	0.21	20	3.390	12.5	832
vest/15	75.20	0.51	279	3.390	12.5	11829
vest/16	0.00		22	0.000	12.5	0
Total	664.95	0.52	4351	3.373		183456

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1437

code(s) : 23+24+26+27+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	12.60	0.62	69	3.390	12.5	2917
vest/3	30.45	0.62	332	3.390	12.5	14063
vest/4	57.10	0.48	468	3.390	12.5	19831
vest/6	82.70	0.45	278	3.390	12.5	11800
vest/7	148.20	0.58	1139	3.390	12.5	48251
vest/8	14.40	0.47	113	3.390	12.5	4784
vest/9	100.40	0.48	686	3.390	12.5	29071
vest/10	0.00	0.45	33	3.390	12.5	1416
vest/11	109.80	0.52	485	3.390	12.5	20537
Total	555.65	0.53	3603	3.390		152669

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1450

code(s) : -1+1+24+27+28+96+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	0.00		20	0.000	12.5	0
vest/4	33.15	0.45	169	3.390	12.5	7182
vest/5	94.25	0.45	228	3.390	12.5	9646
vest/6	43.90	0.50	171	3.390	12.5	7225
vest/7	0.00	0.51	31	3.390	12.5	1315
vest/8	36.40	0.55	275	3.390	12.5	11670
vest/9	90.40	0.56	611	3.390	12.5	25899
vest/10	72.50	0.51	526	3.390	12.5	22271
vest/11	9.00	0.47	76	3.390	12.5	3224
vest/12	0.00		67	0.000	12.5	0
vest/13	10.25	0.58	185	3.390	12.5	7836
vest/15	12.30	0.52	75	3.390	12.5	3194
vest/16	5.40	0.46	49	3.390	12.5	2075
vest/17	25.15	0.50	171	3.390	12.5	7226
vest/18	246.15	0.46	1061	3.390	12.5	44957
vest/19	0.00		6	0.000	12.5	0
vest/20	1.80	0.42	6	3.390	12.5	242
Total	680.65	0.50	3726	3.306		153961

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s.m.ni_0.45_vest

profile : x=1462

code(s) : -1+1+23+24+25+26+27+61+62+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	15.95	0.76	149	3.390	12.5	6326
vest/7	5.20	0.31	35	3.390	12.5	1499
vest/8	23.12	0.56	149	3.390	12.5	6321
vest/9	18.00	0.52	123	3.390	12.5	5209
vest/10	51.45	0.54	232	3.390	12.5	9827
vest/11	3.60	0.50	19	3.390	12.5	811
vest/12	38.56	0.51	172	3.390	12.5	7290
vest/13	18.60	0.50	139	3.390	12.5	5870
vest/15	56.50	0.53	303	3.390	12.5	12852
vest/16	37.30	0.44	272	3.390	12.5	11509
vest/17	25.85	0.54	243	3.390	12.5	10297
vest/18	60.20	0.51	248	3.390	12.5	10519
vest/19	0.00	0.50	10	3.390	12.5	404
vest/20	0.00	0.76	125	3.390	12.5	5295
vest/21	115.80	0.53	483	3.390	12.5	20488
vest/24	39.80	0.50	319	3.390	12.5	13516
Total	509.93	0.53	3021	3.390		128032

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1475
 code(s) : 23+25+96+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	3.60	0.45	137	3.390	12.5	5787
vest/4	77.75	0.56	261	3.390	12.5	11051
vest/5	16.13	0.51	152	3.390	12.5	6453
vest/6	31.10	0.55	208	3.390	12.5	8815
vest/7	22.20	0.49	97	3.390	12.5	4102
vest/8	16.60	0.60	74	3.390	12.5	3115
vest/9	1.80	0.52	86	3.390	12.5	3645
vest/11	26.60	0.54	220	3.390	12.5	9321
vest/12	26.30	0.54	205	3.390	12.5	8704
Total	222.08	0.53	1439	3.390		60994

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1487

code(s) : 25+26+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	0.00	0.45	135	3.390	12.5	5737
vest/3	63.26	0.49	585	3.390	12.5	24805
vest/4	27.00	0.63	146	3.390	12.5	6208
vest/5	19.80	0.59	105	3.390	12.5	4464
vest/6	9.00	0.52	151	3.390	12.5	6409
Total	119.06	0.51	1124	3.390		47623

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1500

code(s) : -1+1+96+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	7.20	0.52	116	3.390	12.5	4915
vest/3	0.00		6	0.000	12.5	0
vest/4	49.60	0.58	258	3.390	12.5	10930
vest/6	36.00	0.58	213	3.390	12.5	9015
vest/7	0.00		6	0.000	12.5	0
vest/8	8.10	0.45	50	3.390	12.5	2118
vest/9	14.60	0.58	105	3.390	12.5	4428
vest/10	28.35	0.51	125	3.390	12.5	5278
Total	143.85	0.55	878	3.343		36685

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1512

code(s) : -1+1+25+97+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	6.40	0.45	22	3.390	12.5	942
vest/4	87.25	0.55	678	3.390	12.5	28746
vest/5	34.28	0.57	231	3.390	12.5	9791
vest/6	45.02	0.56	320	3.390	12.5	13566
vest/7	23.40	0.50	100	3.390	12.5	4257
vest/8	9.00	0.34	39	3.390	12.5	1649
vest/9	0.00	0.55	73	3.390	12.5	3092
Total	205.35	0.54	1464	3.390		62043

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1525

code(s) : -1+1+25+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	18.20	0.45	33	3.390	12.5	1419
vest/3	12.65	0.39	55	3.390	12.5	2342
vest/4	139.90	0.54	1143	3.390	12.5	48451
vest/5	47.55	0.58	217	3.390	12.5	9176
vest/6	50.85	0.52	285	3.390	12.5	12068
vest/7	0.85	0.64	18	3.390	12.5	763
Total	270.00	0.54	1752	3.390		74220

IN STIU ORE RESERVE ESTIMATION 17.12.1998

polygrns: s_m_ni_0.45_vest

profile : x=1537

code(s) : -1+1+26+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	1.80	0.52	33	3.390	12.5	1387
vest/4	9.30	0.45	99	3.390	12.5	4176
vest/5	37.90	0.57	142	3.390	12.5	6021
vest/6	1.80	0.54	10	3.390	12.5	434
vest/7	3.60	0.55	32	3.390	12.5	1354
vest/8	113.40	0.55	796	3.390	12.5	33748
vest/9	20.40	0.50	135	3.390	12.5	5721
vest/10	33.45	0.59	190	3.390	12.5	8062
vest/11	3.60	0.53	26	3.390	12.5	1120
Total	225.25	0.54	1464	3.390		62023

IN SITU ORE RESERVE ESTIMATION 18.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 33+34+35+36

profile	intersection length	ni	area m2	density	projection range	tons
x=1550	89.55	0.56	361	3.390	12.5	15283
x=1562	69.40	0.52	175	3.390	12.5	7416
x=1575	46.55	0.54	295	3.390	12.5	12489
x=1587	234.30	0.51	1153	3.390	12.5	48877
x=1600	289.40	0.56	972	3.390	12.5	41179
x=1612	312.00	0.54	1923	3.390	12.5	81473
x=1625	474.40	0.54	2033	3.390	12.5	86139
x=1637	331.15	0.57	2506	3.390	12.5	106201
x=1650	267.44	0.57	2049	3.390	12.5	86827
x=1662	156.90	0.56	1211	3.390	12.5	51298
x=1675	166.33	0.53	1251	3.390	12.5	52991
x=1687	174.00	0.51	1341	3.390	12.5	56807
x=1700	185.21	0.48	1160	3.390	12.5	49153
x=1712	116.85	0.49	1347	3.390	12.5	57098
x=1725	165.10	0.54	1649	3.390	12.5	69856
x=1737	133.15	0.55	1093	3.390	12.5	46308
x=1750	109.35	0.54	969	3.390	12.5	41068
total	3321.08	0.54	21486	3.3900	212.5	910465

IN SITU ORE RESERVE ESTIMATION 18.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 37+38

profile	intersection	ni	area	density	projection	tons
	length		m2		range	
x=1550	0.00		0	0.000	0.0	0
x=1562	0.00		0	0.000	0.0	0
x=1575	0.00		0	0.000	0.0	0
x=1587	0.00		0	0.000	0.0	0
x=1600	0.00		0	0.000	0.0	0
x=1612	0.00		0	0.000	0.0	0
x=1625	18.80	0.58	266	3.390	12.5	11255
x=1637	25.70	0.62	560	3.390	12.5	23721
x=1650	27.20	0.60	570	3.390	12.5	24135
x=1662	2.30	0.46	36	3.390	12.5	1527
x=1675	13.40	0.50	166	3.390	12.5	7053
x=1687	0.00		0	0.000	0.0	0
x=1700	0.00		0	0.000	0.0	0
x=1712	0.00		0	0.000	0.0	0
x=1725	0.00		0	0.000	0.0	0
x=1737	0.00		0	0.000	0.0	0
x=1750	0.00		0	0.000	0.0	0
total	87.40	0.59	1597	3.3900	62.5	67692

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 33+34+35+36+37+38

profile	intersection length	ni	area m2	density	projection range	tons
x=1550	89.55	0.56	361	3.390	12.5	15283
x=1562	69.40	0.52	175	3.390	12.5	7416
x=1575	46.55	0.54	295	3.390	12.5	12489
x=1587	234.30	0.51	1153	3.390	12.5	48877
x=1600	289.40	0.56	972	3.390	12.5	41179
x=1612	312.00	0.54	1923	3.390	12.5	81473
x=1625	493.20	0.55	2298	3.390	12.5	97395
x=1637	356.85	0.58	3066	3.390	12.5	129922
x=1650	294.64	0.58	2619	3.390	12.5	110962
x=1662	159.20	0.56	1247	3.390	12.5	52825
x=1675	179.73	0.53	1417	3.390	12.5	60045
x=1687	174.00	0.51	1341	3.390	12.5	56807
x=1700	185.21	0.48	1160	3.390	12.5	49153
x=1712	116.85	0.49	1347	3.390	12.5	57098
x=1725	165.10	0.54	1649	3.390	12.5	69856
x=1737	133.15	0.55	1093	3.390	12.5	46308
x=1750	109.35	0.54	969	3.390	12.5	41068
total	3408.48	0.54	23083	3.3900	212.5	978157

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 33

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1550 63.60	0.50	190	3.390	12.5	8039
x=1562 46.35	0.45	58	3.390	12.5	2473
x=1575 41.65	0.55	256	3.390	12.5	10842
x=1587 90.65	0.51	439	3.390	12.5	18589
x=1600 86.00	0.60	274	3.390	12.5	11590
x=1612 86.90	0.48	391	3.390	12.5	16565
x=1625 0.00	0	0	0.000	0.0	0
x=1637 23.65	0.50	127	3.390	12.5	5381
x=1650 40.40	0.49	209	3.390	12.5	8846
x=1662 0.00	0	0	0.000	0.0	0
x=1675 35.30	0.51	243	3.390	12.5	10301
x=1687 43.20	0.50	292	3.390	12.5	12360
x=1700 52.00	0.54	260	3.390	12.5	11035
x=1712 44.65	0.50	220	3.390	12.5	9331
x=1725 32.55	0.49	156	3.390	12.5	6604
x=1737 30.95	0.47	215	3.390	12.5	9123
x=1750 53.10	0.50	329	3.390	12.5	13925
total 770.95	0.51	3658	3.3900	187.5	155003

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 34

profile	intersection	ni	area	density	projection	tons
	length		m2		range	
x=1550	25.95	0.62	171	3.390	12.5	7244
x=1562	23.05	0.55	117	3.390	12.5	4943
x=1575	4.90	0.45	39	3.390	12.5	1648
x=1587	139.80	0.51	695	3.390	12.5	29441
x=1600	203.40	0.55	698	3.390	12.5	29589
x=1612	210.70	0.55	1207	3.390	12.5	51137
x=1625	396.55	0.53	1415	3.390	12.5	59969
x=1637	210.70	0.52	1150	3.390	12.5	48723
x=1650	79.99	0.50	450	3.390	12.5	19056
x=1662	59.75	0.57	399	3.390	12.5	16920
x=1675	41.00	0.55	327	3.390	12.5	13841
x=1687	84.15	0.54	489	3.390	12.5	20724
x=1700	79.79	0.47	364	3.390	12.5	15416
x=1712	32.50	0.54	403	3.390	12.5	17065
x=1725	95.85	0.53	908	3.390	12.5	38490
x=1737	72.20	0.60	528	3.390	12.5	22390
x=1750	28.15	0.61	389	3.390	12.5	16494
total	1788.43	0.54	9748	3.3900	212.5	413089

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45 vest

profile : x=1550 - 1750

code(s) : 35

profile	intersection	ni	area	density	projection	tons
	length		m2		range	
x=1550	0.00		0	0.000	0.0	0
x=1562	0.00		0	0.000	0.0	0
x=1575	0.00		0	0.000	0.0	0
x=1587	3.85	0.54	20	3.390	12.5	848
x=1600	0.00		0	0.000	0.0	0
x=1612	14.40	0.56	325	3.390	12.5	13771
x=1625	77.85	0.57	515	3.390	12.5	21818
x=1637	65.90	0.58	511	3.390	12.5	21649
x=1650	101.65	0.54	547	3.390	12.5	23185
x=1662	67.70	0.52	338	3.390	12.5	14336
x=1675	72.15	0.54	425	3.390	12.5	18000
x=1687	37.10	0.52	407	3.390	12.5	17226
x=1700	24.02	0.50	224	3.390	12.5	9473
x=1712	36.10	0.46	648	3.390	12.5	27474
x=1725	36.70	0.55	584	3.390	12.5	24763
x=1737	30.00	0.53	349	3.390	12.5	14795
x=1750	28.10	0.49	251	3.390	12.5	10649
total	595.52	0.53	5144	3.3900	162.5	217986

IN SITU ORE RESERVE ESTIMATION

17.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 36

profile	intersection length	ni	area m2	density	projection range	tons
x=1550	0.00		0	0.000	0.0	0
x=1562	0.00		0	0.000	0.0	0
x=1575	0.00		0	0.000	0.0	0
x=1587	0.00		0	0.000	0.0	0
x=1600	0.00		0	0.000	0.0	0
x=1612	0.00		0	0.000	0.0	0
x=1625	0.00	0.58	103	3.390	12.5	4353
x=1637	30.90	0.65	719	3.390	12.5	30448
x=1650	45.40	0.64	843	3.390	12.5	35740
x=1662	29.45	0.58	473	3.390	12.5	20041
x=1675	17.88	0.53	256	3.390	12.5	10849
x=1687	9.55	0.46	153	3.390	12.5	6497
x=1700	29.40	0.44	312	3.390	12.5	13230
x=1712	3.60	0.50	76	3.390	12.5	3228
x=1725	0.00		0	0.000	0.0	0
x=1737	0.00		0	0.000	0.0	0
x=1750	0.00		0	0.000	0.0	0
total	166.18	0.59	2935	3.3900	100.0	124386

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest
 profile : x=1550 - 1750
 code(s) : 37

profile	intersection length	ni	area m2	density	projection range	tons
x=1550	0.00		0	0.000	0.0	0
x=1562	0.00		0	0.000	0.0	0
x=1575	0.00		0	0.000	0.0	0
x=1587	0.00		0	0.000	0.0	0
x=1600	0.00		0	0.000	0.0	0
x=1612	0.00		0	0.000	0.0	0
x=1625	12.40	0.60	217	3.390	12.5	9177
x=1637	25.70	0.62	560	3.390	12.5	23721
x=1650	21.20	0.62	511	3.390	12.5	21642
x=1662	2.30	0.46	36	3.390	12.5	1527
x=1675	13.40	0.50	166	3.390	12.5	7053
x=1687	0.00		0	0.000	0.0	0
x=1700	0.00		0	0.000	0.0	0
x=1712	0.00		0	0.000	0.0	0
x=1725	0.00		0	0.000	0.0	0
x=1737	0.00		0	0.000	0.0	0
x=1750	0.00		0	0.000	0.0	0
total	75.00	0.60	1490	3.3900	62.5	63120

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 west

profile : x=1550 - 1750

code(s) : 38

profile	intersection	ni	area	density	projection	tons
	length		m2		range	
x=1550	0.00		0	0.000	0.0	0
x=1562	0.00		0	0.000	0.0	0
x=1575	0.00		0	0.000	0.0	0
x=1587	0.00		0	0.000	0.0	0
x=1600	0.00		0	0.000	0.0	0
x=1612	0.00		0	0.000	0.0	0
x=1625	6.40	0.52	49	3.390	12.5	2078
x=1637	0.00		0	0.000	0.0	0
x=1650	6.00	0.49	59	3.390	12.5	2493
x=1662	0.00		0	0.000	0.0	0
x=1675	0.00		0	0.000	0.0	0
x=1687	0.00		0	0.000	0.0	0
x=1700	0.00		0	0.000	0.0	0
x=1712	0.00		0	0.000	0.0	0
x=1725	0.00		0	0.000	0.0	0
x=1737	0.00		0	0.000	0.0	0
x=1750	0.00		0	0.000	0.0	0
total	12.40	0.50	108	3.3900	25.0	4571

IN STIU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1550 - 1750

code(s) : 33+34+35+36+37+38+96+98+99

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1550 336.20	0.51	1496	3.390	12.5	63391
x=1562 392.30	0.49	1478	3.390	12.5	62622
x=1575 333.00	0.49	1145	3.390	12.5	48505
x=1587 341.35	0.50	1714	3.390	12.5	72639
x=1600 408.15	0.54	1356	3.390	12.5	57456
x=1612 393.35	0.53	2288	3.390	12.5	96945
x=1625 594.70	0.54	2718	3.390	12.5	115171
x=1637 374.25	0.57	3145	3.390	12.5	133289
x=1650 294.64	0.58	2619	3.390	12.5	110962
x=1662 159.20	0.56	1247	3.390	12.5	52825
x=1675 179.73	0.53	1417	3.390	12.5	60045
x=1687 174.00	0.51	1341	3.390	12.5	56807
x=1700 221.46	0.47	1361	3.390	12.5	57688
x=1712 129.85	0.50	1458	3.390	12.5	61794
x=1725 165.10	0.54	1649	3.390	12.5	69856
x=1737 133.15	0.55	1093	3.390	12.5	46308
x=1750 123.40	0.54	1052	3.390	12.5	44564
total 4753.83	0.53	28575	3.3900	212.5	1210867

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1550

code(s) : 1+33+34+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	25.95	0.62	171	3.390	12.5	7244
vest/3	15.35	0.41	95	3.390	12.5	4020
vest/4	63.60	0.50	190	3.390	12.5	8039
vest/5	40.95	0.59	194	3.390	12.5	8241
vest/6	43.85	0.52	136	3.390	12.5	5761
vest/7	9.80	0.60	38	3.390	12.5	1629
vest/8	111.50	0.45	433	3.390	12.5	18351
vest/9	25.20	0.50	238	3.390	12.5	10106
Total	336.20	0.51	1496	3.390		63391

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1562

code(s) : -1+33+34+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	23.05	0.55	117	3.390	12.5	4943
vest/3	46.35	0.45	58	3.390	12.5	2473
vest/4	0.00		13	0.000	12.5	0
vest/5	5.40	0.21	14	3.390	12.5	576
vest/6	3.55	0.43	17	3.390	12.5	707
vest/7	165.35	0.47	644	3.390	12.5	27285
vest/8	27.00	0.43	125	3.390	12.5	5311
vest/9	35.20	0.48	160	3.390	12.5	6784
vest/10	79.20	0.49	246	3.390	12.5	10442
vest/11	9.00	0.49	53	3.390	12.5	2243
vest/12	0.00		14	0.000	12.5	0
vest/13	7.15	0.70	74	3.390	12.5	3140
Total	401.25	0.49	1535	3.330		63905

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m ni_0.45_vest

profile : x=1575

code(s) : -1+33+34+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	4.90	0.45	39	3.390	12.5	1648
vest/3	43.65	0.47	186	3.390	12.5	7901
vest/4	41.65	0.55	256	3.390	12.5	10842
vest/5	0.00		6	0.000	12.5	0
vest/6	19.35	0.32	26	3.390	12.5	1087
vest/7	57.50	0.50	159	3.390	12.5	6717
vest/8	185.30	0.47	505	3.390	12.5	21397
vest/9	9.00	0.55	12	3.390	12.5	517
vest/10	0.00		16	0.000	12.5	0
Total	361.35	0.49	1204	3.329		50109

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest
 profile : x=1587
 code(s) : -1+33+34+35+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	3.85	0.54	20	3.390	12.5	848
vest/3	12.65	0.48	202	3.390	12.5	8577
vest/4	90.65	0.51	439	3.390	12.5	18589
vest/5	0.00		4	0.000	12.5	0
vest/6	9.00	0.41	10	3.390	12.5	415
vest/7	39.80	0.55	126	3.390	12.5	5345
vest/8	54.60	0.46	232	3.390	12.5	9839
vest/9	125.40	0.51	628	3.390	12.5	26621
vest/10	0.00		2	0.000	12.5	0
vest/11	14.40	0.53	67	3.390	12.5	2820
Total	350.35	0.50	1730	3.378		73053

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1600

cube(s) : -1+33+34+35+96+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	102.70	0.46	261	3.390	12.5	11058
vest/5	17.30	0.49	114	3.390	12.5	4849
vest/6	1.10	0.50	60	3.390	12.5	2544
vest/7	1.80	0.44	4	3.390	12.5	172
vest/8	107.80	0.57	416	3.390	12.5	17620
vest/9	43.60	0.63	119	3.390	12.5	5026
vest/10	6.40	0.71	18	3.390	12.5	769
vest/11	0.00		8	0.000	12.5	0
vest/12	6.30	0.61	51	3.390	12.5	2167
vest/13	0.00		3	0.000	12.5	0
vest/14	78.30	0.54	168	3.390	12.5	7120
vest/15	0.00		3	0.000	12.5	0
vest/16	9.75	0.48	72	3.390	12.5	3051
vest/17	36.00	0.55	137	3.390	12.5	5795
Total	411.05	0.54	1433	3.358		60172

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni_0.45_vest

profile : x=1612

code(s) : -1+1+33+34+35+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	14.40	0.56	325	3.390	12.5	13771
vest/3	4.70	0.53	135	3.390	12.5	5731
vest/4	40.10	0.50	147	3.390	12.5	6210
vest/6	37.80	0.47	199	3.390	12.5	8449
vest/7	0.00		5	0.000	12.5	0
vest/8	206.00	0.56	1072	3.390	12.5	45405
vest/9	81.35	0.48	365	3.390	12.5	15473
vest/10	9.00	0.48	45	3.390	12.5	1906
vest/11	0.00		26	0.000	12.5	0
Total	393.35	0.53	2319	3.345		96945

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1625

code(s) : -1+1+34+35+36+37+38+96+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	6.40	0.52	49	3.390	12.5	2078
vest/3	3.05	0.61	37	3.390	12.5	1554
vest/4	0.00		45	0.000	12.5	0
vest/5	2.10	0.49	34	3.390	12.5	1424
vest/6	12.40	0.60	217	3.390	12.5	9177
vest/7	77.85	0.57	515	3.390	12.5	21818
vest/8	378.80	0.54	1344	3.390	12.5	56970
vest/9	2.40	0.33	23	3.390	12.5	979
vest/10	5.40	0.45	30	3.390	12.5	1265
vest/11	0.00		18	0.000	12.5	0
vest/12	30.80	0.44	130	3.390	12.5	5495
vest/13	0.00		2	0.000	12.5	0
vest/14	17.75	0.47	71	3.390	12.5	2999
vest/15	0.00	0.58	103	3.390	12.5	4353
vest/16	35.05	0.46	108	3.390	12.5	4573
vest/17	25.10	0.48	82	3.390	12.5	3464
Total	597.10	0.54	2805	3.312		116150

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1637

code(s) : -1+1+33+34+35+36+37+98+99

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	25.70	0.62	560	3.390	12.5	23721
vest/2	65.90	0.58	511	3.390	12.5	21649
vest/3	86.75	0.50	494	3.390	12.5	20950
vest/6	30.90	0.65	719	3.390	12.5	30448
vest/8	23.65	0.50	127	3.390	12.5	5381
vest/9	3.60	0.26	24	3.390	12.5	1005
vest/11	2.10	0.53	11	3.390	12.5	468
vest/12	5.40	0.47	26	3.390	12.5	1094
vest/13	0.00		3	0.000	12.5	0
vest/14	0.00		20	0.000	12.5	0
vest/16	9.90	0.46	43	3.390	12.5	1805
vest/22	123.95	0.53	655	3.390	12.5	27773
Total	377.85	0.57	3192	3.366		134294

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1650
 code(s) : -1+33+34+35+36+37+38

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	6.00	0.49	59	3.390	12.5	2493
vest/3	21.20	0.62	511	3.390	12.5	21642
vest/4	45.40	0.64	843	3.390	12.5	35740
vest/5	88.35	0.55	463	3.390	12.5	19638
vest/6	0.00		4	0.000	12.5	0
vest/7	13.30	0.49	84	3.390	12.5	3547
vest/8	4.75	0.39	6	3.390	12.5	253
vest/9	55.59	0.50	287	3.390	12.5	12149
vest/10	0.00		5	0.000	12.5	0
vest/11	24.40	0.49	163	3.390	12.5	6907
vest/12	9.70	0.41	40	3.390	12.5	1703
vest/13	1.80	0.36	4	3.390	12.5	164
vest/14	30.70	0.51	169	3.390	12.5	7142
Total	301.19	0.58	2638	3.377		111380

polygons: s_m_ni_0.45_vest

profile : x=1675

code(s) : -1+1+33+34+35+36+37

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	4.15	0.55	79	3.390	12.5	3338
vest/4	13.40	0.50	166	3.390	12.5	7053
vest/5	0.00		5	0.000	12.5	0
vest/6	13.73	0.53	177	3.390	12.5	7511
vest/7	72.15	0.54	425	3.390	12.5	18000
vest/8	41.00	0.55	327	3.390	12.5	13841
vest/9	35.30	0.51	243	3.390	12.5	10301
Total	179.73	0.53	1422	3.378		60045

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1687

code(s) : -1+1+33+34+35+36

name/nm	inters. length	ni	area m2	density	projection range	tons
vest/1	9.55	0.46	153	3.390	12.5	6497
vest/3	15.75	0.55	213	3.390	12.5	9007
vest/4	0.00		2	0.000	12.5	0
vest/5	21.35	0.48	194	3.390	12.5	8218
vest/6	43.20	0.50	292	3.390	12.5	12360
vest/7	73.15	0.53	394	3.390	12.5	16712
vest/8	11.00	0.56	95	3.390	12.5	4012
vest/9	0.00		5	0.000	12.5	0
Total	174.00	0.51	1347	3.374		56807

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1700
 code(s) : -1+1+33+34+35+36+96

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	52.00	0.54	260	3.390	12.5	11035
vest/3	29.40	0.44	312	3.390	12.5	13230
vest/4	15.17	0.49	147	3.390	12.5	6246
vest/5	0.00		22	0.000	12.5	0
vest/6	5.50	0.50	33	3.390	12.5	1399
vest/9	26.84	0.47	224	3.390	12.5	9498
vest/10	0.00		4	0.000	12.5	0
vest/12	14.70	0.34	19	3.390	12.5	793
vest/13	21.15	0.39	119	3.390	12.5	5028
vest/14	0.80	0.35	3	3.390	12.5	108
vest/15	8.85	0.52	76	3.390	12.5	3227
vest/16	5.70	0.49	32	3.390	12.5	1347
vest/17	0.00		2	0.000	12.5	0
vest/18	52.95	0.48	140	3.390	12.5	5918
vest/19	0.00		1	0.000	12.5	0
vest/21	3.90	0.50	18	3.390	12.5	760
Total	236.96	0.47	1412	3.320		58588

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest
 profile : x=1712
 code(s) : -1+1+33+34+35+36+96

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	3.60	0.50	76	3.390	12.5	3228
vest/3	5.65	0.20	8	3.390	12.5	344
vest/4	3.10	0.51	23	3.390	12.5	978
vest/5	17.15	0.56	232	3.390	12.5	9830
vest/6	4.55	0.35	7	3.390	12.5	279
vest/7	1.80	0.45	30	3.390	12.5	1274
vest/8	0.00		3	0.000	12.5	0
vest/9	8.90	0.47	163	3.390	12.5	6910
vest/10	24.10	0.46	462	3.390	12.5	19586
vest/11	7.25	0.52	129	3.390	12.5	5472
vest/12	8.10	0.48	42	3.390	12.5	1763
vest/13	42.85	0.51	190	3.390	12.5	8057
vest/14	7.20	0.48	43	3.390	12.5	1808
vest/15	5.80	0.54	68	3.390	12.5	2887
Total	140.05	0.49	1476	3.384		62416

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1725

code(s) : -1+1+33+34+35

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	36.70	0.55	584	3.390	12.5	24763
vest/3	12.50	0.49	57	3.390	12.5	2420
vest/4	0.00		16	0.000	12.5	0
vest/5	95.85	0.54	844	3.390	12.5	35769
vest/6	20.05	0.49	99	3.390	12.5	4184
vest/7	0.00	0.49	64	3.390	12.5	2721
Total	165.10	0.54	1664	3.358		69856

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m_ni_0.45_vest

profile : x=1737

code(s) : -1+1+33+34+35

name/num	inters. length	ni	area m2	density	projection range	tons
vest/2	25.60	0.52	309	3.390	12.5	13105
vest/3	4.40	0.61	40	3.390	12.5	1690
vest/4	1.45	0.34	11	3.390	12.5	484
vest/6	30.95	0.47	215	3.390	12.5	9123
vest/8	72.20	0.60	528	3.390	12.5	22390
Total	134.60	0.55	1104	3.390		46792

IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s_m ni_0.45_vest

profile : x=1750

code(s) : -1+1+33+34+35+96

name/num	inters. length	ni	area m2	density	projection range	tons
vest/1	0.00	0.50	12	3.390	12.5	499
vest/3	24.90	0.49	223	3.390	12.5	9452
vest/4	14.05	0.50	71	3.390	12.5	2997
vest/5	35.60	0.54	196	3.390	12.5	8323
vest/6	17.50	0.45	132	3.390	12.5	5602
vest/7	3.20	0.47	28	3.390	12.5	1197
vest/8	0.00		6	0.000	12.5	0
vest/9	25.65	0.61	317	3.390	12.5	13451
vest/10	2.15	0.00	15	3.390	12.5	618
vest/11	2.50	0.59	72	3.390	12.5	3043
Total	125.55	0.53	1072	3.372		45182

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IN SITU ORE RESERVE ESTIMATION 17.12.1998

polygons: s m ni 0.45 vest

profile : x=1125 - 1750

code(s) : 23+24+25+26+27+28+33+34+35+36+37+38+54+55+61+62+96+97+98+99

profile intersection	ni	area	density	projection	tons
length		m2		range	
x=1125	0.67	279	3.390	12.5	11838
x=1137	0.57	179	3.390	12.5	7591
x=1150	0.50	298	3.390	12.5	12621
x=1162	0.61	615	3.390	9.4	19557
x=1169	0.87	635	3.390	6.3	13458
x=1175	0.93	711	3.390	6.3	15059
x=1181	0.74	796	3.390	6.3	16872
x=1187	0.97	953	3.390	6.3	20201
x=1192	0.99	1211	3.390	6.3	25668
x=1200	1.36	1043	3.390	6.3	22099
x=1206	0.67	319	3.390	6.3	6761
x=1212	0.60	149	3.390	9.4	4722
x=1225	0.63	242	3.390	12.5	10252
x=1237	0.54	246	3.390	12.5	10405
x=1250	0.58	468	3.390	12.5	19842
x=1262	0.57	817	3.390	12.5	34624
x=1275	0.58	1160	3.390	12.5	49161
x=1287	0.60	1464	3.390	12.5	62036
x=1300	0.51	2004	3.390	12.5	84931
x=1312	0.54	2408	3.390	12.5	102035
x=1325	0.57	3578	3.390	12.5	151610
x=1337	0.54	5361	3.390	12.5	227152
x=1350	0.55	6384	3.390	12.5	270506
x=1362	0.56	6427	3.390	12.5	272357
x=1375	0.52	4737	3.390	12.5	200713
x=1387	0.48	1969	3.390	12.5	84277
x=1400	0.50	4436	3.390	12.5	187992
x=1412	0.50	3178	3.390	12.5	134649
x=1425	0.52	4275	3.390	12.5	181169
x=1437	0.53	3603	3.390	12.5	152669
x=1450	0.50	3628	3.390	12.5	153719
x=1462	0.54	2986	3.390	12.5	126533
x=1475	0.53	1439	3.390	12.5	60994
x=1487	0.51	1124	3.390	12.5	47623
x=1500	0.55	866	3.390	12.5	36685
x=1512	0.55	1425	3.390	12.5	60394
x=1525	0.53	1734	3.390	12.5	73457
x=1537	0.54	1453	3.390	12.5	61589
x=1550	0.51	1496	3.390	12.5	63391
x=1562	0.49	1478	3.390	12.5	62622
x=1575	0.49	1145	3.390	12.5	48505
x=1587	0.50	1714	3.390	12.5	72639
x=1600	0.54	1356	3.390	12.5	57456
x=1612	0.53	2288	3.390	12.5	96945
x=1625	0.54	2718	3.390	12.5	115171
x=1637	0.57	3145	3.390	12.5	133289
x=1650	0.58	2619	3.390	12.5	110962
x=1662	0.56	1247	3.390	12.5	52825
x=1675	0.53	1417	3.390	12.5	60045
x=1687	0.51	1341	3.390	12.5	56807
x=1700	0.47	1361	3.390	12.5	57688
x=1712	0.50	1458	3.390	12.5	61794

x=1725	165.10	0.54	1649	3.390	12.5	69856
x=1737	133.15	0.55	1093	3.390	12.5	46308
x=1750	123.40	0.54	1052	3.390	12.5	44564
total	17532.11	0.55	103195	3.3900	637.5	4244689

Legend

Sydmaimen $x=1250 - x=1537.5$

	above $z=140$	indicated	21
	120 - 140	measured	22
	100 - 120	measured	23
	80 - 100	measured	24
	60 - 80	measured	25
	40 - 60	measured	26
	20 - 40	measured	27
	0 - 20	measured	28

Sydmaimen $x=1462.5$

	0 - 20	inferred	61
	-20 - 0	inferred	62

Nordmaimen main lense $x=1550 - 1750$

	above $z=100$	measured	31
	80 - 100	measured	32
	60 - 80	measured	33
	40 - 60	measured	34
	20 - 40	measured	35
	0 - 20	measured	36
	-20 - 0	indicated	37
	-40 - -20	indicated	38

Dinosaurmalm, $x=1125 - x=1237.5$

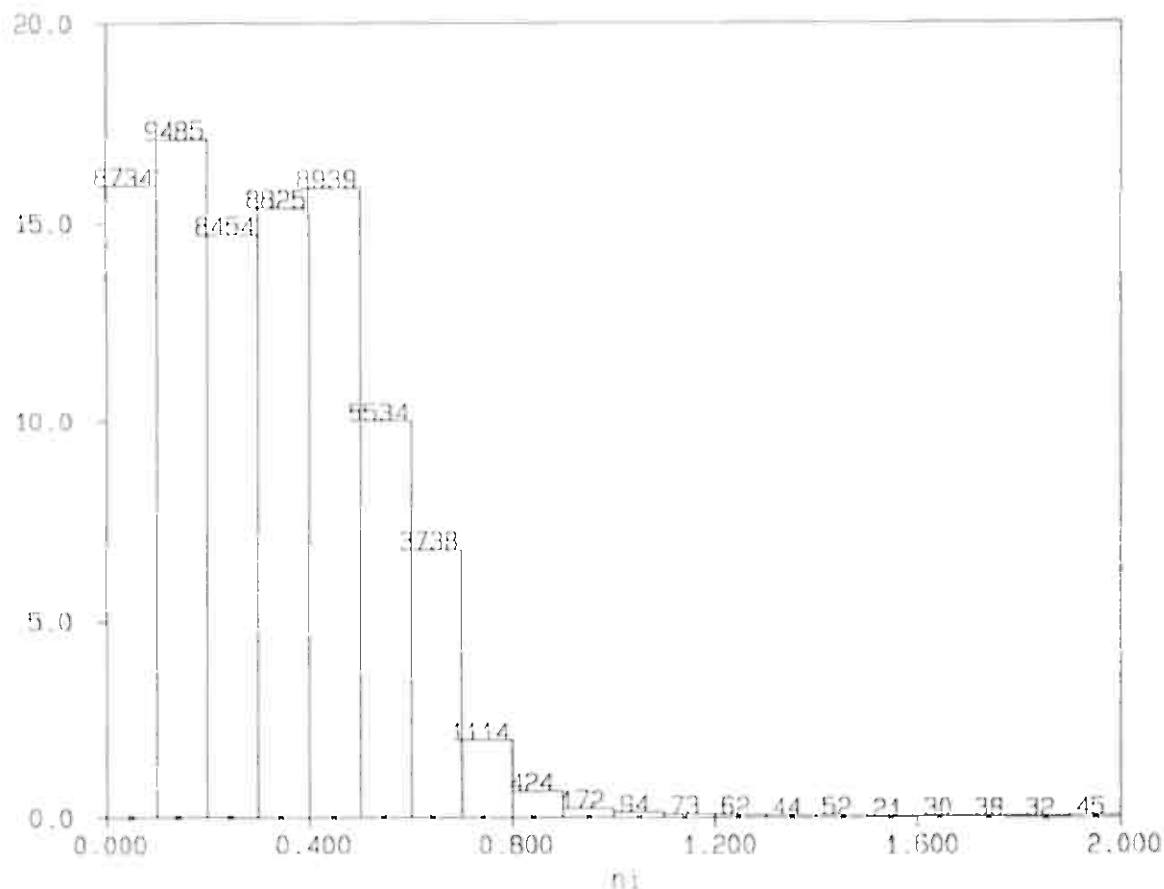
	above $z=140$	measured	51
	120 - 140	measured	52
	100 - 120	measured	53
	80 - 100	measured	54
	60 - 80	measured	55

Other categories

	mined areas	99
	abandoned areas	98
	pillar around ramp	97
	mineralisation, no value	96
	stope models	

Histogram of ni

(Total 103507.58/104225.33 m)



SELECTION OF DRILL CORE SAMPLES BY all.st1

Rock types: all

Drill hole	from	to
R-24-93	0.00	165.50
R-18-93	0.00	151.15
R-18-93	0.00	204.50
R-20-93	0.00	198.90
R-21-93	0.00	252.20
BH-245-145	0.00	359.80
bh-826-98	0.00	110.00
bh-827-98	0.00	50.00
bh-425-95	0.00	30.10
bh-426-95	0.00	42.45
bh-427-95	0.00	40.30
bh-428-95	0.00	36.95
R-76-95	0.00	208.00
R-75-95	0.00	167.50
bh-468-95	0.00	14.80
bh-470-95	0.00	47.20
bh-471-95	0.00	60.40
bh-478-95	0.00	36.70
P-10-96	0.00	243.21
bh-825-98	0.00	65.50
BH-245-140	0.00	462.80
BH-245-150	0.00	462.70
BH-225-150	0.00	583.20
BH-225-180	0.00	453.50
P-6-96	0.00	336.55
bh-661-96	0.00	71.30
bh-662-96	0.00	43.00
bh-672-96	0.00	93.15
bh-674-97	0.00	101.25
bh-725-97	0.00	105.35
bh-725-97	0.00	61.00
bh-835-98	0.00	41.30
bh-836-98	0.00	53.45
bh-834-98	0.00	34.10
BH-235-120	0.00	416.50
BH-235-150	0.00	534.30
BH-235-180	0.00	517.40
BH-13	0.00	350.00
BH-235-150	0.00	74.00
bh-658-96	0.00	37.10

Number of samples is 56447
Number of samples in plot is 55910

15.1.1999

BASIC STATISTICS, WEIGHIED BY length , 15.1.1999/all.stl

var	samples	w sum	min	max	mean
ni	56382	104225.33	0.000000	5.870000	0.344901
nibr	333	652.13	0.000000	0.760000	0.464005
cu	4094	6511.09	0.000000	3.200000	0.081187
co	474	1061.18	0.000000	0.210000	0.018796
febr	322	627.53	0.051000	4.780000	2.671118
s	444	1009.58	0.000000	14.920000	1.888047

var	variance	skewness	kurtosis	std.dev.	std.error
ni	0.104849	5.294983	47.725945	0.323805	0.001003
nibr	0.020002	-0.863556	0.940861	0.141430	0.005538
cu	0.009259	9.810667	222.750351	0.096226	0.001193
co	0.000301	3.900403	38.071335	0.017358	0.000533
febr	0.578949	-0.536182	0.239388	0.760887	0.030374
s	3.462861	2.971040	14.711922	1.860876	0.058566

var	geom.mean	f25	f50	f75	rel.dev.
ni	0.247533	0.150000	0.310000	0.480000	0.938832
nibr	0.430814	0.390000	0.491880	0.560000	0.304803
cu	0.063167	0.030000	0.070000	0.120000	1.185245
co	0.021781	0.000000	0.020000	0.030000	0.923516
febr	2.519709	2.149538	2.830000	3.230000	0.284857
s	1.768540	0.470632	1.800791	2.550000	0.985609

DISTRIBUTION OF ni WEIGHTED BY length , 15.1.1999/all.stl

class	no of samples	freq	umul freq.	freq %	umul %	class mean
0.0000 - 0.1000	8734	16608.23	16608.23	15.93	15.93	0.0493
0.1000 - 0.2000	9485	17821.63	34429.86	17.09	33.03	0.1430
0.2000 - 0.3000	8454	15317.90	49747.75	14.69	47.72	0.2453
0.3000 - 0.4000	8825	16025.83	65773.58	15.37	63.09	0.3456
0.4000 - 0.5000	8939	16550.81	82324.38	15.88	78.97	0.4490
0.5000 - 0.6000	5534	10420.84	92745.22	10.00	88.96	0.5466
0.6000 - 0.7000	3738	7040.75	99785.98	6.75	95.72	0.6416
0.7000 - 0.8000	1114	2045.11	101831.09	1.96	97.68	0.7414
0.8000 - 0.9000	424	706.44	102537.52	0.68	98.36	0.8415
0.9000 - 1.0000	172	251.63	102789.16	0.24	98.60	0.9519
1.0000 - 1.1000	94	145.25	102934.41	0.14	98.74	1.0521
1.1000 - 1.2000	73	106.37	103040.77	0.10	98.84	1.1400
1.2000 - 1.3000	62	90.57	103131.34	0.09	98.93	1.2466
1.3000 - 1.4000	44	62.40	103193.74	0.06	98.99	1.3527
1.4000 - 1.5000	52	68.50	103262.24	0.07	99.05	1.4540
1.5000 - 1.6000	21	35.00	103297.24	0.03	99.08	1.5477
1.6000 - 1.7000	30	49.83	103347.07	0.05	99.13	1.6430
1.7000 - 1.8000	38	47.95	103395.02	0.05	99.18	1.7408
1.8000 - 1.9000	32	49.95	103444.98	0.05	99.23	1.8531
1.9000 - 2.0000	45	62.60	103507.58	0.06	99.29	1.9531
2.0000 - 5.8700	472	743.80	104251.38	0.71	100.00	3.0688

totals 56382 104251.38 104251.38 100.00 100.00 0.3448

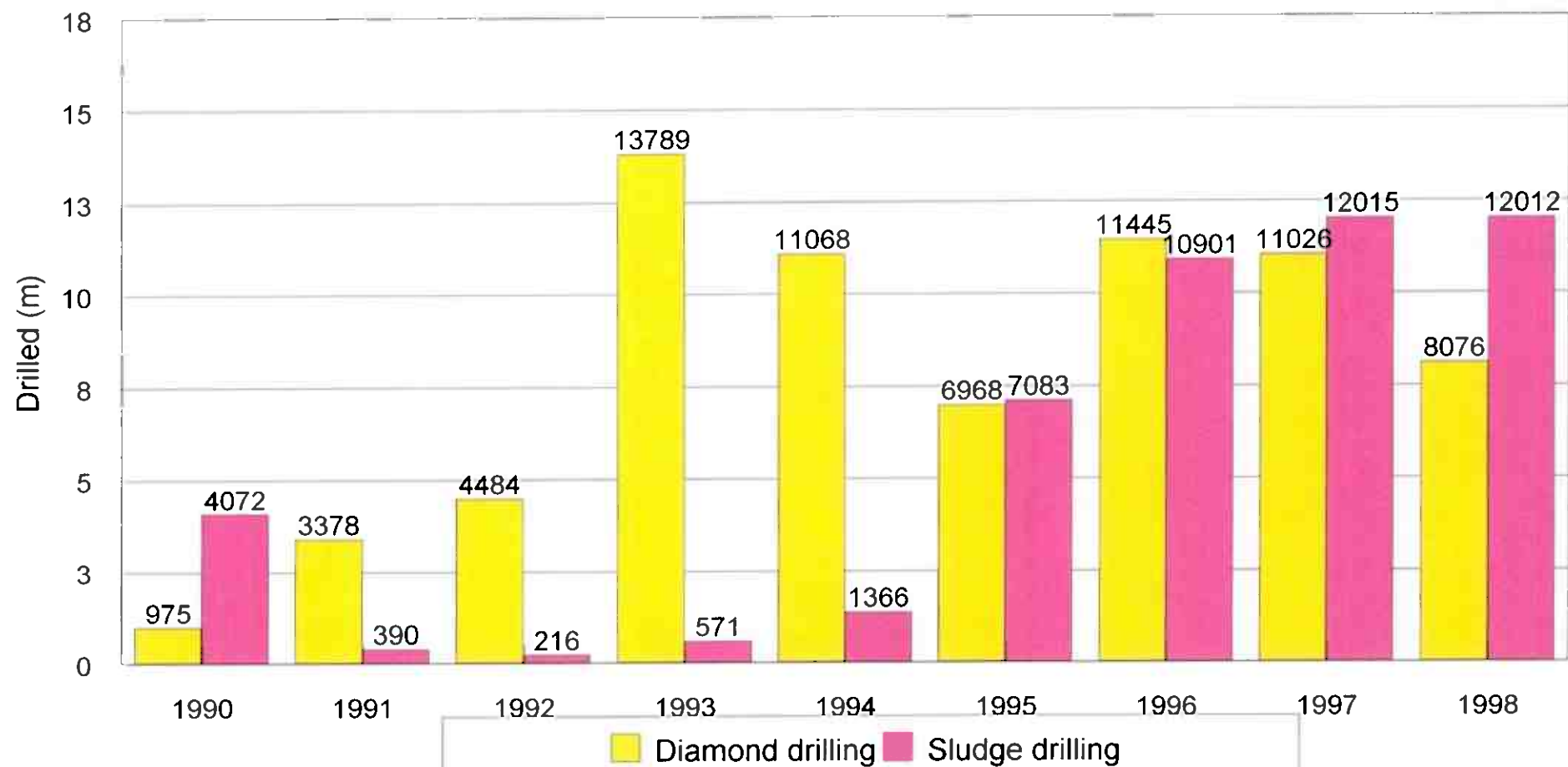
minimum.....	0.0000
maximum.....	5.8700
range.....	5.8700
arithmetic mean...	0.3449
geometric mean....	0.2475
median.....	0.3100
variance.....	0.1048
std. deviation....	0.3238
std. error.....	0.0010
relative deviation	0.9388
skewness.....	5.2950
kurtosis.....	47.7259
percentile of 25..	0.1500
percentile of 75..	0.4800

DENSITIES OF THE SAMPLES, WESTERN ORE BODY

Drill hole	Depth	Pol.section	Core sample	Ni HNO3	Density	Sample
R-7-93	142,5	X		0,58	3,41	93-31045
R-7-93	155,0	X		0,68	3,42	93-31052
R-7-93	169,0		X	0,61	3,44	93-31059
R-8-93	137,0	X		0,54	3,39	93-31114
R-8-93	143,2	X		0,54	3,41	93-31118
R-8-93	138,0		X	0,60	3,39	93-31115
R-9-93	95,0	X		0,64	3,40	93-31127
R-9-93	101,5	X		0,67	3,41	93-31131
R-9-93	106,5		X	0,42	err (2.85)	93-31133
R-9-93	117,6	X		0,66	3,38	93-31138
R-10-93	125,0		X	0,50	3,44	93-31176
R-10-93	126,3	X		0,48	3,44	93-31177
R-10-93	141,0		X	0,52	3,41	93-31184
R-10-93	150,5	X		0,62	3,38	93-31189
R-10-93	163,0		X	0,78	3,41	93-31195
R-10-93	164,5	X		0,69	3,43	93-31196
R-11-93	169,0		X	0,56	3,29	93-31259
R-11-93	183,0		X	0,64	err (3.12)	93-31266
R-11-93	207,0		X	0,59	3,38	93-31278
R-12-93	103,0		X	0,55	3,32	93-31300
R-12-93	109,0		X	0,71	3,42	93-31303
R-13-93	105,0		X	0,54	3,31	93-31330
R-13-93	113,0		X	0,58	3,32	93-31334
R-13-93	127,0		X	0,56	3,41	93-31341
R-14-93	57,6		X	0,39	3,44	93-31348
R-14-93	94,0		X	0,45	3,39	93-31360
R-14-93	110,0		X	0,59	3,47	93-31364
R-15-93	112,0		X	0,67	3,41	93-31394
R-15-93	120,0		X	0,38	3,29	93-31398
R-15-93	132,0		X	0,56	3,40	93-31404
R-15-93	142,0		X	0,65	3,43	93-31409
R-16-93	120,0		X	0,44	3,39	93-31433
R-16-93	148,0		X	0,63	3,42	93-31477
R-16-93	157,0		X	0,58	3,40	93-31451
R-18-93	114,0		X	0,55	3,34	93-31493
R-18-93	126,0		X	0,56	3,36	93-31499
R-19-93	106,0		X	0,39	3,37	93-31591
R-19-93	118,0		X	0,54	3,38	93-31597
R-20-93	142,0		X	0,48	3,34	93-31630
R-20-93	151,0		X	0,56	3,37	93-31635
				0,567	3,390	

Investigations 1990-98

Nikkel og Olivin AS



PRODUKSJONPLAN 18 MÅNEDER ØSTMALM + VESTMALM (1000 t, påmating verket)

RAMPE -art	1999 JAN Tot 1000 t	1999 FEB Tot 1000 t	1999 MAR Tot 1000 t	1999 APR Tot 1000 t	1999 MAY Tot 1000 t	1999 JUN Tot 1000 t	1999 JUL Tot 1000 t	1999 AUG Tot 1000 t	1999 SEP Tot 1000 t	1999 OKT Tot 1000 t	1999 NOV Tot 1000 t	1999 DES Tot 1000 t	2000												TOTALT HELE PERIODEN			RAMPE -art																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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NB: Døgnproduksjon 2270 tonn hver produksjonsdag
Tonnasjen i parentes er usikkert, med i brytingsplanen
men ikke i påmating-tonnasje

Leonhard Næsen & Sønnene representerer akseptør denne produksjonsplanen,
som er bindende for JAN måned og veiledende for andre måneder

Harald Næsen
Harald Næsen, anleggssjef LNS

Markus Ekberg
Markus Ekberg, gruvesjef N&O

Tonnasjen med kursiv er fortløpende
(med grønt usikkert)

Prod. prog.	Ni-%	0,530
utvinning	74,0%	3290
Ni kons	13,0%	25307



CUT-OFF GRADES FOR DIFFERENT DECISION MAKING SITUATIONS FOR THE PERIOD 1/1999-3/2000

COSTS	LONGHOLE-PRODUCTION DRIFTING MINE TOTAL AVG 1/99-3/2000 MILL (Mil variable is 15 NOK/t) ADMIN+SAFETY+ENVIR TAILING DEPOSIT CONC. FREIGHT N&O TOTAL	COST ITEM COMBINATIONS					NOK/TONNE
		56.6	56.6	56.6	56.6	56.6	
		56.6					NOK/TONNE
		90.0					NOK/TONNE
		76.8				76.8	NOK/TONNE
		34.1	15.0	15.0	34.1	34.1	NOK/TONNE
		7.0				7.0	NOK/TONNE
		6.6			6.6	6.6	NOK/TONNE
		6.8	6.8	6.8	6.8	6.8	NOK/TONNE
		131.4	21.8	78.4	104.1	111.1	NOK/TONNE
		-32.5	-32.5	-32.5	-32.5	-32.5	NOK/TONNE
			-10.7	45.9	71.6	78.6	98.8 TOTAL

COST OF CEASED PRODUCTION, NO PRODUCTION 30000000 NOK
 PRODUCTION 1/1999-3/2000 922000 TONNES
 (Costs of ceased production includes filling of the tailing deposit with quarried rock and compensation to the contractor, these costs can be avoided with continued production)
 CORRECTED PRODUCTION COST

NICKEL PRICE (BUDGET 225 US\$/LB 34.58 NOK/KG
 NICKEL RECOVERY WITH GRADE 0.55% NI 75 %

NSR OF THE ORE

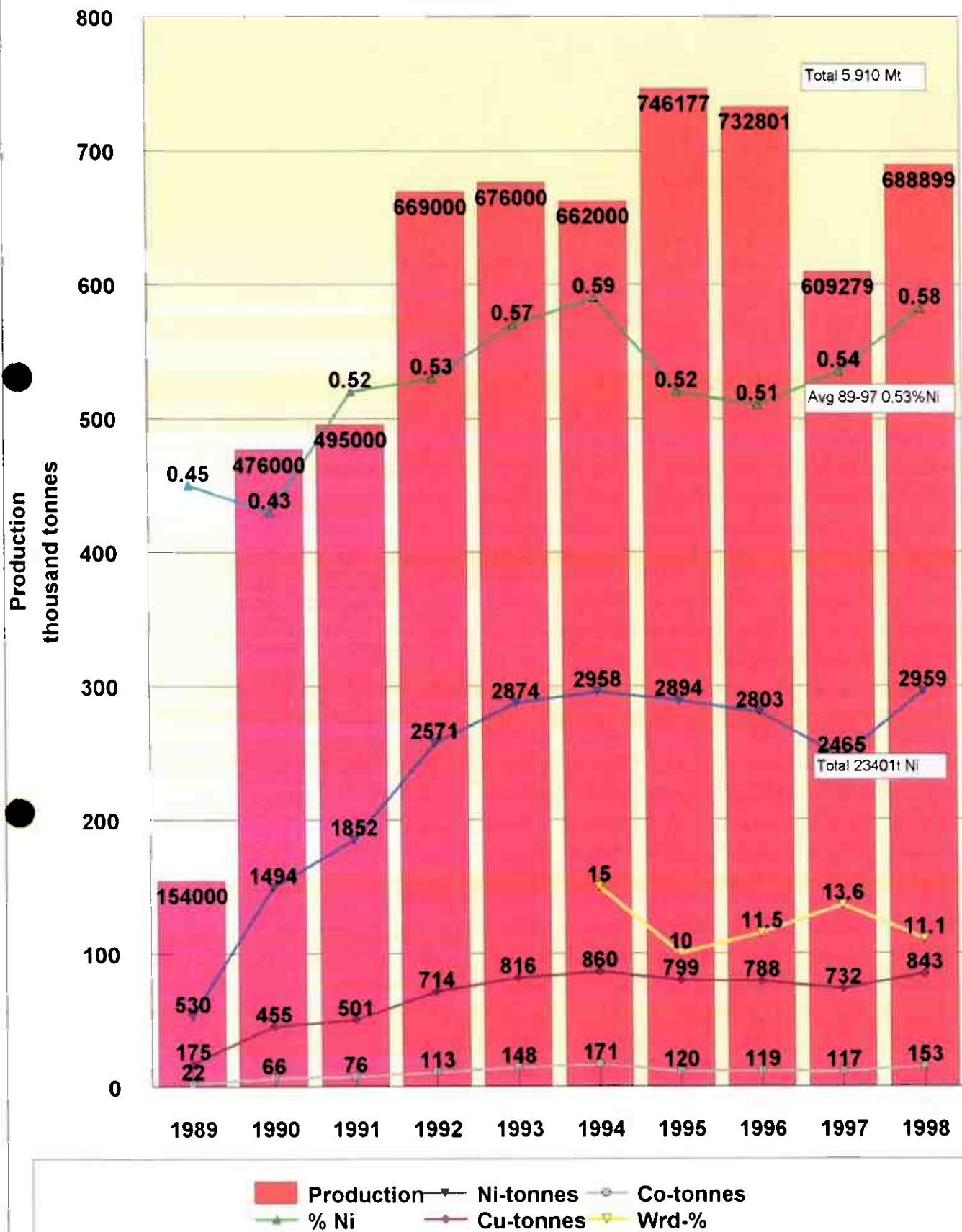
Ni%	Rec%	aym%Ni in conc	Ni-price	NSR/tonne	Cu-Coextra	Right NSR	Covers cost items:
0.65	78.0	75	34.58	131	1.00	131	All costs without production ceasing cost
0.60	76.5	75	34.58	119	1.00	119	All costs with production ceasing cost as a negative cost
0.55	75.0	75	34.58	107	1.00	107	All costs with production ceasing cost as a negative cost
0.53	74.0	75	34.58	102	1.00	102	Budget mill feed grade and recovery
0.50	73.5	75	34.58	95	1.00	95	
0.45	72.0	75	34.58	84	1.00	84	Cut-off grade ▼
0.425	71.3	75	34.58	79	1.00	79	Long hole production + all others - ceasing cost
0.40	70.5	75	34.58	73	1.00	73	Lh+mill+tailing+ conc.freight
0.35	69.0	75	34.58	63	1.00	63	
0.30	67.5	75	34.58	53	1.00	53	▼
0.25	66.0	75	34.58	43	1.00	43	Lh+mill variable+conc. freight

Note: Payment 75% of nickel in concentrate is given by Harjavalta officials and excludes Cu-Co extra payment

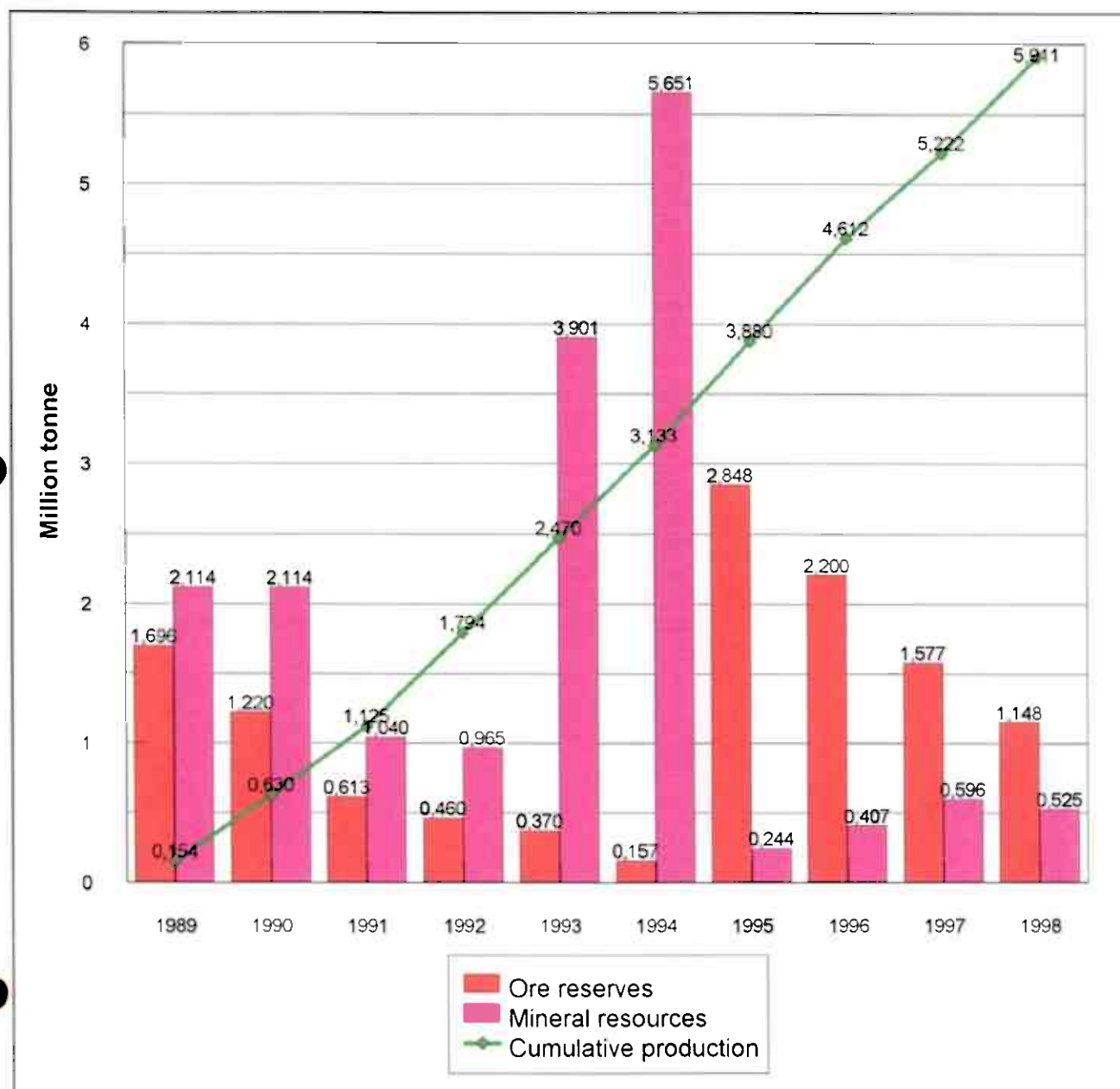
WITH 10% WASTE ROCK DILUTION CUT-OFF GRADE 0.45% NI IS CORRECT

O:\123data\year98\Oresstate\cut-off-grade.wk4

Production 1989 - 1998 Nikkel og Olivin AS



Ore reserves and mineral resources at the end of the year



	Ore reserves Mt	Mineral resources Mt	Total	Ni %	Prepared by	Cumulative production Mt
1989	1,696	2,114	3,810	0,62	M Motys	0,154
1990	1,220	2,114	3,334	0,50	1989-prod	0,630
1991	0,613	1,040	1,653	0,50	Ø. Pettersen	1,125
1992	0,460	0,965	1,425	0,55	Ø. Pettersen	1,794
1993	0,370	3,901	4,271	0,59	M. Ekberg (incl Vestmalm)	2,470
1994	0,157	5,651	5,808	0,55	M. Ekberg (incl Vestmalm)	3,133
1995	2,848	0,244	3,092	0,52	M.Ekberg/L.Storhaug	3,880
1996	2,200	0,407	2,607	0,55	M.Ekberg/L.Storhaug	4,612
1997	1,577	0,596	2,173	0,54	M.Ekberg/L.Storhaug	5,222
1998	1,148	0,525	1,673	0,51	M.Ekberg/L.Storhaug	5,911