Bergvesenet
Postboks 3021, 7002 Trondheim

Rapportarkivet

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
BV 3759			Trondheim	
Kommer fra ..arkiv	**Ekstern rapport nr**	**Oversendt fra**	**Fortrolig pga**	**Fortrolig fra dato:**

Tittel

Diamantboring Kjettevann, Mølland, Iveland

Forfatter	Dato	Bedrift
Nixon, Frank	1969	Sulfidmalm A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Iveland	Aust-Agder	Østlandske	15114	

Fagområde	Dokument type	Forekomster
Boring Kjernebeskrivelser		Kjettevann
Råstofftype	**Emneord**	
Malm/metall		

Sammendrag

BV3759

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 13.60S - 8.68E BEARING 270 DIP 53 HOLE NO: 1 SHEET NO: 1
LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY KJETTEVANN MOLLAND
CASING: ~~1.45~~ m 2 m FINISHED: 7.10.69 FARM IVELAND NORWAY
CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.45		Overburden till and boulders.
1.45	20.77		Massive medium grained gabbro/norite with poor and sporadic dissemination.
20.77	23.63.		Ultrabasic rock, rich in amphibole, intrusive, weak dissemination of py & po
23.63	33.00		Massive meta gabbro/amphibolite. Some banding or layering.
33.00	37.60		Massive, medium grained gabbro/norite.
37.60	40.93		Basic gabbro/norite weak dissemination.
40.93	41.34		Coarse grained gabbroic rock.
41.34	57.27		Medium grained gabbro/norite with disseminations (in part up to 2%) mainly pyrite.
57.27	59.73		Coarse grained gabbro with poor dissemination.
59.73	67.95.		Medium grained meta gabbroic rock into which has been intruded ultrabasic - hypersthene/amphibole rock. Poor dissemination in both rock types.
67.95	75.00		Coarse grained gabbro with poor dissemination.
75.00	78.00		Medium grained gabbro/norite 2-5% sulphides mainly po.
78.00	85.18		~~Coarse/medium grained norite/gabbro with dissemination. In parts up to 10% but generally poor.~~ Coarse/medium grained amphibolite/meta gabbro, in part with good disseminations of sulphides.
85.18	92.00		Medium grained norite/gabbro with dissemination in parts up to 10% but generally poor.
92.00	102.09		Slightly foliated meta. gabbro. poor dissemination
102.09	145.90		Foliated amphibolite/amphibole gneiss with sporadic disseminations of pyrite
145.90			End of hole.

A/S SULFIDMALM

DIAMOND DRILL RECORD

~~KJETTEVANN~~

LOCATION: 13.60 S - 8.68 E BEARING 270 DIP: 53 HOLE NO: 1 SHEET NO: 2

LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY KJETTEVANN MOLLAND

CASING: ~~6m~~ 2m FINISHED: 7.10.69 FARM IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.45		Overburden.
1.45	20.77		Massive, medium grained gabbro/norite, with for the most part a brown feldspar. Some small amount of introduced qtz.?
			1.79 - 1.82 specks of py.
			At 2.43 and 2.60 chlorite coated joint planes.
			2.86 - 2.89 small zone along which movement has taken place, rock is slightly sheared. Rock seems in part to be weathered and has probably been an open fracture here.
			3.00 - 3.40 specks of py.
			3.19 - 3.23 small shear zone, upper and lower boundary planes are biotite (phlogopite?) rich and show signs of weathering.
			3.55 - 3.65 fracture (possibly sheared zone) much biotite (phlogopite)
			3.80 biotite rich fracture, biotite seems to persist on other side of fracture for a few cm's
			3.80 - 3.90 specks of py & po.
			4.07 - 6.62 from 0 - 2% sulphides. Py and po seem to be equally distributed as specks blobs and stringers. A few small specks of cp seen.
			6.20 - 6.24 quartz feldspar vein
			7.08 - 7.60 specks to 1% sulphides mainly po.
			7.88 - 8.19 sulphides seen on fracture planes.
			9.08 - 9.50 specks of po & py.
			9.50 - 10.13 fractured zone with carbonate on fracture plane.
			10.30 carbonate lined joint
			10.48 carbonate lined joint
			11.28 - 11.33 small shear zone
			12.92 - 13.15 fracture zone with carbonate on fracture planes.
			13.98 chlorite coated fracture plane.
			17.14 - 17.18 5% sulphides dominantly po.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.605 - 8.68E BEARING: 270° DIP: 53° HOLE NO: 1 SHEET NO: 3

LOGGED BY: F. NIXON STARTED: 22.7.69 PROPERTY: Gettevann, Molland

CASING: ~~5m~~ 2m FINISHED: 7.10.69 from Ireland, Norway

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
-			From about 18 m the rock seems to be changing slightly in character, still massive gabbroic but in places contains more biotite and from
			18.00 - 18.15 white specks which fizz weakly with HCl.
			18.34 - 18.36 small shear zone.
			18.36 - 18.52 more basic (amphibole rich part)
			20.15 - 20.36 fracture zone.
20.77	23.63		Fine/med grained basic/ultrabasic section carrying much amphibole, contains introduced feldspar as irregular veins and near the lower contact seems to contain fragments of country rock - here a med. gr. massive amphibolitic rock.
			Over entire length it contains from 0 - 2% sulphides po & py.
23.62	33.00		Massive med/coarse (in parts fine grained) amphibolite. In part metagabbroic. Also in part a distinct layering. Nearing 30 m the rock becomes more meta-gabbroic. Some introduced qtz & feldspar
			26.67 - 26.72 Qtz feldspar vein
			29.00 - 29.60 What looks like layering - basic (fine gr) alternating with med grained amphibolitic rock.
			32.27 - 33.00 specks of sulphides.
33.00	37.60		Gradual change over to more gabbroic rock. To about 37.60 typical med gr. browny feldspar variety.
37.60	40.93		From 37.60 onwards the character of the rock changes becoming basically darker/more basic but in part with some white spots (feldspar) on the core surface.
			35.84 - 35.93 Very fine gr. slightly sheared basic rock. Intrusive?
			Between 37.70 and 37.85 there seems to be some kind of layering or could it be due to multiple intrusion? Two fine grained bands - gabbroic

A/S SULFIDMALM

DIAMOND DRILL RECORD

~~KJETTEVANN~~

LOCATION: 13.60S - 8.68E
BEARING: 270 DIP: 53 HOLE No: 1 SHEET No: 4
LOGGED BY: F. NIXON
STARTED: 22.9.69 PROPERTY: Gjellerann Mølland
CASING: ~~1.45~~ 2m
FINISHED: 7.10.69 from Iveland Norway
CORE SIZE: 32mm
TESTS (CORRECTED):

FROM	TO		DESCRIPTION
-			bands, 4 cms wide, in the more basic rock.
			33.00 - 37.90 specks to 2% sulphides, py &
			po with a little cp. Best impregnation from
			37.20 - 37.60 where it is over 2%.
			From 40.00 - 40.93 the rock is very basic
			in character
			40.00 - 40.40 specks to 2% sulphides, po &
			py dominantly po.
			40.80 - 40.86 over 2% py on both sides of
			small shear.
			40.82 small shear, carbonate lined.
40.93	41.34		Coarse grained gabbro/norite with pinky brown
			feldspar and occasional specks of pyrite and
			po.
41.34	57.27		Med gr. gabbro/norite, massive, contains in part
			coarse fractions that are distributed unevenly,
			possible due to introduction of feldspar and a
			little qz. Only at one place 40.45 -
			does it look as if the coarser variety may be
			a uniform "layer" with the med. gr. variety as
			host rock.
			44.33 small joint or shear.
			45.70 - 46.12 slightly fractured zone
			47.30 joint
			47.30 - 47.80 the rock is distinctly coarser.
			48.38 - 48.52 the rock is finer gr. and seems
			to have a distinct mineral orientation
			49.00 carbonate enriched fracture zone.
			41.34 - 41.46 stringers and specks of
			sulphides po, py, cp?, in limited areas
			up to 2%
			41.73 - 42.00 2% sulphides po & py mainly as
			stringers "core angle" of these stringers
			averages about 46
			42.42 - 42.46 up to 2% sulphides associated
			with iron oxides?
			42.95 - 43.66. 2% sulphides down to specks

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60S - 8.68E
BEARING: 270 DIP: 53 HOLE NO: 1 SHEET NO: 5
LOGGED BY: E NIXON STARTED: 22.9.69 PROPERTY: Kjettevann Melland
CASING: ~~145~~ 2mm FINISHED: 7.10.69 from Ireland Norway
CORE SIZE: 32mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
			mostly po & py as dissemination and stringers with some fracture fillings
			43.95 - 45.00 2% sulphides as stringers, fracture fillings and disseminations, mainly po + py and cp. 44.30 - 44.70 2 - 5%.
			45.34 - 45.40 over 5% sulphides
			46.60 - 46.80 2% sulphides dominantly py.
			Specks of sulphides are distributed through the core lengths not mentioned above.
			50.00 - 50.50. Contains sulphides as specks and fracture fillings, mostly pyrite and is slightly more than accessory.
			Between 50.50 and 51.00 the rock is coarser and more acid? due to increase in feldspar - typical pinky brown variety - again in places this looks as if it could be some kind of layering.
			50.80 - 50.86 Fine dissemination of sulphides mainly py.
			51.00 - 53.00 Odd sulphides and as fine impregnation and stringers. Stringers when they occur seem to be orientated in a definate direction i.e 60 - 65°
			53.20 - 53.27 Over 2% sulphides mainly py.
			53.62 - 53.69 "layer" of fine gr. gabbroic rock.
			54.12 - 54.70 Over 2% sulphides po & py. py seems to dominate. Again stringers trend approx 60°
			53.27 - 54.12 specks of sulphides
			54.60 - 56.70 fractured zone
			55.00 - 57.27. specks of sulphides
57.27	59.73		Coarse grained gabbroic rock. The feldspar forms large crystals of a slightly pinky colour set in a matrix of smaller crystals of pyroxene and feldspar.
			At the upper contact there is a slight enrichment of sulphides, mainly py. Otherwise contains occasional specks of sulphides
			57.60 - 57.80 Evidence of open fractures
			57.27 - 57.62 Specks to 2% sulphides mainly py

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60S - 8.68E BEARING 270° DIP: 53° HOLE No: 1 SHEET No: 6

LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY Kjettevann Mölland

CASING: ~~146~~ m 2in FINISHED: 7.10.69 from Ireland Norway

CORE SIZE: 52mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
-			Gradual change around 59.70 into med. gr. variety.
59.73	67.95		Med gr. fairly massive gabbroic rock, in parts quite basic. Carbonate, talc and chlorite noted on fracture planes.
			61.37 - 61.70 sheared and fractured zone carbonate and chlorite on shear planes.
			63.48 - 63.67 fracture zone
			66.06 - 66.33 slightly sheared zone
			66.71 - 67.12 finer grained sheared (foliated zone) sulphides in this lie // to shearing.
			60.00 - 61.00 specks to 1% sulphides (in parts between 1% and 2%) dominantly pyrite
			61.00 - 64.00 Occasional specks of sulphides again mostly pyrite.
			64.20 - 64.50 2% sulphides as small disseminations - again dominantly pyrite.
			65.84 - 66.81 2-5% sulphides as stringers and dissemination dominantly pyrite.
			66.95 - 67.70. specks to 2% sulphides dominantly pyrite. At 67.70 the rock type changes slightly into a more uniform med gr. compact gabbro type and the sulphides whilst enriched around this contact do not seem to pass into the new rock type.
67.95	75.00		Coarse gabbro/norite of the type that is seen in outcrop at Mölland. Brownish pink feldspar is dominant. Round 69.71 seems to be becoming gradually more medium grained up to 70m only the odd specks of sulphides seen.
			67.95 - 71.08 specks and isolated clumps of pyrite.
			71.08 - 71.42 specks to 2% of sulphides mainly py
			74.16 - 74.21 sheared qtz/feldspar vein.

A/S SULFIDMALM

DIAMOND DRILL RECORD

~~KJETTEVANN~~
LOCATION: 13.60S - 8.68E BEARING 270 DIP 53 HOLE NO: 1 SHEET NO: 7
LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY Kjettevann
CASING: ~~145m~~ 2m FINISHED: 7.10.69 Mølland fra Island Norway
CORE SIZE: 52mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
75.00	78.00		Medium grained, massive, compact gabbroic rock with in part introduced qtz a feldspar. Over entire length contains 2-5% sulphides mainly po. Last 15 cms contain up to 10% sulphides. Occur as blebs, stringers, disseminations and small fracture fillings. Again the stringers seem to have a definate trend ca. 50°
78.00	85.18		For the most part a coarse gr. feldspar/amphibole rock with a patchy mottled appearance, contains in part a more med. gr. gabbroic rock.
			78.94 - 79.02 qtz/feldspar vein
			79.40 - 79.70 sheared and fractured zone
			Round about 80m it passes into a more med. gr. basic/ultrabasic variety.
			80.90 - 81.94 2-5% sulphides py + po and a little cp. 81.68 - 81.94 over 10% sulphides some massive po
			In the rest of the length the rock contains isolated specks and stringers of sulphides.
85.18	102.09		Gradual change over into a medium grained compact norite/gabbroic rock, massive in nature except for the first half meter which has a slight foliation.
			85.27 - 85.47 2% sulphides as very fine dissemination
			85.95 - 86.56 5-10% sulphides mainly po as blebs, disseminations and fracture fillings
			87.15 - 87.35 Over 5% sulphides
			Between 87.15 and 87.56 there is a fine impregnation which in parts approaches 2%.
			87.86 - 88.03 fine grained meta dolerite/amphibolite rock, upper contact is sharp and transcordant against coarse variety of the gabbro, the lower contact is much for more diffuse and difficult to see.
			87.56 - 87.86 specks of sulphides.
			up to 90.00 there are occasional specks of sulphides
			88.27 conc. of over 2% over a couple of cm's
			88.64 py lined fracture.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.605 - 8.68 E BEARING: 270° DIP: 53° HOLE No: 1 SHEET No: 8

LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY: KJETTEVANN, MOLLAND, ÅREM

CASING: ~~45~~ 2m FINISHED: 7.10.69 IVELAND, NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
-			The rock contains bands of coarser material and some of these have a definate orientation. One measured at 89.43. was 52°
			The rock is also becoming gradually more and more foliated and from 92 m there is a definate foliation. The rock however must still be called a meta-gabbro.
			92.70 - 92.90 2% sulphides as disseminations and stringers. po & py.
			90.00 - 100.00. occassional specks, stringers and fracture fillings - mainly py.
102.09	145.90		The rock gradually becomes more and more foliated and although it may still be part (a very foliated sheared part) of the gabbro body - it must be classed here as a hornblende gneiss, consisting of hb. feldspar, biotite ± qtz.
			103.00 - 103.37 5% sulphides but almost all pyrite. on fracture surface 40% pyrite.
			103.37. - 105.00 specks to 2% dominantly pyrite. At 104.16 and 104.48 there are fracture fillings of massive pyrite.
			105.00 - 119.45 specks to 2% sulphides
			108.50 - 108.60 over 2% mainly py.
			109.50 - 110.00 over 2% sulphides mainly py.
			111.70 - 111.98 Qtz vein.
			113.75 - 114.12 more massive section - more amphibolitic, no sulphides
			112.00 - 113.30 epidote noted.
			119.06 - 119.22 fine gr. meta dolerite?
			119.75 - 119.88 fine gr meta dolerite? concordant.
			The rock in many places can be called a foliated amphibolite.
			110.00 - 110.25. 5-10% sulphides as dissemination and stringers. Dominantly pyrite
			110.25 - 111.00 2-5% py as dissem & stringers
			111.00 - 113.10 approx. 2% pyrite
			113.68 - 113.77 Shear zone.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60S - 8.68E BEARING: 270 DIP: 53 HOLE NO: 1 SHEET NO: 9

LOGGED BY: F. NIXON STARTED: 22.9.69 PROPERTY: KJETTEVANN MOLLAND FARM

CASING: ~~4.45~~ m 2in FINISHED: 7.10.69 IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
			114.12 - 114.50 2-5% pyrite
			114.70 - 115.07 massive amphibolite
			115.07 - 115.87 more than 2% py as fine dissem. & stringers
			116.00 - 116.10 2-5% py.
			116.10 - 120.00 specks, in some places more (1-2%) of pyrite plus po? From 117.50 the rock is becoming quite strongly magnetic and magnetite can be seen around 119.06 (near the contact here) and between 119.90 - 120.00
			Am still calling all these foliated rocks amphibole gneisses, although in fact they do vary a little, from more acid varieties through to more basic, gabbroic varieties.
			127.20 - 127.24. granite vein
			127.39 - 127.62 granite dyke
			125.96 - 126.19 compact massive fine gr. gabbroic rock, seems to be concordant.
			From 128.70 start getting the occasional speck of pyrite.
			130.31 - 130.37. Qtz vein
			137.58 - 137.68 Qtz vein
			136.90 - 137.35. sheared zone
			130.13 - small bleb of magnetite
			130.37 - 130.80 specks of py as fine dissemination
			130.80 - 130.82 noticeable py. stringers.
			130.82 - 131.84 specks of py.
			From 131.84 downwards keep getting specks and at 136.60 they become quite numerous.
			137.28 - 137.46 over 2% py.
			137.46 - 139.50 from specks to 1% py.
			138.33 - 138.34 magnetite visible.
145.90			End of hole

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 1360S - 868E BEARING 270 DIP: 53 HOLE NO: 1 SHEET NO: 10

LOGGED BY: E. NIXON STARTED: 22.9.69 PROPERTY KJETTEVANN MYLLAND FARM

CASING: ~~145~~ m Lin FINISHED: 7.10.69 IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION					
			Core Angles.					
			2.43 m	53°	joint	85.50 m	52°	
			2.60 m	40°	joint	87.36 m	52°	
			3.20 m	55°	shear	87.41 m	57°	mineralized fracture
			6.20 m	70°		92.50 m	48°	
			6.24 m	70°	contact	94.64 m	42°	
			10.30 m	75°	joint	97.90 m	43°	
			10.48 m	88°	joint	99.85 m	42°	
			11.30 m	64°	shear	102.30 m	53°	
			13.98 m	40°	joint	105.20 m	41°	
			15.36 m	30°	joint	108.50 m	55°	
			15.47 m	25°	joint	111.10 m	63°	
			16.57 m	50°	joint	114.20 m	45°	
			17.52 m	45°	joint	117.20 m	55°	
			18.35 m	62°	shear	120.10 m	59°	
			29.45 m	45°	layering	122.15 m	45°	
			35.84 m	65°	contact	124.70 m	55°	
			37.74 m	54°	layering	127.80 m	46°	
			40.82 m	37°	shear	130.10 m	40°	
			44.33 m	55°	shear	133.10 m	54°	
			46.30 m	45°	joint	136.50 m	59°	
			50.56 m	62°		139.90 m	60°	
			51.65 m	18°	fracture	142.80 m	52°	
			52.20 m	62°	stringers	144.70 m	55°	
			53.95 m	57°				
			57.15 m	56°				
			61.44 m	50°	shear			
			66.23 m	50°				
			66.90 m	55°				
			62.30 m	57°				
			67.77 m	50°				
			70.14 m	53°				
			70.70 m	48°				
			74.18 m	55°				
			79.15 m	60°				
			81.30 m	46°				
			84.65 m	48°				

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 13.60S - 8.68E BEARING 270 DIP 70 HOLE NO: 2 SHEET NO: 1

LOGGED BY: E. NIXON STARTED: 7.10.69 PROPERTY KLETTEVANN MOLLAND

CASING: ~~1.55~~ m 2m FINISHED: 24.10.69 FARM IVELAND NORWAY.

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.55		Overburden till and boulders.
1.55	19.00		Massive medium gr. fairly basic gabbro/norite.
19.00	24.90		Ultrabasic amphibole rich specks of sulphides
24.90	71.00.		Massive medium grained norite.
			From 55.00-71.00 it is intruded by an
			ultrabasic pyroxene/amphibole rock which
			between 55.92 and 65.42 carries approx 10%
			sulphides.
71.00	73.90.		Complex section of med gr amphibolitic rocks
			and fine gr basic rocks. This section is also
			intruded by the ultrabasic.
73.90	77.30		Med gr. gabbroic rock.
77.30	79.67.		Coarse grained amphibolitic rock
79.67.	80.34		Hornblendite.
80.34	82.62		Medium coarse grained meta gabbroic rock
			contains in part up to 10% sulphides.
82.62	92.00		Basic gabbro over 2% sulphides, disseminated.
92.00	97.20.		Medium gr. meta gabbro/amphibolitic rock.
			with in part over 2% sulphides.
97.20	124.90.		Very basic to ultrabasic rock.
124.90	128.15.		Coarse gr. feldspar/amphibole rock rich in magnetite
128.15	131.00		Basic/ultrabasic rock.
131.00	135.00		Amphibolitic rock gradually changing to —
135.00	153.23.		Amphibole gneiss/foliated.
153.23	158.20		Basic/ultrabasic rock
158.20	161.52		Foliated coarse/medium grained amphibole gneiss.
161.52	172.07.		Medium grained gabbro/norite with a distinct
			layering, odd sulphides.
172.07	185.42		Foliated amphibole gneiss.
185.42			End of hole.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60S 8.68E BEARING 270 DIP: 70 HOLE NO: 2 SHEET NO: 2

LOGGED BY: F. NIXON STARTED: 7.10.69 PROPERTY KJETTEVANN MOLLANS

CASING: ~~150m~~ 2m FINISHED: 24.10.69 FARM IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.55		Overburden
1.55	24.90		Massive medium grained fairly basic variety of gabbro. From around 19m the rock becomes very basic in character and this continues down to 24.90. although feldspar appears before this point. Carbonate was noted on some fracture planes.
			3.86-3.87 small carbonate rich shear zone.
			7.55-7.56 small sheared Qtz feldspar vein
			8.00-8.35 slightly fractured zone
			11.31-11.33 small fine grained sheared zone.
			All the way down to 20m it contains occasional specks of sulphides dominantly pyrite. These specks become more concentrated around 15.90-16.00 From 20m down to 25m we get specks and blebs of pyrite some of the blebs being quite large
24.90	27.27		Med. grained gabbroic rock in part quite basic and with irregular patches of feldspar in parts. In other parts the feldspar is distributed more evenly and regularly the rock then looking like a coarse facies of the gabbro
			~~24.23~~-26.80-26.92 fine gr. gabbroic/amphibolite rock with higher magnetic content than the surrounding rocks. Intrusive? upper contact is difficult to identify and delimit, but the lower contact is quite ~~smod~~ sharp and uniform.
27.27	28.20		Coarse gabbro with pinky brown feldspar as is seen in ontcrop at Kjettevann. From 28.00 to 28.20 it becomes gradually less coarse
			Contains some specks of pyrite.
28.20	55.92		Massive medium grained gabbro/norite
			29.45-29.52 med gr. granodioritic? intrusive with fine impregnation of pyrite at least 2%.
			In parts (due to what looks like the introduction of feldspar) the rock is quite coarse grained) Down to 34.72 find isolated specks of sulphides mainly py.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60 S 8.68 E BEARING 270 DIP: 70 HOLE No: 2 SHEET No: 3
LOGGED BY: F. NIKON STARTED: 7.10.69 PROPERTY KJETTEVANN MOLLAND
CASING: ~~1.55~~ m 2 in FINISHED: 24.10.69 FARM IVELAND NORWAY
CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
28.20	55.92	cont	34.72 - 36.05 dissemination of up to 2% pyrite
			From 40.00 - 41.24 the rock is partly coarse grained.
			42.67 - 43.03 - Very fine gr. sheared magnetic, compact basic rock which looks to be intrusive into the surrounding rocks, both upper and lower contacts seem to be transcordant.
			45.75 - 46.27 finish gr. meta amphibolitic? rock could be intrusive, it contains some coarser fragments which are possibly fragments of country rock that have been partly assimilated. However these coarser fragments could also have developed by crystal growth.
			The same kind of rock seems to occur between 46.30 and 46.35.
			54.92 - 54.95 dk vein.
55.92	65.42		"Ore zone"! The medium grained gabbro seems to have been intruded by a basic/ultrabasic amphibole rich fraction carrying much sulphides po. py and cp - predominantly po.
			56.29 - 56.35 dk/feldspar vein very rich in magnetite, the country rock around the top contact is also enriched in magnetite.
			58.72 - 58.83. Evidence of a small fault or thrust which displaces a small 2 cms qtz vein over a distance of 4 cms. The fault has a core angle of 10° and is in part occupied by sulphides.
			Over entire zone contains approx 10% Sulphides
65.42	71.40		The med gr. gabbroic rock continues til 71.40, still with the uneven patches of dark hb rich rock but only with the odd sulphides.
71.40	71.60		Med/fine gr. massive amphibolitic/gabbroic rock with sharp even upper contact (53°)
71.60	72.25		round about 71.60 there is a gradual change into a more med gr. rock of the same composition

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60S 8.68E | BEARING: 270 | DIP: 70 | HOLE NO: 2 | SHEET NO: 4
LOGGED BY: F. NIXON | STARTED: 7.10.69 | PROPERTY: KJETTEVANN. MØLLAND
CASING: ~~155~~ m 2 ins | FINISHED: 24.10.69 | FARM. IVELAND. NORWAY.
CORE SIZE: 32 mm | TESTS (CORRECTED):

FROM	TO		DESCRIPTION
71.60	72.25	cont.	Both fine gr. and med gr. rocks contain clumps of darker (ampl. rich) material.
72.25	72.60		The same fine gr rock with patches of coarser basic material.
72.60	72.97		Med/coarse gr. fairly massive gabbroic rock with what looks like some growth of feldspar in places.
72.97	73.55		Fine/med gr. amphibolitic/gabbroic rock.
73.55	73.90		Coarse feldspar/amphibole rock with a zone 2 cms of dark minerals at the upper contact. Lower contact is a more gradual change over into more med. gr. rocks.
73.90	77.30		Essentially med. gr. gabbroic rock, but it contains both fine gr and coarse gr patches and it is very difficult to decide if there has been some kind of layering that has been disturbed or that the different textures reflect different intrusions, or ? 76.50 - 76.90 coarse section.
77.30	79.67		The rock is now becoming more amphibolitic in nature, it is med to coarse grained and seems to consist essentially of amphibole and feldspar the respective amounts varying. 78.00 - 78.40 very basic 79.00 - 79.67 sheared zone.
79.67	80.34		Dark hbl dike with odd patches of feldspathic material. At upper contact is a small zone of massive sulphides.
80.34	81.70		Med in part coarse gr. gabbroic rock with irregular basic patches 80.42 - 80.70 2% sulphides po. py. cp. 80.70 - 81.00 specks. 81.00 - 81.12 10% po cp. py. 81.12 - 81.70 specks to 2%
81.70	82.62		Zone containing much quartz as vein material 82.00 - 82.20 strong shear zone.
82.62	97.00		Basic med. gr gabbroic rock. Over the first 20-30 cms almost ultrabasic. The main rock type has a

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DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.00S 8.68E | BEARING 270 | DIP 70 | HOLE No: 2 | SHEET No: 5
LOGGED BY: F. NIXON | STARTED: 7.10.69 | PROPERTY KJETTEVANN MOLLAND
CASING: ~~55~~m 2m | FINISHED: 24.10.69 | FARM IVELAND. NORWAY.
CORE SIZE: 32 mm | TESTS (CORRECTED):

FROM	TO		DESCRIPTION
82.62	97.00	cont	mottled appearance with white patches (acid dks ~~minerals~~ lt/dk feldspar). It is difficult to decide whether this is just the nature of the rock or whether the basic stuff is a later intrusion
			83.50 - 85.00 much introduced qtz and feldspar
			83.00 - 84.00 specks to 1% po py cp.
			84.00 - 85.00 2% sulphides po. py cp mostly as blebs and disseminations.
			85.00 - 87.00 2% sulphides
			87.00 - 89.00 at least 2% po. cp. py.
			89.00 - 70.00 over 2% sulphides
			From 90.00 onwards the rock becomes less blotchy and more uniform
			92.80 - 92.84 dk qtz vein with concentration of magnetite in the host rock near the upper and lower contacts.
			94.43 - 94.50 Brecciated qtz/feldspar vein.
			95.79 - 95.97 pinkish granite.
			90.30 - 91.10. 2% sulphides po. py cp.
			93.00 - 93.50 2% sulphides a lot of pyrite
			Between 91.10 and 93.00 get specks which sometimes approach 1-2%.
			From 92.70 onwards the rock becomes more amphibolitic.
97.00	97.20		Very weathered rotten fracture zone.
97.20	124.90		Very basic to ultrabasic friction, amphibole rich plus some pyroxene and a mica (phlogopite) Also contains 'remnants' of med gr rock.
			109.57 - 109.81. fine gr. intrusive
			From 118.00 the rock has a distinct green colour and is essentially a hbdite.
			118.58 - 118.75 dk qtz feldspar amphibole green type rock with a fine dissemination of sulphides mainly py + a very little cp.
			Between 110 and 120 it contains some odd sulphides as fine disseminations but nothing approaching noteworthy quantities.

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DIAMOND DRILL RECORD

LOCATION: 13.60S 8.68E BEARING: 270 DIP: 70 HOLE NO: 2 SHEET NO: 6
LOGGED BY: F. NIXON STARTED: 7.10.69 PROPERTY: KJETTENANN MØLLAND
CASING: ~~45m~~ 2m FINISHED: 24.10.69 FARM IVELAND NORWAY
CORE SIZE: 32mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
124.90	128.15		Gradual change into a coarse gr. rock (metamorphic) consisting essentially of feldspar and amphibole and carrying quite a large amount of magnetite. In some cases the nature of the mineral intergrowth gives one the impression that the rock has been formed in some kind of breccia zone – it looks crushed. Contains specks of sulphides over its entire length, both as dissemination and on fracture planes. 127.50 – 127.80 Around 2% py.
128.15	135.00		Compact massive very basic/ultrabasic rock. Low magnetics. From 131.00 this rock is gradually getting more acid until at around 135.00 it passes into an amphibole gneiss. Contains a lot of biotite although no actual foliation is developed. 139.90 coarse bds feldspar rock which continues to 140.25.
135.00	146.00		Up to 144 it is still fairly massive, even though it now is a typical metamorphic rock. 144.00 – 145.00 an intermediate rock type that contains amphibole and a whitish feldspar. feldspar content increases with depth. and there is also a foliation developing.
146.00	152.89		Amphibole gneiss, med/coarse gr. The foliation changes rapidly, so at 150 m to 151 or so we are still almost along the foliation.
152.89	153.23		White quartz (pure) vein.
153.23	158.20		Dark green massive basic to ultrabasic amphibole rock. Contains minor amounts of feldspar in parts. Rich in actinolite? 153.46 – 153.57 Qz vein contacts 36° Between 156.27 – 158.32 and 157.12 – 157.13 are small bands of med gr. amphibolite – must be younger intrusives. Contains odd specks of sulphides.

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DIAMOND DRILL RECORD

LOCATION: 13.60 S. 8.68 E. BEARING: 270 DIP: 70 HOLE NO: 2 SHEET NO: 7

LOGGED BY: F. NIXON STARTED: 7.10.69 PROPERTY: KJETTEVANN

CASING: ~~155m~~ 2½ FINISHED: 24.10.69 MOLLAND - EVELAND - NORWAY.

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
158.20	161.52		At 158.20 we get an increase in feldspar and for the first metre the rock is a coarse gr. feldspar amphibole ± biotite rock before passing into a less coarse gr more gneissic variety.
			160.12 - 160.19 sheared quartzitic vein, shearing is // to the contacts.
			Between 160.19 and 160.57 there is some kind of folding going on the core angles change direction
			160.91 - 161.12 amphibole rich section
161.52	172.07		A more massive compact meta gabbroic rock, shows a remarkable alternation of med. gr lighter portions and more darker portions, which are more basic & coarser, contain hypersthene.
			Some parts are so uniform that there is almost a kind of repetetive layering, 5 or 6 cms between layers and the layers having a core angle of approx 45°. In other parts there is no such uniform layering here the darker portions seem to cut haphazard into the lighter.
			164.00 - 164.15 2-5% sulphides po py. c.p.
			164.15 - 164.30 0-2% as fine dissemination.
			170.70 - 171.05 2% sulphides mainly po.
			Apart from the above mentioned it contains other odd sulphides
172.07	185.42		Foliated amphibole gneiss much feldspar and quartz. At least, down to 176.00 there seem to be "ghost remnants" of an original light and dark layering structure (as above) Foliation orientated accross these in some cases.
			From 178 to end of hole - much epidote
			180.75 - 180.80 mylonite zone.
			In parts quite a rich dissemination of pyrite.
185.42			End of Hole.

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DIAMOND DRILL RECORD

LOCATION: 13.60 S. 8.68 E BEARING 270 DIP: 70 HOLE No: 2 SHEET No. 8

LOGGED BY: E. NIXON STARTED: 7.10.69 PROPERTY KJETTEVANN

CASING: ~~145 m~~ 2 in FINISHED: 24.10.69 MØLLAND, IVELAND, NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION			
			Core Angles.			
			1.77.	33 joint	177.50	32
			2.25	26 joint	180.50	50
			3.86	50 shear	183.15	40
			7.55	53 shear	184.70	60.
			11.32	68 shear		
			26.92	45 contact		
			29.45	29 contact		
			29.52	32 contact		
			33.25	52		
			38.30	55		
			39.45	29 joint		
			48.50	65		
			45.75	33 contact		
			46.27	40 contact		
			49.47	15 vein		
			51.70	51		
			55.58	17 fracture		
			56.29	49 contact		
			56.35	45 contact		
			63.42	49		
			76.50	48		
			79.10	65 shear		
			92.84	60 contact		
			94.50.	70 contact.		
			95.79	60 contact		
			95.97	65 contact		
			144.50	51		
			146.80	38		
			151.50	27		
			158.70	47		
			160.19	55 contact		
			160.25	45 normal		
			160.50	48 other way		
			171.50	40		
			174.50	45		

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: 13.605 - 25.78E BEARING 270 DIP: 70 HOLE NO: 3 SHEET NO: 1

LOGGED BY: F. NIXON STARTED: 27.10.69 PROPERTY KJETTEVANN HIÖLLAND

CASING: ~~116~~ 2m FINISHED: 7.11.69 FARM IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.10		Overburden till and boulders.
1.10	22.50		Basic med gr. gabbro
22.50	27.00		Above rock enriched in amphibole.
27.00	40.00		Medium grained basic gabbro.
40.00	72.00		Med grained gabbro/ norite in parts basic. with in part poor sulphide dissemination.
72.00	87.50		Extremely basic section
87.50	95.50		Coarse / medium grained gabbroic rock in parts hornblenditic in parts more amphibolitic.
95.50	110.00		Massive medium grained gabbro/ norite.
110.00	115.70		Coarse grained gabbro
115.70	116.50		Medium grained gabbro.
116.50			End of hole.

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13,60 S 25 78 E BEARING 270 DIP: 70 HOLE NO: 3 SHEET NO: 2
LOGGED BY: F NIXON STARTED: 27.10.69 PROPERTY KJETTEVANN MOLLAND
CASING: ~~F10~~ m 2m FINISHED: 7.11.69 FARM IVELAND NORWAY
CORE SIZE: 32mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
0	1.10		Overburden - till and boulders.
1.10	22.50		Extremely basic med gr. gabbroic rock, not entirely fresh. In some sections it could be called ultrabasic. In some sections it seems to contain both ortho and clino pyroxenes amphiboles. After the first 4 m. the rock becomes more massive and fresher and pyroxenes can be seen.
			2.80 - 2.90 injection of quartzitic material
			9.31 - 9.60 fine gr. fairly magnetic basic intrusive, meta gabbroic in nature.
			11.41 - 12.00 the rock is slightly sheared and contains abundant biotite and more feldspar than in the surrounding rocks.
			12.69 - 12.77 pegmatite vein.
			19.30 - 19.44 sheared fracture zone.
			20.24 - 20.25 small peg vein.
			20.46 - 21.44 somewhat fractured zone
			21.48 - 21.56 small shear zone with much chlorite.
			0 - 17.00 just the odd speck of sulphides.
			17.00 - 17.36 over 2% sulphides, mainly py as fine to med. gr. impregnation.
			17.68 - 17.93 specks to 2% med. gr. dissemination mainly pyrite.
22.50	27.00		The basic gabbro is still essentially the same although here the rock is slightly greener in colour which could reflect an increase in the amphibole content.
			23.16 - 23.20 small intrusive band of a fine/med gr. dioritic? rock with fine dissemination of pyrite. Same rock type occurs between 23.43 and 23.58.
27.00	40.00		Med gr. basic gabbro.
			From 28.70 - 29.43 the drill follows the line of a fracture and consequently the rock here is very fractured - with carbonate

A/S SULFIDMALM

~~KJETTEVANN~~ DIAMOND DRILL RECORD

LOCATION: 13605. 25.78E BEARING 270 DIP: 70 HOLE NO: 3 SHEET NO: 5

LOGGED BY: F. NIXON STARTED: 27.10.69 PROPERTY KJETTEVANN MOLLAND

CASING: ~~+10~~m 2m FINISHED: 7-11-69 FARM IVELAND NORWAY.

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
			on the fracture planes.
			29.70 - 29.84 fractured and sheared zone.
			34.33 - 34.49 quartz filled (partly) fractured and sheared zone.
			35.42 - 36.08 drill follows line of fracture which is lined with carbonate and chlorite.
			37.50 - 37.60 uneven qtz vein with a few isolated specks of sulphides
40.00	60.00		From around 40m the rock is increasing in feldspar content and becoming more like the normal norite.
			44.58 - 44.68 small shear zone
			46.20 - 46.70 introduction of feldspar makes the rock here quite coarse grained.
			45.81 - 45.88 fine gr. basic magnetic rock - meta gabbro?
			44.20 - 44.50 specks to 2% disseminated sulphides mainly pyrite.
			49.20 - 50.00 specks to 1% sulphides.
			The rock is still basically the same basic noritic type but around 53.00 seems to be getting a more even, fine gr norite type, but this in part is still fairly basic
			52.41 - 52.48 dz vein with some reddish mineral. The rocks on either side of this vein over a distance of 10 cm are green in colour - thermal contact metamorphism?
			54.00 - 54.27 fractured zone.
			57.82 - 58.17 extremely fine gr. meta-dolerite? rich in magnetite.
			Between 50 and 60 m sulphides occur sporadically as fine disseminations but in no place approach 1%.
60.00	70.00		From 60 m begin to get the introduction of feldspar and between 60 m and 70m the rock is partly med / fine gr. and partly

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DIAMOND DRILL RECORD

~~KJETTEVANN~~

LOCATION: 13.60 S. 25.78 E BEARING 270 DIP: 70 HOLE NO: 3 SHEET NO: 4

LOGGED BY: F. NIXON STARTED: 27.10.69 PROPERTY KJETTEVANN MOLLAND

CASING: ~~110m~~ 2 m FINISHED: 7.11.69 FARM IVELAND. NORWAY.

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
			fairly coarse grained; where coarse grained and carrying much feldspar the rock type is very unlike a gabbro and it could almost be taken for a granitic gneiss
			62.00 - 62.32 more than specks but less than 2% sulphides as med/coarse dissemination
			62.60 63.45 weak dissemination of sulphides
			65.00 - 67.50 averages less than 2% sulphides starting with fine - through to med. and then coarse dissemination mostly po.
70.00	87.50		The rock is essentially a med. gr basic gabbroic rock. The basicity varies, sometimes it is strongly basic, other times it is more like a normal gabbro. The rock is massive and in surface characteristics does not show much variation. - although in some places a few more specks of biotite can be seen than in others.
			72.93 - 73.00 small peg. vein uneven contacts
			72.00 - 72.15 slight shear zone with a small enrichment of pyrite.
			71.00 - 74.15 odd specks of sulphides mainly pyrite.
			74.15 - 74.50 there is a slight increase in the sulphide content but this is still very minor.
			From 74.50 down to 80.00 we still get odd specks of sulphides, slight enrichment from 77.00 - 77.50.
			80.20 - 80.55 slightly sheared with development of quite a lot of biotite and some fine pyrite specks.
			83.20 - 83.40 less than 2% sulphides
			84.32 - 84.36 small shear zone
			84.67 - 84.80 sheared biotite rich zone
			85.20 - 85.34 very coase hypersthene/feldspar zone

A/S SULFIDMALM

DIAMOND DRILL RECORD

LOCATION: ~~KJETTEVANN~~ 13.60 S. 25.79 E BEARING 270 DIP 70 HOLE NO: 3 SHEET NO: 5

LOGGED BY: F. NIXON STARTED: 27.10.69 PROPERTY KJETTEVANN MOLLAND

CASING: ~~EW~~ m 2m FINISHED: 7.11.69 FARM IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
			85.42 - 85.45 small shear zone.
			85.82 small carbonate vein
			86.00 - 87.00 The rock is greener in colour and contains more amphibole.
			86.25 - 86.29 Qz vein
			83.40 - 90.00 occasional specks of sulphides mainly pyrite occur.
87.50	90.00		Coarse grained gabbro contains introduced quartz.
90.00	95.50		Med / coarse grained, fractured (in part) and sheared (in part) more amphibolitic rock - in part much like hornblendite in other parts it shows a coarse intergrowth of feldspar and amphibole.
			94.00 - 94.18 med gr. red granite.
95.50	110.00		The rock reverts back to a massive med. gr more normal gabbro / norite
			95.50 - 96.70 contains specks of sulphides py. po. Not in amount are slightly over average, perhaps in places up to 1% but not more.
			Between 94.00 and 100.00 are darker bands about 1 cm thick Not occur at regular intervals and seem to be of essentially the same mineral composition as the rest of the rock. This is some kind of layering. Core Angle is approx 45°
			This layering continues down to 109 m and is essentially the same as we see in hole no. 2 around 160 m.
			109.32 - 109.43 peg vein.
			109.00 - 110.00 The rock is not showing layering seems to have been slightly affected by shearing although only slightly
			104.13 - 104.30 and 108.70 - 108.90 1% sulphides.
110.00	115.70		Fairly coarse grained gabbro with much reddish feldspar.

A/S SULFIDMALM

DIAMOND DRILL RECORD

~~KJETTEVANN~~

LOCATION: 13.60 S 25.78 E BEARING: 270 DIP: 70 HOLE NO: 3 SHEET NO: 6

LOGGED BY: F. NIXON STARTED: 27.10.69 PROPERTY: KJETTEVANN HOLLAND

CASING: ~~10~~ m 2" 1 FINISHED: 7.11.69 FARM. IVELAND NORWAY

CORE SIZE: 32 mm TESTS (CORRECTED):

FROM	TO		DESCRIPTION
-			115.00 - 115.27. fine/med gr. part.
			111.22 - 111.26 2% sulphides
			115.10 - 115.44. po and a little cp as fracture linings. Otherwise odd specks of sulphides.
115.70	116.50		Med gr gabbro.
116.50			End of hole

Core Angles.

11.80	60	shear.
12.77	38	contact
21.50.	48	shear
34.36	53	shear
44.60	74	shear
45.81 } 45.88 }	63	contact.
52.41.	52	contact
57.82.	45	contact.
72.10	45	shear
84.34	54	shear
86.25	55	contact
101.50.	40	layering.