ARIS SUMMARY SHEET

District Geologist, Nelson

Off Confidential: 90.01.25

ASSESSMENT REPORT 18633 MINING DIVISION: Nelson

PROPERTY: Goatfell
LOCATION: LAT 49 07 00 LONG 116 12 00
UTM 11 5440514 558378
NTS 082F01E
CLAIM(S): Goat 1,Goat 2
OPERATOR(S): Chevron Min.
AUTHOR(S): Hitzman, M.W.
REPORT YEAR: 1989, 150 Pages
COMMODITIES SEARCHED FOR: Zinc,Lead,Silver
KEYWORDS: Proterozoic,Aldridge Formation,Reverse faults,Tourmalinite pipe Alteration,Sulphides
WORK DONE: Geological,Drilling,Physical

DIAD	844.1 m	2 hole(s);NQ
GEOL	500.0 ha	
PETR	5 sample(s)	
ROAD	0.5 km	

RELATED REPORTS: 16970

ASSESSMENT REPORT

GEOLOGICAL, GEOPHYSICAL AND DIAMOND DRILLING WORK

GOATFELL GROUP

Yahk Area, B.C.

Nelson and Fort Steele Mining Divisions

N.T.S. 82/F1 ~~W~~E

Latitude: 49°07'N

Longitude: 116°12'W

Owners: G. Leask; Chevron Minerals Ltd.

Operator: Chevron Minerals Ltd.

Author: M. W. Hitzman

February 1989

ala/h/r

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

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1.0 SUMMARY

During 1988 Chevron Minerals Ltd. undertook a surface exploration program on the Goatfell Property near Yahk, B.C.

The Goatfell Property contains a major tourmalinite pipe cutting metasediments of the middle Proterozoic, middle Aldridge Formation. This occurrence was deemed a favorable indicator for zinc-lead-silver mineralization of the Sullivan type. The primary target zone is the Sullivan mine horizon near the lower - middle Aldridge boundary.

Chevron Minerals Ltd. completed geologic mapping, a two-hole diamond drilling program, limited petrographic studies and three short lines of MAG/VLF during the 1988 field season.

The work confirmed the stratigraphic position of the prospect area suggested during 1987. Further geologic mapping, combined with diamond drilling, revealed a significant zone zone of quartz-chlorite-carbonate-pyrite alteration with associated weak zinc and lead mineralization.

2.0 INTRODUCTION

Diamond drilling was conducted on the Goatfell Project between July 15 and October 27. Geological mapping in the project area was carried out intermittently during the same period. Personnel for the project were based in a motel near Yahk, B.C.

The objectives of the 1988 exploration program on the Goatfell Project were to evaluate the property for a Sullivan-type stratiform zinc-lead- silver deposit (Hamilton, et al., 1982). The exploration model for a Sullivan-type massive sulfide deposit assumes that such a deposit formed at a horizon displaying evidence of tectonic instability such as abundant slumped beds, conglomerates or debris slides, and rapid lateral facies variations. In addition, it is possible that deposits of this type will have associated alteration zones. The most likely alteration pattern in a major ore system is thought to be a tourmalinized zone below the orebody, possibly with weak pipe-like extensions into overlying sediments, and a broad silica - chlorite - high sulfur (pyrite) - base metals-rich halo below and above the orebody with an albite-iron sulfide - rich core. Weaker hydrothermal systems, in which alteration did not persist after sulfide deposition, may contain only footwall alteration such as a zone of silica - chlorite - (albite) alteration enclosing small tourmalinite pipes. Any major syngenetic/syndiagenetic deposit in the Aldridge Formation is expected to display a weak geochemical fringe extending up to several kilometers from the deposit along the ore horizon as at the Sullivan Mine. Although the prime horizon of interest on the Goatfell Property is the Sullivan mine horizon in the uppermost lower Aldridge, other horizons within the middle Aldridge are also considered possible sites for syndiagenetic - syngenetic mineralization.

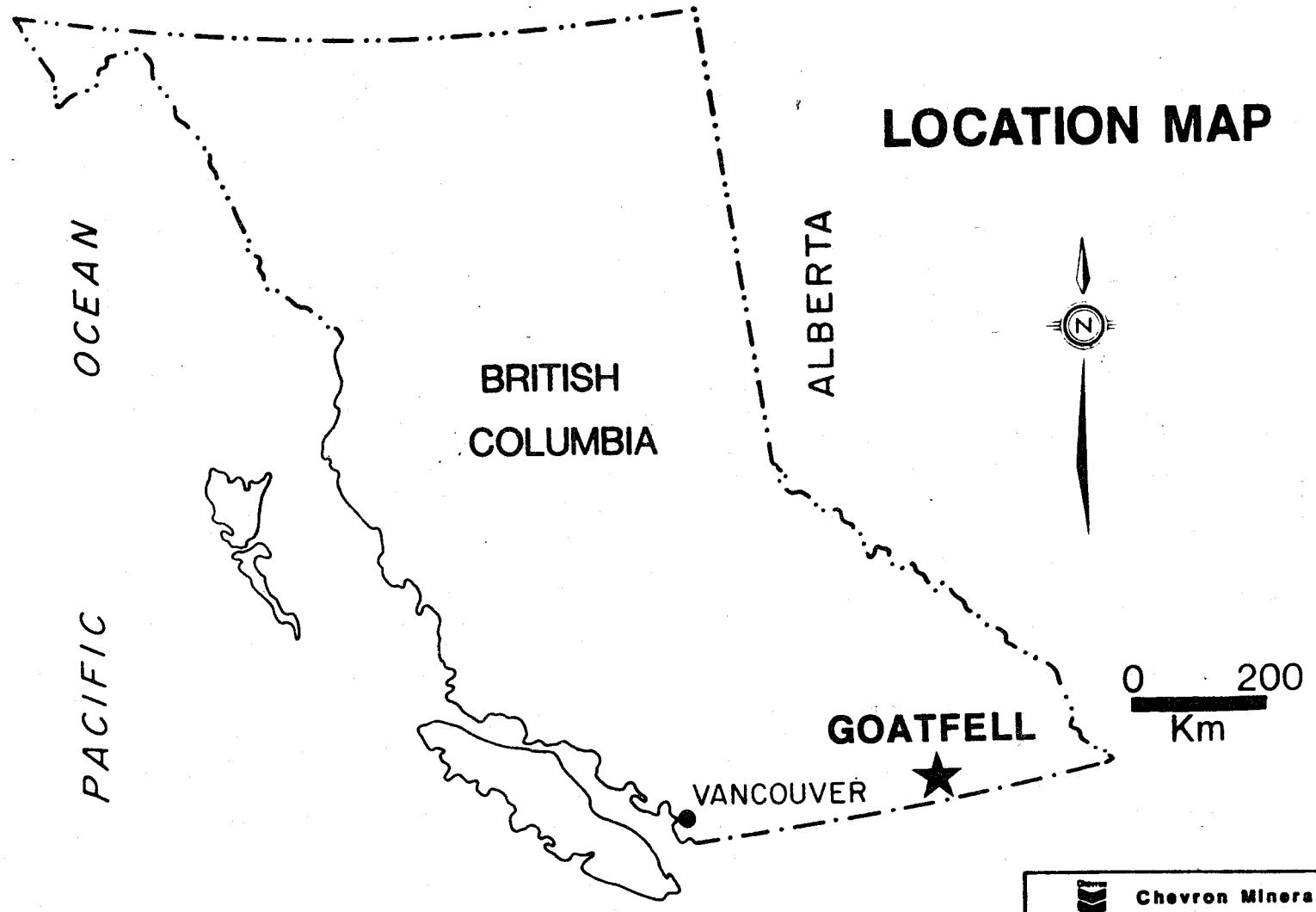
Exploration on the Goatfell Property during 1988 was achieved by mapping of the various alteration types in the Aldridge Formation and diamond drilling to test the Sullivan mine horizon. The 1988 program consisted of:

1. Geological mapping and prospecting on the Goat 1, 2, and 3 claims and the immediately surrounding area at 1:5,000 scale.
2. A geophysical survey consisting of three lines (1.9 kilometers) of MAG/VLF R22K on the Goat 1 and 2 claims to determine the location of a major fault.
3. Road repair for drill access.
4. Diamond drilling for a total of 844.14 m in two NQ holes.

3.0 LOCATION AND ACCESS

The Goatfell Property is located approximately 10 km northwest of the town of Yahk in southwestern British Columbia (Figure 1) and 10 km north of the Canada - USA border (NTS 82F/1; latitude 4907' north, longitude 11612' west).

Elevations on the property range from approximately 700 m along Kitchener Creek to 1,645 m on the highest mountains. Moderate to cliff forming slopes with broad U-shaped valleys, occasionally with more recent steep down cutting gorges, typify the topography of the region. The property is generally forested with pine and fir except in areas of recent clear cutting and along Kitchener Creek where farming has been developed.



Chevron Minerals Ltd.

GOATFELL PROJECT

LOCATION MAP

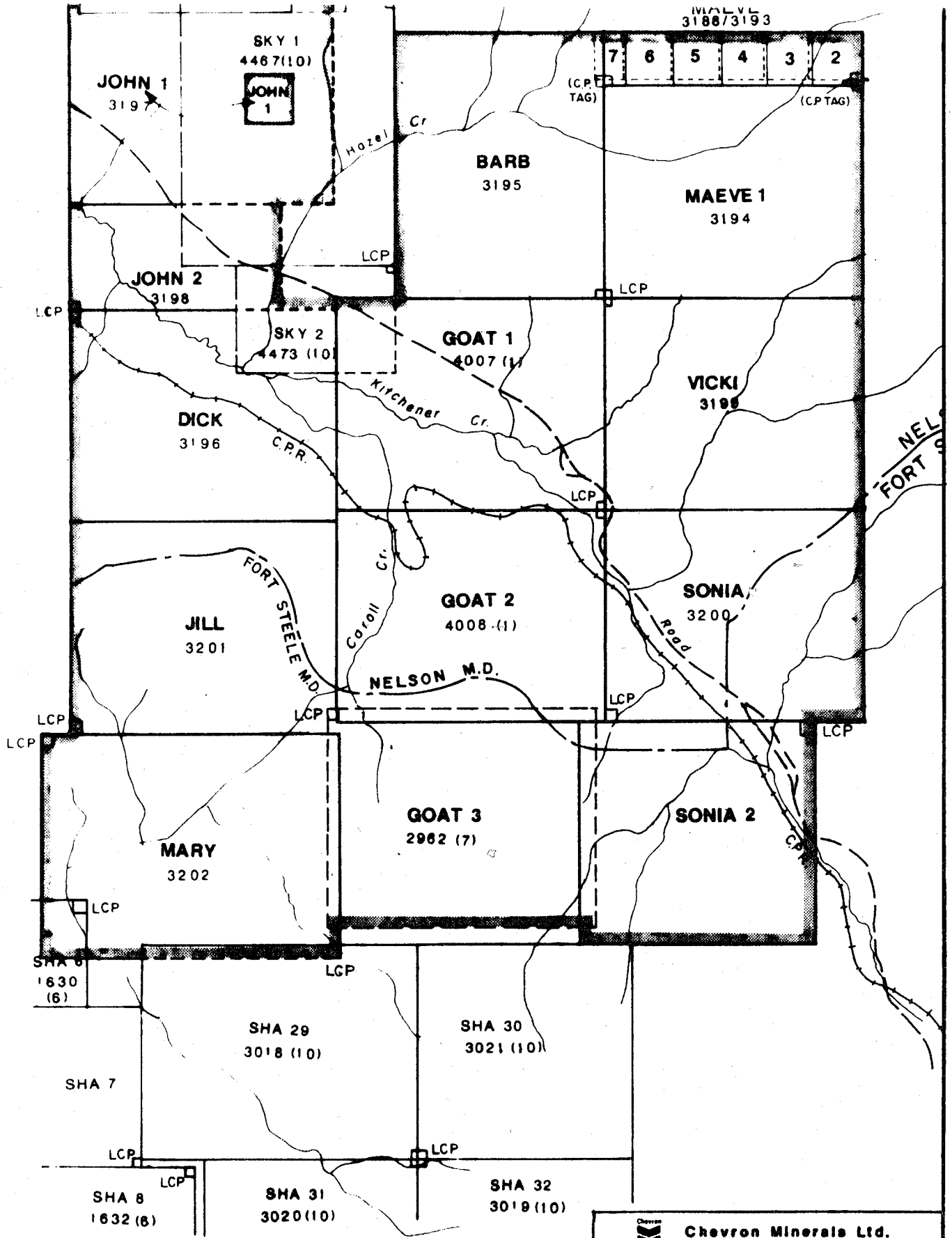
FIGURE No 1		PROJECT No M-586	
DATE SEPT. 89'	REVISIONS		SCALE 1:10000
NTS No 82 F/ 1			FILE No.
COMPILED BY			

Access to the property is by Highway 3 which crosses the northern portion of the property through the valley connecting the Kitchener Creek (west) and Rainy Creek drainages. The highway corridor also contains two natural gas pipelines and a CPR branch rail line. Permission must be sought for crossing the gas pipeline corridor with oversized vehicles. A number of forestry and private roads cross the property. Access to the southern portion of the property is provided by a major forestry road which joins Highway 3 just to the southeast of the Goatfell railway siding and intersects the Carroll Creek valley to the west. Permission to use the private roads must be obtained from local property owners. The BC Hydro high tension line lies approximately 7 km west of the property.

4.0 CLAIM STATUS AND OWNERSHIP

The Goatfell Property straddles the Nelson and Fort Steele Mining Divisions (Figure 2). Table 1 lists the claim names, number of units, record number and expiry dates for all claims comprising the Goatfell Property.

The Goat 1 and 2 claims are owned by Gordon Leask and are under option to Chevron Minerals Ltd. Chevron has an agreement with Leask whereby Chevron can earn a 65 percent interest in the claims by making specified expenditures. Formosa Resources Corporation has an agreement with Chevron Minerals Ltd. whereby it can earn 50 percent of Chevron's interest in the claims by making certain specified



Chevron Minerals Ltd.

GOATFELL PROJECT

CLAIM MAP

FIGURE No 2		PROJECT No M-586	
DATE SEPT. 89	REVISIONS		SCALE 1:50,000
NTS No 82F/1			FILE No
COMPILED BY J.W.			

Table 1

CLAIM STATUS

Claim Name	Record No.	Mining Division	Units	Expiry Date (after submission of this report)
Goat 1	4007	Nelson	20	January 27, 1999
Goat 2	4008	Nelson	20	January 27, 1993
Goat 3	3286	Ft. Steele	20	February 8, 1990
John 1	5364	Nelson	20*	September 9, 1989
John 2	5365	Nelson	8*	September 9, 1989
Dick	5363	Nelson	20*	September 10, 1989
Jill	3201	Ft. Steele	20	September 12, 1989
Mary	3202	Ft. Steele	20	September 12, 1989
Barb	5368	Neson	20	September 9, 1989
Maeve 1	5356	Nelson	20	September 10, 1989
Maeve 2*	5357	Nelson	1	September 10, 1989
Maeve 3	5358	Nelson	1	September 10, 1989
Maeve 4	5359	Nelson	1	September 10, 1989
Meave 5	5360	Nelson	1	September 10, 1989
Maeve 6	5361	Nelson	1	September 10, 1989
Maeve 7	5362	Nelson	1	September 10, 1989
Vicki	5366	Nelson	20	September 10, 1989
Sonia	5367	Nelson	20	September 11, 1989
Sonia 2	3228	Ft. Steele	20	October 30, 1989
Sky	4467	Nelson	20*	October 17, 1990
Sky 2	4473	Nelson	6	October 29, 1990
Sky 3	5314	Nelson	1	September 2, 1989

*John 1 - 6 complete units, 6 fractional units overlapping Star 4 claim (4477 - Cominco) and Sky claim (4467 - Wiklund).
*John 2 - 4 complete units, 3 fractional units overlapping Sky 1 claim (4467 - Wyklund) and Sky 2 claim (4473 - Wiklund).
*Dick - 16 complete units, 3 fractional units overlapping Sky 2 claim (4473 - Wiklund).
*Maeve 2-6 overlap Maeve 1 claim, while Maeve 7 is a fractional claim overlapping Barb and Maeve 1 claims.
*Sky claim oncompasses Sky 3 1 unit claim.

expenditures. The Sky claims are owned by Mr. David Wiklund and Mr. Harry Davies and are under option to Chevron Minerals Ltd. Chevron has an agreement with Mr. Davies and Mr. Wiklund whereby Chevron can earn the entire right, title and interest to the property by making specified expenditures. All other claims in the property are held by Chevron Minerals Ltd.

5.0 PREVIOUS EXPLORATION

Although detailed, modern geological work has been carried out in portions of the Aldridge Formation outcrop area by members of the British Columbia Geologic Survey (Rice, 1940; Reesor, 1981; Hoy and Diakow, 1982; Hoy, 1984), a modern geological map of the 82 F/1 sheet is not available. The occurrence of massive tourmalinite along the railway at Goatfell has been recognized for a number of years, however (Ethier and Campbell, 1977). Despite the relationship recognized at the Sullivan Mine between tourmalinite and mineralization, the Goatfell occurrence remained unclaimed until early 1985 when it was staked by Mr. Gordon Leask.

During the summer of 1985 Leask carried out prospecting and limited geologic mapping. The prospecting revealed a high angle zone of carbonate - manganese breccia with trace sphalerite and galena on the west bank of Hazel Creek near its juncture with the Kitchener valley on the Sky claim. Prospecting also located what was thought to be a siliceous pyritic exhalative horizon within thick sandstones near the railway loop on the Goat 1 claims (G. Leask, 1985).

The goal of geological mapping from 1986-87 was to determine the depth to the lower - middle Aldridge Formation boundary, which roughly coincides with the Sullivan Mine time horizon. Through use of well-laminated or "varved" marker beds within the middle Aldridge Formation and the discovery of probable lower Aldridge sediments at the mouth of Hazel Creek it was determined that the Sullivan mine horizon occurred at reasonable depth (less than 1000 m) in the central portion of the property. A major, high-angle fault trending north-south across the property was recognized which significantly down-dropped the target horizon to the west.

Besides the obvious tourmaline alteration in the pipe-like body cropping out along the railway line, tourmaline alteration was also inferred from abundant float in the area of the Carroll Creek forestry road, immediately east of the Goat 3 LCP. An indistinct alteration was noted by Leask to the west of the tourmalinite pipe along the railway loop. The siltstones and sandstones in this area were noted to be bleached. Leask interpreted this alteration type as "albitic." Based on the distribution of alteration and a supposed thickening of bedding in the railway exposures, Leask proposed a 1 kilometer wide graben trending ENE and straddling the Goat 1 and 2 claim boundary.

A transient electromagnetic and magnetic survey was conducted over much of the Goat 1 and 2 claims during July, 1987 by Orequest Ltd. and Quantech Consulting Inc. to test for

conductors in the proposed graben (LeBel and Morrison, 1987). The EM-37 data was contaminated by culture sources, primarily the railway line and pipeline. Within the existing coverage no strong anomalies were located. However, a finite, formational-appearing conductor was located in the southern portion of the grid. The magnetic coverage revealed a pronounced magnetic anomaly over the Moyie sill exposed to the west of the high angle, north-south trending fault. The poorly outcropping sill to the east does not show an anomaly, however. Recommendations from this program were stratigraphic drill holes to test the Sullivan horizon in the area of best alteration along the northern portion of the railway loop and immediately south of the railway loop in the area of the weak EM anomaly.

In August, 1987 a limited lithochemical survey was undertaken on the property (Edmunds, 1987). Samples were taken along a traverse through the lower Aldridge in the area of the railway loop. The method utilized involved collecting clusters of samples along traverses across strike and analyzing the samples for Pb, Zn and Hg. A sample score was calculated that is a combination of these three elements and that score was evaluated against a cut-off value established from work on known mineralized systems. Values from the forty eight samples taken were all close to background. The conclusion from the survey was that significant stratiform mineralization is not present for at least 5 kilometers in the stratigraphic sequence sampled.

6.0 REGIONAL GEOLOGY

The Goatfell Property lies on the western flank of the Purcell Anticlinorium and is entirely underlain by middle Proterozoic rocks of the Belt - Purcell Supergroup.

Although the Belt - Purcell Supergroup rocks preserve delicate depositional textures they are metasediments having undergone extreme sedimentary loading during the Proterozoic. This loading produced advanced burial diagenesis or load metamorphism up to the biotite isograd of greenschist facies (McMechan and Price, 1982; Maxwell and Hower, 1967). The metamorphism produced only a weak foliation in clay/mica-rich rocks and minor recrystallization, rarely polygonization, of quartz grains. Due to this metamorphism the rocks in the sequence are given metamorphic designations: quartzite (metasandstone), siltite (metasiltstone) and argillite (metamudstone).

The Goatfell area is predominantly underlain by the Aldridge (Pritchard) Formation which in the Purcell Mountains forms the lowest exposed member of the Belt-Purcell Supergroup. The Aldridge Formation in the southern Purcell Mountains is in excess of 4200 m thick (Hoy, 1982; McMechan, 1981; Edmunds, 1973, 1977) and has been subdivided into three members. The lower Aldridge, consists of rusty-weathering, laminated to thin-bedded, fine-grained quartzite, argillaceous quartzite and siltite. Minor black argillite partings, commonly containing abundant diagenetic iron sulfide (now pyrrhotite)

are present. The lower Aldridge has a maximum exposed thickness of approximately 1000 m in the southern Purcell Mountains (Reesor, 1958; Edmunds, 1977).

The overlying middle Aldridge is distinguished from underlying rocks by the predominance of grey, argillaceous quartzite. The unit as a whole is characterized by thin- to thick-bedded, fine-grained quartzite and argillaceous quartzite interbedded with massive to laminated or ripple cross-laminated siltite and minor laminated argillite. The quartzite and siltite beds are commonly massive but contain sedimentary structures that suggest they are turbidite deposits. A number of laminated marker horizons, first noted by Cominco geologists, occur within siltites and argillites of the middle Aldridge and can be traced throughout the Purcell Mountains and southward into the USA (Huebschman, 1973). Recognition and correlation of these markers makes it possible to stratigraphically locate sections within the monotonous middle Aldridge.

The upper Aldridge consists of thin-bedded, rusty-weathering dark to medium grey argillite and siltite. It grades upwards into the Creston formation (Ravalli Group-Burke (lowest), Revett, and St. Regis Formations in northern Idaho and Montana) which contains varicolored argillaceous quartzite, siltstone, argillite and rare quartzite lenses containing abundant shallow water depositional textures.

The Goatfell Property straddles the Moyie-Dibble Creek fault, a steeply west- dipping, Laramide thrust fault with an estimated 10 -15 km of southeasterly directed movement (Benvenuto and Price, 1979). The Yahk block to the east of the Moyie fault appears to be structurally simple, forming a broad anticline with its culmination in the vicinity of the Chevron Mt. Mahon property. A complicated block-faulted terrane is present to the west of the Moyie fault. On the Goatfell Property the next major fault to the west of the Moyie is a high-angle, reverse fault, termed the Spider Creek fault, which appears to be a backthrust. The Spider Creek fault is cut out by the Moyie thrust to the south near Kingsgate and dies out or is cut out by the Old Baldy fault to the north on the Chevron Kydd property. The Old Baldy fault is a high-angle, reverse fault with an offset similar, but of less magnitude, to the Moyie and St. Mary faults. The Old Baldy fault can be traced into the Kidd Creek area but is cut by a series of high-angle normal faults to the west.

These north-trending normal faults define a major north-trending syncline situated between the Creston valley anticline and the Purcell anticline. The age of these faults is not known with certainty but is believed to be late Laramide to Tertiary. The effect of the faults is significant for exploration in bringing the lowermost middle Aldridge Formation near the surface in a number of locations between Creston and Yahk.

7.0 PROPERTY GEOLOGY

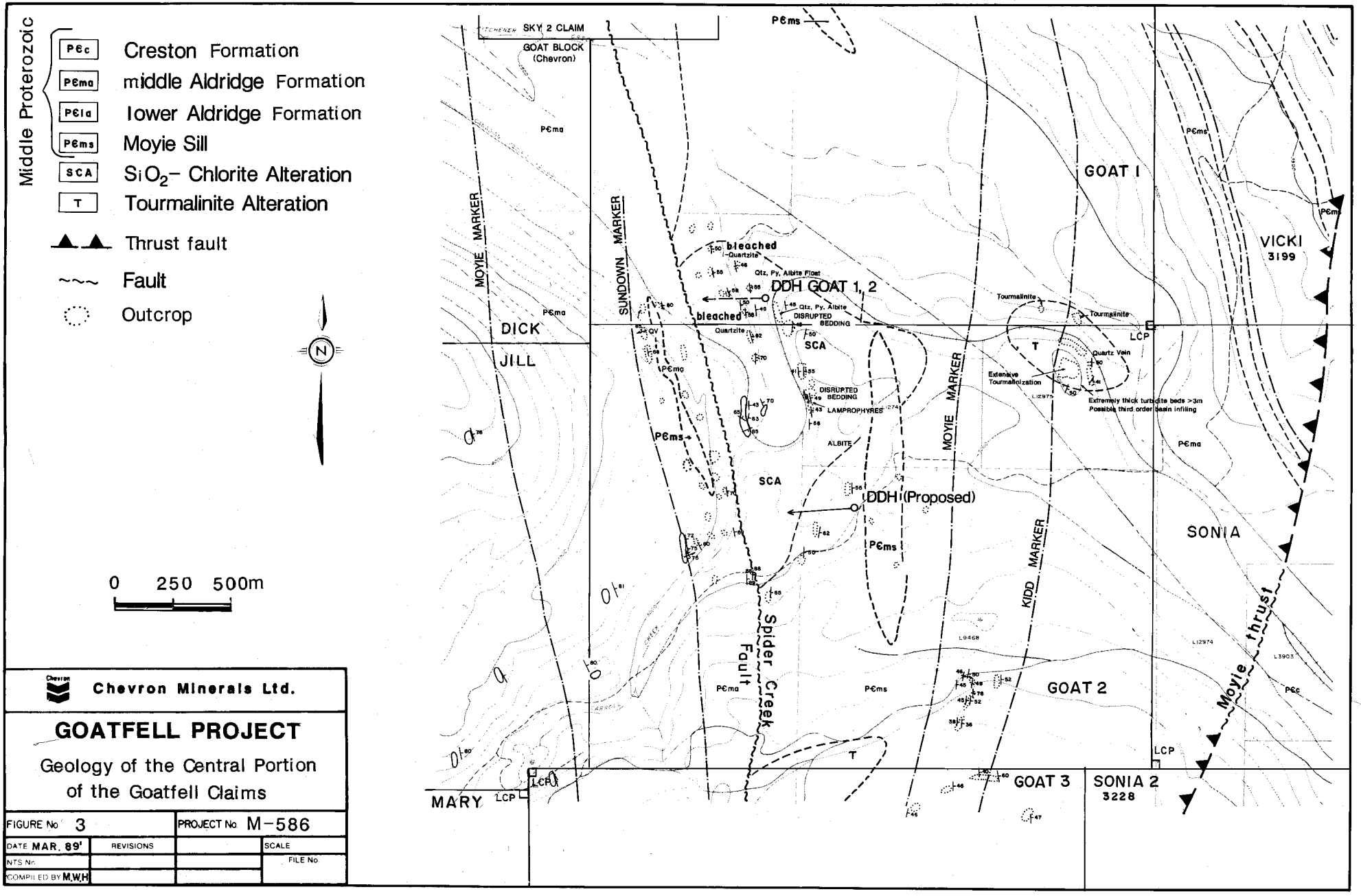
7.1 Introduction

Geologic mapping of the central portion of the property was carried out from July 5 to 9, July 19 to 20, October 5-6, and October 13 to 16, 1988 by Murray W. Hitzman, of Chevron Minerals Ltd., the operator of the project. An area of approximately 7 square kilometers was covered, mainly on the boundary between Goat 1 and 2 claims but extending northwards across Kitchener Creek to the Hazel Creek area. The area had been previously mapped by G. Leask in 1987. However, the current mapping emphasized examination of the rocks for alteration.

7.2 Lithologies

The majority of the Goatfell Property is underlain by middle Aldridge metasediments (Figure 3). A small zone of lower Aldridge occurs in the Hazel Creek area on the Goat 1 and Sky claims. Creston Formation and upper Aldridge rocks are found on the eastern edge of the claim block but were not examined in detail during the 1988 season. The middle Aldridge is intruded by two igneous rock types, the Proterozoic Moyie Sills and Cretaceous -Tertiary (?) lamprophyre dikes.

Bedrock is covered by a thin mantle of glacial drift throughout most of the area, except in the Kitchener Creek valley where an unknown thickness of glacial drift and alluvial sediments are present. Exposures are restricted to



Chevron Minerals Ltd.

GOATFELL PROJECT

Geology of the Central Portion of the Goatfell Claims

FIGURE No. 3		PROJECT No. M-586	
DATE MAR. 89'	REVISIONS		SCALE
NTS No.			FILE No.
COMPILED BY M.W.H			

steep slopes or man-made cuts such as the CPR line. Total exposure is about 5%.

Individual stratigraphic units are described below based on observations made during field mapping, core logging and from petrographic studies. A discussion of the structural geology and alteration and mineralization on the property follows. Complete petrographic descriptions are included as Appendix III.

lower Aldridge (PCla)

Well-established lower Aldridge crops out on the Sky claims near the mouth of Hazel Creek. Discontinuous, poor outcrop limits definition of a well-defined stratigraphy. Outcrops are dominantly rusty-weathering argillaceous quartzites with thin, dark grey siltite tops. Abundant stream float indicates the presence of dark grey to black argillite, much of which contains abundant disseminated to laminated iron sulfide, both pyrite and pyrrhotite.

middle Aldridge (PCma)

The middle Aldridge member forms the majority of the rock exposed on the Goatfell Property. Fine- to medium-grained, weakly argillaceous quartzite is the most common lithology in outcrop. This rock weathers to a brownish color and is greyish on fresh surfaces.

Individual quartzite beds are generally 0.5 to 4 m in thickness and display a poorly developed grading. The massive quartzites are separated by siltite beds which are commonly only 10-20 cm thick but may be up to 4 m thick. In drill core, individual turbidite beds are more easily distinguished. They are generally composed of a massive, structureless quartzite base which shows a rapid, upwards transition to siltstone. Between 5 and 10% of the turbidite beds have a laminated siltite to argillite top which commonly displays cross-ripple laminations.

Based on the correlation of the sequences in the Goat 1 and 2 drill holes, which were collared at the same point and drilled at 50 and 70 respectively, there appears to be extreme variation in bed thickness in the lower middle Aldridge. The most extreme variation is a single massive quartzite bed which varies from 4 m to 20 m in thickness over a lateral distance of 40 m. Extremely thick quartzite beds are found up into the central portion of the middle Aldridge. In the tourmalinized zone along the railway, one quartzite bed is approximately 30 m thick but appears to thin rapidly along strike up the hill. Soft sediment deformation textures, such as slump features and rip-up clasts are present, but rare, in the section examined to date.

These relationships suggest that the middle Aldridge in this portion of the Goatfell Property contains a series of channel-fill deposits in an upper- to mid-fan position. These

channels may have been present on a broad regional turbidite fan or may reflect more local processes such as a subsidiary fan in a localized basin or graben. More stratigraphic sections need to be measured in this interval from throughout the Goatfell area before firm conclusions regarding the depositional environment can be substantiated.

Petrographic studies (Getsinger, 1988 - Appendix III) on samples from the drill holes confirmed that the most common rock types are fine-grained quartzite and siltite. In the least altered samples the mineralogy is 50-70% quartz, 0-20% feldspar (plagioclase + K-feldspar), 10-45% muscovite (including sericite), up to 15% biotite, 3 % sphene and 3-4% opaques (commonly iron sulfide). In thin section the rocks display good sorting of clastic grains though there has been some mineral overgrowth as well as some metamorphic recrystallization. Small-scale sedimentary textures in the more argillaceous rocks, such as bedding, graded bedding, slump folding and rip-up clasts are well-preserved. Static metamorphic textures, especially porphyroblastic mineral overgrowths of muscovite, biotite and garnet are superimposed on the sedimentary texture. The red-brown color of the biotite is unusual in rocks of greenschist grade, it probably indicates a high titanium content in the sedimentary protolith. High initial titanium is also indicated by the presence of up to 3% sphene in many of the samples. Retrograde minerals in the rocks are chlorite, sericite and minor epidote. Chlorite, together with opaques, appears to

be dominantly an alteration product of the red-brown biotite. Epidote occurs around opaques but may be common in the drill hole samples because of their altered nature, ie. increased carbonate content.

upper Aldridge (PCua)

Upper Aldridge rocks probably crop out on the southeast corner of the Sonia 2 claim but were not examined during the 1988 field season.

Creston Formation (PCc)

Creston Formation is present along the eastern edge of the property on the Vicki, Sonia and Sonia 2 claims. Due to its position, high above the lower middle Aldridge section of economic interest, the Creston Formation was not examined in detail during the 1988 field season.

Proterozoic Moyie intrusive rocks (PCms)

A number of Moyie metadiorite to metagabbroic sills are present on the Goatfell Property to the west of the Moyie fault. These rocks are dark green-grey to dark green, fine- to medium-grained. The majority of sills contain 40 - 60% hornblende, 15 - 40 % plagioclase, and 10 - 20 % quartz. Common accessory minerals include biotite, garnet, magnetite, apatite, sphene, rutile, leucoxcene, carbonate minerals, and epidote - clinozoisite. The sills commonly show a variable mineralogy indicative of varying degrees of alteration.

On the Goatfell Property, Moyie sills have been recognized at the lower - middle Aldridge contact in the Hazel Creek area and at irregular intervals throughout the middle Aldridge. The sills appear to form discontinuous lenses in the Goatfell area with a maximum thickness of 80 meters. The sill mapped in the area between the Goat 1 drill hole site and the tourmalinite pipe is unusual in its lack of magnetic response, presumably caused by destruction of magnetite.

Cretaceous - Tertiary (?) lamprophyre dikes

At least two meter thick, dark greenish dikes crosscut an area of disrupted bedding along the railway line (Figure 3). The dikes are heavily weathered. They appear to contain amphibole and pyroxene phenocrysts in a fine-grained dark matrix. The rock was termed a lamprophyre by Leask (Leask, 1985) although no petrologic work has been conducted to confirm this.

7.3 Structure

The Goatfell Property may be divided into three structural blocks. To the east of the Moyie thrust rocks of the Belt-Purcell Supergroup strike nearly north-south and dip moderately (40-45) to the west. Between the Moyie thrust and the Spider Creek backthrust the middle Aldridge metasediments strike approximately north south and dip 45 - 60 (average 55) to the east. To the west of the Spider Creek fault uppermost middle Aldridge rocks strike NNW and dip 60 - 80 to the east.

Offset on the Moyie fault has not been determined on the Goatfell Property but regional work suggests the fault has 12 - 15 kilometers of southeasterly directed displacement. Offset on the Spider Creek backthrust fault has been calculated at approximately 3,000 m based on offset of marker beds within the middle Aldridge. The Spider Creek fault forms a topographic low. Drilling and surface mapping indicates the fault zone is at least 50 m in width and is composed of sheared argillaceous material containing floating blocks of quartzite.

7.4 Alteration and Mineralization

Two distinctive styles of alteration, tourmalinization and quartz - chlorite - pyrite, have been delineated on the Goatfell Property.

Tourmalinization appears to be present in at least two areas on the claim block. The best known is an oval area (500 x 300m) centered on the railway line immediately west of the Goat 1,2 LCP. The degree of tourmalinization within this zone appears variable (Edmonds and Rodgers, 1987). In weakly altered zones the rocks are darker grey than normal and somewhat more difficult to break with a hammer than is typical. In thin section these rocks show fine-grained, olive to brown tourmaline needles interstitial to quartz grains (Ethier and Campbell, 1977). More thoroughly altered rocks are jet black, extremely hard and break with a semi-conchoidal fracture. Bedding features are commonly obscured in the most

altered rocks. Quartz veins are typical of the most altered zones presumably due to brittle fracture during metamorphism and later deformation. Detailed mapping of this tourmaline pipe together with geochemical studies (Beaty et al., 1988) will be undertaken during the 1989 field season. Tourmalinite has also been found as abundant float along the forestry road connecting Highway 3 with Carroll Creek, near the Goat 2 and 3 claim boundary. This tourmalinite is similar to that exposed along the railway. The occurrence has not been mapped in detail.

A second type of alteration has been distinguished on the Goatfell Property. Earlier workers (Leask, 1988 per. comm; and Edmunds and Rodgers, 1987) noted "bleached," pale quartzites and siltites in the vicinity of the railroad loop and assumed they were albite-rich, based on analogies with the albite-rich assemblage present immediately above the massive portion of the Sullivan mineralized lense. Mapping during the 1988 season indicated that this alteration type, termed quartz-chlorite-pyrite alteration, covers a roughly triangular area. The alteration extends approximately 1.2 kilometres along the Spider Creek fault and appears to narrow in width upwards toward the tourmalinite pipe on the railway. This alteration type is present throughout almost the entire length of drill holes Goat 1 and 2. Data from drilling and surface exposures indicate it effects at least 500 m of stratigraphic section.

Weakly altered, grey to dark grey quartzites within the alteration zone contain hairline to centimeter wide greenish veins which generally cut bedding at a high angle. Pale greenish bleaching extends out irregularly from these veins into bedding, producing a jagged irregular edge to the bleached zone. In thin section it is apparent that many of the veins have calcite cores. The bleached, green coloration is caused by muscovite/sericite, minor chlorite and carbonate. This type of alteration appears to grade into a pervasive bleaching typical of much of the altered zone.

Thin section examination of pervasively bleached rocks (Appendix III) shows that the bleaching involves removal of biotite and some opaques as well as recrystallization of quartz and fine-grained mica into larger, less turbid crystals and addition of carbonate. Bleaching is better developed in quartzites than siltites or argillites. Although albite was sought in the thin sections there is little evidence of greater than 1-3% in any of the rocks examined to date.

Carbonate is a typical mineral within quartzites of the altered area. It occurs as a late, pervasive cement between quartz grains and occasionally is abundant enough to be distinguished megascopically as concretions up to 7 cm in diameter. Calcium-rich minerals such as garnet and epidote group minerals are more common in the altered zone than elsewhere in middle Aldridge rocks. Pink garnet, commonly poikilitic to skeletal in texture, is a common accessory

mineral in carbonate-rich zones as are epidote and clinozoisite.

Bleaching of siltite and argillite is also seen in the Goatfell drill holes. These zones commonly display a buff-white to tan color on fresh surfaces. A single sample (DDH 1 - 1117') from one of these zones contains 40 - 50 % muscovite/sericite and abundant carbonate (2-4%). Minor albite is present but further petrographic study is required to determine whether or not albite is a common constituent of this alteration subtype.

All the altered rocks appear to contain more chlorite, sphene (1-3%), carbonate (1-5%) and tourmaline (1-2%) than typical middle Aldridge rocks. Additionally, pyrite is a common iron sulfide in the altered sequence. Whole-rock analysis of altered and unaltered rocks from this portion of the middle Aldridge will be conducted as part of the 1989 program to more closely evaluate the chemical variations between these altered rocks and typical unaltered middle Aldridge lithologies.

Several styles of mineralization have been noted on the Goatfell Property. Fine-grained siltites and argillites in both the lower and middle Aldridge contain minor amounts of laminated, diagenetic iron sulfide, now pyrrhotite. Quartz veins cutting the tourmalinite along the railway contain irregular clots of pyrrhotite. On the NW bank of Hazel Creek a meter wide quartz vein was excavated in the past. It

contains minor sphalerite, galena and pyrite. Thin quartz veins with base metal sulfides were also intersected by drilling within the Spider Creek fault.

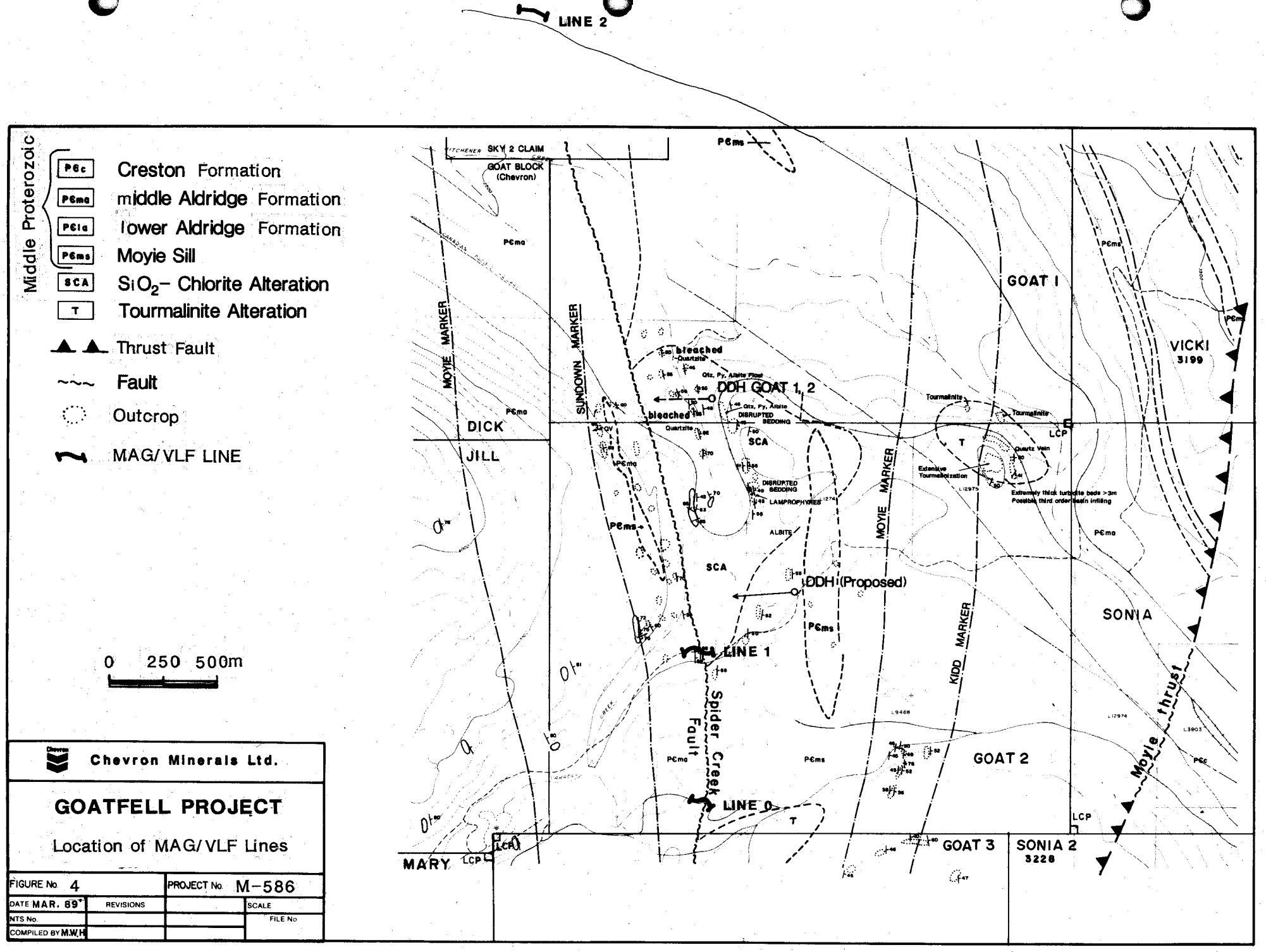
Disseminated and veinlet-controlled sulfide mineralization is common within the quartz - chlorite - pyrite alteration zone intersected in the drilling. Pyrite and pyrrhotite are the most common sulfide minerals. Pyrite predominates in quartzites and in highly altered zones, whereas pyrrhotite is most common in siltites and argillites. Sphalerite occurs most commonly intergrown with quartz and carbonate minerals in hairline vein fillings within altered beds. The sphalerite has a characteristic red-brown color. Disseminated red-brown sphalerite occurs as a cement in some altered quartzites and rarely may account for 2-4% of the rock over short intervals. In hole Goat - 2 minor laminated sphalerite occurs with pyrrhotite in siltites and argillites. Galena is relatively rare. Where present, it occurs with disseminated sphalerite. More coarsely crystalline sphalerite, galena, pyrite and chalcopyrite occur in centimeter-wide, bedding parallel quartz veins intersected in both drill holes. No assays were made of the mineralization present in either drill hole.

8.0 GEOPHYSICS

In October, 1988 three lines of MAG/VLF were run in order to better determine the position of the Spider Creek fault. Line 0 (650 m) was located along the main forestry access to Carroll Creek along the southern boundary of the Goat 2 claim

(Figure 4). Line 1 (625 m) was located to the north of Line 0, along the overgrown road following Carroll Creek. Line 2 (625 m) was located along Highway 3 at the mouth of Hazel Creek. The half-day survey was completed using a Omni-Plus tie-line MAG/VLF R22K instrument. Uncorrected total field magnetic data as well as both in-phase and quadrature readings was collected at 25 m stations. The VLF data was recorded from three transmitting stations (Annapolis, Hawaii, and Seattle) at each location. Data was plotted in the field for each of the lines (Appendix IV). Magnetic data was plotted as uncorrected total field values. VLF data was plotted as linear array of in-phase and quadrature values.

On Line 0 the supposed trace of the fault (between stations 350 and 450), based on sparse outcrop geology, was confirmed by a rapid shift of total field magnetic readings as well as a broad decrease in quadrature values shown in data from all three stations (Appendix IV). The fault location on Line 1 was not obvious from the magnetic data. VLF quadrature values, however, show a pronounced decrease between stations 325 and 425, which is taken to represent the fault zone. This location corresponds well with the location derived from bedding dip changes in outcrops in the area. The fault location is more problematic on Line 2 which was run along Highway 3 with its associated cultural features such as buried cables, overhead wires and metal culverts. The total field magnetic data shows a change in trend between stations 325


LINE 2
Middle Proterozoic
PEc Creston Formation
PEma middle Aldridge Formation
PEla lower Aldridge Formation
PEms Moyie Sill
SCA SiO_2– Chlorite Alteration
T Tourmalinite Alteration
Thrust Fault
Fault
Outcrop
MAG/VLF LINE
0 250 500m
SKY 2 CLAIM
GOAT BLOCK (Chevron)
MOYIE MARKER
SUNDOWN MARKER
DICK
JILL
MARY
bleached
Quartzite
Qtz, Py, Albite Float
DDH GOAT 1, 2
DISRUPTED BEDDING
LAMPROPHYRES
ALBITE
SCA
DDH 1 (Proposed)
LINE 1
LINE 0
Spidler Creek Fault
GOAT 1
GOAT 2
GOAT 3
VICKI 3199
SONIA
SONIA 2 3228
KIDD MARKER
Moyie thrust
Tourmalinite
Extensive Tourmalinization
Quartz Vein
Extremely thick turbidite beds >3m
Possible third order basin infilling
LCP
Chevron Minerals Ltd.
GOATFELL PROJECT
Location of MAG/VLF Lines
FIGURE No. 4
PROJECT No. M-586
DATE MAR. 89
REVISIONS
SCALE
NTS No.
FILE No
COMPILED BY M.W.H

and 400. A pronounced increase in VLF quadrature values are found at these same stations in readings utilizing the Hawaii and Seattle stations. Although this location is approximately the one that would have been picked utilizing surface geologic data, the absence of nearby outcrop control makes this determination less precise than those from Lines 0 and 1. The geophysical data confirms the information gained from drilling that the Spider Creek fault zone is up to 100 m wide.

9.0 DIAMOND DRILLING

During July to October, 1988 a diamond drilling program was conducted on the Goatfell Property to test the Sullivan mine horizon in the area of the quartz-chlorite-pyrite alteration zone. Two diamond drill holes were completed for a total length of 844.14 meters. Boundary Drilling Inc. of Vancouver, B.C. was contracted to drill the property during the 1988 season. The drilling began on July 15 and was completed October 17 using a trailer-mounted DMW-1 drill and NX rods. The core is currently stored in a warehouse in Cranbrook, B.C. leased to Mr. G. Leask.

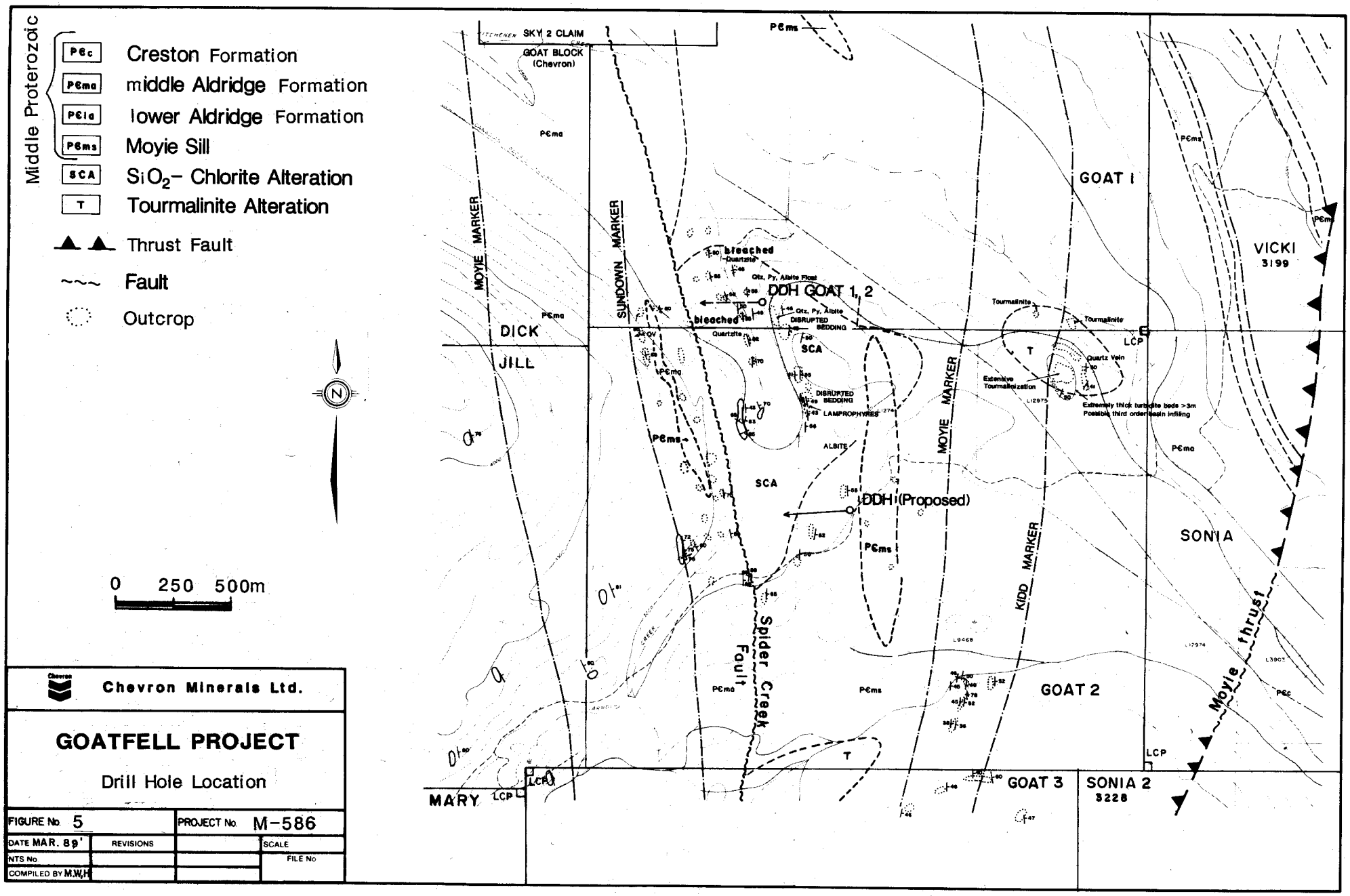
The drill core was logged on site. The first 255 m of Goat-1 was logged by Dr. Jennifer Pell, consulting geologist. Both drill holes were then logged in their entirety by Mr. Gordon Leask. Hole to hole correlation was accomplished by Dr. Murray Hitzman utilizing Leask's drill logs and by inspection of the drill core in Cranbrook. The drill logs are found in Appendix V.

9.1 Drill Hole Goat - 1

Drill hole DDH Goat-1 was collared on the Goat -1 claim approximately 50 m west of the CPR line above Carroll Creek (Figure 5). The hole was designed to test the Sullivan mine horizon in the lower Aldridge. This hole was drilled to a total depth of 391.7 metres. The bearing of the hole was 265 and it had a collar angle of 50 at surface. Seven orientation tests were taken downhole utilizing a Sperry-Sun instrument.

The drill hole collared in typical quartzite-dominated middle Aldridge metasediments (Figure 6). The contact between the middle to lower Aldridge members was picked at 280.6 metres immediately below a 4 m thick quartzite bed. The lower Aldridge member is distinguished from the middle Aldridge in DDH Goat-1 by the increased amount of siltite relative to quartzite. Laminated marker beds were found at 160-161 m and 309-310 m. A major sheared zone was intersected from 288 - 293 m which is believed to be a high angle normal fault. The main Spider Creek fault zone was encountered at 354 m and drilling was terminated due to poor core recovery in highly sheared siltites within the fault zone.

The hole displayed quartz-chlorite-pyrite alteration, with associated carbonate, of quartzite beds throughout its entire length. Intense alteration affecting quartzites and siltites was noted at 300 - 302 m and 310 - 316 m. There was no conspicuous change in the style or relative intensity of

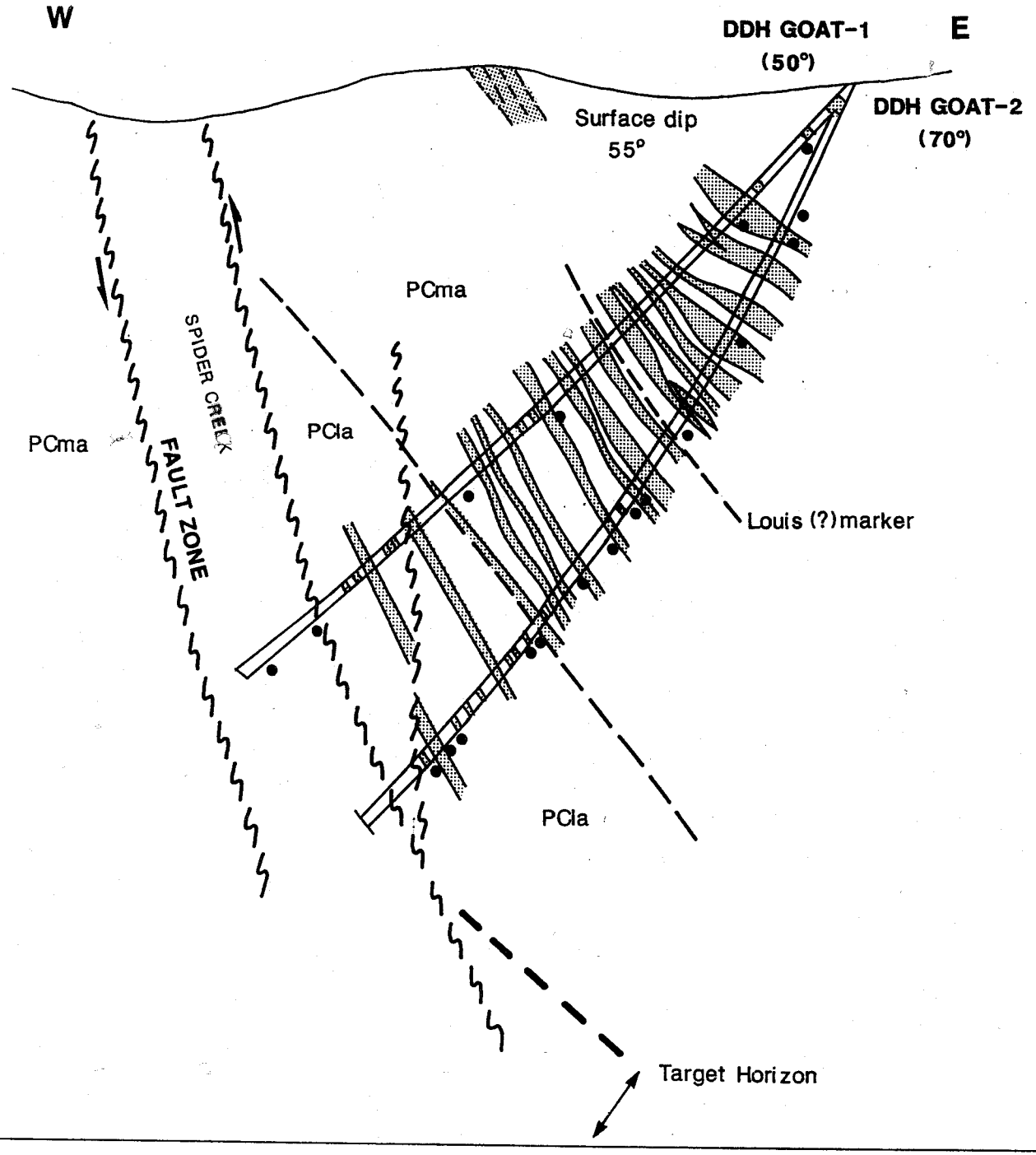

Middle Proterozoic
PEc Creston Formation
PEma middle Aldridge Formation
PEla lower Aldridge Formation
PEms Moyie Sill
SCA SiO_2– Chlorite Alteration
T Tourmalinite Alteration
Thrust Fault
Fault
Outcrop
N
0 250 500m
SKY 2 CLAIM
GOAT BLOCK (Chevron)
MOYIE MARKER
SUNDOWN MARKER
DICK
JILL
MARY
bleached
Quartzite
Qtz, Py, Albite Float
DDH GOAT 1, 2
Qtz, Py, Albite
DISRUPTED BEDDING
SCA
DISRUPTED BEDDING
LAMPROPHYRES
ALBITE
SCA
DDH 1 (Proposed)
Spider Creek Fault
MOYIE MARKER
KIDD MARKER
Tourmalinite
Tourmalinite
Extensive Tourmalinization
Quartz Vein
Extremely thick turbidite beds >3m
Possible third order basin infilling
GOAT 1
VICKI
3199
SONIA
GOAT 2
GOAT 3
SONIA 2
3228
Moyie thrust
LCP
Chevron Minerals Ltd.
GOATFELL PROJECT
Drill Hole Location
FIGURE No. 5
PROJECT No. M-586
DATE MAR. 89'
REVISIONS
SCALE
NTS No.
FILE No.
COMPILED BY M.W.H

alteration downhole. Minor base metal mineralization, dominantly red-brown sphalerite, but occasionally with fine-grained galena, was noted at 33 - 35 m, 82 - 83 m, 203 - 204 m, 258 - 259 m, 342 - 344 m, 372 - 373 m, and at 374.6 m. In most instances the sulfides form disseminations or fillings of discontinuous fractures in quartzites. Between 258 and 259 m the mineralization infills small, discontinuous fractures in slumped siltite beds. The mineralization at 374.6 m occurs in a 3 cm wide quartz vein which is probably related to the Spider Creek fault.

The drill hole failed to reach the projected Sullivan mine horizon due to cut-out along the Spider Creek fault. The presence of significant alteration and minor base metal mineralization were considered encouraging, however.

9.2 Drill Hole Goat - 2

Drill hole Goat - 2 was collared from the same site as Goat-1. The hole had the same bearing as Goat-1 (267), but was drilled at a steeper inclination (70°). Goat-2 was designed to determine the dip of the Spider Creek fault, test the lateral continuity of individual beds as well as alteration types and penetrate the Sullivan mine horizon. The hole was drilled to a total depth of 452.44 before being terminated due to poor core recovery within the Spider Creek fault. Five orientation tests were taken downhole utilizing a Sperry-Sun instrument.



LEGEND

- Quartzite
- Siltite (argillite)
- Sphalerite occurence

0 50 100m

Chevron Minerals Ltd.

GOATFELL PROJECT

TRUE CROSS SECTION
DDH GOAT 1-2

FIGURE No 6		PROJECT No M-586	
DATE Mar. 89'	REVISIONS		SCALE 1:3,000
NTS No			FILE No
COMPILED BY M.W.H			

The hole collared in middle Aldridge metasediments. Despite the proximity of the two drill holes, significant thickness variations in quartzite beds was observed (Figure 6) indicating channelling in this portion of the turbidite fan. The lower - middle Aldridge contact was picked at 295 m, below a thick quartzite unit. Laminated marker beds were located at 173 - 179 m, 194.5 - 195.7 m and 343 - 344 m. The marker beds at 161 m in DDH Goat -1 and the marker beds at 194.5 m in DDH Goat - 2 were correlated, though the match is poorer than had been hoped due to the intensity of alteration in both holes. It is believed that this is the Louis Marker which is approximately 295 m above the ore horizon in the Sullivan mine area. Goat - 2 contained a number of thin zones displaying disturbed bedding in siltites (47 - 48m, 258 m, 317 m, and 365 m). The absence of comparable zones in Goat - 1 emphasizes the lateral inhomogeneity of the sedimentary sequence in this area.

A discrete clay gouge zone between two quartzite beds was intersected at 416 - 418 m. This may be the down dip extension of the fault zone intersected at 288 m in DDH Goat - 1. The main Spider Creek fault zone was intersected at 431 m in Goat - 2 and the hole remained in clay gouge with quartzite blocks until its termination at 452.44 m.

Alteration in DDH Goat - 2 resembles that in the first hole. The dominant alteration type is quartz-chlorite-pyrite with carbonate which extends through the entire hole. Intense

alteration, which was believed to include albite, is more pronounced in Goat - 2. Intensely altered zones were intersected from 16 - 17 m, 21-23 m, at 50 m, 53-54 m, 60 - 64 m, 67 - 68 m, 115 - 116 m, 210 - 121 m, 217 - 218 m, 225 - 226 m, at 267 m and 272 - 273 m. Thus zones of most intense alteration appear to be more common near the top of the hole. With the exception of the alteration at 267 m, the majority of intense alteration is confined to quartzite beds.

Minor mineralization is ubiquitous in Goat - 2. Sphalerite was noted at 62 - 63 m, 73 m, 122 - 123 m, 164 - 164 m, 188 m, 209 - 211 m, 218.7 m, 229 m, 241 - 242 m, 253.5 m, 292 m, 316 m, 319 m, 324 m, 333 m, 362 m, 384 m, 391 - 396 m, and 406 m. High in the hole the base metal sulfides occur as weak dissemination and fillings of discontinuous, hairline fractures. The occurrence at 122 - 123 m contains galena in addition to red-brown sphalerite. From 218 to 333 m sphalerite occurs as hairline fracture fillings and laminations with pyrite and pyrrhotite in siltites and argillites. Exceptions are the occurrences at 253 m, 362 m, 384 m, and 391 - 396 m which are disseminations and fracture fillings in quartzite beds. At 292 m sphalerite occurs with pyrite, pyrrhotite, galena and chalcopyrite in two bedding parallel, several centimeter-wide quartz veins.

Drill hole Goat - 2 was successful in allowing for determination of the dip of the Spider Creek fault (approximately 70 to the east), and in providing information

concerning the continuity of individual beds and alteration zones. Unfortunately the hole intersected the Spider Creek fault prior to encountering the Sullivan mine horizon in the lower Aldridge, based on correlations utilizing the laminated marker beds.

10.0 CONCLUSIONS

1. The majority of the Goatfell Property is underlain by middle Aldridge metasedimentary rocks. The lower Aldridge is exposed on the east side of the Spider Creek fault near Hazel Creek.

2. The Goatfell Property consists of three structural blocks: a block to the east of the Moyie thrust containing Creston Formation and upper and middle Aldridge Formations; a block between the Moyie thrust and the Spider Creek backthrust consisting of middle Aldridge and minor lower Aldridge Formations; a western block consisting entirely of middle to uppermost middle Aldridge Formation.

3. Surface mapping and drilling indicate that quartzite beds within the lowermost middle Aldridge display rapid variations in thickness suggestive of highly channelized sediments within an active turbidite fan.

4. The trace of the Spider Creek fault has been constrained throughout much of the central portion of the property by geologic mapping and three lines of MAG/VLF.

5. Two distinctive styles of alteration have been delineated on the property: tourmalinite alteration and quartz-chlorite-pyrite alteration. Tourmalinite alteration has been found in place along the railway line on the Goat 1 -2 claim boundary. This occurrence contains nearly massive tourmalinite in places and appears to have a pipe-like shape which cross-cuts bedding. A second zone of tourmalinite is inferred to the south along the Carroll Creek access forestry road from abundant float. Quartz - chlorite - pyrite alteration forms a broad zone adjacent to the Spider Creek fault in the area of the railway line. Petrographic studies suggest this zone is characterized by a lack of biotite and increased chlorite, white mica and carbonate minerals.

6. Two diamond drill holes (Goat 1 and 2) were completed on the property. The holes were drilled from the same site on identical bearings but at differing angles (50 and 70). Both holes penetrated the lower - middle Aldridge contact but encountered the Spider Creek fault zone before testing the Sullivan mine horizon. Alteration and weak mineralization were encountered along the length of both holes.

7. Weak mineralization consisting of pyrite and sphalerite, with trace galena, was intersected in the drilling. Mineralization consists primarily of fracture filling of hairline calcite-quartz veins in altered quartzite beds. Minor disseminated iron sulfide - sphalerite mineralization in quartzite beds was observed as well as weak, laminated iron sulfide - sphalerite mineralization in argillites.

8. The Sullivan mine horizon, the prime horizon of interest during the current phase of exploration, remains untested. Results to date are encouraging and exploration during the 1989 season should be geared toward a definitive test of this horizon.

11.0 RECOMMENDATIONS

Further exploration on the Goatfell Property is warranted by the 1988 exploration results. The program for 1989 should include:

1. Geologic mapping (1:5000) of the entire Goatfell Property.

2. Detailed (1:2500) geologic mapping of the ridge between Hazel and Kitchener Creeks on the Goat 1, Barb and Sky claims. This mapping should include a measured section from the lower Aldridge through the middle Aldridge. Lithochemistry through the section would aid in

evaluation of possible productive horizons above the Sullivan mine horizon.

3. Extension of the shallow soil geochemical survey on the Sky claims to other portions of the Goatfell block. Areas for testing should be based on the results of the lithochemical survey recommended above.

4. Detailed (1:2500) mapping of the railway tourmalinite pipe to determine its geometry and zoning. Comparisons (chemical, isotopic) of the tourmalinite from both Goatfell Property occurrences with tourmaline from other Belt Supergroup occurrences.

5. Continued petrographic study of the quartz-chlorite-pyrite alteration zone and comparison with unaltered Aldridge lithologies. The study should include whole rock chemistry of altered and unaltered rocks. Petrographic studies should be conducted to determine the differences between the magnetic and non-magnetic Moyie sills on the property.

6. Further diamond drilling to test the Sullivan mine horizon. A vertical hole at the site of DDH Goat 1,2 would test the horizon as well as providing further information on bed thickness variations and variability of alteration assemblages. A second, angle hole to the south at the northern boundary of the Goat 2 claim is

required to test the weak EM anomaly identified in 1987 as well as the Sullivan mine horizon. Further drilling would be contingent on positive results such as intersections of significant mineralization/alteration or lithochemical response in rock from the Sullivan mine horizon. A further hole to the south on Goat 2 or 3, in the vicinity of the suspected southern tourmalinite pipe would help delineate the extent of alteration zones. A fourth hole in the Kitchener Creek valley to cut the middle - lower Aldridge contact in the near-surface would provide useful information on Quaternary cover thickness in the valley and on lateral changes in stratigraphy as well as possible northern extensions of the recognized alteration zone.

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APPENDIX I

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Murray W. Hitzman, hereby certify that:

1. I am presently employed as a geologist by Chevron Minerals Ltd. at 1900 - 1055 West Hastings Street, Vancouver, B. C.

2. I have studied geology at Dartmouth College (A.B. 1976), and have graduate degrees in geology from the University of Washington, Seattle (M.S. 1978), and from Stanford University, Stanford, California (Ph.D. 1983).

3. I have practiced within the geologic profession since 1975.

4. That I am a member in good standing of the Geological Society of America, the Society of Economic Geologists and The Geological Society.

5. That the work outlined in this report was conducted under my supervision.

Dated the 15 day of February, 1989

Murray W. Hitzman

a1a/h/r

APPENDIX II

COST STATEMENT

GOATFELL

1988 COST STATEMENT

Salaries

	Field	Office	Field Dates	
M. Hitzman	18	20	July 5-9, July 19-20 Aug. 18, Sept.22-23, Oct. 5-6, Oct. 13-16, Nov. 24-25	$ 9,620.40
G. Leask	19	-	Aug. 7-14, Sept.5-6, Sept.17-19,Sept.21-23, Oct. 5-6	7,200.00
J. Pell	10	-	April 29-30 July 30 - Aug. 6	1,480.00
R. Morris	8	-	July 30 - Aug. 6	1,000.00
T. Eldrige	1	-	July 6	250.00
J. Leask	5	-	Sept. 10-13, Oct. 4	2,000.00
R. Edmunds	-	1		400.00
			Total	$21,950.40

Disbursements

Airline flights		$ 2,224.70
Truck rental	22 days @ $50	1,100.00
Suburban rental	8 days @ $40	320.00
Car rental		842.18
Lodging		1,276.93
Fuel		357.49
Telephone		161.75
Food, meals		289.73
Maps, copying		45.62
Thin sections and petrographic reports		1,400.75
Core racks	2 @ $1000	2,000.00
Drafting, reproduction		1,861.35
D6C	16 hrs. @ $65	1,040.00
544 JD Loader	7 hrs. @ $55	385.00
Faller	8 hrs. @ $10	80.00
Equipment move	2 hrs. @ $100	200.00
6 6' 10x10	$30/each	180.00
Diamond Drilling		127,883.29
	Total Cost	$163,599.19

ala/h/r

GOATFELL

1988 DIAMOND DRILLING COSTS

Mobilization/Demobilization		$ 5,796.50
Drilling		
DDH Goat - 1	20' @ $24.00	480.00
	1000' @ $21.00	21,021.00
	360' @ $35.00	12,600.00
DDH Goat - 2	20' @ $24.00	480.00
	1000' @ $21.00	21,000.00
	500' @ $35.00	17,500.00
Drill Moves/Set Up/Standby		
DDH Goat - 1	55.5 man hrs. @ $38.50	2,136.75
	5 labor hrs. @ $20.00	100.00
DDH Goat - 2	41 non-operating hours @ $93.00	3,813.00
	38 man hrs. @ $38.50	1,463.00
	18 labor hrs. @ $20.00	360.00
Other		
Drilling materials		15,920.28
Core Boxes		2,305.50
Sperry Sun rental		1,500.00
Board/lodging		18,607.68
Steel gates for landowner		385.07
Field check of site prior to drilling		2,414.51
	Total Drilling Cost	$127,883.29

ala/h/r

APPENDIX III

PETROGRAPHIC REPORT ON SAMPLES FROM THE GOATFELL PROPERTY J.S. GETSINGER, DECEMBER 2, 1988

ala/h/r

PETROGRAPHIC REPORT ON SAMPLES FROM GOATFELL PROPERTY

FOR

CHEVRON MINERALS LTD.

BY

J.S. GETSINGER, Ph.D.

DECEMBER 2, 1988

TABLE OF CONTENTS

SUMMARY OF PETROGRAPHY ON FIVE SAMPLES FROM THE GOATFELL PROPERTY

Description of Samples

Five samples were selected from drill hole DDH-1 on the Goatfell property for thin section interpretation (DDH1-Bx55 (298 m), DDH11-1004' (306 m), DDH1-1073' (327 m), DDH1-1117' (340 m), and DDH1-1139.5' (347 m)).

All 5 rocks are meta-siltstone to fine sandstone, with some variation in mineralogy and texture. Mineralogy consists of 40 to 60% quartz, up to 15% feldspar (plagioclase ± K-feldspar), 10 to 45% muscovite (including sericite), up to 15% biotite, up to 4% garnet, up to 3-4% opaques, up to 10% carbonate, up to 3% sphene, and up to 1% tourmaline or epidote.

Texture is well-sorted to poorly sorted (within the siltstone to fine sandstone range), clastic to somewhat recrystallized. Sedimentary structures such as bedding, graded bedding, slump folding, and rip-up clasts are well-preserved. Static metamorphic textures are superimposed on the sedimentary textures, as seen in sample DDH1-Bx55 (298 m), with its porphyroblastic and atoll garnets, and in other samples with porphyroblastic muscovite and metamorphic biotite.

In this sample suite, tourmaline does not coexist in equilibrium with biotite, but tends to occur in rocks with greater than 15% muscovite. It occurs as small, individual prisms zoned from bluish-green to brown (up to 1% of rock). Tourmaline was noted in rocks with more structural complexity, such as slump folding, convolute bedding, or microfaulting.

The presence of sphene up to 3% seems excessive for a typical siltstone. It occurs, in part, surrounding opaques (Fe-Ti-oxides (?) such as ilmenite), but also as an alteration associated with tourmaline, related to a crosscutting trend in sample DDH1-1117' (340 m). This suggests that the calcium and/or titanium may have been introduced in fluids along with boron.

Opaques are in general finely disseminated and in small amounts, up to 3-4%. They were observed in hand specimen to consist of pyrrhotite and arsenopyrite, but may also consist of ilmenite, as suggested by alteration to sphene. Some appear to be retrograde reaction products of biotite altering to chlorite, also suggesting Fe-Ti oxides.

Metamorphic minerals are mainly biotite, muscovite, and garnet, with retrograde chlorite, epidote, and muscovite/sericite. Red-brown colour of biotite usually indicates amphibolite facies metamorphism; however, other features in these rocks suggest a lower grade, such as greenschist facies metamorphism. The red-brown colour is believed to reflect Ti-content. It is possible that the metamorphism was more of a metasomatism caused by movement of hydrothermal fluids through the rock rather than typical regional or burial metamorphism.

Garnet porphyroblasts in sample DDH1-Bx55 (298 m) are interesting because some are poikiloblastic whereas others are in ring shapes (atolls) with recrystallized quartz in the core.

Muscovite occurs as porphyroblasts and also as finer grained sericite. The larger flakes are interpreted as porphyroblastic rather than detrital grains because of their randomly distributed orientation and their metamorphic association. For instance, in sample DDH1-Bx55 (298 m), large muscovite grains in one layer are likely to be

porphyroblastic because the rock also contains porphyroblastic garnet and metamorphic biotite. In some rocks the sericite is clearly an alteration of feldspar (DDH1-1139.5' (347 m)) whereas in others it probably represents metamorphically recrystallized argillaceous minerals or layers (DDH1-1117' (340 m)).

Retrograde metamorphic minerals are mainly chlorite, sericite, and minor epidote. Sphene is also seen as an alteration around opaques. Pale green chlorite, with associated opaques, is a common alteration from red-brown biotite. It also occurs along fractures, especially in sample DDH1-1073' (327 m). Epidote was noted around opaques and also as clinozoisite veinlets crosscutting other structures and muscovite porphyroblasts, as in sample DDH1-Bx55 (298 m).

Postmetamorphic alteration consists of late carbonate veinlets (1 mm). They are composed mainly of calcite, but some ankeritic component may also be present (as in sample DDH1-1117' (340 m).

Summary of Geological History

The geological history of the area around drill hole DDH-1 can be summarized briefly using evidence from the 5 samples studied in thin section. Sedimentary deposition of fine sand to silt with some argillite probably occurred in a turbiditic environment, as indicated by slump-folds and possible microfaulting, but there is not enough data from these sample to distinguish lower from middle Aldridge Fm.

Static metamorphism without deformation occurred in conditions approximating upper greenschist facies or perhaps hornblende hornfels facies. The most diagnostic mineral assemblage observed was garnet - biotite - muscovite (+ quartz) ± sphene ± tourmaline. Some metamorphic components may have been introduced by

metasomatism or hydrothermal fluids, such as boron, calcium, titanium. Age relations of tourmaline and other metamorphic minerals are not clear, although tourmaline and sphene appear to be somewhat related to crosscutting trends.

Retrograde metamorphism involved fracturing and hydration of minerals at a lower temperature (such as consistent with lower greenschist facies), with biotite altering to chlorite ± opaques, feldspar and muscovite/sericite altering to a later phase sericite, and epidote/clinozoisite veinlets.

Mineralization consisting of up to 3-4% finely disseminated opaques, possibly including pyrrhotite, arsenopyrite, Fe-Ti oxides and Fe-oxides, may have been primary or metamorphic.

Postmetamorphic alteration consisted of minor carbonate veining (calcite ± ankerite). No penetrative deformation appears to have taken place.

Comparison with Samples from Sullivan and Mt. Mahon

Three samples from other areas were also described in thin section for comparison with the samples from drill hole DDH-1. Samples S-1 and S-2 are from the Sullivan orebody, and sample Mt. Mahon 2 is from Mt. Mahon.

Sample S-1 is supposed to be an example of a chloritized siltstone from the Sullivan Hanging Wall. It is a mineralized siltstone, but there is hardly any chlorite in it. The dominant alteration products are fine-grained garnet and quartz, with lesser biotite, plagioclase, and minor chlorite. The disseminated opaques, mainly pyrrhotite, are also locally altered to red hematite.

Sample S-2 is an example of the Sullivan Tourmalinite Footwall. It is an altered granule conglomerate with clasts of siltstone and shale as well as quartz grains. Both the clasts and matrix have been altered to a dirty brown mat of fine-grained crystals which are likely to be tourmaline, in comparison with previous descriptions. The tiny needles are colourless to pale green, but with no visible pleochroism, unlike most tourmaline; and length fast, consistent with a uniaxial negative mineral. Carbonate and muscovite alteration are intimately associated with opaques, which are disseminated throughout in a small amount (3-4%) as lumpy, skeletal grains.

Sample Mt. Mahon 2 is a tourmalinized turbiditic siltstone with fine-grained, altered shaly layers. As well as fine, very pale green tourmaline(?) needles forming a brown mat-like alteration (up to 30%), there are also larger, individual grains of tourmaline (<1%) which can be positively identified as such because of distinctive green to tan pleochroism (O>E).

The samples from DDH-1 are also altered siltstone, but none show the pervasive fine-grained tourmaline alteration typical of Sullivan or Mt. Mahon.

II. PETROGRAPHIC DESCRIPTIONS

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd. Date: 88-11
Project: Goatfell - M586 Collector: M.W. Hitzman
Sample: M586-DDH1-Bx55 (298 m) Date Collected: 1988

LOCATION: Goatfell project, B.C., drill hole DDH-1, 298 m depth

ROCK TYPE: Meta-siltstone to fine sandstone

HAND SPECIMEN: Thin section offcut chip (0.8 x 2.1 x 3.6 cm) cut perpendicular to compositional layering (bedding), which is defined by light to dark green layers (2-6 mm) with apparent grading. Grain size is very fine (0.1 mm?) with slightly coarser black and dark green spots to 0.25 mm. Mineralization consists of a few grains (up to 0.5 mm) of angular to subhedral, silvery arsenopyrite (<< 1%) and minor disseminated pyrrhotite (not apparently magnetic). Pink areas (up to 7 mm) superimposed across bedding may be garnet; the smaller areas are solid pink, whereas the larger ones show a rim 0.5 mm wide of pink garnet(?) surrounding a grey to greenish-grey core (atoll structure). Very fine calcite veins (react in HCL) crosscut the garnet atolls.

THIN SECTION:

% (Approx.)	MINERALS
60	Quartz - Angular to subrounded, poorly to medium well-sorted silt- to fine sand-sized clastic grains; some undulose extinction; uniaxial(+). Occurs also in larger grains within atoll garnets, where undulose extinction is most common.
10-15	Muscovite/Sericite - Colourless mica, med. biref., may be from altered feldspar and/or detrital mica. One layer has porphyroblastic muscovite as well as abundant sericite, sphene, etc. Clinozoisite vein crosscuts muscovite porphyroblast.
5-10	Biotite - Brown mica, occurs disseminated as small, squarish flakes, concentrated in some layers more than others. Locally altered to chlorite. Associated with sphene.
5	Chlorite - Pale green, an alteration of biotite
3-4	Garnet - Poikilitic to skeletal to atoll-shaped, filled mainly by quartz. Inclusions may be quartz, clinozoisite, minor opaques.
2-3	Sphene - High relief, brownish pleochroism, sphene shape; isolated grains and as common high relief grains, possibly from altered biotite; may include leucoxene(?). Some sphene surrounds opaque grains in a reaction rim.

1	Epidote/Clinozoisite - High relief; common anomalous blue biref., occurs around opaques and in crosscutting veinlets.
2-3	Opaques - Small grains, skeletal grains. Associated with clinozoisite, post-garnet, some altered to sphene (may be ilmenite).
Trace	Rutile or Hematite - High relief grain with strong red absorption
1	Carbonate - Isolated large grains and vein alteration near the atoll garnets.

ROCK TEXTURES/STRUCTURES: Bedding is well preserved as variations in composition and texture. Biotite is altered to chlorite. Garnet occurs as porphyroblasts and ring-shapes (atolls). Muscovite occurs as porphyroblasts and as sericitic alteration of feldspar(?). Sphene is concentrated in layer with porphyroblastic muscovite, epidote, sericite, and opaque dust. No deformation textures were noted except for slightly flattened garnets and undulose extinction in quartz.

PROTOLITH: Siltstone, quartz arenite, or greywacke

ALTERATION/MINERALIZATION: Alteration is metamorphic: muscovite - garnet - biotite (lower amphibolite facies?); and retrograde metamorphic: sericite - chlorite - epidote (greenschist facies). Opaques are apparently premetamorphic.

CONDITIONS OF FORMATION: Deposition of quartz - feldspar(?) siltstone or greywacke in turbidite environment. Static metamorphism to lower amphibolite facies or hornblende hornfels facies produced red-brown biotite and garnet (and sphene); retrograde metamorphism resulted in chlorite, sericite, epidote alteration.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd. Date: 88-11
Project: Goatfell - M586 Collector: M.W. Hitzman
Sample: M586-DDH1-1004'(306 m) Date Collected: 1988

LOCATION: Goatfell project, B.C., drill hole DDH-1, 306 m depth

ROCK TYPE: Meta-siltstone to fine sandstone

HAND SPECIMEN: Thin section offcut chip (0.8 x 2.2 x 3.6 cm), cut across layering. About one third of the section is light yellowish-green with thin rip-up clasts (up to 0.1 x 3 mm) of finer-grained yellowish-green shale and patchy yellowish- green alteration that may be sericite. The other part of the section is slightly finer-grained (<0.1 mm), dark grey, with light greenish-grey alteration patches. Only very minor local reaction to HCl. Mineralization is not apparent, although there may be some very finely disseminated sulphides. Non-magnetic.

THIN SECTION:

% (Approx.)	MINERALS
60	Quartz - Moderately well-sorted grains are closely packed with minimal sericitic matrix; uniaxial(+)
5	Feldspar - K-feldspar - Microcline twinning(?), minor - Plagioclase - Albite twinning, relief contrast with quartz
10-15	Muscovite - Colourless mica. Detrital and alteration. Locally occurs with fine-grained, semi-opaque material.
10-15	Biotite - Brown mica, equant small flakes; locally altered to chlorite
3-5	Chlorite - Pale green, from altered biotite; causes local light green colour of rock.
<1	Sphene - High relief, biref. Isolated grains and fine-grained alteration products
<1	Carbonate - Mainly in veinlet
<1	Opaques - Fine-grained, ragged, disseminated; also associated with chlorite

ROCK TEXTURES/STRUCTURES: Rip-up clasts are finer-grained, slightly more argillaceous than rest of siltstone. Sedimentary textures are well preserved; no deformation textures were noted. Chlorite replaces biotite. Mica is somewhat aligned on bedding.

PROTOLITH: Siltstone to fine sandstone

ALTERATION/MINERALIZATION: Alteration is mainly metamorphic - biotite, muscovite; and retrograde metamorphic - sericite, chlorite; with late carbonate veining. Opaques may be primary or products of retrograde metamorphism.

CONDITIONS OF FORMATION: Deposition in turbidite environment. Static metamorphism to upper greenschist facies(?). Retrograde metamorphism caused biotite to alter to chlorite.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd.
Project: Goatfell - M586
Sample: M586-DDH1-1073'(327 m)

Date: 88-11
Collector: M.W. Hitzman
Date Collected: 1988

LOCATION: Goatfell project, B.C., drill hole DDH-1, 327 m depth

ROCK TYPE: Meta-siltstone to fine sandstone

HAND SPECIMEN: Thin section offcut chip (0.9 x 2.1 x 3.6 cm). Rock is very fine-grained (less than 0.1 mm), hard, siliceous, a dull greenish, tannish grey. Layering is defined by subtle textural changes. Darker grey blebs and patches to 1 cm (chlorite) and very fine, light-coloured veinlets (calcite, react in HCl) crosscut the siltstone. Non-magnetic.

THIN SECTION:

% (Approx.)	MINERALS
60	Quartz - Poorly sorted, angular to subrounded silt-sized grains
15-20	Muscovite - Colourless mica, med. biref., irregularly aligned
5-10	Carbonate - In crosscutting veinlets, probably calcite
1	Tourmaline - Isolated small, euhedral to subhedral grains. Slightly zoned, with O = blue-green to olive to brown, E = tan, O > E.
3-5	Chlorite - Pale green, low biref., with pleochroic haloes; occurs as alteration along fractures
Trace	Zircon - Pleochroic haloes in chlorite
2-3	Opaques - Finely disseminated

ROCK TEXTURES/STRUCTURES: Bedding is not planar but somewhat convoluted or perhaps microfaulted. Crosscutting fractures are filled with carbonate; some are filled with chlorite. Fracturing may indicate minor brittle deformation.

PROTOLITH: Siltstone or quartz arenite

ALTERATION/MINERALIZATION: Tourmaline occurs as individual grains disseminated throughout. Muscovite may indicate low grade metamorphism. Chlorite is a product of alteration or retrograde metamorphism. Calcite is a late vein-type alteration. Mineralizatio consists of finely disseminated opaques.

CONDITIONS OF FORMATION: Siltstone was deposited in turbidite enviornment. Low-grade metamorphism may be indicated by muscovite, but assemblage is generally undiagnostic. Chlorite is a result of later retrogression or hydrothermal alteration. Calcite came in on veins o microfaults, indicating possible brittle fracturing.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd. Date: 88-11
Project: Goatfell - M586 Collector: M.W. Hitzman
Sample: M586-DDH1-1117'(340 m) Date Collected: 1988

LOCATION: Goatfell project, B.C., drill hole DDH-1, 340 m depth

ROCK TYPE: Meta-siltstone to fine sandstone

HAND SPECIMEN: Thin section offcut chip (0.8 x 2.3 x 3.7 cm). Light greenish-grey, hard siltstone shows sedimentary structures such as graded bedding, local soft-sediment folding, and possible slumping. The coarser grains may be muscovite. Rusty veinlets are both parallel to and crosscutt bedding; some are filled with milky white material; little reaction to HCl.

THIN SECTION:

% (Approx.)	MINERALS
40-45	Quartz - Fine-grained, clastic
5(?)	Plagioclase - Albite-twinned grains in with quartz
40-45	Muscovite - Mainly sericitic, fine-grained, white mica, aligned subparallel to bedding. Some layers are nearly pure mica.
2-3	Sphene - High relief, sphene-shaped, brownish, as alteration of opaques (ilmenite?) and as individual grains and alteration associated with tourmaline-bearing areas.
<1	Tourmaline - Tiny zoned grains, olive to brownish, associated with sphene along a crosscutting trend and within the layering.
1-2	Opaques - Finely disseminated and in clumps
2-3	Carbonate - In veins. Poor reaction to HCl and rusty weathering suggest dolomitic or ankeritic component. Untwinned; extrem relief changes; one index lower than or equal to balsam (indicating some calcite); extreme biref.; uniaxial(-) with colour rings.

ROCK TEXTURES/STRUCTURES: Bedding is somewhat curved, but not visibly cross-laminated. Mica defines bedding-parallel foliation. Tourmali and sphene are related to a crosscutting trend. Carbonate comes in veins, some parallel to bedding.

PROTOLITH: Siltstone or quartzofeldspathic arenite with argillaceous layers

ALTERATION/MINERALIZATION: Tourmaline and sphene may have been introduced hydrothermally. Muscovite/sericite indicates some metamorphic recrystallization. Mineralization consists of finely disseminated opaques. Late carbonate veins are probably ankeritic.

CONDITIONS OF FORMATION: Deposition of siltstone in turbiditic environment. Low-grade metamorphic recrystallization. Possible hydrothermal alteration bringing in sphene and tourmaline, possibly opaques. Lat carbonate veining.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd.
Project: Goatfell - M586
Sample: M586-DDH1-1139.5'(347 m)

Date: 88-11
Collector: M.W. Hitzman
Date Collected: 1988

LOCATION: Goatfell project, B.C., drill hole DDH-1, 347 m depth

ROCK TYPE: Hornfelsed siltstone to fine sandstone

HAND SPECIMEN: Thin section offcut chip (0.8 x 2.1 x 3.6 cm). Very fine-grained (<< 0.1 mm), hard, massive siltstone is light greenish-grey with tiny green spots(0.1 mm), and darker grey. The transition is irregular, not following bedding, and appears to crosscut primary textures. One late, crosscutting veinlet reacts in HCl (calcite). Non-magnetic.

THIN SECTION:

% (Approx.)	MINERALS
50-55	Quartz - Well-sorted, interlocking grains.
10-15	Feldspar - Turbid, with relief contrast to quartz, somewhat altered to sericite
15	Muscovite - As porphyroblasts scattered throughout, and pervasive sericite alteration on altered feldspar
10	Chlorite - Pale green flakes, distributed throughout
1-2	Biotite - Pale brown mica, mainly altered to chlorite; bent grains
Trace	Tourmaline - Slightly zoned, olive to brown
2-4	Opaques - Finely disseminated, and altered to semi-opaque masses, possibly sphene
<1	Carbonate - In crosscutting veinlets

ROCK TEXTURES/STRUCTURES: Biotite is altered to pale green chlorite. Texture is clearly clastic but somewhat recrystallized, with no clear foliation or bedding. The colour difference in the rocks is due to more opaques in the dark portion, and chlorite in the light greenish-grey portion.

PROTOLITH: Siltstone or quartzofeldspathic arenite

ALTERATION/MINERALIZATION: Feldspar is altered somewhat to sericite; biotite nearly completely to chlorite. Pale green visible alteration in rock is related to chloritization of biotite. Mineralization consists of finely disseminated opaques. Late carbonate veins crosscut rock.

CONDITIONS OF FORMATION: Deposition of siltstone in turbidite environment. Some metamorphic recrystallization caused growth of biotite, and muscovite porphyroblasts. Retrogression is mainly indicated by chlorite alteration. Opaques may be primary or metamorphic. Carbonate veinlets are late hydrothermal.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd. Date: 88-12
Project: Goatfell - M586 Collector: -
Sample: Sullivan S-1 Date Collected: Pre-1988

LOCATION: Sullivan Chloritized Siltstone, Hanging Wall

ROCK TYPE: Mineralized garnetiferous quartz-biotite siltstone

HAND SPECIMEN: No hand specimen. Section shows squarish patch 1 x 1.5 cm of darker area with scattered, fine-grained opaques and red-brown grains (hematite, 2-3%) forming darker core, in a background of fine-grained, light-coloured rock. Opaques and darker minerals, 5-10%.

THIN SECTION:

% (Approx.)	MINERALS
5-10	Opaques - Finely disseminated, with some concentration toward centre of slide, anhedral, skeletal forms, surrounded by garnet and quartz alteration; some alteration to hematite.
2-3	Hematite - High relief, anhedral grains with red absorption, surrounding and intergrown with skeletal opaques.
20-25	Garnet - High relief, light-coloured alteration associated with opaques, blobby to subhedral, isotropic to very low biref.
30-35	Quartz - Occurs as polygonal grains interstitial to mineralization, uniaxial(+) with some albite. Also occurs in siltstone matrix (+_ feldspar) with sericite.
5-10	Biotite - Brown mica associated with opaques
3-4	Chlorite - Low to anomalous blue biref., very pale green, associated with hematite
10	Sericite (Muscovite) - Fine-grained, colourless mica in fine-grained sediment that is not as altered as central part
2-5	Feldspar (Albite?) - With albite twinning, associated with opaques and quartz; may also occur in siltstone part
Trace	Tourmaline - Very tiny, individual greenish grains in siltstone

ROCK TEXTURES/STRUCTURES: Rock is very fine-grained overall, with coarser, recrystallized area in the centre, with opaques, garnet, quartz, biotite, and chlorite, with minor feldspar. Rest of rock is less altered, finer-grained, sericitic quartz (+_ feldspar?) siltstone. Garnet is clearly associated with opaques.

PROTOLITH: Siltstone

ALTERATION/MINERALIZATION: Alteration associated with mineralization is dominantly garnet and quartz, with lesser biotite, chlorite, and feldspar (there is not enough chlorite to justify calling it "chloritized", however). Mineralization may be pyrrhotite, and must include some iron.

CONDITIONS OF FORMATION: Deposition in fine-grained sedimentary environment. Possible metamorphism to upper greenschist facies, postdating or accompanying mineralization. Later retrograde alteration to minor chlorite and hematite.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd.
Project: Goatfell - M586
Sample: Sullivan S-2

Date: 88-12
Collector: -
Date Collected: pre-1988

LOCATION: Sullivan Tourmalinite Footwall

ROCK TYPE: Tourmalinized siltstone conglomerate

HAND SPECIMEN: No hand specimen.

THIN SECTION:

% (Approx.) MINERALS

40% Clasts: Angular to subangular, dirty white to olive brown, tabular, up to 2 x 3 mm, with fine laminations, apparently siltstone or shale, altered to brownish, fine-grained material which contains tourmaline(?) needles.

Matrix:

25-30 Quartz - Colourless. Angular silty to sandy grains, some subdivided, recrystallized; some overgrown with tiny needles; uniaxial(+).

3-4 Opaques - Pyrrhotite(?); occurs in lumpy skeletal grains, in matrix.

<1 Iron oxide(?) - High relief, brownish alteration around opaques.

25 Tourmaline(?) - Fine-grained needles forming brownish mat throughout matrix and in clasts; colourless to pale green, length fast.

2 Carbonate - Associated with opaques and muscovite

1-2 Muscovite - Colourless mica, medium biref., associated with opaques. Also occurs in some altered clasts.

ROCK TEXTURES/STRUCTURES: Poorly sorted sediment has grain size from silt(?) to small pebbles of siltstone or shale. Clasts as well as matrix are pervasively altered with tourmaline needles. Quartz is unaltered, shows some recrystallization. Opaques are disseminated skeletal grains in matrix.

PROTOLITH: Sedimentary conglomerate with clasts of siltstone/shale

ALTERATION/MINERALIZATION: Alteration is mainly in form of fine-grained tourmaline(?) needles (up to 25%). Mineralization is associated with muscovite and carbonate.

CONDITIONS OF FORMATION: Deposition in quartz-rich clastic sedimentary environment (turbidite), with conglomerate forming locally from shale and siltstone layers, indicating faulting or slumping. Tourmaline-alteration is post-depositional.

PETROGRAPHIC REPORT by J.S. Getsinger, PhD

For: Chevron Minerals Ltd.
Project: Goatfell - M586
Sample: Mt. Mahon 2

Date: 88-12
Collector: -
Date Collected: pre-1988

LOCATION: Goatfell project, B.C.

ROCK TYPE: Tourmalinized(?) siltstone

HAND SPECIMEN: No hand specimen. Slide shows very fine-grained, laminated shale to siltstone, with finer-grained portions a dull olive brown colour. Siltstone shows wavy bedding, possibly intraformational slump-folding.

THIN SECTION:

% (Approx.) MINERALS

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30 Quartz (+_ Feldspar?) - Fine-grained, colourless, low biref., low relief background material

5 Feldspar - Larger grains in coarser (silty) layers, biaxial, poikiloblastic

20-30 Muscovite - Colourless mica flakes; in coarser-grained layers aligned at an angle (40 degrees) to bedding, apparently subparallel wit axial planes of minor slump folds.

1 Garnet - Euhedral, individual grains (porphyroblasts) sparsely distributed across the section, occurring particularly in the finer-grained layers (14 grains total, 0.1 to 0.5 mm).

2 Opaques - Very finely disseminated throughout

<1 Tourmaline - Individual prisms in silty layers; O = green, E = colourless to tan, O > E.

20-30 Tourmaline(?) - Fine-grained, med.-high relief, dark-appearing but actually colourless to very pale green needles, in shaly layers length fast; no pleochroism; forming a dirty-brown looking mat. Clearly a different phase from the larger individual grains of green tourmaline seen scattered throughout the section.

ROCK TEXTURES/STRUCTURES: Grain size varies from very fine (clay?) to fine (silt) in laminations and graded bedding (beds < 1 cm, laminations < 1 mm). Coarser-grained laminations have muscovite aligned at about 40 degrees to bedding, subparallel to axial planes of minor folds.

PROTOLITH: Siltstone/shale (turbidite)

ALTERATION/MINERALIZATION: Metamorphic minerals are garnet and muscovite, possibly feldspar. Alteration includes two possible forms of tourmaline, larger individual green grains, and a brown mat of fine-grained needles. Mineralization consists of very finely disseminated opaques.

CONDITIONS OF FORMATION: Deposition of fine sediment in turbiditic environment. Static metamorphism, possibly accompanied by very weak deformation, to upper greenschist facies (garnet, muscovite). Tourmaline needles are probably hydrothermal, whereas larger grains could be detrital and/or metamorphic.

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STATEMENT OF QUALIFICATIONS

I, Jennifer S. Getsinger, do hereby certify:

1. That I am a geologist employed by Chevron Minerals Ltd. with offices at 1900 - 1055 West 1055 West Hastings Street, Vancouver, B.C. V6E 2E9.

2. That I have studied geology at Harvard University (A.B. 1974), and have graduate degrees in geology from the University of Washington, Seattle (M.S. 1978), and from the University of British Columbia, Vancouver (Ph.D. 1985).

3. That I have practiced within the geological profession since 1974.

4. That I am a Fellow of the Geological Association of Canada and a member of the Geological Society of America.

5. That the opinions, conclusions and recommendations contained herein are based in part on petrographic analysis and research carried out by me.

6. That I hold no direct or indirect interest nor do I expect to receive any interest in the property or in any securities of the owner or operator of the property, or in any associated companies.

7. That this report may be utilized for inclusion in a Prospectus or Statement of Material Facts.

Signed _____

Jennifer S. Getsinger, Ph.D.

December 2, 1988
Vancouver, B.C.

APPENDIX IV

MAG/VLF SURVEY
GOATFELL PROPERTY
OCTOBER 1988

a1a/h/r

LINE 0
Mag data

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
TOTAL FIELD DATA (uncorrected)

Reference field: 56800.0
Datum subtracted: 0.0Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:14:27

LINE 0
MAG DATA

Line 0+00 N Date 14 OCT 88 #1

POSITION	FIELD	ERR	DRIFT	TIME	DS	FIELD=X	GRAD=+	
#1	56369.7	.00	0.0	10:50:38	88	.	+.	X .
#2	57409.9	.02	0.0	10:52:05	88X	.	+.	.

Line 0+00 N Date 14 OCT 88 #3

POSITION	FIELD	ERR	DRIFT	TIME	DS	FIELD=X	GRAD=+	
0+00 E	57409.7	.02	0.0	10:52:55	88X	.	+.	.
0+25 E	57521.7	.03	0.0	10:53:55	88	. X .	+.	.
0+50 E	57528.1	.02	0.0	10:55:17	88	. X .	+.	.
0+75 E	57525.6	.02	0.0	10:56:27	88	. X .	+.	.
1+00 E	57516.4	.02	0.0	10:57:21	88	. X .	+.	.
1+25 E	57519.0	.02	0.0	10:58:16	88	. X .	+.	.
1+50 E	57534.0	.02	0.0	10:59:05	88	. X .	+.	.
1+75 E	57538.3	.02	0.0	11:00:36	88	. X .	+.	.
2+00 E	57540.1	.02	0.0	11:01:35	88	. X .	+.	.
2+25 E	57550.6	.02	0.0	11:02:44	88	. X.	+.	.
2+50 E	57524.7	.02	0.0	11:03:34	88	. X .	+.	.
2+75 E	57523.2	.02	0.0	11:04:33	88	. X .	+.	.
3+00 E	57522.0	.02	0.0	11:05:31	88	. X .	+.	.
3+25 E	57518.4	.02	0.0	11:06:29	88	. X .	+.	.
3+50 E	57510.6	.02	0.0	11:07:17	88	. X .	+.	.
3+75 E	57495.5	.02	0.0	11:08:25	88	.X .	+.	.
4+00 E	57470.6	.02	0.0	11:09:14	88	X. .	+.	. ← FAULT
4+25 E	57526.7	.02	0.0	11:10:08	88	. X .	+.	.
4+50 E	57553.1	.02	0.0	11:10:58	88	. X.	+.	.
4+75 E	57693.2	.02	0.0	11:11:50	88	. .	+.	X .
5+00 E	57700.7	.03	0.0	11:12:50	88	. .	+.	X .
5+25 E	57602.6	.02	0.0	11:13:40	88	. . X	+.	.
5+50 E	57502.9	.02	0.0	11:14:43	88	.X .	+.	.
5+75 E	57599.9	.02	0.0	11:15:44	88	. . X	+.	.
6+00 E	57559.8	.02	0.0	11:16:41	88	. X.	+.	.
6+25 E	57545.4	.03	0.0	11:17:33	88	. X .	+.	.
6+50 E	57540.8	.02	0.0	11:19:55	88	. X .	+.	.
#30	57500.6	.02	0.0	11:21:42	88	.X .	+.	.
#31	57397.0	.02	0.0	11:33:53	88	. .	+.	. X

LINE O
VLF DATA
ANNAPOLIS

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:17:55

LINE D
VLF DATA
ANNAPOLIS STATION

Line 0+00 N Date 14 OCT 88 21.4 #1

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
#1	69.9	0.2	3910.	11.0	10:50:38	99	0.0	!			
#2	-13.4	-15.1	9.64	-7.6	10:52:05	53	89.4	!			

Line 0+00 N Date 14 OCT 88 21.4 #3

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-15.4	-13.9	9.64	-8.7	10:52:55	53	-87.7				
0+25 E	-17.1	-10.7	9.85	-9.7	10:53:55	54	-83.6				
0+50 E	-20.6	-8.3	10.19	-11.6	10:55:17	43	-83.0				
0+75 E	-21.1	-6.5	10.66	-11.9	10:56:27	43	-66.8	5.1			
1+00 E	-20.5	-4.1	10.92	-11.5	10:57:21	45	-83.8	2.1	3.6		
1+25 E	-20.4	-2.9	11.04	-11.5	10:58:16	43	-68.3	-0.5	0.8		
1+50 E	-16.2	-1.3	11.28	-9.2	10:59:05	44	-70.3	-2.7	-1.6		
1+75 E	-14.3	-0.8	10.95	-8.1	11:00:36	45	-78.3	-5.7	-4.2		
2+00 E	-10.7	-1.0	10.65	-6.1	11:01:35	45	-86.5	-6.5	-6.1		
2+25 E	-5.1	-0.3	10.56	-2.9	11:02:44	46	-69.9	-8.3	-7.4		
2+50 E	-1.3	1.0	10.37	-0.7	11:03:34	49	-79.1	-10.6	-9.5		
2+75 E	0.2	0.0	10.31	0.1	11:04:33	55	-62.2	-8.4	-9.5		
3+00 E	0.9	0.1	9.90	0.5	11:05:31	47	-63.4	-4.2	-6.3		
3+25 E	1.4	-0.7	9.86	0.8	11:06:29	46	-56.0	-1.9	-3.1		
3+50 E	-2.7	-3.3	9.73	-1.5	11:07:17	43	-81.1	1.3	-0.3		
3+75 E	-5.6	-4.7	9.91	-3.2	11:08:25	55	-71.1	6.0	3.6		
4+00 E	-4.7	-4.1	10.14	-2.6	11:09:14	54	-68.9	5.1	5.5		
4+25 E	-1.5	-1.9	10.14	-0.8	11:10:08	56	-70.5	-1.3	1.9		
4+50 E	-0.1	-1.0	9.58	0.0	11:10:58	53	-86.3	-5.0	-3.2		
4+75 E	-2.9	-1.6	9.23	-1.6	11:11:50	44	-80.9	-1.8	-3.4		
5+00 E	-5.7	-2.7	9.27	-3.2	11:12:50	45	-73.9	4.0	1.1		
5+25 E	-7.3	-1.8	9.52	-4.1	11:13:40	44	-63.9	5.7	4.8		
5+50 E	-9.3	0.0	9.73	-5.3	11:14:43FENC	44	-60.1	4.6	5.1		
5+75 E	-10.6	1.7	10.00	-6.0	11:15:44	43	-54.8	4.0	4.3		
6+00 E	-11.6	2.6	10.09	-6.6	11:16:41	44	-65.8	3.2	3.6		
6+25 E	-10.8	4.5	10.17	-6.2	11:17:33	44	-66.9	1.5	2.3		
6+50 E	-10.6	5.4	10.47	-6.0	11:19:55	44	-74.1	-0.4	0.5		
#30	-9.8	0.3	9.73	-5.6	11:21:42TIE	44	-65.7	!			
#31	-15.5	-13.1	8.90	-8.8	11:33:53TIE	43	-85.5	!			

LINE O
VLF Data
ANNAPOLIS

LINE 0
VLF DATA
ANNAPOLIS STATION

```
OMNI-PLUS  Tie-line MAG/VLF R22K  Ser  #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator:  3333
Records:   89
Bat:  17.2 Volt   Lithium:  3.48 Volt
Last time update: 10/12 10:08:00
Start  of  print: 10/14 15:22:39

Line   0+00 N  Date 14 OCT 88  21.4    #1
POSITION  VLF - TOTAL FLD = X  IN-PHASE = +  QUAD = #
                     -30           -10            10            30           50
    #1   .           .+         . .      #   .           . X
    #2   .X          .         #+.           .           .

Line   0+00 N  Date 14 OCT 88  21.4    #3
POSITION  VLF - TOTAL FLD = X  IN-PHASE = +  QUAD = #
                     -30           -10            10            30           50
  0+00 E .X          .         +#.           .           .
  0+25 E .X          .        +  .#          .           .
  0+50 E .X          .      +    . #         .           .
  0+75 E . X         .     +     .  #        .           .
  1+00 E . X         .      +    .    #      .           .
  1+25 E . X         .      +    .     #     .           .
  1+50 E . X         .        +  .      #    .           .
  1+75 E . X         .         + .      #    .           .
  2+00 E . X         .           .+     #    .           .
  2+25 E .X          .           .   +  #    .           .
  2+50 E .X          .           .      +#   .           .
  2+75 E .X          .           .       *   .           .
  3+00 E .X          .           .       *   .           .
  3+25 E .X          .           .      #+   .           .
  3+50 E .X          .           .    #+     .           .
  3+75 E .X          .           .   +#      .           .     <--
  4+00 E .X          .           .    *      .           .
  4+25 E .X          .           .     #+    .           .
  4+50 E .X          .           .      *    .           .
  4+75 E .X          .           .     *     .           .
  5+00 E .X          .           .   + #     .           .
  5+25 E .X          .           .  +  #     .           .
  5+50 E .X          .           . +     #   .           .
  5+75 E .X          .           .+       #  .           .
  6+00 E .X          .           +        #  .           .
  6+25 E .X          .           .+        # .           .
  6+50 E .X          .           .+         #.           .
    #30  .X          .           .+      #   .           .
    #31  .X          .         +#.           .           .
```

Line 0
VLF Data
Hawaii

LINE 0
VLF DATA
Hawaii Station

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:19:06

Line 0+00 N Date 14 OCT 88 23.4 #1

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
#1	70.5	0.2	3661.	12.0	10:50:38	99	0.0	!			
#2	-10.6	-5.3	4.49	-6.0	10:52:05	52	67.5	!			

Line 0+00 N Date 14 OCT 88 23.4 #3

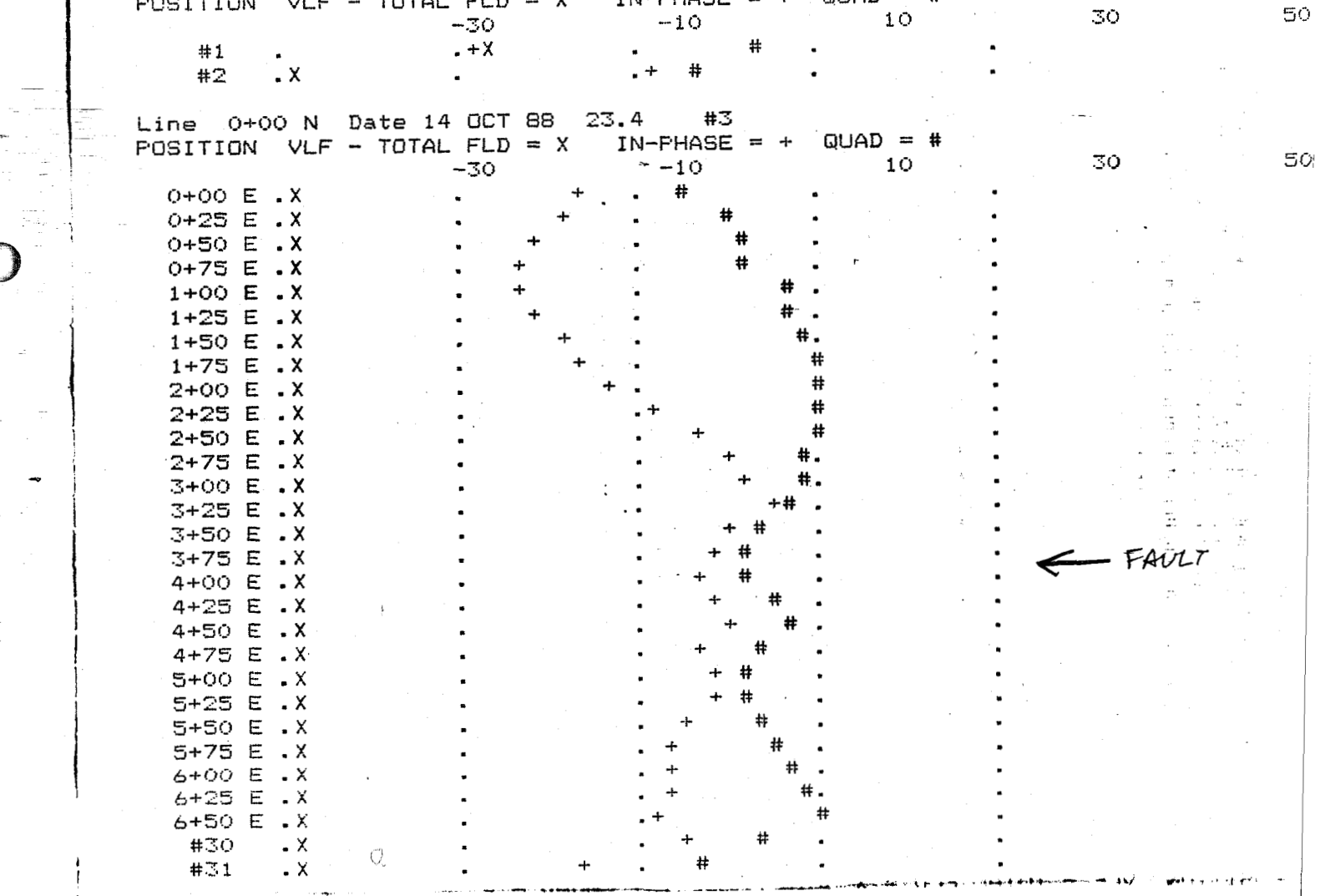
POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-18.9	-6.5	4.32	-10.7	10:52:55	52	72.1				
0+25 E	-20.2	-3.1	4.54	-11.4	10:53:55	53	75.9				
0+50 E	-23.3	-0.8	4.60	-13.1	10:55:17	52	78.3				
0+75 E	-24.4	-0.8	4.74	-13.7	10:56:27	52	-85.2	4.7			
1+00 E	-24.2	3.7	4.97	-13.6	10:57:21	43	79.1	2.8	3.7		
1+25 E	-23.5	4.4	5.05	-13.2	10:58:16	53	-86.6	0.0	1.4		
1+50 E	-20.0	6.1	5.11	-11.3	10:59:05	42	-86.9	-2.8	-1.4		
1+75 E	-18.9	7.1	5.01	-10.7	11:00:36	42	85.5	-4.8	-3.8		
2+00 E	-15.6	7.3	5.00	-8.8	11:01:35	42	76.6	-5.0	-4.9		
2+25 E	-9.8	7.1	5.10	-5.6	11:02:44	53	-86.7	-7.6	-6.3		
2+50 E	-5.0	7.9	5.07	-2.9	11:03:34	43	84.5	-11.0	-9.3		
2+75 E	-2.8	5.0	5.17	-1.6	11:04:33	53	-77.9	-9.9	-10.5		
3+00 E	-0.1	5.0	5.03	0.0	11:05:31	43	-78.5	-6.9	-8.4		
3+25 E	2.0	4.0	5.02	1.1	11:06:29	52	-72.3	-5.6	-6.3		
3+50 E	-1.6	0.7	5.12	-0.9	11:07:17	43	78.8	-1.8	-3.7		
3+75 E	-4.7	-0.8	5.08	-2.7	11:08:25	52	-89.6	4.7	1.4		
4+00 E	-5.2	-0.2	5.10	-2.9	11:09:14	52	-86.7	5.8	5.2		
4+25 E	-3.5	2.2	5.22	-2.0	11:10:08	52	-88.7	1.3	3.5		
4+50 E	-2.6	3.2	5.03	-1.5	11:10:58	52	75.1	-2.1	-0.4		
4+75 E	-5.2	1.2	4.74	-3.0	11:11:50	42	82.7	-0.4	-1.3		
5+00 E	-4.3	-0.9	4.83	-2.4	11:12:50	43	-89.6	1.9	0.7		
5+25 E	-4.6	-0.1	4.85	-2.6	11:13:40	42	-79.3	0.5	1.2		
5+50 E	-7.3	0.5	5.04	-4.1	11:14:43FENC	43	-76.5	1.3	0.9		
5+75 E	-8.4	2.4	5.15	-4.8	11:15:44	43	-70.7	3.9	2.6		
6+00 E	-9.5	4.0	5.22	-5.4	11:16:41	42	-79.5	3.5	3.7		
6+25 E	-8.7	5.3	5.30	-5.0	11:17:33	42	-81.2	1.5	2.5		
6+50 E	-9.9	6.4	5.43	-5.6	11:19:55	53	-89.3	0.4	0.9		
#30	-7.2	1.0	5.15	-4.1	11:21:42TIE	42	-82.3	!			
#31	-17.7	-5.8	5.49	-10.0	11:33:53TIE	53	72.6	!			

LINE 0
VLF Data
Hawaii

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:24:46

LINE 0
VLF Data
Hawaii Station

Line 0+00 N Date 14 OCT 88 23.4 #1
POSITION VLF - TOTAL FLD = X IN-PHASE = + QUAD = #



Line 0+00 N Date 14 OCT 88 23.4 #3
POSITION VLF - TOTAL FLD = X IN-PHASE = + QUAD = #

LINE 0
VLF DATA
SEATTLE

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:16:45

LINE 0
VLF DATA
Seattle Station

Line 0+00 N Date 14 OCT 88 24.8 #1

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
#1	70.6	0.2	3678.	6.0	10:50:38	99	0.0	!			
#2	-17.1	-7.4	76.65	-9.7	10:52:05	58	89.2	!			

Line 0+00 N Date 14 OCT 88 24.8 #3

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-16.7	-7.9	77.05	-9.4	10:52:55	59	-88.4				
0+25 E	-18.8	-4.6	80.46	-10.6	10:53:55	57	-84.7				
0+50 E	-21.2	-1.6	83.78	-11.9	10:55:17	46	-83.0				
0+75 E	-22.0	-0.9	87.75	-12.4	10:56:27	45	-66.4	4.3			
1+00 E	-21.1	2.6	89.98	-11.9	10:57:21	46	-83.3	1.8	3.0		
1+25 E	-20.1	2.4	92.08	-11.4	10:58:16	45	-69.1	-1.0	0.4		
1+50 E	-16.6	4.3	94.09	-9.4	10:59:05	56	-71.1	-3.5	-2.3		
1+75 E	-13.4	4.6	91.08	-7.6	11:00:36	58	-78.2	-6.3	-4.9		
2+00 E	-10.2	4.1	90.05	-5.8	11:01:35	49	-87.1	-7.4	-6.9		
2+25 E	-4.9	4.2	87.94	-2.8	11:02:44	49	-71.0	-8.4	-7.9		
2+50 E	-0.3	4.7	86.35	-0.2	11:03:34	49	-80.3	-10.4	-9.4		
2+75 E	0.3	3.1	86.13	0.1	11:04:33	49	-63.7	-8.5	-9.5		
3+00 E	1.1	2.5	82.92	0.6	11:05:31	49	-64.4	-3.7	-6.1		
3+25 E	1.3	1.5	82.13	0.7	11:06:29	49	-56.6	-1.4	-2.6		
3+50 E	-2.2	-1.1	83.23	-1.3	11:07:17	49	-83.6	1.3	-0.1		
3+75 E	-5.7	-2.5	84.97	-3.3	11:08:25	59	-73.0	5.9	3.6		
4+00 E	-4.8	-1.3	86.64	-2.7	11:09:14	49	-70.9	5.4	5.6		
4+25 E	-1.7	0.9	86.12	-1.0	11:10:08	59	-71.9	-0.9	2.2		
4+50 E	-0.8	1.4	83.01	-0.5	11:10:58	58	-87.9	-4.5	-2.7		
4+75 E	-3.3	0.9	78.75	-1.9	11:11:50	49	-82.8	-1.3	-2.9		
5+00 E	-5.7	-1.0	78.13	-3.2	11:12:50	49	-75.8	3.6	1.1		
5+25 E	-7.6	-0.3	81.63	-4.3	11:13:40	49	-65.8	5.1	4.3		
5+50 E	-9.4	1.3	84.48	-5.4	11:14:43FENC	49	-62.5	4.6	4.8		
5+75 E	-10.3	3.6	86.99	-5.8	11:15:44	49	-56.4	3.7	4.1		
6+00 E	-10.9	5.0	88.44	-6.2	11:16:41	49	-68.0	2.3	3.0		
6+25 E	-9.5	6.4	89.87	-5.4	11:17:33	49	-68.2	0.4	1.3		
6+50 E	-9.7	7.3	92.65	-5.5	11:19:55	49	-76.4	-1.1	-0.4		
#30	-9.4	1.7	86.04	-5.3	11:21:42TIE	49	-67.2	!			
#31	-16.9	-7.7	77.27	-9.5	11:33:53TIE	56	-86.1	!			

LINE 0
VLF DATA
SEATTLE

LINE 0
VLF DATA
SEATTLE Station

```
OMNI-PLUS  Tie-line MAG/VLF R22K  Ser  #2b102
VLF  TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator:  3333
Records:   89
Bat:  17.2 Volt     Lithium:  3.46 Volt
Last time update: 10/12 10:08:00
Start  of  print: 10/14 15:21:25


Line  0+00 N  Date 14 OCT 88  24.8     #1
POSITION  VLF - TOTAL FLD = X    IN-PHASE = +  QUAD = #
                        -30           -10           10           30
     #1    .             .+    X       .          #    .            .
     #2    .            X.             +   .   #        .            .

Line  0+00 N  Date 14 OCT 88  24.8     #3
POSITION  VLF - TOTAL FLD = X    IN-PHASE = +  QUAD = #
                        -30           -10           10           30
   0+00 E .             X.             +   .   #        .            .
   0+25 E .             X.              +    .    #      .            .
   0+50 E .              X       +       .       #      .            .
   0+75 E .              X       +       .         #    .            .
   1+00 E .              .X      +       .           #  .            .
   1+25 E .              .X       +      .           #  .            .
   1+50 E .              .X         +    .             # .            .
   1+75 E .              .X           +  .             # .            .
   2+00 E .              .X             .+             # .            .
   2+25 E .              X              .    +         # .            .
   2+50 E .              X              .        +     # .            .
   2+75 E .              X              .          +#  .            .
   3+00 E .              X              .          +#  .            .
   3+25 E .              X              .          *   .            .
   3+50 E .              X              .        +#    .            .
   3+75 E .              X              .     + #      .            .
   4+00 E .              X              .     +  #     .            .
   4+25 E .              X              .       + #    .            .
   4+50 E .              X              .        +#    .            .
   4+75 E .             X.              .      +  #    .            .
   5+00 E .             X.              .     +   #    .            .
   5+25 E .              X              .   +     #    .            .
   5+50 E .              X              . +       #    .            .
   5+75 E .              X              .+          #  .            .
   6+00 E .              .X             .+           #.            .
   6+25 E .              .X             . +            #           .
   6+50 E .              .X             .+             #           .
    #30   .              X              . +        #   .            .
    #31   .             X.              +   .   #        .            .
```

← Fault

LINE 1
MAG DATA

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
TOTAL FIELD DATA (uncorrected)

LINE 1
MAG DATA

Reference field: 56800.0
Datum subtracted: 0.0Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:14:27

Line 1+00 N Date 14 OCT 88 #32

POSITION	FIELD	ERR	DRIFT	TIME	DS	FIELD=X GRAD=+
0+00 E	57564.4	.02	0.0	12:09:49	88	. X +. .
0+25 E	57595.7	.02	0.0	12:11:18	88	. . X +. .
0+50 E	57616.1	.02	0.0	12:12:08	88	. . X+. .
0+75 E	57620.1	.02	0.0	12:13:11	88	. . X+. .
1+00 E	57603.8	.02	0.0	12:14:03	88	. . X +. .
1+25 E	57588.7	.02	0.0	12:14:50	88	. . X +. .
1+50 E	57571.5	.02	0.0	12:15:34	88	. X +. .
1+75 E	57802.2	.03	0.0	12:16:18	88	. . +. . X
2+00 E	57549.0	.02	0.0	12:17:05	88	. X. +. .
2+25 E	57546.8	.02	0.0	12:17:51	88	. X. +. .
2+50 E	57545.3	.02	0.0	12:18:43	88	. X . +. .
2+75 E	57535.3	.02	0.0	12:19:29	88	. X . +. .
3+00 E	57532.6	.03	0.0	12:20:16	88	. X . +. .
3+25 E	57527.0	.02	0.0	12:21:10	88	. X . +. .
3+50 E	57756.7	.02	0.0	12:22:05	88	. . +. . X
3+75 E	57516.2	.02	0.0	12:22:57	88	. X . +. . ← FAULT
4+00 E	57519.3	.02	0.0	12:23:47	88	. X . +. .
4+25 E	57518.9	.03	0.0	12:24:41	88	. X . +. .
4+50 E	57513.4	.02	0.0	12:25:28	88	. X . +. .
4+75 E	57523.8	.02	0.0	12:26:31	88	. X . +. .
5+00 E	57178.1	.02	0.0	12:27:32	88	. . X+. .
5+25 E	57511.3	.02	0.0	12:28:34	88	. X . +. .
5+50 E	57526.0	.02	0.0	12:29:26	88	. X . +. .
5+75 E	57526.1	.02	0.0	12:30:10	88	. X . +. .
6+00 E	57523.9	.03	0.0	12:30:57	88	. X . +. .
6+25 E	57521.6	.02	0.0	12:31:51	88	. X . +. .
#58	57144.1	.03	0.0	12:33:53	88	. . X +. .
#59	57546.0	.02	0.0	12:38:23	88	. X . +. .
#60	57566.0	.02	0.0	12:42:24	88	. X +. .

LINE 1
VLF DATA
ANNAPOLIS

LINE 1
VLF DATA
ANNAPOLIS STATION

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:17:55

Line 1+00 N Date 14 OCT 88 21.4 #32

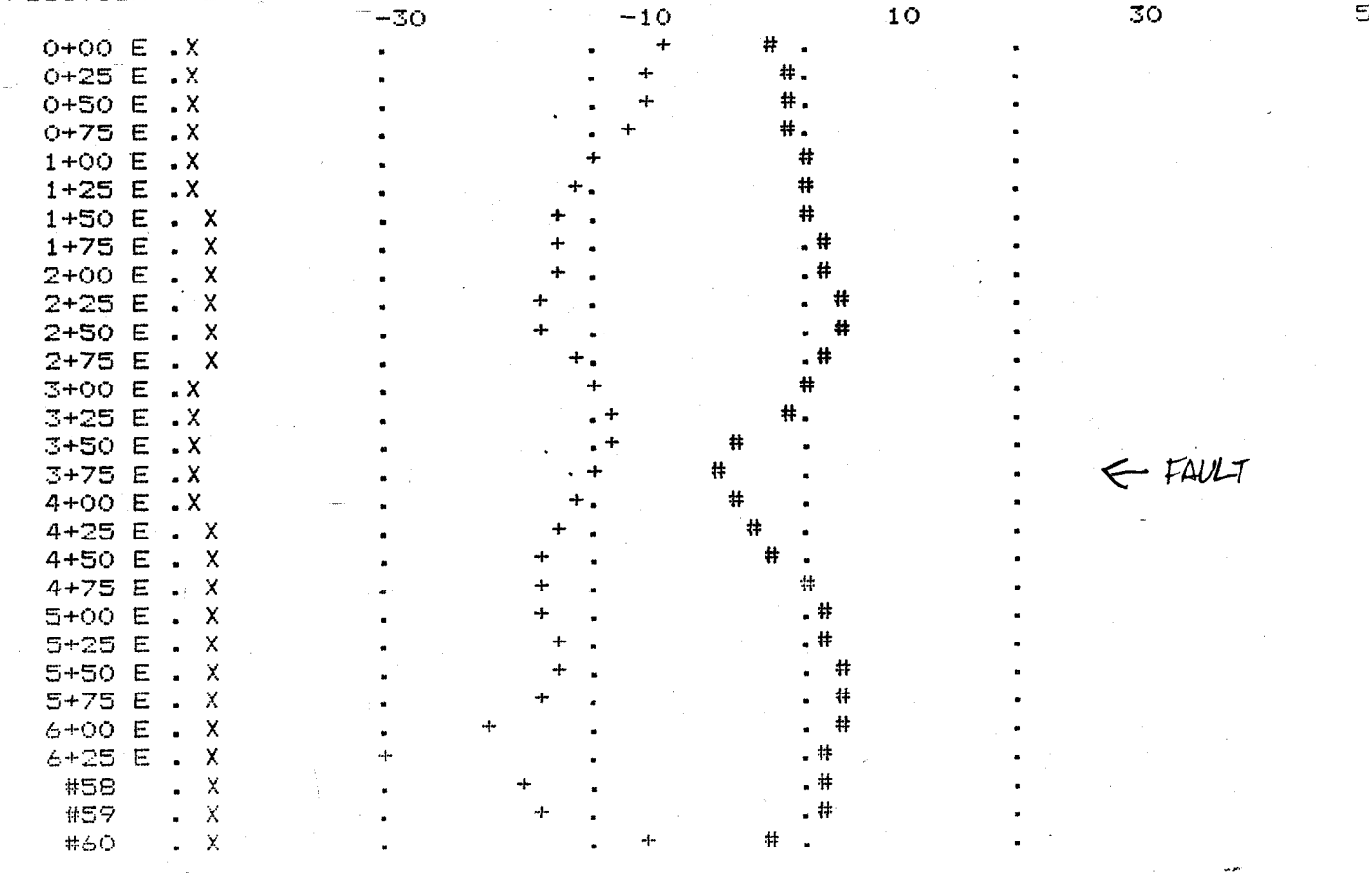
POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-6.3	4.6	10.31	-3.6	12:09:49	54	-76.2				
0+25 E	-6.4	5.3	10.28	-3.6	12:11:18	54	-56.8				
0+50 E	-7.0	5.9	10.38	-4.0	12:12:08	55	-71.1				
0+75 E	-9.1	6.3	10.38	-5.2	12:13:11	55	-78.7	2.0			
1+00 E	-12.4	7.0	10.37	-7.1	12:14:03	53	-74.3	4.7	3.3		
1+25 E	-13.7	6.7	10.44	-7.8	12:14:50	55	-87.5	5.7	5.2		
1+50 E	-14.4	7.0	10.67	-8.1	12:15:34	45	-81.7	3.6	4.6		
1+75 E	-14.5	9.3	10.69	-8.2	12:16:18	54	-83.2	1.4	2.5		
2+00 E	-15.6	9.4	10.65	-8.9	12:17:05	55	89.9	1.2	1.3		
2+25 E	-16.1	10.3	10.67	-9.1	12:17:51	55	89.1	1.7	1.4		
2+50 E	-16.7	9.6	10.74	-9.5	12:18:43	54	-81.3	1.5	1.6		
2+75 E	-14.0	9.2	10.79	-8.0	12:19:29	54	-81.6	-0.5	0.5		
3+00 E	-11.4	7.6	10.51	-6.5	12:20:16	54	-86.2	-4.1	-2.3		
3+25 E	-9.8	5.6	10.27	-5.6	12:21:10	54	-75.0	-5.4	-4.8		
3+50 E	-9.9	1.0	10.02	-5.6	12:22:05	54	-75.3	-3.3	-4.4		
3+75 E	-12.4	-0.4	9.92	-7.0	12:22:57	55	-89.3	0.5	-1.4		
4+00 E	-13.9	0.4	10.24	-7.9	12:23:47	54	-83.6	3.7	2.1		
4+25 E	-14.7	2.8	10.79	-8.3	12:24:41	54	-66.8	3.6	3.6		
4+50 E	-16.3	4.7	11.32	-9.2	12:25:28	53	-60.8	2.6	3.1		
4+75 E	-17.4	7.8	11.85	-9.9	12:26:31	55	-82.9	2.9	2.7		
5+00 E	-16.8	8.8	11.91	-9.5	12:27:32FENC	55	-88.2	1.9	2.4		
5+25 E	-15.8	9.5	11.90	-9.0	12:28:34	56	-81.6	-0.6	0.6		
5+50 E	-14.8	9.9	12.01	-8.4	12:29:26	56	-80.3	-2.0	-1.3		
5+75 E	-17.1	10.2	12.01	-9.7	12:30:10	54	-66.2	-0.4	-1.2		
6+00 E	-21.7	10.2	11.91	-12.2	12:30:57	55	-81.5	4.5	2.0		
6+25 E	-31.2	8.8	11.72	-17.3	12:31:51	45	-85.7	11.4	7.9		
#58	-17.5	8.5	11.97	-9.9	12:33:53TIE	55	-89.7	!			
#59	-16.0	9.5	11.25	-9.1	12:38:23TIE	44	-71.8	!			
#60	-6.4	4.7	10.66	-3.7	12:42:24TIE	57	-84.3	!			

LINE 1
VLF DATA
ANNAPOLIS

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:22:39

LINE 1
VLF DATA
ANNAPOLIS STATION

Line 1+00 N Date 14 OCT 88 21.4 #32
POSITION VLF - TOTAL FLD = X IN-PHASE = + QUAD = #



← FAULT

LINE 1
VLF DATA
HAWAII

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:19:06

LINE 1
VLF DATA
HAWAII STATION

Line 1+00 N Date 14 OCT 88 23.4 #32

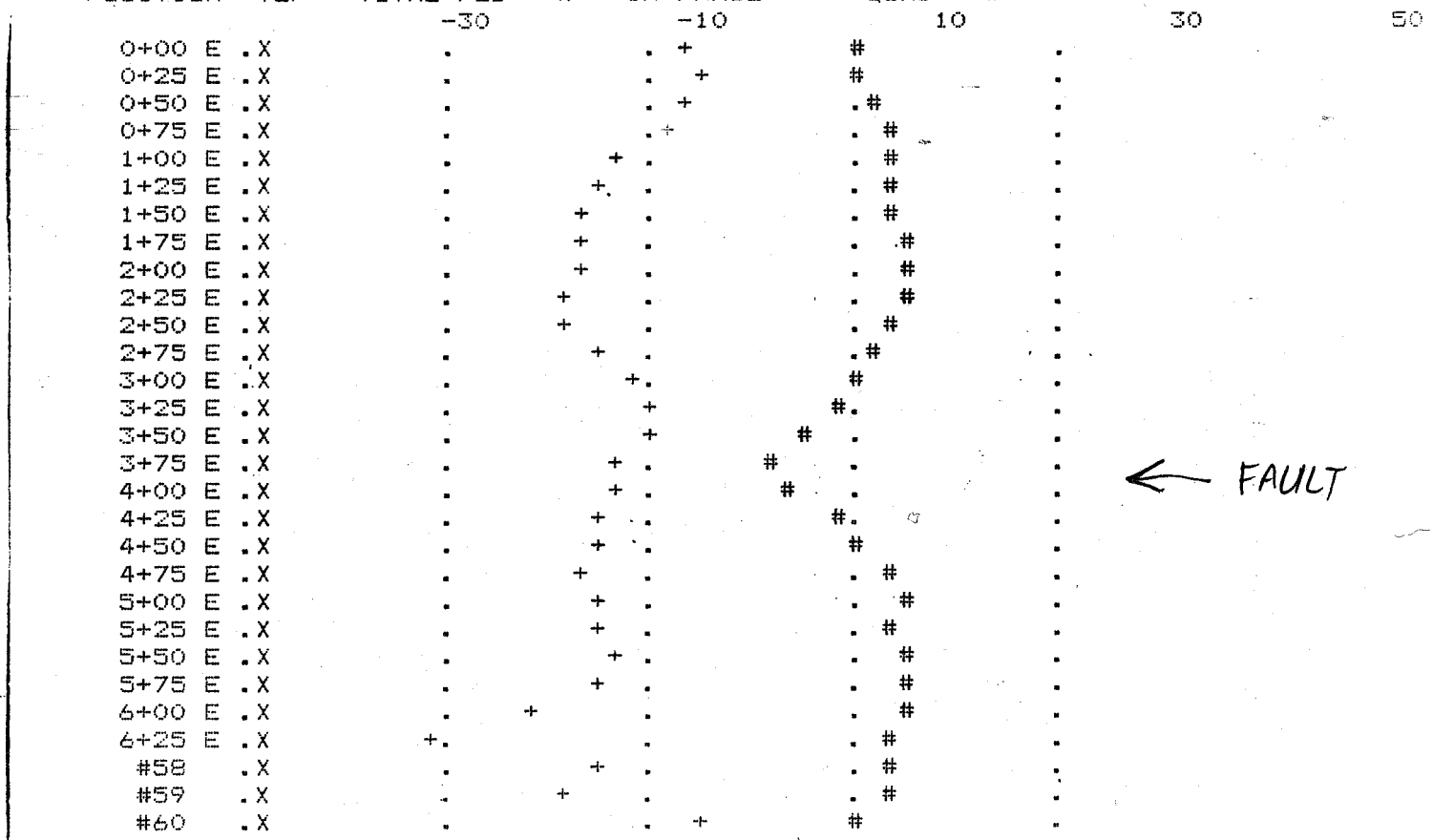
POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT	S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-8.0	7.8	7.36	-4.6	12:09:49		53	78.7				
0+25 E	-7.6	7.6	7.61	-4.3	12:11:18		53	-79.7				
0+50 E	-8.6	8.4	7.95	-4.9	12:12:08		64	84.9				
0+75 E	-11.0	9.7	8.14	-6.2	12:13:11		54	77.7	2.2			
1+00 E	-15.8	9.6	8.39	-8.9	12:14:03		67	83.0	5.9	4.0		
1+25 E	-17.2	9.6	8.49	-9.7	12:14:50		56	70.6	7.5	6.7		
1+50 E	-17.5	10.3	8.61	-9.9	12:15:34		55	77.1	4.5	6.0		
1+75 E	-17.6	11.5	8.75	-10.0	12:16:18		56	73.9	1.3	2.9		
2+00 E	-18.9	11.5	8.73	-10.7	12:17:05		58	68.2	1.1	1.2		
2+25 E	-19.4	12.0	8.78	-11.0	12:17:51		58	68.4	1.8	1.4		
2+50 E	-19.5	10.7	8.95	-11.0	12:18:43		54	77.1	1.3	1.5		
2+75 E	-17.3	9.5	9.00	-9.8	12:19:29		54	77.5	-0.9	0.2		
3+00 E	-13.8	7.4	8.77	-7.9	12:20:16		44	72.4	-4.3	-2.6		
3+25 E	-12.3	5.2	8.43	-7.0	12:21:10		53	83.6	-5.9	-5.1		
3+50 E	-11.8	2.2	8.10	-6.7	12:22:05		54	83.1	-4.0	-5.0		
3+75 E	-14.6	-0.1	8.10	-8.3	12:22:57		54	68.0	0.1	-2.0		
4+00 E	-15.8	1.4	8.37	-9.0	12:23:47		55	74.5	3.6	1.8		
4+25 E	-16.3	4.9	8.87	-9.2	12:24:41		55	-87.7	3.2	3.4		
4+50 E	-17.4	7.3	9.39	-9.8	12:25:28		55	-81.0	1.7	2.4		
4+75 E	-18.4	9.7	9.74	-10.4	12:26:31		55	77.8	2.0	1.8		
5+00 E	-16.7	11.3	9.78	-9.5	12:27:32	FENC	56	72.9	0.9	1.4		
5+25 E	-16.4	11.0	9.92	-9.3	12:28:34		57	78.4	-1.4	-0.3		
5+50 E	-15.2	11.4	9.89	-8.6	12:29:26		56	79.2	-2.0	-1.7		
5+75 E	-17.4	12.4	10.07	-9.9	12:30:10		55	-86.0	-0.3	-1.2		
6+00 E	-22.8	12.1	10.05	-12.8	12:30:57		59	77.7	4.8	2.2		
6+25 E	-32.5	10.8	9.89	-18.0	12:31:51		49	73.0	12.3	8.5		
#58	-17.0	10.9	9.98	-9.6	12:33:53	TIE	59	70.1	!			
#59	-19.6	10.3	9.41	-11.1	12:38:23	TIE	44	86.7	!			
#60	-7.7	6.8	8.05	-4.4	12:42:24	TIE	58	72.6	!			

LINE 1
VLF DATA
HAWAII

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:24:46

LINE 1
VLF DATA
HAWAII STATION

Line 1+00 N Date 14 OCT 88 23.4 #32
POSITION VLF - TOTAL FLD = X IN-PHASE = + QUAD = #



← FAULT

LINE 1
VLF DATA
SEATTLE

CONTROLS Tie-line MAG/VLF R22K Ser #2e102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.46 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:16:45

LINE 1
VLF DATA
Seattle Station

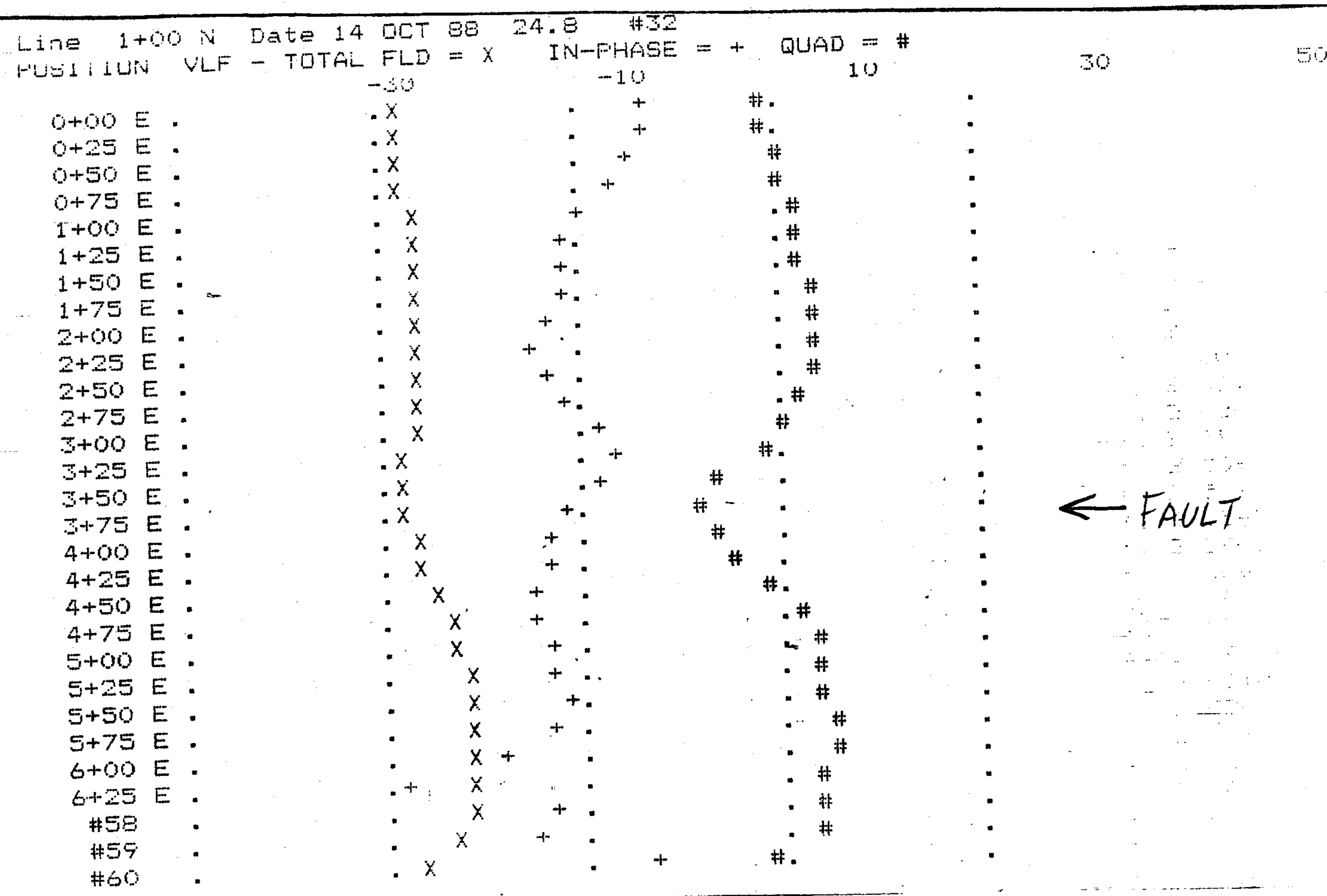
Line 1+00 N Date 14 OCT 88 24.8 #32

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT	S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-6.0	5.8	93.85	-3.4	12:09:49		69	-79.9				
0+25 E	-6.0	5.9	94.01	-3.4	12:11:18		57	-59.7				
0+50 E	-6.4	6.8	94.57	-3.6	12:12:08		59	-73.8				
0+75 E	-8.2	7.7	94.85	-4.7	12:13:11		59	-82.8	1.5			
1+00 E	-11.8	8.1	97.13	-6.7	12:14:03		59	-77.9	4.4	2.9		
1+25 E	-13.6	8.1	97.55	-7.7	12:14:50		59	87.9	6.1	5.2		
1+50 E	-14.1	8.2	98.75	-8.0	12:15:34		59	-85.0	4.3	5.2		
1+75 E	-13.9	9.8	99.68	-7.9	12:16:18		59	-88.1	1.5	2.9		
2+00 E	-15.2	10.3	100.3	-8.6	12:17:05		59	87.0	0.8	1.1		
2+25 E	-16.1	10.9	99.53	-9.1	12:17:51		59	83.3	1.8	1.3		
2+50 E	-15.4	10.2	101.3	-8.7	12:18:43		59	-85.9	1.3	1.5		
2+75 E	-13.8	9.2	101.3	-7.9	12:19:29		58	-85.7	-1.1	0.1		
3+00 E	-10.8	7.9	98.31	-6.2	12:20:16		58	89.6	-3.7	-2.4		
3+25 E	-9.5	5.5	95.29	-5.4	12:21:10		58	-79.9	-5.0	-4.4		
3+50 E	-10.6	1.5	92.84	-6.0	12:22:05		58	-79.4	-2.7	-3.9		
3+75 E	-12.8	-0.1	93.04	-7.3	12:22:57		59	86.8	1.7	-0.5		
4+00 E	-14.3	0.7	96.65	-8.1	12:23:47		59	-88.2	4.0	2.8		
4+25 E	-14.7	3.1	101.4	-8.3	12:24:41		56	-70.1	3.1	3.5		
4+50 E	-16.0	5.3	108.2	-9.1	12:25:28		55	-64.1	2.0	2.5		
4+75 E	-16.5	8.5	112.5	-9.4	12:26:31		59	-87.1	2.1	2.0		
5+00 E	-15.4	9.7	115.7	-8.7	12:27:32	FENC	59	87.7	0.7	1.4		
5+25 E	-14.3	9.9	116.6	-8.1	12:28:34		59	-86.4	-1.7	-0.5		
5+50 E	-13.3	10.8	117.3	-7.6	12:29:26		59	-84.6	-2.4	-2.1		
5+75 E	-15.4	11.3	119.4	-8.7	12:30:10		56	-70.1	-0.5	-1.5		
6+00 E	-20.3	11.7	118.4	-11.4	12:30:57		59	-86.9	4.4	1.9		
6+25 E	-30.0	10.3	118.5	-16.7	12:31:51		47	88.9	11.8	8.1		
#58	-15.4	9.8	121.8	-8.7	12:33:53	TIE	59	86.1	!			
#59	-15.9	10.8	112.4	-9.0	12:38:23	TIE	47	-75.6	!			
#60	-6.3	6.3	101.5	-3.6	12:42:24	TIE	59	-86.2	!			

LINE 1
VLF DATA
SEATTLE

LINE 1
VLF DATA
Seattle Station

[illegible] Tie-line MAG/VLF [illegible] Ser #2e102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 67
Bat: 17.2 Volt Lithium: 3.46 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:21:25



LINE 2
MAG DATA

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
TOTAL FIELD DATA (uncorrected)

LINE 2
MAG DATA

Reference field: 56800.0
Datum subtracted: 0.0Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:14:27

Line 2+00 N Date 14 OCT 88 #61

POSITION	FIELD	ERR	DRIFT	TIME	DS	FIELD=X GRAD=+
0+00 E	57562.4	.02	0.0	13:21:54	88	. X +. .
0+25 E	57618.0	.02	0.0	13:23:12	88	. . X+. .
0+50 E	57569.3	.05	0.0	13:24:22	88	. X +. .
0+75 E	57579.9	.02	0.0	13:25:17	88	. .X +. .
1+00 E	57579.2	.03	0.0	13:25:54	88	. .X +. .
1+25 E	57586.4	.03	0.0	13:26:37	88	. .X +. .
1+50 E	57599.0	.02	0.0	13:27:40	88	. . X +. .
1+75 E	57607.0	.02	0.0	13:28:29	88	. . X +. .
2+00 E	57615.3	.03	0.0	13:29:16	88	. . X+. .
2+25 E	57622.0	.02	0.0	13:30:52	88	. . X+. .
2+50 E	57603.2	.03	0.0	13:31:59	88	. . X +. .
2+75 E	57620.6	.02	0.0	13:33:03	88	. . X+. .
3+00 E	57614.9	.02	0.0	13:33:57	88	. . X+. .
3+25 E	57590.9	.02	0.0	13:34:49	88	. . X +. .
3+50 E	57572.5	.02	0.0	13:35:54	88	. X +. .
3+75 E	57549.3	.02	0.0	13:36:56	88	. X. +. .
4+00 E	57397.6	1.9	0.0	13:37:44	88	. . +. .
4+25 E	58301.0	.03	0.0	13:40:13	88X	. . +. .
4+50 E	57613.9	.02	0.0	13:41:54	88	. . X +. .
4+75 E	57546.7	.03	0.0	13:42:41	88	. X. +. .
5+00 E	57551.8	.02	0.0	13:43:27	88	. X. +. .
5+25 E	57548.8	.03	0.0	13:44:14	88	. X. +. .
5+50 E	57559.3	.03	0.0	13:45:25	88	. X. +. .
5+75 E	57557.0	.02	0.0	13:46:10	88	. X. +. .
6+00 E	57560.0	.02	0.0	13:47:03	88	. X. +. .
6+25 E	57565.6	.03	0.0	13:47:49	88	. X +. .
#87	57552.1	.02	0.0	13:50:56	88	. X. +. .
#88	57621.3	.02	0.0	13:54:34	88	. . X+. .
#89	57565.6	.03	0.0	13:58:53	88	. X +. .

Fault?
X
Fault?

EOF

LINE 2
VLF DATA
ANNAPOLIS

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:17:55

LINE 2
VLF DATA
Annapolis Station

Line 2+00 N Date 14 OCT 88 21.4 #61

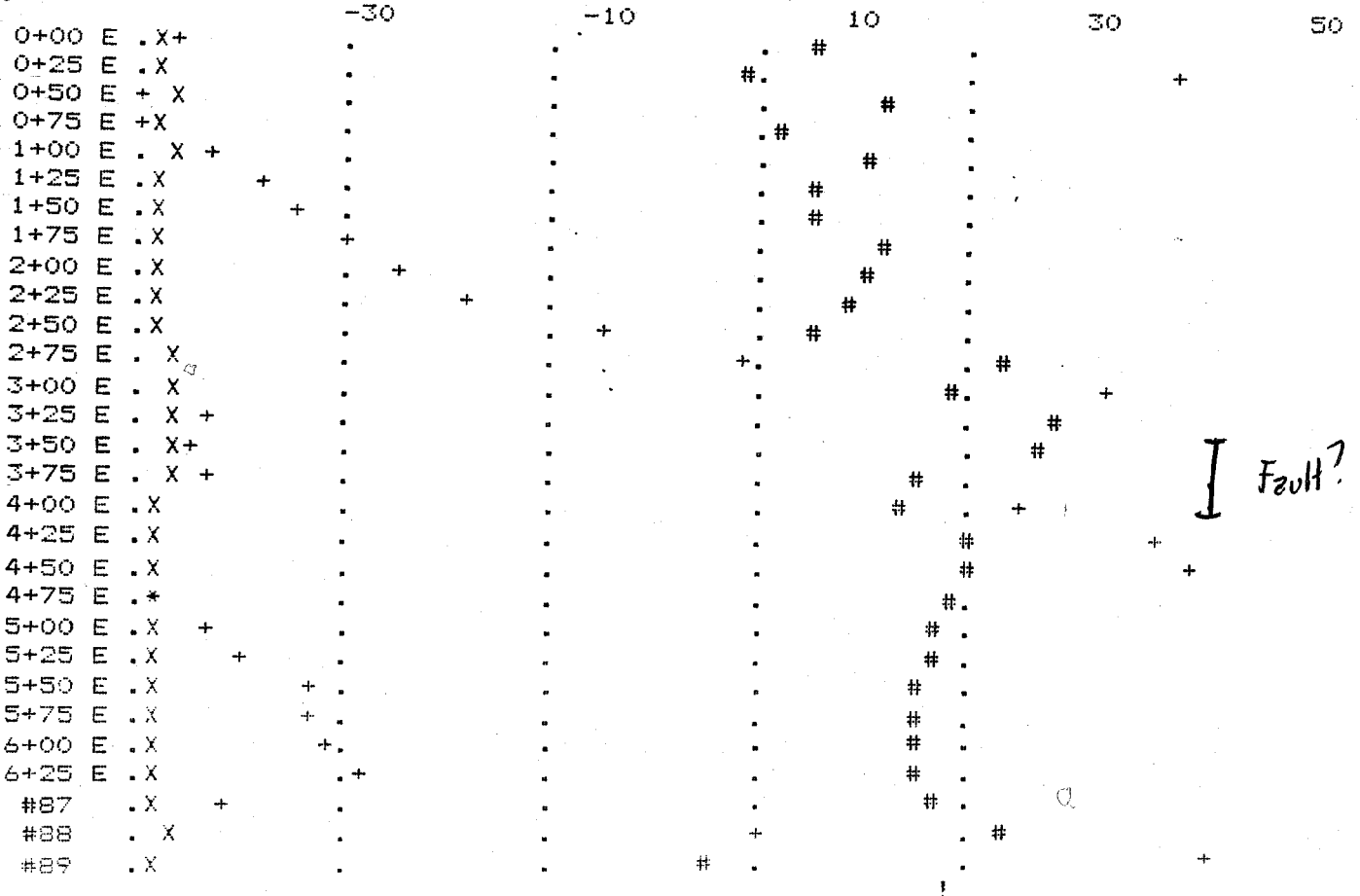
POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT	S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-47.1	11.6	10.52	-25.2	13:21:54		59	43.0				
0+25 E	-55.1	5.9	10.12	-28.8	13:23:12		49	42.0				
0+50 E	-50.6	17.6	11.07	-26.8	13:24:22	POST	59	40.4				
0+75 E	-49.4	8.4	10.28	-26.3	13:25:17		49	48.5	-0.9			
1+00 E	-42.9	17.3	10.64	-23.2	13:25:54		49	41.7	-6.1	-3.5		
1+25 E	-38.9	12.0	9.84	-21.3	13:26:37		59	44.3	-8.6	-7.4		
1+50 E	-35.2	11.3	9.65	-19.4	13:27:40		49	43.6	-8.8	-8.7		
1+75 E	-30.8	18.1	10.24	-17.1	13:28:29		59	41.5	-8.0	-8.4		
2+00 E	-26.6	15.9	10.08	-14.9	13:29:16		59	41.7	-8.7	-8.4		
2+25 E	-20.6	15.3	9.92	-11.6	13:30:52		49	42.2	-10.0	-9.4		
2+50 E	-6.7	11.6	9.79	-3.8	13:31:59		49	38.6	-16.6	-13.3		
2+75 E	-94.7	29.5	12.94	-43.4	13:33:03	ROAD	49	38.8	20.7	2.0		
3+00 E	-60.8	25.0	10.66	-31.3	13:33:57		48	43.2	59.3	40.0		
3+25 E	-43.4	34.3	11.17	-23.4	13:34:49		59	40.3	7.5	33.4		
3+50 E	-45.1	33.0	11.42	-24.3	13:35:54	CABL	59	40.9	-27.0	-9.8		
3+75 E	-44.0	22.1	10.62	-23.7	13:36:56		59	44.3	-6.7	-16.9		
4+00 E	-69.8	20.3	10.28	-34.9	13:37:44	HYDR	49	52.7	10.9	2.1		
4+25 E	-57.0	26.4	10.38	-29.7	13:40:13	CREC	49	47.4	16.6	13.7		
4+50 E	-53.9	25.6	10.45	-28.3	13:41:54		49	47.1	-0.6	8.0		
4+75 E	-48.7	24.4	10.24	-26.0	13:42:41		59	47.6	-10.3	-5.5		
5+00 E	-43.4	23.1	9.97	-23.4	13:43:27		49	46.3	-8.6	-9.5		
5+25 E	-40.0	23.1	9.59	-21.8	13:44:14	ROAD	49	47.8	-9.1	-8.9		
5+50 E	-34.9	21.8	9.85	-19.2	13:45:25		49	44.2	-8.4	-8.8		
5+75 E	-34.8	21.3	9.61	-19.1	13:46:10		49	43.3	-6.9	-7.7		
6+00 E	-32.7	21.7	9.53	-18.1	13:47:03		49	43.3	-3.8	-5.4		
6+25 E	-29.9	21.3	9.97	-16.6	13:47:49	ROAD	49	42.2	-3.6	-3.7		
#87	-41.8	23.6	9.47	-22.7	13:50:56	TIE	49	47.1	!			
#88	-92.7	29.7	11.59	-42.8	13:54:34	TIE	49	38.5	!			
#89	-52.0	1.9	8.37	-27.4	13:58:53	TIE	49	42.3	!			

LINE 2
VLF DATA
ANNAPOLIS

LINE 2
VLF DATA
Annapolis Station

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:22:39

Line 2+00 N Date 14 OCT 88 21.4 #61
POSITION VLF - TOTAL FLD = X IN-PHASE = + QUAD = #



LINE 2
VLF DATA
HAWAII

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:19:06

LINE 2
VLF DATA
Hawaii Station

Line 2+00 N Date 14 OCT 88 23.4 #61

POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT	S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-32.0	6.9	9.52	-17.7	13:21:54		59	30.0				
0+25 E	-32.8	8.7	9.52	-18.1	13:23:12		49	27.7				
0+50 E	-29.3	11.6	9.64	-16.3	13:24:22	POST	59	26.5				
0+75 E	-25.8	10.7	9.34	-14.4	13:25:17		59	31.9	-5.1			
1+00 E	-22.6	12.8	9.55	-12.7	13:25:54		49	28.7	-7.3	-6.2		
1+25 E	-17.2	15.2	9.42	-9.7	13:26:37		59	29.1	-8.3	-7.8		
1+50 E	-12.7	16.1	9.51	-7.2	13:27:40		55	25.2	-10.2	-9.3		
1+75 E	-11.4	16.7	9.69	-6.5	13:28:29		59	26.4	-8.7	-9.5		
2+00 E	-8.4	17.8	9.70	-4.8	13:29:16		59	26.1	-5.6	-7.2		
2+25 E	-4.2	18.6	9.69	-2.4	13:30:52		59	26.2	-6.5	-6.1		
2+50 E	7.6	18.8	9.93	4.3	13:31:59		46	24.5	-13.2	-9.9		
2+75 E	-63.2	19.3	11.90	-32.3	13:33:03	ROAD	49	23.8	20.8	3.8		
3+00 E	-37.0	24.0	10.29	-20.3	13:33:57		49	28.5	54.5	37.6		
3+25 E	-28.3	27.7	10.73	-15.8	13:34:49		59	25.6	8.1	31.3		
3+50 E	-33.6	26.1	10.99	-18.6	13:35:54	CABL	59	26.4	-18.2	-5.1		
3+75 E	-33.1	22.4	10.95	-18.3	13:36:56		59	27.9	0.8	-8.7		
4+00 E	-33.3	33.7	10.79	-18.4	13:37:44	HYDR	49	31.1	2.3	1.5		
4+25 E	-37.2	28.9	10.49	-20.4	13:40:13	CREC	49	32.3	1.9	2.1		
4+50 E	-37.2	29.7	10.39	-20.4	13:41:54		59	31.8	4.1	3.0		
4+75 E	-33.9	27.7	10.18	-18.7	13:42:41		59	31.4	0.3	2.2		
5+00 E	-31.1	26.0	10.15	-17.3	13:43:27		49	31.1	-4.8	-2.3		
5+25 E	-28.9	24.5	9.84	-16.1	13:44:14	ROAD	49	31.9	-5.7	-5.3		
5+50 E	-26.3	23.6	9.99	-14.7	13:45:25		49	29.3	-5.2	-5.5		
5+75 E	-26.5	22.4	9.94	-14.8	13:46:10		59	27.9	-3.9	-4.6		
6+00 E	-25.3	20.6	9.88	-14.2	13:47:03		49	27.2	-1.8	-2.9		
6+25 E	-24.7	19.6	9.84	-13.8	13:47:49	ROAD	59	26.2	-1.5	-1.7		
#87	-30.9	25.0	10.12	-17.2	13:50:56	TIE	49	32.6	!			
#88	-66.5	23.1	11.96	-33.6	13:54:34	TIE	49	25.3	!			
#89	-33.6	8.6	9.28	-18.5	13:58:53	TIE	49	28.9	!			

EOF

LINE 2
VLF DATA
HAWAII

LINE 2
VLF DATA
Hawaii Stat[illegible]

```
OMNI-PLUS  Tie-line MAG/VLF R22K  Ser  #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator:  3333
Records:   89
Bat:  17.2 Volt    Lithium:  3.48 Volt
Last time update: 10/12 10:08:00
Start  of  print: 10/14 15:24:46
```

```
Line  2+00 N  Date 14 OCT 88  23.4   #61
POSITION  VLF - TOTAL FLD = X   IN-PHASE = +   QUAD = #
                          -30          -10           10           30           50
  0+00 E .X          +.              .             #              .
  0+25 E .X          +.              .             .#             .
  0+50 E .X           .+             .             .  #           .
  0+75 E .X           .  +           .             . #            .
  1+00 E .X           .    +         .             .   #          .
  1+25 E .X           .      +       .             .    #         .
  1+50 E .X           .        +.    .             .     #        .
  1+75 E .X           .         +    .             .     #        .
  2+00 E .X           .          .+  .             .      #       .
  2+25 E .X           .           .    +           .      #       .
  2+50 E .X           .           .               +      #       .
  2+75 E . X          .           .               .       #      .          +
  3+00 E .X       +   .           .               .              #.
  3+25 E . X          .  +        .               .               .#
  3+50 E . X        + .           .               .               #
  3+75 E . X         +.           .               .              #  .
  4+00 E . X         +.           .               .                .        #
  4+25 E .X       +   .           .               .                .  #
  4+50 E .X       +   .           .               .                .  #
  4+75 E .X         + .           .               .                .#
  5+00 E .X           +           .               .                #
  5+25 E .X           .+          .               .                #.
  5+50 E .X           .  +        .               .               #  .
  5+75 E .X           .  +        .               .               #  .
  6+00 E .X           .    +      .               .            #     .
  6+25 E .X           .    +      .               .            #     .
   #87   .X           +           .               .              #.
   #88   . X          .           .               .              #  .          +
   #8?   .X         + .           .               .#               .

EOF
```

Fault?

LINE 2
VLF DATA
SEATTLE

OMNI-PLUS Tie-line MAG/VLF R22K Ser #26102
VLF TOTAL FIELD DATA (uncorrected)
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.48 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:16:45

LINE 2
VLF data
Seattle Station

Line 2+00 N Date 14 OCT 88 24.8 #61

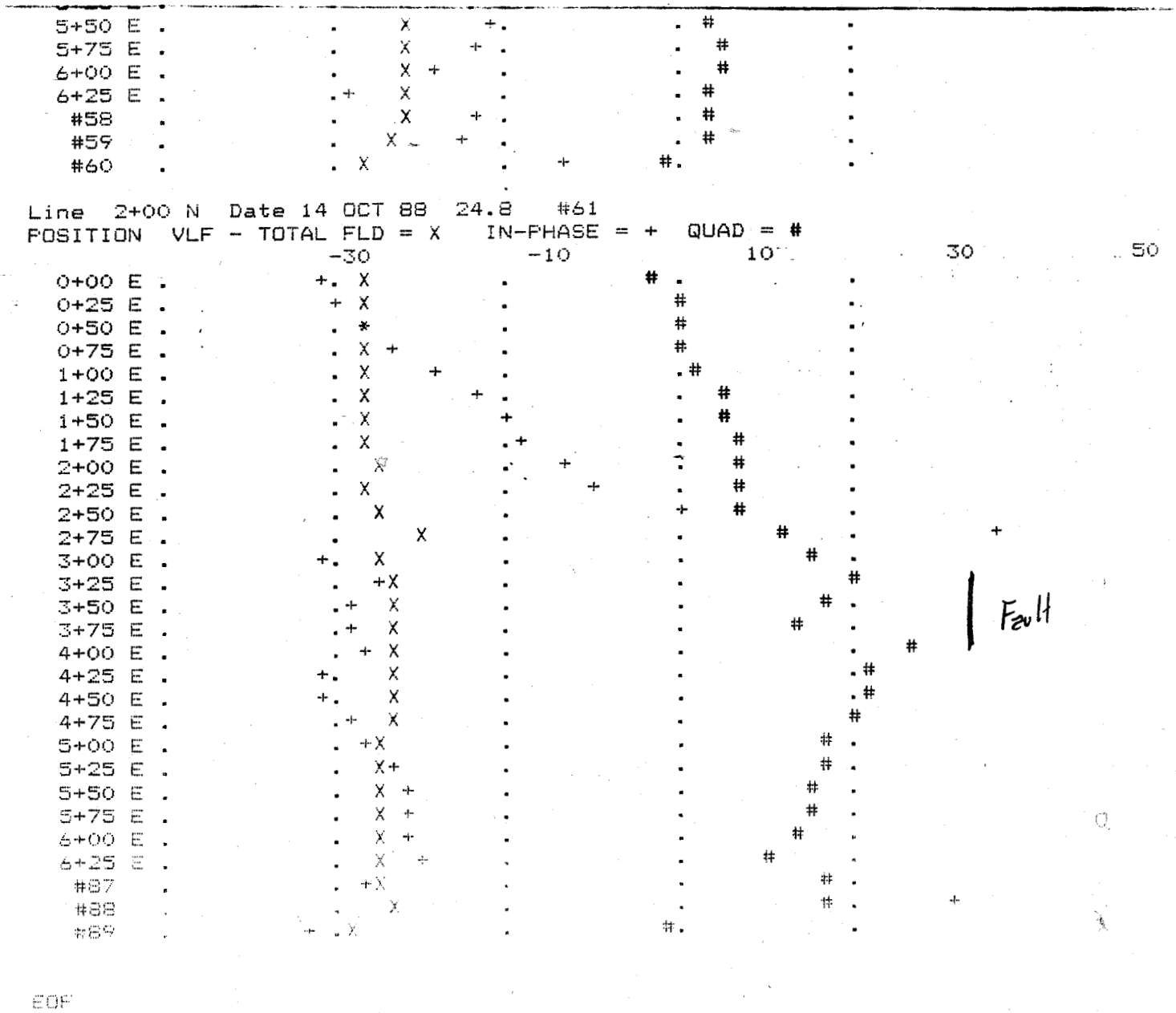
POSITION	I/P	QUAD	T.FLD	TILT	TIME	CULT	S	DIR	4-FRA	5-FRA	RESIS	PHASE
0+00 E	-32.5	3.7	98.25	-18.0	13:21:54		59	28.4				
0+25 E	-31.7	6.5	98.94	-17.6	13:23:12		49	28.1				
0+50 E	-27.5	7.9	98.85	-15.4	13:24:22	POST	49	26.2				
0+75 E	-24.9	7.8	101.6	-14.0	13:25:17		59	35.1	-6.2			
1+00 E	-20.1	8.9	100.2	-11.3	13:25:54		49	28.2	-7.7	-7.0		
1+25 E	-15.5	11.4	99.51	-8.8	13:26:37		59	30.8	-9.3	-8.5		
1+50 E	-12.1	12.1	102.4	-6.9	13:27:40		49	28.4	-9.6	-9.5		
1+75 E	-9.9	13.2	100.6	-5.6	13:28:29		59	28.0	-7.6	-8.6		
2+00 E	-6.0	14.1	103.2	-3.4	13:29:16		59	24.9	-6.7	-7.2		
2+25 E	-3.0	13.9	101.6	-1.7	13:30:52		49	27.9	-7.4	-7.1		
2+50 E	7.4	13.4	105.4	4.2	13:31:59		48	24.2	-11.5	-9.5		
2+75 E	-57.5	17.6	124.4	-29.9	13:33:03	ROAD	49	24.6	20.6	4.5		
3+00 E	-32.0	22.2	109.3	-17.7	13:33:57		49	27.3	50.1	35.3		
3+25 E	-26.9	26.0	114.4	-15.0	13:34:49		59	24.8	7.0	28.5		
3+50 E	-29.3	22.3	116.5	-16.3	13:35:54	CABL	59	26.7	-16.3	-4.7		
3+75 E	-28.9	19.4	114.9	-16.1	13:36:56		49	29.0	-0.3	-8.3		
4+00 E	-27.5	32.7	114.6	-15.4	13:37:44	HYDR	49	31.6	0.2	-0.1		
4+25 E	-32.3	28.1	109.9	-17.9	13:40:13	CREC	49	33.7	0.9	0.5		
4+50 E	-31.8	28.4	110.8	-17.6	13:41:54		59	32.1	4.0	2.4		
4+75 E	-29.6	26.3	109.7	-16.4	13:42:41		59	34.1	0.7	2.3		
5+00 E	-27.0	23.8	106.6	-15.1	13:43:27		49	32.2	-4.0	-1.7		
5+25 E	-24.9	22.7	104.3	-14.0	13:44:14	ROAD	49	33.4	-4.9	-4.5		
5+50 E	-23.7	21.5	105.0	-13.3	13:45:25		49	29.0	-4.2	-4.6		
5+75 E	-23.3	20.9	104.1	-13.1	13:46:10		49	29.0	-2.7	-3.5		
6+00 E	-23.3	19.6	104.5	-13.1	13:47:03		49	28.7	-1.1	-1.9		
6+25 E	-21.9	17.1	103.2	-12.3	13:47:49	ROAD	49	27.0	-1.0	-1.1		
#87	-27.8	23.5	103.0	-15.5	13:50:56	TIE	49	32.5	!			
#88	-63.2	22.4	114.9	-32.3	13:54:34	TIE	59	24.2	!			
#89	-33.8	5.8	90.96	-18.7	13:58:53	TIE	49	29.2	!			

EOF

LINE 2
VLF DATA
SEATTLE

OMNI-PLUS Tie-line P-49/VLF RCVR Ser #26102
VLF TOTAL FIELD DATA (Uncorrected
Date 14 OCT 88
Operator: 3333
Records: 89
Bat: 17.2 Volt Lithium: 3.46 Volt
Last time update: 10/12 10:08:00
Start of print: 10/14 15:21:25

LINE 2
VLF data
Seattle Station



EOF

APPENDIX V

DIAMOND DRILL LOGS

LOG OF DDH GOATFELL 88-1

M.D. NELSON Project GOATFELL Property GOAT Claim GOAT 1

NTS _____ UTM _____, _____ Northing _____ Easting _____ Elevation _____

Collar Azimuth 267° Collar Angle −50° Depth 391 m Date Started July 20, 1988 Date Completed Aug. 2, 1988

Contractor _____ Drill _____

Objective To intersect the Lower - Middle Aldridge time horizon in search of a "Sullivan type" massive sulphide deposit

ORIENTATION TESTS

Depth	Inclination	Azimuth
57'	-52°	267° Az
247'	-50°	265° Az
397	-49°	267° Az
547	-47.5°	267° Az
697	-46.5°	266° Az
847	-45.5°	266° Az
997	-43.8°	265° Az
1347		

CORE SIZE

Depth	Core Size

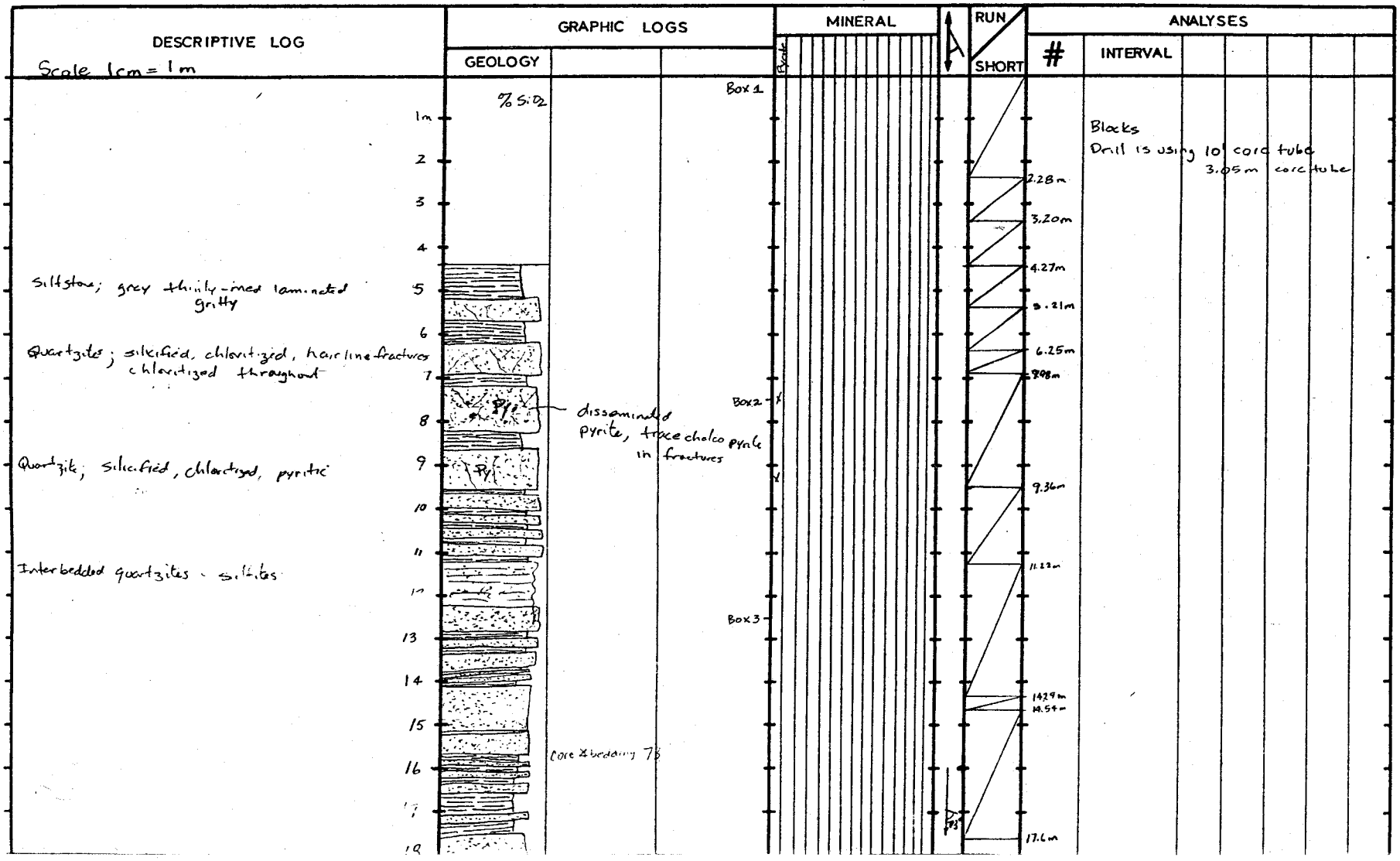
Orientation test instrument _____

CONVENTIONS & SYMBOLS

Logged by G. LEASK.

EDMUNDS & ASSOCIATES
West Vancouver, B.C.

DDH Goat 88-1 CORE SIZE NQ FROM _____ TO _____ LOGGED BY G. LEASK DATE 9/08/88 PAGE 1



DDH Goat 88-1 CORE SIZE NQ FROM _____ TO _____ LOGGED BY G. LEASK DATE Aug 9/88 9/08/88 PAGE 1

DESCRIPTIVE LOG

Scale 1cm = 1m

Bedrock
- massive bedded med grained grey quartzite typical middle aldridge quartzite

- pale green silicified quartzite, still above weathering zone, pyrite is oxidized in fractures

rusty weathering grey-green silicified quartzite

rusty weathering surfaces on fracture planes silicified grey quartzite

minor silty horizons finely laminated siltites.

grey intensely silicified quartzite abundant sericite w/ pyrite dissemination

GRAPHIC LOGS

GEOLOGY

% SiO2

14.1

2 — pale green fracture style silicification texture.

core & bedding 73°

MINERAL

Pyrite

RUN

SHORT

Box 1

Box 2

Box 3

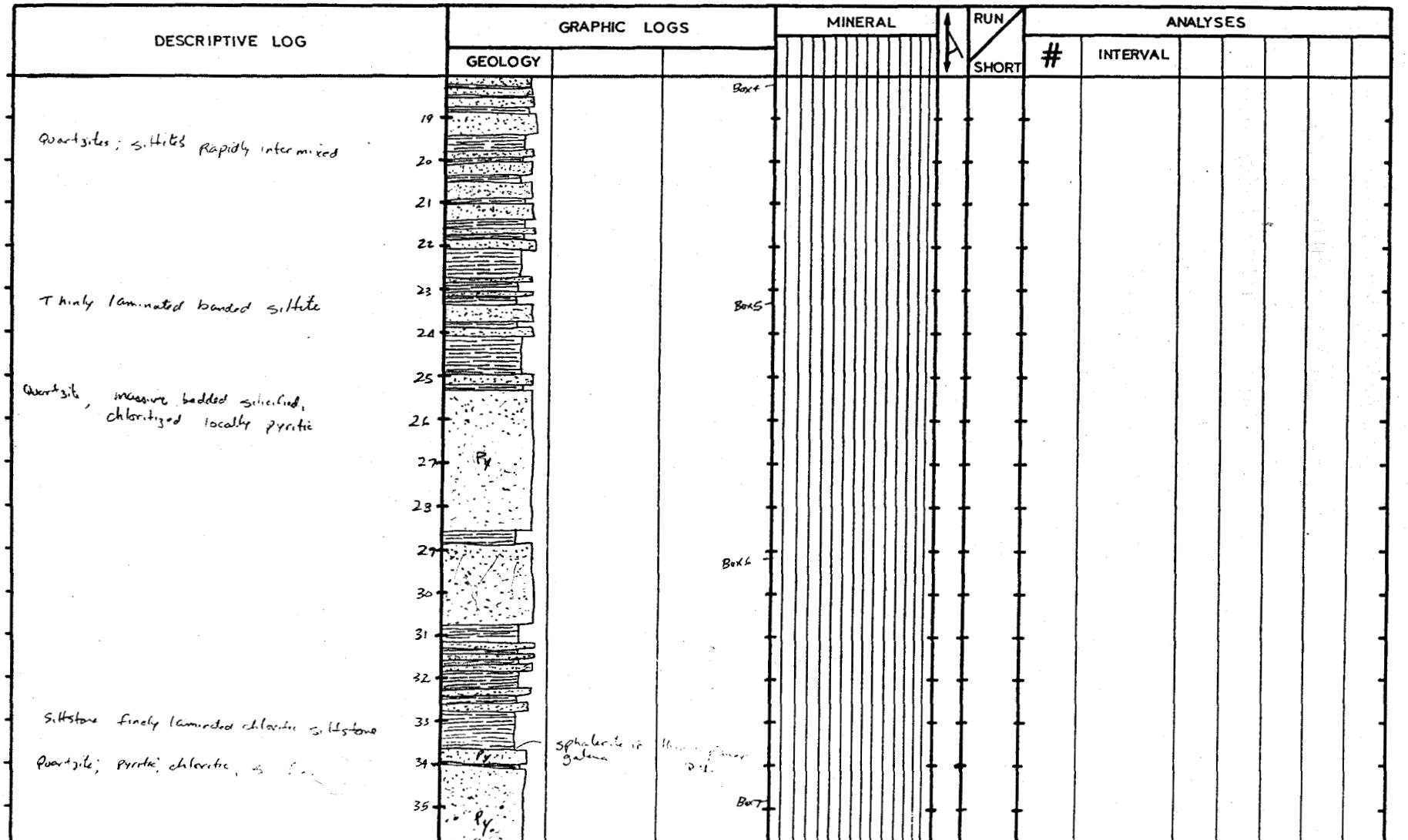
2.28m
3.20m
4.27m
5.21m
6.25m
7.98m
9.36m
11.22m
14.29m
14.54m
17.6m

ANALYSES

| INTERVAL

Blacks
Drill is using 10' core tube
3.05m core tube

DDH GOAT 88-2 CORE SIZE NQ FROM 18m TO 36m LOGGED BY G.LEASK DATE 10/10/88 PAGE 2.

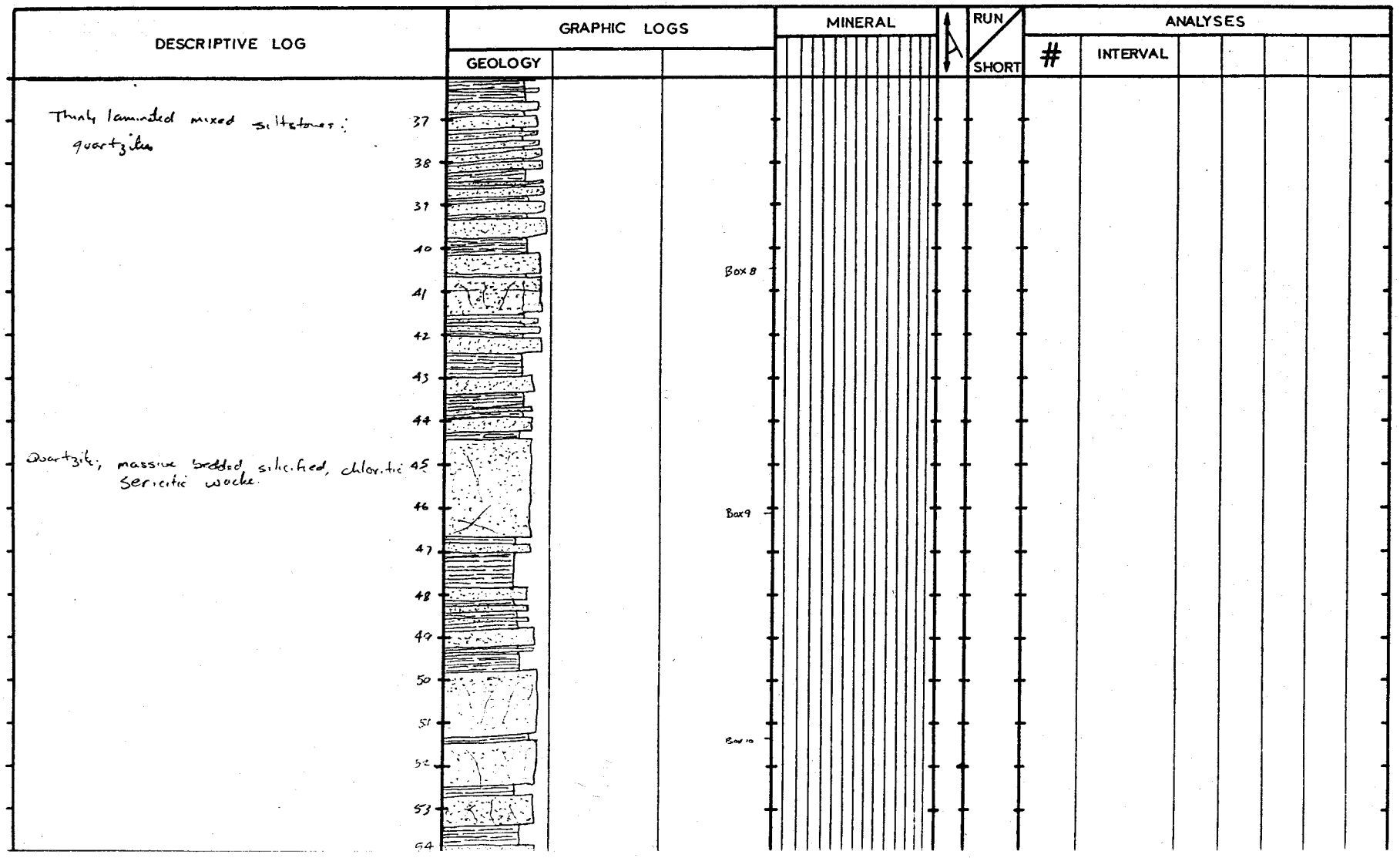


DDH ~~Goat-88-1~~ CORE SIZE NQ FROM 18m TO 36m LOGGED BY G. Leask DATE 9/9/88 PAGE 2

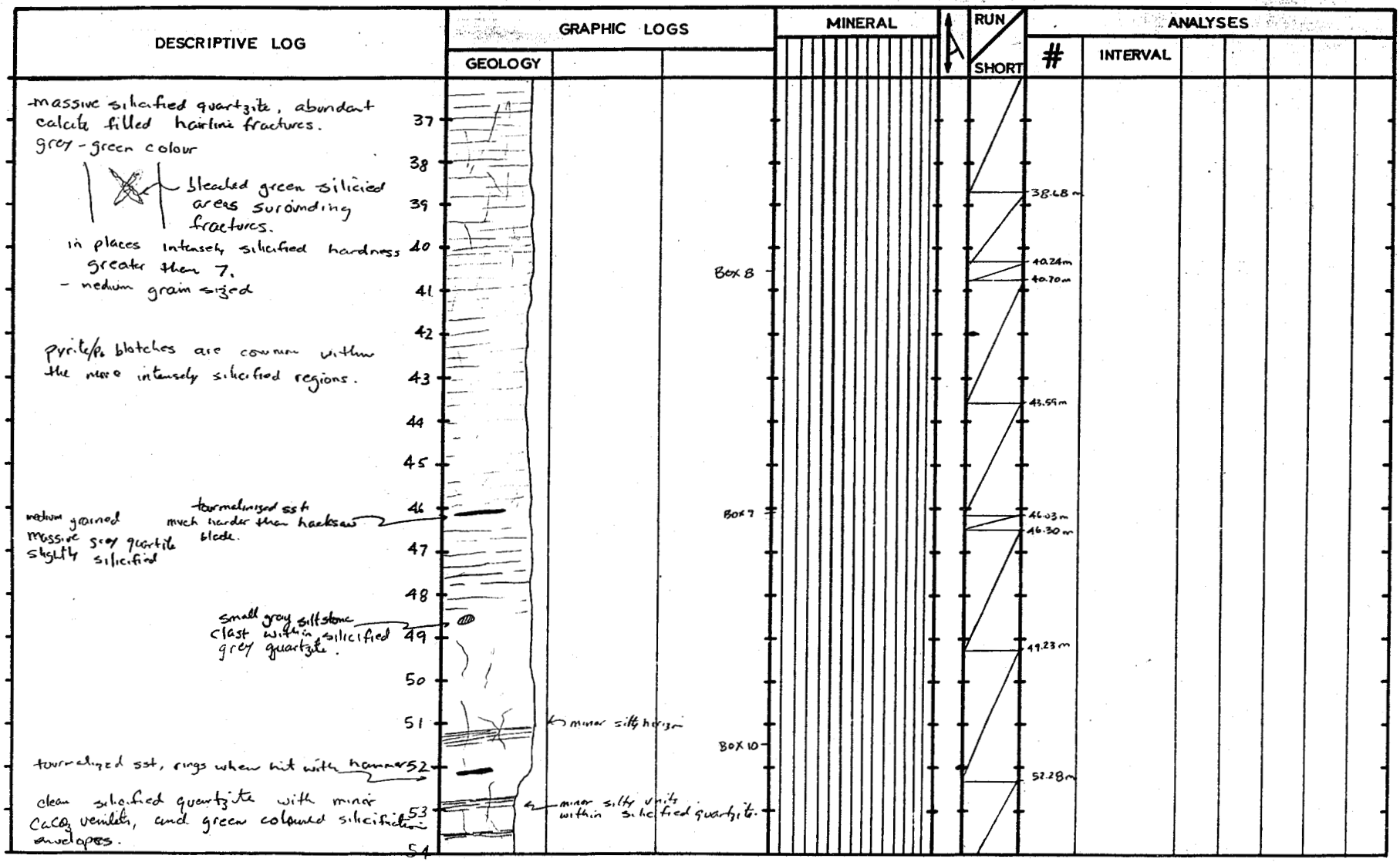
DESCRIPTIVE LOG	GRAPHIC LOGS: GEOLOGY	MINERAL	RUN: SHORT	ANALYSES: #	ANALYSES: INTERVAL
massive bedded medium grained grey quartzite wacke w/ abundant sericite		Box4			
finely laminated siltite w/ Po, Py laminations					
Intensely silicified clean pale green quartz wacke abundant sericite, trace calcite within thin veinlets					
finely laminated grey colored siltstone with minor quartzite interbeds					
massive thick bedded silicified quartzite, chloritized, sericitized grey-green color		Box5			
hairline silicified fractures pale green in color					
finely laminated grey siltite. massive quartzite, with abundant disseminated Pyrite, Po, trace galena and sphalerite (very clean quartzite) ⇒ white	Po, Py, Ga, Sph	Box6			
Grey-green silicified massive quartzite		Box7			

20.33m
22.95m
26m
26.64m
29.66m
32.62m
35.64m

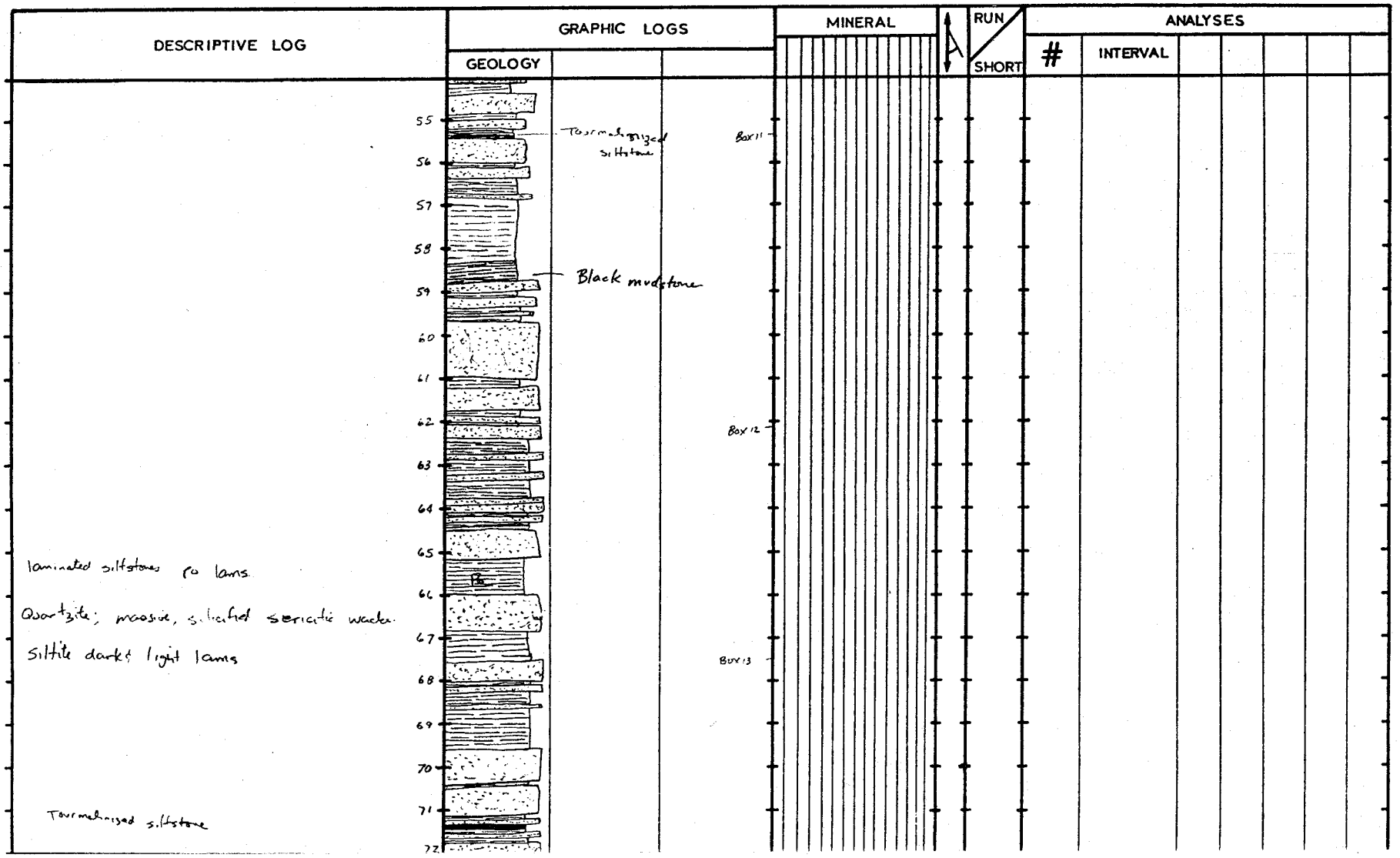
DDH GOAT 88-1 CORE SIZE NQ FROM 36m TO 54m LOGGED BY G. LEASK DATE 10/10/88 PAGE 3



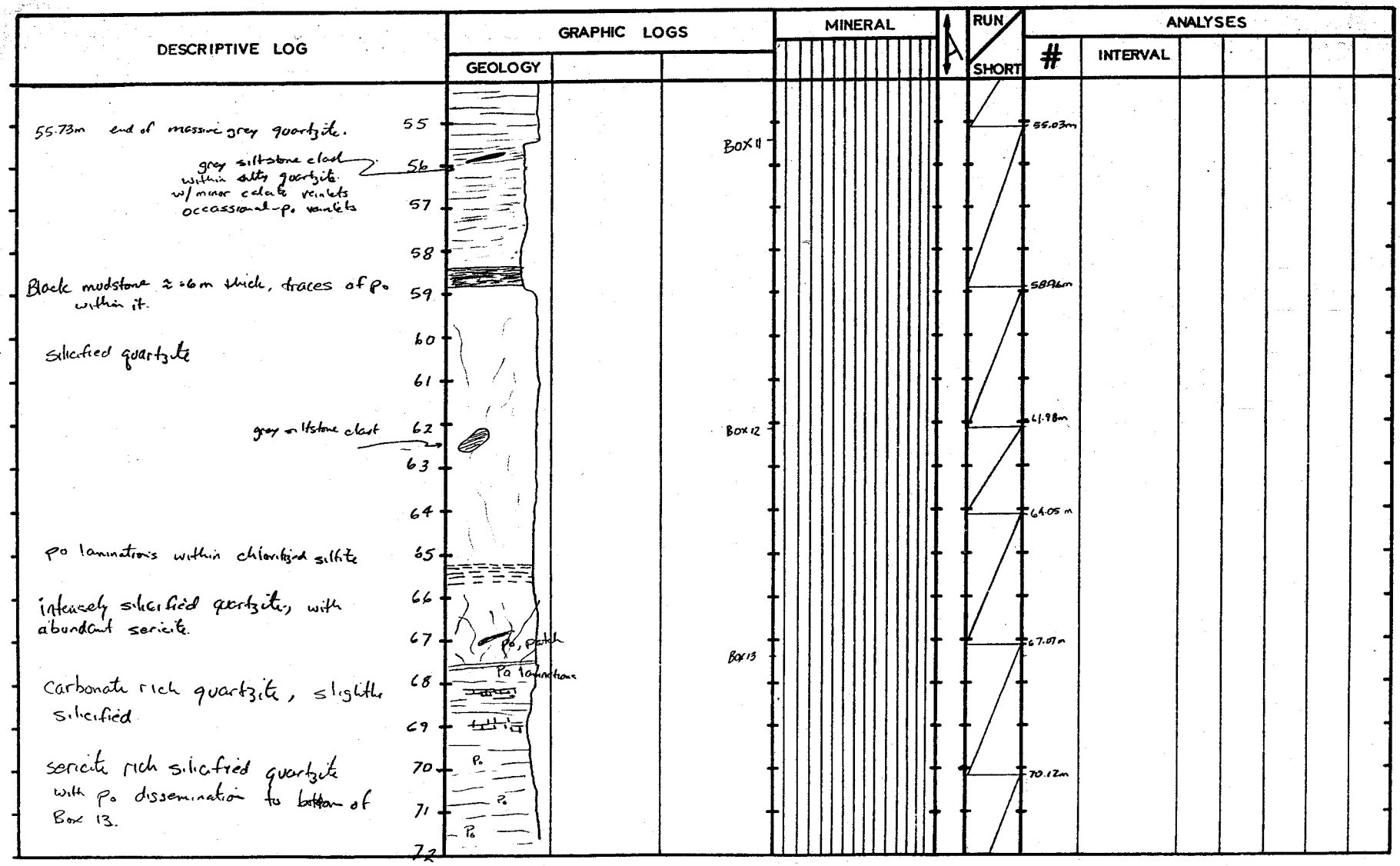
DDH GOAT 88-1 CORE SIZE NQ FROM 36.0m TO 54.0m LOGGED BY G.LEASK DATE 9/08/88 PAGE 3



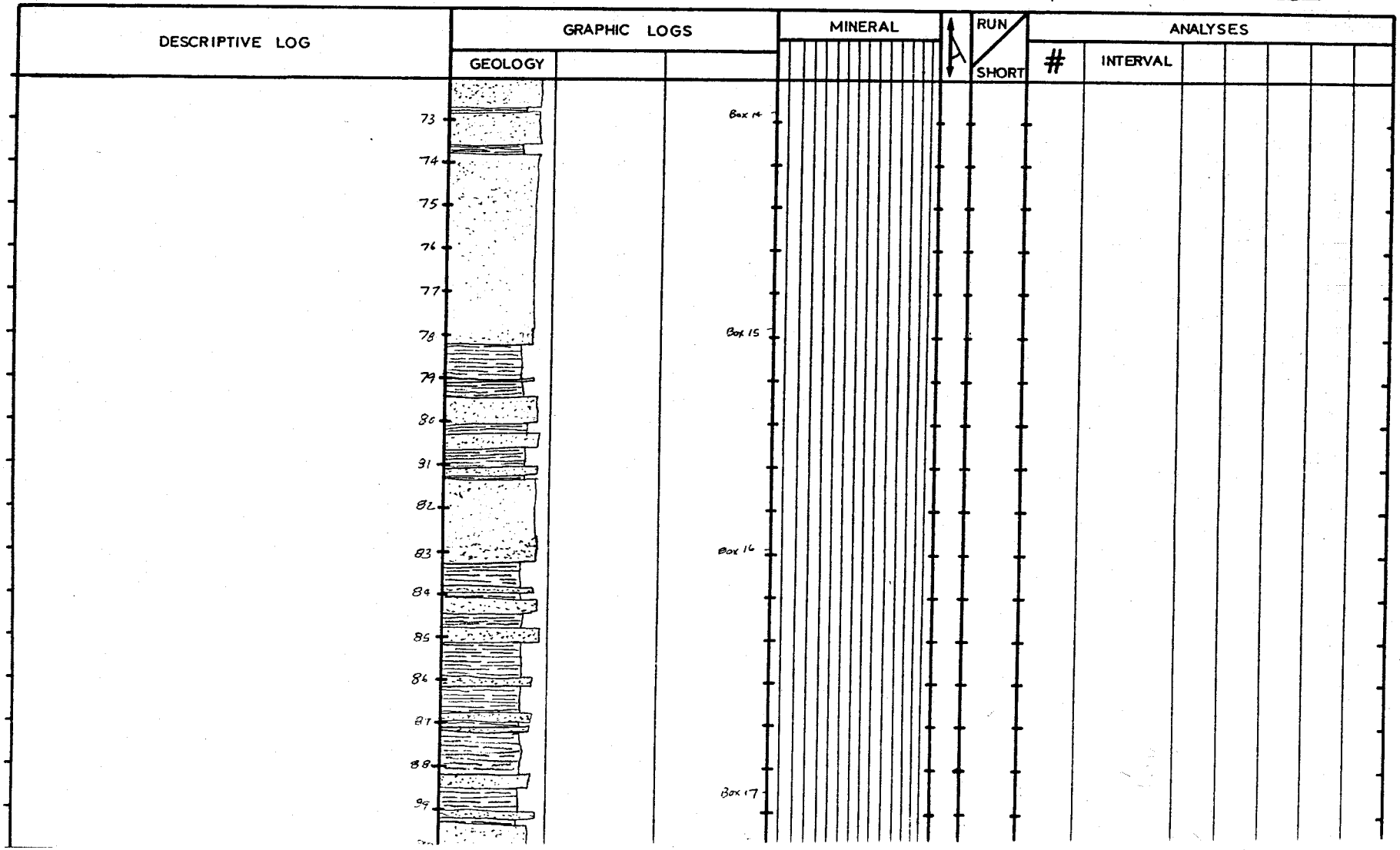
DDH GOAT 88-2 CORE SIZE NQ FROM 54m TO 72m LOGGED BY G. LEASK DATE 10/10/88 PAGE 4



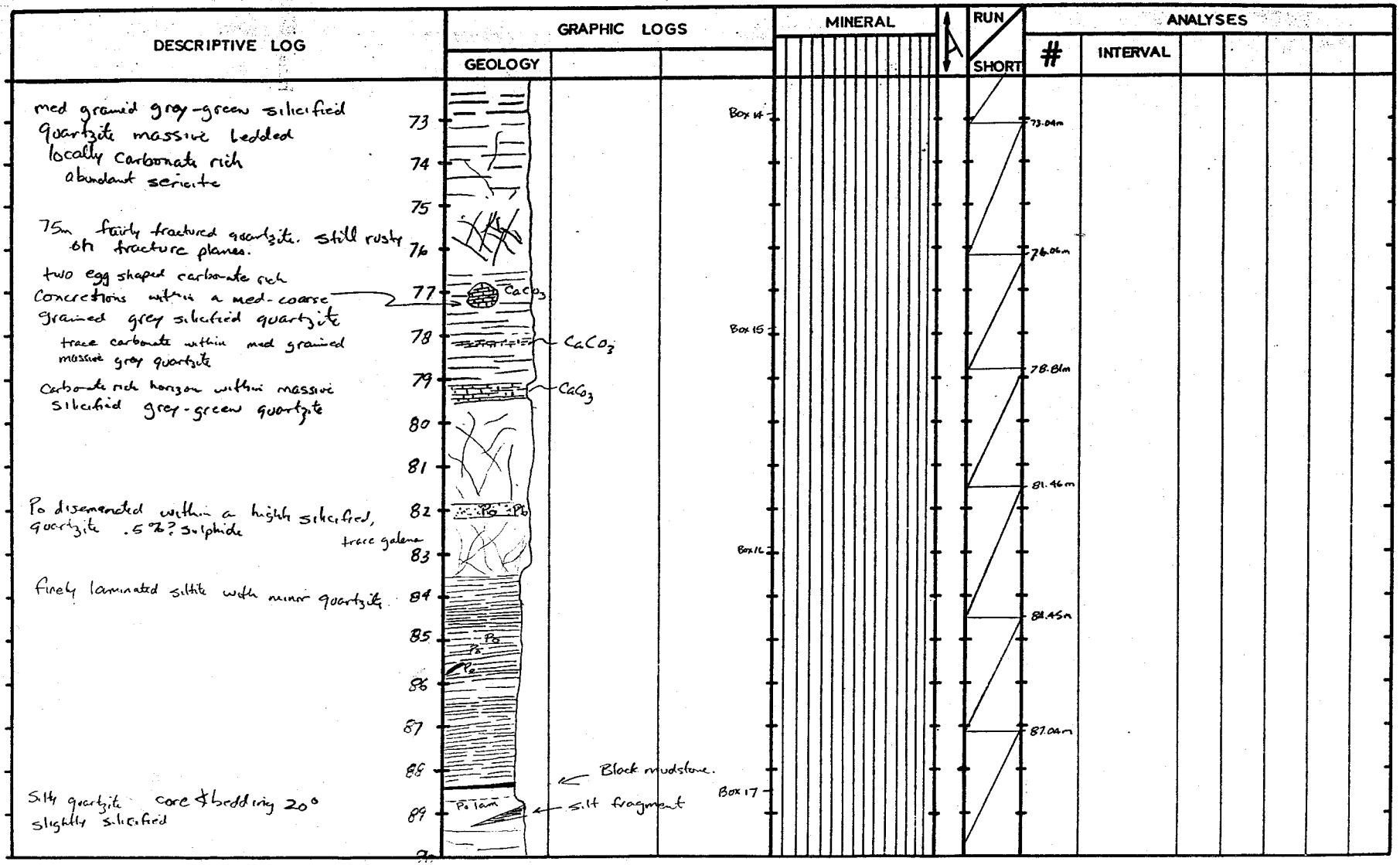
DDH Goat 88-1 CORE SIZE NQ FROM 54m TO 72m LOGGED BY G. LEAK DATE 10/08/88 PAGE 4



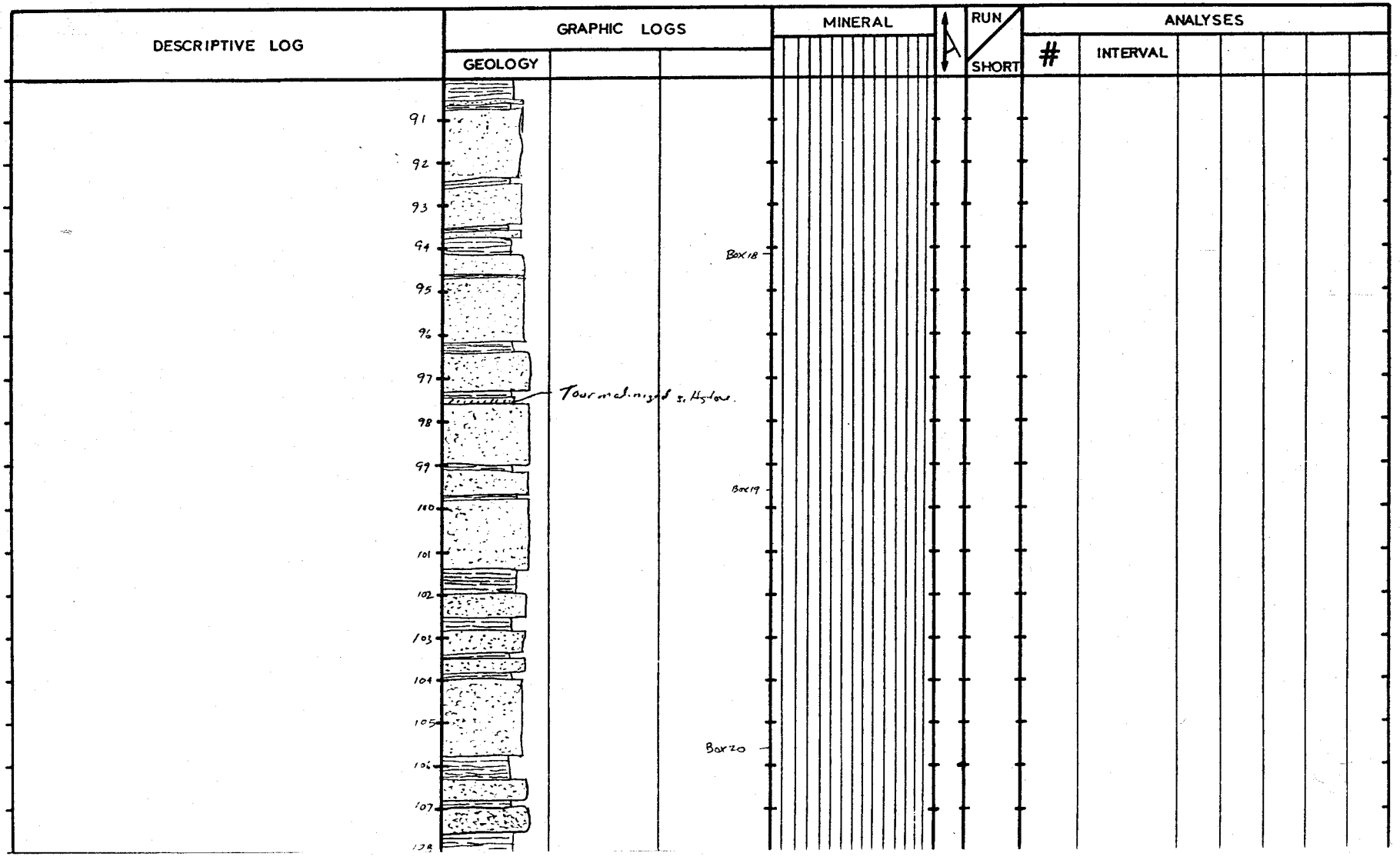
DDH ~~Goat 88-1~~ CORE SIZE NQ FROM 72m TO 90m LOGGED BY G.LEASK DATE 10/10/88 PAGE 5



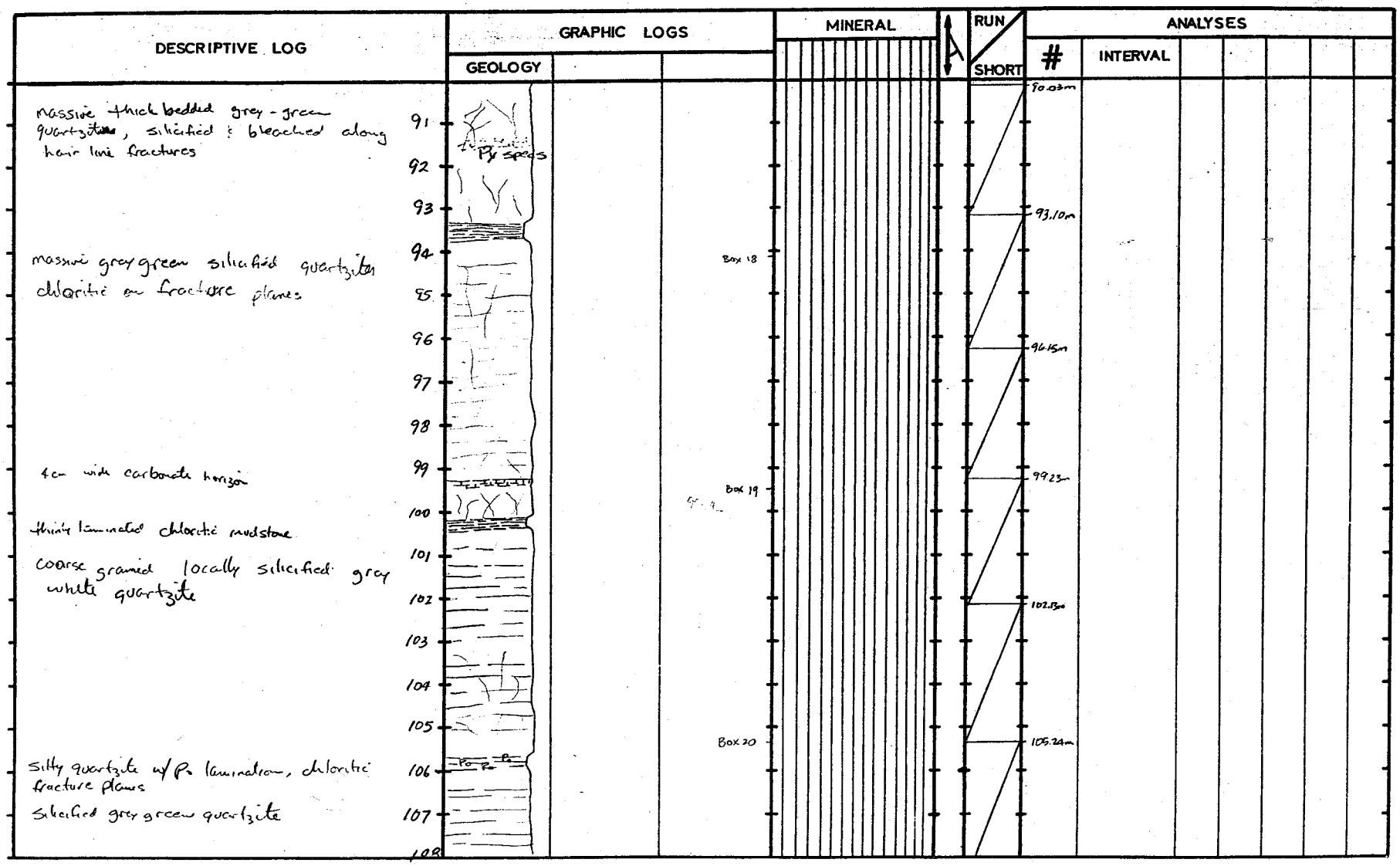
DDH GOAT 88-1 CORE SIZE NQ FROM 72m TO 90m LOGGED BY A. LEAK DATE 10/08/88 PAGE 5



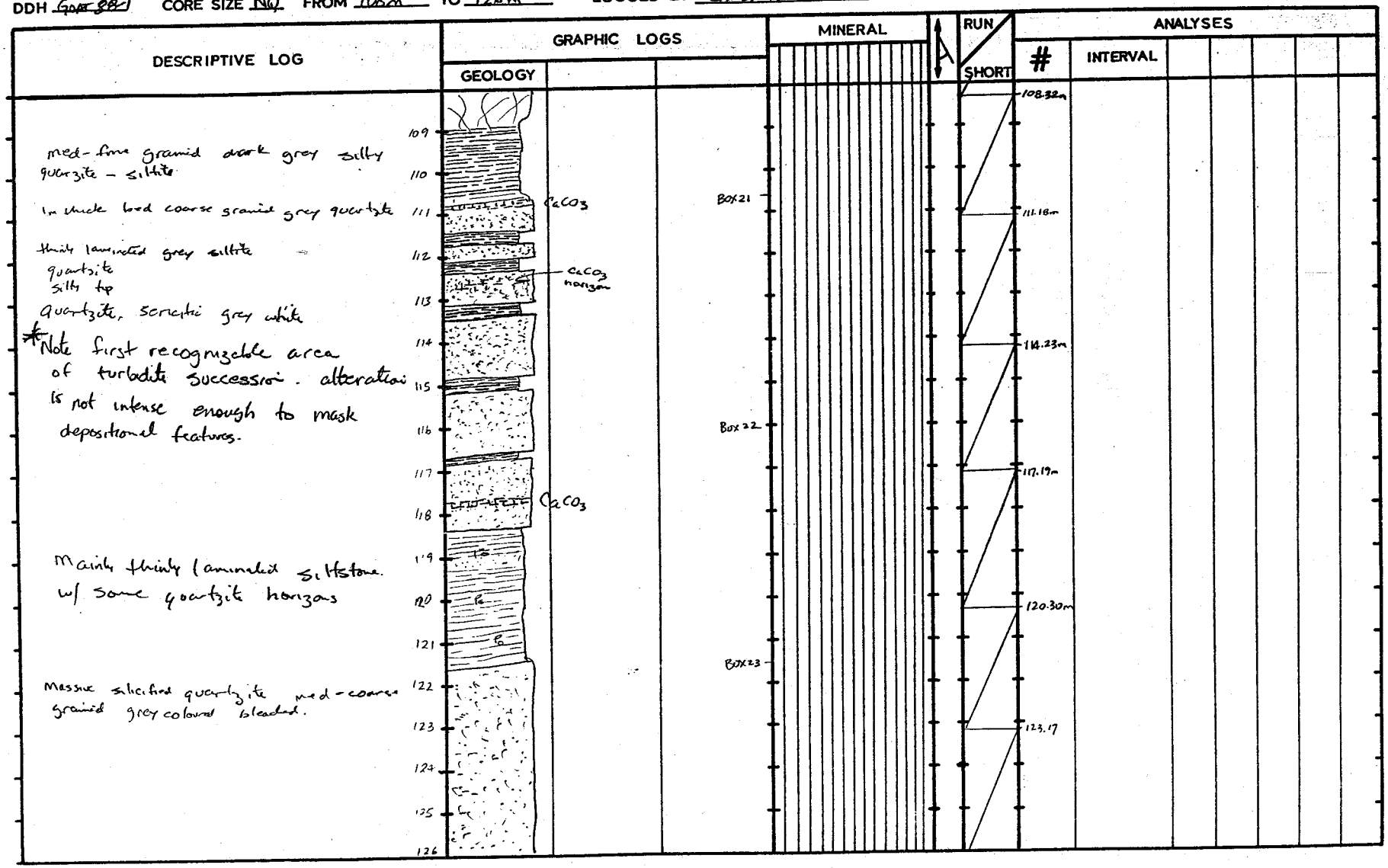
DDH GOAT 88-1 CORE SIZE NQ FROM 90m TO 108m LOGGED BY G. LEASK DATE 10/10/88 PAGE 6



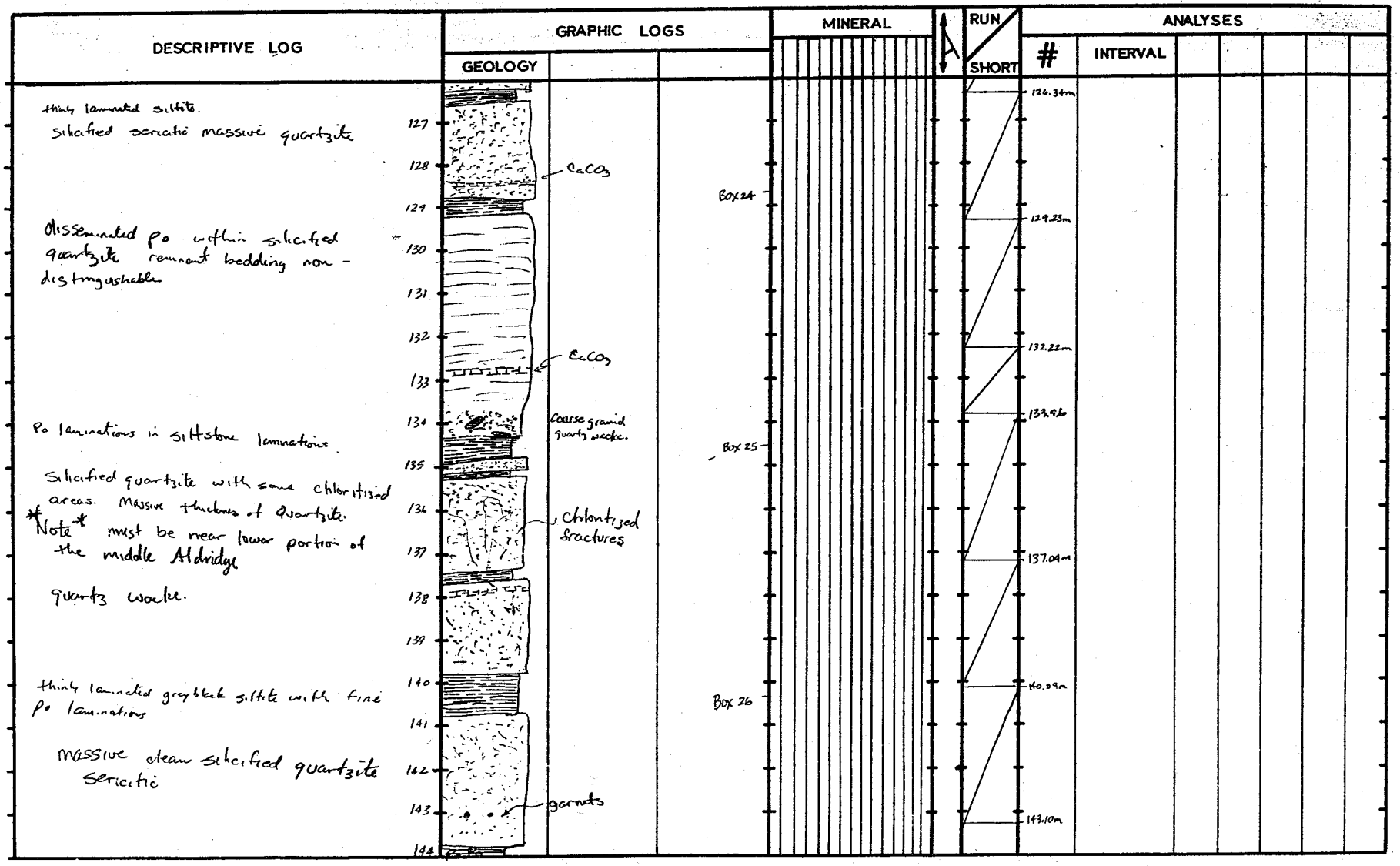
DDH GAM 88-1 CORE SIZE NQ FROM 90m TO 108m LOGGED BY G LEASK DATE 14/08/88 PAGE 6



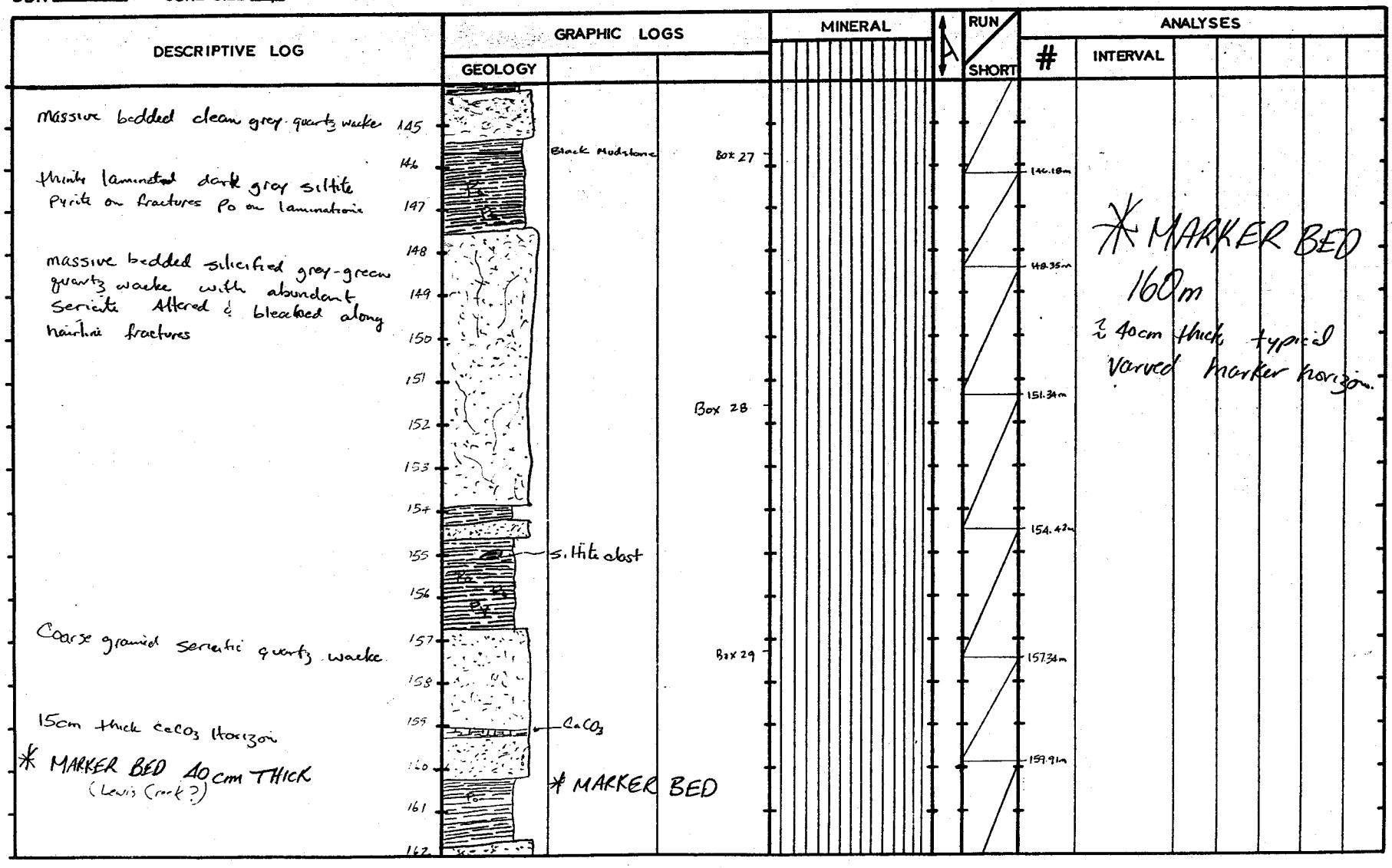
DDH GAM 881 CORE SIZE NQ FROM 108m TO 126m LOGGED BY G.LEASK DATE 14/08/88 PAGE 7



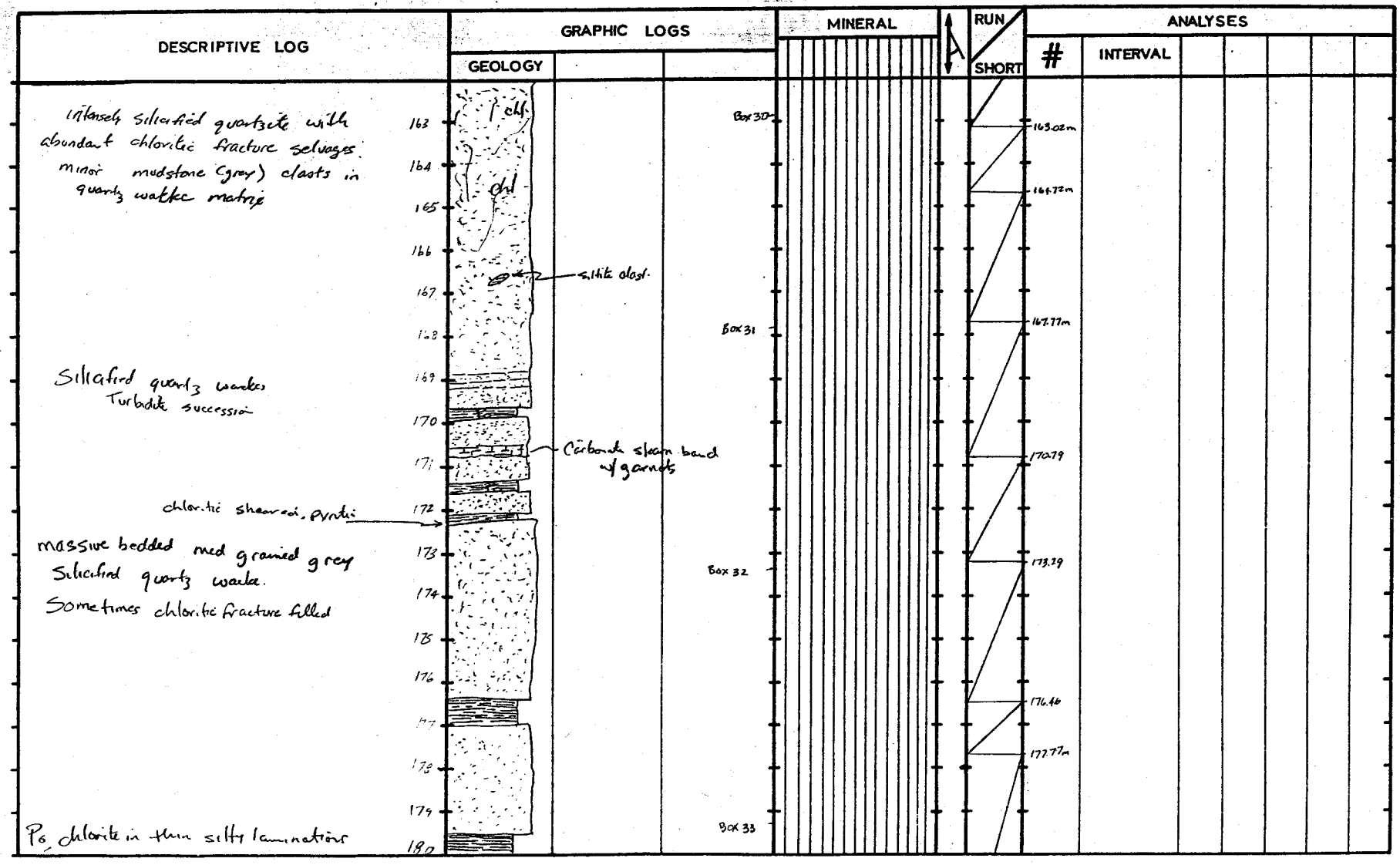
DDH GOAT 88-1 CORE SIZE NQ FROM 126m TO 144m LOGGED BY G.LEASK DATE 14/08/88 PAGE 8



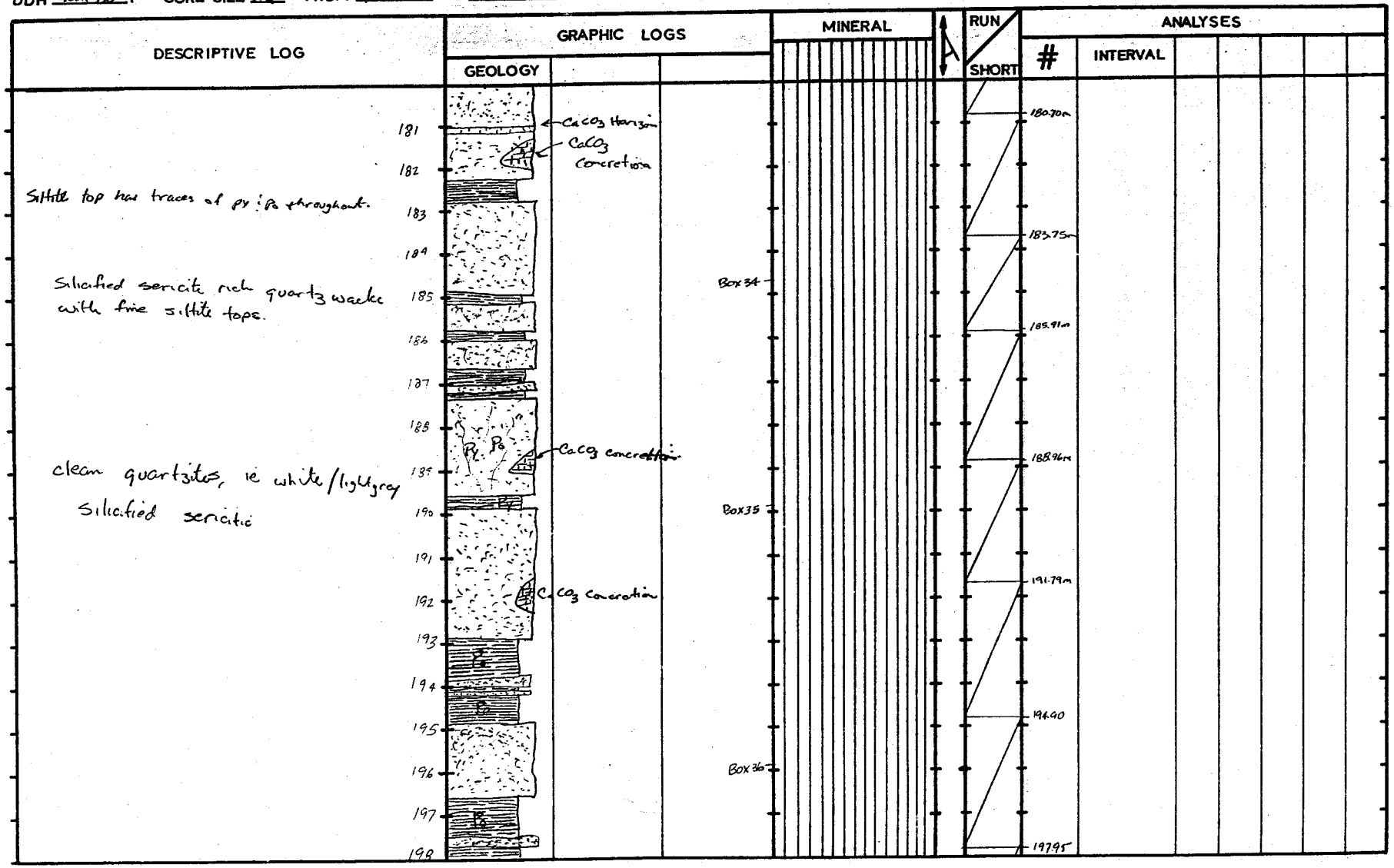
DDH GDATBB-1 CORE SIZE NQ FROM 143m TO 162m LOGGED BY B. LEASK DATE 14/08/88 PAGE 9



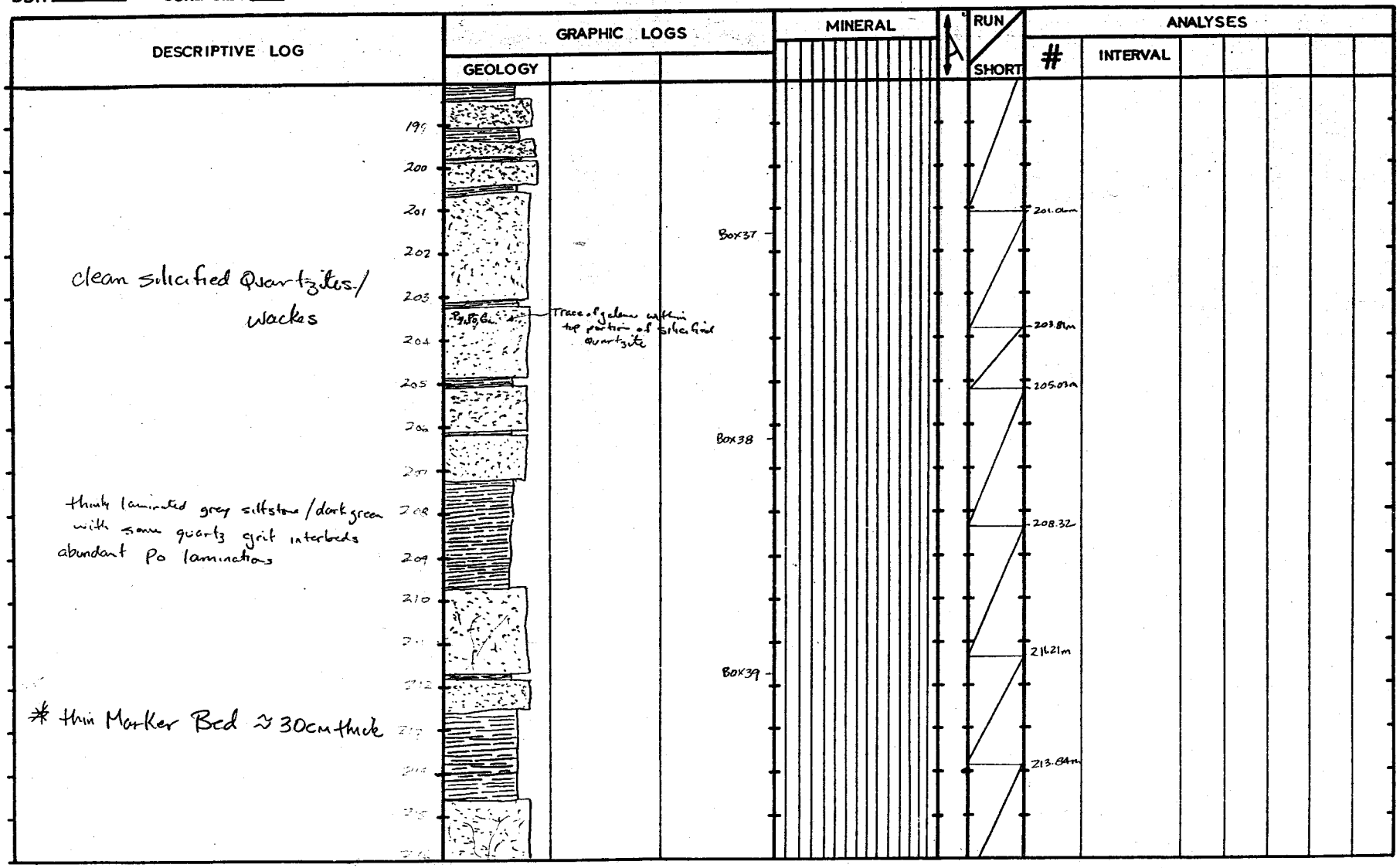
DDH GOAT 88-1 CORE SIZE NQ FROM 162m TO 180m LOGGED BY A.LEASK DATE 14/08/88 PAGE 10



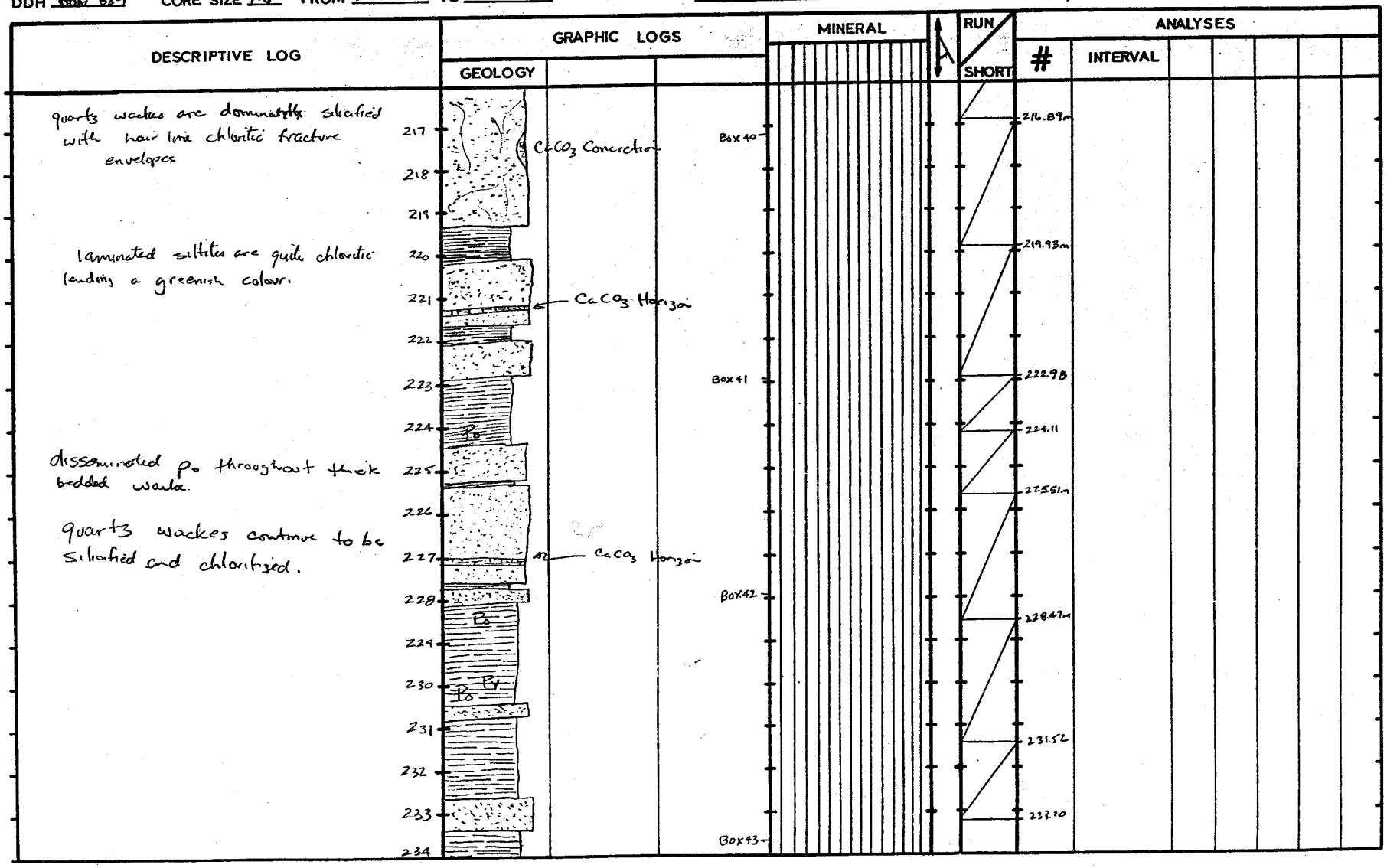
DDH Goat 88-1 CORE SIZE NQ FROM 180m TO 198m LOGGED BY G.L EASE DATE 15/08/88 PAGE 11



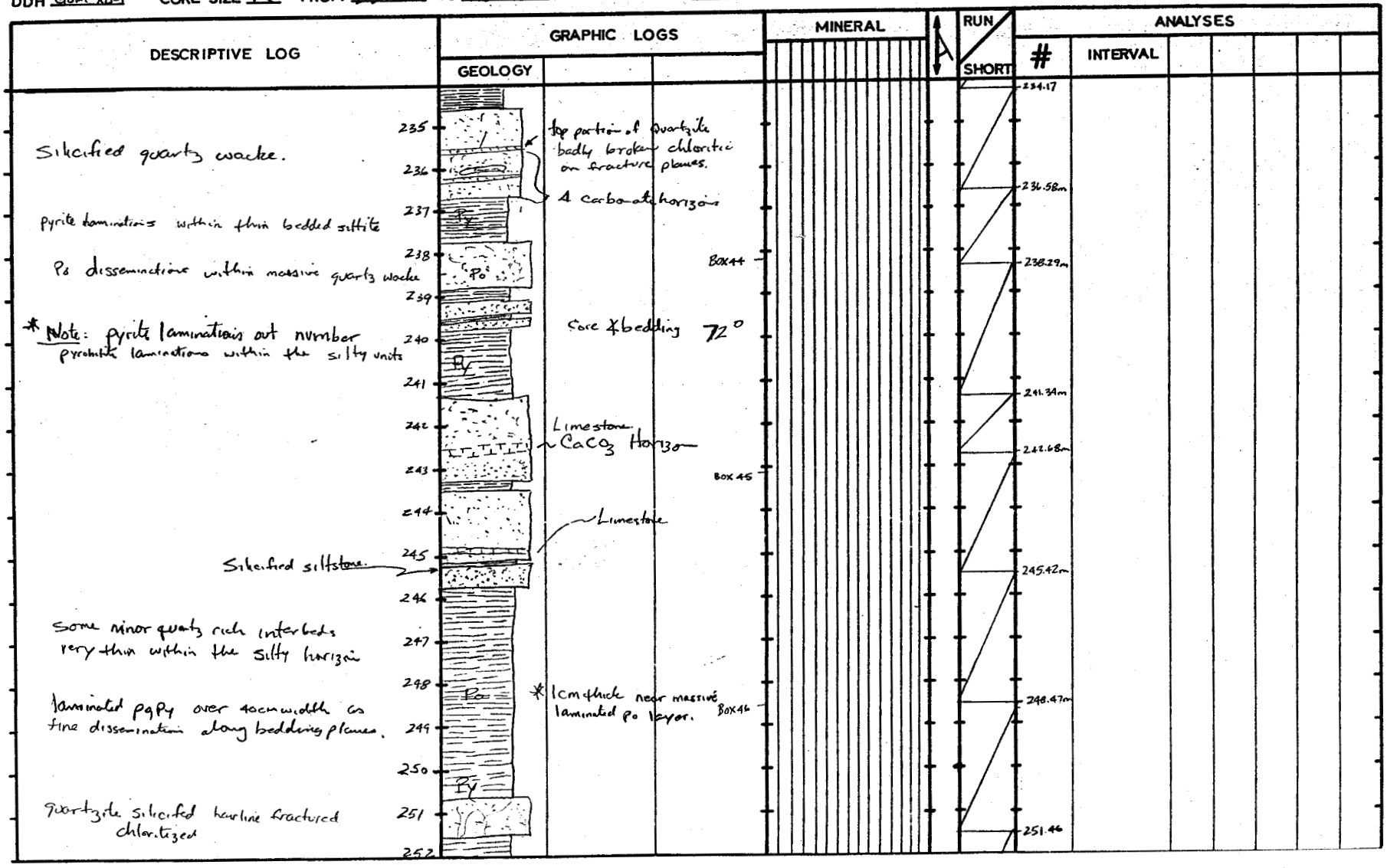
DDH GNAT 88-1 CORE SIZE NQ FROM 198m TO 214m LOGGED BY G.LEASK DATE 15/08/88 PAGE 12



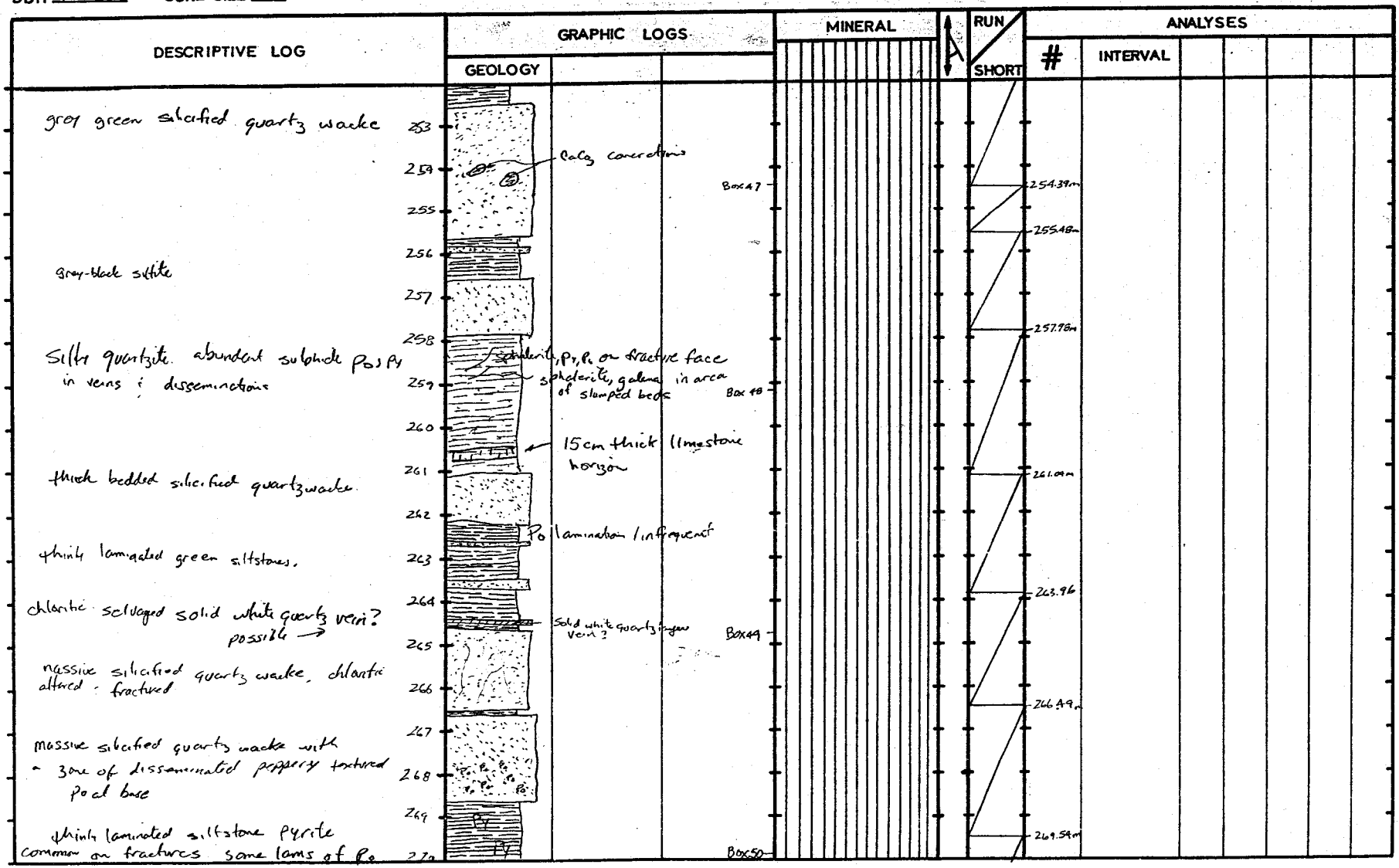
DDH GOAT 021 CORE SIZE NQ FROM 216m TO 234m LOGGED BY G.LEASK DATE 15/08/88 PAGE 13



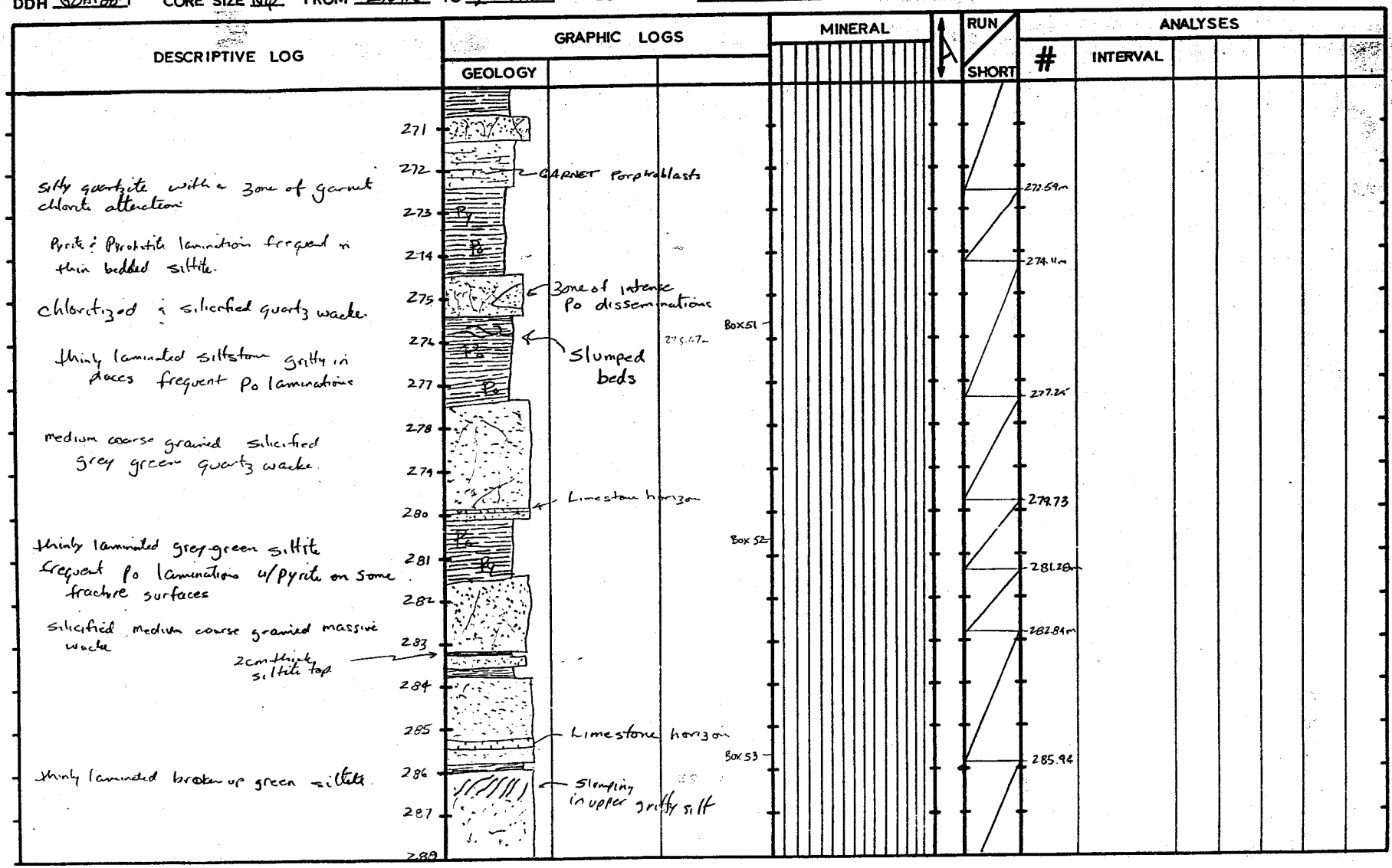
DDH GOAC 88-1 CORE SIZE NQ FROM 234 TO 252m LOGGED BY G. LEASK DATE 15/08/88 PAGE 14



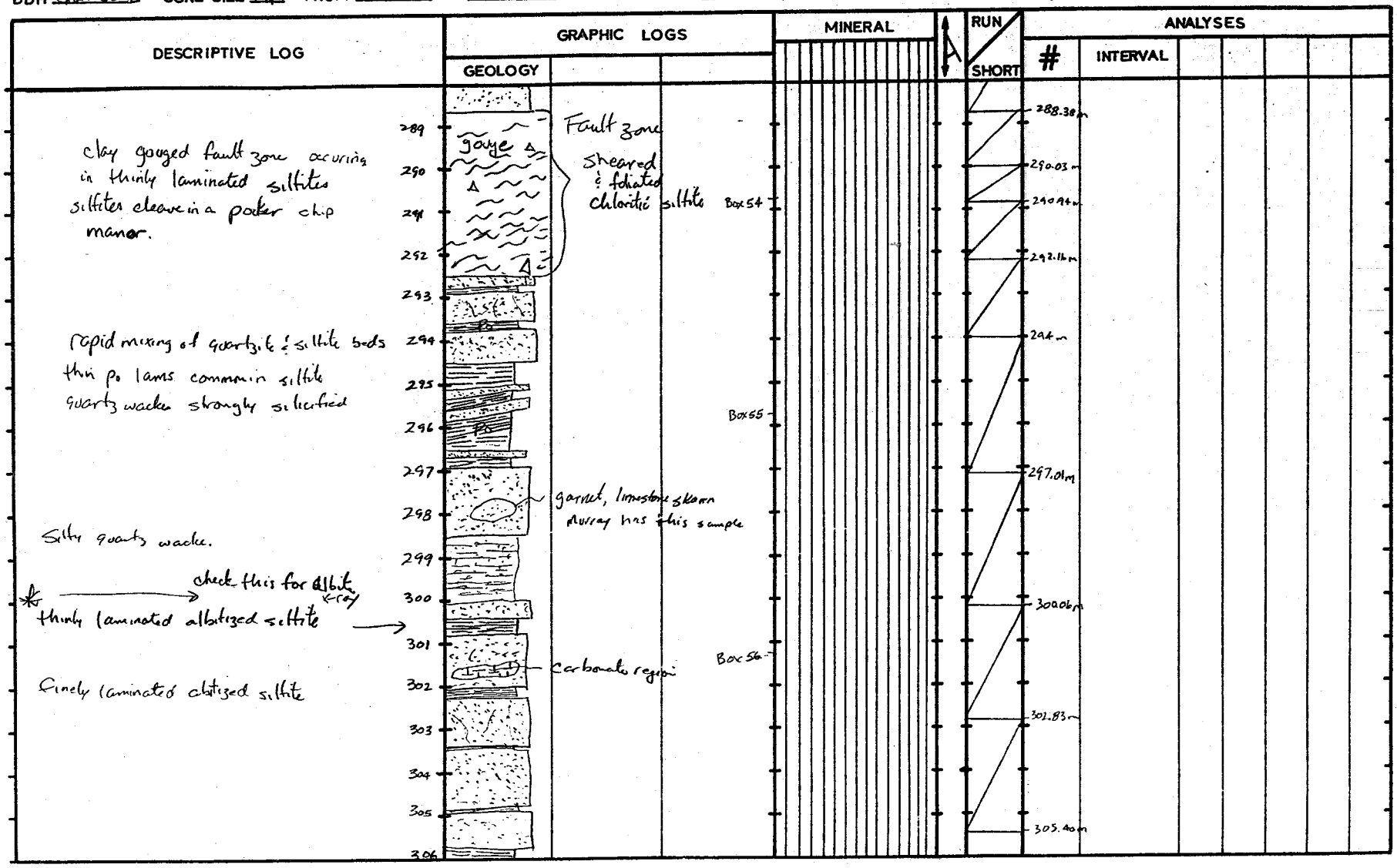
DDH Goan 88-1 CORE SIZE NQ FROM 252m TO 270m LOGGED BY G.LEASK DATE 15/08/88 PAGE 15



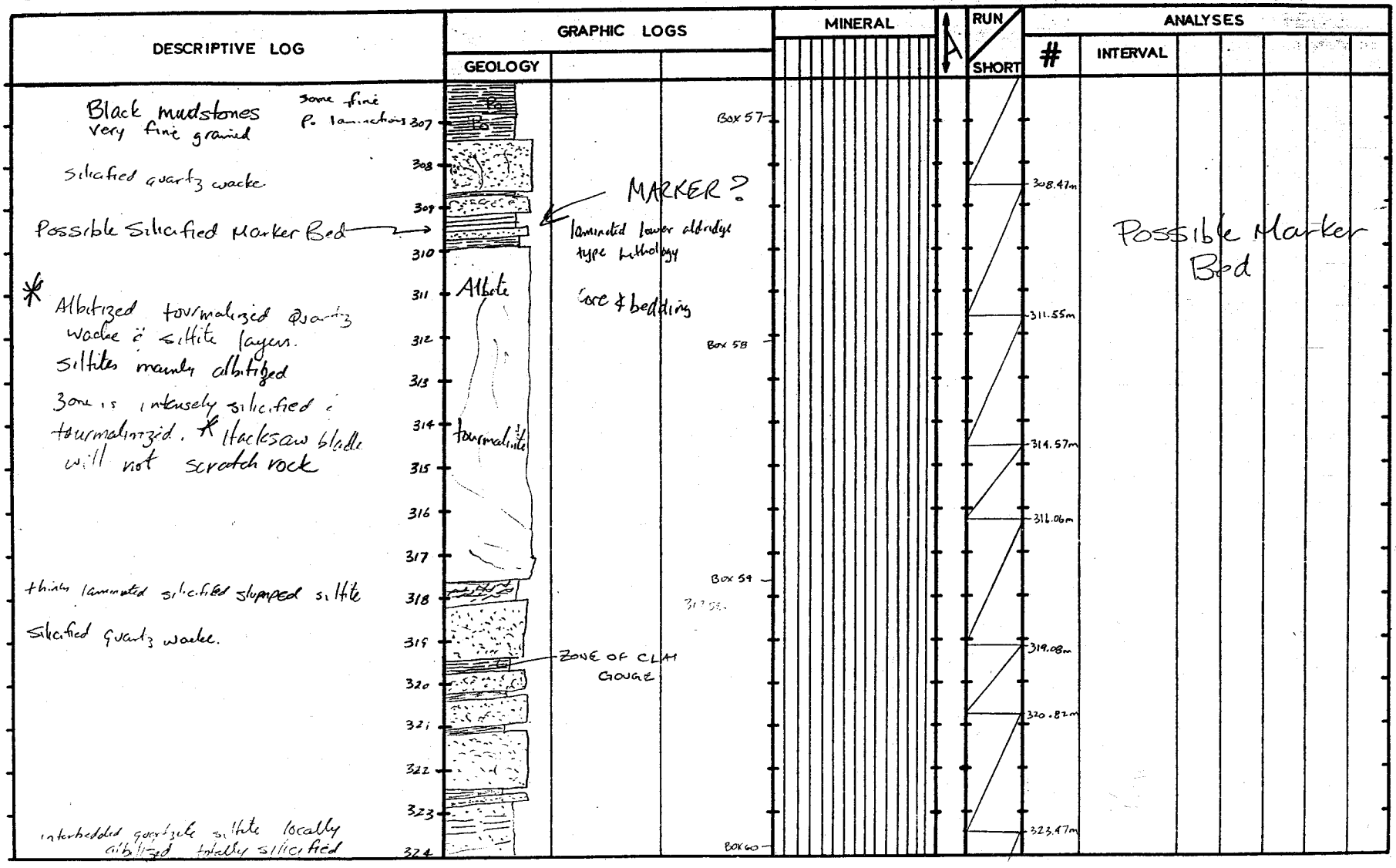
DDH GOAT88-1 CORE SIZE NQ FROM 270m TO 289m LOGGED BY G.LEASK DATE 17/08/88 PAGE 16



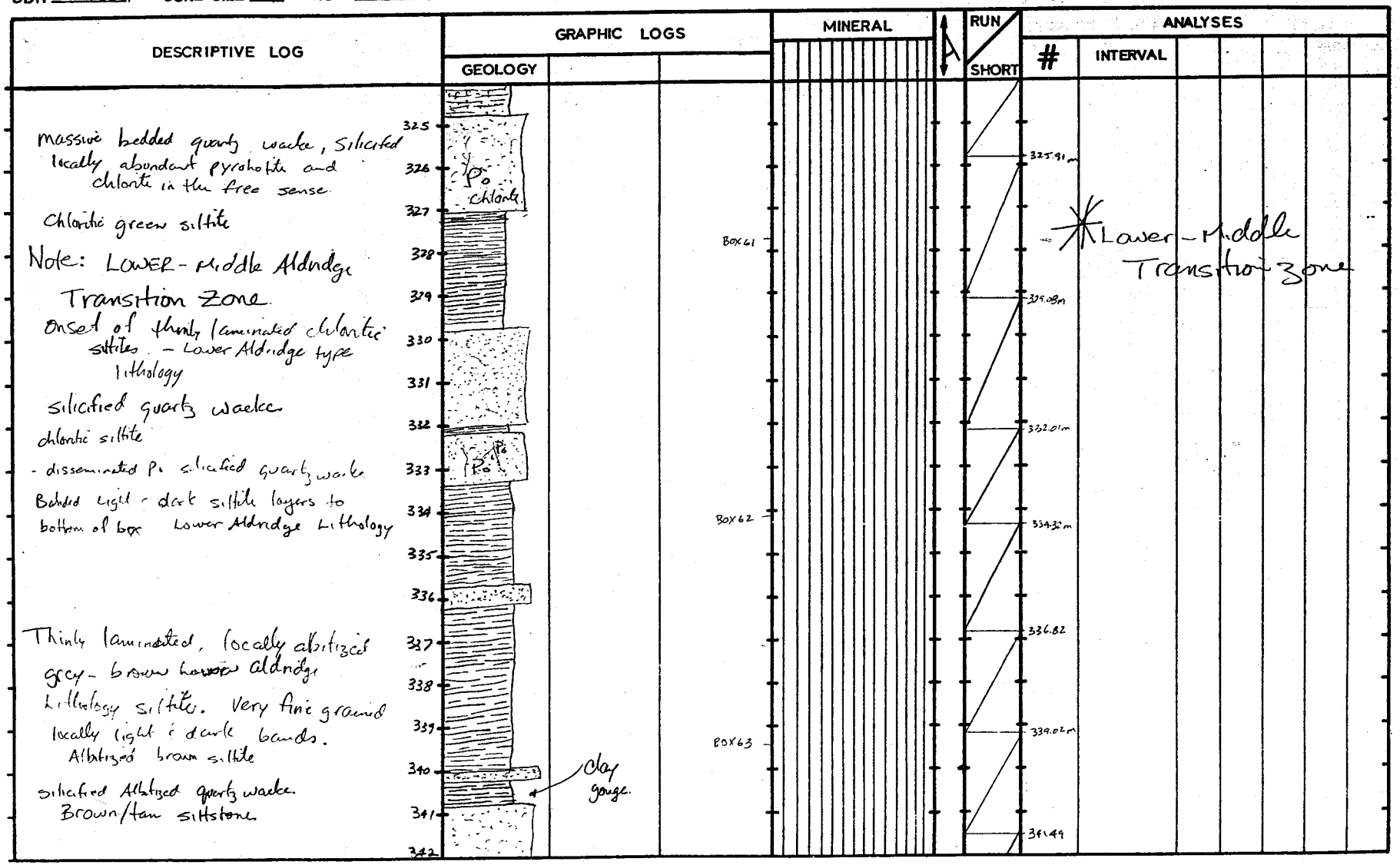
DDH Goat 88-1 CORE SIZE NQ FROM 288m TO 306m LOGGED BY G.L.East DATE 17/08/88 PAGE 17



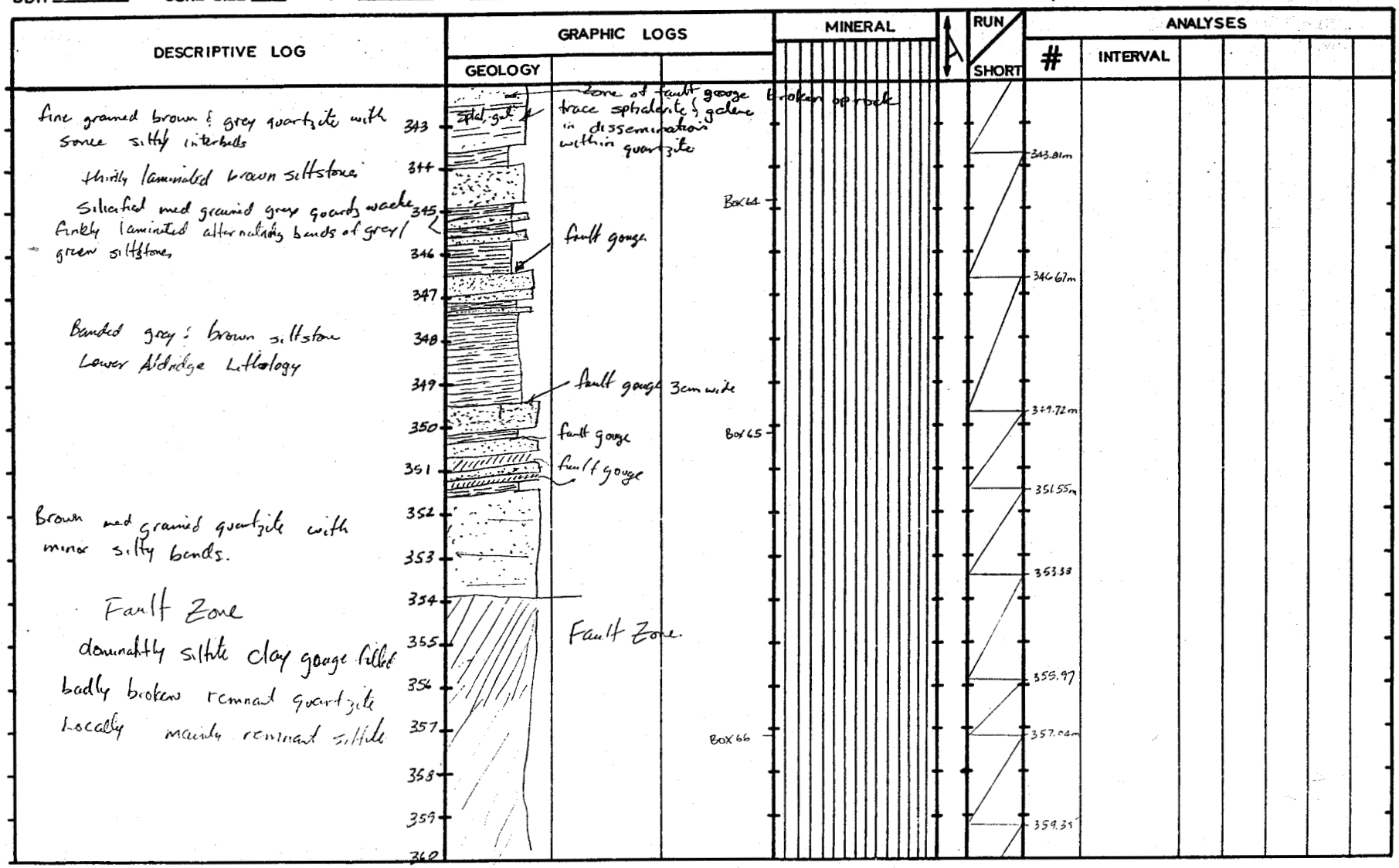
DDH GOAS BB-1 CORE SIZE NQ FROM 306m TO 324m LOGGED BY G.LEASK DATE 17/08/08 PAGE 18



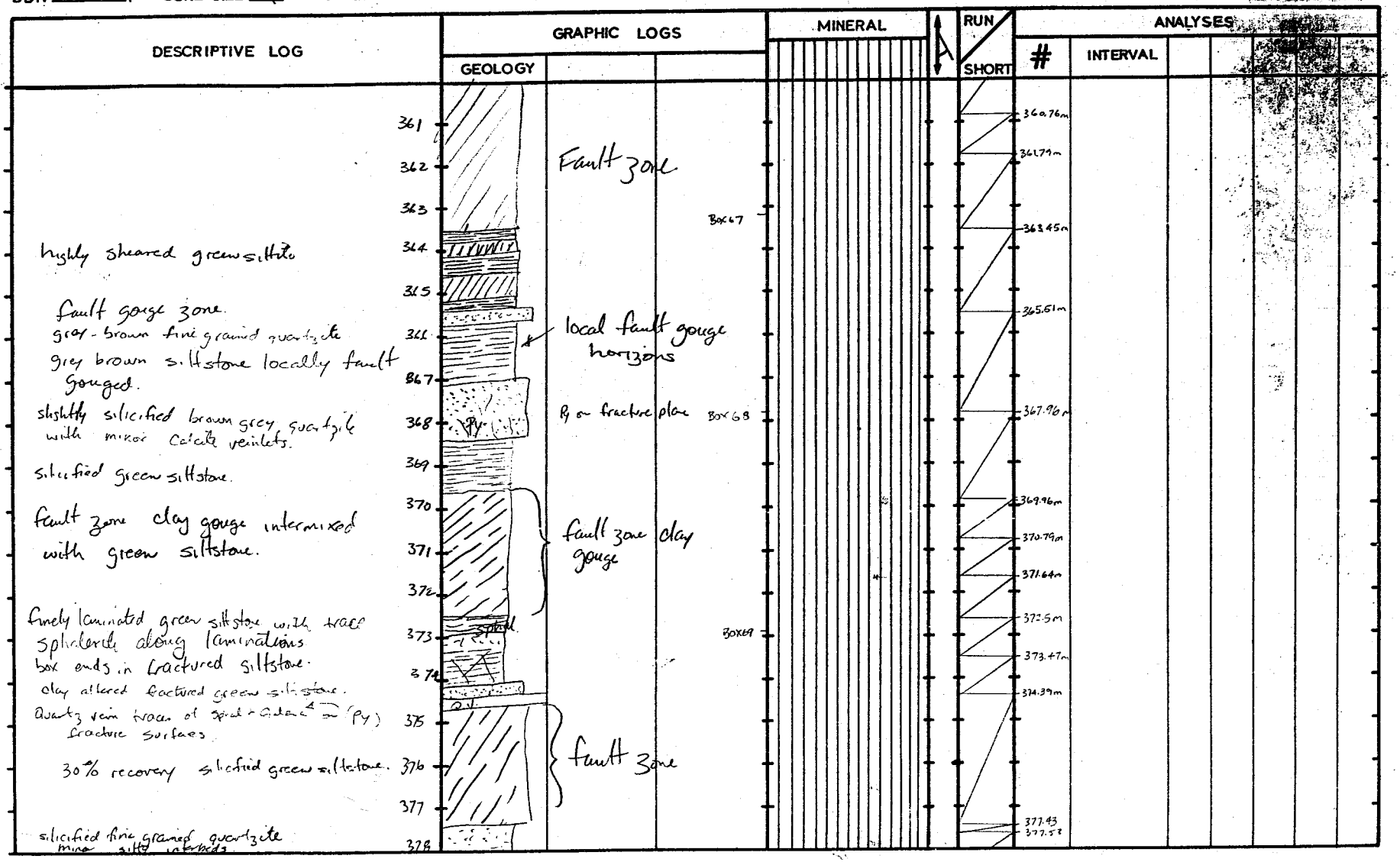
DDH GOAT88-1 CORE SIZE NQ FROM 324m TO 342m LOGGED BY G.LEASK DATE 18/08/88 PAGE 19



DDH Goon 88-1 CORE SIZE NQ FROM 342m TO 360m LOGGED BY G. LEASK DATE 21/08/88 PAGE 20



DDH Gidat 88-1 CORE SIZE NQ FROM 360m TO 378m LOGGED BY G. LEASK DATE 21/08/88 PAGE 21



DDH Geol 88-1 CORE SIZE NQ FROM 378m TO 396m LOGGED BY G.LEASK DATE 31/08/88 PAGE 22

DESCRIPTIVE LOG		GRAPHIC LOGS: GEOLOGY	MINERAL	RUN / SHORT	ANALYSES: #	ANALYSES: INTERVAL
Broken dark green siltstone, silicified	379					
Silicified green siltstone	380		Box 70			
clay gouged fault zone	381					
rocks mainly clay altered	382					
thinly laminated green siltstones.	383	fault zone				
Some 8-10cm solid pieces	384					
Amidst broken rock.	385					
Some silicification within thinly laminated siltstones	386		Box 71			
	387					
	388					
End major fault zone	389					
fine grained green siltstone	390					
local high angle shearing.	391					
	392		Box 72 391.7m			
	393					
	394					
	395					
	396					

379.45m
380.85m
381.98m
382.59
383.75m
385.09m
385.45m
386.91m
386.43m
387.16m
388.95m
389.26m
390.18m

LOG OF DDH Goatfell 88-2

M.D. Nelson Project Goatfell Property Goat Claim Goat 1

NTS _____ UTM _____, _____ Northing _____ Easting _____ Elevation _____

Collar Azimuth 267°Az Collar Angle -70° Depth 453 Date Started Aug 5th/88 Date Completed Oct. 17, 1988

Contractor Boundary Drilling Drill _____

Objective To intersect the Lower-Middle Aldridge time horizon - Sullivan Type Zn-Pb-Ag massive Sulphide target

ORIENTATION TESTS

Depth	Inclination	Azimuth
16.4m (54')	267°	69°
[illegible] (194')	269°	66.5°
217.7m (714')	270°	61°
[illegible] (87[illegible])	272°	60°
[illegible] (103[illegible])	274°	58°

CORE SIZE

Depth	Core Size

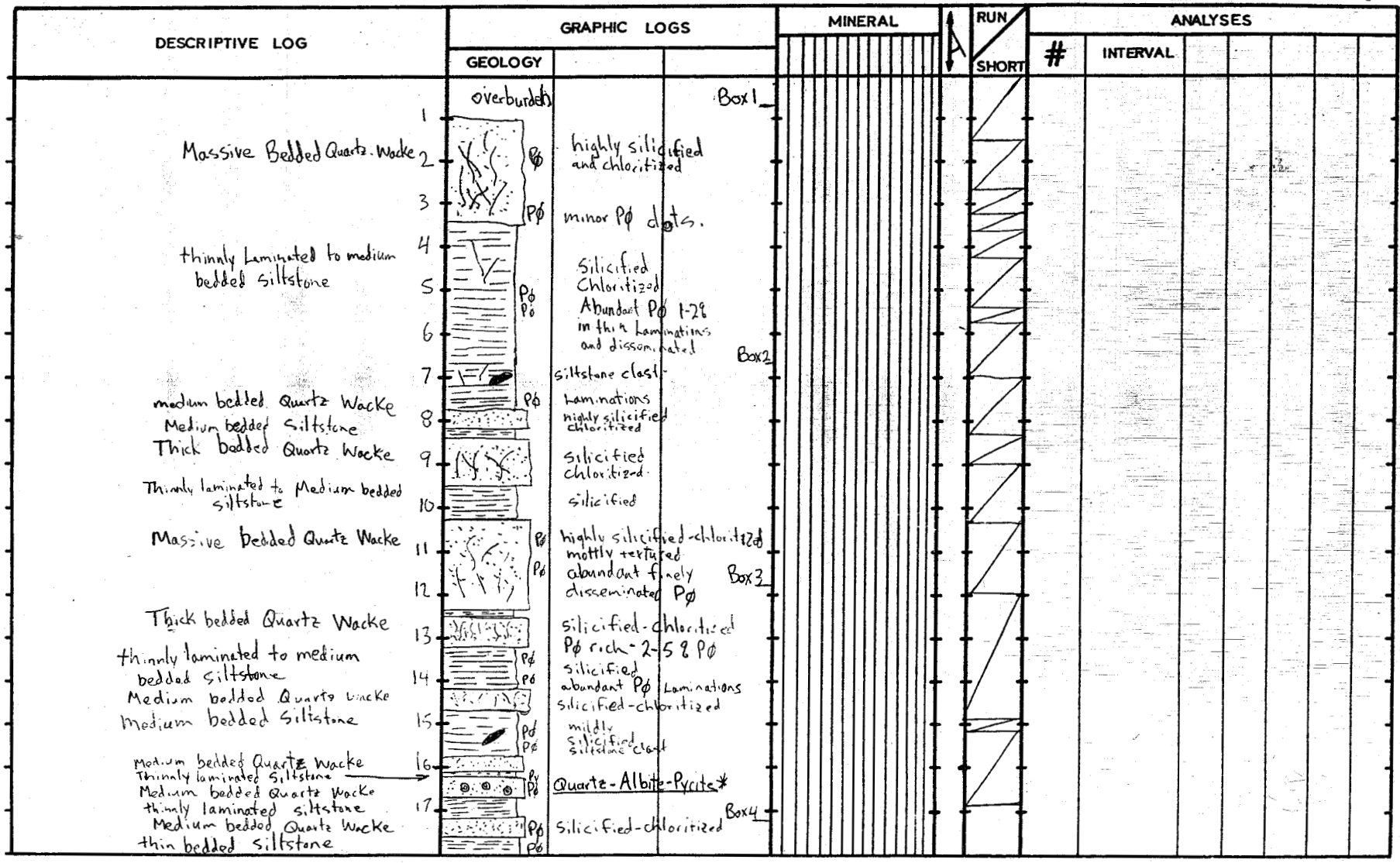
Orientation test instrument _____

CONVENTIONS & SYMBOLS

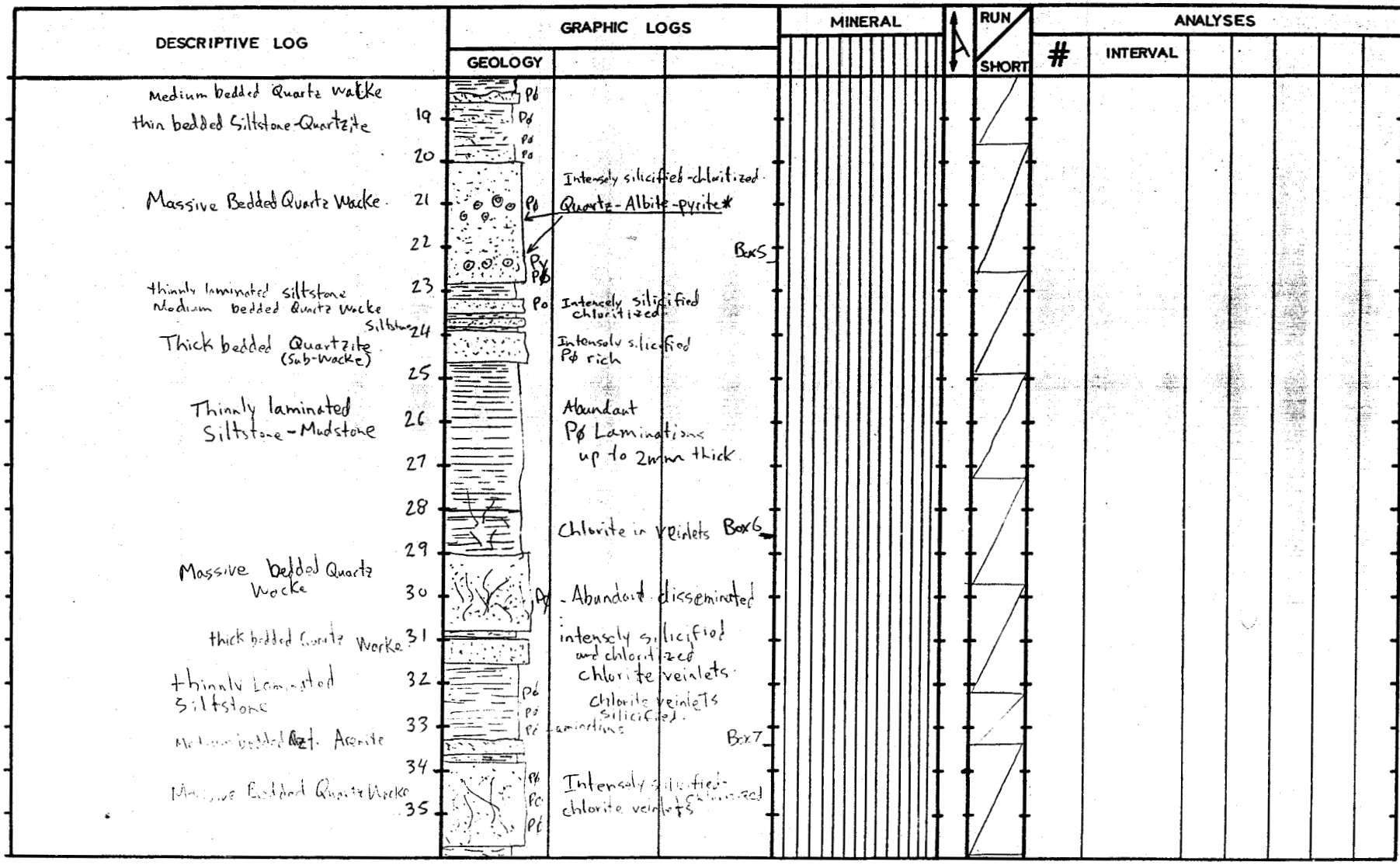
Logged by J.M. Leask

EDMUNDS & ASSOCIATES
West Vancouver, B.C.

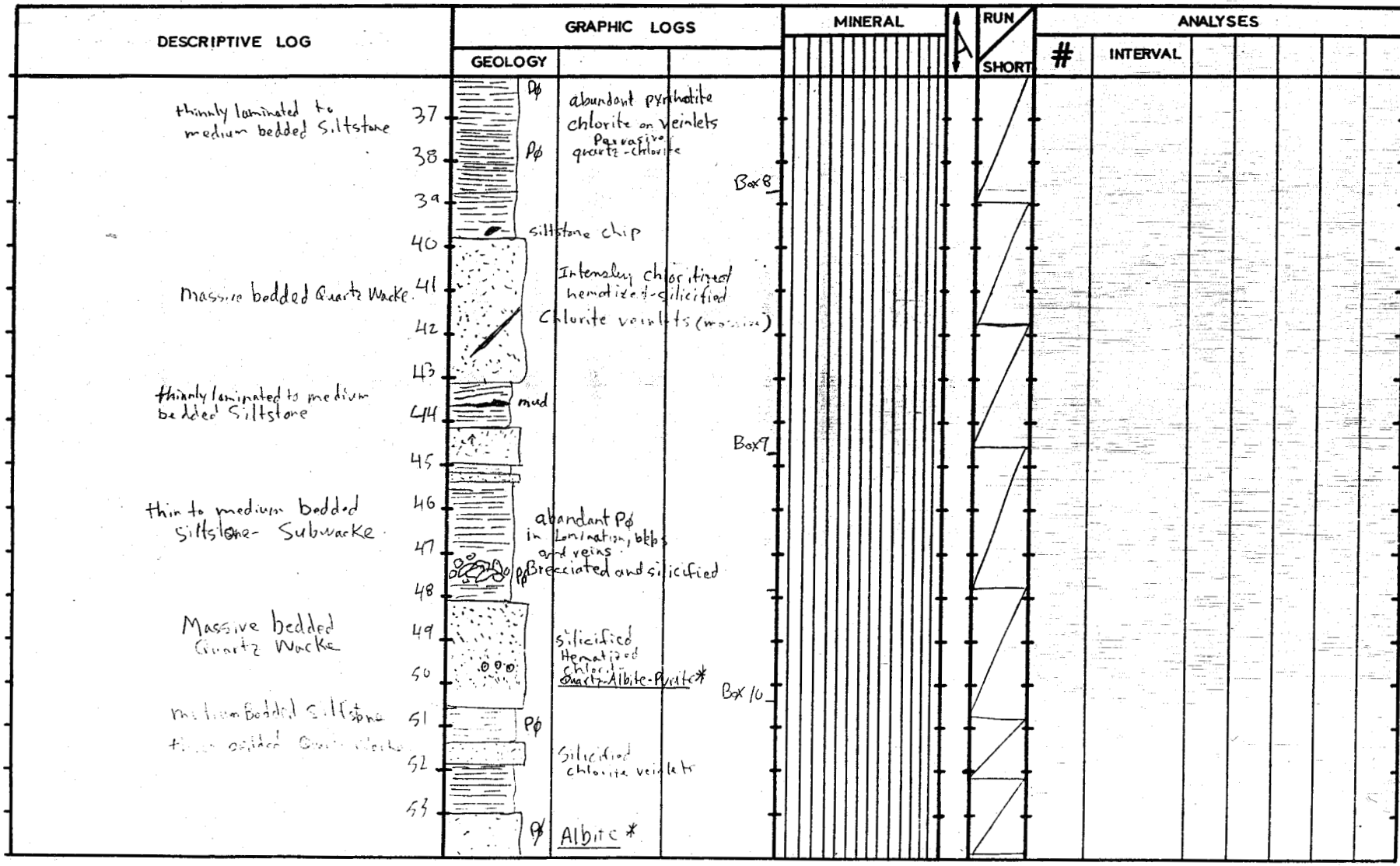
DDH Goat 88-2 CORE SIZE NQ FROM 0 TO 18m LOGGED BY J.M Leask DATE 08/09/88 PAGE 1



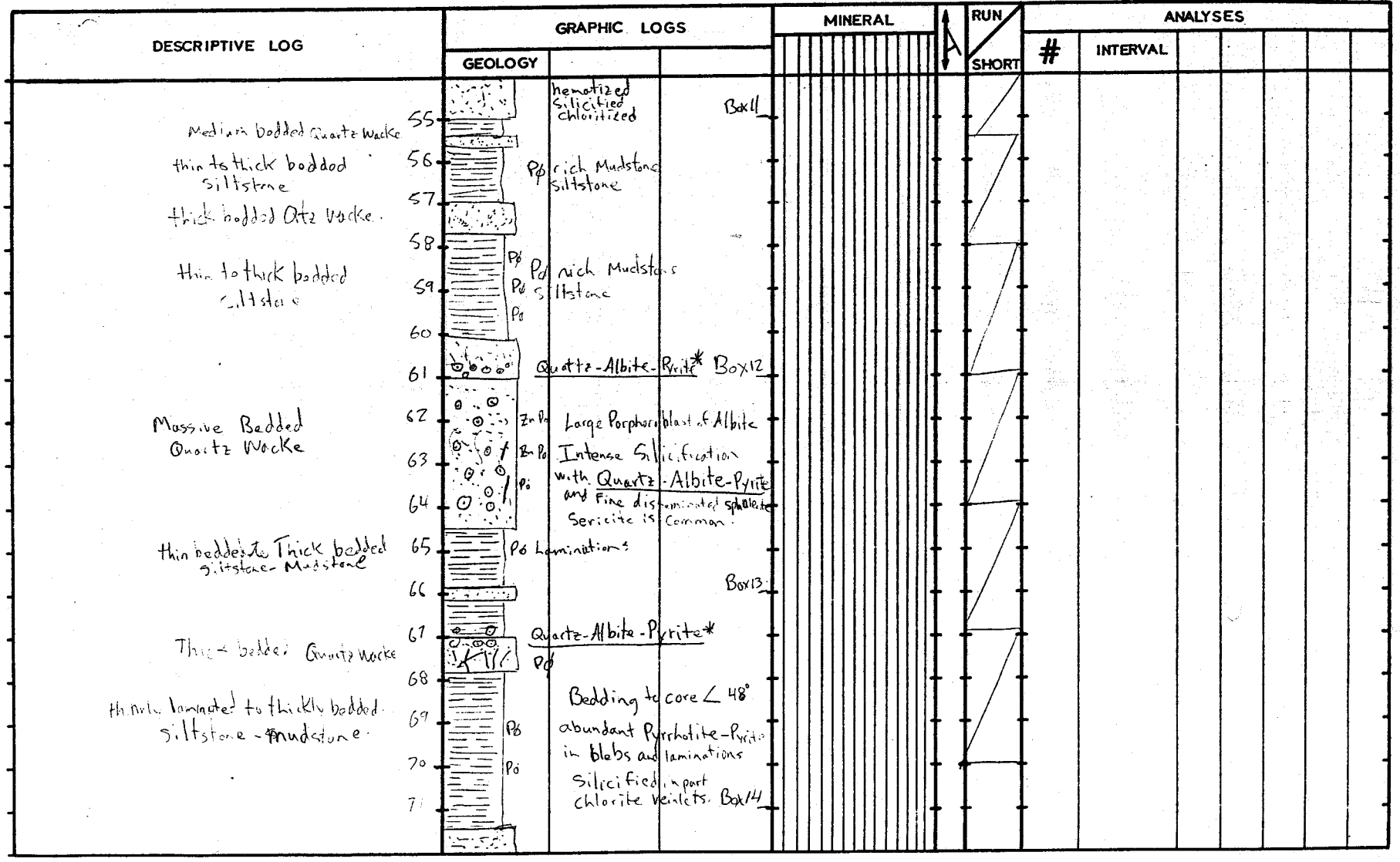
DDH Goat88-2 CORE SIZE NQ FROM 18 meters TO 36 meters LOGGED BY JOLEASK DATE 10/9/88 PAGE 2



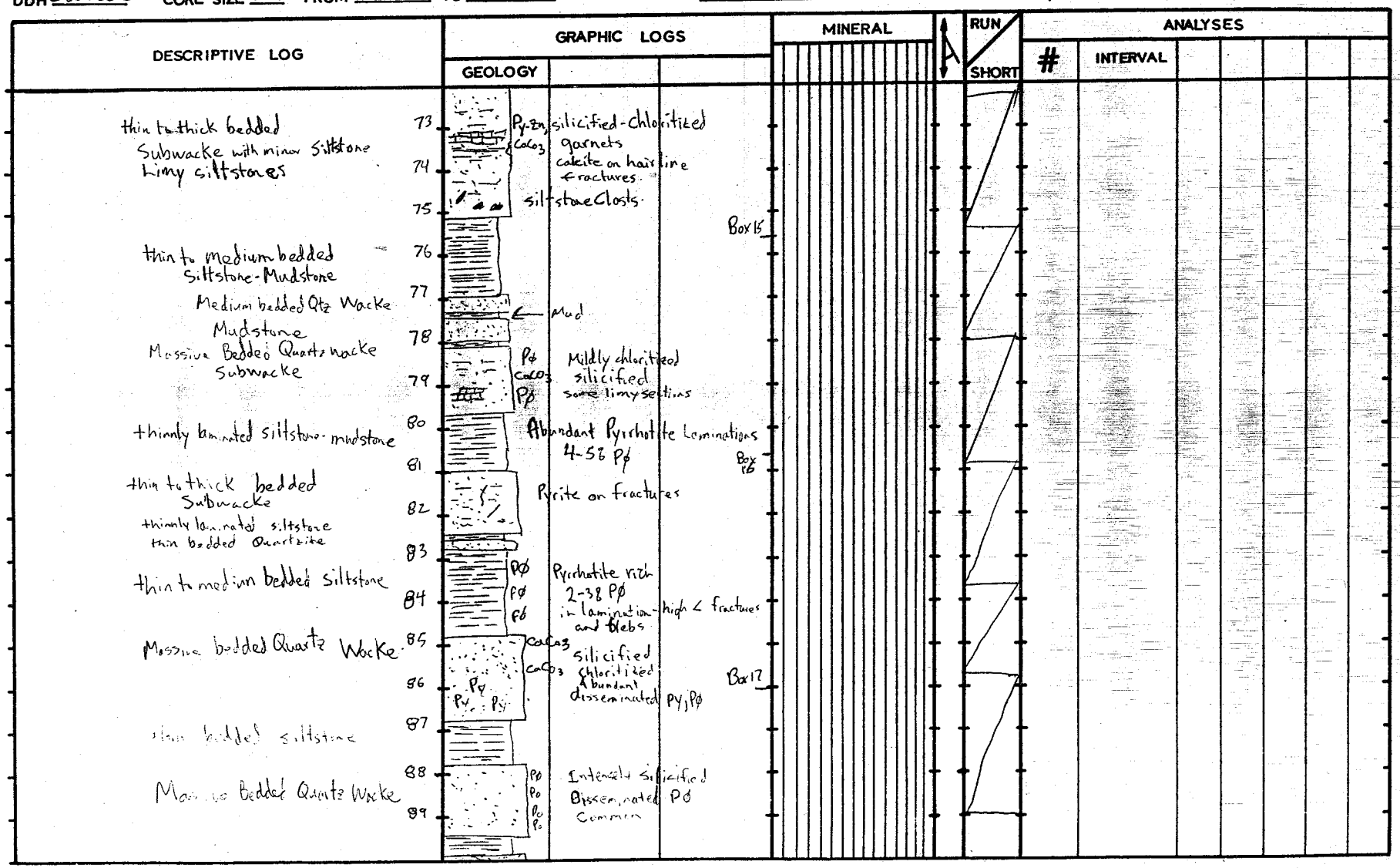
DDH Goat 88-2 CORE SIZE NQ FROM 36m TO 54m LOGGED BY J.M. Lonsk DATE 10/9/88 PAGE 3



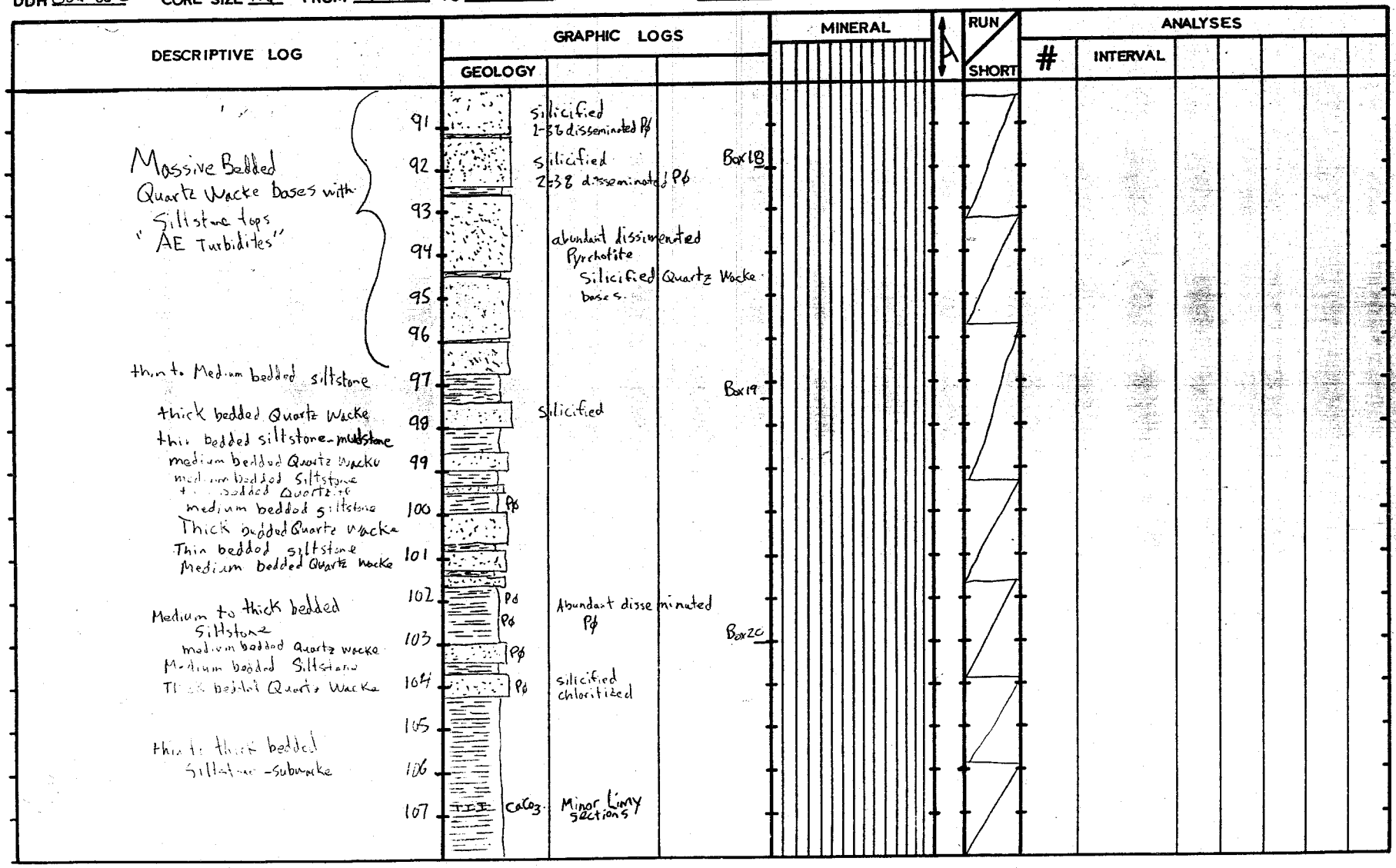
DDH Goat 88-2 CORE SIZE NQ FROM 54m TO 72m LOGGED BY J.M. Leask DATE 12/09/88 PAGE 4



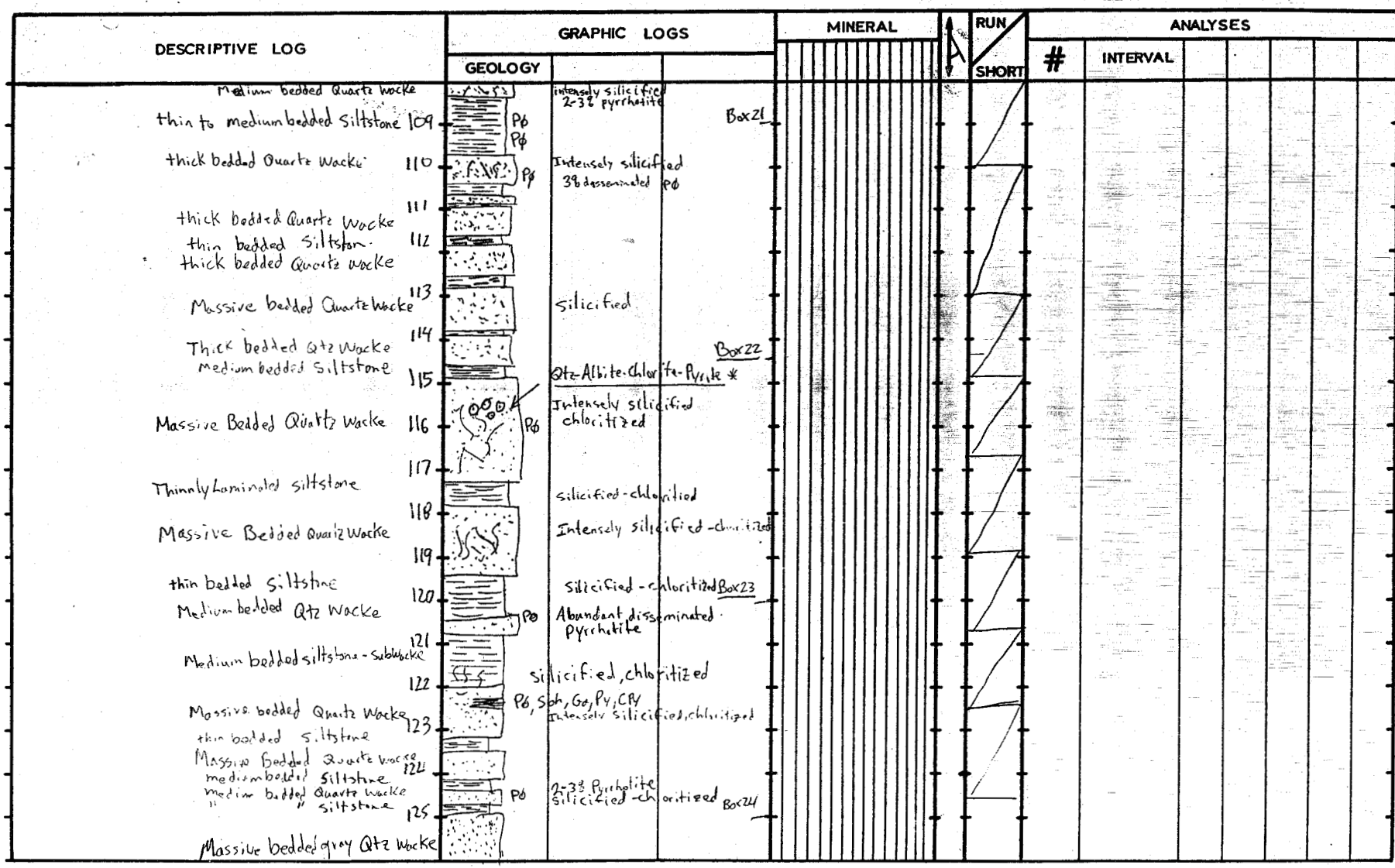
DDH Goat 88-2 CORE SIZE NQ FROM 72m TO 90m LOGGED BY J.M Leask DATE 12/09/88 PAGE 5



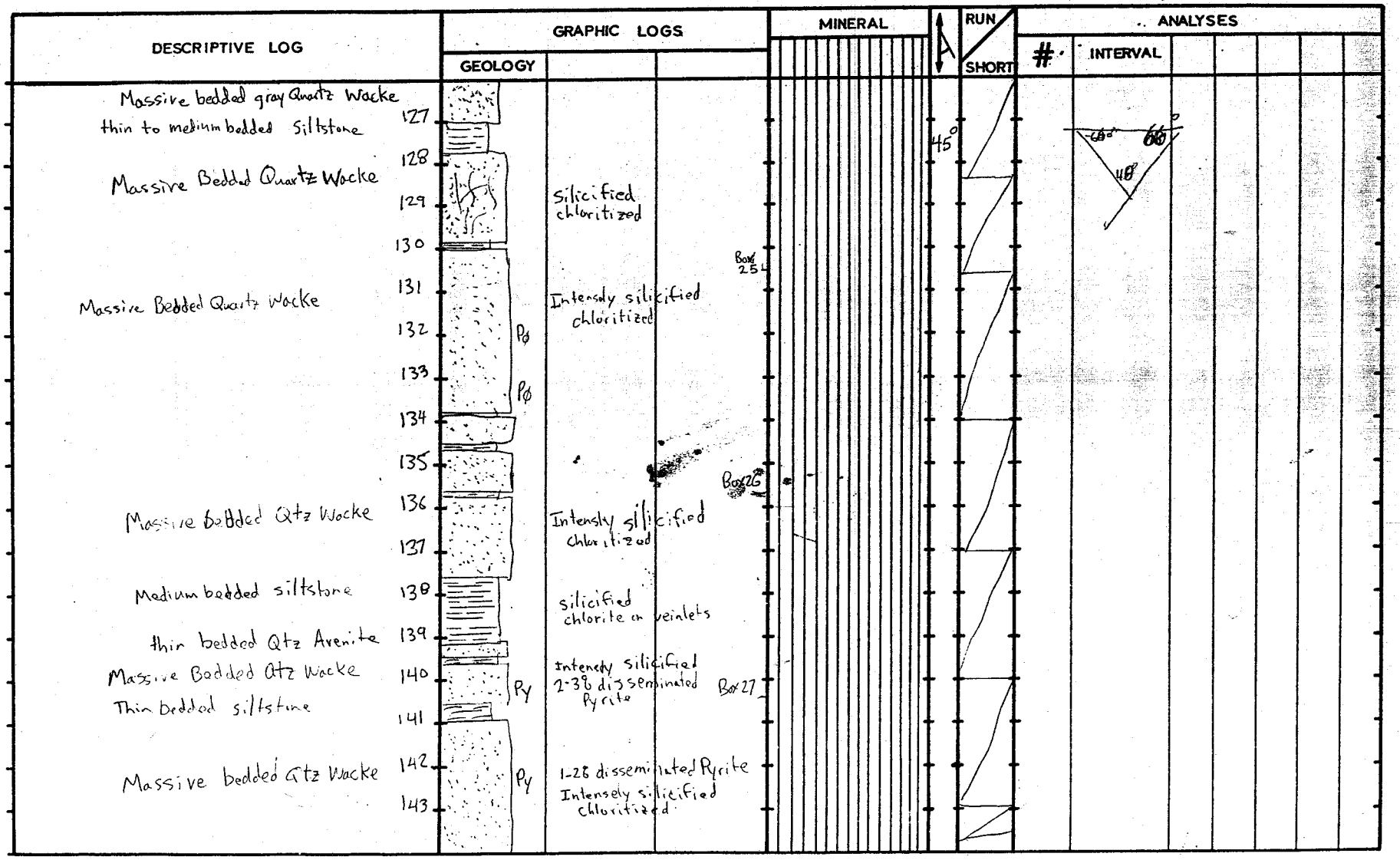
DDH Goat 88-2 CORE SIZE NQ FROM 90m TO 108 m LOGGED BY J.M. Lesk DATE 12/09/88 PAGE 6



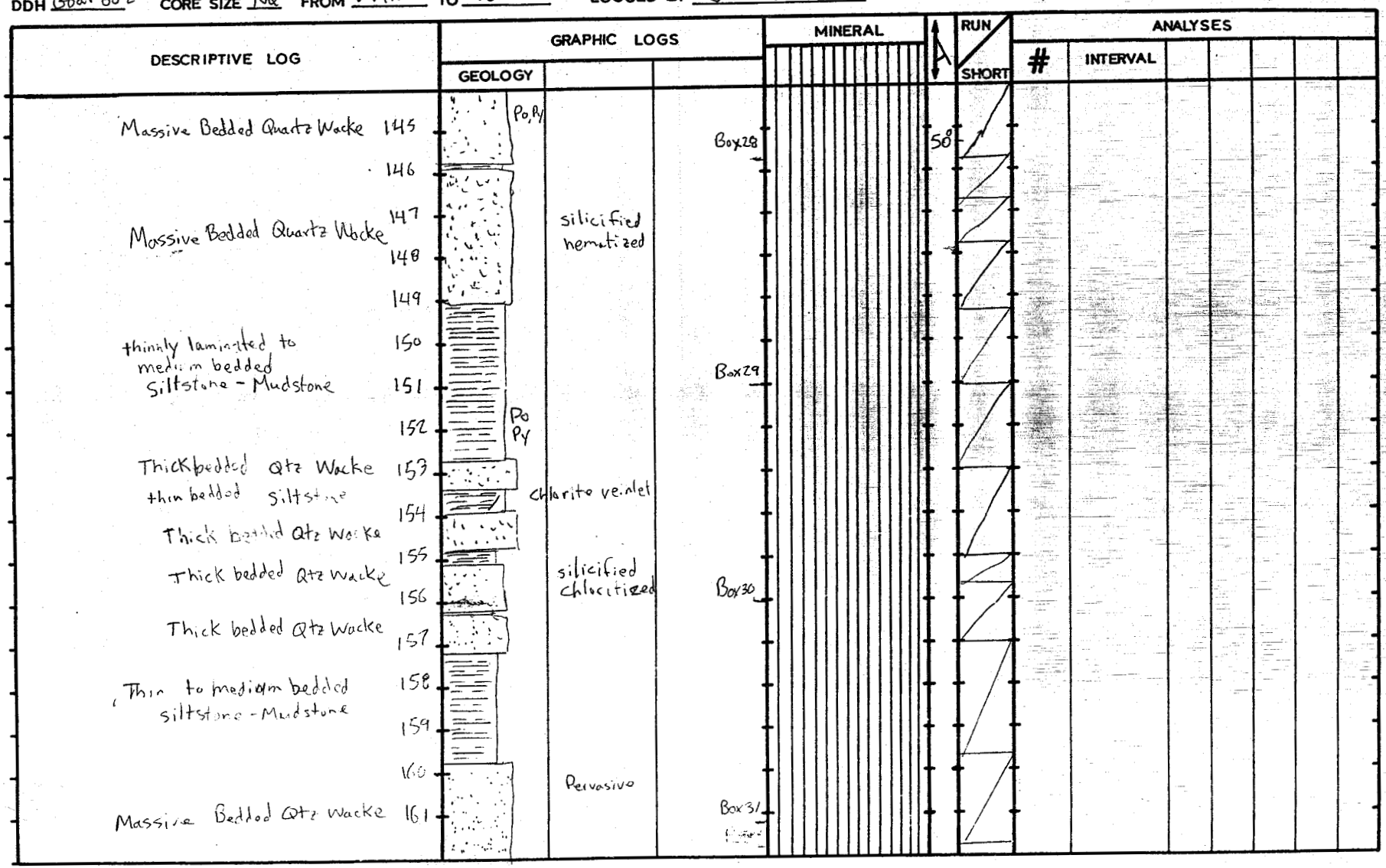
DDH Goat 88-2 CORE SIZE NQ FROM 108m TO 126 LOGGED BY J.M Leask DATE 20/09 12/09/88 PAGE 7



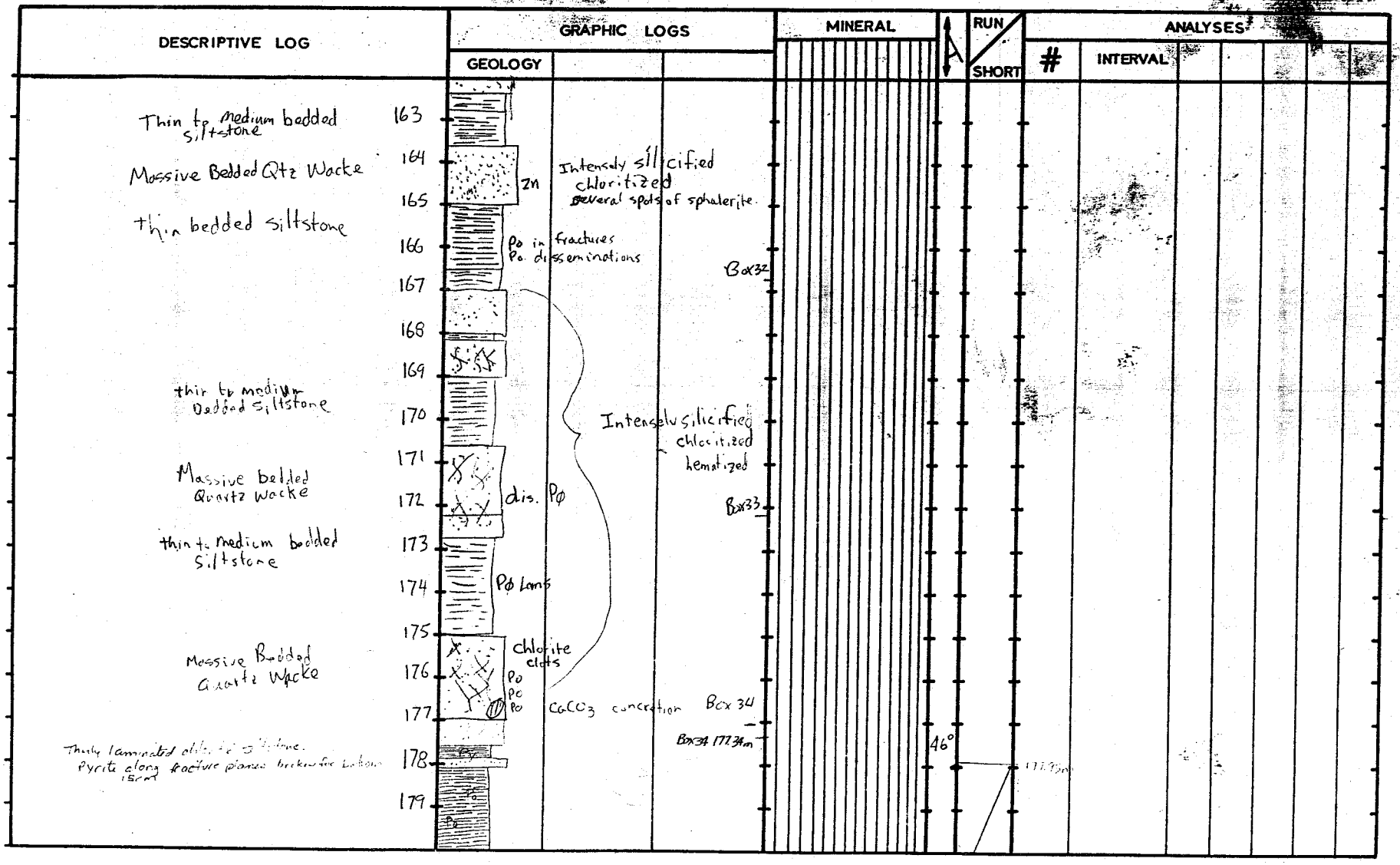
DDH Goat 88-2 CORE SIZE NQ FROM 126m TO 144m LOGGED BY J.M. Leask DATE 20/09/88 PAGE 8



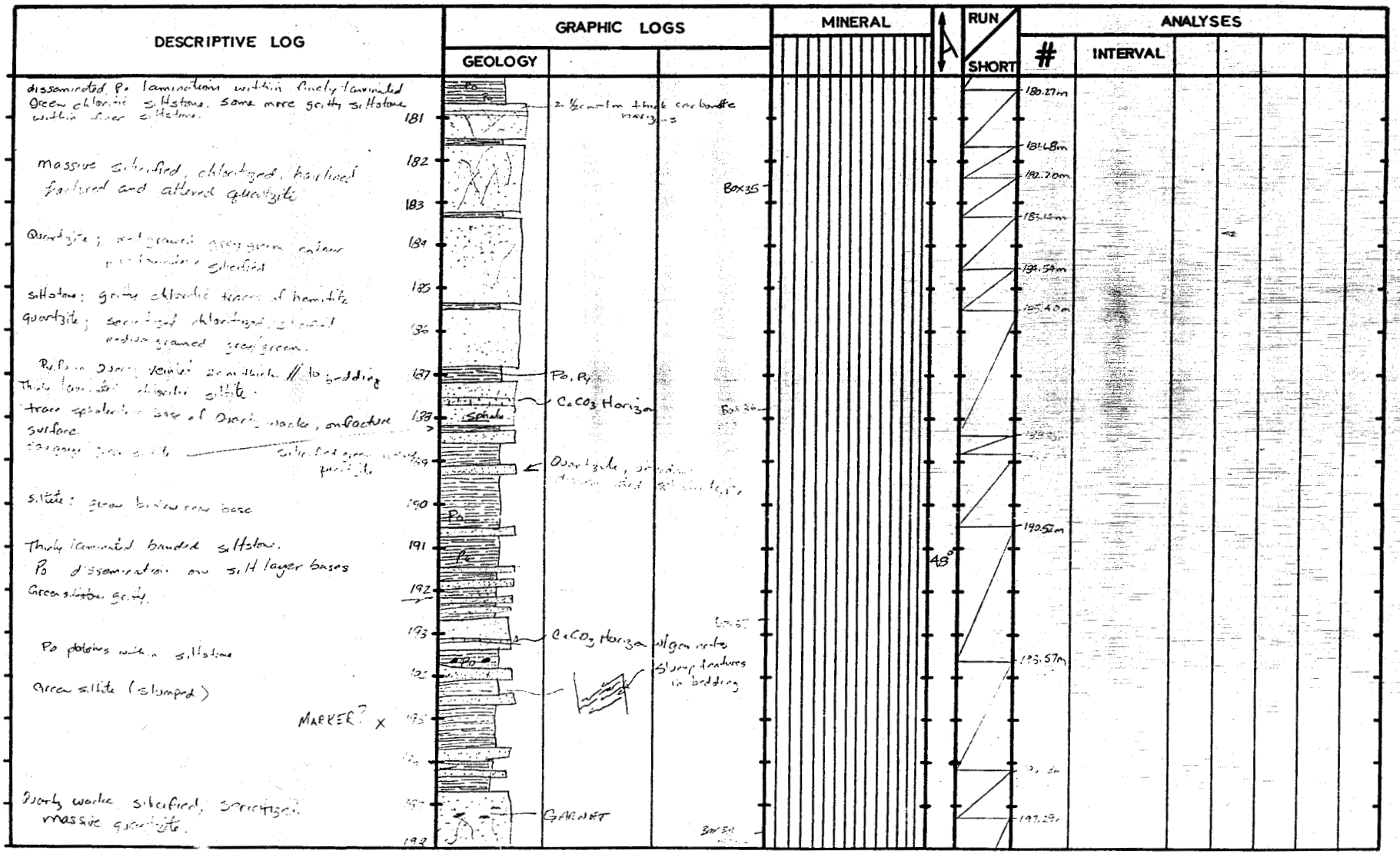
DDH Goat 88-2 CORE SIZE NQ FROM 144m TO 162 LOGGED BY J.M. Leask DATE 20/09/88 PAGE 9



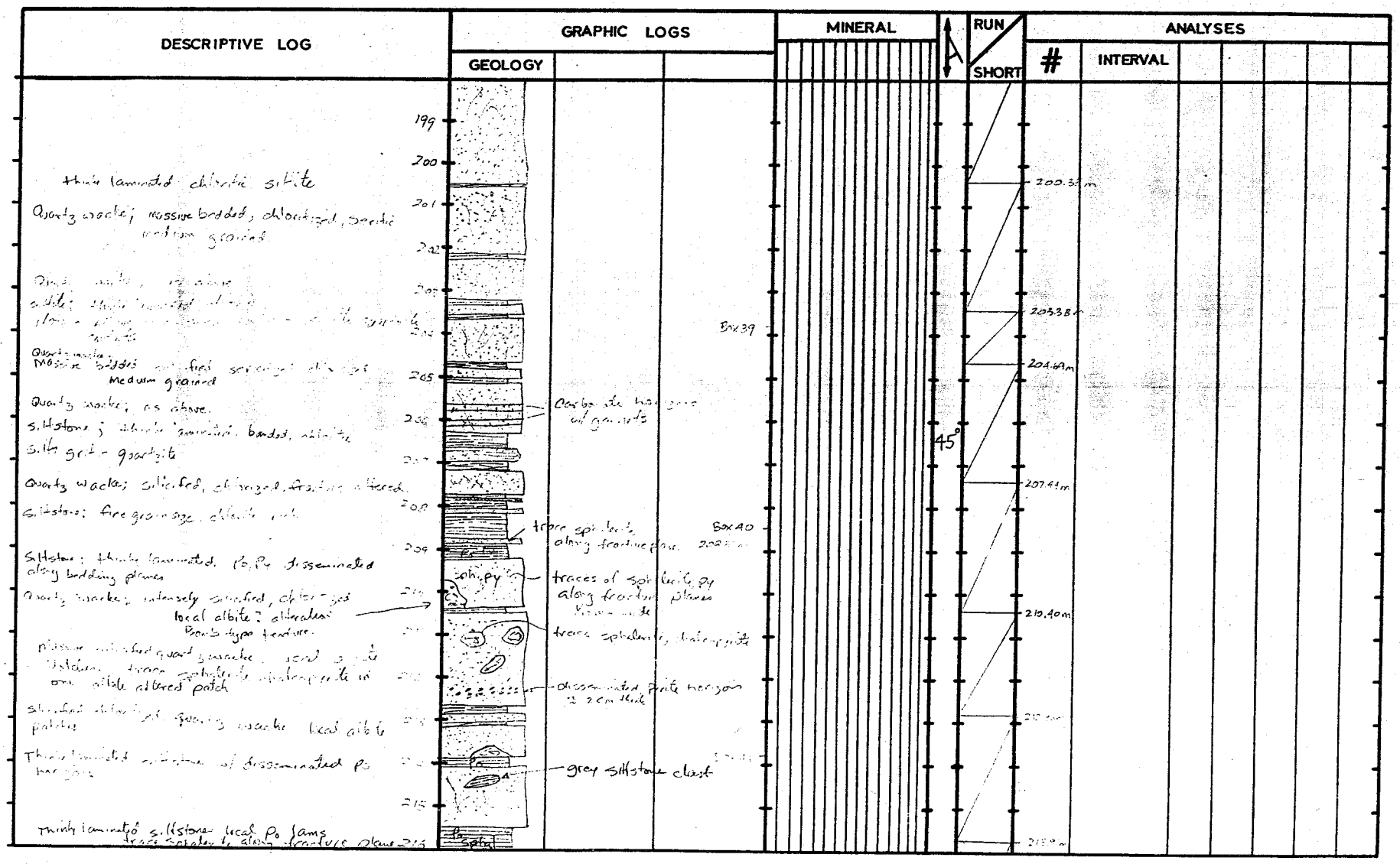
DDH Geat 88-2 CORE SIZE NQ FROM 162m TO 180.1m LOGGED BY J.M. Leask DATE 20/09/88 PAGE 10



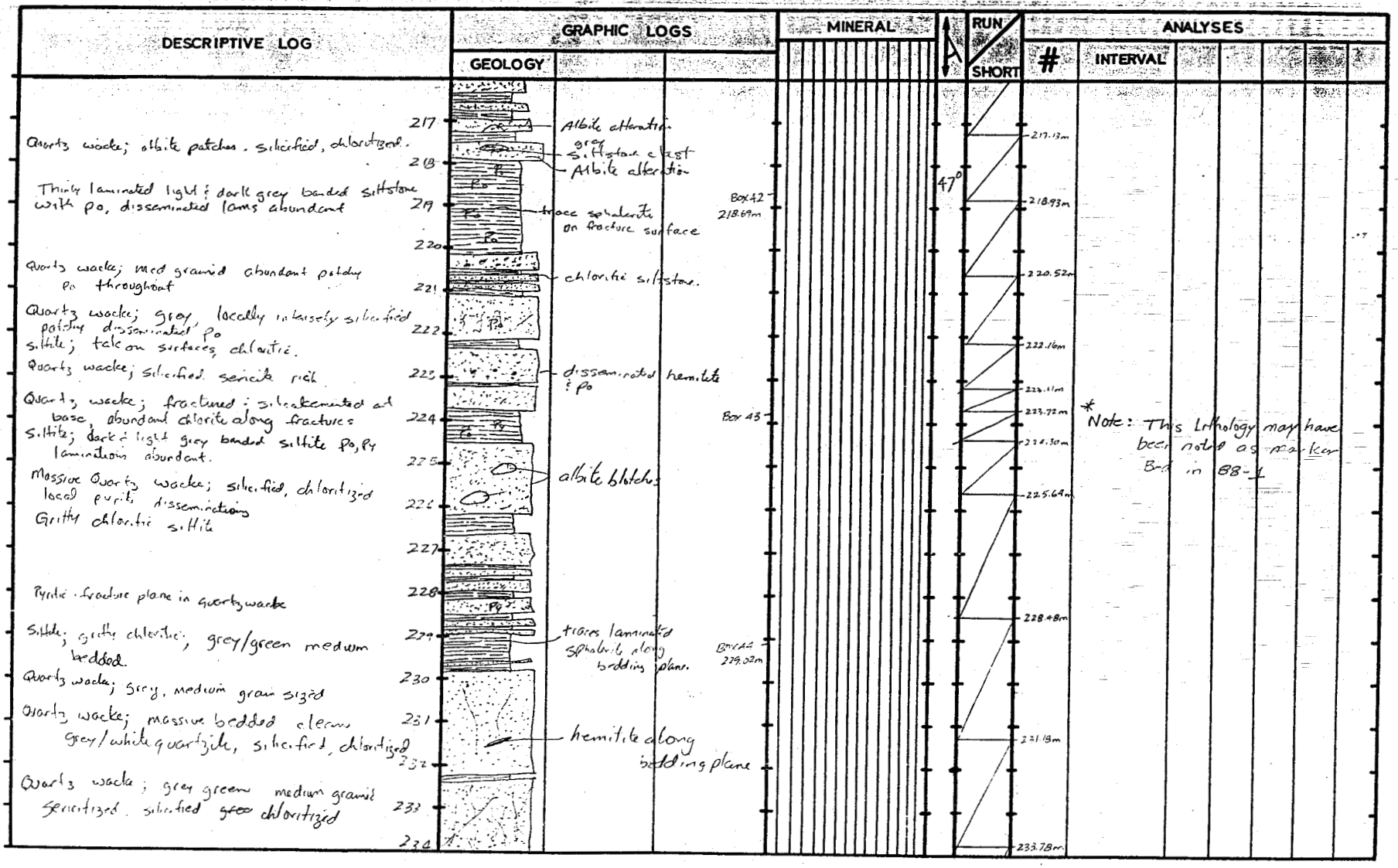
DDH GnAr-88-2 CORE SIZE NQ FROM 180m TO 198m LOGGED BY G. LEAK DATE 27/09/88 PAGE 11



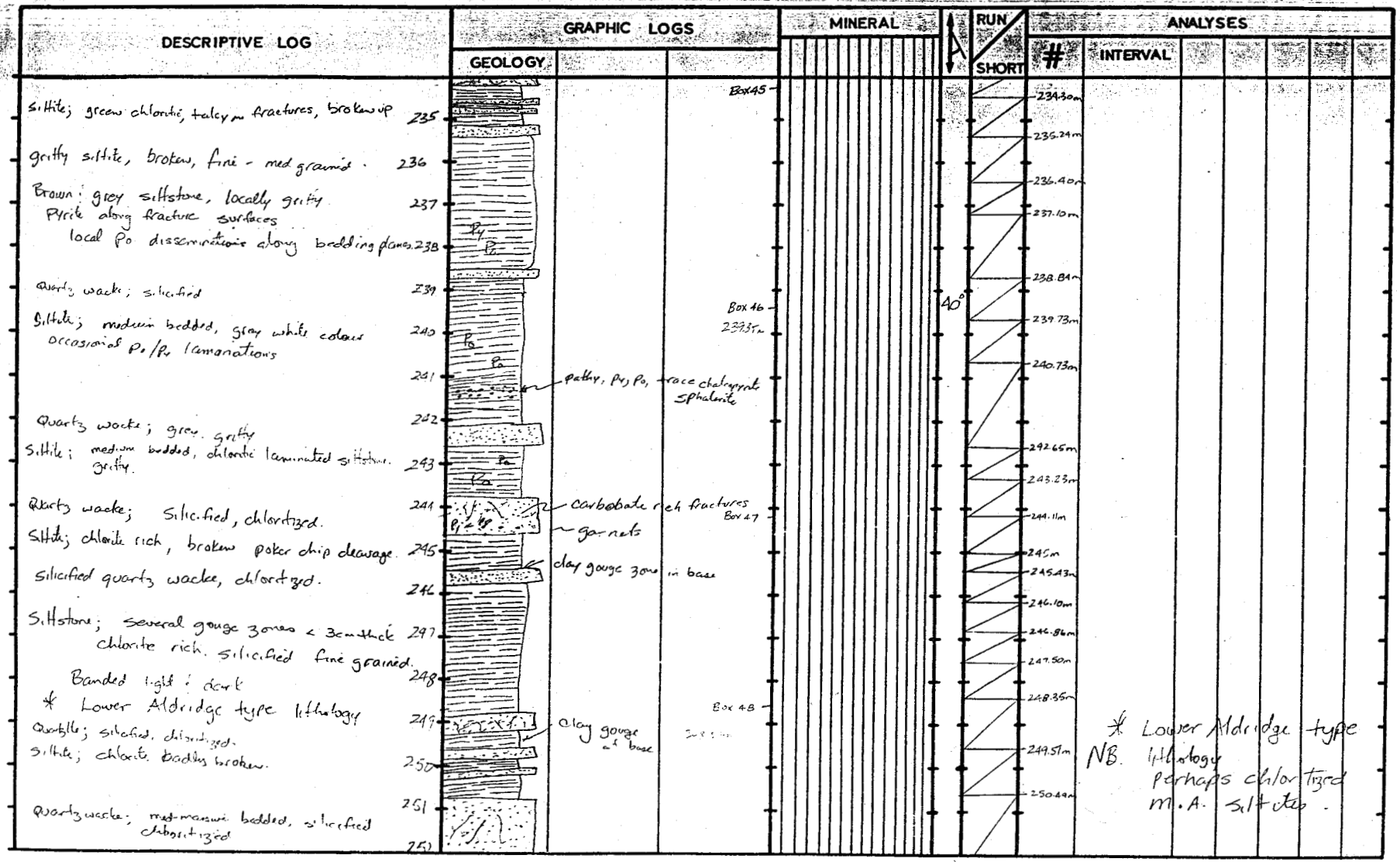
DDH GOAC88-2 CORE SIZE NQ FROM 198m TO 216m LOGGED BY G.LEASK DATE 29/09/88 PAGE 12



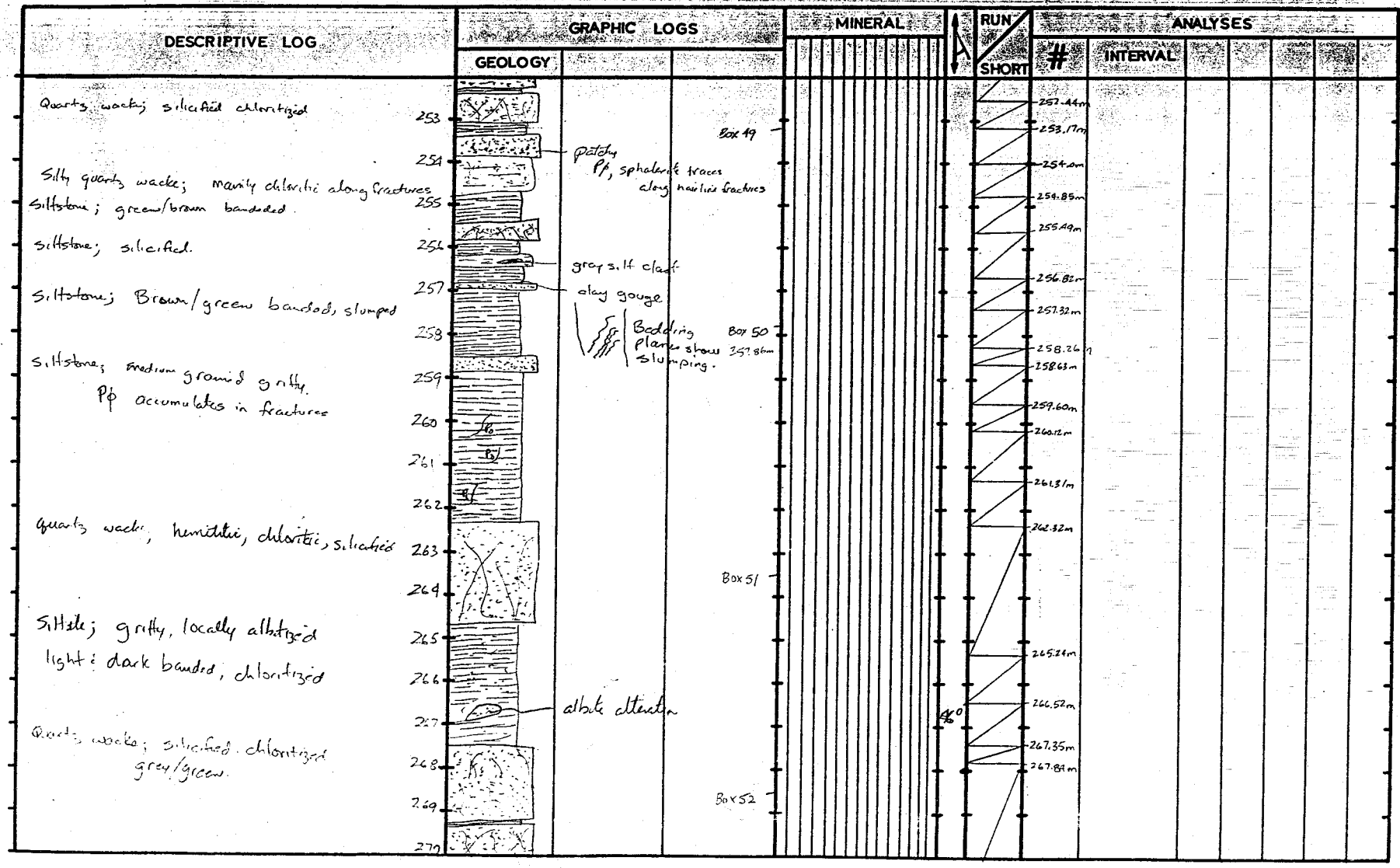
DDH Goat BB-2 CORE SIZE NQ FROM 216m TO 234m LOGGED BY A. LEASK DATE 29/09/88 PAGE 13



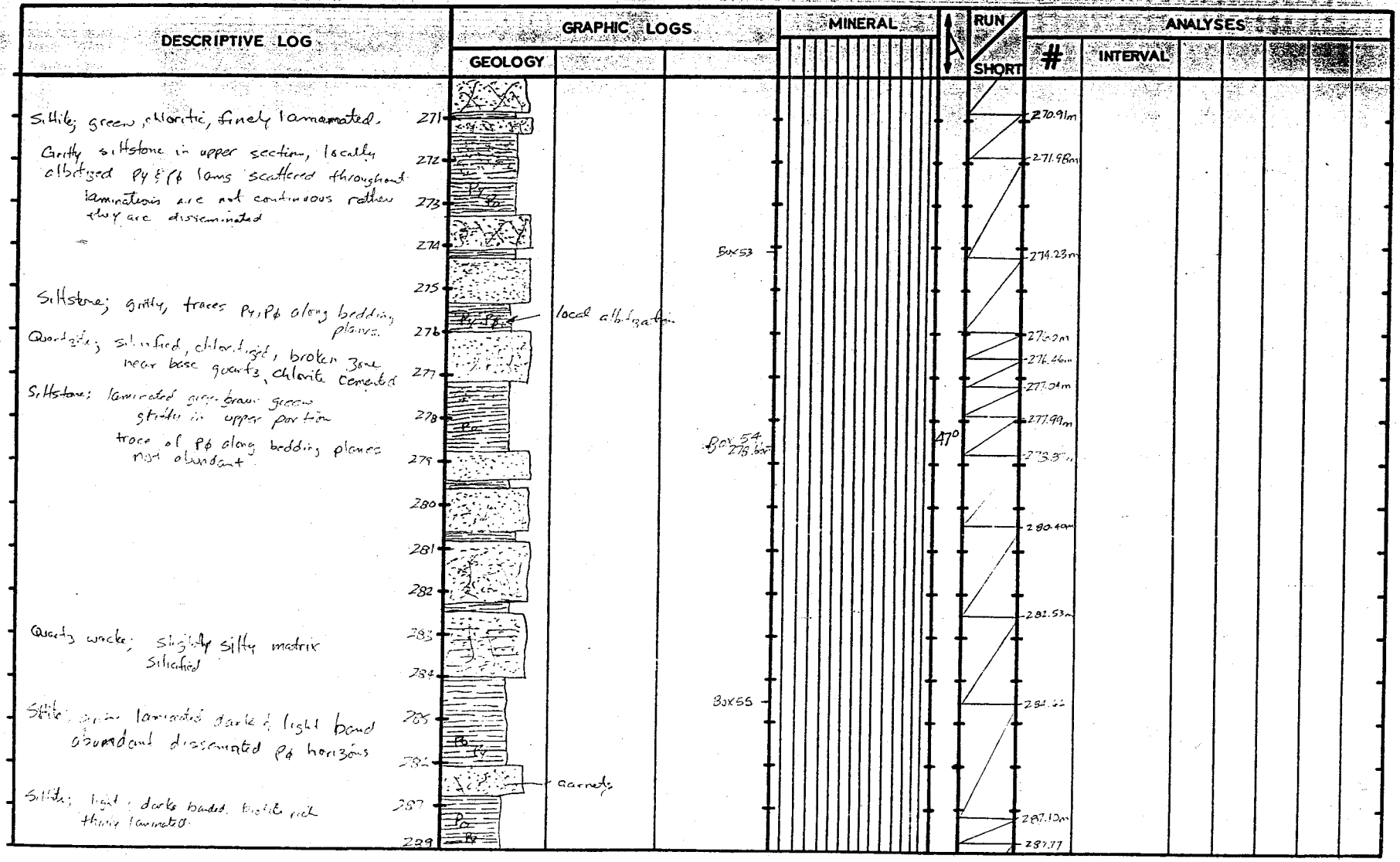
DDH GOAT 88-2 CORE SIZE NQ FROM 234m TO 252m LOGGED BY G. LEASK DATE 29/09/88 PAGE 14



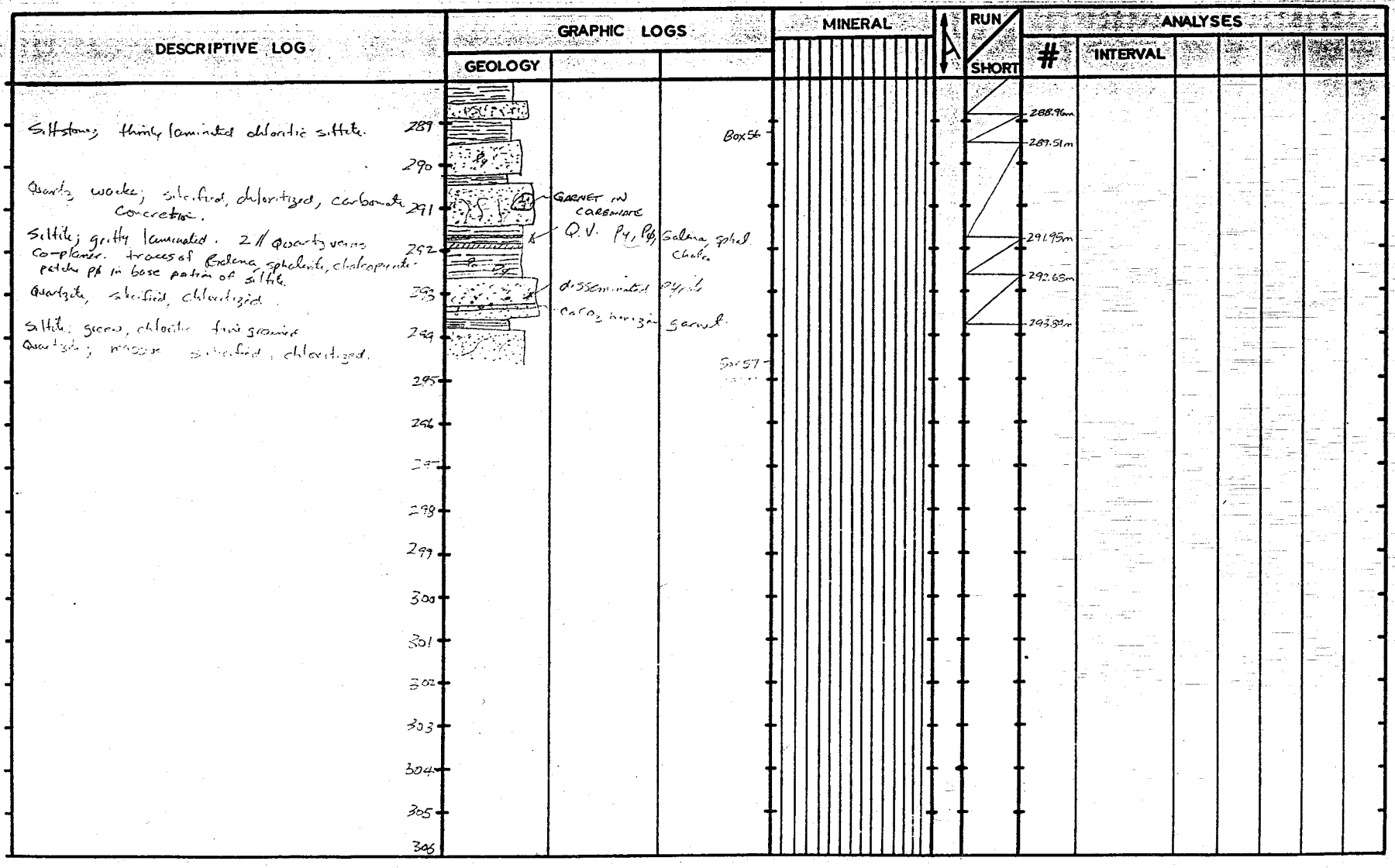
DDH GOAT 88-2 CORE SIZE NQ FROM 252m TO 270m LOGGED BY G.LEASK DATE 29/09/88 PAGE 15



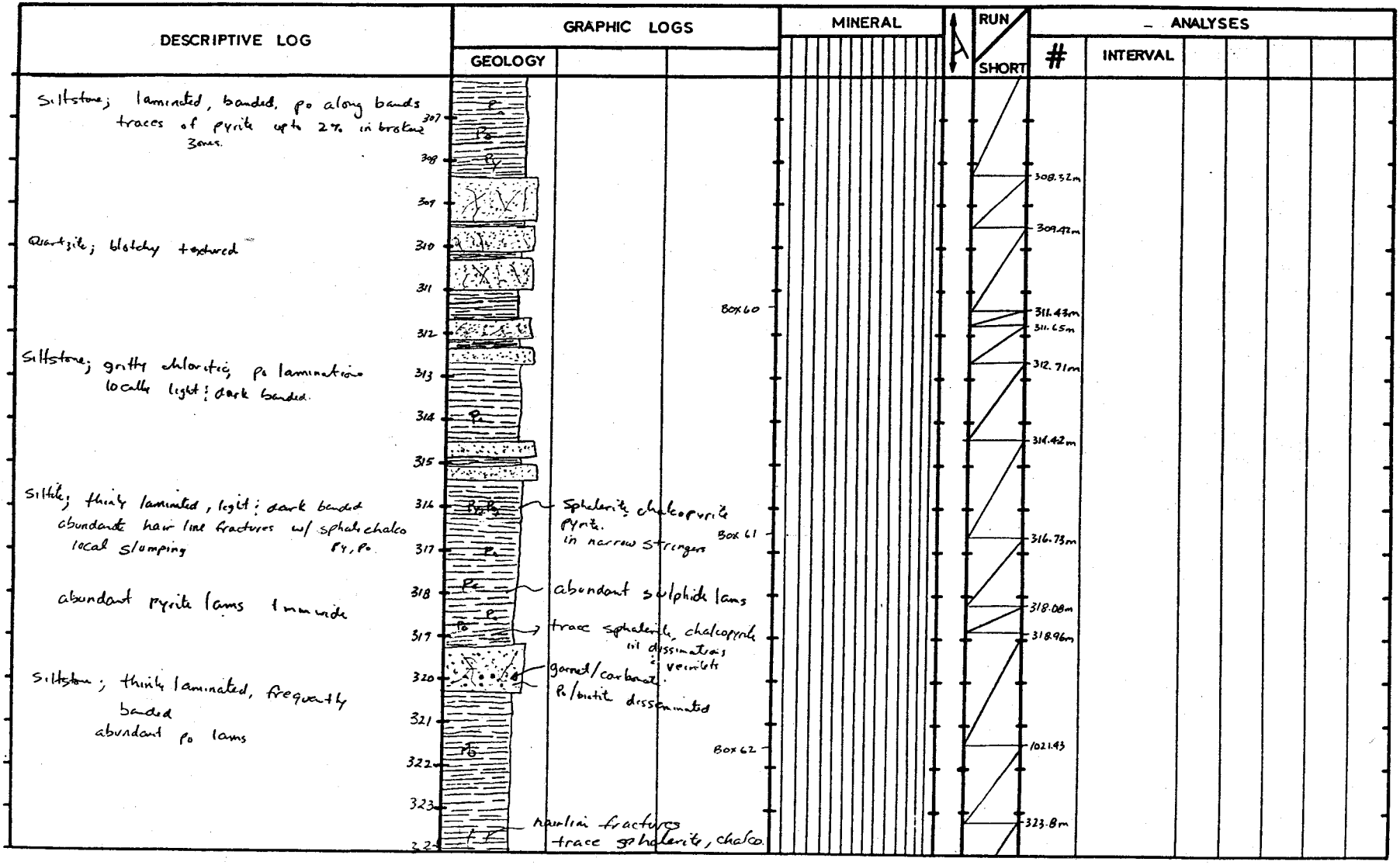
DDH GDA7 88-2 CORE SIZE NQ FROM 270m TO 288m LOGGED BY G.L FAST DATE 30/09/88 PAGE 16



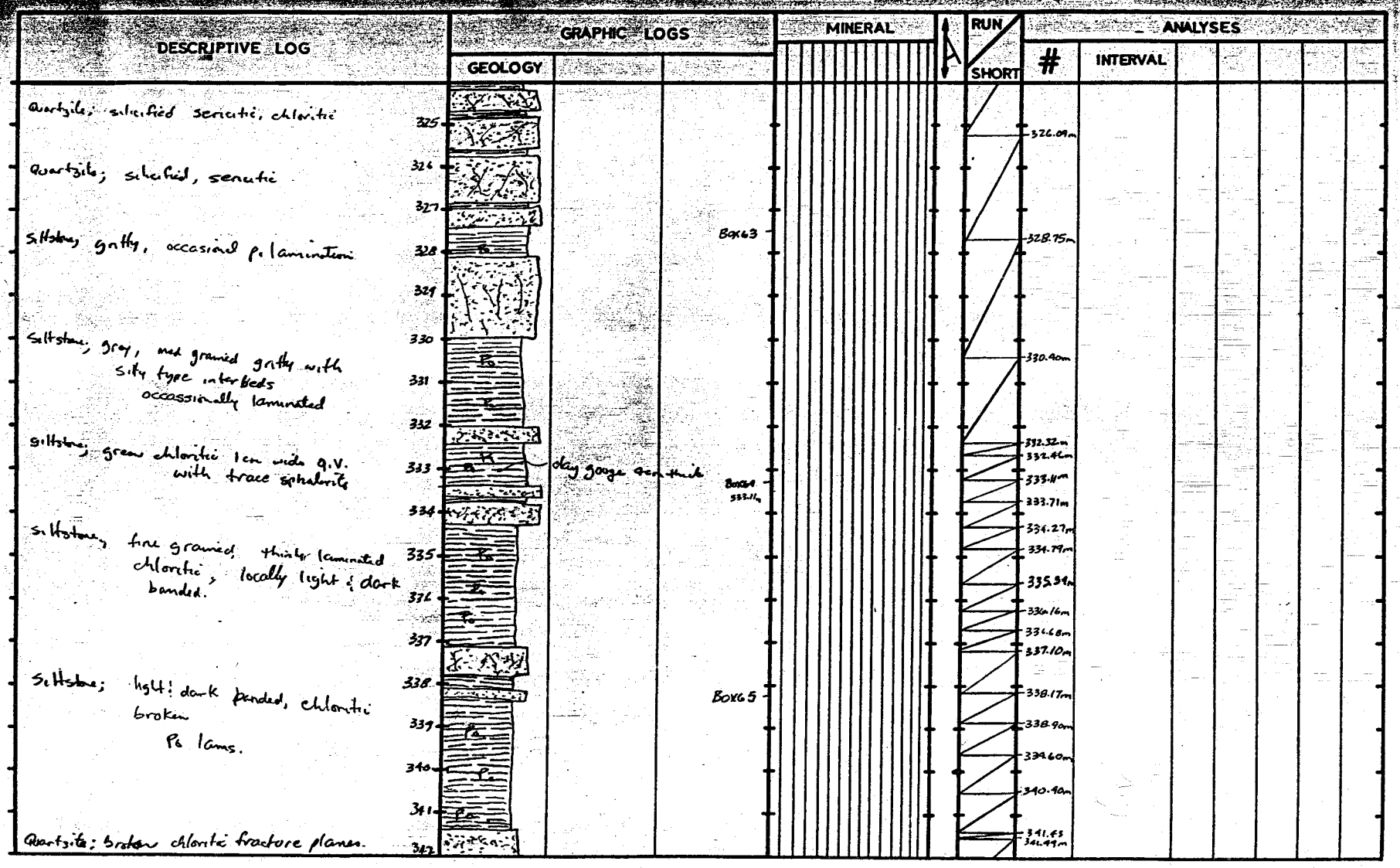
DDH GOAT BAY-2 CORE SIZE NQ FROM 288m TO 306m LOGGED BY G.LEASK DATE 30/09/88 PAGE 17



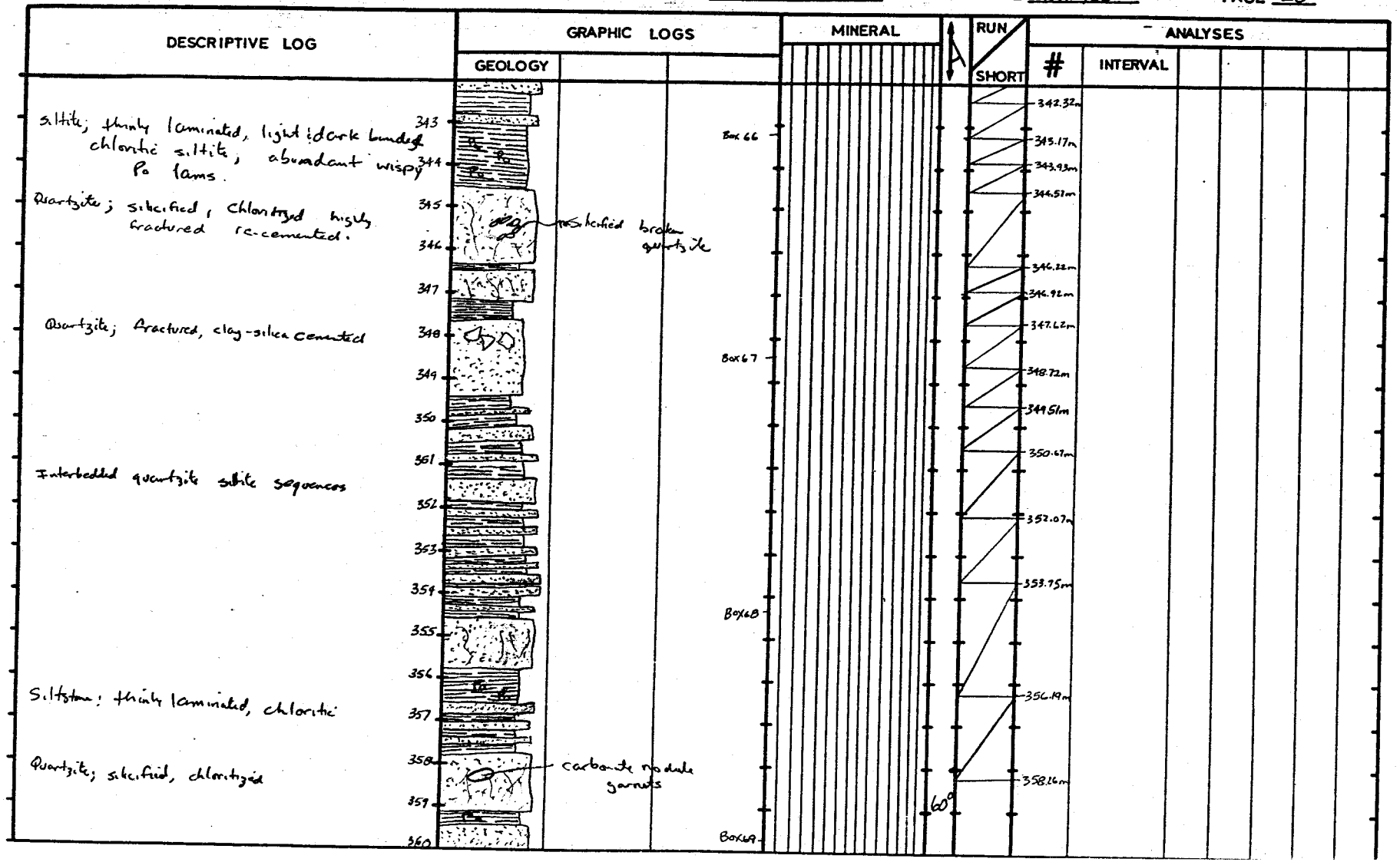
DDH GOAT 88-2 CORE SIZE NQ FROM 306m TO 324m LOGGED BY G. LEASK DATE 09/10/88 PAGE 18



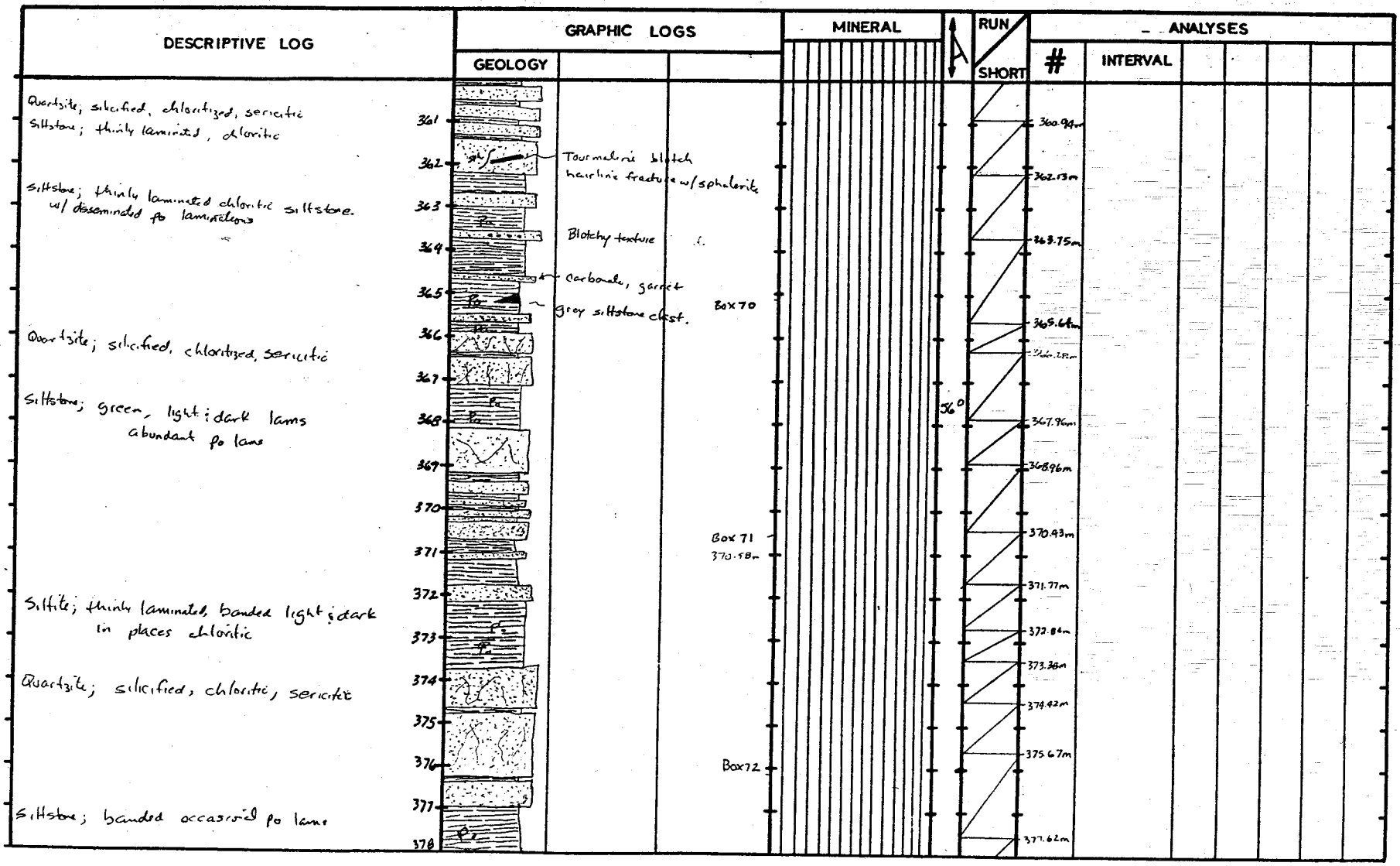
DDH [illegible] CORE SIZE NQ FROM 324m TO 344m LOGGED BY G. [illegible] DATE 9/10/88 PAGE 19



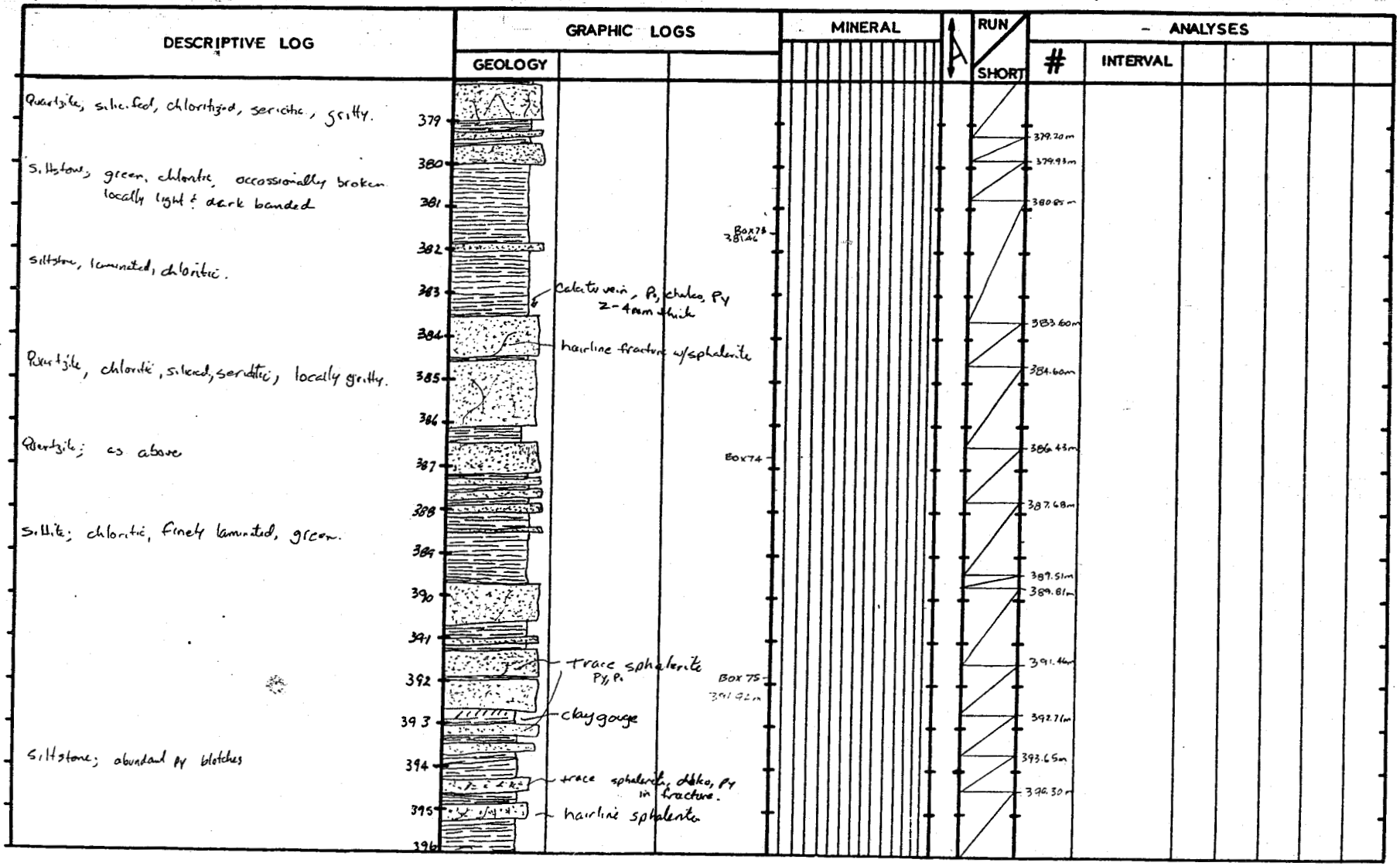
DDH Goat 88-2 CORE SIZE NQ FROM 342m TO 360m LOGGED BY G.LEASK DATE 09/10/88 PAGE 20



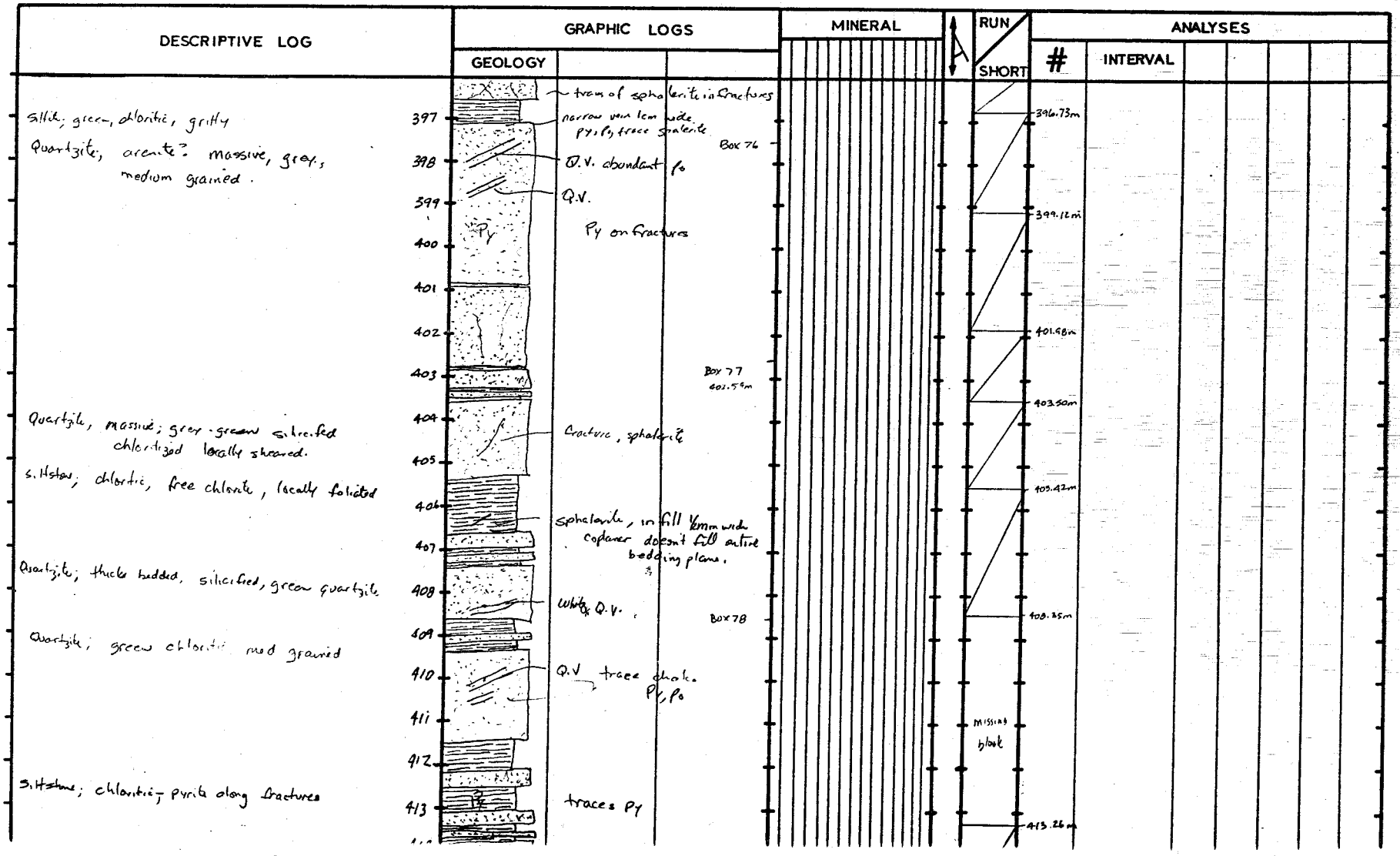
DDH GOAT 88-2 CORE SIZE NQ FROM 360m TO 378m LOGGED BY G. LEASK DATE 23/10/88 PAGE 21



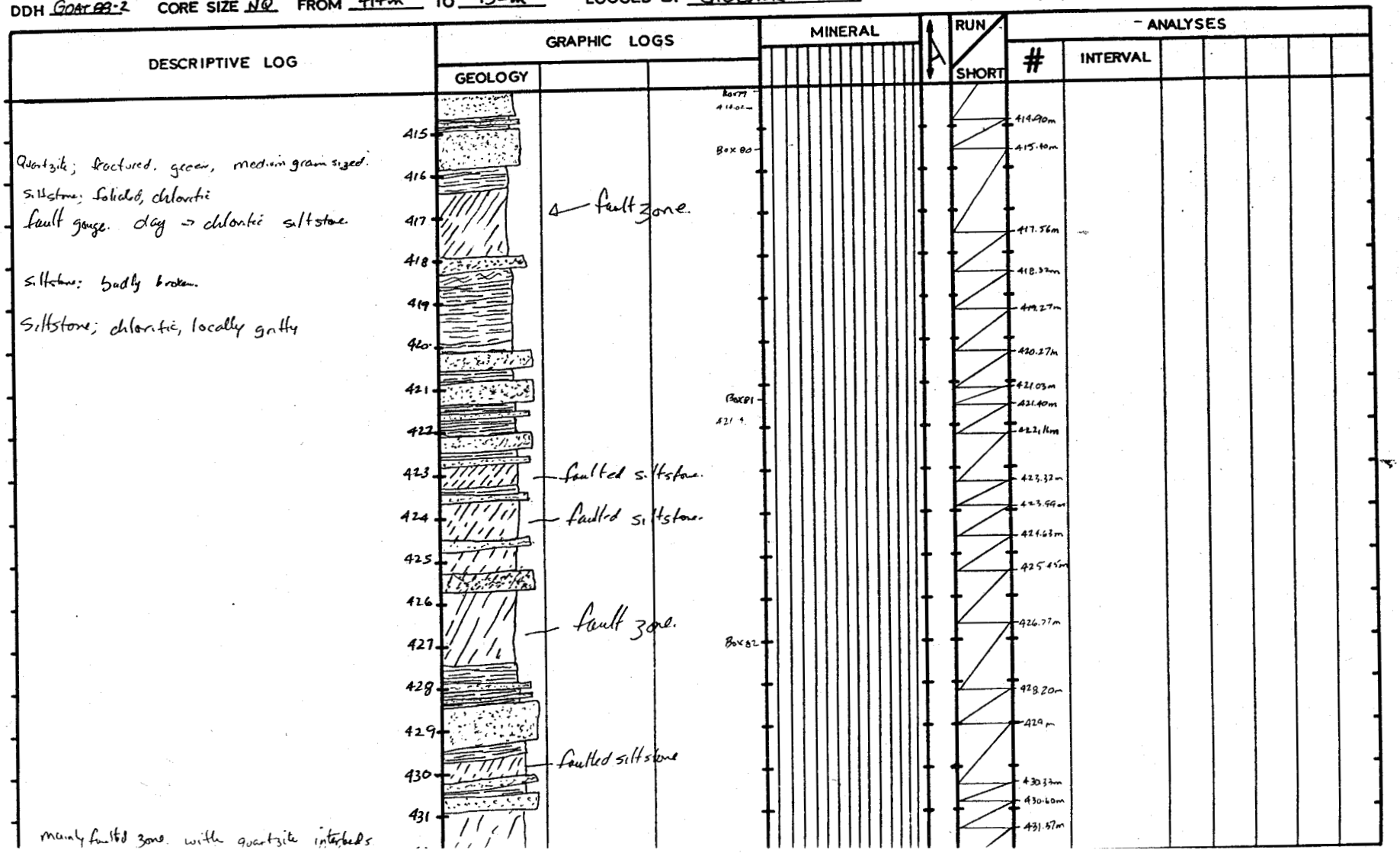
DDH GMT 88-4 CORE SIZE NQ FROM 378m TO 396m LOGGED BY G.LEASK DATE 23/10/88 PAGE 22



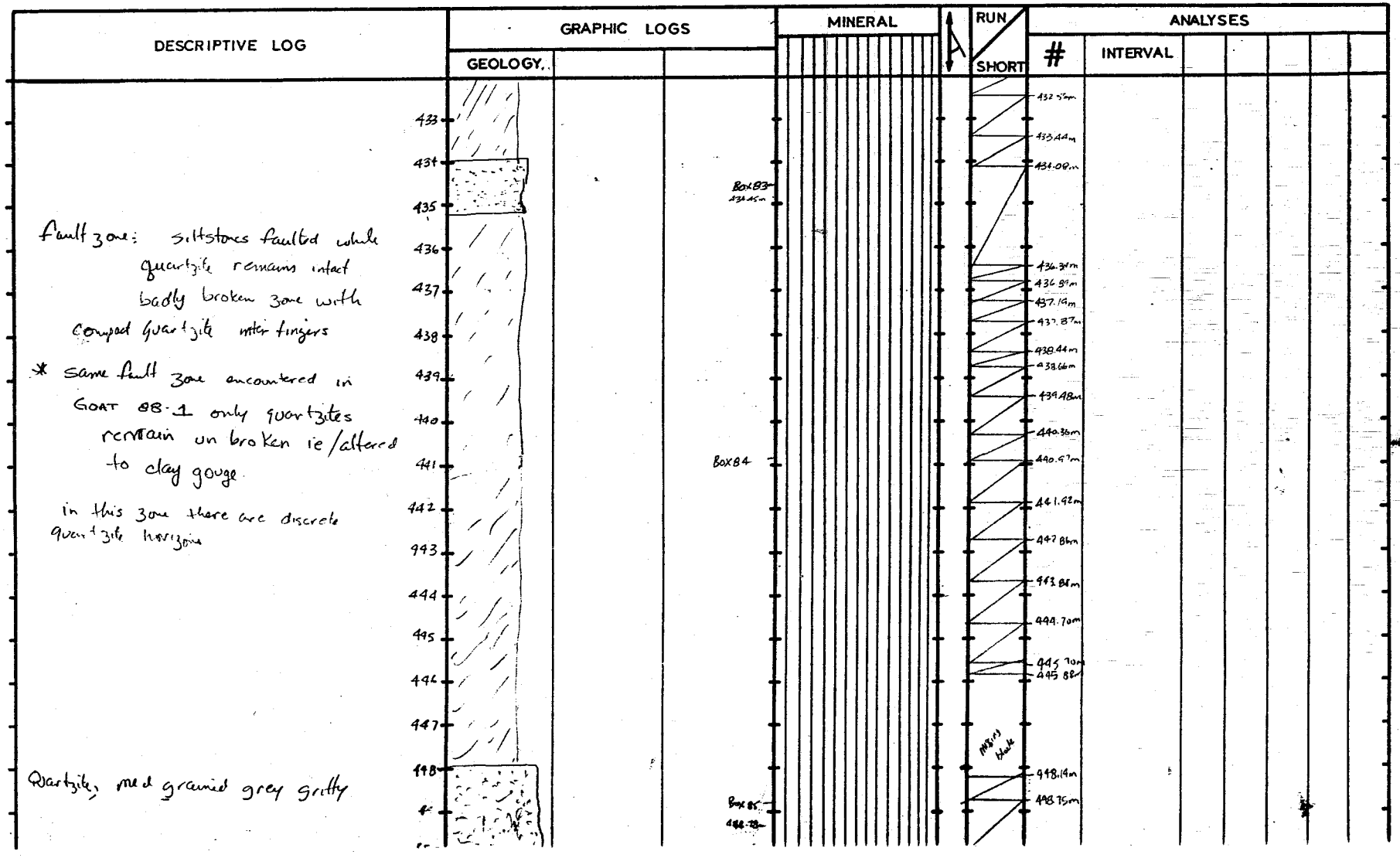
DDH Goat 88-2 CORE SIZE NQ FROM 396m TO 414m LOGGED BY G.LEASK DATE 23/10/88 PAGE 23



DDH GOAT 88-2 CORE SIZE NQ FROM 414m TO 432m LOGGED BY B.LEASK DATE 23/10/88 PAGE 24



DDH GOAT 88-2 CORE SIZE NQ FROM 432m TO 450m LOGGED BY G.L FASK DATE 23/10/88 PAGE 25



DDH GoAr 88-2 CORE SIZE NQ FROM 450m TO 468m LOGGED BY G.L EASK DATE 23/10/88 PAGE 26