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BP NORGE A/S MINERALS
Helgeland Project 1984 Annual Report

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BP NORGE a.s. MINERALS
NORSK HYDRO

HELGELAND PROJECT

ANNUAL REPORT
1984

BY: H.H.BERCHELMANN
J.E.TRÄGÅRDH

SUMMARY

S U M M A R Y

During 1983 follow-up some 1500 stream sed. (sieved) samples were collected, of which approx 15% contained Au. (7% of the samples were anomalous in As and 8% in W). These are resamples of 1982 Au anomalies which were collected predominantly at lower altitudes, delineating ~170 claim areas. As a result of 1983 work 25-30 areas were considered as interesting for further investigation. From these areas, 15 were selected as high priority targets and followed-up in 1984 (+Eitraga). Factors governing the selection of areas were such as:

1) consistency of Au anomalies,
2) structures and geology
3) anomalous path finder element (arsenic).

Areas followed-up 1984 are listed below with results and recommendations for future work. A deep overburden VLF survey was carried out March/April 1984 in following areas:

1) Bjorknes,
2) Vesterelva,
3) Tomasvatn,

Approx. 200 spls. were collected of which none contained Au. The pathfinder As, was highly anomalous in Vesterelva (4 spls. 100-200 ppm) and in Bjorknes (53 ppm). (For further information see report on this).

In total 368 rock samples, 100 soil samples, 55 stream sed. samples and 30 pan conc. were collected during summer 1984.

Rock samples containing Au are listed below. A strong correlation between Bi, Au, As and Sb in high temperature hydrothermal fractures, with or without quartz, exists. In some cases Au and Bi associates without arsenopyrite being present (e.g. Grondalen, Skomoviken). When Bi and Sb are absent strong arsenopyrite mineralizations usually carry little gold (Grundvatn qtz-vein, Skomoviken apy-fractures, qtz-vein in Holm granite, Svartvatnet qtz-apy vein exemplify this).

Stratiform diss. sulphide mineralizations and iron formations were found to contain very little Au (usually 50-100 ppb).

Future work is recommended in following areas which were not followed up in 1984:

1) Reinfjell
2) Vistfjell
3) Leka
4) Sordalen-Husvika
5) Nedre Kvanlivatn
6) Hatten

Structural maps based on aerial photos have been prepared for these areas showing the correlation with Au and As anomalies.

(STRATIFORM) DISSEMINATED SULPHIDE MINERALIZATIONS

AREA	(ppb) Au	As	Sb	Bi	Cu	Pb	Zn	COMMENT
HJARTSKARMO	53 20	0 0	0 0	176 281	972 1317	829 2287	30162 36634	Hosted by amphibolites, marbles
FELLINGFORS	45 28	0 0	0 0	112 61	1317	425	41216	Hosted by calcsilicates, marbles
STABBFORSMOEN	28	13	0	0			Pyrr.	Hosted by calcsilicates
SORENSKOGVATN	37	620	0	6	219	45	Pyrr.	Hosted by hornblende-mica schist
BJORNDALEN	60	23	0	331	1199	10882	31625	Thin bands in marble
EITRAGA	0	0	8	27	44% Ba	1500	3.6%	Sulphide bands in quartzite hosted by marble

IRON FORMATIONS

AREA	(ppb) Au	As	Sb	Bi	Other	COMMENT
TUSTVATNET	49	0	0	0	Magnetite	Bands in calcite marble
HERRINGBOTN	0	15	0	0	Magnetite	Hosted by hornblende schist
EITERAVALLEY	0	14	0	9	Magnetite	Qtz-magnetite bands in amphibolite

ROCK-CHIP ANALYSIS OF
VEIN TYPE MINERALIZATION

SAMPLE	AREA	Au		As	Sb	Bi	OTHER	COMMENTS
MJ3401	MJAVATN	0.09		0	0	21	734 Ba 31 W	1m thick qtz-vein. No sulph.
FF2401	SVENNINGDAL MINE DUMP	5.0	4.6	55349	1002	173	2272 Cu 16861 Pb 17398 Zn	Polymetallic qtz-vein
ET9401	EITERASEN II	0.30	0.29	2079	28	0		1dm wide hydro-thermal fract. Chloritization
ET9402		0.35	0.34	2001	39	0		
HO3404	HOLM GRANITE	0.490		146	38	59	4645 Pb	Polymetal. qtz-vein & thin fis-sures of sphal. gal. in granite.
HO3405		0.090	0.070	804	0	6	200 Pb High Zn	
TN9401	GRUNDVATN	0.042 0.037		15065	5	20	330 Pb 41 W	1.5 thick and 200m long qtz-vein. 37 Mo in skarned wallrock
SK3402	GRONDALEN	2.3	2.5	11	0	421	976 Cu	Hydrothermal fracture w/car-bonate, chlor. cpy (10cm thick)
SK3403		0.472	0.490	9	0	330	1287 Cu	
SK3411	SKOMOVIKEN	0.254	0.264	27	0	301	1913 Pb	3dm thick sulf-bear. qtz-veins in granodiorite.
SK3412		0.178	0.178	25	0	167	1184 Pb	
SK3[redacted]4		0.925	0.833	3		475	46 Pb	
SK3415		0.148	0.129	14547	0	27	91 Pb	Fract. in meta-sed. close to Skomoviken gran.
KL3405	KLAUSMARKELVA	1.04	1.04	188046	76	193		1-2m thick qtz-veins w/fract., aspy mineral-ized, contacts. Also aspy diss. along fractures in granodiorite (No qtz.)
KL3406		./.	./.	2200	3	0		
KL3411		0.13	0.13	5202	3	4		
KL3420		0.16	0.16	10447	9	5		
KL3421		0.35	0.32	22254	6	19		
KL3423		0.15	0.15	20163	6	23		
KL3424		0.32	0.40	18359	14	12		
KL3426		0.72	0.70	64125	0	77		
KL3444		0.148	0.148	11225	0	14		
KL3445		0.025		47	0	97		
KL3452		0.042	0.033	15336	8	30		
KL3453		0.153	0.129	47192	54	43		
KL3454		0.425	0.393	108689	77	133		

N.B.: ALL VALUES IN PPM!

LIST OF AREAS FOLLOWED UP 1 9 8 4 (for detailed description see follow-up sheets)

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Straumen 1926 IV DREVJA	1 anomalous spl (188 ppb) in fluvioglacial sed. at lower altitudes	7 consistent anomalies in 2 branches of the stream at lower alt. RESAMPLE OF ORIGINAL SA. P. NOT ANOMALOUS	1:5.000 Spl Overlay Geochem. 1:5.000 Geology, Structures (Based on economical Mapsheet)	3 pan concentrates 5 rock samples MAPPING	1 pan concentrate anomalous (159 ppb)	Rock spl. taken from pyrr-bearing fractured qtz-veins contained no Au. No future work recommended.
Mjavatn 1926 IV DREVJA	Original spl. 69 ppb Au. Taken in fluvioglacial covered area	7 anom. in various stream branches. One high range anomaly (652 ppb) RESAMPLE OF ORIGINAL SA. P. NOT ANOMALOUS	1:5.000 Spl. overlay Geochem. 1:5.000 Geology, Structures (Based on economical Mapsheet)	8 pan concentrates (Resamples of 1983 Stream sed. spl.) 8 Rock spl.	4 pan concentrates anomalous of which 3 are resamples of non-anomalous 83 stream sed. Pan concentrates of 652 ppb stream sed. anom. without Au 1 rock spl. returned with 90 ppb Au (qtz-vein	Rock spl. from qtz vein contained 90ppb Au. 21 Bi. The vein was found above the 652 ppb stream sed. anomaly. Other rock spl. from sulphide-bearing quartzites & shear-zones returned without Au. Clear correlation between structures & Au-anomalies. exist. Further soil spl. & litho spl. along fractures.
Bjorknes 1926 IV DREVJA	Original spl. points contained 345, 22 ppb Au. Glaciofluvial mtrl. common.	Resamples were anomalous. Northern stream 2 high range anom. Southern stream 2 high range, 1 medium. Weak As anomalies.	1:5.000 spl overlay 1:5.000 Geology (Based on economical mapsheet)	Mapping Rock samples: BK2401-8; BK3404-11 Pan concentrates: BK 2501, 3502-3505 Soil spl. over diss. pyrr. horizon. D.O.B sampling over Northern stream.	Two rock spl. contained Au: 37, 15 ppb. One DOB spl. returned highly anom. in As (53 ppm)	Both litho samples that contained Au were taken from strong pyrrhotite diss. in calcsilicate horizons close to dioritic intrusion. Further follow-up of fracture/breccia zones close to intrusion. Closely spaced soil spl. on slopes and in the vicinity of Au-bearing streams in order to detect the pathfinder As.
Vesterelva 1926 III GRANE	3 anomalous spls in stream sed.(48.8,231 ppb Au). Most of the area covered by till	Resamples contained Au 5 Au anomalies in southernmost stream.(3 high range) Tributary from this contained consistently high As. (56,54,124 ppm) 2 Au anom. in northernmost stream.	1:5.000 spl overlay 1:5.000 structures	Lithosamples: RF 3401-6 Pan concentrates: RF 3501-8 Stream sed: RF 3301-23 Soil samples: RF 3601-21 DOB sampling in two drainage areas	3 Pan concentrates contained Au of which 2 are high range and in other streams than previously sampled. (1.3 ppm, 325 ppb) High As DOB anomalies in tributary to southern stream (145, 205, 236.23 ppm) All soil barren. One stream sed. anom. in stream not sampled previously.	Strong corr. between Au anom. in stream sed. and structures. Further closely spaced DOB or soil sampling over specific areas where Au/As anomalies coincide with fractures.

MAPSHEET CLAIM AREA	1982 RESULTS	1983 RESULTS	MAPS ATTACHED	1984 WORK DONE	RESULTS	COMMENTS
Klausmarkelva 1826 III VEVELSTAD	One Au, 4 As and 2 W anomalies in stream sed.	Three rock samples contained Au (254, 284,26 ppb). Samples taken from arsenopyrite min. qtz-vein	1:20.000 geology, structures, sample loc.	54 rock samples of arsenopyrite mineralized fractures and qtz-veins. KL3401-3454	Eleven rock samples contained over 100 ppb Au Strong correlation with Sb and Bi. All gold bearing rocks from 3 to 7 localities sampled.	The samples were collected along a major N-S trending fault zone, which host a 1-2m thick qtz-vein. The qtz-vein is arseonpyrite mineralized at fractured contacts.The highest Au values are in samples significantly high in Sb, Bi (77, 173 ppm) as well as As (10%). The structure is extending several km. Further follow-up of similar structures in the region especially close to the gabbro body. Blasthole sampling along the structure sampled this year i recommended. Also reconnaissance in marble stripe northeast of this.
Mo-Troms itraqa diss. Zn-Pb-Ba mineralization STORFORSHEI 2027 IV	Rock sampling (Massive sulphide programme).	Three Au anomalies in stream sed. (190, 124, 224 ppb).	1:50.000 sample loc.	Rock samples: MT3401-5 MT9401-2 Stream sed: MT9301-7	One stream sed. Au anom. (Resample of 1983 anom.) No Au in rock.	No further work is recommended.
Gronnfjeldet Massive sulphide STORFORSHEI 2027 IV				DN 3401-12 (Rock spls.)	One rock spl. contained ~30 ppb Au.	One sample returned with background Au value for a massive sulphide in this part of the world (~30 ppb). No further work is recommended.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Vasbotn (Sausvatn) 1825 IV VELFJORD	The area was stream sed. sampled but no Au anomalies.	Rock samples from qtz-arsenopyrite-tourmaline-breccia returned with 800ppb Au. Chloritization of immediate wallrock (25 ppb Au). One visible Au grain was found in pan conc. Further follow-up of this stream by collecting pan conc. resulted in 7 consistent Au anomalies (max. 1150 ppb).	1:5.000 sample point overlay, geochem. 1:5.000 Geology (Based on economical mapsheet). Vertical profile of Au anomalous stream showing stream sed. versus pan concentrates.	Further panning above 83 anomaly (N09501-9503) Soil samples: N09601-9609 Stream sed: N09301-9310 Rock samples: N03401-3412. 3-4dm thick qtz-vein with pyrite, chlorite in fractures was found directly above 1150 ppb Au anomaly.	The two lowermost stream sed. spls. are anomalous of which one is a resample of a 1982 sample. All soils barren. Sa. No. 9303 = 43ppb Au 9304 = 146ppb Au	Rock samples N03407-9,11,12 are taken from qtz-vein/breccia immediately above 1150 ppb anom. in order to compare pan conc. and stream sed. resamples were collected (see vertical profile). The two lowermost stream sed. samples collected from finer-grained mtrl. at lower altitudes were anomalous. Increasing Au, As values in pan conc. upstream where stream sed. are barren. No further work i recommended.
Skomovik & Grondalen 1825 IV VELFJORD 1926 III VEVELSTAD	Original stream sed. sample for Grondalen stream 41 ppb Au. Original stream sed. sample for Skomovikken B 2 ppb Au.	Two Au anom. in stream system draining Grondalen Au-vein (83, 78 ppb) RESAMPLE NOT ANOMALOUS Skomoviken B returned with one 93 ppb Au anom. RESAMPLE NOT ANOMALOUS	See report from Dr. Schoenfeld	Detailed geological mapping and structural interpretation by Clausthal University team. Rock spls: Sk 3401-17	Rock spls from 3 dm thick qtz-veins in Skomovik granodiorite returned w/ Au (925, 264, 187 ppb) and very high Bi concentration up to 475 ppm. See also report from Dr. Schoenfeld.	Tourmaline veins/spots in Skomovik granodiorite ore thought to be derived from surrounding metased., probably during thrusting. Layers of 1-2 dm thick tourmaline rich horizons (60-70%) were observed in biotite schist. It is likely that Au, As min. in fractures was formed during a hydrothermal episode connected with thrusting. At Grondalen a 1dm thick hydrothermal fracture was sampled containing 2.5ppm. Au. (Carbonate infilling, chlorite, pyrite. Hosted by amphibolites).

MAPSHEET CLAIM AREA	1982 RESULTS	1983 RESULTS	MAPS ATTACHED	1984 WORK DONE	RESULTS	COMMENTS
Spelrem 1926 III CRANE	Au anomaly in stream draining diss. sulphide horizon.	Rock spls. were taken from stratiform diss. pyrite min. No Au, 114 As, 700 ppm Pb High chromium. Approx. 10-15m thickness. Further litho-sampling considered necessary	Sketch map of sample loc.	Stream sed.: SP 2301 Rock spls, blasted: SP 9401-19 SP 2401-2 Soil spls: SP 2601-7	Stream sed. spl. anomalous (~262 ppb) Rock samples contained no gold. Soil samples contained no gold.	Diss. pyrite horizon in sericite-quartz-schist, hosted by marble and calc-silicate. Some analytical results: SP 9407: 88 As, 806 BA, 1374 Cr, 853 Ni: (ppm) (Low in Cu, Pb, Zn). Abundant graphite. The Au results leave the source for stream sed. Au anomaly left unexplained.
Tomasvatn 1925 III MAJAVATN	Original anom 27 ppb Several streams in the area were sampled. Thick glaciofluvial material.	One stream sed. spl. highly anomalous (1960 ppb) 3 pan conc. anomalous (263, 329, 1000 ppb Au). All anomalies conc. in area covered by thick glaciofluvial material.	1:5.000 spl overlay 1:5.000 geology	Stream sed.: MA 3301-7 Soil spls: MA 3601-38 Rock spl: MA 3401 Overfraction of str. sed. spls. collected above anomalous area has been re-analyzed DOB grid 25m between spls 100m between lines. VLF survey	4 weak As anomalies in DOB grid. Stream samples: No Au. Soil samples: MA 3609 = 34ppb Au MA 3632 = 66ppb Au MA 3633 = 120ppb Au	The side stream which emerges where cluster of anomalies occur does not carry any Au. The source for Au could be local as the overfractions returned negative. Possibly further soil sampling could be considered. The anomalies occur 2km W (down ice direction) of an amph. breccia. This should be followed-up and rock sampled.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Eiterasen II 1926 III GRANE	One anomaly in major N-S running stream (220 ppb Au)	Resample anomalous. 4 low range and 2 medium range anom. consistently upstream	1:40.000 spl overlay structures	Rock spls: Et 9401-4	All rock spls. contained Au (300,350,28, 28 ppb) High Sb and As.	Rock samples taken from hydrothermal joints in fracturezones. ALTERATION: arsenopyrite, py chloritization. Further follow-up and lithosampling of these fracturezones(approx.50dgr).
Rauvatn 1926 III GRANE	2 Au anom. in 2 streams (43,219ppb) 219 ppb in stream draining Au-qtz-vein Weak As. Most of the area stream sed. sampled	10 Au anom. in area draining Au-qtz-vein. Strong As (Max 220ppm) 3 Au anomalies in parallel stream 1km south. 3 anomalies in stream opposite Au-qtz vein (other side of the valley).	1:20.000 spl overlay 1:20.000 structures	Rock samples: RV 9401-27 (Au-qtz vein) RV 2401-27 RV 3401-32 (Mainly northern part. For analytical results see attached list. An area of approx. 10 km2 was checked. (North of Au-qtz-vein).	QTZ-AU-VEIN: 29.5, 24.5, 21, 3.5, 1, 2.7, 6.5, 3.5, 8.5 ppm A alone 300 m NORTHERN PART: 10 rock spls containing 27-1500 ppb Au.	Strong correlation between Au-As-Sb. All rock samples containing high amounts of Au taken from arsenopyrite rich margins of qtz-veins. The immediate wallrock is chloritized-sericitized. This contains some hundred ppb Au and diss. of apy. In northern part 6-7 qtz-veins (1-3dm wide) were sampled. The stream S of Au-qtz-vein (in overburden covered depression) needs to be soil sampled.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Bellingtons 1926 III GRANE	3 Au anom. in 3 stream sed. (101,37, 27 ppb). Glaciofluvial sand, silt, clay.	1 resample not anomalous. 6 consistent anom. in middle stream (2 high range). 4 anom in northern stream and 3 high range anom. in southern stream. Weak As. All in areas with thick overburden.	1:5.000 sample, Geochem. overlay 1:5.000 Geology, Structures	Rock samples: FF 3401-8, FF 9401-4, FF 2402-4. FF 2401 from Svenninodal mine dumps. Pan Conc.: FF 2501-3, FF 9501-2, FF 3501-3. Soil samples: FF 9601-29. Stream sed. (Not sieved in the field, 500 g collected) FF 9301-15 of which all were resamples of 1 9 8 3 samples.	Two soil spls Au anomalous (79, 132 ppb), arse anomalies associated. 3 Pan conc. localities contained Au, of which one was high range 3.5pp (1 visible gold grain) 3 litho samples containe Au (47,24,50 ppb) No stream sed. spls. were anomalous.	Rock samples taken from stratiform disseminated sulphide (Zn, Cu, py, pyrr) contained Au. This horizon hosted by marbles-calcsilicates. Svenninodal mine dumps returned with 5ppm Au. Further closely spaced soil-sampling near detected soil anomalies and on various altitudes on slope close to stream sed. Au anomalies in middle stream (This would also include soils over marble-quartzite -calcsil. horizon close to anomalies)
Stabbforsmoen Stormoen 1926 III GRANE	2 anom. in 2 streams (142,47 ppb Au)	2 resamples not anomalous. 24 Au stream sed anomalies in 2 stream systems. 10 high range anom. (>100 ppb). Weak As.	1:20.000 spl overlay 1:20.000 Geology, Structures	Rock spls: FF 2405-12 Mapping, structural interpretation	3 lithosamples contained Au (70,29,28 ppb)	2 of the rock samples containing Au taken from mylonitic, siderite veined rock (weak diss. of sphal, gal, py). One (29ppb) spl. taken from stratiform diss Cu, pyrr horizon hosted by thin calcsil-marble stripe. Soil sampling could be considered as no glaciofluvial material exists. Blasting and further lithosampling in order to detect higher Au values in main 50 dgr. structure.

TYPE OF MINERALIZATION	Au (ppb)	As (ppm)	W (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	MIN.	NAME / CLAIM NO.
X-CUTTING QTZ-VEIN	2220	7280	4	77	48	64	PY, As PY	RAUVATNET 17
WALLROCK (BIOTITE GNEISS)	40	2990	5	64	140	1280	As PY CHLORITE	RAUVATNET
CONCORDANT QTZ-VEIN / BRECCIA	860	9482	2	31	10	64	As PY, Fe Carb. TOURM.	VASBOTN (SAUSVATN) 169
WALLROCK (CHLORITE SCHIST	33	185	<1	48	12	101	As PY, CHLOR.	VASBOTN
CONCORDANT QTZ-VEIN	254	>10000	<1	14	12	16	PY, AsPY	KLAUSMARK-ELVEN 173
WALLROCK (QUARTZITE)	-	59	7	16	26	96	-	
CONCORDANT QTZ-VEIN (MARBLE HOSTED)	284	>10000	4	6	268	8	As PY	KLAUSMARK-ELVEN 173
CONCORDANT QTZ-VEIN	26	6550	3	21	74	14	As PY, PY	KLAUSMARK-ELVEN
FRACTURED X-CUTTING QTZ-VEIN	2200	< 1	2	1275	43	60	PY, PYRR ZEOLITE	GRØNDALEN 45
WALLROCK (QUARTZITE)	25	2	2	84	32	34	SULPH., TOURM.	
DISS. SULPH. IN STRATABOUND SHEARZONE (SILICIFIED MARBLE)	390 (Ag >200)	145	2	6000	> 10000	10000	GALENA, SPHAL, PY + As PY	EITERÅ-KROKEN (HJORT-SKARMO) 174
	500 (Sb 155)	5910	7	456	4460	> 10000		
STRATABOUND DISS. SULPH. IN SILICEOUS HORIZON (SHEARED)	-	114	1	113	680	86	PY, CPY	SPELREM
	-	15	1	176	112	114		SPELREM
STRATABOUND MASSIVE SULPHIDE (CHERTY MATRIX)	(Mo 18)	144	1	872	28	226	PYRR, PY, As PY	SØREN-SKOGVATN 49
	(Mo 36)	116	1	548	26	326		
	(Mo 11)	334	1	235	32	288		

AREA:

ELEMENT	MEAN $\overline{X}$	STD.DEV δ	$\overline{X}+1\delta$	THRESHOLD (ppm)	VARIANCE	MEDIAN	ANOMALIES n	ANOMALIES %	MAX * (ppm)
Au									
As									
W									
Cu									
Pb									
Zn									

* Au in ppb

TOTAL NUMBER OF SAMPLES:

NO. OF SAMPLES =

Zn

Pb THRESHOLD:

Cu THRESHOLD:

NO. OF ANOMALIES =

Zn =

Pb =

Cu =

AREA:

BP NORGE a.s Minerals

BP NORGE a.s/ NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
STREAM SEDIMENT ANOMALIES
VERSUS GEOLOGY

Author	J.T.	Drawn by	L.J.	Date	24.IV.1984
Scale		Report No.		Drawing No.	

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Klausmarkelva 1826 III VEVELSTAD	One Au, 4 As and 2 W anomalies in stream sed.	Three rock samples contained Au (254, 284,26 ppb). Samples taken from arseno-pyrite min. qtz-vein	1:20.000 geology, structures, sample loc.	54 rock samples of arsenopyrite mineralized fractures and qtz-veins. KL3401-3454	Eleven rock samples contained over 100 ppb Au Strong correlation with Sb and Bi. All gold bearing rocks from 3 to 7 localities sampled.	The samples were collected along a major N-S trending fault zone, which host a 1-2m thick qtz-vein. The qtz-vein is arseonpyrite mineralized at fractured contacts.The highest Au values are in samples significantly high in Sb, Bi (77, 173 ppm) as well as As (10%). The structure is extending several km. Further follow-up of similar structures in the region especially close to the gabbro body. Blasthole sampling along the structure sampled this year is recommended. Also reconnaissance in marble stripe northeast of this.
Mo-Troms Vitraga diss. Zn-Pb-Ba mineralization STORFORSHEI 2027 IV	Rock sampling (Massive sulphide programme).	Three Au anomalies in stream sed. (190, 124, 224 ppb).	1:50.000 sample loc.	Rock samples: MT3401-5 MT9401-2 Stream sed: MT9301-7	One stream sed. Au anom. (Resample of 1983 anom.) No Au in rock.	No further work is recommended.
Grontjeldet Massive sulphide STORFORSHEI 2027 IV				DN 3401-12 (Rock spls.)	One rock spl. contained 30 ppb Au.	One sample returned with background Au value for a massive sulphide in this part of the world (~30 ppb). No further work is recommended.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Vasbotn (Sausvatn) 1825 IV VELFJORD	The area was stream sed. sampled but no Au anomalies.	Rock samples from qtz-arsenopyrite-tourmaline-breccia returned with 800ppb Au. Chloritization of immediate wallrock (25 ppb Au). One visible Au grain was found in pan conc. Further follow-up of this stream by collecting pan conc. resulted in 7 consistent Au anomalies (max. 1150 ppb).	1:5.000 sample point overlay, geochem. 1:5.000 Geology (Based on economical mapsheet). Vertical profile of Au anomalous stream showing stream sed. versus pan concentrates.	Further panning above 83 anomaly (NO9501-9503) Soil samples: NO9601-9609 Stream sed: NO9301-9310 Rock samples: NO3401-3412. 3-4dm thick qtz-vein with pyrite, chlorite in fractures was found directly above 1150 ppb Au anomaly.	The two lowermost stream sed. spls. are anomalous of which one is a resample of a 1982 sample. All soils barren. Sa. No. 9303 = 43ppb Au 9304 = 146ppb Au	Rock samples NO3407-9,11,12 are taken from qtz-vein/breccia immediately above 1150 ppb anom. in order to compare pan conc. and stream sed. resamples were collected (see vertical profile). The two lowermost stream sed. samples collected from finer-grained mtrl. at lower altitudes were anomalous. Increasing Au, As values in pan conc. upstream where stream sed. are barren. No further work i recommended.
Skomovik & Grondalen 1825 IV VELFJORD 1826 III VEVELSTAD	Original stream sed. sample for Grondalen stream 41 ppb Au. Original stream sed. sample for Skomovikken B 2 ppb Au.	Two Au anom. in stream system draining Grondalen Au-vein (83, 78 ppb) RESAMPLE NOT ANOMALOUS Skomoviken B returned with one 93 ppb Au anom. RESAMPLE NOT ANOMALOUS	See report from Dr. Schoenfeld	Detailed geological mapping and structural interpretation by Clausthal University team. Rock spls: Sk 3401-17	Rock spls from 3 dm thick qtz-veins in Skomovik granodiorite returned w/ Au (925, 264, 187 ppb) and very high Bi concentration up to 475 ppm. See also report from Dr. Schoenfeld.	Tourmaline veins/spots in Skomovik granodiorite ore thought to be derived from surrounding metased., probably during thrusting. Layers of 1-2 dm thick tourmaline rich horizons (60-70%) were observed in biotite schist. It is likely that Au, As min. in fractures was formed during a hydrothermal episode connected with thrusting. At Grondalen a 1dm thick hydrothermal fracture was sampled containing 2.5ppm, Au. (Carbonate infilling, chlorite, pyrite. Hosted by amphibolites).

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Spelrem 1926 III GRANE	Au anomaly in stream draining diss. sulphide horizon.	Rock spls. were taken from stratiform diss. pyrite min. No Au, 114 As, 700 ppm Pb High chromium. Approx. 10-15m thickness. Further litho-sampling considered necessary	Sketch map of sample loc.	Stream sed.: SP 2301 Rock spls, blasted: SP 9401-19 SP 2401-2 Soil spls: SP 2601-7	Stream sed. spl. anomalous (~262 ppb) Rock samples contained no gold. Soil samples contained no gold.	Diss. pyrite horizon in sericite-quartz-schist, hosted by marble and calc-silicate. Some analytical results: SP 9407: 88 As, 806 BA, 1374 Cr, 853 Ni: (ppm) (Low in Cu, Pb, Zn). Abundant graphite. The Au results leave the source for stream sed. Au anomaly left unexplained.
Tomasvatn 1925 III MAJAVATN	Original anom 27 ppb Several streams in the area were sampled. Thick glaciofluvial material.	One stream sed. spl. highly anomalous (1960 ppb) 3 pan conc. anomalous (263, 329, 1000 ppb Au). All anomalies conc. in area covered by thick glaciofluvial material.	1:5.000 spl overlay 1:5.000 geology	Stream sed.: MA 3301-7 Soil spls: MA 3601-38 Rock spl: MA 3401 Overfraction of str. sed. spls. collected above anomalous area has been re-analyzed DOB grid 25m between spls 100m between lines. VLF survey	4 weak As anomalies in DOB grid. Stream samples: No Au. Soil samples: MA 3609 = 34ppb Au MA 3632 = 66ppb Au MA 3633 = 120ppb Au	The side stream which emerges where cluster of anomalies occur does not carry any Au. The source for Au could be local as the overfractions returned negative. Possibly further soil sampling could be considered. The anomalies occur 2km W (down ice direction) of an amph. breccia. This should be followed-up and rock sampled.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Siterasen II 1926 III GRANE	One anomaly in major N-S running stream (220 ppb Au)	Resample anomalous. 4 low range and 2 medium range anom. consistently upstream	1:40.000 spl overlay structures	Rock spls: Et 9401-4	All rock spls. contained Au (300,350.28, 28 ppb) High Sb and As.	Rock samples taken from hydrothermal joints in fracturezones. ALTERATION: arsenopyrite, py chloritization. Further follow-up and lithosampling of these fracturezones(approx.50dgr).
Rauvatn 1926 III GRANE	2 Au anom. in 2 streams (43,219ppb) 219 ppb in stream draining Au-qtz-vein Weak As. Most of the area stream sed. sampled	10 Au anom. in area draining Au-qtz-vein. Strong As (Max 220ppm) 3 Au anomalies in parallel stream 1km south. 3 anomalies in stream opposite Au-qtz vein (other side of the valley).	1:20.000 spl overlay 1:20.000 structures	Rock samples: RV 9401-27 (Au-qtz vein) RV 2401-27 RV 3401-32 (Mainly northern part. For analytical results see attached list. An area of approx. 10 km2 was checked. (North of Au-qtz-vein).	QTZ-AU-VEIN: 29.5, 24.5, 21, 3.5, 1, 2.7, 6.5, 3.5, 8.5 ppm A along 300 m NORTHERN PART: 10 rock spls containing 27-1500 ppb Au.	Strong correlation between Au-As-Sb. All rock samples containing high amounts of Au taken from arsenopyrite rich margins of qtz-veins. The immediate wallrock is chloritized-sericitized. This contains some hundred ppb Au and diss. of apy. In northern part 6-7 qtz-veins (1-3dm wide) were sampled. The stream S of Au-qtz-vein (in overburden covered depression) needs to be soil sampled.

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Fellingfors 1926 III GRANE	3 Au anom. in 3 stream sed. (101,37, 27 ppb). Glaciofluvial sand, silt, clay.	1 resample not anomalous. 6 consistent anom. in middle stream (2 high range). 4 anom in northern stream and 3 high range anom. in southern stream. Weak As. All in areas with thick overburden.	1:5.000 sample, Geochem. overlay 1:5.000 Geology, Structures	Rock samples: FF 3401-8, FF 9401-4, FF 2402-4. FF 2401 from Svenningdal mine dumps. Pan Conc.: FF 2501-3, FF 9501-2, FF 3501-3. Soil samples: FF 9601-29. Stream sed. (Not sieved in the field, 500 g collected) FF 9301-15 of which all were resamples of 1 9 8 3 samples.	Two soil spls Au anomalous (79, 132 ppb), arse anomalies associated. 3 Pan conc. localities contained Au, of which one was high range 3.5pp (1 visible gold grain) 3 litho samples containe Au (47.24.50 ppb) No stream sed. spls. were anomalous.	Rock samples taken from stratiform disseminated sulphide (Zn, Cu, py, pyrr) contained Au. This horizon hosted by marbles-calcsilicates. Svenningdal mine dumps returned with 5ppm Au. Further closely spaced soil-sampling near detected soil anomalies and on various altitudes on slope close to stream sed. Au anomalies in middle stream (This would also include soils over marble-quartzite -calcsil. horizon close to anomalies)
Stabbforsmoen Stormoen 1926 III GRANE	2 anom. in 2 streams (142,47 ppb Au)	2 resamples not anomalous. 24 Au stream sed anomalies in 2 stream systems. 10 high range anom. (>100 ppb). Weak As.	1:20.000 spl overlay 1:20.000 Geology, Structures	Rock spls: FF 2405-12 Mapping, structural interpretation	9 lithosamples contained Au (70.29.28 ppb)	2 of the rock samples containing Au taken from mylonitic, siderite veined rock (weak diss. of sphal, gal, py). One (29ppb) spl. taken from stratiform diss Cu, pyrr horizon hosted by thin calcsil-marble stripe. Soil sampling could be considered as no glaciofluvial material exists. Blasting and further lithosampling in order to detect higher Au values in main 50 dgr. structure.

LIST OF AREAS FOLLOWED UP 1 9 8 4 (for detailed description see follow-up sheets)

MAPSHEET CLAIM AREA	1 9 8 2 RESULTS	1 9 8 3 RESULTS	MAPS ATTACHED	1 9 8 4 WORK DONE	RESULTS	COMMENTS
Strauman 1926 IV DREVJA	1 anomalous spl (188 ppb) in fluvioglacial sed. at lower altitudes	7 consistent anomalies in 2 branches of the stream at lower alt. RESAMPLE OF ORIGINAL SA. P. NOT ANOMALOUS	1:5.000 Spl Overlay Geochem. 1:5.000 Geology, Structures (Based on economical Mapsheet)	3 pan concentrates 5 rock samples MAPPING	1 pan concentrate anomalous (159 ppb)	Rock spl. taken from pyrr-bearing fractured qtz-veins contained no Au. No future work recommended.
Mjavatn 1926 IV DREVJA	Original spl. 69 ppb Au. Taken in fluvio-glacial covered area	7 anom. in various stream branches. One high range anomaly (652 ppb) RESAMPLE OF ORIGINAL SA. P. NOT ANOMALOUS	1:5.000 Spl. overlay Geochem. 1:5.000 Geology, Structures (Based on economical Mapsheet)	8 pan concentrates (Resamples of 1983 Stream sed. spl.) 8 Rock spl.	4 pan concentrates anomalous of which 3 are resamples of non-anomalous 83 stream sed. Pan concentrates of 652 ppb stream sed. anom. without Au 1 rock spl. returned with 30 ppb Au (qtz-vein	Rock spl. from qtz vein contained 90ppb Au, 21 Bi. The vein was found above the 652 ppb stream sed. anomaly. Other rock spl. from sulphide-bearing quartzites & shear-zones returned without Au. Clear correlation between structures & Au-anomalies. exist. Further soil spl. & litho spl. along fractures.
Bjorknes 1926 IV DREVJA	Original spl. points contained 345, 22 ppb Au. Glacioflu-vial mtrl. common.	Resamples were anomal-ous. Northern stream 2 high range anom. South ern stream 2 high range, 1 medium. Weak As anomalies.	1:5.000 spl overlay 1:5.000 Geology (Based on economical mapsheet)	Mapping Rock samples: BK2401-8; BK3404-11 Pan concentrates: BK 2501, 3502-3505 Soil spl. over diss. pyrr. horizon. D.O.B sampling over North-ern stream.	Two rock spl. contained Au: 37, 15 ppb. One DOB spl. returned highly anom. in As (53 ppm)	Both litho samples that con-tained Au were taken from strong pyrrhotite diss. in calcsilicate horizons close to dioritic intrusion. Further follow-up of frac-ture/breccia zones close to intrusion. Closely spaced soil spl. on slopes and in the vicinity of Au-bearing streams in order to detect the pathfinder As.
Vesterelva 1926 III GRANE	3 anomalous spls in stream sed.(48,8,231 ppb Au). Most of the area covered by till	Resamples contained Au 5 Au anomalies in southernmost stream.(3 high range) Tributary from this contained consistently high As. (56,54,124 ppm) 2 Au anom. in northernmost stream.	1:5.000 spl overlay 1:5.000 structures	Lithosamples: RF 3401-6 Pan concentrates: RF 3501-8 Stream sed: RF 3301-23 Soil samples: RF 3601-21 DOB sampling in two drainage areas	3 Pan concentrates con-tained Au of which 2 are high range and in other streams than previously sampled. (1.3 ppm, 125 ppb) High As DOB anomalies in tributary to southern stream (145, 205,236,23 ppm) All soil barren. One stream sed. anom. in stream not spld previously.	Strong corr. between Au anom. in stream sed. and structures. Further closely spaced DOB or soil sampling over specific areas where Au/As anomalies coincide with fractures.

RESULTS OF DETAILED
FOLLOW UP 1984

REPORT ON A VLF, DOB SURVEY IN HELGELAND - SPRING 1984

INTRODUCTION

During March and April 1984 a DOB, VLF survey was carried out in Helgeland. The areas were: Tomasvatn, Bjoerknes and Vesterelva (claim no. 63, 117, 88). The grid spacing was 25m between sample points and 100 m between lines (in some cases 50m). The grids covered the area above and around the last stream sediment Au anomaly (as in Vesterelva II) and were orientated in such a way that traverses cross the regional strike. VLF profiles were conducted simultaniously with DOB sampling.

BJOERKNES

The area is situated near the southwestern edge of Lake Fustvatn. The geology consists of a narrow marble horizon bordered by a gabbro which is netveined by pyrrhotite impregnated granite in the northeastern corner of the grid. This coincides with crossovers on the VLF and one DOB As anomaly (53 ppm). Rock sample analysis of the sulphide-bearing granite returned Au-negative but with 7ppm As. A weak As, W pattern is expressed in the northern part of the grid. A skarnified horizon at the contact between marble and the net veined gabbro could possibly explain high As, W (Au) results and the VLF expression.

TOMASVATN

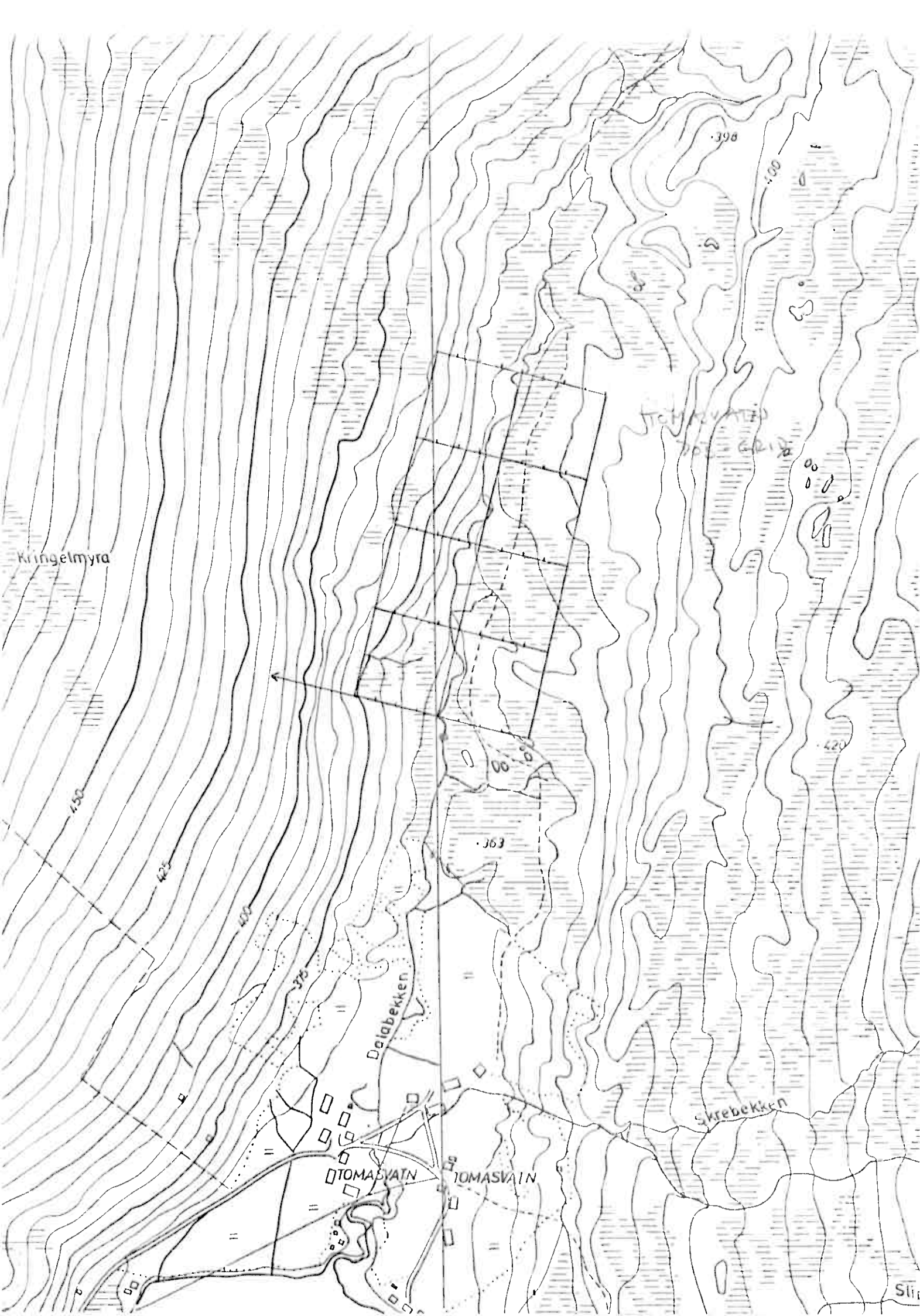
The area is covered by relatively thick overburden situated 1km north of Tomasvatn. The soil analysis returned with erratic and weak As, W values. A rather strong conductivity change apparent from the VLF in the northern part, which could be explained by an amphibolite band contacting marble. This is supported by DOB chips and Mag. results.

VESTERELVA 1

The area is situated south of Klubbfjellet east of Reinfjellet granite and consist of qtz-mica gneiss/schists interbanded with thin marble horizons. The crossovers on the southeastern flank probably reflect a mica schist-marble boundary coinciding with the stream direction. The gap of the two components on the northwestern side would then express lower resistivity over quartz-mica schist/gneiss. It is possible that fracture zones located along the contact contain mineralizations. The analysis returned with weak As values in the range 5-15 ppm.

VESTERELVA II

VLF and DOB anomalies have similar characteristics compared with Vesterelva I. Arsenic anomalies along the qtz-mica schist/marble boundary however, are much stronger with values up to 258 ppm As.


Kringelmyra
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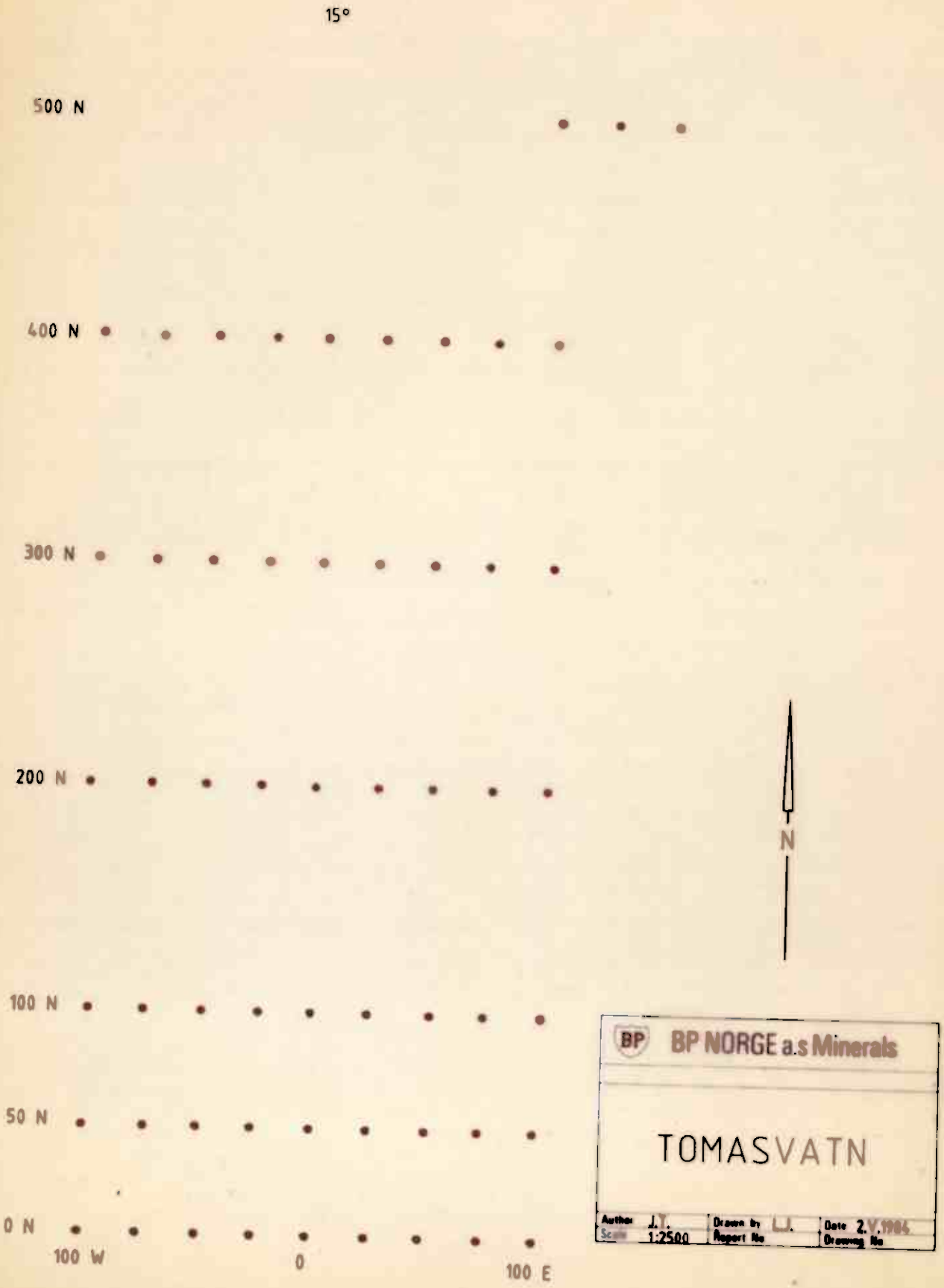
Dalabekken
Skrebekken
TOMASVATN
TOMASVATN



BP NORGE a.s Minerals

TOMASVATN

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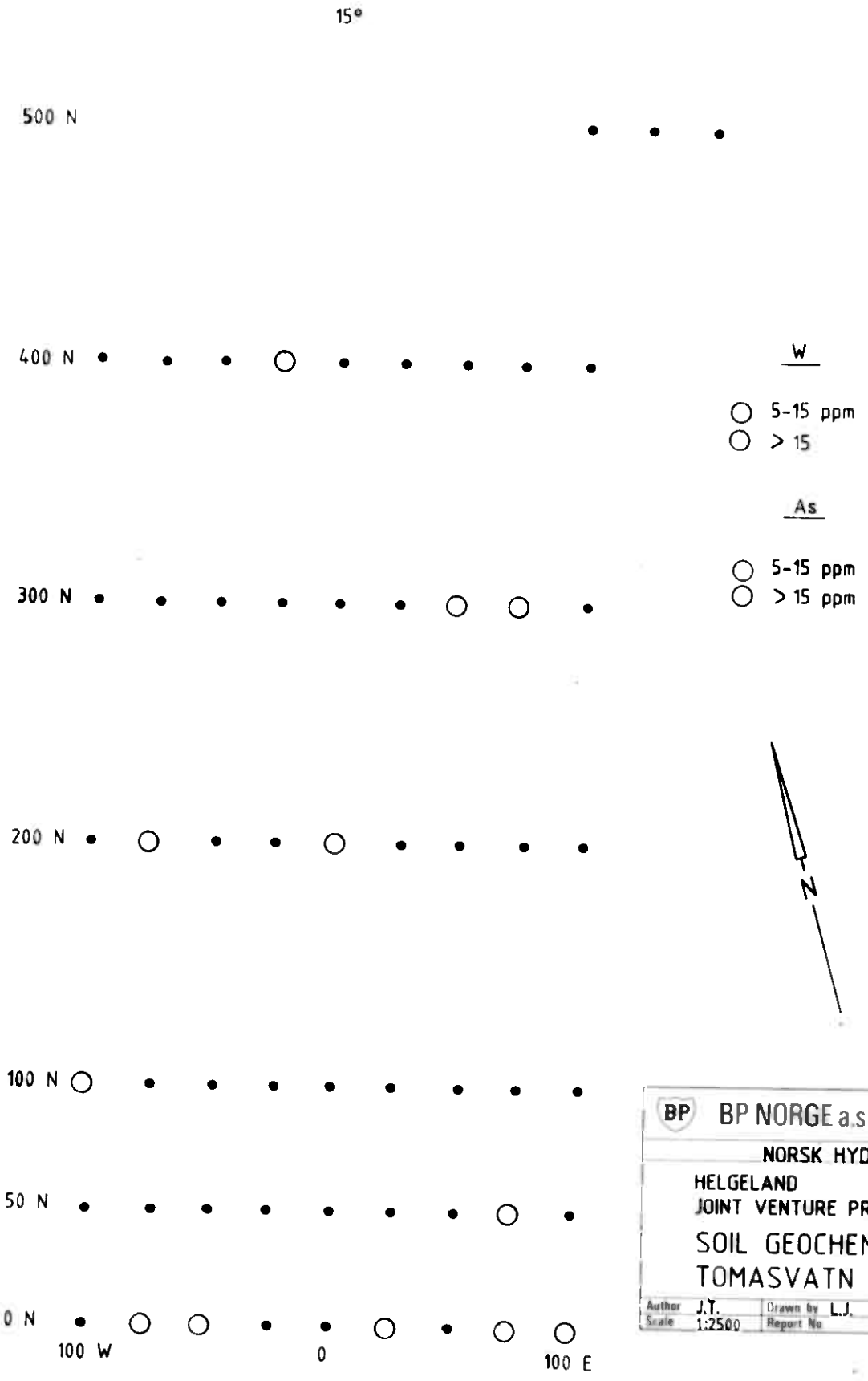


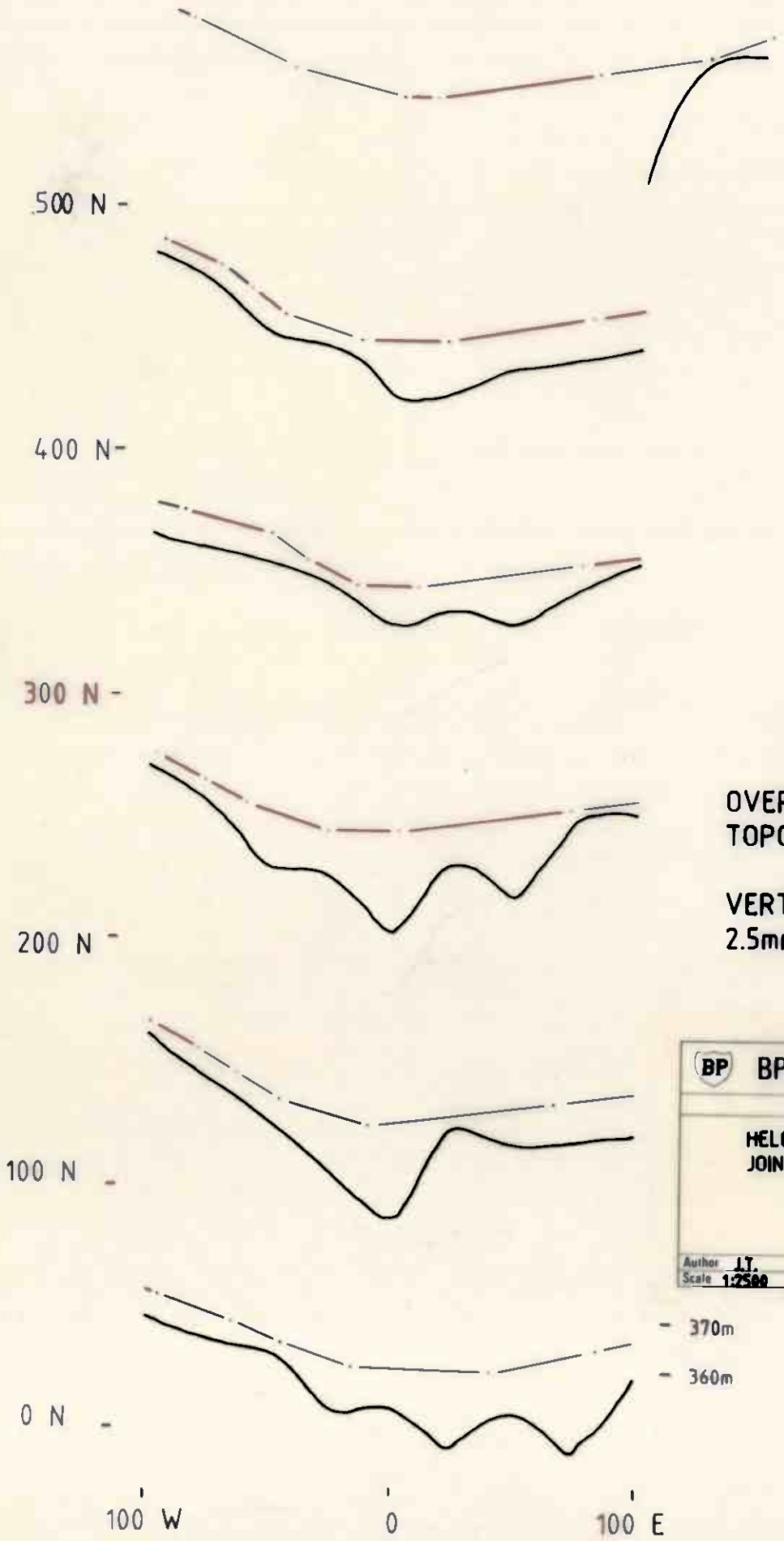
BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
TOMASVATN

Author	J.T.	Drawn by	L.J.	Date
Scale	1:2500	Report No		Drawing No



OVERBURDEN AND
TOPOGRAPHIC PROFILES

VERTICAL SCALE:
2.5mm = 1m

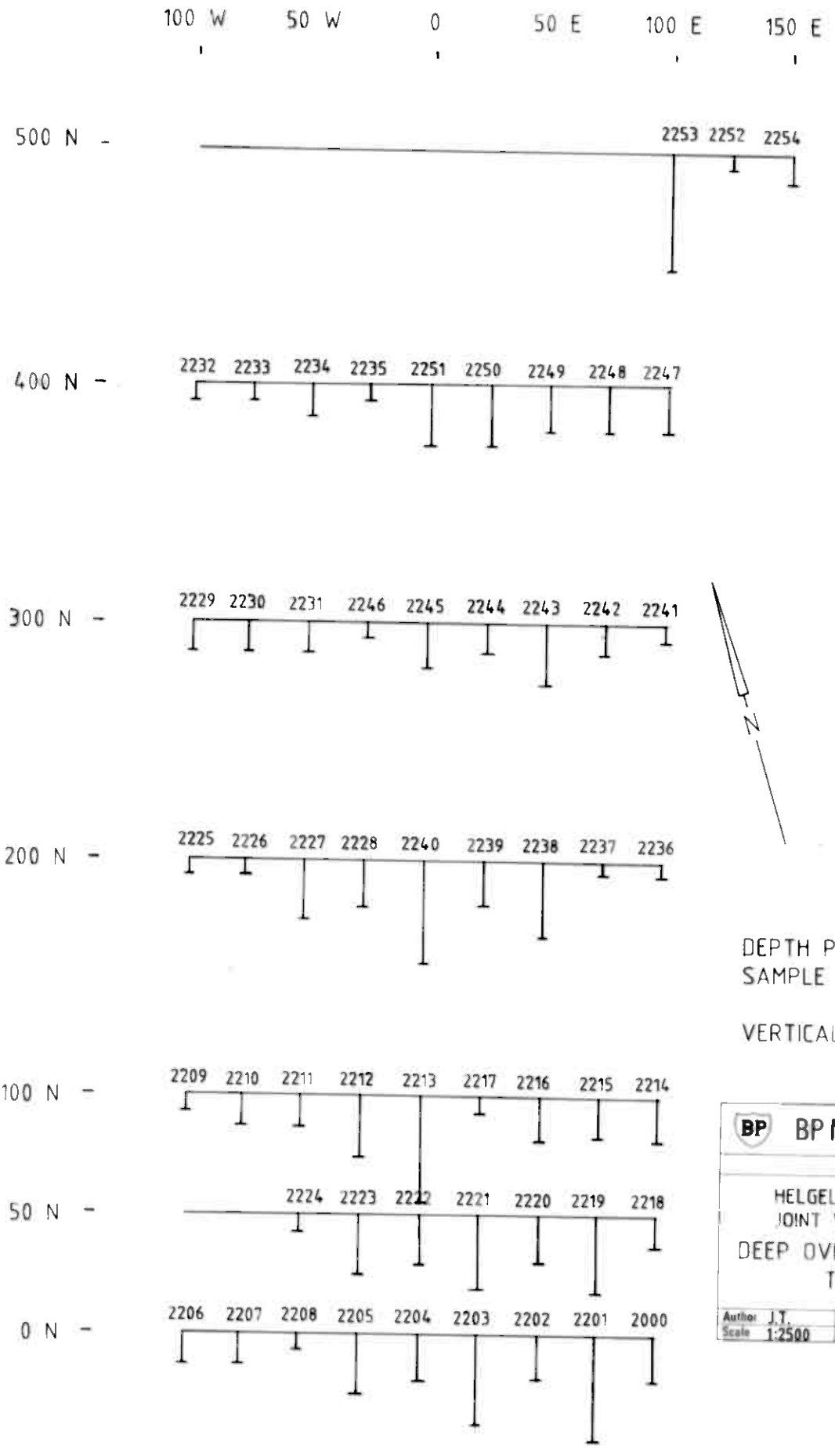
BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

TOMASVATN

Author J.T.	Drawn by L.J.	Date 25.V.1984
Scale 1:2500	Report No.	Drawing No.



DEPTH PROFILES AND
SAMPLE NUMBERS

VERTICAL SCALE: 1cm = 4m

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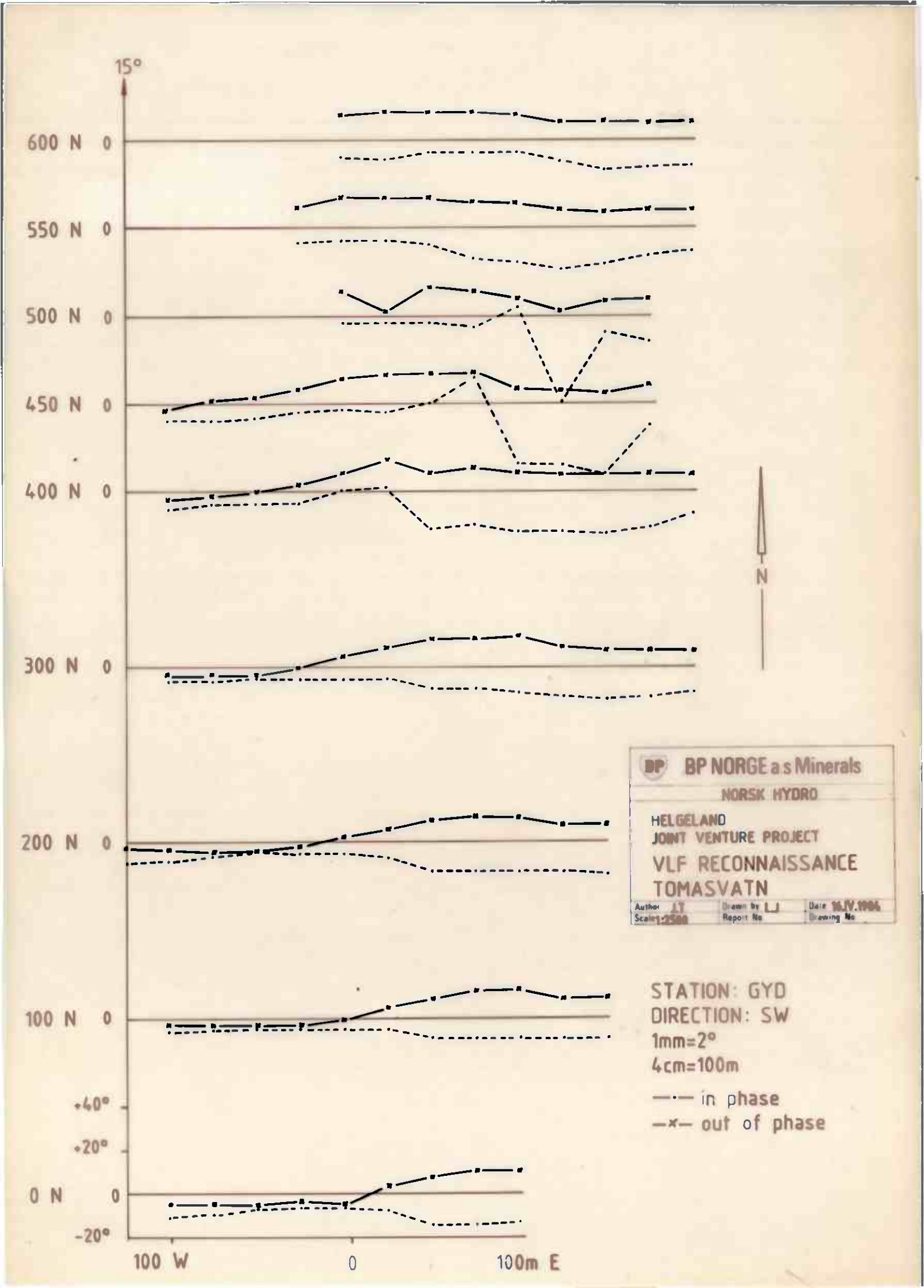
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

DEEP OVERBURDEN SAMPLING
TOMASVATN

Author J.T.	Drawn by L.J.	Date 8.VI.1984
Scale 1:2500	Report No.	Drawing No.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300 N 0
200 N 0
100 N 0
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BP NORGE a.s Minerals
NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
VLF RECONNAISSANCE
TOMASVATN
Author LT
Drawn by LJ
Date 16.IV.1986
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4cm=100m
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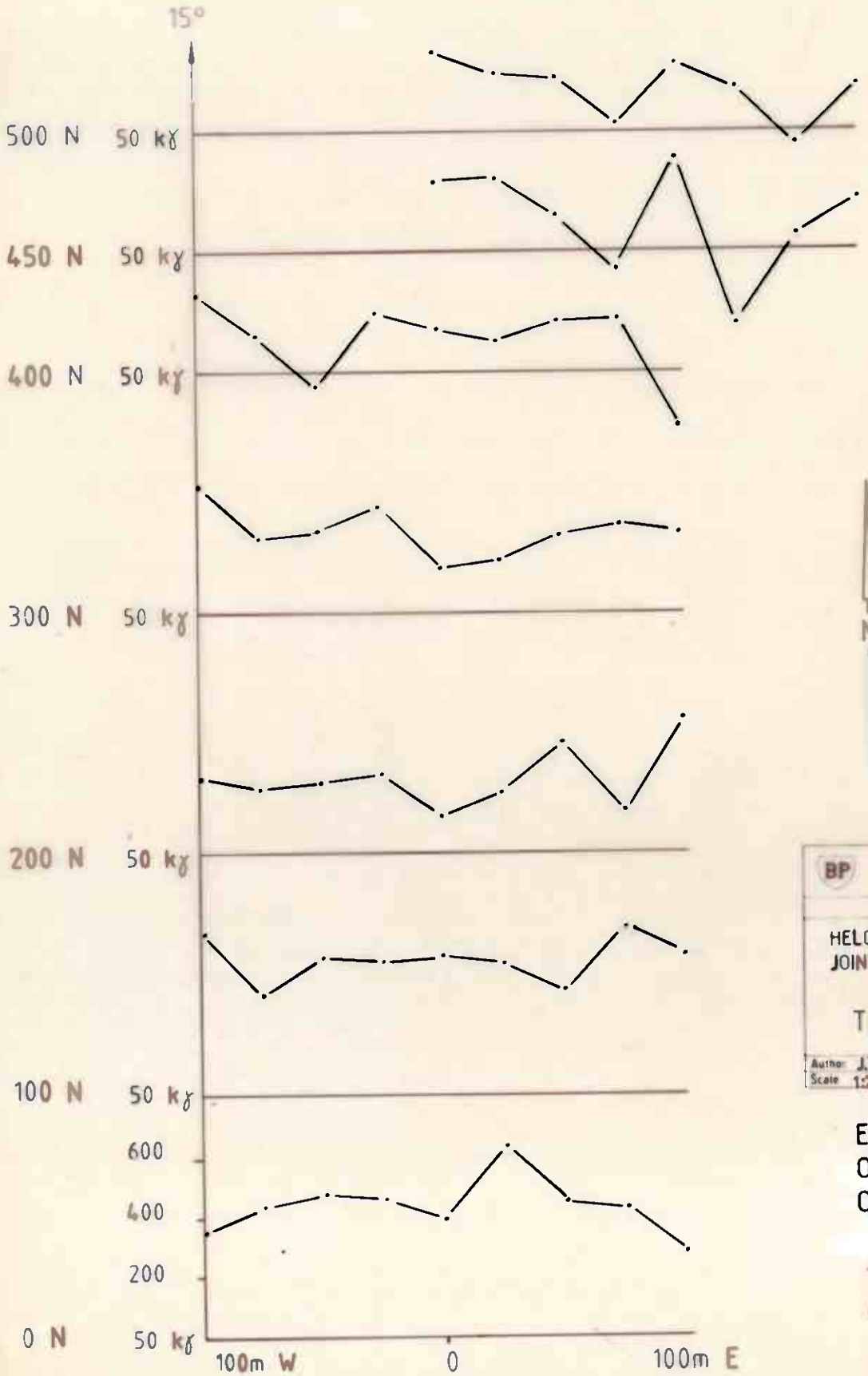


BP NORGE a.s Minerals

NORSK HYDRO

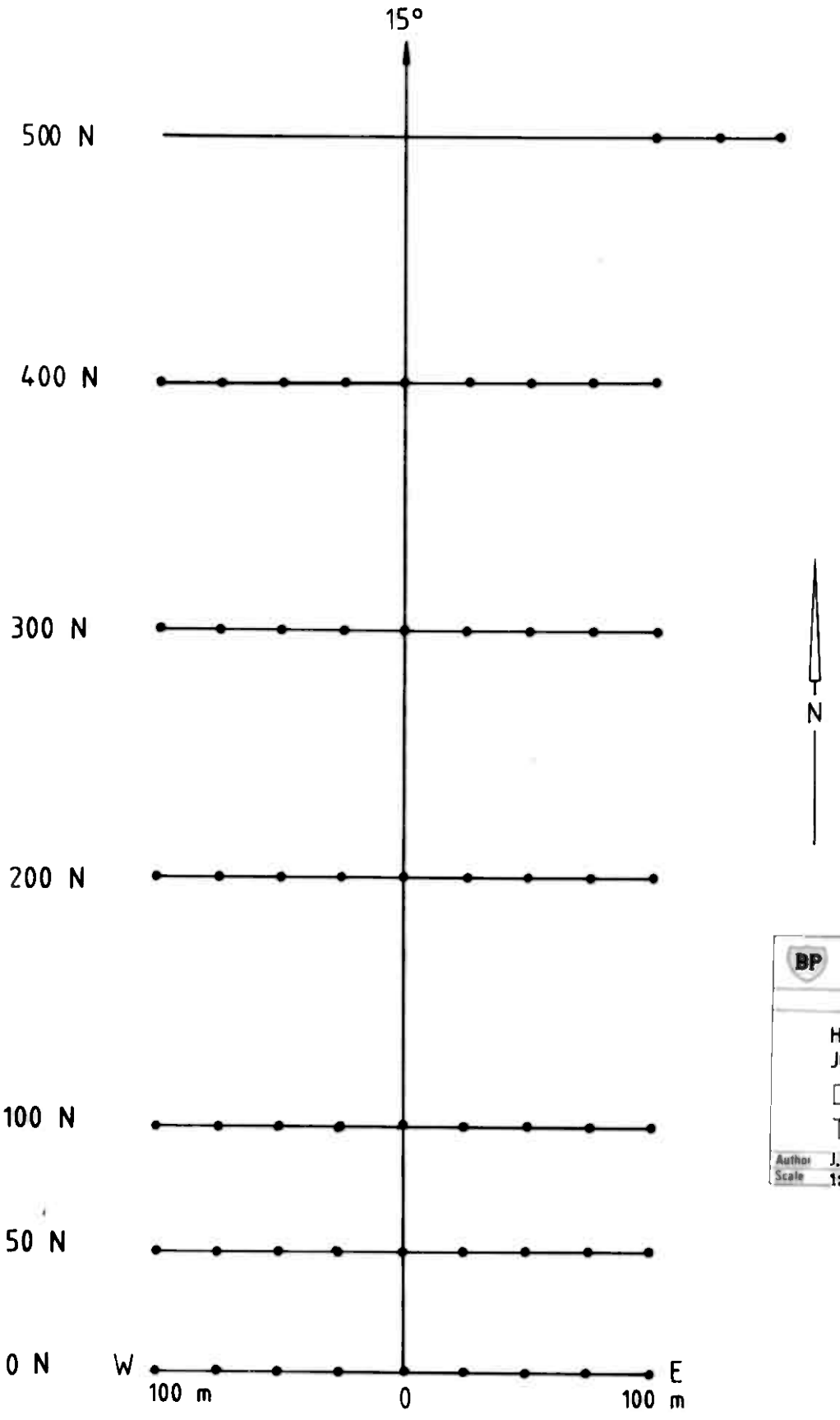
HELGELAND
JOINT VENTURE PROJECT

TOMASVATN MAG.

Author: J.T	Drawn by L.J	Date 16.IV.1985
Scale 1:2500	Report No	Drawing No

EACH VALUE BASED ON AN AVERAGE OF 12 READINGS

1cm=200γ
4cm=100m



RESULTS:

~~TUNGSTEN~~

5 - 15 ppm

> 15 ppm

ARSENIC

5 - 15 ppm

> 15 ppm

N

BP NORGE a.s Minerals

NORSK HYDRO

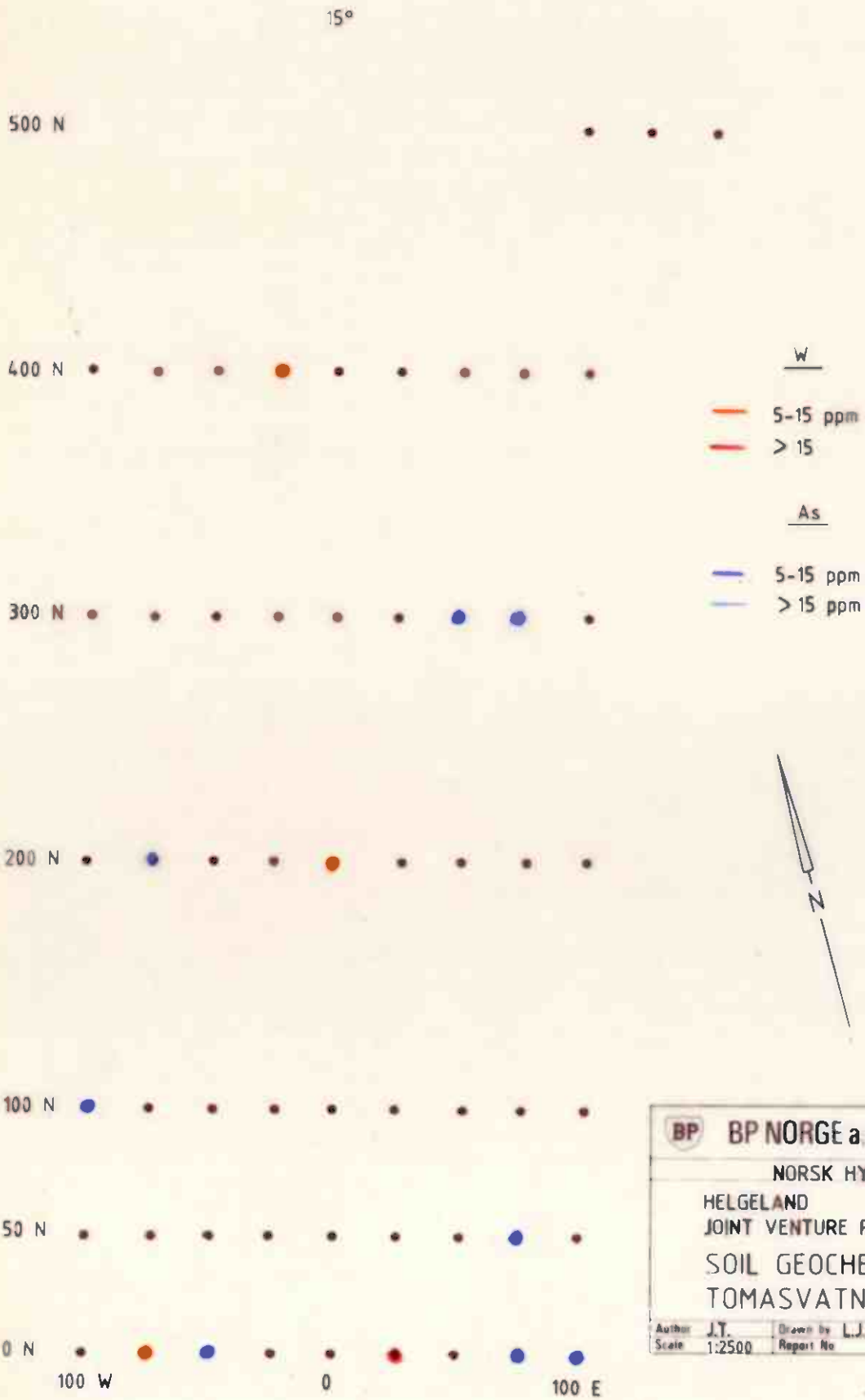
HELGELAND
JOINT VENTURE PROJECT

D.O.B. GRID

TOMASVATN

Author J.T	Drawn by L.J	Date 17.IV.1984
Scale 1:2500	Report No.	Drawing No.

4cm=100m



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NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
TOMASVATN

Author J.T.	Drawn by L.J.	Date 30.V.1984
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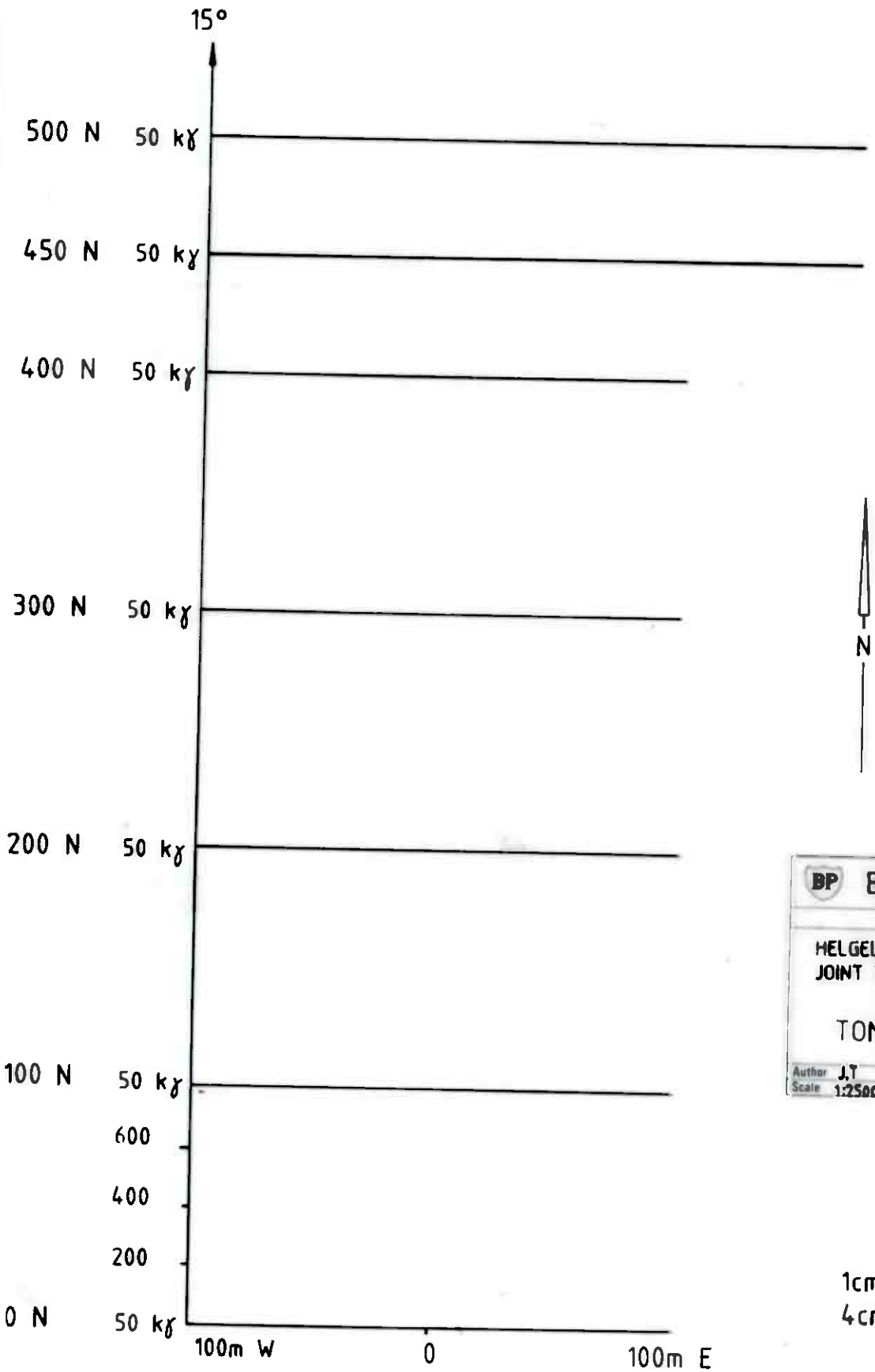

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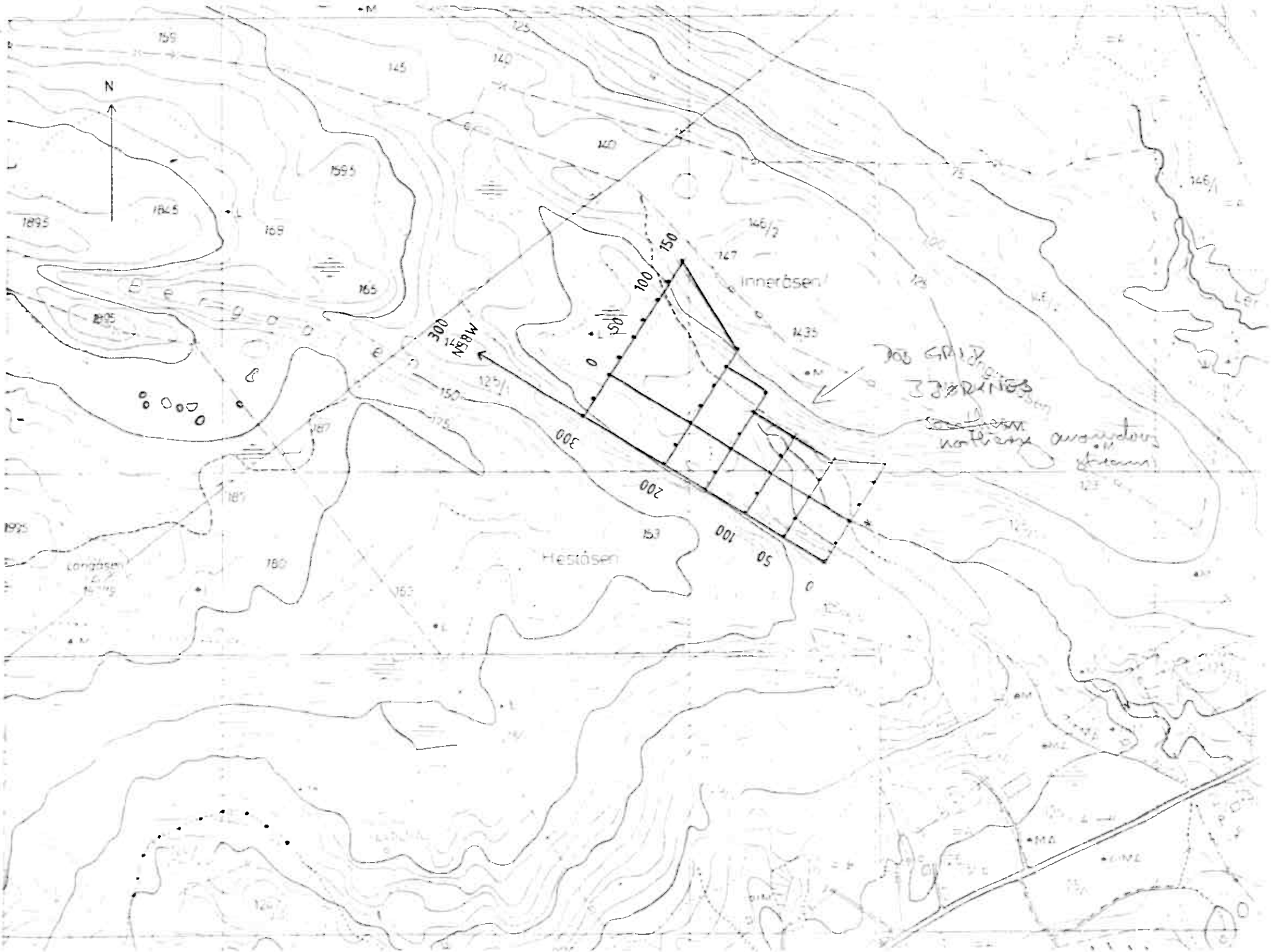
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

TOMASVATN MAG.

Author	J.T	Drawn by	L.J	Date	16.IV.1984
Scale	1:2500	Report No		Drawing No	

1cm=200 γ
4cm=100m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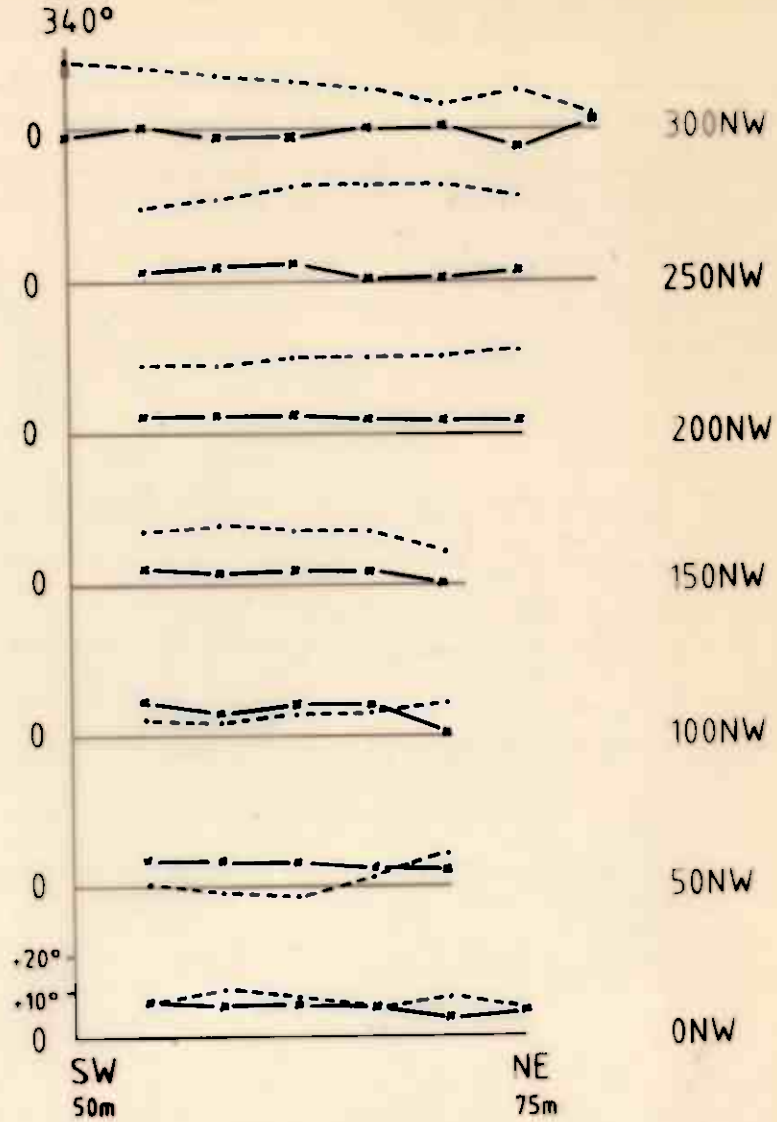

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DIRECTION:NW
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4cm=100m
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x— x— x out of phase

BP NORGE a s Minerals
NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
VLF RECONNAISSANCE
BJØRKNES

Author	J.T.	Drawn by	L.J.	Date	17.IV.1984
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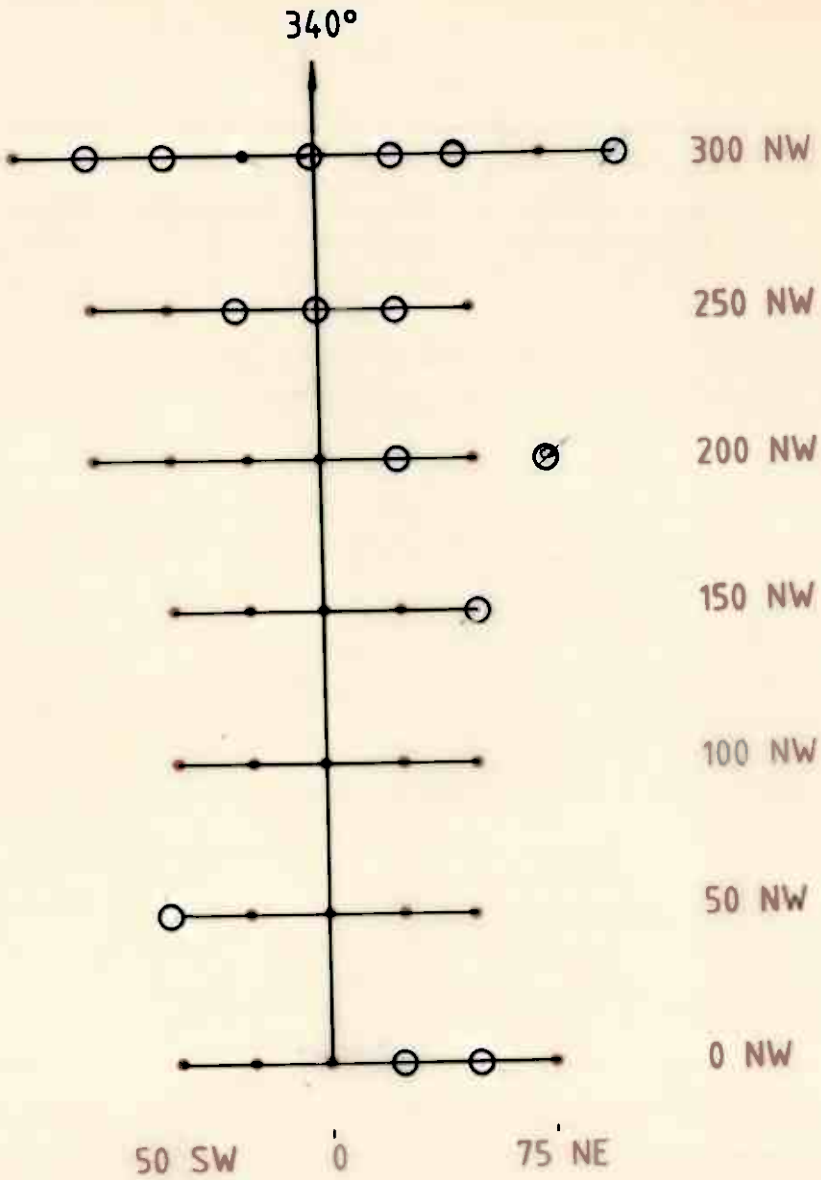
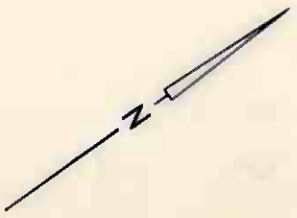




O W GREATER THEN 10PPM
O As " " "

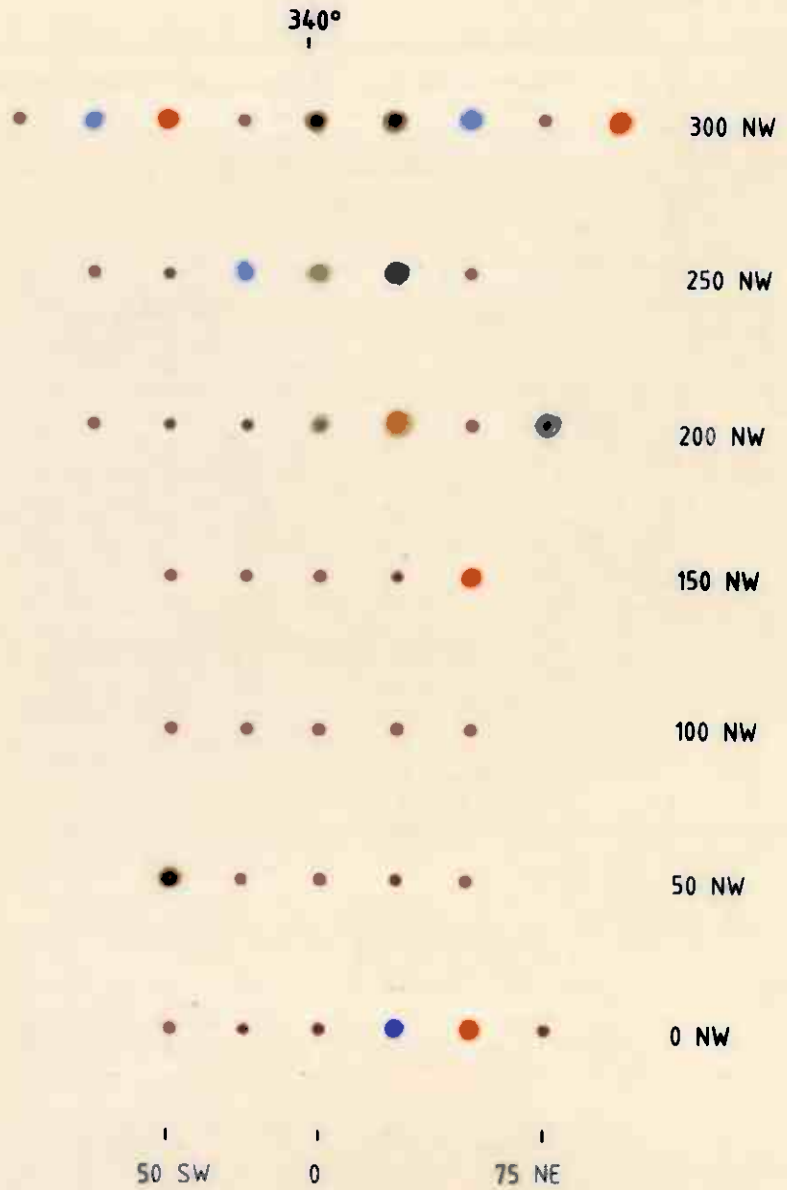
BP NORGE a.s Minerals

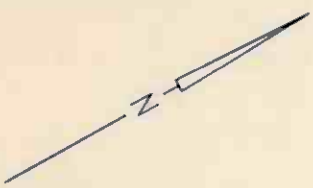
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

D.O.B. GRID
BJØRKNES

Author J.T.	Drawn by L.J.	Date 2.V.1984
Scale 1:2500	Report No.	Drawing No.





W

5-10 ppm

8-15 ppm

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As

8-15 ppm

>15 ppm

5-10 ppm

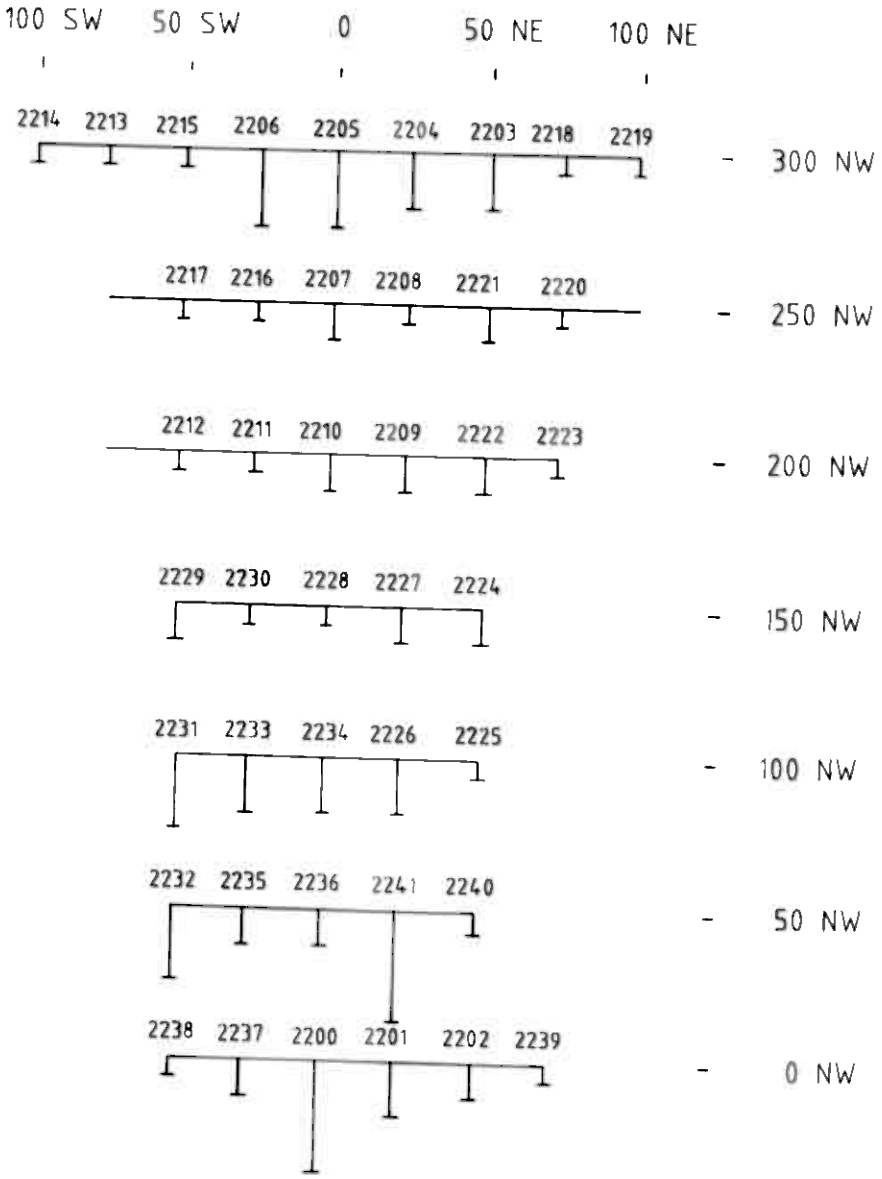
BP NORGE a.s Minerals

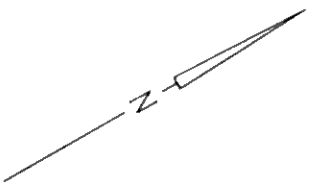
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
BJØRKNES

Author I.T.	Drawn by L.J.	Date 2.V.1984
Scale 1:2500	Report No.	Drawing No.





DEPTH PROFILES AND
SAMPLE NUMBERS

VERTICAL SCALE: 1cm = 4m

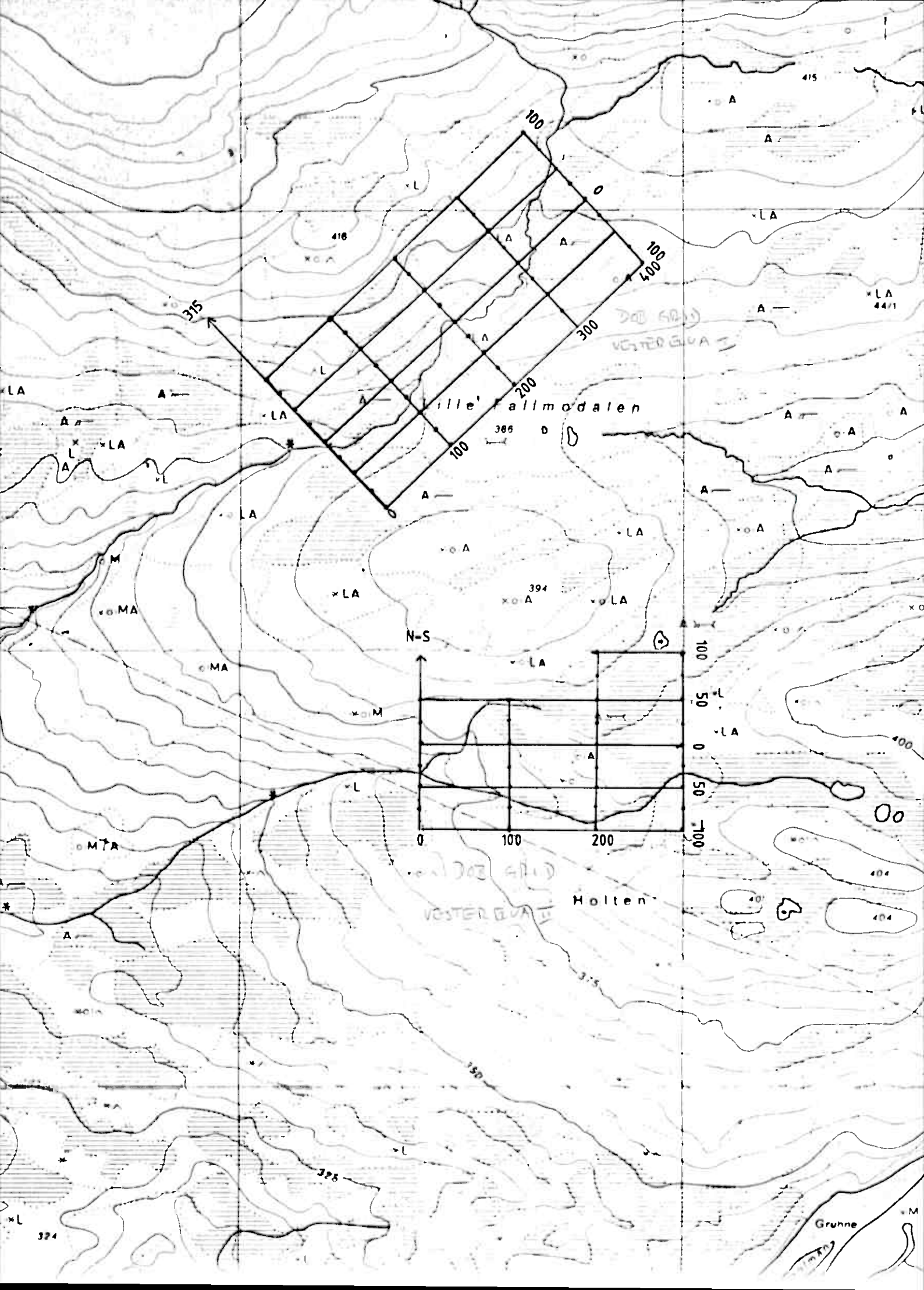
BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

DEEP OVERBURDEN SAMPLING
BJØRKNES

Author J.T.	Drawn by L.J.	Date 8.VI.1984
Scale 1:2500	Report No	Drawing No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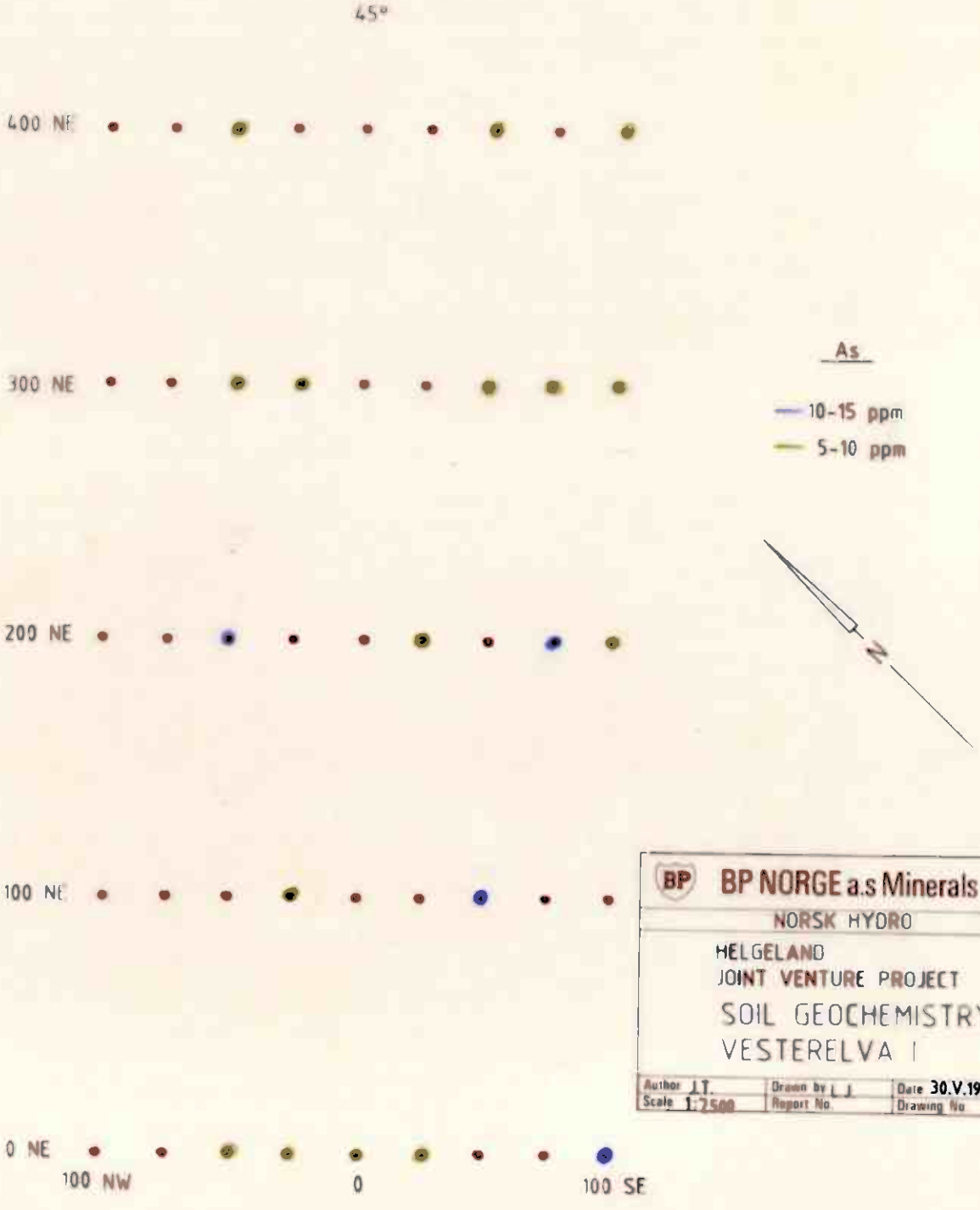
Holten
Grunne



BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
VESTERELVA I

Author J.T.	Drawn by L.J.	Date 30.V.1984
Scale 1:2500	Report No.	Drawing No

BP NORGE a s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
VESTERELVA II

Author J.T. | Drawn by L.J. | Date 30.V.1984
Scale 1:2500 | Report No | Drawing No

As

>20 ppm

5-10 ppm

N

E-W

300 E

200 E

100 E

0 E

50 N

0

100 S

BP NORGE a.s Minerals

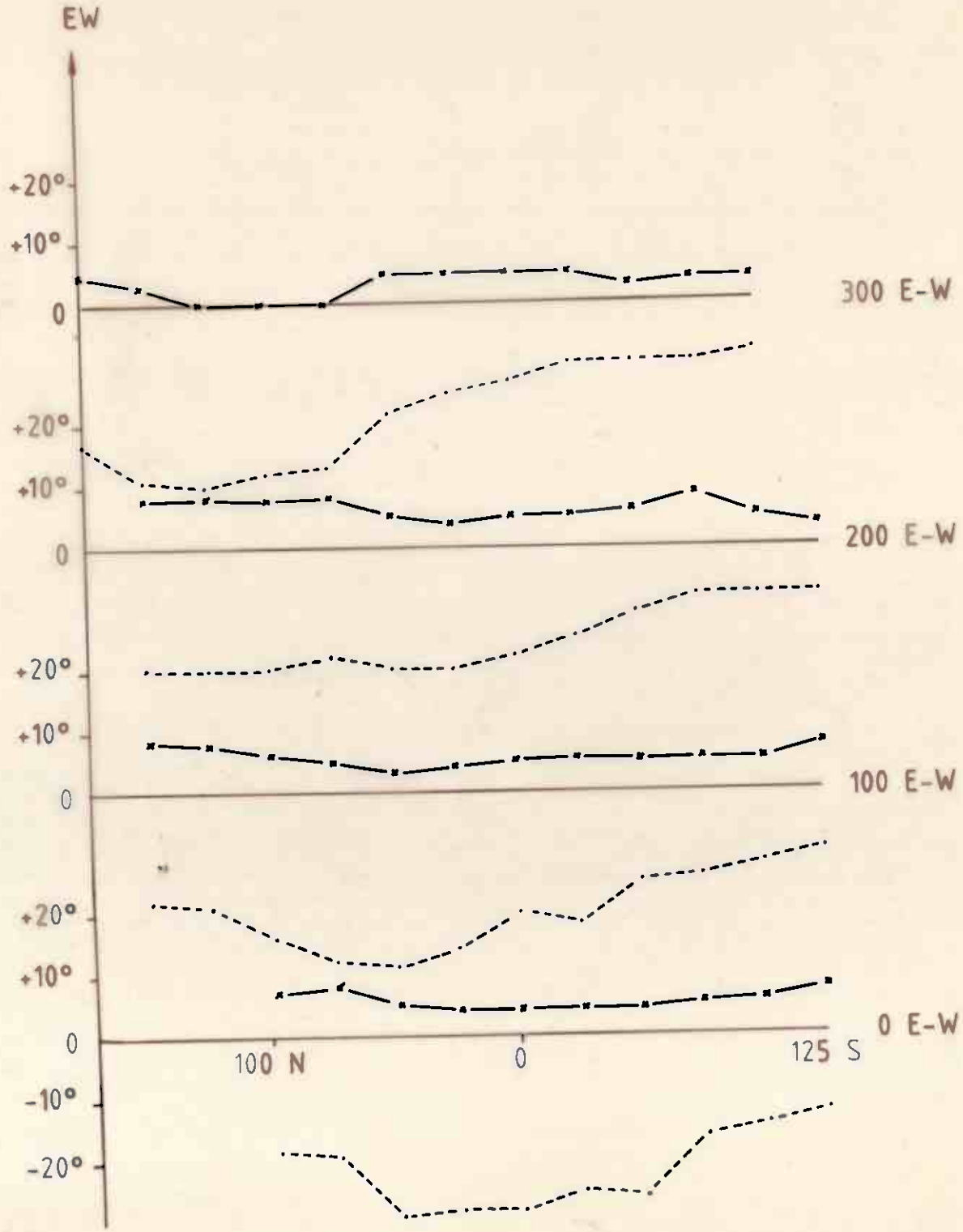
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

VLF RECONNAISSANCE
VESTERELVA II

Author J.T	Drawn by	Date 16.IV.1984
Scale 1:2500	Report No	Drawing No

1mm=1°
4cm=100m
STATION: GYD
DIRECTION: SW
·—·—· in phase
×—×—× out of phase



BP NORGE a s Minerals

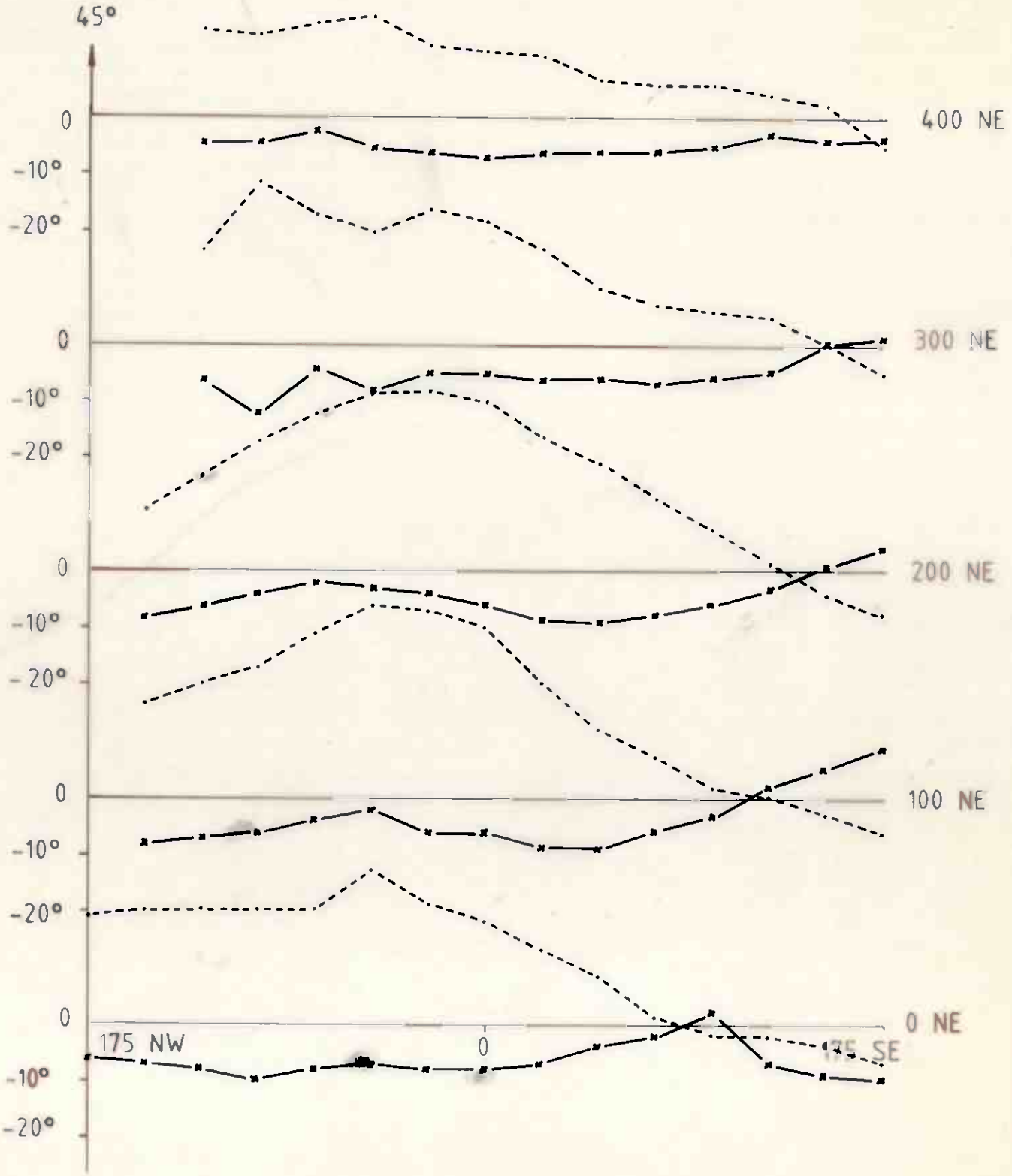
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJEJT

VLF RECONNAISSANCE
VESTERELVA

Author	J.T.	Drawn by	L.J.	Date	17.IV.1984
Scale	1:2500	Report No.		Drawing No.	

STATION: GYD
DIRECTION: SW
1mm=1°
4cm=100m
·—·— in phase
×—×— out of phase



BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

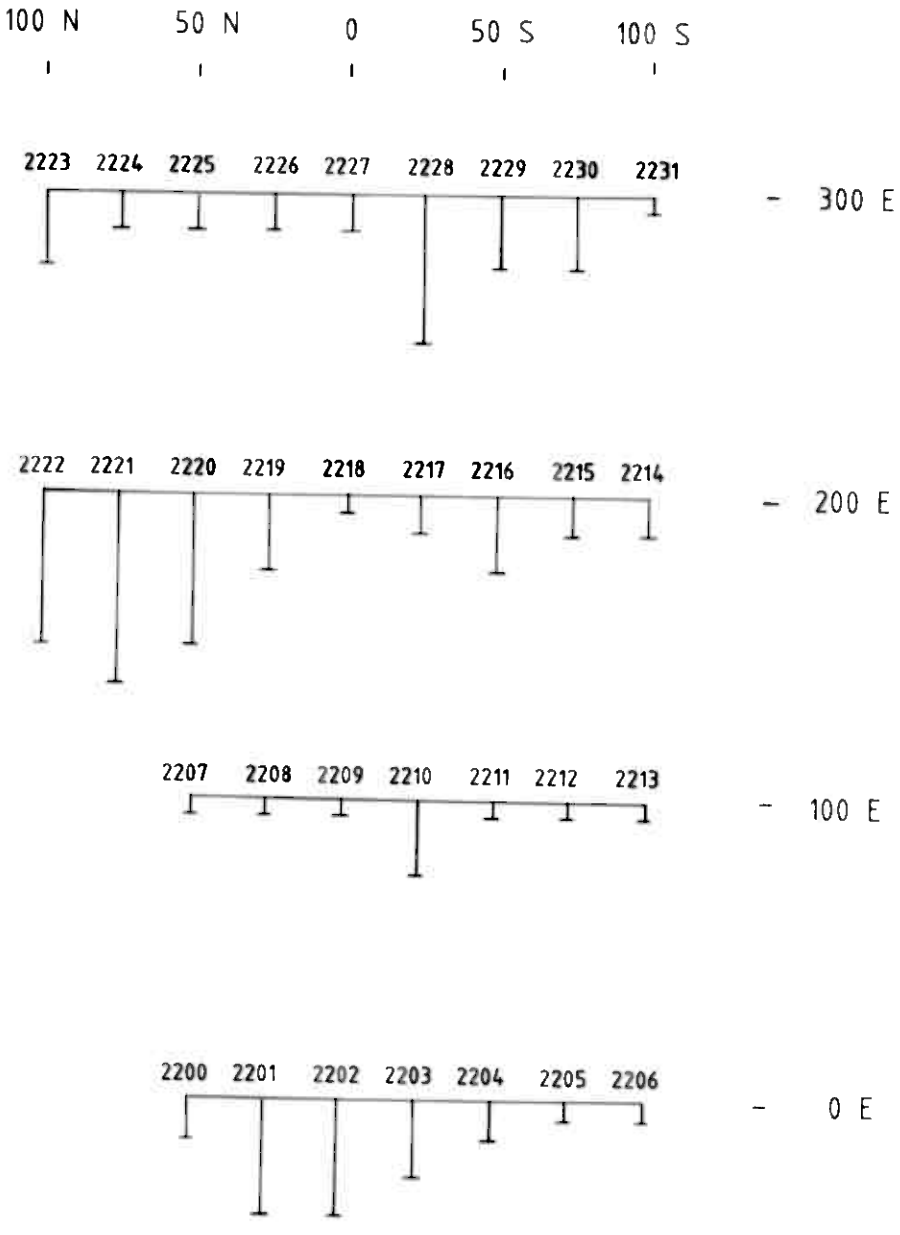
DEEP OVERBURDEN SAMPLING
VESTERELVA II

Author J.T.	Drawn by L.J.	Date 4.VI.1984
Scale 1:2500	Report No.	Drawing No.

DEPTH PROFILES AND
SAMPLE NUMBERS

VERTICAL SCALE: 1cm = 2m

N



BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

SOIL GEOCHEMISTRY
VESTERELVA II

Author	J.T.	Drawn by L.J.	Date
Scale	1:2500	Report No	Drawing No

As

○ >20 ppm

○ 5-10 ppm

N

E-W

300 E

200 E

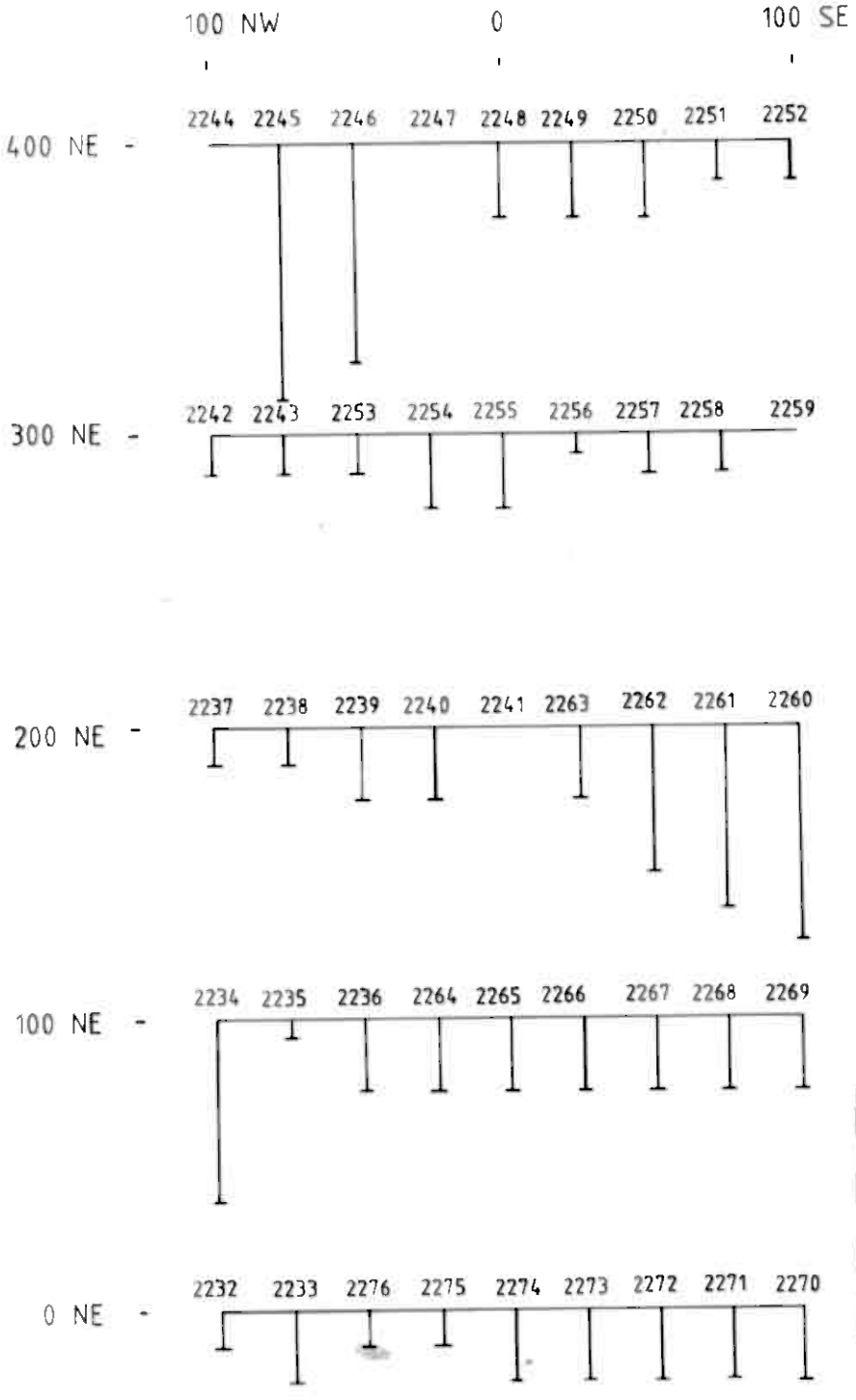
100 E

0 E

50 N

0

100 S



N

DEPTH PROFILES AND SAMPLE NUMBERS

VERTICAL SCALE: 1cm=2m

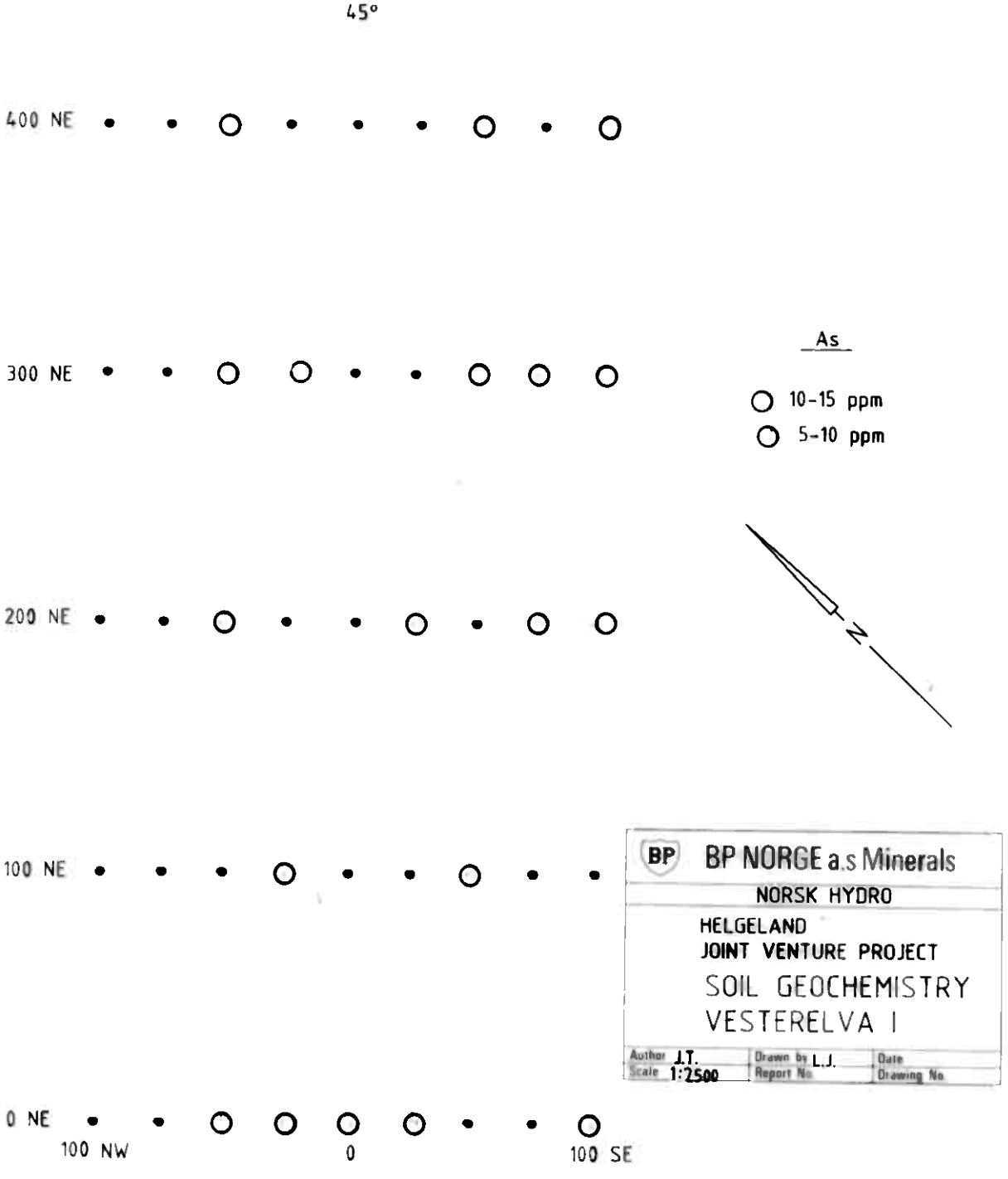
BP NORGE a.s Minerals

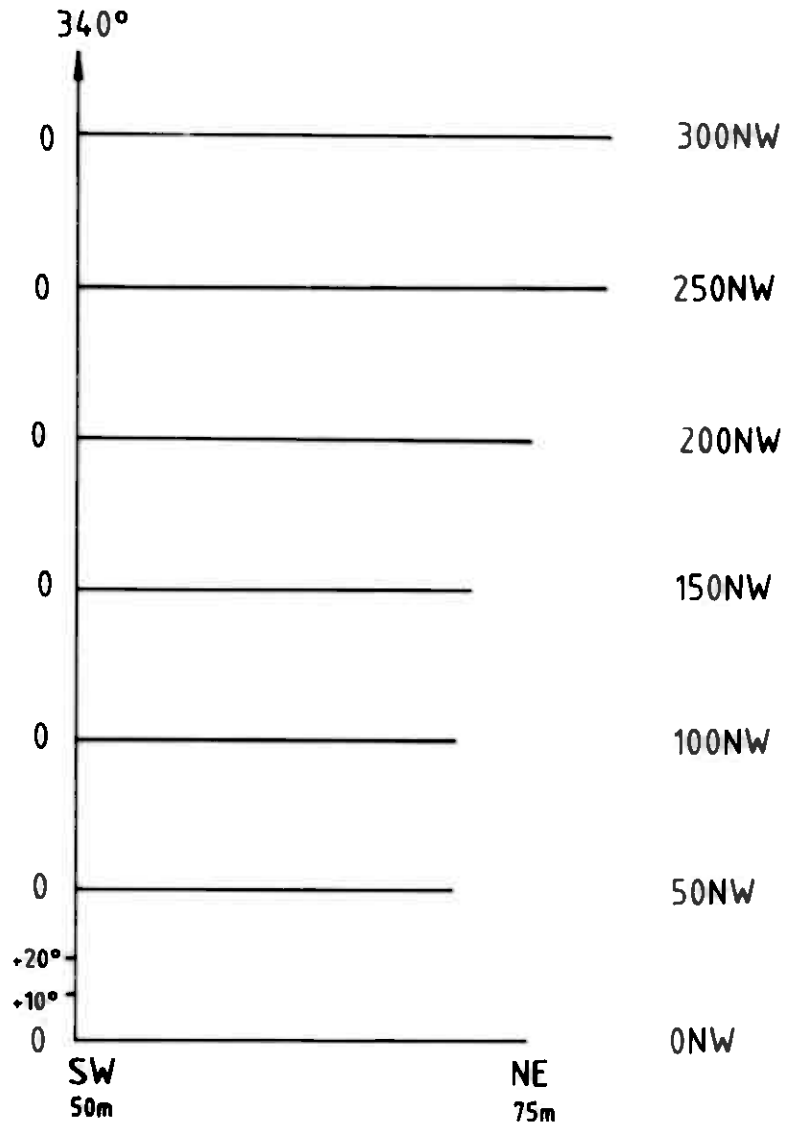
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJECT

DEEP OVERBURDEN SAMPLING
VESTERELVA I

Author J.T.	Drawn by L.J.	Date 8.VI.1984
Scale 1:2500	Report No.	Drawing No.


45°
400 NE
300 NE
200 NE
100 NE
0 NE
100 NW
0
100 SE
As
10-15 ppm
5-10 ppm
N
BP NORGE a.s Minerals
NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
SOIL GEOCHEMISTRY
VESTERELVA I
Author J.T.
Drawn by L.J.
Date
Scale 1:2500
Report No.
Drawing No.



STATION:BODØ
DIRECTION:NW
1mm=2°
4cm=100m
·— ·— · in phase
x— x— x out of phase

BP NORGE a.s Minerals
NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
VLF RECONNAISSANCE
BJØRKNES

Author	J.T.	Drawn by	L.J.	Date	17.IV.1984
Scale	1:2500	Report No.		Drawing No.	

BP NORGE a.s Minerals

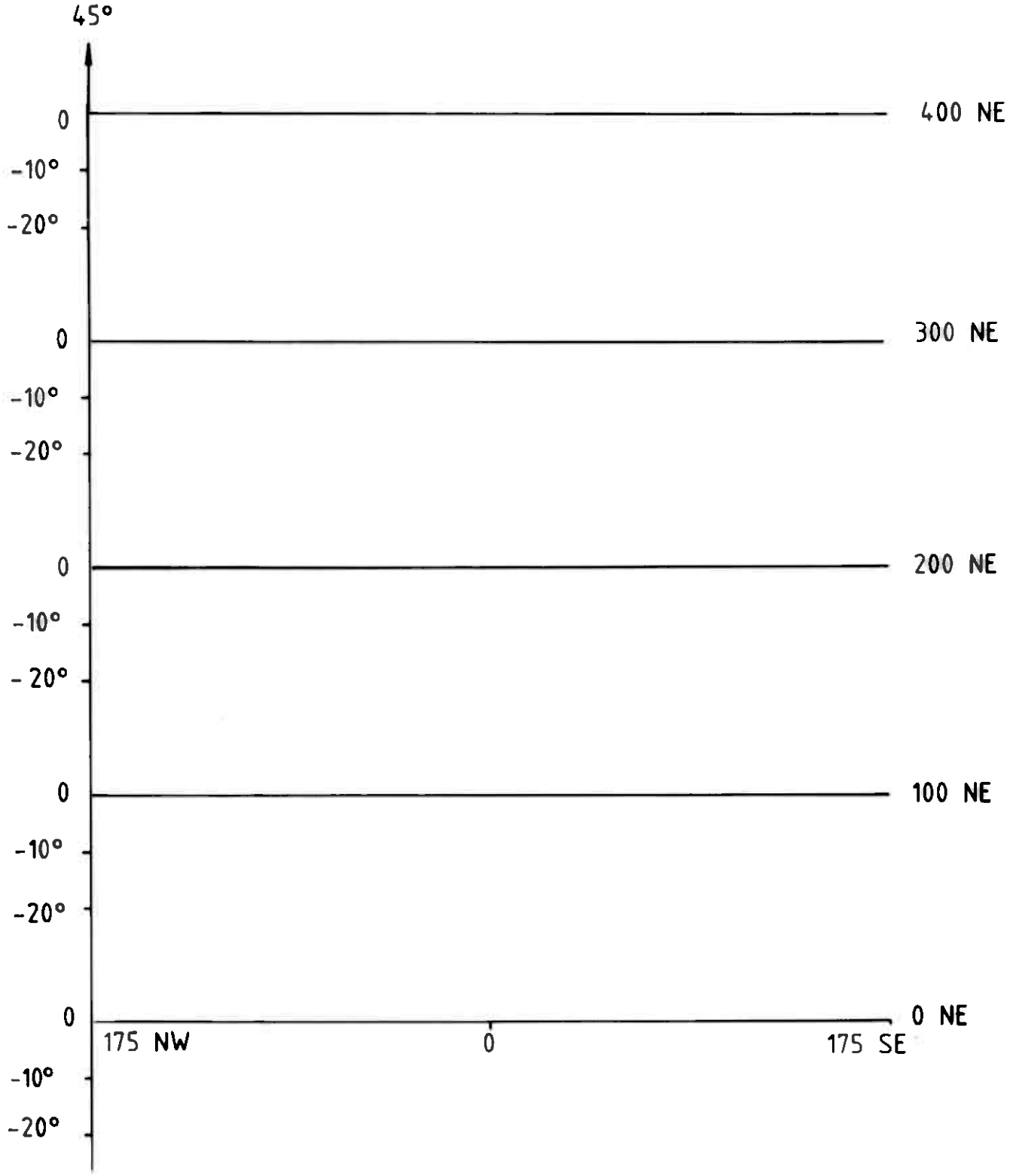
NORSK HYDRO

HELGELAND
JOINT VENTURE PROJEJT

VLF RECONNAISSANCE
VESTERELVA

Author	J.T.	Drawn by	L.J.	Date	17.IV.1984
Scale	1:2500	Report No		Drawing No	

STATION:GYD
DIRECTION:SW
1mm=1°
4cm=100m
·—·— in phase
×—×— out of phase



BP NORGE a.s Minerals

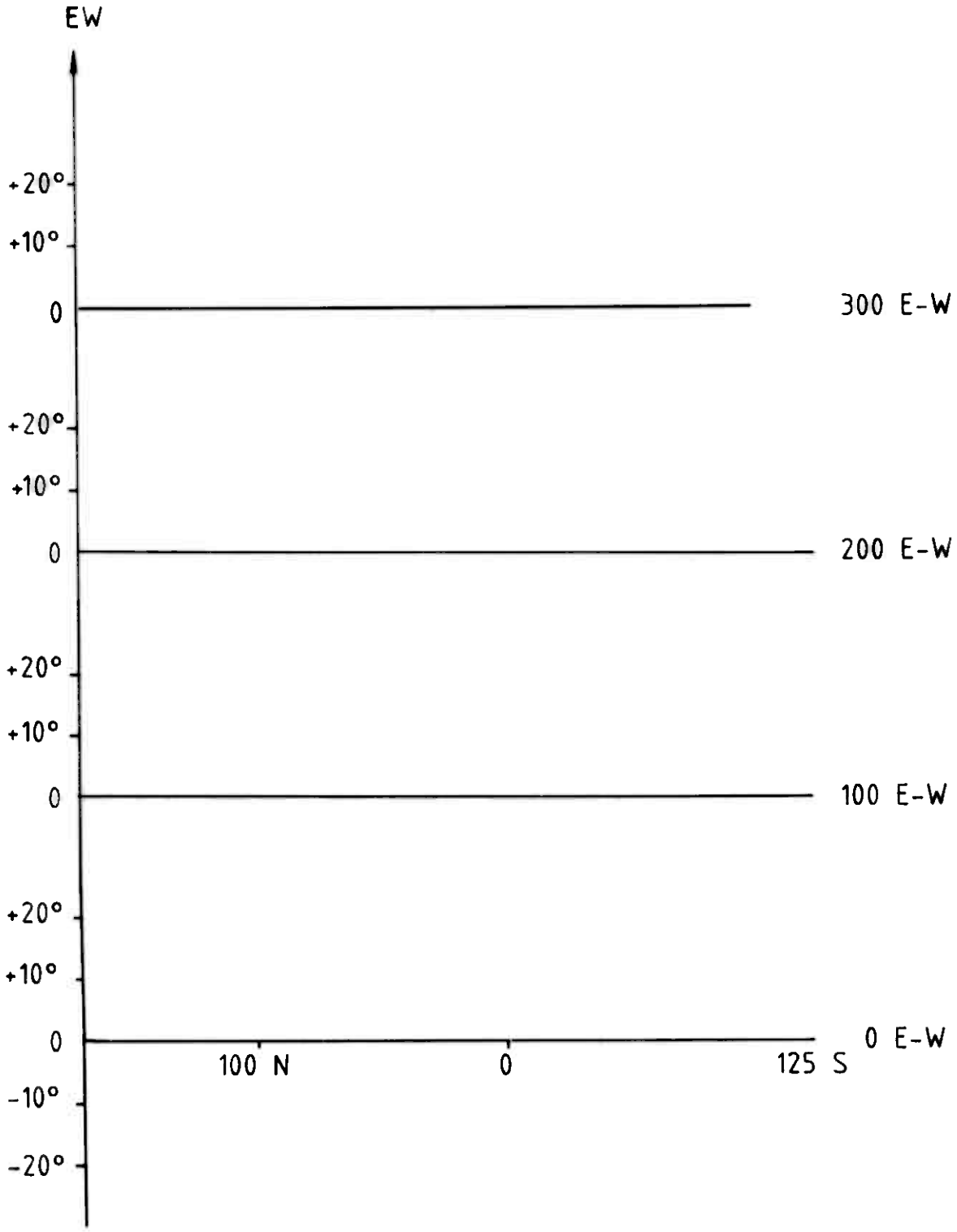
NORSK HYDRO

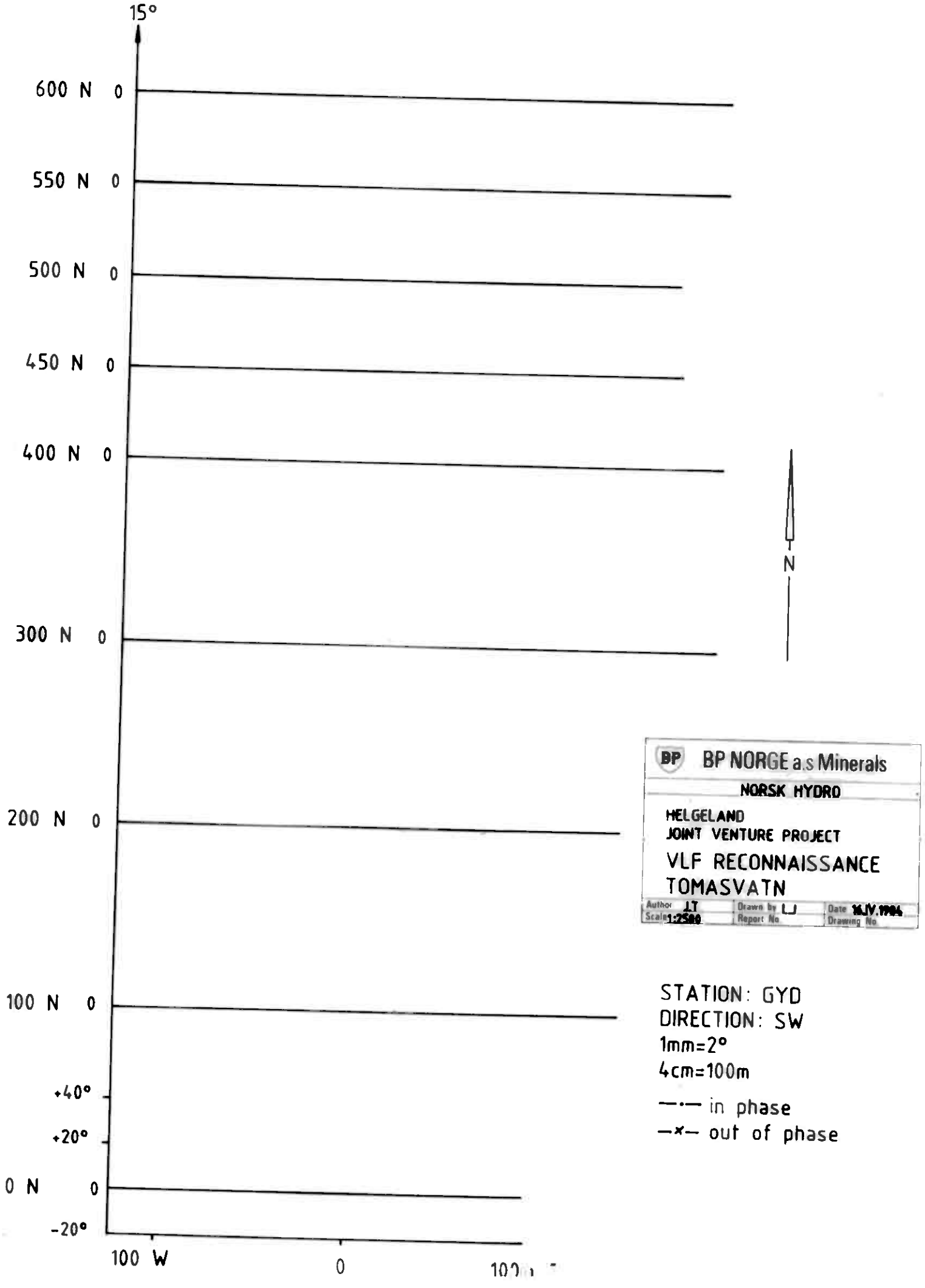
HELGELAND
JOINT VENTURE PROJECT

VLF RECONNAISSANCE
VESTERELVA II

Author J.T	Drawn by	Date 16.IV.1984
Scale 1:2500	Report No.	Drawing No.

1mm=1°
4cm=100m
STATION: GYD
DIRECTION: SW
·—·— in phase
×—×— out of phase




15°
600 N 0
550 N 0
500 N 0
450 N 0
400 N 0
300 N 0
200 N 0
100 N 0
+40°
+20°
0 N 0
-20°
100 W
0
N
BP NORGE a.s Minerals
NORSK HYDRO
HELGELAND
JOINT VENTURE PROJECT
VLF RECONNAISSANCE
TOMASVATN
Author JT
Drawn by LJ
Date 16.IV.1984
Scale 1:2500
Report No
Drawing No
STATION: GYD
DIRECTION: SW
1mm=2°
4cm=100m
—•— in phase
—x— out of phase

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	GRANE 1926 III		DQ 175.5.1

Claim Name: STABFORSMOEN/ STORMOEN No: 20,171,161

Follow Up Team: JT/CS

Samples Taken: Rock Samples: 0300FF2405-2412

Pan Conctr: ./.

Other: ./.

Maps, etc. attached: Geological Scetch Map 1:20.000
Sample Point Location Overlay 1:20.000
(+ Geochem.)

Previous Work / Results:
1982:
Two anomalous stream sediment samples (030018/180435) in the two mainstreams in southern part of the claim.

1983:
Stream sediment follow-up. 71 samples were taken of which 24 samples were anomalous. 9 samples gave high range Au values.

1984 Summary:
Geology:
The whole claim is dominated by various kinds of ~10 dgr. striking metasediments (hornblende-biotite-schist, marbles, calc-silicates, quartzites). In the SE part of the claim the whole unit becomes more heterogenous, whereas in the western parts mainly hornblende-biotite-schists have been found. Intensive dyking of pegmatites and granitic dykes of at least two generations have been observed over the entire area. Numerous pegmatites contained disseminations of pyrrhotite and minor amounts of chalcopyrite. (Rock sample 0300FF2409).

Stratabound sulphide mineralization:
Several up to 2m thick calc-silicate horizons with sulphide impregnation (pyrrhotite, chalcopyrite) have been observed at several localitites in the streambed. (See geological map and scetch). Four rock samples have been taken from these horizons (10 dgr/60 dgr W) (0300FF2410/FF2412 and FF 2505-2506).

Structural mineralization:(mylonite zone)
Apart from these concordant to the schistosity laying sulphide-bearing horizons three major fault/shear zones, striking 120 dgr, 10 dgr, and 50 dgr are running through the area. All these structures meet in one triple point (V31100/N69800). All 1983, high Au anomalies (116 to 289 ppb) are located near this

point. In two of the fault/shear zones poor dissemination of sulphides (pyrrhotite, pyrite, chalcopyrite, galena and sphalerite have been observed. (See geological scetch map). These were sampled (FF 2001-2004;2405-2406;2411;). Galena, sphalerite and chalcopyrite occurred only as sparse infillings along cracks and fissures. Whereas pyrrhotite and pyrite were more common. The 120 dgr. striking structure can be followed approximately 8 km to the SE. The western part of the fracture zone with a width up to 15m consists of a calc-silicatic breccia with siderite along crack-fillings. Silification and chloritization took place along contacts. Sulphides have been found at two locations along this 120 dgr striking structure. In the 10 dgr striking structure a mylonite/breccia has been found. Chlorite along shear planes and iron carbonates could be traced along a distance of 200m. Poor disseminations of pyrrhotite, pyrite and chalcopyrite occur in a 3-4m broad zone.

In lower altitudes a network of small mm wide fissures (40 dgr and 120 dgr striking) with chlorite altertion in the quartz-feldspar-biotite schist were observed in the stream bed. Near to pegmatites or sulphide-bearing calcsilicatic horizons they locally carried sulphides in minor amounts (Rock sample FF2407).

Results:
Two rock samples returned with low level gold anomalies - it seems unlikely that these bedrock sources can account for the widespread, high stream sediment anomalies.

Recommendations:
The whole area has been densely covered by stream sediment samples in 1983. Further follow-up should start with detailed geological mapping in scale 1:5.000, followed by rock sampling/blasting and possibly DOB-sampling at the triple junction.

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1925 III		DQ 167 II

Claim Name: TOMASVATN No: 063

Follow Up Team: AS/MK

Samples Taken: Rock Samples: 0300MA3401

Pan Conctr: ./.

Other: stream sediments (sieved):
0300MA3301-3307
bank soil:
0300MA3601-3638

Maps, etc. attached: 1:5.000 Sample points
1:5.000 Geology

Previous Work / Results:

1982:

1 anomalous sieved sample (050033; 27 ppb Au) duplicate sample (050032 was not anomalous).

1983:

1st follow-up, sieved samples: 7 sieved samples taken of which 1 (MA 7011) contained 1960 ppb Au. 2nd follow-up consisted of:

a) 3 pan concentrates in which gold was detected in all 3. Following comments from sample forms: MA6101 (263 ppb Au) taken 100m upstream from anomalous sieved sample MA 7011. MA6102 (329ppb Au) taken at anomalous sieved sample MA7011. MA6106 (1000ppb Au) taken 250m upstream from anomalous sieved point MA7011.

b) Furthermore 2 sieved stream sediment samples were taken: MA6103 as resample of anomalous sample MA7011 and MA6105 at same point as pan concentrate MA6106 (1000ppb). None of these two sieved samples were anomalous.

c) Also 2 bank/soil samples were taken MA6104 and MA6107. None of these were anomalous.

The 1983 sampling resulted in 1 highly anomalous sieved sample (1908 ppb Au) and 3 pan concentrates (of 3) with detected gold, all in a restricted area of 200-300m. A sieved resample of the anomalous sieved sample (7011=1908ppb Au) was negative.

A sieved sample (MA6106 = 1908ppb Au) was negative.

A sieved sample (MA6105) at same spot as the highest gold value

detected in a pan concentrate (MA6106 = 1000 ppb Au) gave no gold.

The D.O.B. grid sampled during the winter 83/84 returned only low arsenic values. A total of 54 samples were collected of which 4 samples contained more than 10ppm As.

1984 Summary:

The valley in which the mainstream (N-S) runs is covered by thick outwash and/or boggy terrain. Outcrops are found on the eastern slope from approx. 390 m a.s.l. and consist of qtz-fsp- mica biotite schists and gneisses. AT 425-450 m a.s.l. in atributary running E-W impure quartzite was found in 2-3m thick zones. At one point a few disseminated sulphides py, po were found (rock sample MA3401). Below 450 m a.s.l. the general strike is 180o of foliation but changes to 50o/70o NW above 450m. No detailed follow-up of the geology was done as it was more pertinent to try to solve the following two questions.:

a) Is the gold derived from the thick outwash covering the area? In order to try to resolve this 39 bank soil samples were taken.

AND

b) Is the gold in the stream coarse grained? The bad reproductability of sieved samples at the same location and bad correlation between sieved samples and pan concentrates could also indicate this.

   In order to check this the sieved fractions from 125-250 microns of the stream sed. samples in the area were sent off for analysis. i.e. samples:
   050032-050036
   MA7010-MA7014
   MA6103 and MA6105
   MA3301-MA3303

Recommendations:

All soil samples returned with negative Au values except one (14ppb). Furthermore all the overfractions of 1983 stream sed. samples (-250 microns) returned negative. This indicates a local source for the Au anomalies. However, it is not excluded that the source still could be in the drift. An amphibolite breccia zone exists ~2km east of the anomalous area. It strikes N-S and is extending over several kilometers according to geological maps. This zone needs further attention and ought to be followed up. The metamorphic grade is increasing in this direction as we approach the nappe boundary between Helgeland and Seve-Koli nappes.

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	DREVJA 1926 IV		DO 185 I-IV

Claim Name: BJORKNES EASTERN & WESTERN PART No: 117

Follow Up Team: JT/MK (E); AS/CS (W)

Samples Taken:
Rock Samples: BK 2401-2408 (E)
BK 3404-3411 (W)

Pan Conctr: BK 3502-3505 (W)
BK 2501 (E)

Other:

Maps, etc. attached: Geological scetch map 1:5.000
Sample point overlay 1:5.000

Previous Work / Results:
1982:
EASTERN PART
Stream sed. 180028, 180029.

WESTERN PART
2 anomalous stream sediment samples in eastern part of claim.

1983:
EASTERN PART
Stream sed. BK1006-1010, BK1001-1005, Rock spl. BK1001

WESTERN PART
Stream sed. (sieving) follow-up of 1982 anomalous samples. 10 samples of which 4 gave high range Au values D.O.B. during winter (83/84).

1984 Summary:
EASTERN PART
The reconnaissance and detailed mapping was concentrated along the diorite (gabbro) - carbonate contact. At several sites along the contact evidence for shearing/brecciation was observed accompanied by pyrrhotite (py) disseminations, silicification and granitic netveining. The granitic netveining is always confined to the contact zone marble (calcsilc)/diorite.

WESTERN PART
Carbonates (dolomite-marbles), calcsilicates and amphibole bearing calcsilicates with thin carbonate bands and elongated pods are found in the northern part. The contact between the

intrusive and metasedimentary rocks show only slight alteration where these have been found in direct contact (scarnification-silification). (Dry intrusive? - tectonized contacts?). Pyrrhotite as the only sulphide found was seen in three different settings:

1) As centimeter sized aggregates and fracture infill in silicified (hornfelsed?) carbonates close to (no direct contact observed) metasedimentary - intrusive contacts. Large amounts of finer grained pyrrhotite also present. Pyrrhotite in this setting was found at 2 locations. In the eastern part of the Bjorknes area: a) at rock sample position 0300BK3411 where it could be followed for approx. 10m along strike of 100o having a thickness of 1-2m and at b) rock sample point 030BK3404. Approx. 5-6m along strike and a width of 1-2m. The two occurrences in the western part lie along strike of 110 and coincide - roughly along strike with the occurrences in the eastern part. No genetical interpretation will be made here but it should be noted a) that the general strike of foliation/bedding in the metasediments is 100o-120o and thus possibly confining the strongly pyrrhotite bearing mineralization to a specific sedimentary unit b) the metasedimentary intrusive contact has a strike of 100o-120o. The two locations in the Western part lie within 50m of this contact and the concentration of pyrrhotite here could be associated with the intrusives.

2) Pyrrhotite as mm to cm aggregates and densely disseminated was furthermore found in 1cm to 30cm broad metamorphic reaction contacts (skarnification) between the amphibolite bearing calcsilicates and the intercalated calcite marble bands and elongated pods.

3) Finally, pyrrhotite was common in small amounts, as fine grained disseminations in the calcsilicatic and amphibolite bearing calcsilicatic rocks.

Recommendations:
EASTERN PART
Provided the reanalysis of Spls. BK 1001-1005 show anomalous levels of Sb and/or Bi. Further follow-up of southern Au-bearing stream.

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	VEVELSTAD 1826 III		

Claim Name: Klausmarkelven No: 173

Follow Up Team: AS/CS

Samples Taken: Rock Samples: 0300KL3401-3454

Pan Conctr: ./.

Other: ./.

Maps, etc. attached:

Previous Work / Results:

1982:

2 stream sediment samples with arsenic-anomalies only!

1983:

During a short reconnaissance trip qtz-veins containing arsenopyrite were found. 5 rock samples were taken of which 3 from 2 localities contained gold in the 200-300 ppb range.

1984 Summary:

An area of approx. 4 km N-S, and 1 km E-W extent was checked in detail along the northern part of Klausmarkelven, in order to determine the extent of the arsenopyrite-bearing qtz-veins found during 1983.

Arsenopyrite was found at 7 localities. The 4 southernmost localities (I-IV) could be followed along a 165 dgr lineament (165/80E fault), the distance between the southernmost and northernmost locality being 1100m. At all these localities the arsenopyrite was clearly associated with qtz-veins ranging in thickness from cm scale to 2m. The arsenopyrite being contained in a mm to 15cm broad contact zone between the qtz veins and the host rock, or to a lesser extent in cracks and small vugs within the qtz veins.

The arsenopyrite bearing qtz veins only outcrop intermittently along the 165 dgr striking lineament with a total exposed length of 125m. To the south of locality IV the lineament runs through areas claimed by competitors and to the north of locality IV no further outcrops of qtz veins were found along the 165 dgr striking lineament.

To the NNE of the northernmost locality along the 165 dgr striking lineament, arsenopyrite was found at three localities (V, VI and VII). At locality VI the arsenopyrite was found in strongly silicified marbles and calcsilicates in an area of 40x20m. At locality V lying between locality IV and VI the arsenopyrite found was in an up to 3cm thick fracture (no qtz)

striking 20 dgr and being hosted by porphyritic granodiorite. At locality VII arsenopyrite was found in a 40m x 50m area in a) 6 fractures (±qtz) striking 20-40 dgr, having a width of up to 4 cm, and being hosted by porphyritic granodiorite, b) as up to 1cm large euhedral crystals disseminated in the granodiorite in dm patches over an area of 1 x 4m.

The total distance from the southernmost (Loc I) to the northernmost localities (Loc VII) where arsenopyrite was found is ~1900m with a total outcrop length of 175-200m.

Short geological description

The main part of the Klausmark area is covered by porphyritic granodiorite enclosing a 10m to 500m broad N-S running, metasedimentary band. (mainly marbles with minor calcsilicates and amphibolites). At the contacts between the porphyritic granodiorite garnet skarn is developed in zones up to 0.5m but it is not certain if these are intrusive skarns. (Possibly fault related skarns). Biotite bearing feldspar porphyry dykes up to 20m broad can be followed over distances of up to 1km, and are seen to cut through both the porphyritic granodiorite and the metasediments. The observed strike often being 160-170 dgr. Faulting along a major plane 165-170 dgr/80 E has been observed to postdate the intrusion of the porphyry dykes (mylonitization and brecciation at Loc III). Between localities I and IV the faulting and mylonitization is (syn)postdated by emplacement of qtz veins with, in places, associated arsenopyrite at margins, and to a lesser degree in fractures and vugs in the qtz veins. The arsenopyrite bearing qtz veins have been observed to be hosted by all three above mentioned rock types.

Three minor directions of faulting have also been observed in the area: a)20-30 dgr/80E-80W b)165/10-20 dgr E c)60-80 dgr/60-80 dgr S. Qtz veining has been observed in the first two of these directions and the 20-30 dgr/80dgr E-80dgr W direction hosts arsenopyrite at localities V and VII often without associated qtz. The fault direction 60-80o/60-80oS appears to be youngest and is seen offsetting the qtz vein at Loc. III. In the area to the north of locality III along the bottom of the Klausmarkelva valley rusty staining along fractures and joints with all above mentioned directions is common.

A tentative chronological outline is given below

1) Deposition of metasediments
2) (?Deformation - metamorphism??)
3) Intrusion of porphyritic granodiorite, possibly with shearing along 165o striking plane causing strong orientation of phenocrysts.
4) Intrusion of biotite bearing feldspar porphyry dykes. Often along 160o-170o strike.

5a) Faulting along major 165-170o/80oE plane(s) and minor 20-30o/80E-80oW, 165/10-20oE, 60-80o/60-80oS planes.
5b) Emplacement of qtz veins with slightly younger arsenopyrite introduction.
5c) Continued minor faulting along 60-80o/60-80oS planes.

Recommendations:

Further follow up of N-S running structures in the area especially towards the gabbroic body to the west. Also reconnaissance in marble belts to the north east is recommended. Blasting along the major apy-Au-bearing fault zone could result in that pervasive alteration and richer Au-apy mineralization is observed. (1984 rock samples returned with max 1.04ppm Au)

ANALYTICAL RESULTS:

SA. NO.	LOC. NO.	PPB AU	PPM AS	PPM SB	PPM BI
KL 3401		/	255	0	0
3402		/	9	0	5
3403		/	11	0	6
3404		/	892	0	0
3405	III	1040	188046	76	193
3406		/	2200	3	0
3407		/	83	0	0
3408		/	2426	0	0
3409		/	357	0	0
3410		/	50	0	0
3411	III	130	5202	3	4
3412		/	21	0	0
3413		/	30	0	0
3414		/	50	0	0
3415		/	90	0	0
3416		/	487	0	0
3417		/	1475	0	0
3418		/	1036	0	0
3419		/	2629	0	0
3420	VI	160	10447	9	5
3421	VI	350	22254	6	19
3422		/	331	0	0
3423	VI	150	20163	6	23
3424	VI	400	18359	14	12
3425		/	180	0	0
3426	VI	720	64125	0	77
3427	VI	100	9058	0	10
3428		/	46	0	0
3429		/	94	0	24
3430		/	120	0	0
3431		/	32	0	0
3432		/	8	0	0
3433		/	15	5	0
3434		/	0	0	0
3435		/	13	0	0
3436		/	5	0	0
3437		/	0	0	19
3438		/	6	0	0
3439		/	6	0	8
3440		/	6	0	0
3441		/	0	0	0
3442		/	265	0	0
3443	VII	88	7559	7	9
3444	VII	148	11225	0	14
3445	VII	25	47	0	97
3446		/	24	0	14
3447		/	15	0	10
3448		/	12	3	0
3449		/	6	0	0
3450	VII	13	0	0	0
3451		/	912	0	0
3452	VII	42	15336	8	30
3453	VII	153	47192	54	43
3454	VII	425	108689	77	133

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1926/4,DREVJA	B016	DP 185 IV

Claim Name: MJAVATNET No: 141

Follow Up Team: AS/CS

Samples Taken: Rock Samples: 0300MJ3401-3408

Pan Conctr: 0300MJ3502-3509

Other: ./.

Maps, etc. attached: a) Geological Scetch Map 1:5.000
b) Sample Point Overlay 1:5.000
(+ Geochem.)

Previous Work / Results:

1982:
1 anomalous sample (69ppb Au) 180272, at bottom of drainage system.

1983:
Stream sediment sampling (sieving) of drainage system. 28 samples of which 7 contained gold. 1 high-range, 4 med-range and 2 low-range.

1984 Summary:
Garnet-hornblende-mica schists and gneisses with varying amounts of qtz-fsp dominate the entire area covered by the drainage system. In the two southern tributaries impure quartzite containing small (mm-sized) aggregates of mica and in few places disseminated pyrrhotite, could be followed for up to 300 m in the stream beds. A major fault/shear zone striking 30 dgr. runs through the area. From aerial photos this fault zone can be followed for approx. 10 km to the north and 15 km to the south. The southward projection of the fault zone runs along the western margin of the Reinfjellet granite. In the Mjavatnet area the fault separates a western schist/gneiss area characterized by strongly developed foliation parallel to the main fault directon and tight isoclinal folding (fold axis parallel to main fault) from an eastern gneiss/schist area characterized by irregular open folding. The impure quartzites found in the two southern tributaries over 300m were not found in the main stream 400m to the north and it is believed that the above mentioned fault "cuts off" the quartzites.

At 350 m.a.s.l. in the southern tributary a facture zone up to 1.5m broad could be followed for 30m along a strike of 100 dgr. Within the fracture zone thin (iron?) carbonate infilled fractures and a few zones up to 20cm thick of silicified breccia

with minor amounts of pyrrhotite were observed. The fracture zone is not in itself "spectacular" but it should be noted that linear features (faults) with a strike of 90 and 110 dgr. can be traced on the aerial photos. These fault directions are parallel to the fault directions seen further to the south in the Fellingfors, Stabforsmoen, Vesterelva and Rauvatn areas where there are good indications that these may be of importance as Locii for As/Au mineralization.

Conclusion:
Apart from the above mentioned fracture zone and the pyrrhotite bearing impure quartzite no sulphide bearing rocks were observed in situ. It is doubtful whether any further visual inspection of the area, at present, would result in giving a reasonable explanation for the gold detected in the sieved sediment samples.

After the follow-up on the Mjavatnet area had been done we were visited by Stan Hoffmann who introduced us to a number of possible geochemical methods which could be applied as a follow-up to the stream sediment sampling.

Soil or bank sampling could be considered in the area - especially above sample point MJ4009 (652 ppb gold) as only a fairly small area would need to be covered. For the rest of the area bank soil sampling would have to be fairly extensive as the anomalous points are scattered over a large area. Before engaging in such a programme it is suggested that bank sampling is done in the Strauman claim 3 km to the north where the stream sediment samples show a considereably tighter pattern. Results from this area could be applied to the Mjavatn area.

Recommendations:
Bank/soil sampling above anomalous point MJ4009 (652 ppb Au)

Results:
MJ 3401 = 90 ppb Au, 21 ppm Bi
MJ 3500 = 90 ppb Au
MJ 3507 = 93 ppb Au
MJ 3508 = 93 ppb Au
MJ 3509 = 117 ppb Au

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1825 IV		DJ 170.5.2 DK 170.5.1

Claim Name: VASBOTN No: 169

Follow Up Team: CS/MK

Samples Taken:
- Rock Samples: N03401-3412
- Pan Conctr: N09501-9502
- Other:Soil spl N09601-9609
- Stream sed: N09301-9310

Maps, etc. attached: Geology 1:5.000
Sample points + geochem 1:5.000
Vertical profile of Au anomalous stream

Previous Work / Results:

1982:
Stream sed. spl. 040059-65. No spl. were anomalous.

1983:
Pan conc. N01007-1024,1032,1033,1037 (8 spl. anomalous. Cluster of 7 anomalies in one stream) See spl point overlay. Rock spl. from qtz-apy breccia (10cm wide) in 40 dgr. shear zone contained 800 ppb Au.

1984 Summary:
Further panning above last 1983 anomaly (1150 ppb) + soil sampling on both sides of stream. Rock spl. were taken from fractured qtz-vein containing chlorite and pyrite (30cm wide). The qtz-vein strikes 30 dgr. and cuts the stream directly above last 1983 anomaly. Rock spl. also taken from skarned contact (gabbro-calc silicates). The anomalous stream drains a sequence of metasediments consisting of a basic (gabbroic clasts), conglomerate, marbles, calc silicates and biotite-garnet schists. The calc silicates are locally pyrr, py rich. These bend around a metagabbro body which has caused skarning in dm-scale. A major lineament defines the boundary between biotite-garnet gneiss and marble. Close to this contact serpentinite bodies occur.

Stream sed. samples were taken as resamples of 1983 pan. conc. anomalies in order to compare the two methods (see vertical profile). The result from this indicate that pan conc. has a better reproduceability than sieved samples, especially when the sediment is coarse at high slope angles. Consequently the sieving method detects Au in flat areas with predominantly fine-grained material, but is missing out Au at increasing slope angle.

Recommendations:
Fracture zone defined by sulphide bearing qtz-vein considered likely source for Au. No further work recommended as target is too small.

180230

110202

180231

BK 3503

BK 3404 – 0,6,0

BK3502

BK 3405-6

0,13,0,0

[30],27,7,0,4

BK 3407 – 0,0,0,0

BK 3505

BK 3411 – 0,0,6,0

BK 2405 – 0,9,0,0

BK 3401

BK 3410

BK 3408 0,8,0,0

0,5,0,0

BK3504

0,0,0,?

BK 2402-3 – 0,4,00

BK 2502 – BK 2406-7 – 0,7,0,6

0,0,0,0

0,0,0,0

BK 2404 0,5,0,7

BK 2408 0,0,0,0

11

BK 1006

BK 2401 – 0,0,3,0

BK 1007

BK 1008 124 / 7 / 53

BK 2501

BK 1009

BK 1010 446 / 5

180229 22

446 PPB Au

5 PPM As

180233

180232

BK 1005

BK 1004 191 / 2

BK 1003

BK 1002 140 / 4

180228 145

BK 1001 42 / 8

FUSTVATNET

E6

○ STREAM SED. SPL.

□ SOIL SPL.

△ PAN CONC.

⊕ As ANOM. D.O.B SPL.

x ROCK SPL.

N

0 500m

MOSJOEN

BP NORGE a.s Minerals

BJÖRKNES

SAMPLEPOINTS, GEOCCHEM.

Author J.T	Drawn by J.T	Date
Scale 1:5000	Report No.	Drawing No.

FF6017
FF6019
FF6018
030033
030034
110034-35
FF9402
FF9401
FF5103
FF6016
FF6015
110036
FF9625
FF2501
FF9626
FF9627
FF9628
FF5025
FF9301
FF2403-4
FF9629
FF9308
FF9609
FF5102
FF5020
FF9303
030031
FF5017
FF9302
FF5024
FF9608
FF9307
FF6026
FF5018
030032
FF9315
FF9306
FF9607
FF9606
FF6025
FF9902
FF5023
FF2503
FF9304
FF9305
FF5022
FF9605
FF5021
FF9604
FF5019
FF9314
FF9602
FF9603
FF3401-4
FF9601
FF9610
FF3408
FF5016
FF2401
FF3405-7
FF9619
FF9313
FF9611
FF3501-3
FF9618
FF9403
FF5009
FF9309
FF9404
FF9616
FF9615
FF9613
FF9612
FF5014
FF9617
FF5010
FF9614
FF9310
FF5013
FF5011
FF9311
FF5015
FF9624
FF5012
FF9312
FF9620
FF9623
FF9621
FF9622
FF2402
ALMVATNET
FF5004
110033
FF5005
FF5006
FF5003
FF9501
FF2502
FF5002
FF5003
VEFSNA
030030
FF5001
FF5008
110032
TROFORS
N
0
500m

- ROCK SPL.
△ PAN CONC
□ SOIL SPL.
○ STREAM SED. SPL.

Au ppb
As ppm(other anomalie in ppm)

BP NORGE a.s Minerals

FELLINGFORS
SAMPLE POINTS

Author	Drawn by	Date
Scale 1:5000	Report No.	Drawing No.

030084
030082
110009 131
RF8043 15 6
RF8041/47 63 11
RF8040
RF8039
RF8037 25
RF8038 18
030050
RF3508
RF8046
RF8044
110018
110008 45 5
RF8045
RF3312
030049
RF3602
RF3606
RF3601
RF3607
RF3310
RF3309
RF3603-5
RF3311
RF3608
RF3609
RF3308
RF3610
RF3313 32
RF3611
RF3612
110007 14
RF3307
RF3324
RF3321 174 5
RF3322
RF3318 12
RF3615
RF3323
RF3317 17
RF3319 17
RF3613-14
RF6007 205
030048
110019
RF3616
RF3306 13
RF3503
RF3617
RF3618
RF3304
RF3302 10
RF3301
RF3316 11
RF3504 325
RF3303 16
RF3315
RF3620
RF3621
RF3305
RF3314
RF6006 144
RF3507
030047
RF6003 14
RF6005 17
110028
RF6008 124
RF6004
110029 28 56
RF6009 54
110020
x RF3402
RF3505 1290
RF3401
RF3403
x RF3404
RF3506
x RF3405
110030 48 19
RF 6001 106
RF3501-2 50
RF6002 48
030045
N
0
500 m

D.O.B GRID 1
D.O.B GRID 2
145
205
23
236

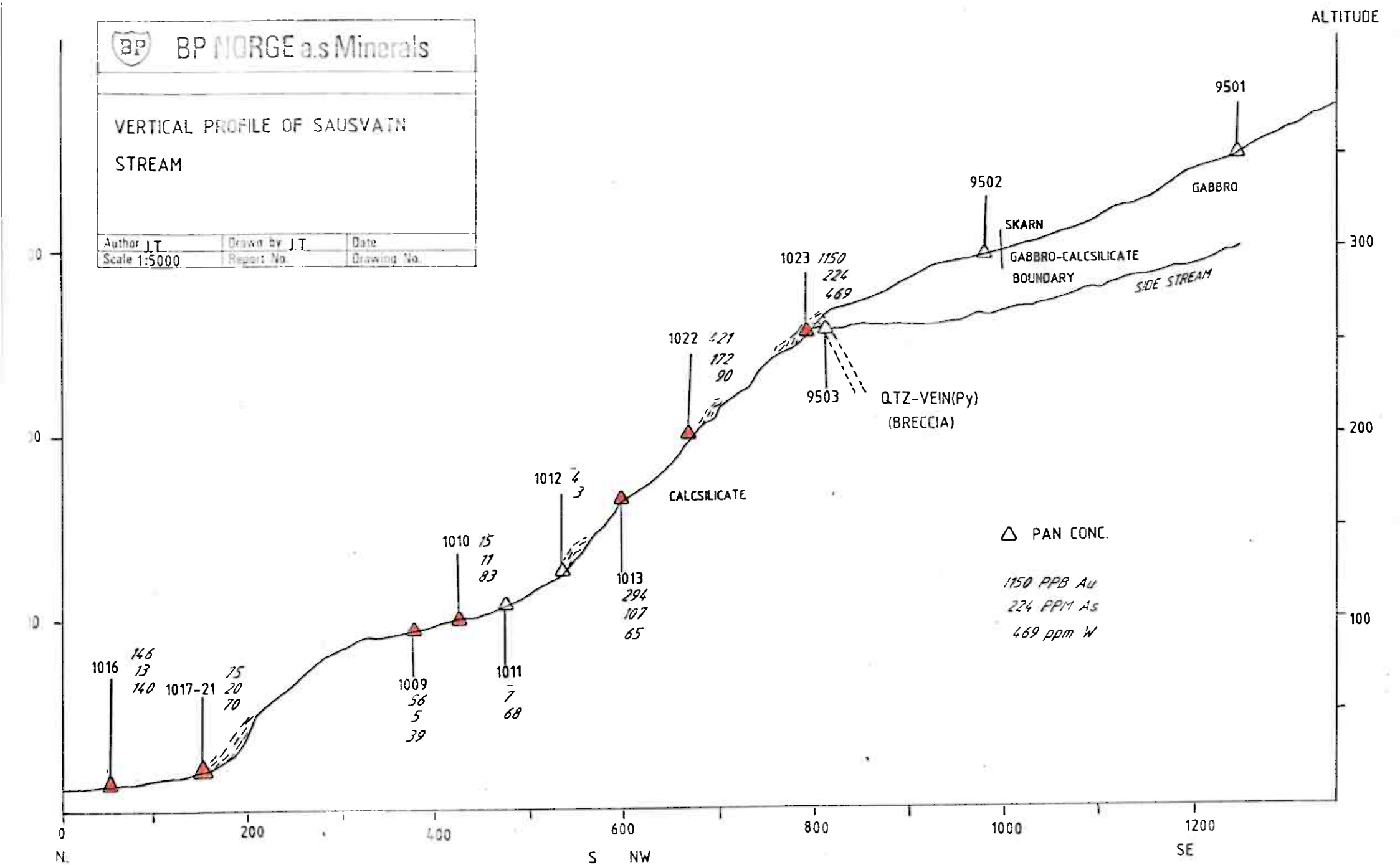
◉ O.O.B SPL.
○ STREAM SED. SPL.
△ PAN CONC.
□ SOIL SPL.
x ROCK SPL.
48 PPB Au
18 PPM As

BP NORGE a.s Minerals

VESTERELVA

SAMPLEPOINTS, GEOCHEM.

Author: J.T.	Drawn by J.T.	Date
Scale 1:5000	Report No.	Drawing No.

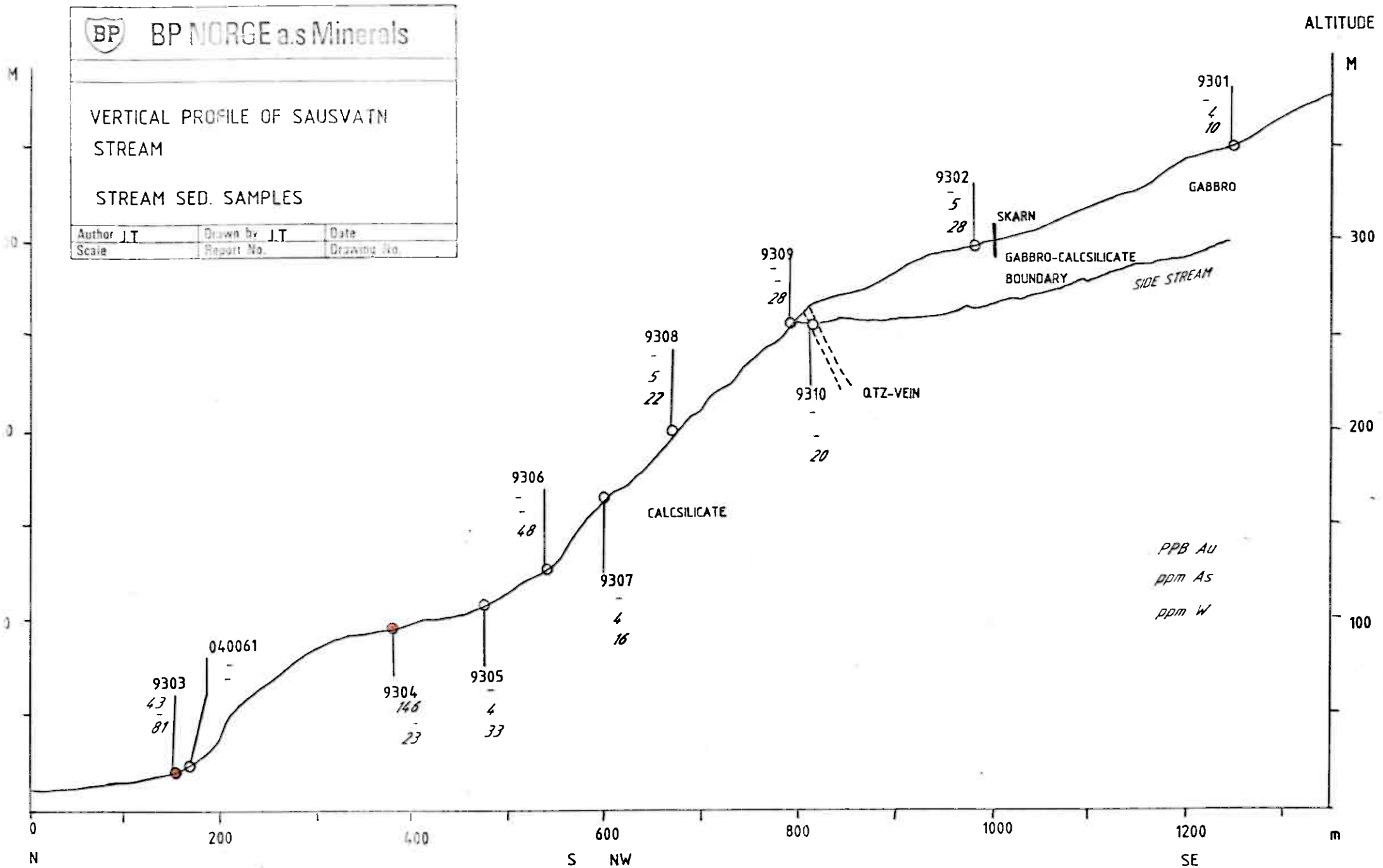

BP NORGE a.s Minerals
VERTICAL PROFILE OF SAUSVATN STREAM
Author J.T.
Drawn by J.T.
Date
Scale 1:5000
Report No.
Drawing No.
ALTITUDE
300
200
100
9501
GABBRO
9502
SKARN
GABBRO-CALCSILICATE BOUNDARY
SIDE STREAM
1023 1150 224 469
1022 421 172 90
9503
QTZ-VEIN(Py) (BRECCIA)
CALCSILICATE
1012 4 3
1010 15 11 83
1013 294 107 65
1009 56 5 39
1011 7 68
1016 146 13 140
1017-21 75 20 70
PAN CONC.
1150 PPB Au
224 PPM As
469 ppm W
0
200
400
600
800
1000
1200
N.
S
NW
SE

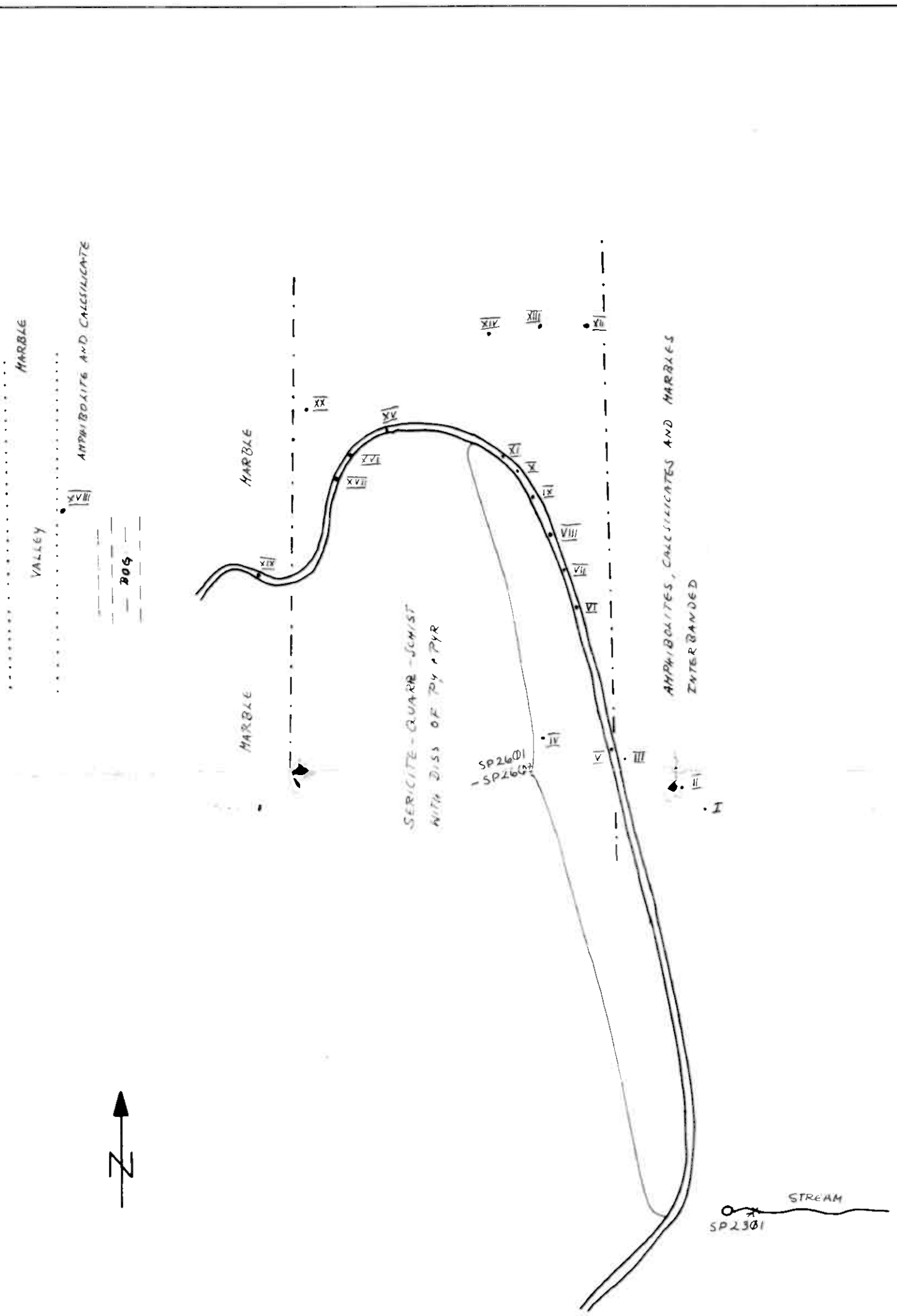
BP NORGE a.s Minerals

VERTICAL PROFILE OF SAUSVATN STREAM

STREAM SED. SAMPLES

Author J.T	Drawn by J.T	Date
Scale	Report No.	Drawing No.





BP NORGE a.s Minerals

SPELREM

LOCATION OF BLAST HOLES AND SAMPLE POINTS

Author C.S.	Drawn by C.S.	Date 13.8.84
Scale	Report No.	Drawing No.

SAUSVATN

040062
1033
1032
040063
040064 14
040065
x 3402

3001-12 800 7000
1014
1015 117 20 9
040060
040059

1016 146 17 140
9303 43
1007-8,1017-21,1037 15 20 70
040061 6
3018
9304 146
1009 56 5 39
1010 15 11 83
9609
9608
9305
1011 7 68
1012 4 4
9306
9607
9606
1013 194 107 65
9307
1022 421 177 90
9308
x 3410
1150 1023 224 469
9309
3409+11+12
3407
9503
9310
9603
3406
9601
3408
9602
x 3405
9302
9502
x 3404
9301
9501
x 3403

N

0 500m

o STREAM SED. SPL.

△ PAN CONC.

□ SOIL SPL.

x ROCK SPL.

146 PPB Au
17 PPM As
140 PPM W

BP NORGE a.s Minerals

SAUSVATN

SAMPLEPOINTS, GEOCHEM

Author J.T, A.S, J.F	Drawn by J.T	Date
Scale 1:5000	Report No	Drawing No

REINFJELLET GRANODIORITE

BIOTITE GNEISS

SVART-
VATNET

SKARN

419 PPB Au

MARBLE

BIOTITE GNEISS

SKARN

MARBLE

MARBLE

PORPHYROBLASTIC
GRANODIORITE

MARBLE

SÖR-SVART VATNET

TO RAUVATN

● Au ANOMALY

◉ COMBINED Au,As ANOMALY

○ As ANOMALY

BP NORGE a.s Minerals

REINFJELLET

STRUCTURES, STREAM SED. ANOMALIES

(AREAL PHOTO F023)

Author: J.T	Drawn by: J.T	Date:
Scale: 1:20 000	Report No.:	Drawing No.:

GRANODIORITE

GRANODIORITE

STILBITE FILLED JOINTS

PORPHYROBLASTIC GRANODIORITE

N

0 600 M

- Au ANOMALY
- COMBINED Au,As ANOMALY
- As ANOMALY
- BIOTITE-HORNBLENDE SCHIST, MARBLE

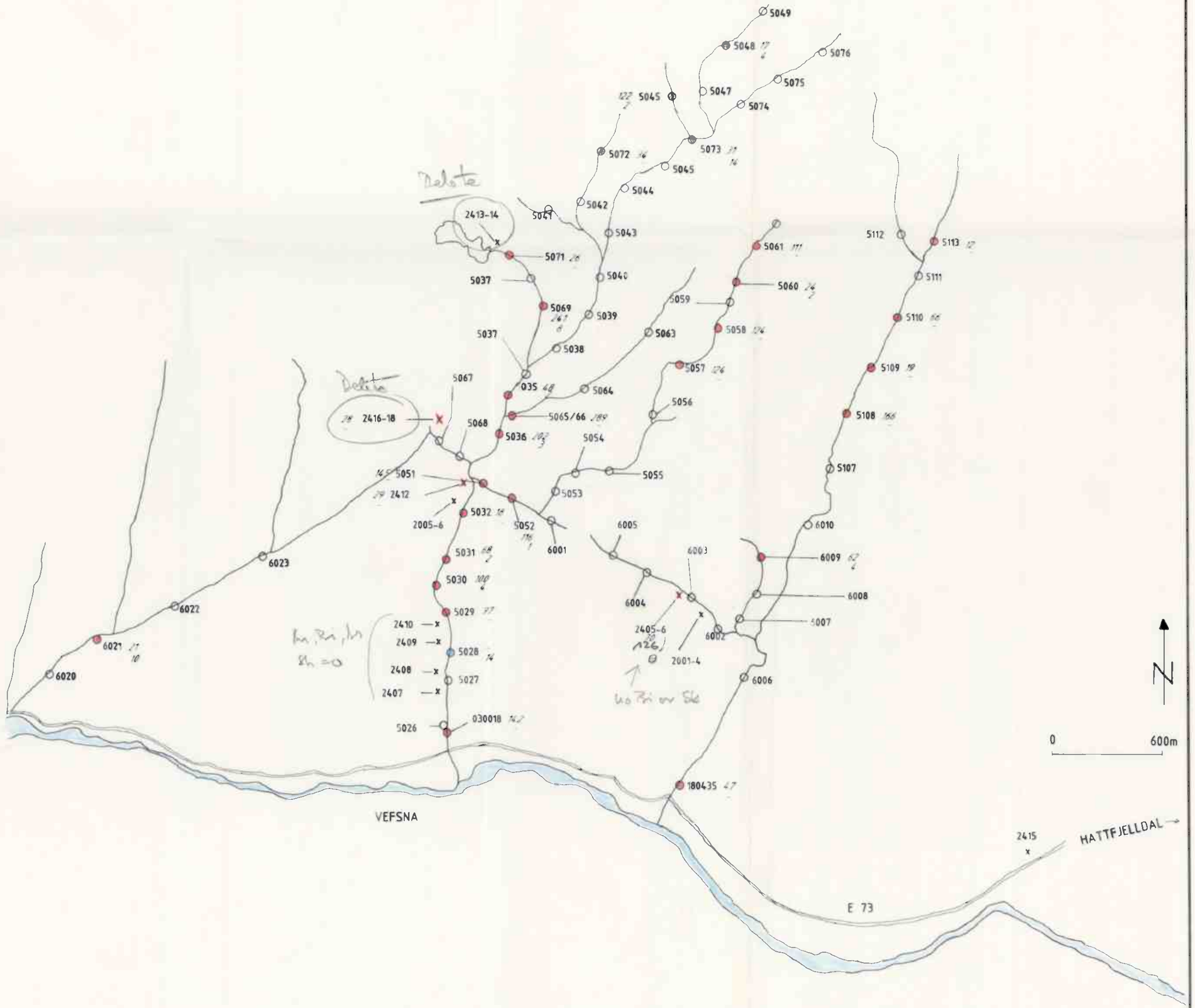
BP NORGE a.s Minerals

VISTFJELL

STRUCTURES . STREAM SED.

(AREAL PHOTO G016)

Author J.T	Drawn by J.T	Date
Scale 1:20000	Report No.	Drawing No.



TROFORS

○ STREAM SED. SPL

x ROCK SPL.

100 PPB Au

4 PPM As

BP NORGE a.s Minerals

STABBFORSMOEN

SAMPLEPOINTS, GEOCHEM.

Author J.T	Drawn by J.T	Date
Scale 1:20 000	Report No.	Drawing No.

TASKLIVATN

LOC.7 40-42g 17.6 Au

LOC.4

LOC.6

LOC.3

LOC.2

LOC.1 0.5 ppm Au

GABBRO

PORPHYROBLASTIC GRANODIORITE

PORPHYROBLASTIC GRANODIORITE

OKFJORD

N

0 600m

METASEDIMENTS, MARBLE, AMPHIBOLITE, CALCSILICATE

QTZ-VEIN

ARSENOPYRITE (QTZ-VEIN)

FRACTURE

APY DISS IN HYDROTHERMAL JOINTS

LOC.1 : KL3417

LOC.2 : KL3418

LOC.3 : KL3406-11, 3412-15, 3404-5

LOC.4 : KL3419-24
KL3438

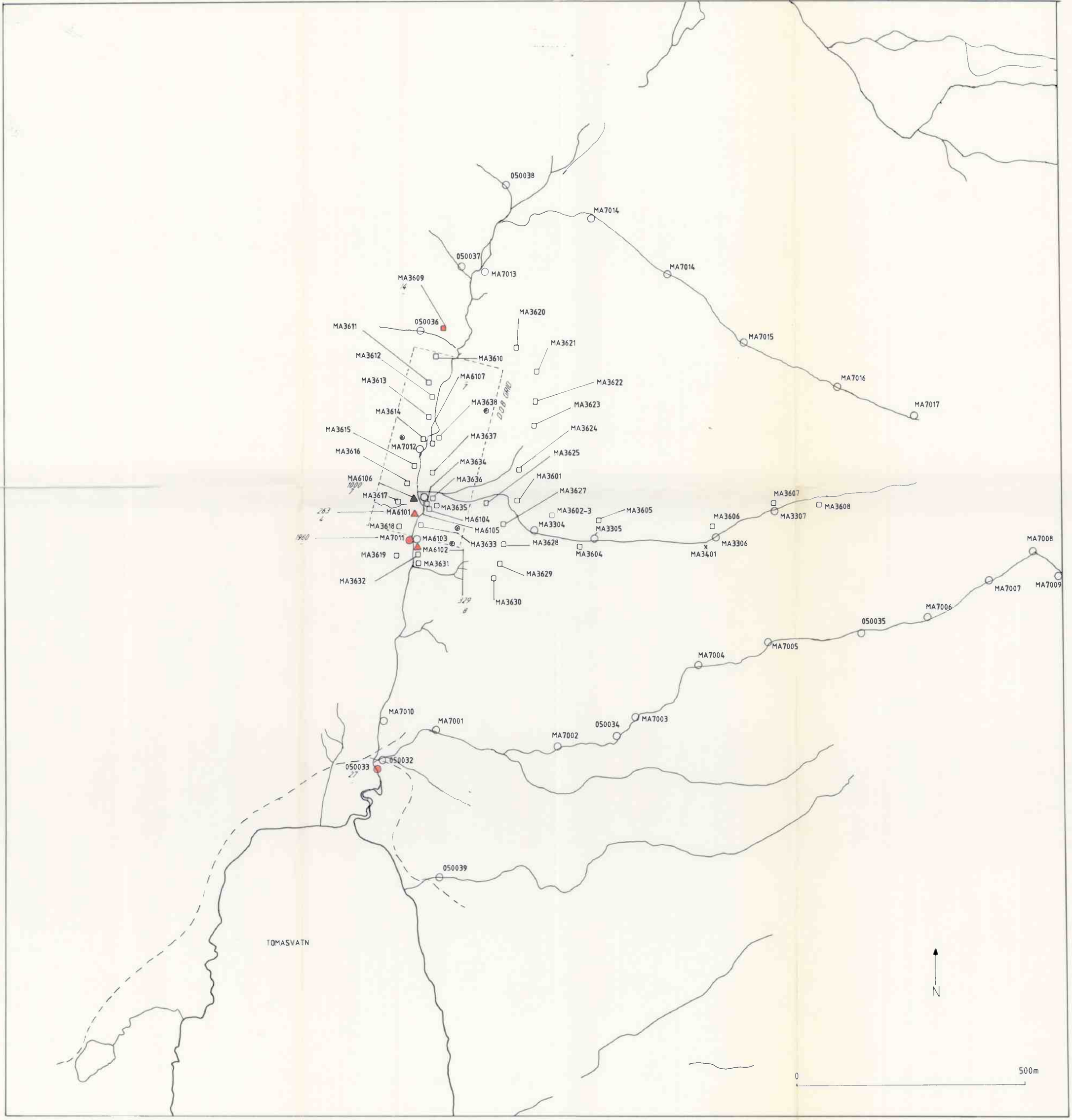
LOC.6 : KL3426-27

LOC.7 : KL3440-46, 3451-54

BP NORGE a.s Minerals

KLAUSMARKELVEN

Author J.T.C.S./A.S.	Drawn by J.T.	Date
Scale 1:20000	Report No.	Drawing No.



263 ppb Au

4 ppm As

⊛ As anomalous DOB sample

○ STREAM SED. SPL.

□ SOIL SPL.

△ PAN CONC.

x ROCK SPL.

BP NORGE a.s Minerals

TOMASVATN

SAMPLEPOINTS, GEOCHEM.

Author JT/A.S	Drawn by J.T.	Date	
Scale 1:5000	Report No.	Drawing No.	

E 6

180273

7002

180268 188

7001

7003 77

3501

2501 159

7009 80

7011

7010 54

7004 163

2401 X

6001

7005 27

6002

7007 23

7008

7006 50

6003

6004

MJÅVATNET

2503

2405 X

2404

2403 X

X 2402

N

0 500m

188 PPB Au
PPM As

○ STREAM SED.

△ PAN CONC.

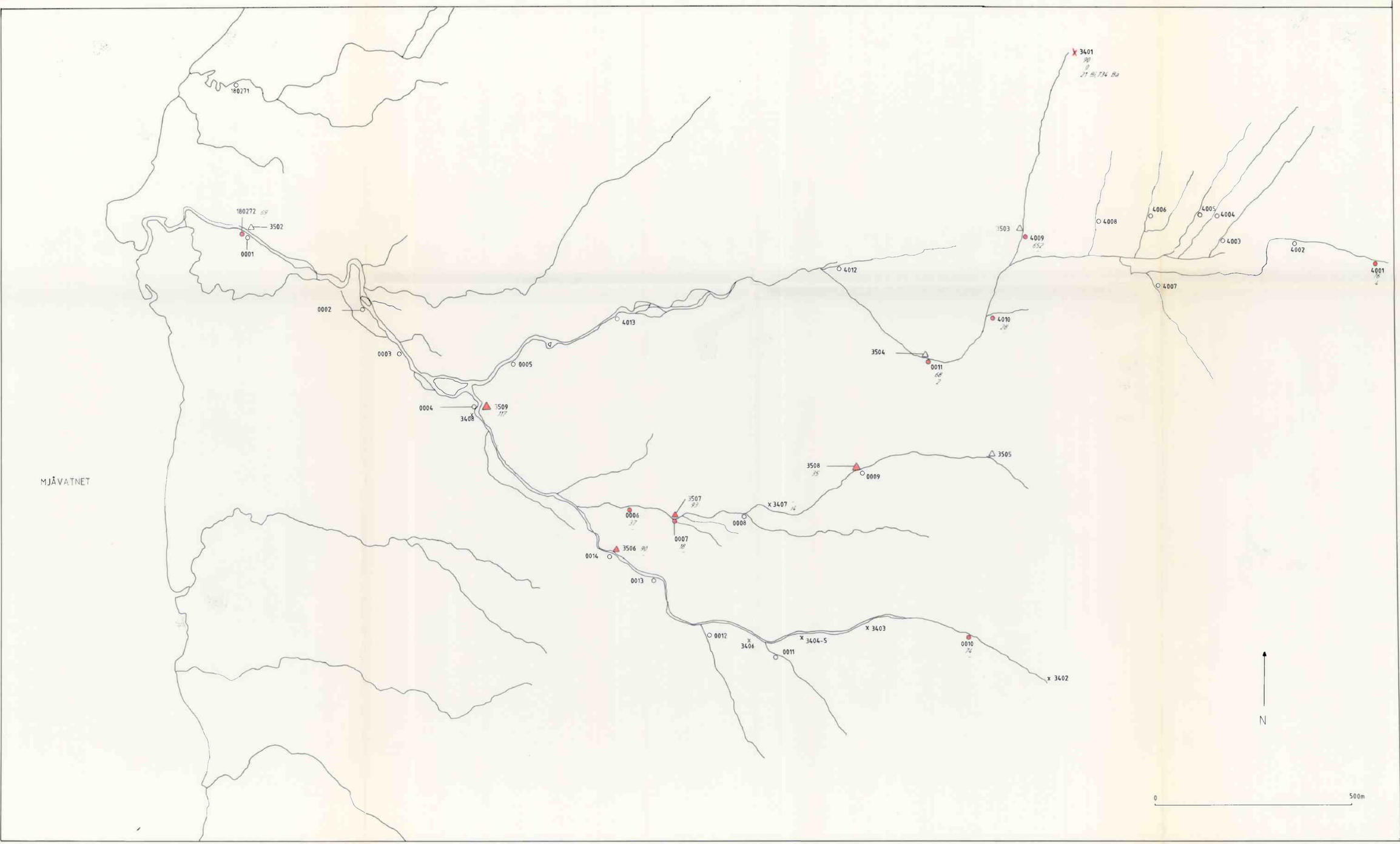
x ROCK SPL.

BP NORGE a.s Minerals

STRAUMAN

SAMPLEPOINTS, GEOCHEM.

Author J.T	Drawn by J.T	Date
Scale 1:5000	Report No.	Drawing No.



△ PAN CONC.

○ STREAM SED. SPL.

x ROCK SPL.

68 PPB Au

2 PPM As

BP NORGE a.s Minerals

MJÅVATNET

SAMPLEPOINTS, GEOCHEM.

Author J.T.AS	Drawn by J.T.	Date
Scale 1:5000	Report No.	Drawing No.

RAUVATNET
DRILLING PROGRAMME

BLASTHOLE NO.	SAMPLE NOS.
I	9401-03
II	9404-05
III	9406-07
IV	9408
	9409 WALLROCK
V	9410-11
VI	9412
VII	9413-14
VIII	9415-17
IX	9418-19
X	9420-21
XI	9422-23
XII	2424-25
XIII	9426-27

LEGEND

- ○ STREAM SEDIMENT SAMPLE POINTS
- ● *219* PPB Au ABOVE DETECTION LIMIT
- □ ROCK SAMPLE LOCATION
  ALL SAMPLES 0300 RV. . . .

BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND PROJECT
ANOMALY COMPILATION
JAMTFJELLDALEN-RAUVATN

Author H.H.B	Drawn by H.H.B	Date 25.X.84
Scale 1:20 000	Report No.	Drawing No.

RAUVATN

ROAD TO GRANE

N

LEGEND

- MAJOR STRUCTURE
- MINOR STRUCTURE
- QUARTZ VEIN
- AMPHIBOLITE
- QUARTZITE
- MARBLE

BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND PROJECT
PHOTOLINEATIONS
JAMTFJELLDALEN - RAUVATN

Author H.H.B	Drawn by H.H.B	Date 25.X.84
Scale 1:20 000	Report No.	Drawing No.

R A U V A T N E T D R I L L I N G P R O G R A M M E

Following the discovery of a quartz-arsenopyrite-gold vein in outcrop, blast hole rock samples were collected and returned the following results:

SAMPLE NO.	Au		As	Sb	Bi	Pb	Ba	COMMENTS
9401	23.0	24.5	3.7%	31	40	1800	391	Interface and margin of qtz-vein (H.Wall)
9402	29.5	27.0	10.5%	56	106	76	275	Interface and margin of qtz-vein (H.Wall)
9412	21.0	21.0	1.3%	11	15	306	76	Interface and margin of qtz-vein (H.Wall)
9413	3.5	3.3	6939	15	13	122	92	Interface and margin of qtz-vein (H.Wall)
9411	1.1	1.0	154	65	199	3.3%	21	Fracture qtz-vein (center)
9404	2.7	2.5	2165	0	4	21	581	Qtz-vein at brecc. margin
9406	6.5	6.2	4135	0	0	24	205	Qtz-vein at brecc. margin
9410	3.5	3.5	1818	5	0	324	273	Fracture qtz-vein (center)
9408	0.43	0.411	95	0	0	27	910	Wallrock
9403	0.192	0.058	253	0	5	20	557	Wallrock
9407	0.166	0.166	190	0	0	16	800	Wallrock
9409	0		37	0	5	19	657	Wallrock
9405	0		48	0	5	16	837	Wallrock
9415	8.3	8.7	4.0%	27	41	12	329	Interface and margin of qtz-vein (H.wall)

9416	0.070	0.078	984	0	5	9	684	Wallrock
3427	0.17	0.137	1577	0	0	321	130	Margin of northern qtz-vein
3428	0		71	6	28	3065	38	Qtz-net veining northern vein
3429	0.21	0.169	276	0	9	790	460	Altered ext. of main qtz-vein

For the location of the sample points please refer to enclosure.

During November 1984, a drilling programme was performed in order to:

i) establish th true width of the mineralized vein and altered host rocks.

ii) test the continuation of the vein between surface outcrop.

iii) test the continuation of the vein to the west, across a 20 dgr. striking shear zone.

iv) see if the shear zone itself is mineralized.

v) confirm high grade Au-mineralization at depth.

A total of 379 m were drilled in 5 holes. The core diameter was 42.3 mm.

DDH 1-3 were drilled towards north to intersect the mineralized vein with ESE-WSW strike and dip 70 dgr S. DDH-4 was drilled with 25 dgr inclination in south-easternly direction to intersect the junction of the vein with the shear zone.

DDH-5 was sited 120m west of the shear zone to intersect a possible continuation of the mineralization.

For the location of the drillholes refer to enclosure.

Results:

i) The mineralized sections in DDH 1-3 indicate a true width of the vein between 4 and 5 meters. (Enclosures)

ii) DDH-2 sited between two surface outcrops intersected mineralization so that an continuous vein between DDH 1 and DDH 3 is conceivable.

iii) DDH 5 located west of the shear zone intersected a narrow zone of strongly altered quartz-fdsp-biotite-garnet schist with no arsenopyrite or gold mineralization. (Enclosure).

However, 40m further to the west blast hole sample no. 9', assayed 0.7-0.4 ppm Au.

iv) DDH 4 intersected moderately chloritized biotite-garnet schists with an intensely sheared zone consisting of graphite schists and massive pyrite at 164.75 to 166.25m. (Enclosure).

Gold was not detected in core samples from DDH 4.

v) Drill core sample 0300RV0024 from 43.00-43.25m in DDH 3 returned with 22.2 - 26.7 ppm Au in a duplicate analysis.

The grades obtained from blast hole samples of surface outcrops were thereby confirmed at depth and a supergene enrichment of gold can be ruled out.

Description of sample preparation and analysis:
The core samples were logged and split twice using a diamond saw so that 3/4 of the core were despatched for analysis and 1/4 was retained for further analysis. With 25cm core length/sample, the resulting sample weight varies between 500-800 g and the average volume was 350 ccm.

These samples were crushed and milled to - 200 micron. Two splits of 50g were analyzed for gold after the volatilization of sulfides in two stages.

In some cases - when the duplicate analysis of one sample showed high variations (i.e. Sample no. 0300RV0026: 7.25 ppm, Dup: 2.45 ppm) another 4 analysis were done and the mean of 6 analysis reported (0300RV0026: 3.17ppm).

These variations indicate a nugget effect, that is to say, the gold content is not evenly distributed throughout the sample but rather concentrated in erratic, yet very small particles

Au assay results of 30 g/t, equals a gold grain of 0.078 cubic mm in a 50 g analytical sample provided all the gold would be concentrated in one grain.

All we know to date about the gold mineralization in Helgeland indicates that the gold forms small grains sitting in the interstices of arsenopyrite crystals.

Higher concentrations of gold are normally caused by repeated hydrothermal events leading to remobilization and redeposition of coarser gold in little veinlets. This gold is removed easily from a rock sample during drilling and sample preparation as the rock tends to break preferrentially along these fissures and veinlets.

This might explain that the assay results from DDH-2 and DDH-3 are somewhat lower than the assay results from blast hole samples collected at surface.

However, a generall trend with regards to gold-grades and dimensions of the vein in common to the drilling results as well as the surface observations:

DDH 3 the westernmost intersection of the vein went through 5 meters of low grade mineralization. (0.1 - 1.68 ppm Au, average 0.473 ppm Au). Blast hole samples collected from outcrop at the surface projection of this intersection returned with 8.3 - 8.7 ppm Au.

DDH 2 sited approx. 200m along strike to the east of DDH 3, went through two mineralized zones:
1m of low grade mineralization ranging from 0.14 - 1.8 ppm, average 1.05 ppm Au between 31.0 and 32.0 meters.

The main zone was drilled between 60.25 and 65.00 with assays ranging from 0.1 - 6.8 ppm. The average grade of the intersection is 1.26 g/t. Surface blast hole samples from the area returned gold values between 1.1 and 21.0 ppm.

DDH 1 intersected the easternmost part of the vein where blast hole samples assayed between 0.43 - 29.5 ppm Au. Mineralization was intersected between 38.75 m and 39.75 with values ranging from 0.15 - 3.38 ppm, average 1.3 ppm and the main zone between 42.75m and 45.50 with assay results ranging from 0.1 - 26.7 ppm. The average grade is 3.45 ppm over 2.5 meters. It appears as if the overall gold grade increases towards east, whereas the width of the vein decreases.

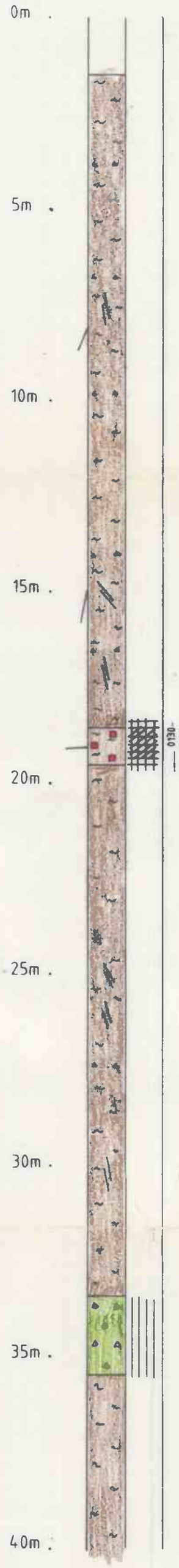
Surface mapping of the eastern continuation of the structure - which can be easily recognized from aerial photos for at least one kilometer - has been very limited to date.

The structure can be seen cutting through a ridge of biotite-garnet schists and branching out into the carbonate sequence forming the next valley to the east. At the inferred intersection of the structure with the carbonate horizon a stream-sediment sample was collected during 1982 which returned with anomalous gold. (Enclosure).

Strong and consistent stream sediment gold anomalies were also found in a creek - running sub-parallel to the Rauvatn vein approx. 1.7 km to the south. (Enclosure).

Recommendations:

An area of 3 x 3 km around the Rauvatn mineralization should be geologically mapped in scale 1:5.000 in order to detect extended mineralization along strike or in sub-parallel system and direct the diamond drilling.



DDH RAUVATNET 5
DIRECTION: 190°
INCLINATION: 60°

LEGEND

REMOBILIZED QTZ-FDSP-BIOTITE-GARNET SCHIST

FINE GR. LAMINATED QTZ-BIOTITE-GARNET SCHIST

TWO MICA PEGMATOID

QUARTZ VEIN

ARSENOPYRITE

PYRITE - PYRRHOTITE DISS.

DIP ANGLES OF FOLIATION

DIP ANGLES OF ALTERED FRACTURES

WALL ROCK ALTERATION

WEAK

MODERATE

STRONG

u046 SAMPLE NOS. PREFIX 0300 RV . . . .

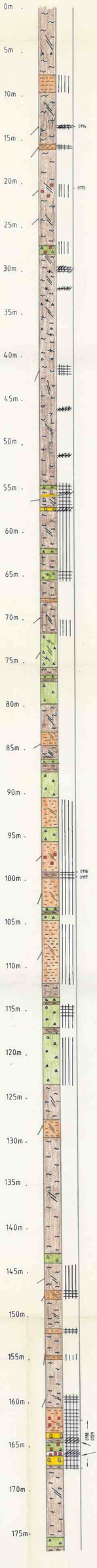
3/4 OF CORE 42.3 mm ϕ SAMPLED OVER 25 cm INTERVALL. AVERAGE SAMPLE VOLUME : 350 ccm
SAMPLE WEIGHT: 500 - 800 g

BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND PROJECT
1984
RAUVATNET DRILLING
PROGRAMME

Author H.H.B.	Drawn by H.H.B.	Date 9.XI.84
Scale 1: 100	Report No.	Drawing No.



DDH RAUVATNET 4
DIRECTION: 145°
INCLINATION: 25°

LEGEND

- REMOBILIZED QTZ-FDSP-BIOTITE-GARNET SCHIST
- FINE GR. LAMINATED QTZ-BIOTITE-GARNET SCHIST
- TWO MICA PEGMATOID
- QUARTZ VEIN
- ARSENOPYRITE
- PYRITE - PYRRHOTITE DISS.
- DIP ANGLES OF FOLIATION
- DIP ANGLES OF ALTERED FRACTURES

WALL ROCK ALTERATION

- WEAK
- MODERATE
- STRONG

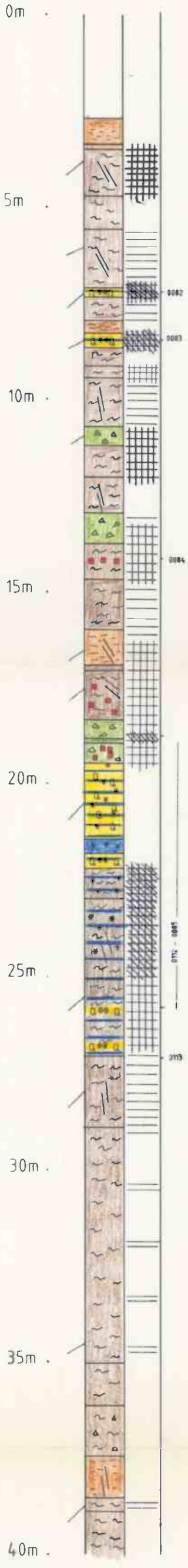
0046 SAMPLE NOS. PREFIX 0300 RV . . . .

3/4 OF CORE 42.3 mm ϕ SAMPLED OVER 25 cm INTERVALL. AVERAGE SAMPLE VOLUME : 350 ccm
SAMPLE WEIGHT: 500 - 800 g

BP NORGE a.s Minerals
NORSK HYDRO

HELGELAND PROJECT
1984
RAUVATNET DRILLING PROGRAMME

Author H.H.B.	Drawn by H.H.B.	Date 9.XII.84.
Scale 1: 200	Report No.	Drawing No.



DDH RAUVATNET 3
DIRECTION: 12°
INCLINATION: 50°

LEGEND

- REMOBILIZED QTZ-FDSP-BIOTITE-GARNET SCHIST
- FINE GR. LAMINATED QTZ-BIOTITE-GARNET SCHIST
- TWO MICA PEGMATOID
- QUARTZ VEIN
- ARSENOPYRITE
- PYRITE - PYRRHOTITE DISS.
- DIP ANGLES OF FOLIATION
- DIP ANGLES OF ALTERED FRACTURES

WALL ROCK ALTERATION

- WEAK
- MODERATE
- STRONG

0046 SAMPLE NOS. PREFIX 0300 RV . . . .

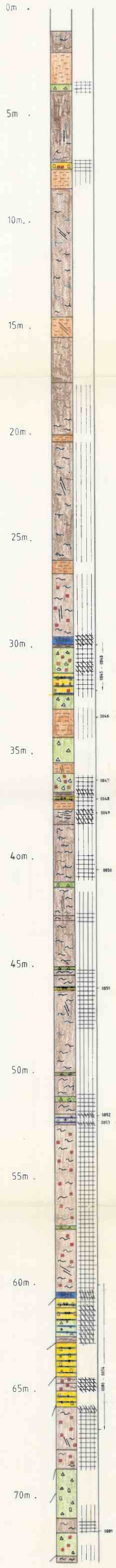
3/4 OF CORE 42.3 mm ϕ SAMPLED OVER 25 cm INTERVALL. AVERAGE SAMPLE VOLUME : 350 ccm
SAMPLE WEIGHT: 500 - 800 g

BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND PROJECT
1984
RAUVATNET DRILLING PROGRAMME

Author H.H.B.	Drawn by H.H.B.	Date 9.XII.84
Scale 1: 100	Report No.	Drawing No.



DDH RAUVATNET 2
DIRECTION: 12°
INCLINATION: 70°

LEGEND

- REMOBILIZED QTZ-FDSP-BIOTITE-GARNET SCHIST
- FINE GR. LAMINATED QTZ-BIOTITE-GARNET SCHIST
- TWO MICA PEGMATOID
- QUARTZ VEIN
- ARSENOPYRITE
- PYRITE - PYRRHOTITE DISS.
- DIP ANGLES OF FOLIATION
- DIP ANGLES OF ALTERED FRACTURES

WALL ROCK ALTERATION

- WEAK
- MODERATE
- STRONG

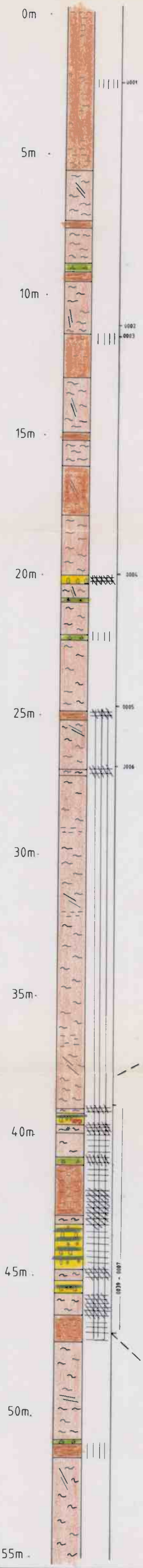
0046 SAMPLE NOS. PREFIX 0300 RV ....

3/4 OF CORE 42,3 mm ϕ SAMPLED OVER 25 cm INTERVALL. AVERAGE SAMPLE VOLUME : 350 ccm
SAMPLE WEIGHT: 500 - 800 g

BP NORGE a.s Minerals
NORSK HYDRO

HELGELAND PROJECT
1984
RAUVATNET DRILLING PROGRAMME

Author H.H.B.	Drawn by H.H.B.	Date 9.XII.84
Scale 1 : 100	Report No.	Drawing No.



DDH RAUVATNET 1
DIRECTION: 12°
INCLINATION: 50°

LEGEND

- REMOBILIZED QTZ-FDSP-BIOTITE-GARNET SCHIST
- FINE GR. LAMINATED QTZ-BIOTITE-GARNET SCHIST
- TWO MICA PEGMATOID
- QUARTZ VEIN
- ARSENOPYRITE
- PYRITE - PYRRHOTITE DISS.
- DIP ANGLES OF FOLIATION
- DIP ANGLES OF ALTERED FRACTURES

WALL ROCK ALTERATION

- WEAK
- MODERATE
- STRONG

0046 SAMPLE NOS. PREFIX 0300 RV . . . .

3/4 OF CORE 42.3 mm ø SAMPLED OVER 25 cm INTERVALL. AVERAGE SAMPLE VOLUME : 350 ccm
SAMPLE WEIGHT: 500 - 800 g

LITHOLOGY	ALTERATION PRODUCTS	ASSAY RESULTS g/t Au	
		N.S	
		N.S	
		N.S	
	c	0.15	. 39m
PY	c	1.54	
APY	c	0.13	
APY		3.38	
		---	. 40m

		---	. 41m

		---	
	c	0.46	. 42m
	c	0.06	
	c	---	
	c	---	
	c	0.56	. 43m
		22.2- 26.7	
	c	3.30	
APY		2.45- 7.25	average 3,17
	s	0.20	. 44m
APY	c	0.22	
APY		0.17	

		0.10	. 45m
APY		0.78	
	s	0.62	
	c	---	
	s	0.08	. 46m
	c		

BP NORGE a.s Minerals

NORSK HYDRO

HELGELAND PROJECT
1984
RAUVATNET DRILLING
PROGRAMME

Author H.H.B.	Drawn by H.H.B	Date 9.XII 84
Scale 1: 100	Report No.	Drawing No.

RECOMMENDATIONS FOR
DETAILED FOLLOW UP 1985

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1926 III	1:20.000 blown up	

Claim Name: RAUVATN No: 17

Follow Up Team: JT/AS/CS/MK

Samples Taken: Rock Samples: RV9401-9427;RV2401-2427
RV3401-3432

Pan Conctr: ./.

Other: ./.

Maps, etc. attached: Structures 1:20.000
Sample Points 1:20.000

Previous Work / Results:
1982:
Original stream sed. anomaly 219 ppb (Rauvatn) qtz-vein. The whole area stream sed. sampled. 50168-177, 030057, 110087-88.

1983:
14 anomalies in drainage of Au-bearing qtz-vein. 3 anomalies in stream on slope opposite Au-bearing qtz-vein (RV6013-6015).

1984 Summary:
Rauvatn South:
The area consists of uniform biotite-qtz-fsp gneisses interbanded with amphibolites and thin horizons of quartzites. It is considered an open question whether this horizon is volcanogenic or metasedimentary.

The valley to the west consists of biotite schist and marbles. Numerous pegmatitic dykes trending 120 dgr. occur in the area.

Two major directions of structures exist (1) 20 dgr. as exemplified by a major shear zone/thrust which can be followed throughout the area (2). ~E-W trending fracture zones which very often host mineralized qtz-veins. Most of these veins dip steeply to the south and when present Au-apy mineralization is always confined to fractured/brecciated margins at the qtz/wallrock contact. The main Rauvatn Au-apy qtz-vein contains rich Au-apy mineralization ranging from 4% As, 8.5ppm Au to 10% As, 30ppm Au at the fractured/brecciated margin. The thrust zone cuts the E-W trending qtz-veins and it appears that it swells at these localities (15-20m thickness). The thrust zone is likely to have been active both before, during and after the formation of the qtz-veins and the hydrothermal episode. It is not ruled out that the thrust zone could have gold potential at points were qtz-vein and thrust zone intersect. Blasting took place along a

300m section of the Au-bearing qtz-vein (samples RV9401-9427)

Rauvatn North:
After reconnaissance of ~12km2 north of the Au-bearing qtz-vein a set of E-W trending ~30cm wide qtz-veins was found. Most of the localities sampled held arsenopyrite mineralization in cracks and vugs along the qtz-wallrock contact. The wallrock very often shows chlorite alteration and in places also arsenopyrite dissemination. Strong diss. of pyrite with weak cpy and galena was observed in places where arsenopyrite is absent. The hydrothermal influence seems to be stronger when approaching the main 20 dgr. shear zone. The appearance of these veins is comparable to the Rauvatn Au-structure.

Recommendations:
The Rauvatnet structure can be traced on aerial photographs for at least 1km to the east and continues westward across the shear zone for another 400m. At the valley bottom the structure N 20 dgr. E striking marbles. This intersection should be followed up by DOB sampling. The Au-anomalous stream approx. 1.7 km south of the Rauvatn has not been followed up yet.

R A U V A T N E T S O U T H
(Main Au-bearing qtz-vein)

SAMPLE NO.	Au		As	Sb	Bi	Pb	Ba	COMMENTS
9401	23.0	24.5	3.7%	31	40	1800	391	Interface and margin of qtz-vein (H.Wall)
9402	29.5	27.0	10.5%	56	106	76	275	Interface and margin of qtz-vein (H.Wall)
9412	21.0	21.0	1.3%	11	15	306	76	Interface and margin of qtz-vein (H.Wall)
9413	3.5	3.3	6939	15	13	122	92	Interface and margin of qtz-vein (H.Wall)
9411	1.1	1.0	154	65	199	3.3%	21	Fracture qtz-vein (center)
9404	2.7	2.5	2165	0	4	21	581	Qtz-vein at brecc. margin
9406	6.5	6.2	4135	0	0	24	205	Qtz-vein at brecc. margin
9410	3.5	3.5	1818	5	0	324	273	Fracture qtz-vein (center)
9408	0.43	0.411	95	0	0	27	910	Wallrock
9403	0.192	0.058	253	0	5	20	557	Wallrock
9407	0.166	0.166	190	0	0	16	800	Wallrock
9409	0		37	0	5	19	657	Wallrock
9405	0		48	0	5	16	837	Wallrock
9415	8.3	8.7	4.0%	27	41	12	329	Interface and margin of qtz-vein (H.wall)
9416	0.070	0.078	984	0	5	9	684	Wallrock
3427	0.17	0.137	1577	0.	0	321	130	Margin of northern qtz-vein
3428	0		71	6	28	3065	38	Qtz-net veining northern vein
3429	0.21	0.169	276	0	9	790	460	Altered ext. of main qtz-vein

* N.B.: ALL VALUES IN PPM UNLESS STATED OTHERWISE!

R A U V A T N E T N O R T H

SAMPLE NO.	Au		As	Sb	Bi	Pb	Ba	COMMENTS
2413	0.333	0.294	1.0%	5	6	29	52	Margin of qtz-vein (interface to wallrock)
2415	1.3	1.4	27.5%	64	298	248	353	Massive Apy (Gossan)
2416	0.358	0.381	2.9%	9	30	229	786	Margin of qtz-vein (interface to wallrock)
2417	0.274	0.254	2744	3	0	26	152	Margin of qtz-vein (interface to wallrock)
2418	0.037	0.037	1882	5	0	0	739	Wallrock
2425	0.103	0.094	6269	0	0	5	1087	Random chip of contact zone (qtz-vein, wallrock)

* N.B.: ALL VALUES IN PPM UNLESS STATED OTHERWISE!

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1926 IV		DP 185.5.2

Claim Name: STRAUMAN No: 140

Follow Up Team: JT/MK

Samples Taken: Rock Samples: 0300MJ 2401-2405

Pan Conctr: 0300MJ2501, 2503, 3501

Other:

Maps, etc. attached: a)Geological Scetch Map 1:5.000
b)Sample Point Overlay 1:5.000
(+ geochem.)

Previous Work / Results:
1982:
Original spl. point 188 ppb Au. (180268)
180273?.

1983:
MJ7001-7011, MJ6001-6004
A cluster of anomalies at lower altitudes in drift covered areas.

1984 Summary:
Lower parts of Vefsn river valley consist of marble + numerous granitic, pegmatitic dykes. This carbonate unit gradually becomes finely interbanded with fine-grained mica schist and hornblende schist + calc silicates at higher altitudes. Towards the east this unit grades into a mica+fsp+qtz+garnet gneiss, locally with a granitic-gneiss appearance. This is considered to be an increase in metamorphic grade of the schist unit. At lower altitudes in the southern stream, (See transparent overlay), several 0.5m thick N-S striking qtz-veins with fracture fillings of pyrrhotite, pyrite was observed. These were sampled (MJ2402-5). Rather poor exposure and uniform geology makes it difficult to explain stream sed. Au anomalies. No structures except the fractured qtz-veins mentioned was observed. From aerial photo a weak pattern of 45 dgr. structures exist.

Recommendations:
If further follow-up is required, bank-soil sampling is recommended because the anomalies are confined to drift covered areas. To be followed-up together with Mjavatn. Samples from sulphide-bearing qtz-veins returned without Au, As, Sb, Bi.

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	1926 III		

Claim Name: Eiterasen II No: 128

Follow Up Team: JT/CS

Samples Taken: Rock Samples: ET9401-9404

Pan Conctr: ./.

Other: ./.

Maps, etc. attached: Sample points, Geochemistry 1:40.000

Previous Work / Results:

1982:

Anomalous sample 220 ppb Au

1983:

Six follow-up stream sed. samples (FF5077-5082). All were anomalous (2 med-range and 4 low-range).

1984 Summary:

Several 120 dgr. trending fracture zones crosscut the anomalous stream. Although the fracture zones can be 5-10m wide the hydrothermal activity as observed in the stream bed seems to be restricted to decimeter wide joints. These contain arsenopyrite and pyrite disseminations accompanied by a decimeter thick envelope of chloritization and sericitiation. The northern part of the stream consists of marbles with thin horizons of biotite schists and calc-silicate. The south is dominated by uniform biotite gneiss, which is also the predominant rock type in the region as a whole.

Hydrothermal joints containing sulphide dissemination were sampled at 3 localities of which one (the northernmost) contained disseminations of arsenopyrite over 1 dm thickness. Samples from this zone returned with 350, 290 ppb Au (9401-9402).

The analytical results show a clear Sb-As-Au association.

Recommendations:

The entire stream has to be followed to its source as 1983 Au-anomalies are open ended and even increase upstream. Geological mapping of structures and rock sampling!

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	GRANE 1926 III		P 177 I, II

Claim Name: Vesterelva No: 88

Follow Up Team: AS/MK

Samples Taken: Rock Samples: 0300RF3401-RF3406

Pan Conctr: 0300RF3501-RF3508

Other: Stream seds. sieved:
RF3301-RF3323
Bank/soil:
RF3601-3621

Maps, etc. attached: 1:5.000 Structures
1:5.000 Sample point

Previous Work / Results:
1982:
1 stream sediment sample (110030, 48 ppb Au)

1983:
9 stream sediment samples. 5 Au anomalous (3 high, 1 med, 1 low). D.O.B. on two grids. With 4 high range As anomalies in southern grid.

1984 Summary:
Geology
Large parts of the area are covered by thick glacial till and/or bog, it is therefore difficult to deliniate lithological units with great precision. Outcrops in the main part of the area are of porphyroblastic gneiss where porphyroblast of qtz and fsp up to 1-2cm are embedded in a mafic matrix of amphibole (hornblende) and minor biotite. In the northern part of the claimed area good outcrops of quartz-diorite can be seen which in composition is very similar to the above mentioned porphyroblastic gneiss. At the outer margins of the quartz diorite foliation can be seen and it is speculated that the porphyroblastic gneiss is a strongly deformed deriviate of the granodiorite. Foliation measured in the gneiss has a strike of 20-40o, parallel to the main regional strike of the enclosing metasediments. To the East and West of the qtz-diorite/porphyroblastic gneiss, metasedimentary bands consisting mainly of carbonates are found. To the west of Vesterelva the marbles are strongly invaded by granitic dykes (up to 80% dykes) of several generations. To the east along Glugvaselva the marbles form a 100 m broad band trending 30o. Here numerous sulphide bearing (py, po) amphibolitic bands and highly deformed pods often with "skarn" contacts to the marble

are found. The amount and size of these amphibolititc pods increases towards the qtz-diorite/porphyroblastic gneiss and they could be deformed dykes associated with the intrusion of the qtz-diorite.

In the SE and Northern part of the claimed area, where the cover of till is not present, straint joints/faults having a strike of 100-110o can be seen, crosscutting all lithologies. This joint/fault direction is a common regional feature which combined with a joint/fault direction of 70-80o constitutes a late set of conjugate faults. Evidence from other areas seem to indicate that this set of conjugate faults are locii of qtz-apy-(Au) mineralization.

Within the Vesterelva claim deep overburden sampling during the winter revealed high arsenic values up to 220 ppm in 6 sample points taken along lineament 25-50m wide, trending 100o. High arsenic values (up to 250ppm) were detected in sieved sediment samples in the stream draining this area and it is recommended that a closely spaced deep overburden grid be sampled in order to further delineate the arsenic anomalous area. Towards the west the continuation of the linear feature striking 100o is obscured by a thick cover of glacial till.

In the northern tributary of the stream draining the Vesterelva area gold was detected in the upper 2 (of 3) sieved stream sediment samples. During the 1983 follow-up stream sediment sampling programme, the stream was unfortunately not sampled above the upper of these anomalous samples. Stream sediment samples have been collected upstream this year to the top of the stream. Furthermore stream sediment samples have been taken in 3 minor streams not previously sampled, draining the Vesterelva claim.

During the sampling of these streams it became apparent that large parts of the drainage area was covered by glacial up to 10m thick till consisting of clay-silt-sand and pebbles up to 10cm. Euhedral crystals of pyrite were found in one locality in the till.

Recommendations:

Depending on the results on Sb and Bi analysis of high arsenic samples, a structural interpretation of the area should direct a very closely spaced DOB programme.

H E L G E L A N D P R O J E C T

1984 DETAILED FOLLOW UP

	M 711	Aerial Photo	Oko.kart
Claim Location	GRANE 1926 III		DP 176.5.1
			DP 176.5.2
			DP 176.5.3
			DP 176.5.4

Claim Name: FELLINGFORS No: 19

Follow Up Team: JT/CS

Samples Taken:

Rock Samples: FF2401 (Svenningdal Mine)
FF3401-3408;9401-9404;2402-2402

Pan Conctr: FF2501-2503;9501-9502;3501-3503

Other:Soils: FF9601-9629
Stream seds: FF9301-9315

Maps, etc. attached: Sample overlay 1:5.000
Geology overlay 1:5.000

Previous Work / Results:

1982:
Taken in the three main rivers (Sample overlay 1:5.000)

1983:
FF5001-5025, 5102-5103, 6015-6026 (stream sed. samples)

1984 Summary:
At lower altitudes in the vicinity of Vefsn river the litholgies consists of thick marble units locally interbanded with calc-sil. and amphibolitic horizons reflecting a local facies change. These horizons are often pyrrhotite, pyrite impregnated. Close to the E6 at Fellingfors a similar horizon contains disseminations of sphalerite, chalcopyrite, pyrrhotite and magnetite over a strike length of 500M. Calc-silicates host the mineralization interbanded with thin carbonate bands. Sparse diss. of cpy and pyrrh. was observed in the footwall. At higher altitudes further east qtz-fsp-mica gneiss with numerous crosscutting but deformed pegmatitic dykes locally containing pyrrhoite, pyrite exist. This unit includes thin quartzite horizons. Further east along a north-south striking scar (depression) a homogenous marble unit exists containing amphibolitic lenses diss. with pyrrh. The marble unit contacts a hornblende-garnet-biotite gneiss to the east. East-west striking scars cut the area. They prob. reflect old fracture zones reworked several times by inland ice. The overall regional structural pattern shows a marked lineation

along 100-120 dgr. and 50-70 dgr. trends. The Svenningdal structure is ~120 drg.

Overburden

At lower altitudes the overburden consists of glaciofluvial sediments, marine clay and recent stream alluvium. This type of overburden is thick in the east-west depressions where a cluster of Au-anomalies exist. Along the scree slopes inmature locally derived soil exist (till with B-horizon) which was soil sampled. The upper part of northern stream bed consists of clayey till with rel. high amounts of pyrite.

Recommendations:

Gold anomalies cluster at lower altitudes in the streams, where the overburden is thick.

Around Sa. No. FF 5025 a good correlation between gold anomalies in the stream and in bank soil samples exists. Arsenic anomalies in soil samples are frequent. The old Svenningdalen mine - our samples from the ore returned 5 ppm gold - lies along strike of the east-west trending structures just across the Vefsn valley. Very closely spaced soil sampling on grids is recommended.

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
TJOTTA H U A S R V E I A K	SORDALEN	42	Geol. mapping/ rock sampling base of slope soil sampling	4 team days	Husvik-lineament. Shearzones should be checked in connection with biotite schist-marble boundaries. Stream system with high range Au and Zn. Maybe analogous. with Herringbotn? Possibility of stratabound Pb-Zn-Au occurrence!
	OVERJORD HESTDALEN	6 40		4 --- 8 days	The proximity of these anomalies to the Husvika Deposit is of particular interest.
MOSJOEN H A A T R T E E A N	HATTEN	108	Geol. mapping/rock sampling, blasting	6 team days HELICOPTER SUPPORT --- 6 days	Mapping should place emphasis on tracing the contact between marble and intrusives (poss. shearzones, sulphide min.) The westernmost cluster of Au-anomalies, associated with Pb-Cu- and As-anomalies, should be checked by geological traverses and detailed rock-sampling.
DREVJA D R R E E G V I J O A N	KJONNAASEN II	86	Geol. mapping/rock sampling. Possibly DOB. Await additional Sb and Bi analysis of high arsenic samples. Photo interpretation.	6 team days --- 6 days	Mapping should concentrate on the south western area where main cluster of anomalies occur. Traverses across lithologies (NW-SE directions) as well as checking the contact zone between marble and biotite schist/granodiorite gneiss. This transition zone is considered important (skarning-silification-shearing-sulfide impr. etc.).

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
MAJAKLUMPEN	HOLMTJERN	114	Mapping and sampling of the thick quartz vein observed	2 team days	Overall high Pb-As anomalies. The mapping and sampling of the quartz veins up to 4m wide should clarify if they contain any gold.
	KALKLAVDALEN III	137	The myloinite zone described should be mapped and sampled.	3 team days HELICOPTER SUPPORT -------- 5 team days	Rock samples from sulfide dissemination close to the mylonite zone contained 3000 ppm Cu and 120 ppb Au.
SOLSTAD	ROSVIK	151	Geological mapping, rock and bank soil sampling around Sa. P. RK 5005 (228 ppb Au)	2 team days -------- 7 team days	The geological association of that anomaly with acid volcanics, serpentinites and granodiorites is of interest.
				TOTAL 132 team days field work ==========	6.6 man month or two follow-up teams in the field from June - October

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
D R R E E G V I J O A N	BJORKNES	117	Geol. mapping/rock sampling and DOB sampling	DOB 6 team days mapping/rec 4 team days --- 10 days	North-south traverses with DOB in lower terrains. Geol. mapping should emphasize on contact zones between basic-acid intrusions and metasediments at higher altitudes. Detailed follow-up in 1984 was restricted to northern stream where gold anomalous skarn horizons were found.
GRANE	EITERAASEN II	128	Detailed geology/rock sampling	4 team days	Clear Sb-Bi-As-Au association in rock samples with up to 350 ppb Au! Fracture controlled alteration zones. Stream sed. anomalies increase and are open towards south!
	LANGVATN II	96	Geol. mapping/rock sampling, bank soil sampling	3 team days	Au associated with base-metal anomalies. Along strike of Hjartskarmo deposit.
	SVEBAKK	129	dto.	3 team days	To be followed-up together with Fellingfors!
F E L L I N G F O R S A R E A	LAKSFORS I	73	dto.	4 teamdays	A NW-SE trending zone of Au-anomalies extending over 500m and 3 streams.
	FELLINGFORS	19	Detailed soil sampling and VLF traverses.	7 teamdays	Numerous marble horizons and quartzites interbanded with biotite schist-granitic gneiss -garnet mica schist. Cross-cutting fracture zones. The old Svenningdalen mine with 5ppm Au in the ore lies along strike of a EW structure just across the Vefsn valley.
	STABFORSMOEN STORMOEN	171 161	Detailed geol. mapping/ rock sampling	10 teamdays HELICOPTER SUPPORT --- 31 team days	Two rock samples returned with low-level gold content, which can not account for the strong and wide spread gold anomalies. Detailed mapping followed by blast hole sampling is recommended.

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
GRANE R E I N A F R J E E A L L E T	SOR-SVARTVATNET C - F VESTERELVA	69 80 81 82 88	Geol. mapping/rock sampling, DOB, VLF Structurall analysis of aerial photos. Follow-up should be guided by Sb and Bi anomalies of high arsenic samples.	10 team days DOB/VLF 5 team days mapping HELICOPTER SUPPORT	Of particular interest due to proximity to Rauvatn occurrence. Similar tectonic regime. All E-W trending structures should be carefully followed-up.
	RAUVATNET JAMTFJELLDAL I II III IV	 77 78 92 93	Detailed geol./rock sampling. DOB, VLF, Air photo interpretation	10 team days DOB, VLF 10 team days geology --- 35 team days	Fracture interpretation. Detailed geol. of biotite schist-gneisses. DOB on western extension of Au-bearing shearzone as well as VLF. Attention to where fracture zones meet or intersect carbonate horizons.
EITERAA E I A T R E E R A A A	VESTFJELDENE	32	Detailed mapping/rock sampling. Samples high in arsenic will be analyzed for Sb and Bi.	6 team days HELICOPTER SUPPORT	Mapping out the metasedimentary raft to the north-east. Contact zones between marble and biotite hornblende schist. High Pb-Zn, W, As indicates stratabound shear and/or skarn related min. (E.g. Maalviken, Reppen). High As in surrounding granodiorite.
	FORHOLTEN	89	Detailed geol./rock sampling	3 team days --- 9 team days	East-west trending structures with quartz-tourmaline veins should be examined as well as diorite-marble contact zone. High gold anomaly near the source of the stream.
	N. VESTERDALS-ELVEN	28	Geological mapping of headwaters	3 team days HELICOPTER SUPPORT --- 12 team days	Strong Pb-Zn anomaly associated with sulfide impregnation in biotite schist. A similar horizon returned with 340 ppb Au approx. 1.5km to the north!

MAPSHEET	CLAIM/NO.	RECOMMENDATIONS	DURATION	COMMENTS
VEVELSTAD	NEDRE KVANLIVATN 23	Geol. mapping/rock sampling, base of slope soil sampling.	5 team days 5 team days	Sample the alteration zones in granodiorite as well as mapping out the metasedimentary rafts and fracture zones. Care should be taken to sample sheared, weathered alteration zones correctly in order to not miss the gold. High W, As, Zn may have it's source in mineralized alteration zone along fractures.
VEVELSTAD ANDALS-HATTEN AREA	KLAUSMARKELVEN 173	Geol. mapping/rock sampling + panning Structural analysis of aerial photos.	5 team days HELICOPTER SUPPORT 5 team days	The Klausmarkelven qtz-vein extends intermittently over 3km! Mineralization consists of arsenoppyrite and up to 2 ppm Au in grab-samples. More detailed mapping and blast hole sampling is essential!
GRANE	KVALFORS 94	Bank soil sampling and geological mapping	3 team days	The high gold anomaly is open towards the south, where a restricted catchment area awaits follow-up.
	LIA II 99	Geological Reconnaissance	1 team day	Two of three sed. samples returned with increasing gold values upstream. Small catchment area.
	RAVATNET I 75	Stream sediment, soil and rock sampling	3 team days 7 team days	One very high gold anomaly detected in small tributary draining restricted catchment area. Possible connection with SVARTVATNET anomalies!

F U T U R E W O R K

As a result from follow-up 1984, future work is proposed in the following areas (for detailed recommendations see follow-up sheets): Mjavatnet, Bjorknes, Vesterelva, Fellingfors, Stabbforsmoen, Klausmarkelva. These areas are already at an advanced state with regards to detailed sampling results and structural interpretation which should allow further work to be precise and not time consuming. Future work is also proposed for following areas described below. (See also 1:40.000 scetch maps).

HATTEN

The area consists of thin marble horizons enclosed by schistose amphibolites and biotite-amphibole gneisses.

Furthest to the west a granodioritic intrusive and a qtz-feldspar augen gneiss occur.

In the south-east a metadiorite/gabbro has produced skarning in contact with marbles. The highest stream sed. anomaly in the area (600 ppb Au) was collected near this contact zone.

The stream sed. sampling 1983 resulted in 14 Au anomalies, but no high arsenic (max. 9ppm).

The structural pattern shows two major directions:
a) N-Nw and b) NE to E. The latter direction is interpreted to be latest and a prior target for follow-up. This is confirmed by field observations which concluded that tourmaline-pyrrhotite mineralized fracture zone with chloritization was observed near stream sed. Au anomalies.

Rock sample of this mineralization was negative. However, closed investigation and rock sampling of similar zones is recommended.

NEDRE KVANLIVATN

The structural pattern is somewhat complex but the area has been selected as interesting (see 1:40.000 structural interpretation). Three directions of lineaments appear to converge in this region, namely, a)NW-SW b)NE to E and c)NS. Structures running NS and NW coinside with stream sed. Au anomalies (max. 1ppm combined with As).

Generally the region consists of mica-schist/gneiss and porphyroblastic granodiorite.

SORDALEN-HUSVIKA

A cluster of 4 Au anomalies occur in a NS running valley near a Pb-Zn occurrence. The major direction of structurs is EW. Structures having this direction should be followed-up in the vicinity of the Au-bearing stream.

LEKA

Consistent high stream sed. Au anomalies appear in streams draining a major lithological boundary between serpentinite and metagabbro. This contact is sheared, and the only alteration observed during field reconnaissance was low grade metamorphic talc-asbestos alteration of the serpentinite.

However, further detailed investigation of structures near this contact is recommended. The high range Au anomalies (>100ppb) combine systematically with arsenic. Qtz-veins were observed in the vicinity of Au anomalies, but they were not sampled. Late high temp., hydrothermal alterations in this region should be considered prospective.

REINFJELLET

To be compared with Rauvatnet. Predominant structural directions are a)EW and b)NS. Several high range Au anomalies (>100ppb) exist combined with high arsenic (20-40ppm range). The highest Au anomaly occur near a skarned contact to the Reinfjellet granite (350ppb). This was sampled but returned negative. Soil sampling along structures coinciding with Au-As anomalies is recommended.

VISTVATNET

A cluster of Au anomalies exist in a stream running along a metasedimentary stripe (biotite-hornblende schist, marble). Very strong arsenic and tungsten concentration are associated with Au anomalies. A set of structures parallel to the stream occur in the drainage area. These are obvious follow-up targets. Another set of structures is running perpendicular in north-south direction. Abundant low temperature stilbite infilling along mm to dm wide joints occur in the area. These predominantly crosscut the stream at shallow angels. The area is very well exposed which means that field reconnaissance for hydrothermal alterations along structures should be effective.

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
MAJAKLUMPEN	HOLMTJERN	114	Mapping and sampling of the thick quartz vein observed	2 team days	Overall high Pb-As anomalies. The mapping and sampling of the quartz veins up to 4m wide should clarify if they contain any gold.
	KALKLAVDALEN III	137	The myloinite zone described should be mapped and sampled.	3 team days HELICOPTER SUPPORT --- 5 team days	Rock samples from sulfide dissemination close to the mylonite zone contained 3000 ppm Cu and 120 ppb Au.
SOLSTAD	ROSVIK	151	Geological mapping, rock and bank soil sampling around Sa. P. RK 5005 (228 ppb Au)	2 team days --- 7 team days	The geological association of that anomaly with acid volcanics, serpentinites and granodiorites is of interest.
				TOTAL 132 team days field work ==========	6.6 man month or two follow-up teams in the field from June - October

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
D R R E E G V I J O A N	BJORKNES	117	Geol. mapping/rock sampling and DOB sampling	DOB 6 team days mapping/rec 4 team days --- 10 days	North-south traverses with DOB in lower terrains. Geol. mapping should emphasize on contact zones between basic-acid intrusions and metasediments at higher altitudes. Detailed follow-up in 1984 was restricted to northern stream where gold anomalous skarn horizons were found.
GRANE	EITERAASEN II	128	Detailed geology/rock sampling	4 team days	Clear Sb-Bi-As-Au association in rock samples with up to 350 ppb Au! Fracture controlled alteration zones. Stream sed. anomalies increase and are open towards south!
	LANGVATN II	96	Geol. mapping/rock sampling, bank soil sampling	3 team days	Au associated with base-metal anomalies. Along strike of Hjartskarmo deposit.
	SVEBAKK	129	dto.	3 team days	To be followed-up together with Fellingfors!
F E L L I N G F O R S A R E A	LAKSFORS I	73	dto.	4 teamdays	A NW-SE trending zone of Au-anomalies extending over 500m and 3 streams.
	FELLINGFORS	19	Detailed soil sampling and VLF traverses.	7 teamdays	Numerous marble horizons and quartzites interbanded with biotite schist-granitic gneiss -garnet mica schist. Cross-cutting fracture zones. The old Svenningdalen mine with 5ppm Au in the ore lies along strike of a EW structure just across the Vefsn valley.
	STABFORSMOEN STORMOEN	171 161	Detailed geol. mapping/ rock sampling	10 teamdays HELICOPTER SUPPORT --- 31 team days	Two rock samples returned with low-level gold content, which can not account for the strong and wide spread gold anomalies. Detailed mapping followed by blast hole sampling is recommended.

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
GRANE R E I N A F R J E E A L L E T	SOR-SVARTVATNET	69	Geol. mapping/rock sampling, DOB, VLF Structurall analysis of aerial photos. Follow-up should be guided by Sb and Bi anomalies of high arsenic samples.	10 team days DOB/VLF 5 team days mapping HELICOPTER SUPPORT	Of particular interest due to proximity to Rauvatn occurrence. Similar tectonic regime. All E-W trending structures should be carefully followed-up.
	C - F	80			
		81			
		82			
	VESTERELVA	88			
	RAUVATNET		Detailed geol./rock sampling. DOB, VLF, Air photo interpretation	10 team days DOB, VLF 10 team days geology --- 35 team days	Fracture interpretation. Detailed geol. of biotite schist-gneisses. DOB on western extension of Au-bearing shearzone as well as VLF. Attention to where fracture zones meet or intersect carbonate horizons.
	JAMTFJELLDAL I	77			
	II	78			
	III	92			
	IV	93			
EITERAA E I A T R E E R A A A	VESTFJELDENE	32	Detailed mapping/rock sampling. Samples high in arsenic will be analyzed for Sb and Bi.	6 team days HELICOPTER SUPPORT	Mapping out the metasedimentary raft to the north-east. Contact zones between marble and biotite hornblende schist. High Pb-Zn, W, As indicates stratabound shear and/or skarn related min. (E.g. Maalviken, Reppen). High As in surrounding granodiorite.
	FORHOLTEN	89	Detailed geol./rock sampling	3 team days --- 9 team days	East-west trending structures with quartz-tourmaline veins should be examined as well as diorite-marble contact zone. High gold anomaly near the source of the stream.
	N. VESTERDALS-ELVEN	28	Geological mapping of headwaters	3 team days HELICOPTER SUPPORT --- 12 team days	Strong Pb-Zn anomaly associated with sulfide impregnation in biotite schist. A similar horizon returned with 340 ppb Au approx. 1.5km to the north!

MAPSHEET	CLAIM/NO.	RECOMMENDATIONS	DURATION	COMMENTS
VEVELSTAD	NEDRE KVANLIVATN 23	Geol. mapping/rock sampling, base of slope soil sampling.	5 team days ------- 5 team days	Sample the alteration zones in granodiorite as well as mapping out the metasedimentary rafts and fracture zones. Care should be taken to sample sheared, weathered alteration zones correctly in order to not miss the gold. High W, As, Zn may have it's source in mineralized alteration zone along fractures.
VEVELSTAD ANDALS-HATTEN AREA	KLAUSMARKELVEN 173	Geol. mapping/rock sampling + panning Structural analysis of aerial photos.	5 team days HELICOPTER SUPPORT ------- 5 team days	The Klausmarkelven qtz-vein extends intermittently over 3km! Mineralization consists of arsenoppyrite and up to 2 ppm Au in grab-samples. More detailed mapping and blast hole sampling is essential!
GRANE	KVALFORS 94	Bank soil sampling and geological mapping	3 team days	The high gold anomaly is open towards the south, where a restricted catchment area awaits follow-up.
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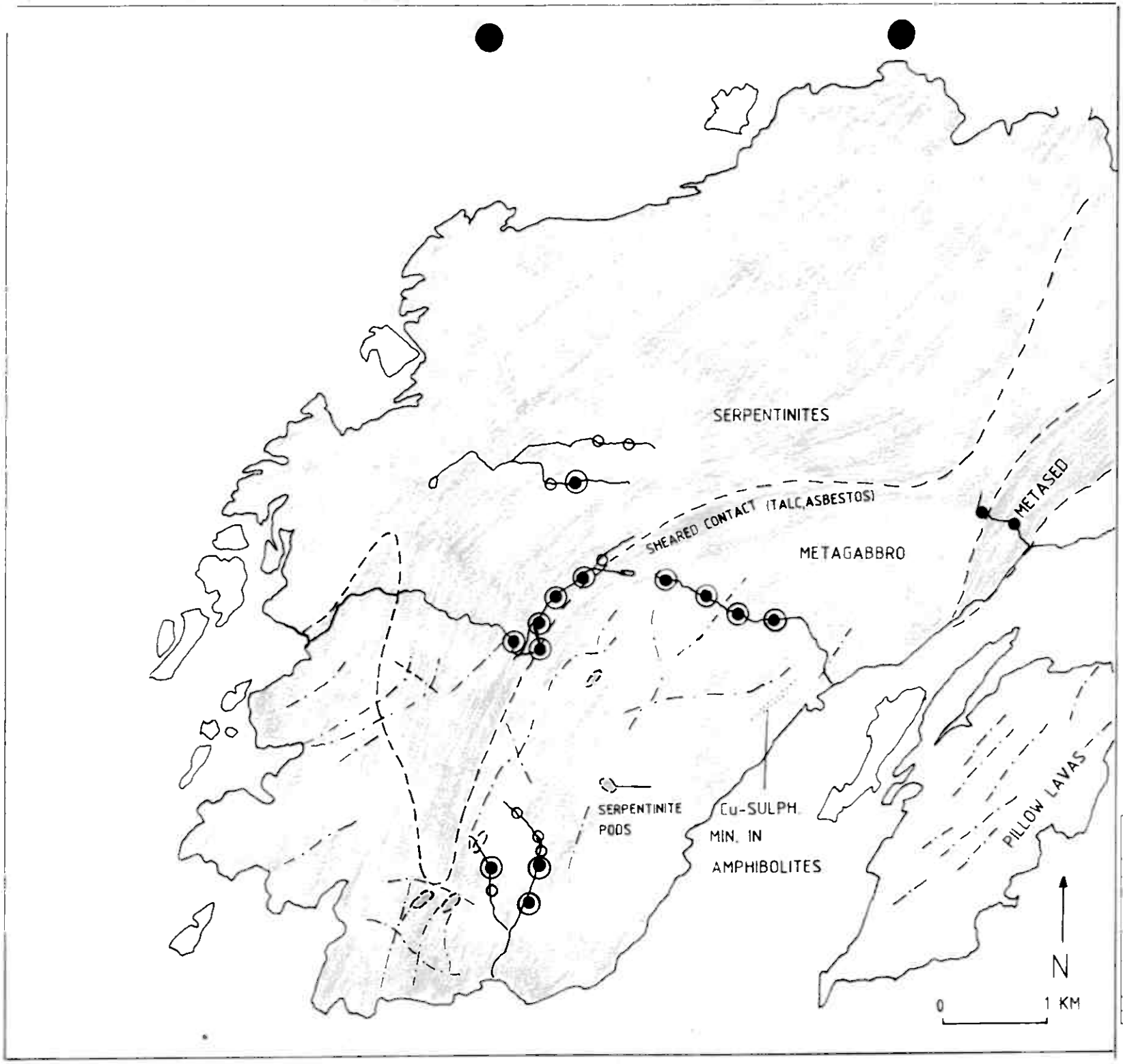
	RAVATNET I 75	Stream sediment, soil and rock sampling	3 team days ------- 7 team days	One very high gold anomaly detected in small tributary draining restricted catchment area. Possible connection with SVARTVATNET anomalies!

MAPSHEET	CLAIM/NO.		RECOMMENDATIONS	DURATION	COMMENTS
TJOTTA H U A S R V E I A K	SORDALEN	42	Geol. mapping/ rock sampling base of slope soil sampling	4 team days	Husvik-lineament. Shearzones should be checked in connection with biotite schist-marble boundaries. Stream system with high range Au and Zn. Maybe analogous. with Herringbotn? Possibility of stratabound Pb-Zn-Au occurrence!
	OVERJORD HESTDALEN	6 40		4 --- 8 days	The proximity of these anomalies to the Husvika Deposit is of particular interest.
MOSJOEN H A A T R T E E A N	HATTEN	108	Geol. mapping/rock sampling, blasting	6 team days HELICOPTER SUPPORT --- 6 days	Mapping should place emphasis on tracing the contact between marble and intrusives (poss. shearzones, sulphide min.) The westernmost cluster of Au-anomalies, associated with Pb-Cu- and As-anomalies, should be checked by geological traverses and detailed rock-sampling.
DREVJA D R R E E G V I J O A N	KJONNAASEN II	86	Geol. mapping/rock sampling. Possibly DOB. Await additional Sb and Bi analysis of high arsenic samples. Photo interpretation.	6 team days --- 6 days	Mapping should concentrate on the south western area where main cluster of anomalies occur. Traverses across lithologies (NW-SE directions) as well as checking the contact zone between marble and biotite schist/granodiorite gneiss. This transition zone is considered important (skarning-silitication-shearing-sulfide impr. etc.).



○ As ANOMALY

◉ COMBINED Au,As

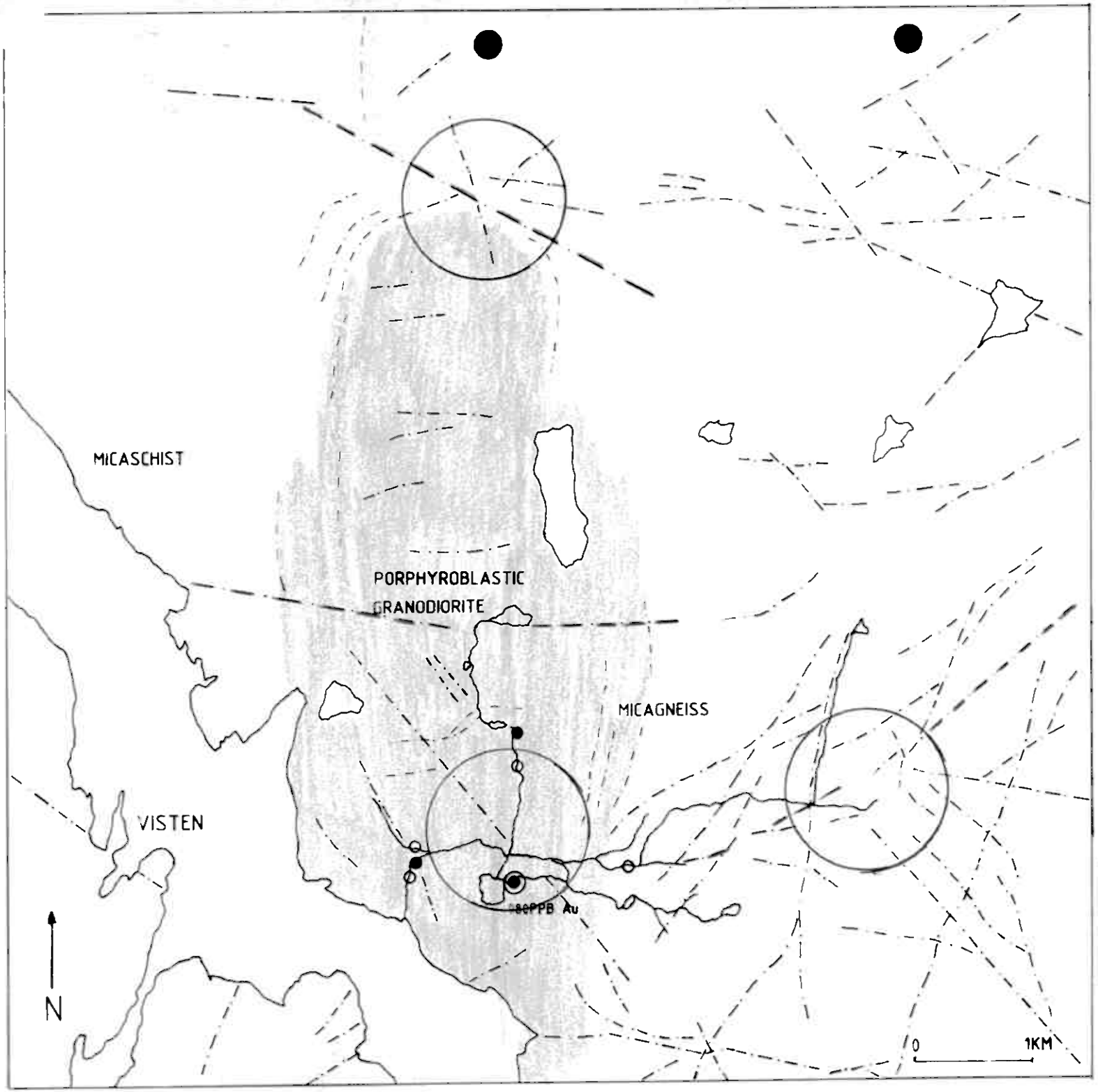
● Au-ANOMALY

BP NORGE a.s Minerals

LEKA

GEOLOGY, ANOMALIES

Author J.T	Drawn by J.T	Date
Scale 1:50000	Report No	Drawing No



● Au ANOMALY

◉ COMBINED Au,As ANOMALY

○ As ANOMALY

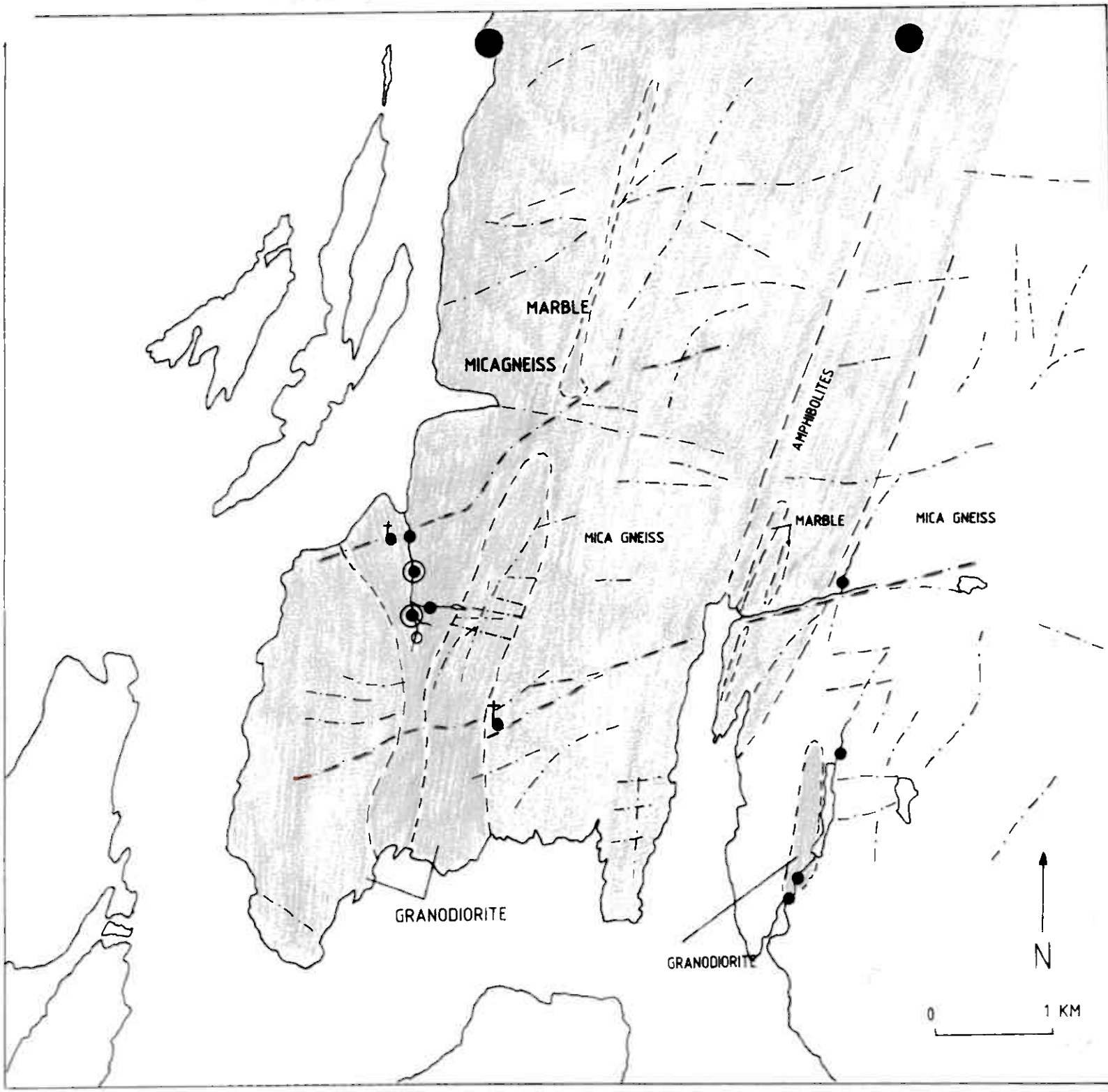
BP NORGE a.s Minerals

NEDRE KVANLIVATN

STRUCTURES, ANOMALIES

(AREAL PHOTO F013)

Author J.T	Drawn by J.T	Date
Scale 1:40000	Report No	Drawing No



Major structure

Zn -Pb OCCURENCE

Au ANOMALY

COMBINED Au,As ANOMALY

As ANOMALY

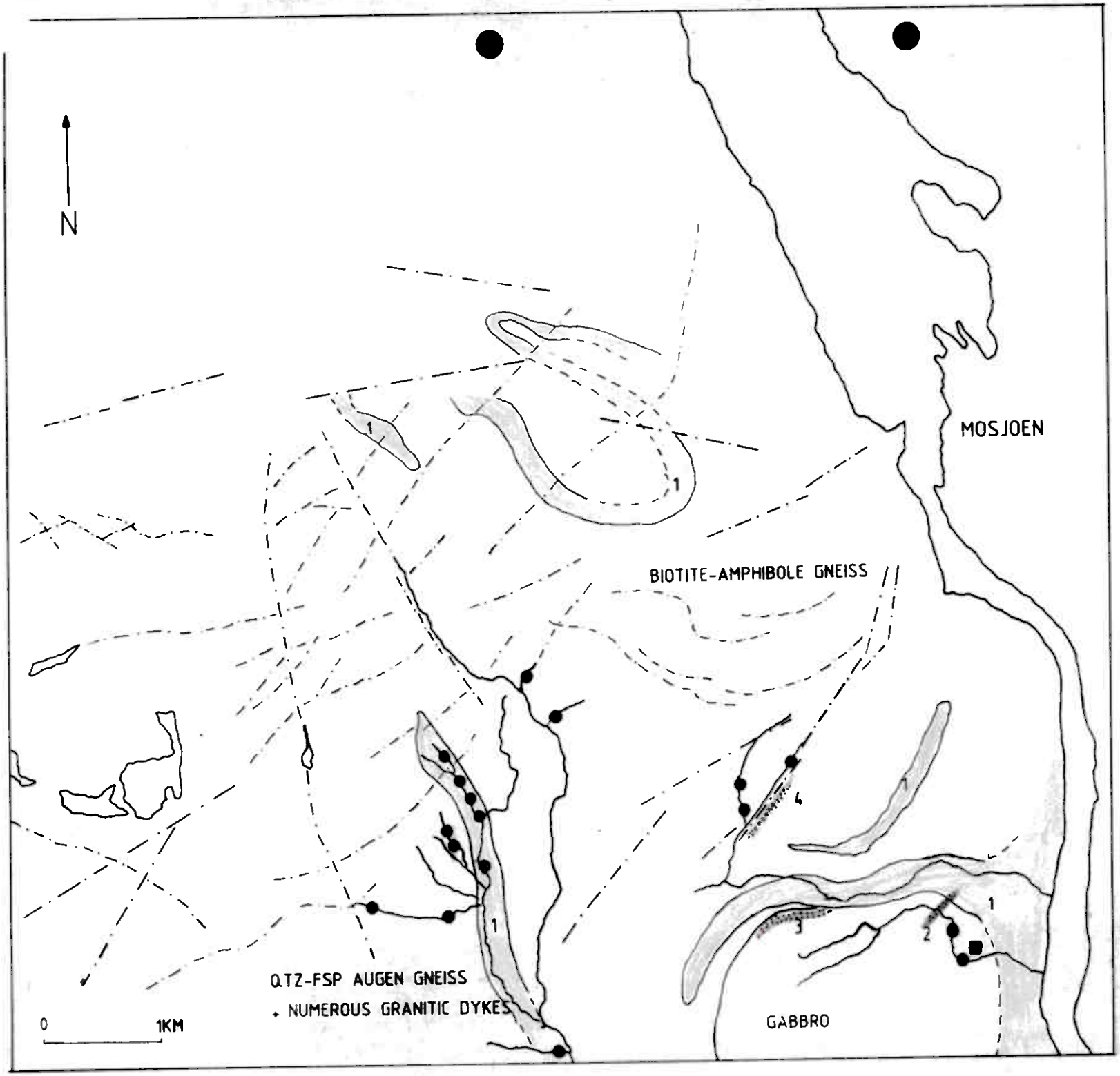
BP NORGE a s Minerals

SÖRDALEN HUSVIKA

GEOLOGY, ANOMALIES

(AREAL PHOTO 0008)

Author J.T	Drawn by J.T	Date
Scale 1:40000	Report No	Drawing No



● Au IN STREAM SED,

■ Au IN SOIL

1 METASED. PRED. MARBLE

2 TOURMALINE FRACTURE

3 SKARNING

4 SULPHIDE BEARING FRACTURE

BP NORGE a.s Minerals

HATTEN

STRUCTURES, ANOMALIES

Author J T	Drawn by J T	Date
Scale 1:40000	Report No	Drawing No

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Sordalen** No:**42** Size:1.0 km2

Claim location:Map sheet 1826 IV Tjotta

:Air Photo

:Oko Kart

Pegged: Yes No--PartlyClaim retained: yes/No

Stream length: 1.0 km/ Drainage area:1.0km2

Original sample point(72ppb Au) resampled: Yes No

Follow up team: CR/AK Duration:1.0 days

Nos.of follow up sample: HU 8001- HU 8008

Description of drainage system:

The stream splits into 4 small tributaries,all of which were sampled.Higher parts of the drainage run through talus,in lower parts glacial overburden dominates.

Geology:

The main lithology is a homogeneous biotite mica schist. No geological observations possible in lower part of the drainage,due to thick overburden.

Comments:

Four gold anomalies were detected in the lower part of the drainage, all of which are associated with elevated arsenic values.

Recommendations for further follow up:

Two samples show also anomalous Lead concentration. The proximity of these anomalies to the Husvik deposit is of particular interest. The catchment area is well defined and follow-up should consist of: Base of slope soil-rock chip sampling and geological mapping.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:Oeverjord No: 6 Size:2.25 km2

Claim location:Map sheet 1826 II Tjotta,1826 I Mosjoen

:Air Photo D 009,008.010

:Oko Kart

Pegged:Yes No Partly Claim retained: yes/No

Stream length: 0.4km Drainage area:0.1km2

Original sample points(15,20 ppb Au) resampled:YesNo

Follow up team: OK/GT Duration:1.0 days

Nos.of follow up samples: Hu 4049- HU 4052

Description of drainage system:

Two minor streams draining narrow bedrock valleys (appx. 10 m wide)with birch dominated vegetation.Resampling took place in alluvial cones,follow up samples further upstream taken from active sediment.

Geology:

Main lithology is a biotite schist with boudins (cm-scale)of quartzo-feldspathic remobilisations.Cobbles of clear and milky quartz in the stream.

Comments:

See No. 40 Hestdalen.

Recommendations for further follow up:

Ditto.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Hestdalen** No:**40** Size:0.5 km2

Claim location:Map sheet 1826 II Tjotta

:Air Photo

:Oko Kart DK 182 I

Pegged:Yes No Partly Claim retained: yes/No

Stream length: 0.75km/ Drainage area:4.0km2

Original sample point(30 ppb Au) sampled:Yes No

Follow up team: OK/GT Duration:1.5 days

Nos.of follow up sample: Hu 4053 - HU 4057

Description of drainage system:

The stream system drains the western slopes of Hamran,and flows into a lake elongated in a north-south depression .Overflow from the lake drains southward,and proceeds via an estuary into the sea.

Geology:

The area around the lake is dominated by a biotite gneiss,which commonly exhibits quartz-feldspar boudins.Locally a migmatite is formed by intense"Durchbewegung"of the biotite gneiss and an equigranular granodiorite.

Comments:

Sample No. HU 4053 returned with 132 ppb Au, and is the only sample collected from that drainage.

Recommendations for further follow up:

Follow-up should concentrate around Sa. No. HU 4053. Of particular interest is the presence of strong N-S trending structures, which are sub-parallel to the Husvik mineralization.

Try to locate the source of milky-quartz pebbles in the stream.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Hatten** No:**108** Size:4.5 km2

Claim location:Map sheet 1826 I Mosjoen

:Air Photo

:Oko Kart DN 182 III,I

Pegged:Yes No--PartlyClaim retained: yes/ No

Stream length: 9.5 km/ Drainage area:3.0km2

Original sample points(40,34ppb Au) resampled: Yes No

Follow up team: IF/TO Duration:3.5 days

Nos.of follow up sample: Mo 1041- Mo 1057

Mo 1061- Mo 1081

Description of drainage system:
The anomalous drainage systems in the Kvanndalsnesan area are a)6 streams draining the W. valley slope, descending from bedrock/thin peat bottomed ponds thence via waterfalls and rapids, frequently in the N. via karst tunnels, to the clay/peat valley floor b)the N. section of Kvanndalselva, supplied by small streams draining the E. valley slope via rapids and bog, and part of the N. West slope by the same.

Geology:
Biotite-fsp-(hbl)schists cont. abundant coarse-grained qtz-fsp deformed veins and lenses, and amphibolite horizons, together with interbedded calcite and dolomite marbles. These have been intruded by both biotite and biotite-muscovite granite, only locally tending pegmatitic, with minor skarning, rafts of marble and amphibole schists occur within granites. Minor gabbro also present on W. slope. Three bulk rock samples taken (0300M01003, 1004, 1005) of mineralization:
1003:Pyrrhotite impregnation in quartz-amph-calcsilicate assemblage near contact of large marble enclosure in granite near contact zone.
1004: pyrrhotite-cpy impregnation in quartz-vein and mica-poor granite. The quartz-veining at this location is thick (1-2m), resembling a rusty, coarse-sugar textural quartzite.
1005:Fe hydroxide/limonite-rich, completely altd. gabbro/ amphibolite with rusty quartz-veins, collected only ~150m from 1004.

Comments:
Numerous low to high range gold anomalies, the greatest concentration appearing to suggest a source northwest of Kvanndalsnesan.

Recommendations:
The westernmost cluster of Au-anomalies associated with Pb-Cu-and As anomalies should be followed up by geological traverses and detailed sampling.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:Kjonnasen II No 86 /Size:1.0 km2

Claim location:Map sheet 1926 IV Drevje

:Air Photo D 018

:Oko Kart P 182 IV

Q 182 III

Pegged:Yes No-Partly Claim retained: yes/ No

Stream length 1.5 + 0.5 km Drainage area: 1.5 km 2

Original sample point (9,24,8,8,44ppb Au) resampled:Yes No

Follow up team: OK/KA Duration: 2.0days

Nos.of follow up sample AD 4908 - AD 4921

Description of drainage system:
System drains the northern slopes of Reinfjellet. At lower altitudes bedrock crops out at relatively few places (overburden, mires, vegetation). At higher altitudes, bedrock is largely exposed. Mires are common along the streams.

Geology:
Bedrock is uniform in area. Granodiroite dominates and holds in places acidic veins which may form stockworks. Stream pebbles and glacial material show varying petrography.

Comments:
Although a source has not yet been recognized, the number of Au anomalies detected in this area (See also 1982), and the adjoining claim areas (112 Almdalen A, 146 Kjonnasen IV), together with high As values, precludes immediate dropping of the area.

Recommendations:
Provided the analysis of As-anomalous samples yields also Bi and or Sb anomalies a carefull follow-up consisting of bank sampling at lower altitudes and geological mapping at higher elevations is mandatory.

Structural analysis of aerial photos must come first.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Bjorknes** No117 Size:1.75 km2

Claim location:Map sheet 1926 IV Drevja

:Air Photo C 015

:Oko Kart DO 185 I,II,III,IV

Pegged: Yes No---Partly Claim retained: Yes No

Stream length 3.0km Drainage area: 2.0km 2

Original sample points(345,22ppb Au) resampled: Yes No

Follow up team: IF/TO Duration: 1.0day

Nos.of follow-up sample : BK 1001 - BK 1010

Description of drainage system:
Two rivers sampled: a)southern: sources via seepage from beneath heavily vegetated overburden of boulders and gravel, descends via channels cut in same through pastureland to original sample point (180229), b)northern: rises in a bog draining gabbro hills, descends via rapids through gravel and clay overburden to original anomaly point (180228).

Geology:
From what little is exposed at lower levels and (better) near the stream sources, the area appears to be mainly homog. gabbro. In the vicinity of sample BK 1007 however, (at least) the gabbro is net-veined by thin (dm) granitic veins and quartz, with loc. abundant pyrrhotite mineralization. (Sample BK 1001 rock chip).

Comments:
Four high-range (to 446ppb) and one medium-range anomaly detected in both streams. Rock sample BK 1001 did not return with Au values.

Recommendations:
Detailed follow-up during 1984 was restricted to the northern stream, where gold-anomalous [illegible] horizons were found. Further follow-up should concentrate on the anomalies in the southern stream.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Kvalfors**No: **94** Size:1.0 km2

Claim location:Map sheet 1926 II Granea

:Air Photo

:Oko Kart DO 180 I

Pegged: yes-No---Partly Claim retained: yes / No

Stream length 1.5 km/ Drainage area:2.0km2

Original sample point (25 ppb Au) resampled: Yes-No

Follow up team: JT/GT Duration:1.0 days

Nos.of follow up sample EI 2011- EI 2019

Description of drainage system:
The stream rises in a boggy area,and in gentle slope,descending gently partly over bedrock(thin overburden) to a swampy area near the river Vefsna. Tributaries entering from the West at higher altitudes were sampled individually.

Geology:
Uniform biotite schists/gneisses grading to granite gneiss.Locally pegmatites and quartz-schlieren.Overall very uniform lithology.

Comments:
One isolated high level gold anomaly,without accompanying pathfinder element anomalies.

Recommendations:
A rapid follow-up of the high gold anomaly is proposed, as the anomaly is open towards the south. Bank sampling and mapping in the head waters is necessary.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: **Eiterasen II No128** Size: 0.5 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart

Pegged:Yes No-Partly Claim retained: Yes No

Stream length 2.5km Drainage area: 3.0 km 2

Original sample points(220ppb Au) resampled:Yes No

Follow up team: KB/KA Duration:1.0 day

Nos.of follow up sample : FF 5077 - FF 5082

Description of drainage system:
The river is approx. 10m wide and up to 2m deep. It runs in a big steep-walled canyon with a large speed, and is only joined by 2-3 very small tributaries.

Geology:
The bedrock consists of an interlayered white to black marble and a dark mica-schist. The mica-schist often carries small red garnets. At sample point 5082 small (1mm) pyrite cubes, disseminated in a black marble, were observed, most probably of diagenetic origin.

Comments:
Six of the samples returned with detectable gold (four low and two medium range). The sampling was not continued to the headwaters.

Recommendations:
Detailed geology/lithogeochemistry.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: **Langvatnet II** No: **96** Size: 1.5 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart DO 176 II

Pegged:Yes No-Partly Claim retained: Yes No

Stream length 1.5km Drainage area: 1.5 km 2

Original sample points(84ppb Au) resampled:Yes No

Follow up team: KB/KA Duration:1.0 day

Nos.of follow up sample : FF 5083 - FF 5087

Description of drainage system:
System rises in a lake, having no tributaries, and is relatively broad (3-5m), being braided in several places. Average slope is quite steep (~20o), there being some larger waterfalls.

Geology:
Headwaters in biotite-gneiss with numerous pegmatites, grading downstream to slightly foliated biotite-rich granodiorite. A marble (?raft) occurs in the lake area.

Comments:
One medium and one high-range Au anomaly.
The highest Au-anomaly is associated with Pb-Zn anomaly. The stream sed. anomaly is approx. along strike of the precious metal enriched polymetallic Hjartskarmo mineralization!

Recommendations:
Geological mapping and bank sampling.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: **Lia II** No: **99** Size:0.75 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart D0 177 IV

Pegged:Yes No-Partly Claim retained: Yes No

Stream length 0.7km Drainage area:0.75 km 2

Original sample points(30ppb Au) resampled:Yes No

Follow up team: KB/KA Duration:0.5 day

Nos.of follow up sample : FF 5092 - FF 5094

Description of drainage system:
The stream is sampled upstream from the railroad. In the lower part it has covered a canyon in marble. Further upstream there are some falls and the stream originates in a small moor. It has one small tributary.

Geology:
In the lower part the stream runs in marble. In the upper part there are some outcrops of granodiorite. There is a thin till overburden in most of the area.

Comments:
Two of three samples returned with Au, with increasing levels upstream.

Recommendations:
A brief check of the geology around Sample No. FF 5094 is warranted.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: **Svebakk** No:**129** Size: 0.5 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart

Pegged:Yes No-Partly Claim retained: Yes No

Stream length 1.0km Drainage area: 1.5 km 2

Original sample points(54 ppb Au) resampled:Yes No

Follow up team: KB/KA Duration:1.0 day

Nos.of follow up sample : FF 5095 - FF 5101

Description of drainage system:
The river is rather small, less than 2m wide. It's lower part has several falls. Above the moor is a fall, partly in talus and there is one tributary.

Geology:
The upper part of the river runs through talus with boulders of marble and granite. The moor lies in an area of till overburden and alluvial sediments. Downstream the lake there are outcrops of garnet - mica-schist.

Comments:
Two low and one high-range Au anomaly detected.

Recommendations:
The stream section from the high anomaly up to the lake should be followed up by bank sampling and geological mapping.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Laksfors I** No: **73** Size:4.5 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart P 177 I, III

Pegged: Yes-No Partly Claim retained: yes / No

Stream length 10.0 km/ Drainage area:4.0km2

Original sample points (ppb Au) resampled: Yes No

Follow up team: JT/GT OK/GT Duration: days

Nos.of follow up sample RF 2009 - RF 2040

Description of drainage system:

Geology:
Medium-grained massive white granite with local inclusions of biotite schist. Quite intense jointing of granite in upper part of stream. Here also stockwork of pegmatite and quartz-veins occur (former cut by latter). No mineralization has been noted in these as well as in the granite. The granite contacts marble (downstream) horizontally (marble lower) with a 1-2dm skarned zone (sparse pyrite, epidote crystalls). The granite varies between the mentioned fine-grained massive white granodioritic type and a coarser grained biotite richer type (locally foliated- gneissic). This seems to be intruded by the white granite but the actual relationship is unknown (if any?).

Comments:
Six Au anomalies were detected in 4 of the 5 tributaries forming the system (2 high-range and 4 medium-range), these draining a 'strike-length' of approximately 500m. During the second follow-up in 1983, 5 overburden samples were taken near anomalous sample points, two adjacent points having medium-range Au anomalies.

Recommendations:
A NW-SE trending zone of gold anomalies extending over 500m and 3 streams found. This zone should be followed up by soil and bank sampling and geological mapping.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:Sor-Svartvatnet H No: 87 Size: km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart

Bedded: yes-No---Partly Claim retained: yes/ No

Stream length 1.0 km/ Drainage area:1.5km2

Original sample point (233 ppb Au) resampled: Yes-No

Follow up team: CR/AK/JT Duration:1.0 days

Nos.of follow up sample RF 8037 - RF 8048

Description of drainage system:
Source is bog,descending through peatland and a heavily vegetated valley to join Vesterelven where the overburden consists of thick clay.

Geology:
Vesterelven follows a bed of marble which includes abundant granodiorite dykes and boudinaged amphibolite lenses which reflects the intense tectonic activity along the entire valley on the east side of the Reinfjellet granite.Micaschist hosts the marble at Svartvatnet,this being intruded by intensely pegmatite-veined porphyritic diorite.At the contact of the Reinfjell granodiorite,a thin marble stripe occurs,with local skarn mineralization.(pyrite,pyrrhotite)

Comments:
Taken along with claims nos.18,68, and 83 nine gold anomalies were detected.Three high range anomalies are concentrated in the south-east corner of the claims.These anomalies are broadly associated with strong arsenic anomalies,a pattern characteristic of the stream sediment anomalies downstream from the Quartz-arsenopyrite-gold veins at Rauvatn.This cluster of anomalies could be explained by a repetition of the mineralization aforementioned caused by strike-slip faulting in NW-SE direction.

Recommendations:
A high priority follow-up target.Deep overburden sampling with detailed geology/lithogeochemistry.In addition some tests with ground geophysics (EM and Mag.)are planned.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:Ravatnet I No: 75 Size:1.25 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart P 178 I, III

Pegged: Yes No Partly Claim retained: yes / No

Stream length 2.5 km/ Drainage area:2.0km2

Original sample points (11, 63 ppb Au) resampled: Yes No

Follow up team: JT/OK/GT Duration:2.0 days

Nos.of follow up sample RF 2041 - RF 2055

Description of drainage system:
Stream with two large and various smaller tributaries drains the rocky slopes of Reinfjellet to the west as well as a large boggy plateau below the treeline.

Geology:
Rather uniform with extensive equigranular granitic-granodioritic bedrock. Locally, gneisose appearance. In a few places, pegmatitic stockwork of small extension (Down to a few m wide).

Comments:
Single (very) high-range Au anomaly detected in small tributary to sampled stream. N.B. claim area lies on opposite side of Reinfjell intrusive to the Sorsvartvatnet claim group.

Recommendations:
As Sample No. RF 2055 was collected from a small tributary, the follow-up with stream sediment sampling, geological mapping and rock sampling is straightforward.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Sor-Svartvatnet C** No: 69 Size:6.0 km2

Claim location:Map sheet 1926 III Grane

:Air Photo

:Oko Kart D 179 I,II

Pegged: yes-No---Partly Claim retained: yes/ No

Stream length 6.0 km/ Drainage area:8.0km2

Original sample points (181,2 ppb Au) resampled: Yes-No

Follow up team: AS/BS Duration:2.5 days

Nos.of follow up sample RF 3001 - RF 3069

Description of drainage system:
Numerous tributaries drain boggy areas and the well exposed western slopes of the Reinfjellet valley,thence meandering through bog and glacial till.For the lowermost 1.5 kms the stream flows in a shallow valley with small waterfalls/gulleys with good exposure.
Geology:
Stream drains all the lithological units in the northern part of Reinfjellet i.e. eastern marble,biotite-gneiss,western marble and Reinfjellet granodiorite,lying as N-S to NNE-SSW orientated bands.Going from east to west the sequence is as follows:
1.Intrusives:Porphyritic granodiorite,intruded by a later generation of more acid,equigranular dykes.
2.A 0.5 - 1.0 km broad eastern marble zone,running parallel to the mainstream between Svartvatnet and Nordre Svartvatnet.
The marble is interbanded with granodioritic,gneissose rocks and amphibolite lenses and pods.These rocks conceivably represent deformed and metamorphosed dykes.The amphibolites are often sulfide bearing (pyrrhotite,minor pyrite and very few grains of Cu-sulfides.)
The above mentioned rock types are all intersected by nearly undeformed granodioritic dykes.
3.The eastern marble zone is followed by a 2 km.broad biotite schist/gneiss zone.The contact between these two lithologies seems to be gradual over 10 - 30m with decreasing amounts of marble forming bands within the biotite gneiss.The proportion of mafic constituents in the biotite schists is highly variable.
4. Western marble zone of 1 km width.This marble sequence is frequently intruded by leucocratic dykes following the general strike direction.
5.Furthest to the west of the sampled area,intrusive rocks of granodioritic composition were encountered.A zone of 10 - 50 m wide skarn alteration(with diss.py,po)was observed at the contact to t6he western marble.

Comments:
Taken together with Sor-Svartvatnet D - F ten gold anomalies were detected(4 high range,2 mid range and 4 low range).As in the

Sor-Svartvatnet area as a whole the majority of the larger anomalies appear to be associated with the contacts of the Reinfjell porphyritic granodiorite to the metasediments.

Recommendations:
To be treated anologues with Sor Svartvatnet D-F-LU Vesterelva. DOB sampling along the rivers anomalous in gold and arsenic. Numerous larger scale structures parallel to the Rauvatn-vein crosscut the metasediments in the valley floor, where the anomalies are concentrated.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Forholten** No: **89** Size:2.5 km2

Claim location:Map sheet 1826 II Eitera

:Air Photo

:Oko Kart DN 179 I,II,III,IV

Pegged:Yes No Partly Claim retained: yes/ No

Stream length 3.0 km/ Drainage area:3.0km2

Original sample point (107 ppb Au) resampled: Yes No

Follow up team: TK/HK Duration:2.0 days

Nos.of follow up sample EI 7030- EI 7050

Description of drainage system:
Main stream rises in bog fed by meltwater,descending via karst systems.A triburtary has its source in Klubvatn.N.B. possible contamination on samples EI 7048 - 7050 from roads,forrest tracks.

Geology:
The high ground in the west consists of micaschist and granodiorite,grading into interbedded marbles and quartzites together with amphibolites and acid horizons(?tuffaceous) in the lower parts of the valley.

Comments:
Three low-range and one high range anomalies,which appear to have a source within quartz-diorite to the north-west.

Recommendations:
The high Au-anomaly of Sample No. EI 7047 was sampled near the source of the stream. Overall steep slopes indicate that active sediment was sampled - the catchment area is relatively small and a bedrock source should be found by geological mapping and rock sampling.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: Vestfjeldene No: 32 Size:3.75 km2

Claim location:Map sheet 1826 II Eitera

:Air Photo

:Oko Kart DL 178 IV; M 178 III

Pegged:Yes No Partly Claim retained: Yes No

Stream length 7.0km Drainage area: 5.0 km 2

Original sample point (ppb Au) resampled:Yes No

Follow up team: AS/BS -(CR/AK/JT) Duration:3.5 day
Nos.of follow up sample : VV 2001 - VV 2005
VV 2011 - VV 2017
VV 3001 - VV 3017

Description of drainage system:
Source in snow-filled gulleys, descending via gulleys in well exposed terrain to a single gulley, thence into an area with numerous large overgrown boulders, (mainly derived from the surrounding slopes), with thin overburden which is probably morraine derived.

Geology:
The axis of the stream system follows a broad NE-SW trending raft of metasediments within both prophyritic and equigranular granodiorite. The metasediments are dominated by biotite-hornblende schist/gneiss which contain a thin marble horizon. The latter is skarned at contacts with numerous granite/granodiorite dykes, sulphides being observed at only one locality (VV 3001). To the N. West of the system, numerous smaller lenses and rafts of pelite occur in the granodiorite. Intense zones of stilbite introduction occur striking sub-parallel (i.e. approx. 045o) to the main gulley, the largest of these (approx. 70m broad x 200m strike), occurring near sed. sample points VV 3012, 3013.

Comments:
Seven Au anomalies were detected in the main stream and one of the upper gulleys along a 2.5km length (1x high-range, 3x med-range, 3x low-range). Skarn sample VV 3001 was not anomalous. The source is likely to be closely bound to the 045 fracture system within the metasedimentary raft. All gold anomalies are strongly correlated with As-Pb anomalies and concentrate along a major structure.

Recommendations:
High As-samples will be analysed for Sb and Bi. The resulting anomalies are to guide geological mapping and blast hole sampling.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Nedre Kvanlivatn** No: **23** Size:4.5 km2

Claim location:Map sheet 1826 III Vevelstad

:Air Photo F 012,013,014

:Oko Kart DK 180 III

Pegged: Yes No Partly Claim retained: yes/ No

Stream length 7.0km/ Drainage area:8.0 km 2

Original sample point (199 ppb Au) resampled:Yes No

Follow up team: AS/BS Duration:2.0 days

Nos.of follow up sample SF 3026 - SF 3046

SF 3001 - SF 3017

Description of drainage system:
The drainage system comprises a main stream with a general east-west direction. 4 tributaries to the north of the main stream with an orientation north-south were sampled. To the south of the main stream a stream system (A) parallel to the main stream was sampled. The lower (i.e. western) 1km of the main stream and the two tributaries in the western part (B+C) run in creeks. Often very narrow with rapids and small water falls. The overburden is local and thin. Most of the area is barren rock with sparse vegetation at higher altitudes. The creeks are often infilled with overgrown boulders. Between 1-2 km upstream from the coast the main stream and tributary system A runs in flat area. Here the main stream is strongly meandering and in places consists of a braided stream system. Tributary system A passes through a boggy area in the western part and drains a small lake further to the west. 3 small streams run into the small lake from the south and east. The tributary system drains the eastern slope of Hogfjeld.

The difference in drainage pattern between the western and eastern part of the sampled area, is mainly governed by the difference in lithology in the two parts. The rock type being porphyritic granodiorite in the western part and metasediments (mainly mica-schist) in the eastern part. The ~N-S orientation of the tributaries B and C is governed by major N-S striking fracture zones.

Geology:
Strong alteration of the porphyritic granodiorite occurs in the western part of the area, in 0.1 to 10 m broad NW-SE and N-S trending zones. This consists of chloritization, sericitization and epidotization and the introduction of k-feldspar and quartz. Thin jasperoidal silica and stilbite occurs as veinlets. No sulphides were observed (Rock samples SF 3003-3008).

Comments:
Two anomalies detected. Regionally strong arsenic anomalies and a very high Zn-Pb anomaly at Sample P. SF 3044. 1 (very) high range =980 ppb, one medium-range).

Recommendations:
The follow-up should concentrate on Sa. P. SF 3035 with 980 ppb Au. A bedrock source should be reached to the south - where the topography indicates a major structure parallel to the eastern shore of Vaslivatn. Base of slope soil sampling and geological mapping with final rock sampling.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**N.Vesterdalselven** No:28 Size:1.5 km2

Claim location:Map sheet 1826 II Eitera

:Air Photo /

:Oko KartDK 175 II

Pegged:YesNo-Partly Claim retained: yes/No

Stream length: 0.8km Drainage area:0.3 km2

Original sample point(9 ppb Au) resampled: Yes/No

Follow up team: OK/GT Duration:2.0 days

Nos.of follow up samples: TE 4015 - TE 4023

Description of drainage system:
The stream, with one tributary in the lower part,drains the eastern slope of Laksmarkelvdalen.Over the lower 300 m the stream runs with moderate slope angles through forrest,partly also on overgrown talus. At higher altitudes the slope angle becomes very steep and the stream passes through a gorge into more moderate slopes again.

Geology:
The area is dominated by granodiorite.In addition mica-schists,marbles and greenish metasediments(skarn)were found.The granodiorite is greatly affected bystilbite alteration along north-south trending fissures.Rock sample 0300 TE 4016 was taken from this alteration.Upslope of stream sed.samples TE 4022/23 and TE 4021 a sulfide bearing biotite schist was detected.These horizons were between 0.4 and 4.0 meter wide.

Comments:
No gold anomalies detected, but samples TE 4017 and TE 4018 show very anomalous Pb-Zn values. The anomalies are open towards south-west.

Recommendations for further follow up:
Rapid check of headwaters to detect the source of Pb-Zn anomaly. Sulfide-bearing skarn horizons as mentioned in the description above, returned with 340 ppb Au from N-Westerdalen approx. 1.5 km further north.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Holmtjern I** No:**114** Size:0.25 km2

Claim location:Map sheet 1825 II Majaklumpen/

:Air Photo 25-4 15

:Oko Kart

Pegged:YesNoPartly Claim retained: yes/No

Stream length: 0.5km Drainage area:0.25 km2

Original sample point(7 ppb Au) resampled:YesNo

Follow up team: KB/KA Duration:1.0 days

Nos.of follow up samples: KD 5001 - KD 5002
Description of drainage system: Small stream of one meter width runs along a canyon,probably defining a fault .Most of the stream is snow covered,no tributaries seen.

Regional Geology: Predominant lithology is Biotite Gneiss.Local depressions are underlain by marbles and other metasediments.The contacts between the gneisses and the marble horizons is characterized by abundant skarns.Along the NW-shore of the lake intense Quartz veining is observable.These veins reach up to 4m in width.

Comments:
No gold anomalies detected, but overall high Pb-Zn-As levels.

Recommendations for further follow up:
The quartz veining of considerable width should be checked as a possible bedrock source for the base-metal, As anomalies.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Kalklavdalen III** No:137 Size:1.25 km2

Claim location:Map sheet 1825 II Majaklumpen/

:Air Photo 25-4-14/

:Oko Kart DN 168/2

Pegged:YesNoPartly Claim retained: yes/No

Stream length: 1.5km Drainage area:2.5 km2

Original sample point(68 ppb Au) resampled:YesNo

Follow up team: KB/KA Duration:1.0 days

Nos.of follow up samples: KD 5013 - KD 5019

Description of drainage system: A mainstream and three tributaries were sampled.The mainstream runs mostly over bedrock,and is therefor irregular in width and depth.Generally shallow and up to 5 meters wide forms the stream occasionally little pods and lakes.The three tributaries.as well as the mainstream follow the orthogonal N-S,E-W jointing.

Regional Geology: Main lithology is gneissose Diorite and Monzodiorite.In the east of the claim contact to granite.A pegmatitic quartz-vein with chalcopyrite mineralization (rock sample 0300 KD 5001)was found in tributary 1,which follows a N-S trending fault.Further upstream occurs a 10 meter wide mylonite?/shear zone.

Comments:
One middle range gold anomaly detected in area with 136 Kalklavdalen III. Rock sample KD 5001 returned with 120 ppb Au and 3000 ppm Cu.

Recommendations for further follow up:
The mylonite zone should be mapped and sampled!

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name:**Rosvik** No151 Size:1.75 km2

Claim location:Map sheet 1725 II Solstad

:Air Photo

:Oko Kart

Grazed: Yes-No---Partly Claim retained: Yes No

Stream length 2.0km Drainage area: 3.0 km 2

Original sample points:10 ppb Au+ resampled:Yes-No

Follow up team: KA/KB Duration:1.0day

Nos.of follow up sample : RK 5001 - RK 5017

Description of drainage system:
The stream is 2-3m wide and 0.3-0.4 m deep for the first 800m,where it runs in a flat area.The rest of the stream alternates between a steeply plunging and a meandering behaviour.The lowest part of the stream meanders through post-glacial marine sediments!

Geology:
Granite and granodiorite intruded into a fine-grained laminated,pink feldspathic lithology (possibly volcanics) and metasediments(mica schist).A serpentinite pod also occurs.

Comments:
One high and one middle range gold anomaly.The geological association(acid tuffs,serpentinite,granite/granodiorite)is of interest.

Recommendations:
Detailed geological mapping and lithogeochemical sampling and bank, base of slope soil sampling around Sa. P. RK 5005.

ANOMALY FOLLOW UP HELGELAND PROJECT 1983

Claim Name: **Lekatinden II No155** Size: 0.5 km2

Claim location: Map sheet 1925 III Leka

: Air Photo NLF 8001, 25-1 (Frames 11-12)

25-2 (frames 04-05)

: Oko Kart

Reached: Yes No---Partly Claim retained: Yes No

Stream length 2.0km Drainage area: 1.5 km 2

Original sample point (49 ppb Au) resampled: Yes No

Follow up team: HB/IF Duration: 0.5day

Nos. of follow up sample : LE 0005 - LE 0013

Description of drainage system:
Two major tributaries rising in mod. sloped semi-plateau with excellent exposure and numerous shallow gulleys, descent via steep waterfalls not uncommonly following bedrok fractures to a flat semi-bog area with no exposures. Thence through bedrock gulleys to the original anomaly point.

Geology:
Headwaters in metagabbro with strongly folded chloritic shear-zones. This is cut by sub-vertical fractures commonly containing minor traces of sulphide mineralization. Metagabbro and diorite near original anomaly point.

Comments:
One high-range, 2 med-range and 1 low-range anomaly detected. Very good correlation between gold, arsenic and copper.

Recommendations:
The contact between the metagabbro in the east and the serpentinite in the west should be carefully inspected and sampled.

ORIENTATION MAPS

sphalerite
qtz - vein
reworked gold occurence
gold
arsenopyrite
galena
pyrite, pyrrhotite
stratiform sulph. occurence
fracture zone in metased
fracture zone in granitoids
thrust boundaries
fault zone

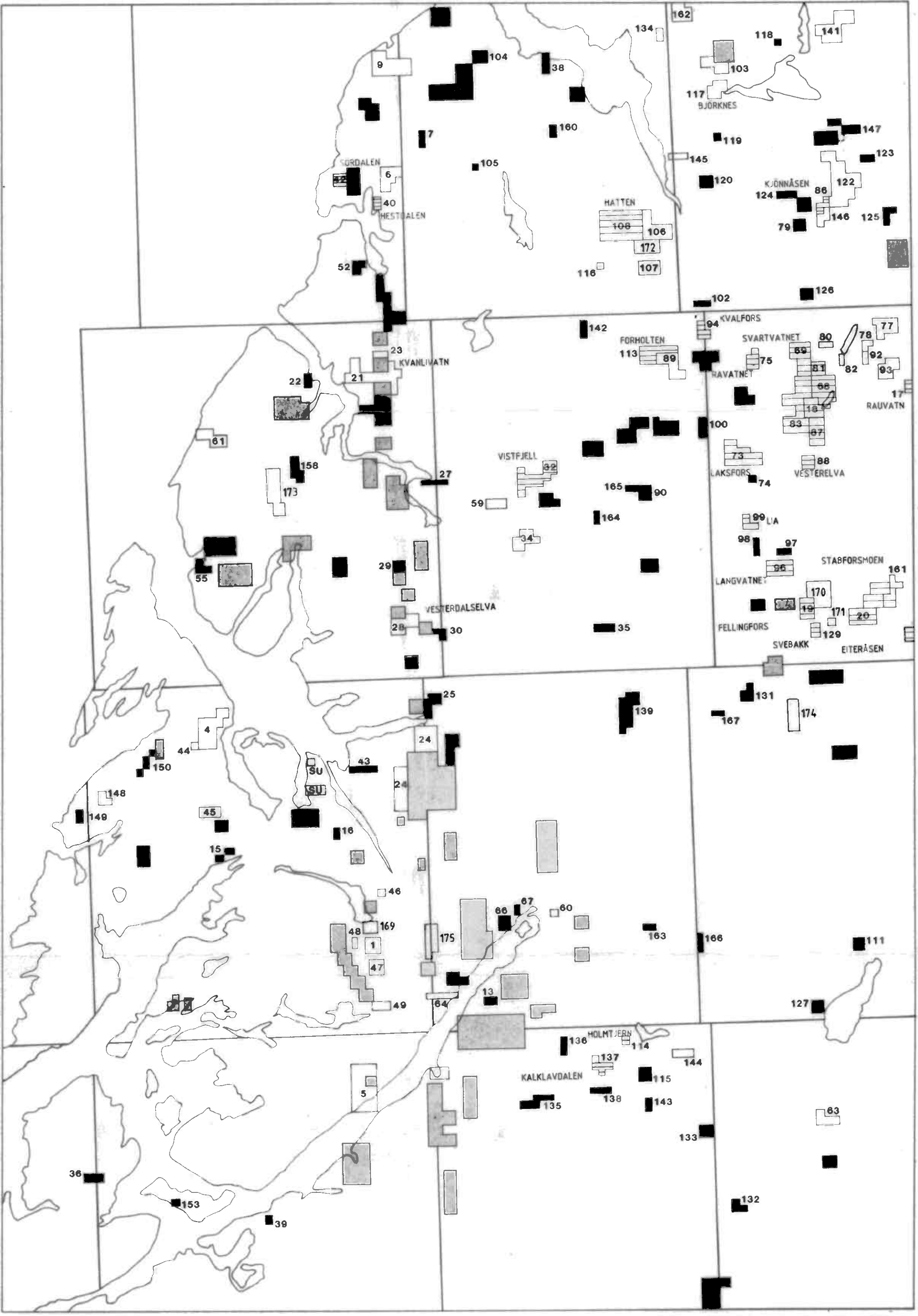
N

0 2 4 6 8 10 km

BP NORGE a.s Minerals

Structural interpretation of western Helgeland (Hemnes, Velfjord, Rindal)

Author	Drawn by JT/MK	Date 10.9.1984
Scale 1:100000	Report No.	Drawing No.



COMPETITORS CLAIMS

23 NUMBERED JOINT VENTURE CLAIMS

CLAIMS INVESTIGATED AND ABANDONED

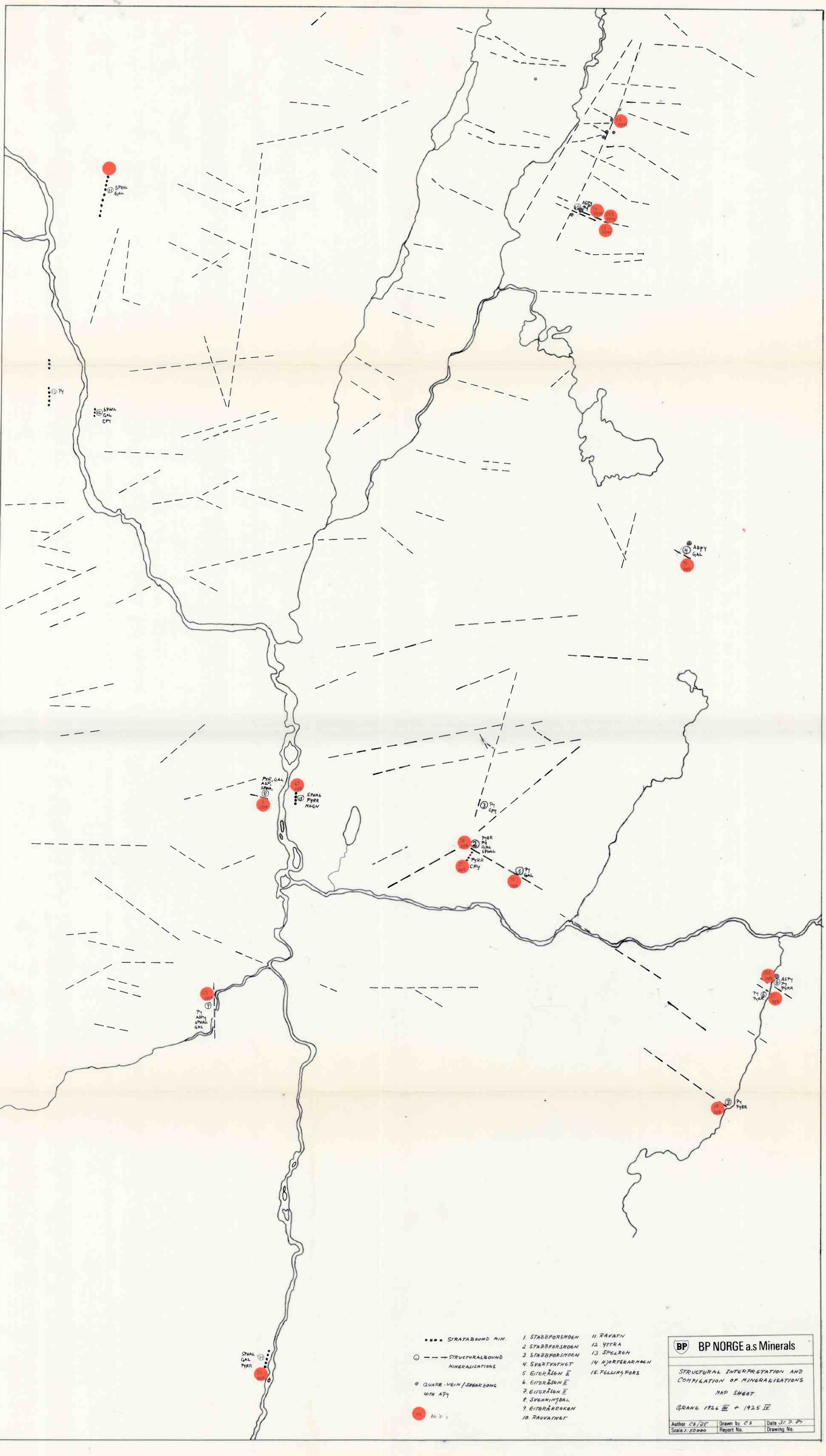
CLAIMS PROPOSED FOR 1985 FOLLOW UP

BP MINERALS INTERNATIONAL LTD

HELGELAND PROJECT

TENURE COMPILATION

Author H.H.B	Drawn by K.FIRMIN	Date OCT. 1984
Scale 1:250,000	Report No	Drawing No 1838


11 SPHAL GAL
15 ppm
ASPY
1 ppm
13.5 ppm
13 ppm
13 PY
12 SPHAL GAL CPY
4 ASPY GAL
15 ppb
PYR, GAL ASP, SPHA, 8
47 ppb
15 SPHAL PYRR MAGN
3 PY CPY
28 ppb
2 PYRR PY GAL SPHAL
27 ppb
PYRR CPY
1 PY GAL
75 ppb
350 ppb
5 ASPY PY PYRR
PY PYRR 6
27 ppb
9 PY ASPY SPHAL GAL
7 PY PYRR
28 ppb
SPHAL GAL PYRR 14
53 ppb
STRATABOUND MIN.
STRUCTURALBOUND MINERALISATIONS
QUARZ-VEIN / SHEARZONE WITH APy
Au in ppb
1. STABBFORSHOEN
2. STABBFORSHOEN
3. STABBFORSHOEN
4. SVARTVATNET
5. EITERÅSEN II
6. EITERÅSEN II
7. EITERÅSEN II
8. SVENNINGDAL
9. EITERÅKROKEN
10. RAUVATNET
11. RAVATN
12. YTTRA
13. SPELREN
14. HJORTEKARMOEN
15. FELLINGFORS
BP NORGE a.s Minerals
STRUCTURAL INTERPRETATION AND COMPILATION OF MINERALISATIONS
MAP SHEET
GRANE 1926 III + 1925 IV
Author CS/JT
Drawn by CS
Date 31.7.84
Scale 1:50000
Report No.
Drawing No.