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Tittel Report on follow-up work on regional stream sediment survey anomalies, Setesdal, Southern Norway. C Holmevatten.				
Forfatter D Ellen		Dato 1973	Bedrift Sulfidmalm A/S	
Kommune Bykle Suldal Vinje	Fylke Aust-Agder Rogaland Telemark	Bergdistrikt Østlandske	1: 50 000 kartblad 14143	1: 250 000 kartblad Sauda
Fagområde Geologi geokjemi	Dokument type Rapport	Forekomster		
Råstofftype Malm/metall	Emneord Cu Pb Zn			
Sammendrag Ingen Pb forekommster funnet, i motsetning til hva de geokjemiske anomaliene indikerte. Prosjektet ligger på grensen mellom disse tre kommuner og fylker. Vi har to eksemplarer av denne rapporten				

FALCONBRIDGE NIKKELVERK A/S

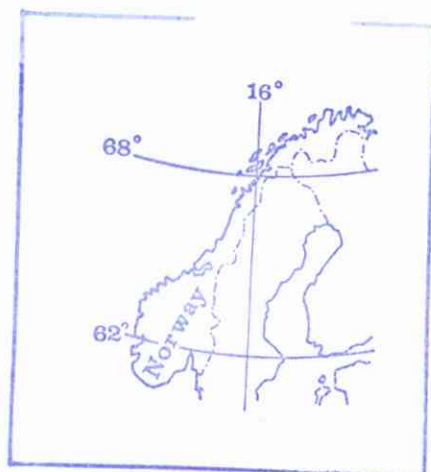
PROJECT 905-9

A/S SULFIDMALM

REPORT ON FOLLOW UP WORK ON REGIONAL STREAM
SEDIMENT SURVEY ANOMALIES, SETESDAL,
SOUTHERN NORWAY.

C. HOLMEVATTEN

D.J. ELLEN



BV 481

Report Nr. 289/73/9

INTRODUCTION

In a regional stream sediment survey carried out in 1972 (report 233/72/9) a number of areas with anomalous Cu, Zn and Pb values were outlined. in the north part of the area surveyed, near the Pre-Cambrian - Caledonian border. Some of the streams showed high Pb values, and it was considered possible that there could be Pb deposits similar to those found further north-east along the same contact zone (see report No. 263/73/6). This report describes work carried out at one of the areas considered anomalous- the Holmevannet area.

LOCATION

The area described occurs at the north-west of the Setesdal mountain range. It is about 20 kms south of the all-weather road E 76. Altitude is high, 1000 - 1260 m above sea level, and entirely above tree level. Access is relatively good, by taking road 46 from Røldal to Nesflaten and a private road (built for an hydro-electric scheme) up to within 4 kms of the area. Holmevatn is 210 kms west of Oslo, 200 kms north of Kristiansand and 130 kms south-east of Bergen.

ORIGINAL STREAM SEDIMENT SURVEY

In this original survey, the anomaly classes were defined as follows:

Class	ppm range	Significance
1	Cu 17 - 27 Pb 35 - 46 Zn 54 - 100	high background
2	Cu 27 - 44 Pb 46 - 76 Zn 100 - 180	significant
3	Cu over 44 Pb " 76 Zn " 180	highly significant

These classes are used again in this survey.

The original results are shown on map No. 9.74 A3

WORK CARRIED OUT

The priorities of the follow up work were:

1. Determine the geology of the area
2. Prospect for sulphides
3. Try to isolate individual anomalies.

Unfortunately the whole of anomaly area was not covered, due to various reasons. Snow lies late in this area, reindeer hunting takes place in August - September, and bad weather in late September closed the area. The area that was covered included a number of the anomalous values, however.

GEOLOGY

The geological observations are shown on map No.

The Pre-Cambrian basement is a metabasic amphibolitic rock of the Telemark suite of supracrustals.

Overlying the Pre-Cambrian rocks are black shales, phyllites, mica schists with varying amounts of quartz. It was difficult to discover the relationships between these and the underlying Pre-Cambrian rocks. It seems most likely that they are allochthonous units corresponding to the "Holmasjø formation" described in a recently published paper on the rocks north of road E 76. The black shales lying immediately on the Pre-Cambrian rocks may represent small amounts of autochthonous rocks, of Cambro-Ordovician age. Those occurring within the schists are more silty.

No true quartzites were noted in the area.

The schists show quite strong deformation with numerous minor folds.

MINERALIZATION

Pyrite and pyrrhotite were the only sulphide minerals observed in the region, mainly in the black shale units. No galena was observed.

Several rusty zones were observed, generally associated with thin zones of black shales. They contained very small quantities of sulphides. The streams contained a large number of rusty boulders, but they rarely contained sulphides. It seems that the rust is due to the release of Fe from silicate minerals.

Several samples were assayed, but the results were extremely low.

Sample	Cu	Pb	Zn	Fe	S
181.9.73	0.06	0.02	0.1	3.3	0.69
182.9.73	0.08	0.02	0.1	4.1	1.0
184.9.73	0.08	0.02	0.1	5.7	0.98
185.9.73	0.07	0.02	0.1	6.0	1.6

GEOCHEMICAL WORK

Supplementary stream sediment samples were taken every 250 m on a number of streams which had given anomalous results in 1972. It was considered that this could isolate and define geochemically anomalous areas. The stream sediments were analyzed by Falconbridge, Vancouver, for Cu, Pb, Zn, Mn. The results are plotted on map 9.74 A3.

There are anomalous values in most of the streams, but they do not outline any specific areas. In some cases high values occur at the top of streams near their source. Only three Cu and two Pb values fall below the high background class. The high values are not associated with any particular horizon or rock type.

DISCUSSION

After the 1972 regional survey, it was considered that the discovery of a geochemically anomalous area could indicate the possibility of lead mineralization, as this area lies on the eastern border of the Caledonides, and lead deposits have been found in a number of other places on this border. A review of such deposits was included in report 263/73/6.

The investigations carried out in 1973 do not give any encouragement to this possibility. The geological conditions are not the same in this area as in those where deposits have been discovered. Where deposits have been found, they have occurred in more or less pure sandstones, always tectonized. In this area no areas of pure quartzite have been discovered - the rocks contain a larger quantity of micas, and are more highly deformed. So from a geological viewpoint the conditions would not appear to be suitable for finding lead deposits. The rocks lying above the Pre-Cambrian are shales, schists and phyllitic rocks, and generally barren, apart from a few specks of pyrite and pyrrhotite.

Prospecting and geological investigations have not defined the source of the geochemical anomalies. There are several possible explanations:

1. Anomalies derived partly from strong iron - manganese precipitation

In a number of streams, boulders stained with Manganese were noted indicating iron - manganese precipitation. When the results are plotted against manganese on a logarithmic scale, straight line graphs are obtained. Mn values vary from 450 to 2500 ppm. However, few of the streams could be said to originate in bogs.

2. Anomalies derived partly from weathering due to heavy frost action

As these samples were all taken at over 1000 m, they could be anomalous due to frost action. The area has a very thin overburden. It is believed that with a thin moraine cover and a mean temperature close to zero, then innumerable joints form in the bedrock. As this exposes a larger surface to weathering, any lead present may be more easily leached out from the bedrock than is usual at lower levels. Norwegian investigations have shown that lead is strongly bound by humus. Under conditions such as in this area, with low temperature and strong frost action, humus production is low, and consequently there might be only small amounts present to tie up the lead. The lead will thus accumulate in the stream sediment even though the actual lead content in the bedrock is relatively low.

3. Blind Mineralization

This is a possibility, but even if present is not considered likely to be of economic interest, as the major criteria for at least a Pb - Zn deposit of economic interest are missing.

It is thought that one or more of these explanations is the cause of the geochemical anomalies.

CONCLUSIONS

1. A follow-up investigation (geological and geochemical) was carried out in the Holmevatn anomaly area of the 1972 regional geochemical investigations.
2. No Pb - Zn mineralization was discovered.
3. The anomalous values are not considered due to Pb - Zn mineralization.
4. No further work is recommended.

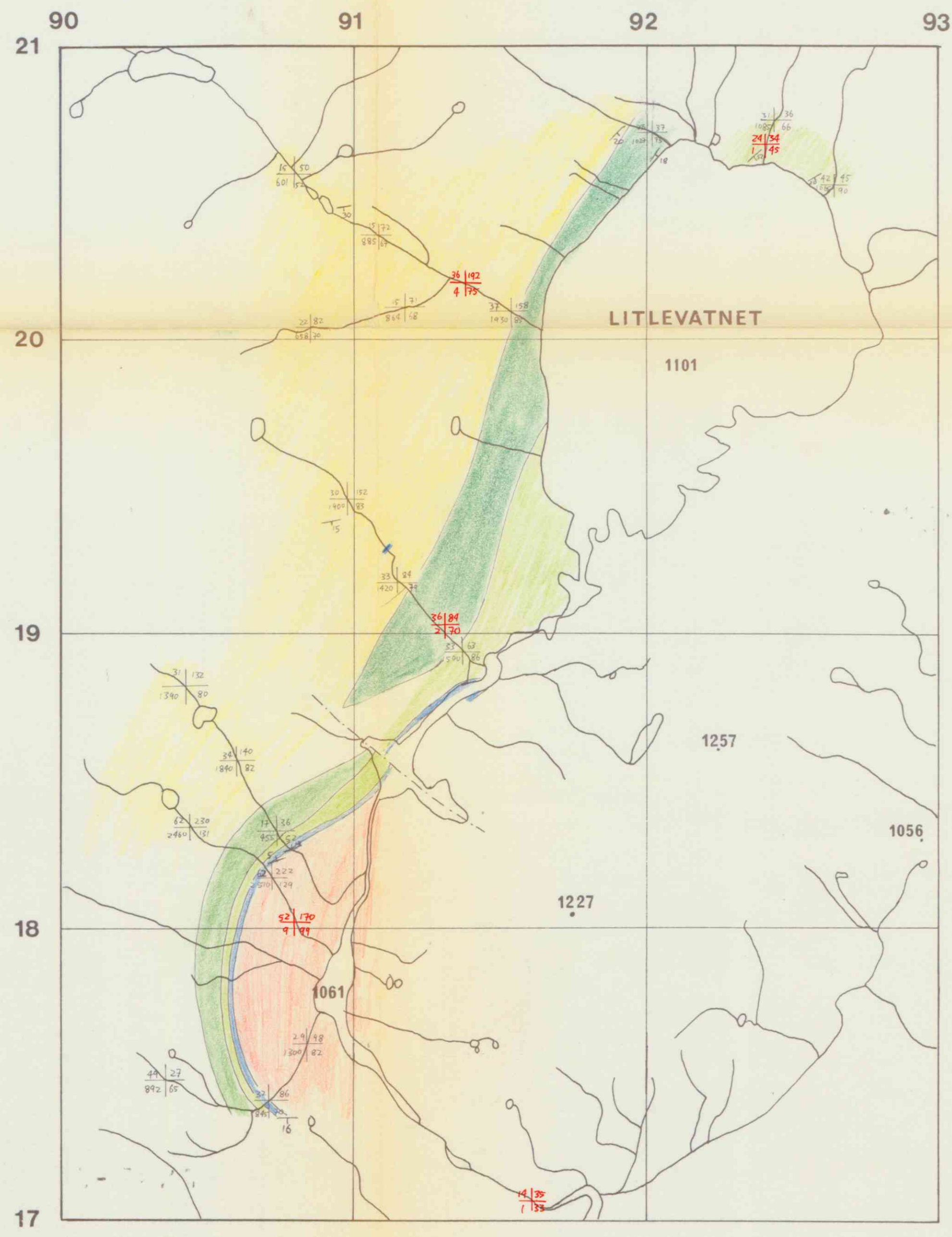
INTER-OFFICE MEMORANDUM

Subject:

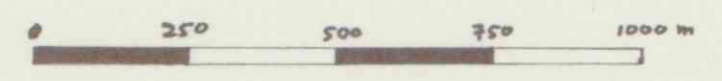
905-9. Holmevatten, Setesdal Report Nr. 289/73/9

Please find attached Ellen's account of follow-up work on the Holmevatten stream sediment anomalous area in the Setesdal region. The presence of anomalous values was confirmed and ascribed to a combination of frost action effects and coprecipitation with manganese. An unfavourable geological environment for Pb-Zn mineralization is present and no further work is recommended.

John S. Gamm



- Phyllite group
- Quartz-mica schists
 - Black silty shales
 - Dark mica schists
 - Light mica-quartz schists
 - Black shales, often rusty with minor py.po.
 - Precambrian amphibolite
 - fault
 - Dip / strike
 - $\frac{Cu}{Pb}$ / $\frac{Mn}{Zn}$ stream sediment results
 - 1598 spot heights
 - $\frac{Cu}{Pb}$ / $\frac{Mn}{Zn}$ 1972 stream sediment results



GEOLOGY AND GEOCHEMISTRY HOLMEVATNET, NORWAY	SCALE		
	1:12500		
	OBS. DE, OH	9 - 73	
	DRAW. DE, FN	3 - 74	
SULFIDMALM	TRAC. DE	3 - 74	
	CHK.		
	MAP NO.	9-74-A3	
	MAP SHEET	BREIVE 1414 III	