



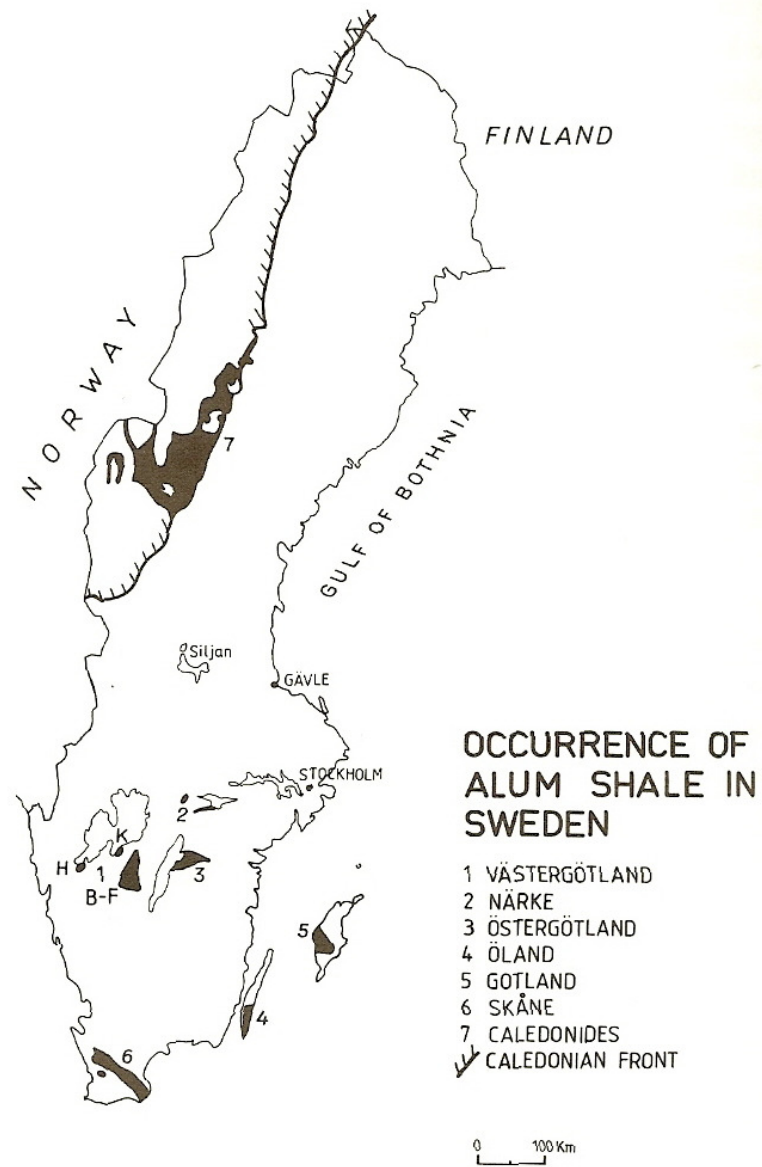
# **ENERGY INDEPENDENCE FOR EUROPE:**

**AN UPDATE ON THE CAMBRIAN ALUM SHALE PROJECT IN SWEDEN (2009)  
A WORLD CLASS ENERGY RESOURCE FOR OIL AND URANIUM**

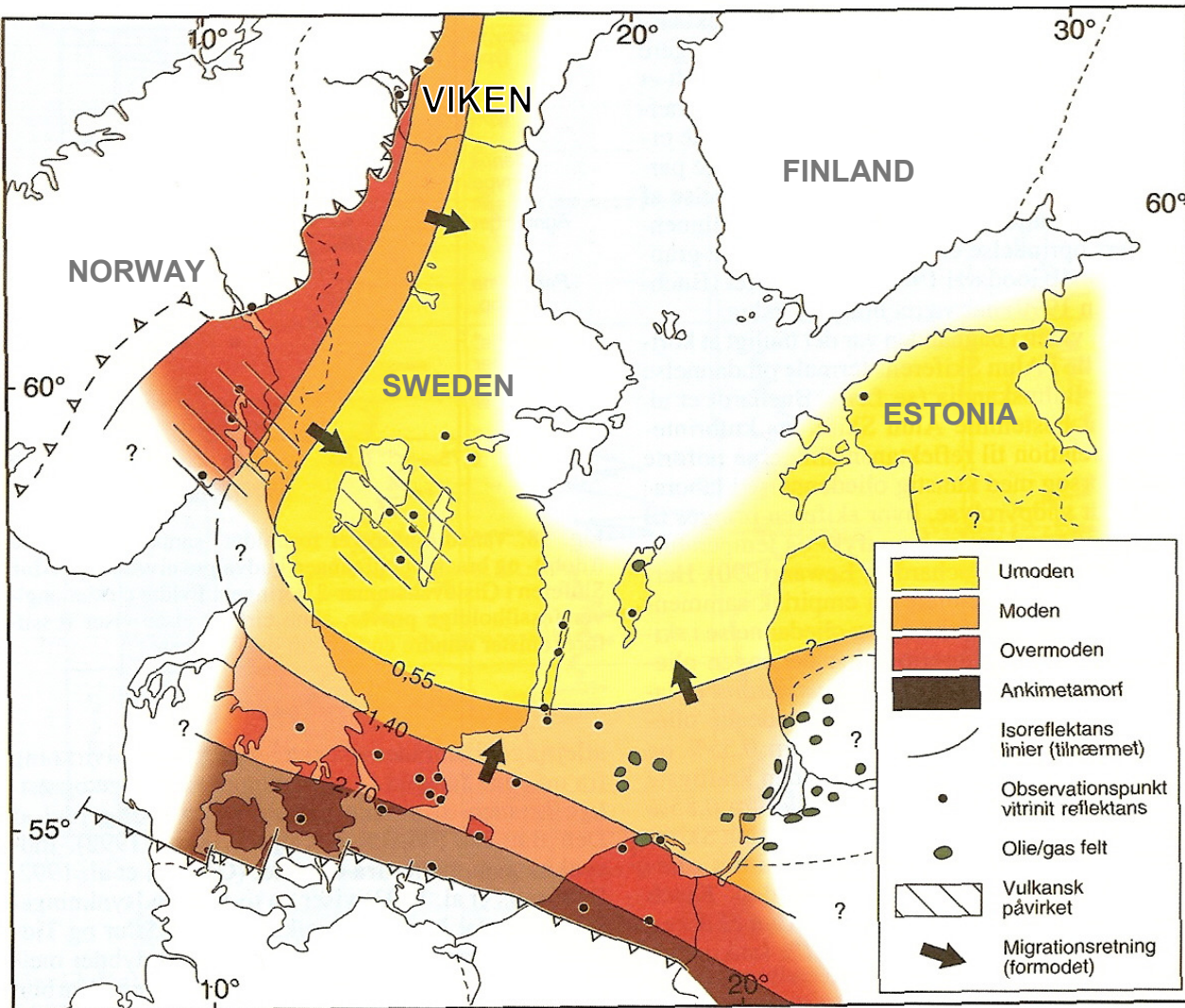
**(Presentation at the 29th Oil Shale Symposium at Colorado School of Mines)**

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Patricia Sheahan (4) and Sven Snäll (5)**

1. President
2. Exploration manager
3. Technical advisor, PhD
4. Director
5. Technical advisor, PhD



From Andersson *et al.* 1985



Maturity of Lower Paleozoic rocks in the southern part Baltoscandia (from Buchardt *et al.* 1997).



# Significant resources of kerogen and oil in the shales

Quantities of shale, organic matter and oil in alum shales containing more than 10 % organic matter (modified after SOU 1956:58 and Gee *et al.* 1982, unpublished report).

	Shale billion tonnes	Organic matter: %	million tonnes	Oil: %	million tonnes	Billion MJ	Energy: in gas and coke billion MJ	Total: energy billion MJ
Närke	1.7	20	340	4.5-5.5	85	3 500	8 800	12 300
Östergötland	12	14	1 600	3.5	400	16 800	41 900	58 700
Västergötland								
Billingen-Falbygden	12	13	1 600	1.5	200	8 400	46 100	54 500
Halle- and Hunneberg	1	13	100	0	0	0	3 400	3 400
Kinnekulle	1	14	140	3.4	20	1 200	3 800	5 000
Öland	6	12	700	2.7	170	7 000	18 000	25 000
Skåne	15	11	1 600	0	0	0	58 600	58 600
Jämtland								
Southern Storsjön Area	<u>26</u>	12	<u>3 200</u>	*	*	*	<u>117 200</u>	<u>117 200</u>
Total:	75		9 280				297 800	334 700

\*) Reportedly oil-bearing  
ARC Krenkel, H. 2009



# Significant resources of a variety of trace elements in the alum shales

## Economic metals: uranium, vanadium, molybdenum and nickel

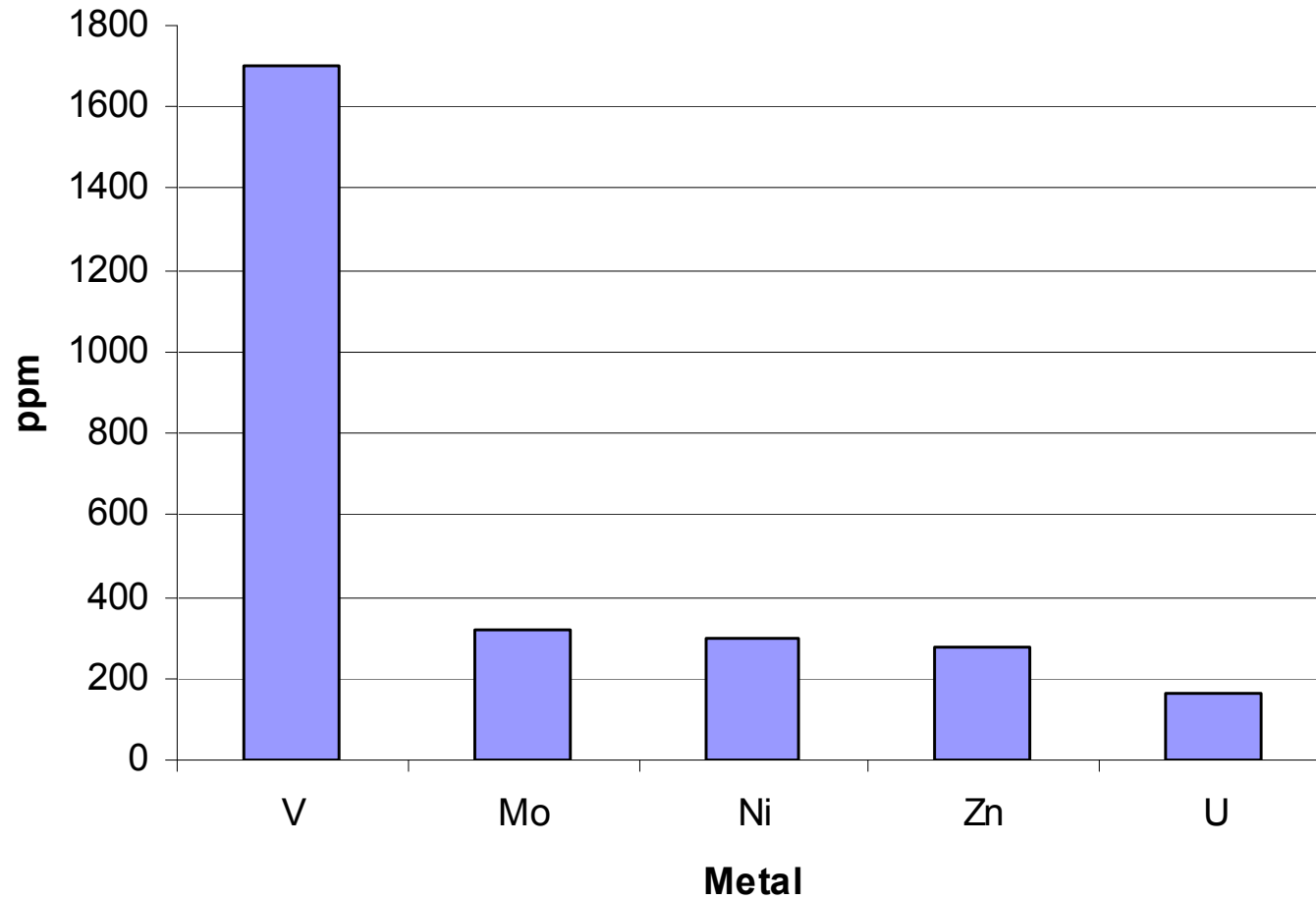
Thickness, oil content, uranium, vanadium, molybdenum, nickel and zinc content of some Swedish and Estonian shales (from Hessland & Armands, 1978, Andersson et al. 1985, Petersell, 1997 and Veski & Palu, 2003).

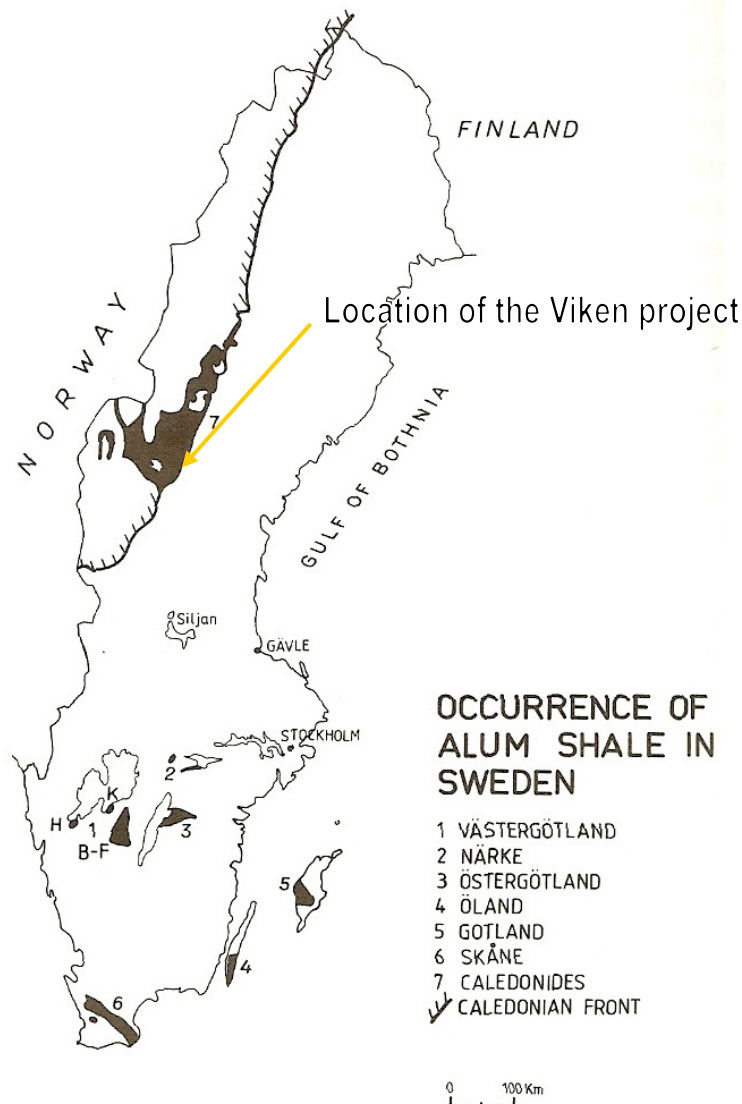
Area/deposit	Thickness	Oil content	U	V	Mo	Ni	Zn
	m	%	ppm	ppm	ppm	ppm	ppm
Närke	12-19	4-8 <sup>a</sup>	86-302 <sup>a</sup>	unknown	unknown	unknown	unknown
	17	5 <sup>b</sup>	150 <sup>b</sup>	500 <sup>b</sup>	200 <sup>b</sup>	200 <sup>b</sup>	200 <sup>b</sup>
Östergötland	14-24	3.5 <sup>b</sup>	20-269 <sup>a</sup>	400-2700 <sup>a</sup>	120-160 <sup>a</sup>	160-300 <sup>a</sup>	40-300 <sup>a</sup>
Billingen-Falbygden	8-10	1.5 <sup>b</sup>	95-409 <sup>a</sup>	500-1090 <sup>a</sup>	170-360 <sup>a</sup>	unknown	unknown
			213 <sup>c</sup>	680 <sup>d</sup>	270 <sup>d</sup>	160 <sup>d</sup>	150 <sup>d</sup>
<b>Jämtland, Myrviken</b>	<b>152-204</b>	<b>3-4<sup>e</sup></b>	<b>170-185<sup>f</sup></b>	<b>1500-1870<sup>f</sup></b>	<b>288-313<sup>f</sup></b>	<b>360-405<sup>f</sup></b>	<b>410-430<sup>f</sup></b>
Estonia, Dictyonema	0-6	3 <sup>b</sup>	36-162 <sup>a+b</sup>	350-1040 <sup>a+b</sup>	53-406 <sup>a+b</sup>	75-185 <sup>a+b</sup>	170-222 <sup>a+b</sup>

a) Min. and max. concentrations, b) Average, c) Average over an interval of 8.2 m, d) Average over an interval of 9-10 m, e) Reported (Krenkel, personal comm.), f) Concentrations over a width of 152-204 m



# Economic metal contents, Viken





## POTENTIAL WORLD CLASS RESOURCE

Extensions: 15 km long, 1 km wide, 200 meters thick

Drill tested NI 43-101. Inferred resource

Vanadium 4 245 000 tonnes

Molybdenum 688 000

Nickel 914 000

Uranium 399 000

OIL POTENTIAL FOR THIS RESOURCE:

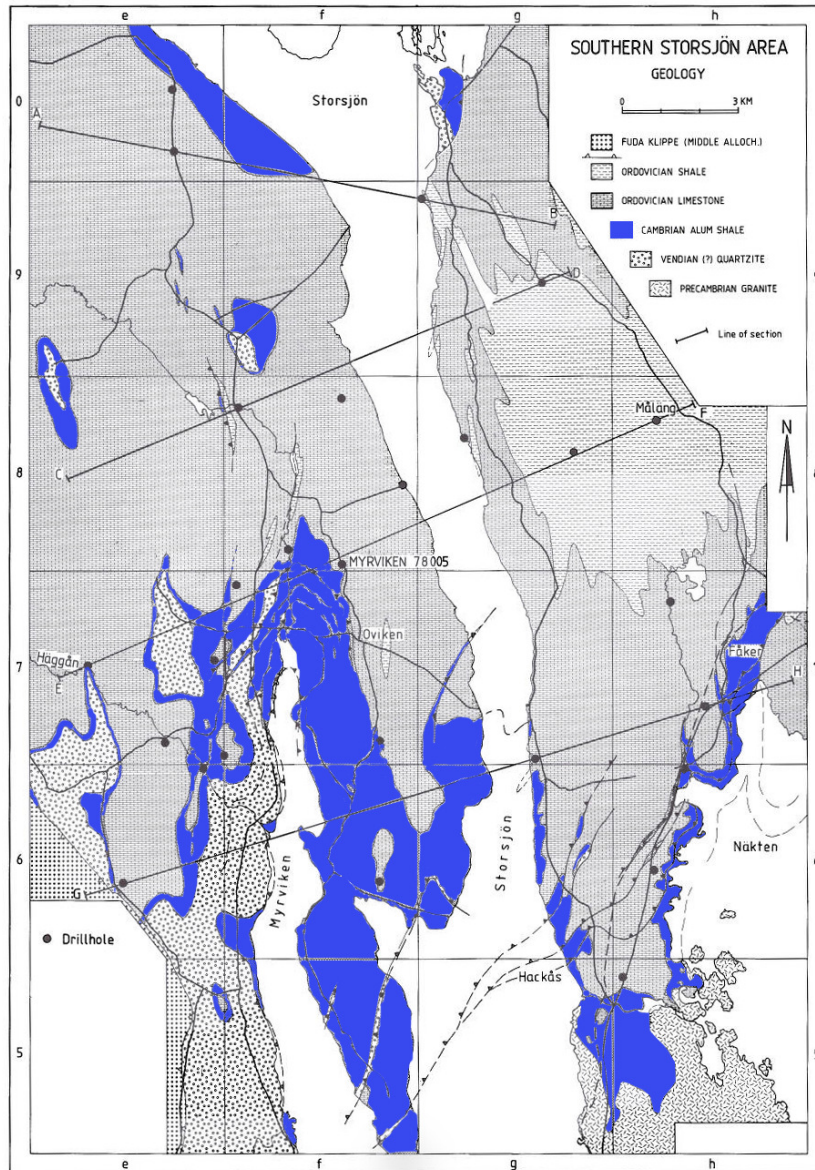
700 million barrels?

OIL POTENTIAL IN THE STORSJÖ AREA:

6 300 million barrels?

From Andersson *et al.* 1985

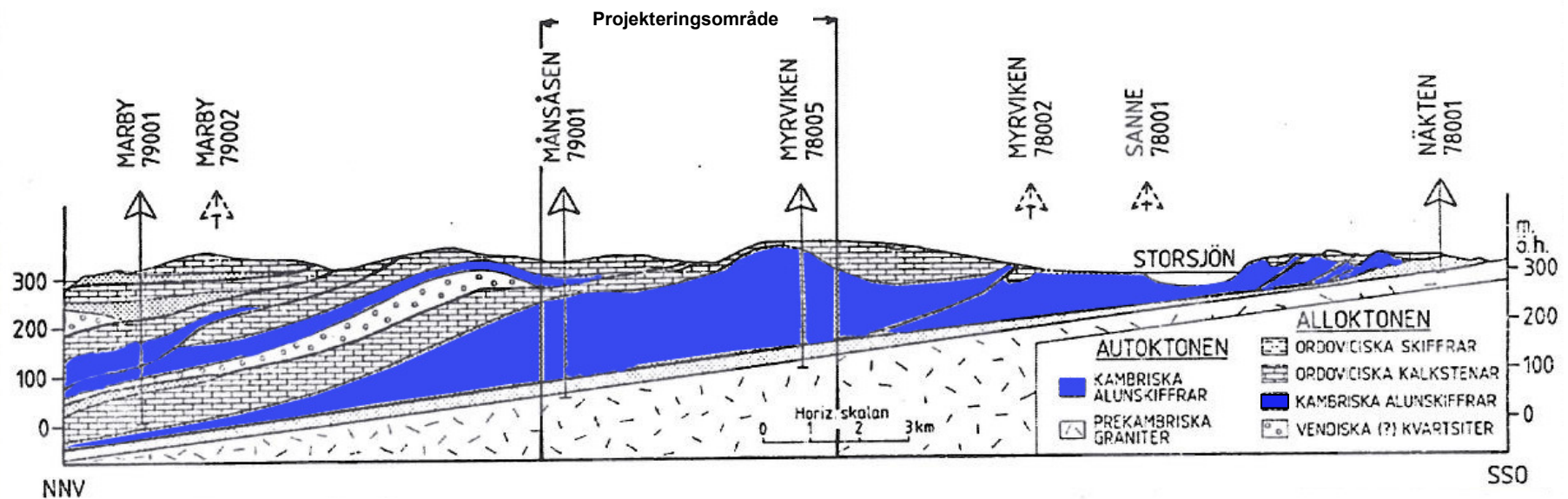
# Geology of the Viken area



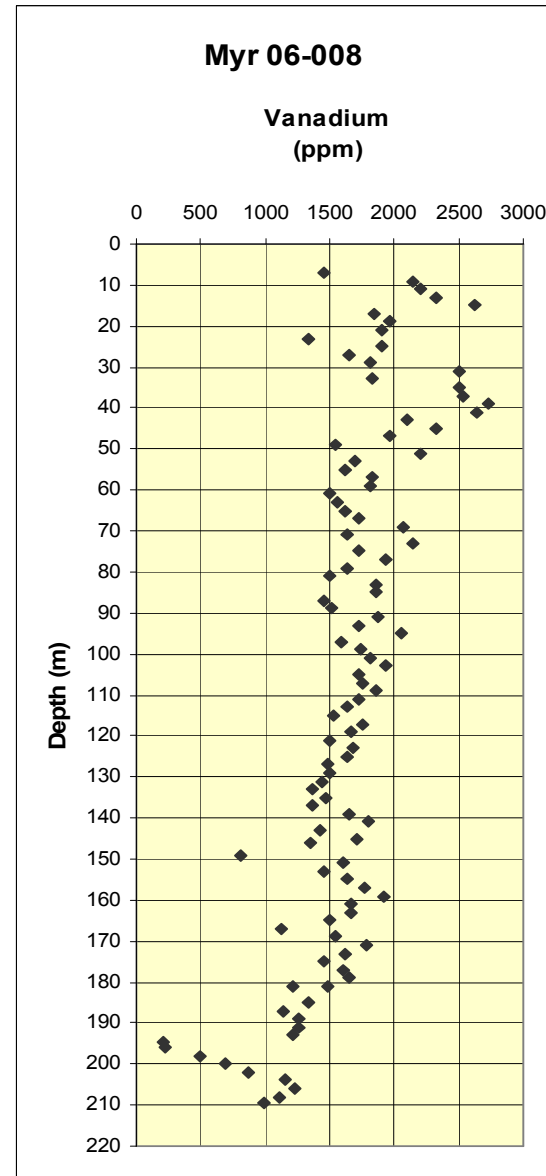
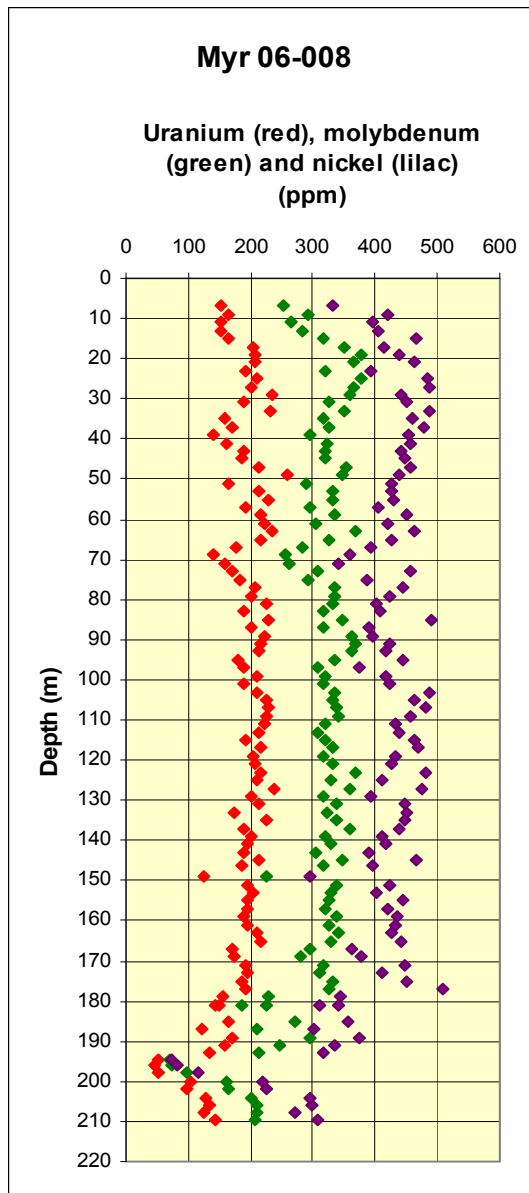


# Geological cross section

(NNW-SSE) Marby-Oviken-Hackås



# Distribution of metals down to 210 meters





# Estimation (NI 43-101 February 2009)

<b>Metal</b>	<b>Grade</b>	<b>Percentage</b>	<b>Quantity</b>
	g/tonne	%	tonnes
Vanadium	1 620	1,620	4 245 000
Molybdenum	240	0,024	688 000
Nickel	300	0,030	914 000
Uranium	160	0,016	399 000

Black (Alum) Shale: 2,8 billion tonnes.  
(Reportedly 4.6 million tonnes of uranium in the total Storsjö area SGU)



I ❤️ Uranium & Oil 🛢️

Thank you

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