ENVIRONMENTAL GUIDELINES FOR PRE-PLANNING THE DEAD SEA - ROTEM POTASH CONVEYER(1)

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The Dead Sea Works are planning a 40 km long potash conveyer from the Dead Sea (elevation -400 m) to Rotem (elevation +450 m). The terminal will be located 1.5 km from the Periklas plant, the products of which are sensitive to traces of potassium. In order to prepare environmental guidelines for the pre-planning of the conveyer, we measured the potassium background concentration in the air and the ground. Since "harmful" concentrations could not be specified by Periklas, it was decided to plan the conveyer so that the concentration of potassium in Periklas, resulting from the conveyer terminal activity, will not exceed that of the background.

The sampling and analysis methods were developed and tested. Then, background concentrations were measured at Periklas and near the existing terminal in Dimona. The results were analyzed and, using a simple dispersion calculation method, it was recommended that the conveyer be built so that the emission rate of the fine fraction of the potash does not exceed 1.5×10^{-5} μg/sec, and its concentration at the terminal fence (∿ 100 m) does not exceed ∿1 mg/m^3.

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METALLIC MINERALIZATION PHENOMENA ALONG TECTONIC ELEMENTS IN ISRAEL

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The orientations of the main tectonic elements in Israel (faults and flexures)are at 45 to 90° to the Jordan Rift Valley. Concentrations of iron and manganese oxides occur in relatively close proximity (within a few hundred meters) of these tectonic elements. The mineralization is found in Israel, Egypt (Sinai) and Jordan. The working hypothesis of the present study is that these oxides serve as traps for various metals, and by studying the mineralization, hidden ores may possibly be discovered.

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Table 2

Main iron vein mineralization phenomena and their associated metals

Tectonic element	Mineralization site	Enriched metals		No. of the site where found in Fig. 3
		Minor	Major	
Thamad	G. E-Risha	Mn,Zn	Fe,Ba	2
	G. Khasham E-Tarif	Zn	Fe,Mn,Mg	1
	Nahal Raham	Mn,n	Fe,Mg	3
Paran	Kippat Eshet	Mn,Zn,As	Fe,Mg,Si	4
	Zavar Habakbuq	Zn,Pb	Fe,Si	5
	Bruka	Zn,b	Fe,Si,Mg	6
Arif Batur	Har Massa	V,Ni,U	Fe,Si	9
	Nahal Meishar	V,Zn,Ni,U	Fe,Mg	8
Ramon	Nahal Geled	Zn,V,Ni,Cu, Ba,(As)	Fe,Mn	10
Nafha	Nahal Massor	V,Mo,As,Zn, U,Ba	Fe,Si	12
Makhtesh Qatan	Nahal Peres	Mo,As,Ni,V, U	Fe,Mg	13
Zohar	Reches Zohar	Mo,V,As,Ba, U,Ag	Fe,Si,Mg	14
Arad-Dimona	Arad	Mo,V,Zn,Ni, Ba,U	Fe	15
Yattir	M. Shalem	Zn,Ni,Mo,V	Fe,Mn,Ba	16
Fault escarpment	Sarbil	Sr,B,Ra,Rn	Mn,Fe	19
	En Boqeq	Zn,Ni,Mo	Fe,Mn,Cu,Mg	18
Qalquilia	Jaiyus	As,V,Zn,Mo, Mn,Cu,Ni,Pb	Fe	22
Zur Natan	Zur Natan	V,As,Ni,Zn, Cu,Mo,(Ag)	Fe	23

The mineralization phenomena occur as veins, lenses and impregnations in country rocks, mainly limestone and dolomite of the Judea Group. Lenses and veins range from a few meters to tens of meters in length, and from a few centimeters to several meters in thickness. The phenomena along a given tectonic element are not continuous, but occur with gaps of up to a few kilometers. The principal iron minerals are goethite and hematite, with limonite, siderite, maghemite, magnetite and pyrite also locally present. Accessory minerals include calcite, quartz, barite and dolomite.

The geochemical characteristics vary from one tectonic element to another and changes between elemental occurrences along the same tectonic element are also observed (Table 2). Maximum minor element contents in handpicked specimens are given in Table 3. Anomalous concentrations are found only in the veins and are higher by one or more orders of magnitude than concentrations in country rocks.

Table 3

Maximum concentration of selected elements*

Element	Ba	Cu	Mo	Ni	Pb	Sr	V	Zn	U
Conc. (%)	1	0.5	0.5	0.13	0.1	0.3	0.8	0.5	0.1

*Analyses by atomic absorption, delayed neutron activation, gamma spectroscopy.

Possible sources for the mineralization and associated trace elements are: (1) country rock leached by meteoric water and (2) deep-seated source(s) with upward migration through fault zones.

The age of transverse faults is post-Miocene[1]. This age is related to similar mineralization phenomena in Egypt and Saudi Arabia along transverse faults relative to the Red Sea[2].

Although data on the economic implication of the mineralization in Israel are not yet available, the present indications argue for detailed studies on the relationship between the metalliferous occurrences and the host tectonic elements.

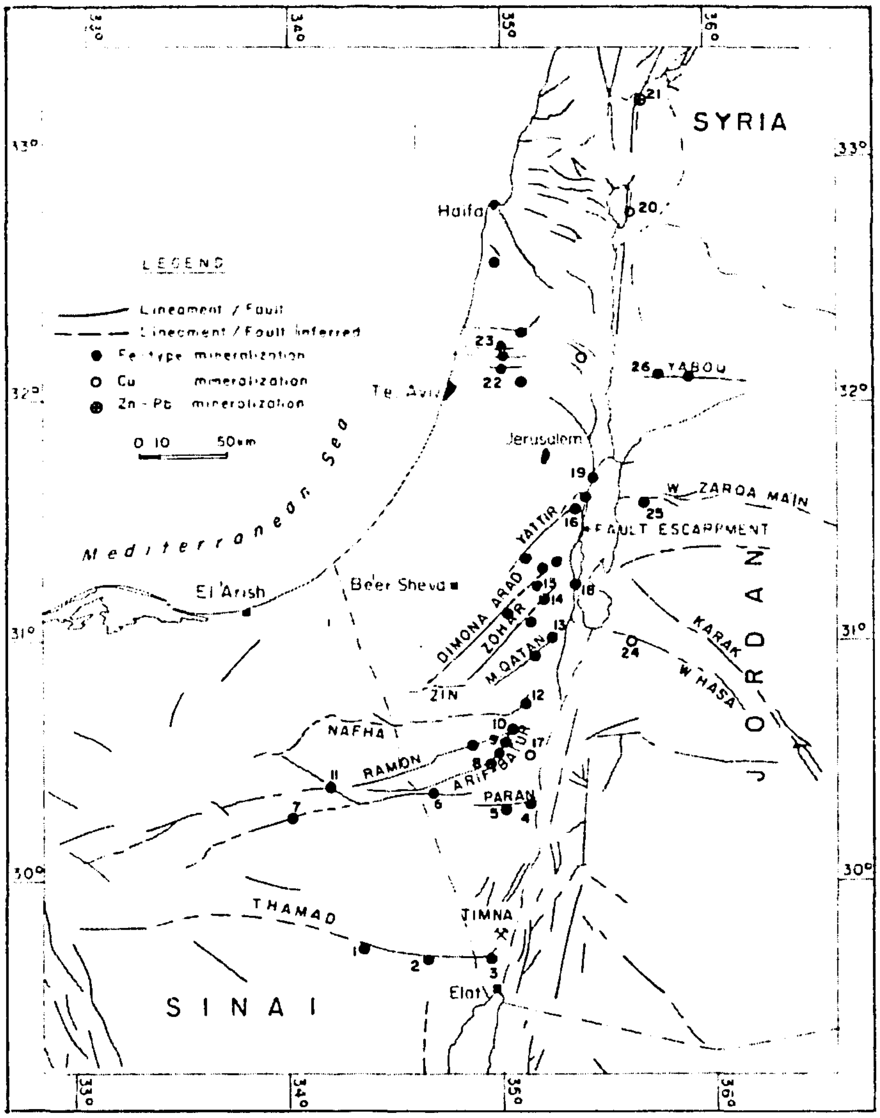

Fig. 3

Occurrences of mineralization in Israel and adjacent areas that were sampled

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2. Mitchell, A. H. G. and Garson, L. S., Min. Sci. Eng. 8, 129 (1976)