THE MINERAL INDUSTRY OF

ICELAND

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The mineral industry of Iceland, owing to abundant hydroelectric and geothermal energy and lack of indigenous resources, was largely composed of metal production from imported raw materials. Nearly all production of aluminum and ferrosilicon was exported. However, all production of industrial minerals, with the exception of diatomite, was used by local industries.

According to latest revision, foreign investment in the mineral industry, with the exception of energy, was encouraged; however, it was subject to sector-specific legislation. The majority of founders of any joint company must be residents of Iceland. All board members must be citizens and, while a company could acquire real estate, it was not allowed to exploit natural resources.[2]

Following the trend of other European countries, Iceland was undertaking privatization of Government-owned enterprises. As a first step, a holding company was created, with a board of directors entrusted with decision-making accountability.

While the production of commodities for domestic consumption remained about the same, export-oriented production of metals and pumice was beneficially influenced by the improved economic situation of European countries. *(See table 1.)*

Owing to the trade agreement and geographical proximity to the European Union, most of Iceland's trade was with Europe. The exports of aluminum, diatomite, and ferrosilicon constituted about 12% of the value of Iceland's total exports.[3]

Most of the shares in the major mineral industry enterprises in 1994 were still held by the Government. The remainder were either foreign-owned and locally operated or, for smaller businesses, locally owned and operated. *(See table 2.)*

In 1994, Islenzka Alfelagid hf-Icelandic Aluminum Co. Ltd. (ISAL) was the only manufacturer of aluminum metal from alumina imported mainly from Australia. The 99,500-metric-ton-per-year (mt/a) capacity smelter at Straumsvik near Hafnarfjordur, 17 kilometers (km) southwest of Reykjavik, was owned by Alusuisse-Lonza Holding Ltd. of Switzerland and employed about 435 people.[4] According to ISAL, production of primary aluminum has been steadily increasing, reaching about 99,300 metric tons (mt) in 1994.

The Iselska jarnblendifelagid hf-Icelandic Alloys Ltd. at Grundartangi, 25 km north of Reykjavik, had two 30-megawatt semiclosed three-phase submerged-arc furnaces designed for production of 75% ferrosilicon and employed about 155 people.[5] Raw materials (3.5 mt per ton of ferrosilicon) were transformed from the local harbor to storage by conveyor belt, while finished ferrosilicon ingots were hauled by trucks. The fumes were cooled and filtered and the resulting byproduct, microsilica, was used by a nearby cement plant as an additive.

The 1994 production of about 66,000 mt was slightly lower than in 1993, due to a burnthrough of Furnace 1, interrupting production for more than 2 months.[6]

On January 1, 1994, the state-owned Sementsverksmidja Rikisins hf (State Cement Works) became a Limited Company. The 38-year-old plant in Akranes, on the north side of Hvalfjordur, 22 km north of Reykjavik, employed about 115 people.[7] Due to a lack of limestone, it used sea shells, rhyolite, other indigenous materials, and imported gypsum. The 1994 production was 80,856 mt, a slight decline from the previous year.[8]

The entire production of diatomite was supplied by Kisilidjan hf (Diatomite Plant Ltd.) in Myvatnssveit, in the northwestern part of the country, near Lake Myvatn. During the summer months, when the lake is not frozen, the diatomaceous earth was pumped from the bottom of the lake and dried in kilns, using geothermal energy, to 99% solid matter. A production license has been extended until the year 2010 but restricted to specific areas of the lake because of adverse effects on sediment displacement. After the present deposit is exhausted, the operation was expected to transfer to the nearby Bolir-area where reserves were estimated to last for decades.[9]

All production of pumice was concentrated around Mount Hekla, 110 km east of Reykjavik. The 28-million-cubic-meter deposit was formed during a volcanic eruption in 1104. The density of the dry, loose pumice was 320 kilograms per cubic meter, suitable for light concrete and building blocks.

The largest quarry was operated by Eldber hf, a joint venture of Iceland's Jardenfnaidnadur hf and Unternehmensbeteiligungen GmbH of Germany. The pumice is 4 meters (m) to 6 m thick, covered with an overburden of a maximum of 1 m. A large order by a German partner caused an increase in the annual production of pumice in Iceland from an estimated 45,000 mt in 1993 to about 230,000 mt in 1994.

Rhyolite, with a silicon content of about 65%, was quarried in the Hvalfjordur District and trucked to a cement

plant 35 km away. In 1994, 16,400 mt was produced, all used to manufacture cement.[10]

Salt was produced from seawater extracted from an underground reservoir at a depth of about 1,500 m by Icelandic Salt Co. The resulting salt had a high concentration of potassium and magnesium compounds with a low sodium level.

Most of the 1994 sand production, which originated from calcareous sea shells, was used to manufacture cement. On the seabed of Faxafloi, at a depth of 30 m to 35 m, lies a commercial concentration of shell sand. It had a calcium carbonate content of more than 90%. Production was by dredging and pumping to shore, 10 km to 18 km away.[11]

The known mineral reserves of Iceland consisted solely of industrial minerals, mainly construction materials. *(See table 3.)*

All of Iceland's major cities were on the coast, mainly in the western part of the country, around the capital, Reykjavik. Consequently, most of the 11,543 km of road were in western Iceland.

Iceland was heavily dependent on sea transportation, boasting about 70 ports. In addition to Reykjavik, which accounts for 60% of imports and 30% of exports, they include well-equipped ports in Akureyri, Grundartangi, Hafnarfjordur, Keflavik, Seydisfjordur, Siglufjordur, Straumsvik, and Thorlakshofn. The merchant marine had 10 ships totaling 53,037 deadweight tons. It included three cargo, three refrigerated cargo, two roll-on/roll-off cargo ships, one oil tanker, and one chemical tanker.

Iceland's future industrial development depended on utilizing its abundant hydroelectric and geothermal power. The total potential for electric production from hydro and geothermal power was estimated at 50,000 gigawatt hours per year. Since only about 10% of the potential energy was being harnessed, the Government continued to encourage foreign investment in energy intensive industry, despite a lack of raw materials. Future plans included constructing a 210,000-mt/a capacity aluminum smelter, exporting electric power to Western Europe, and developing spar and perlite deposits.

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[1]Text prepared Apr. 95.
[2]Ministry of Commerce. New Legislation on Foreign Investment in Iceland. Apr. 12, 1991.
[3]Central Bank of Iceland. Economic Statistics, Quarterly, 16, No. 1, Feb 1995.
[4]ISAL Telefax. Mar. 28, 1995.
[5]Grundartangi Ferro-Alloy Plant.
[6]Icelandic Alloy Ltd. Annual Report 1994, p. 22.
[7]Iceland State Cement Works, Akranes, Iceland.
[8]Sementsverksmidjan hf, Arkanesi. Arsskyrsla 1994, p. 5.
[9]Kisilidjan hf at Myvatn. Annual Report 1991, p. 6.
[10]Work cited in footnote 6.
[11]Work cited in footnote 6.

Major Sources of Information

Idnadar-og Vidskiptaraduneyti (Ministry of Industry -Ministry of Commerce), Arnarhvoli, IS-150 Reykjavik, Telephone: 1-609-070.

Islenzka Alfelagid hf (Icelandic Aluminium Co.Ltd.), Straumsvik, P.O. Box 244, IS-Hafnarfjordur, Telephone: 560-7000.

Major Publications

Islenska jarnblendifelagid hf (Icelandic Alloys Ltd.): Annual Report 1994.

Kislidjan hf: Annual Report 1991.

Sementsverksmidjan hf (Cement Works): Annual Report 1994.

TABLE 1
ICELAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1990	1991	1992	1993	1994
Aluminum metal, primary 3/		86,800	88,800	89,500	94,500 r/	99,300
Cement, hydraulic 4/		114,000	106,000	99,800	85,500 r/	83,100
Diatomite		26,100	23,100	19,900	18,000 r/ e/	25,000 e/
Ferrosilicon		62,800	50,300	51,700	67,400 r/	66,000
Nitrogen: N content of ammonia		8,290	8,920	8,710	8,700 e/	8,700 e/
Pumice and related volcanic material:						
Pumice		28,200	33,400	33,500	45,000 r/ e/	230,000 e/
Scoria		657	389	462	500 e/	500 e/
Salt e/		2,500	3,000	4,210 5/	4,500	4,500
Sand:						
Basaltic	cubic meters	50	50	--	--	300
Calcareous, shell	do.	111,000	106,000	85,800	81,300 r/	81,500
Sand and gravel	thousand cubic meters	4,010	3,660	3,660	3,600 e/	3,600 e/
Silica dust 6/		11,200	10,700	10,200	10,000 e/	10,000 e/
Stone, crushed:						
Basaltic		105,000	117,000	109,000	100,000 e/	100,000 e/
Rhyolite	cubic meters	24,400	23,000	18,200	16,500 r/	16,400

e/ Estimated. r/ Revised.
1/ Previously published and 1994 data are rounded be the U.S. Bureau of Mines to three significant digits.
2/ Table includes data available through Mar. 1995.
3/ Ingot and rolling billet production.
4/ Sales.
5/ Reported figure.
6/ Byproduct of ferrosilicon.

TABLE 2
ICELAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	ISAL (Alusuisse-Lonza Holding Ltd 100%)	Straumsvik	100
Cement	Sementsverksmidja Rikisins (Government 100%)	Akranes	115
Diatomite	Kisilidjan hf (Government 98%)	Myvatnssveit	27
Fertilizer	Aburdarverksmidja Rikisins (Government 100%)	Gufunes	60
Ferrosilicon	Islenska jarnblendifelagid hf (Government 55% and Elkem A/S 30%)	Plant at Grundartangi	72
Pumice	Eldber hf (Jardenfnaidnadur hf 51%)	Mount Hekla	210
Do .	Pumice Products Ltd (BM Valla Ltd 100%)	do.	32
Salt	Icelandic Salt Co (Akzo NV of Netherlands 58%)	Plant at Svartsengi	5

TABLE 3
ICELAND: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES FOR 1994

(Million metric tons unless otherwise specified)

Commodity		Reserves
Diatomite		2.5
Shell sand		2.5
Perlite		48
Pumice	million cubic meters	28