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The Mineral Industry of Switzerland

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Switzerland is a highly developed, mountainous country located in Central Europe; it borders the European Union (EU) member states of Austria, France, Germany, and Italy. Although more than a thousand mineral deposits are present, extraction of a very limited amount of mineral resources is economically viable today. Switzerland's mineral output consisted almost exclusively of industrial minerals for the construction sector, refined gold, and refined silver. Although historically important, iron ore production ceased when the last two iron ore mines closed in 1967. Industrial minerals that were mined and used on a large scale were clay, gypsum, and rock salt. Hydraulic cement and sulfur (from petroleum refining) were also produced. Stone continued to be an important commodity in terms of gross value added. The majority of domestically consumed stone was mined and processed in Switzerland. Locally produced nonmetallic minerals included raw materials for the brick and tile industry; lime and marl for the binder material industry; and sand and gravel, dimension stone, and crushed stone for the construction industry (Geology Portal, 2013, b–d).

Metal refining, in particular the refining of precious metals such as gold and silver, was a highly significant component of Switzerland's economy. Although gold was not mined in Switzerland, the country had the largest refined gold output and export in the world. Seventy percent of global gold production was estimated to have been refined in Switzerland in 2012 (Mariani, 2012). Metal processing was limited mostly to secondary aluminum, secondary lead, and steel production.

Transit or merchant trade of commodities was another way minerals played an important role in Switzerland's economy. Switzerland relied on imports to meet most of its needs and to supply the materials needed to process minerals for reexport. It continued to be one of the most open economies in the world, with high recorded export and import levels per capita. The country ranked 11th in the world in terms of the International Chamber of Commerce (ICC) Open Markets Index based on aggregate trade flows as a percentage of gross domestic product (GDP) and free trade policy of low tariffs and nontariff barriers to trade (International Chamber of Commerce, 2013, p. 17).

The commodities sector, which included minerals, has accounted for an estimated 50% of Switzerland's economic growth since 2010 owing to increased commodities trading activity conducted primarily in the Lake Geneva region of southwestern Switzerland. The country has become a leading transit hub in the global flow of minerals from producers and exporters to consumers and importers in recent years, accounting for an estimated 15% to 25% of the estimated $3 trillion global trade in commodities, although few minerals are produced domestically. Switzerland's share of global trade in commodities exceeded 25% for minerals such as alumina, copper, lead, petroleum, and zinc (Jung and Seith, 2012; Thut, 2013, p. 161–162).

Some of the world's leading commodity trading companies, ranked by annual revenue, were based in Switzerland. Among these were Vitol Group, which was the world's leading oil trader; Glencore plc, the world's leading commodities trading company; Gunvor Group Ltd., a leading petroleum, coal, and liquefied natural gas (LNG) trader; Trafigura Beheer B.V., a leading petroleum and metals trader; and Mercuria Energy Group Ltd., one of the world's top five energy traders. Measured in terms of output, companies based in Switzerland accounted for one-third of world trade in crude petroleum and products (Schneyer, 2011; Swiss Trading & Shipping Association, 2014). In 2010 (the latest year for which comprehensive data were available), Glencore reported a 60% share of the world trading market in zinc metal, 50% in zinc concentrates, and 50% in copper metal. This was followed by other metals, including lead metal and lead concentrates (45% each), alumina (38%), copper concentrates (30%), cobalt (23%), aluminum (22%), and ferrochrome (16%). The company also had significant shares in mineral fuels markets, including thermal coal (28%), methane coal (12%), and petroleum (3%) (Glencore International plc, 2011, p. 22). In May 2013, Glencore also became one of the world's leading mining companies following its acquisition of the fourth-ranked mining company in the world, Xstrata plc (Blas, 2013; Thut, 2013, p. 161).

Minerals in the National Economy

In 2013, Switzerland's GDP increased by 2.0% in real terms, accelerating from a 1.0% rate of growth in 2012. Nominal GDP was $685.4 billion in 2013, up from $666.1 billion in 2012. The increased rate of growth was mainly due to increases in private consumption, construction output, and net exports (International Monetary Fund, 2014, p. 4; World Bank, The, 2014). The gross value added by manufacturing and construction decreased by 0.3% and agriculture, forestry, and fishing decreased by 2.2%, while the services sector including commerce increased by 2.9%. Within manufacturing and construction, the value added by manufacturing decreased by 0.6%, which was a slight improvement from the 0.9% contraction in 2012. The mining and quarrying sector contracted and its value added decreased by 4.0% in 2013 compared with an increase of 1.7% in 2012 (Federal Statistical Office, 2014c, d).

In 2013, manufacturing made up about 18.7% of Switzerland's GDP, which was slightly lower than its 19.0% share in 2012. The mining and quarrying sector accounted only for about 0.12% of the gross national value added, which was a slight decrease from 0.13% in the previous year (Federal Statistical Office, 2014d).

Switzerland's commodity sector was an important component of the national economy. The sector, which included every globally traded mineral, accounted for an estimated 3.5% of GDP and employed about 10,000 people. Data on mineral

trading activity were not readily available, as the value of the flow of goods in transit trade that never physically entered Switzerland was not captured by official trade statistics. Measured as transit trade, which was recorded in the balance of payments data, 94% of which was estimated to have been made up by commodities, the net income of the commodity sector has increased fifteenfold since 1998 to reach CHF19.1 billion ($20.2 billion[1]) in 2012 (the latest year for which comprehensive data were available). This was a decrease of 3.3% compared with the level in 2011. Mineral fuels were by far the largest commodity group in Switzerland's transit trade, accounting for 73% of the total, which was followed by stone and metals, with a 13% share (Berne Declaration, 2011, p. 41; Farge, 2013; Swiss National Bank, 2013; Thut, 2013, p. 161).

Government Policies and Programs

Mineral exploration and extraction in Switzerland was governed by the Bergregal, "principles of mining law." According to the Swiss civil code (Art. 664 ZGB), the Federal Government entrusted the 26 regional governments (Cantons) with legislative rights over public and unclaimed property, which included underground mineral resources. The Federal code only asserted that the interests and rights of landowners, the state, and the license holder must be safeguarded. Cantons granted licenses for mineral exploration and exploitation based on their own planning and building regulations, environmental impact assessments, and safety regulations. Mineral regulations and procedures differed widely from one Canton to another, as each Canton had the authority to set its own mining law, to establish resource rights, and to issue mining licenses. The Federal Government did not own any territory in the Cantons or exercise any authority with regard to mineral resource regulations (Geology Portal, 2013a).

Production

In 2013, refined gold and refined silver production increased substantially. Refined gold output was estimated to have increased by about 36% and refined silver by 27% compared with production in 2012. Industrial minerals produced by mining and processing included cement, gypsum, lime, salt, and sulfur. The production of industrial minerals increased slightly, with the exception of lime and sulfur from petroleum refining. Estimated crude steel production and secondary lead production remained about the same as in 2012. The output of most petroleum refinery products increased, including liquefied petroleum gas, gasoline, distillate fuel oil, and residual fuel oil. Kerosene and naphtha output remained about the same. The country's secondary aluminum production was mainly exported for use in the automotive industry, and its salt production was used for both domestic consumption and export. Data on mineral production are in table 1.

[1]Where necessary, values have been converted from Swiss francs (CHF) to U.S. dollars (US$) at an annual average exchange rate of CHF0.964=US$1.00 for 2013. All values are nominal, at current prices, unless otherwise stated.

Structure of the Mineral Industry

Switzerland's mineral producers were owned privately or by the Cantons. Table 2 is a list of major mineral industry facilities, including their locations and capacities.

All four leading gold refiners (by annual production and capacity) were owned privately. Argor-Heraeus S.A. was owned by Heraeus Holding GmbH, Commerzbank International S.A., and Münze Österreich (the Austrian Mint). Metalor Technologies S.A. was owned by Astorg Partners S.A. of France, and Produits Artistiques Métaux Précieux S.A. (PAMP) was a subsidiary of MKS S.A. of Switzerland. Finally, Valcambi S.A. was a wholly owned subsidiary of European Gold Refineries Holding S.A., which was in turn owned by Newmont Mineral Holding B.V. of the United States.

Mineral Trade

In 2013, Switzerland's trade surplus reached an all-time high of CHF24.0 billion ($24.9 billion). Both exports and imports increased by about 2%, excluding electricity. Metals made up 6.0% of Switzerland's exports and increased by 1.3% compared with 2012. Raw materials accounted for about 1% of total imports and increased by 1.8%. Energy sources, including electrical energy, motor fuels, thermal fuels, and crude oil and basic products, made up about 8.1% of imports and decreased by 13.2% compared with 2012. The decrease in energy imports was highest for electrical energy (58.3%), followed by motor fuels (10.8%). The reported decreases in both electricity import and export volumes were in part owing to the recent restructuring process within Switzerland's electricity industry, which resulted in mergers of trading departments and reduced total group figures in 2013. Crude petroleum and basic products imports, on the other hand, increased by 48.4% and thermal fuels by 5.1% (Federal Customs Administration, 2014a, p. 1–9; Swiss Federal Office of Energy, 2014a).

Switzerland continued to be the world's top exporter of gold metal, which was estimated to be the country's leading export in value. In 2013, Switzerland exported 2,777.11 metric tons (t) of gold valued at $122.1 billion (CHF117.7 billion). Gold exports increased 77% by weight compared with 2012 and 48% by value, with the difference owing to the lower price of gold in 2013 compared with 2012. Swiss gold imports also increased substantially. By weight, they increased 36% to reach 3,080.45 t and by value 23% to reach $113.9 billion (CHF109.8 billion) (Federal Customs Administration, 2014b, p. 1).

Switzerland was also a significant importer and exporter of silver. The country exported 2,411 t of silver valued at $1.77 billion (CHF1.71 billion) and imported 1,837.21 t valued at $1.43 billion (CHF1.38 billion). Silver exports increased 47% by weight and 10% by value, whereas imports decreased 19% by weight and 40% by value, with the difference owing to the lower price of silver in 2013 (Federal Customs Administration, 2014b, p. 1).

Switzerland also imported 21.41 t of gold and platinum coins of which 9.23 t was reexported. Coin imports increased 9% by weight, whereas coin exports more than doubled, increasing by almost 115% (Federal Customs Administration, 2014b, p. 1).

Switzerland's economy was tightly integrated with the EU through the European Free Trade Agreement (EFTA). The country was the EU's fourth largest trading partner, while the 27 member countries of the EU dominated Swiss trade, accounting for 54.8% of exports and 72.7% of imports in 2013. Germany continued to be Switzerland's most important trading partner by far, accounting for 18.5% of exports and 28.1% of imports. The United States had the second highest share with 11.7% of exports, while Italy ranked second in imports with a 10.1% share (European Commission, 2014; Federal Statistical Office, 2014a, b).

In 2013, Switzerland's exports to the United States totaled $28.3 billion, while Switzerland's imports from the United States amounted to $26.8 billion. Exports to the United States included, in descending order of value, nonmonetary gold ($268 million), other precious metals ($80 million), iron and steel advanced manufactures ($53 million), iron and steel products except advanced manufactures ($52 million), bauxite and aluminum ($29 million), other petroleum products ($22 million), and nuclear fuel materials ($9 million). Switzerland's imports from the United States included, in descending order of value, nonmonetary gold ($12.7 billion), other precious metals ($249 million), iron and steel products except advanced manufactures ($82 million), coal and other fuels ($74 million), nonferrous metals ($59 million), natural gas liquids ($20 million), aluminum and alumina ($11 million), iron and steel mill products ($11 million), copper ($10 million), and nuclear fuel materials ($3 million) (U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Aluminum.—Novelis Switzerland S.A., which was a subsidiary of Novelis S.A. of the United States, was the leading producer of aluminum sheet metal for the automobile industry in Europe. The annual capacity of the new Novelis Fusion casthouse in Sierre was almost doubled to 130,000 t in 2012. In May, Novelis announced that it would further expand its production capacity for automotive sheet metal in Europe by increasing capacity at its plant located in Gottingen, Germany (PRNewswire, 2012; Novelis S.A., 2013).

Gold.—In 2013, Switzerland did not mine gold, but there was increased exploration activity in a number of southern Cantons. NV Gold Corp. of Canada continued to prospect for gold through its Surselva project in the Medel Valley despite the vote against the proposed gold mining project by the Medel/Lucmagn residents. In April 2012, they voted not to authorize a 5-year exploration permit owing to their concerns about environmental and other quality of life issues. NV Gold estimated prospective resources at the Surselva project area to be 22.7 t of gold metal valued at an estimated $1.2 billion within 129 square kilometers (km^2). In January 2012, the company reported that of the 86 samples taken, 72 had returned gold values in excess of 150 parts per billion (ppb) gold with 48 containing in excess of 1.0 gram per ton (g/t) and 7 containing in excess of 10.0 g/t (NV Gold Corp., 2012a, c; Squires, 2012; Topf, 2012).

In November 2012, NV Gold was granted a 5-year exploration permit for gold and precious metals in a 115-km^2 property within the Communes of Disentis/Mustér, Sumvitg, and Trun in the Canton of Graubunden. In 2013, NV Gold conducted additional rock-chip geochemical sampling in the Tavetsch zone near the Vorderrhein within the Sumvitg community and in the Stavelatsch area, outlining the extent of the mineralized zone at Stavelatsch and suggested continuity of the zone between Stavelatsch Pass and Vallesa Pass (NV Gold Corp., 2012b; 2014, p. 2).

Aurania Resources Ltd. of Canada was engaged in copper, gold, and uranium exploration in southwestern Switzerland. The company held a 100% interest in three exploration projects in the Canton of Valais through its subsidiary AuroVallis SARL. In November, the company completed its initial exploration drilling on the Mont Chemin gold and Siviez uranium-copper-gold properties, which consisted of 12 holes totaling 1,390 meters (m) and 4 holes totaling 623 m, respectively. In December, Aurania reported that it received all assay results from the initial exploration drilling program on the Mont Chemin gold project. The results showed that most drilled holes contained at least 1 g/t at varying intervals and high-grade gold and silver mineralization could be intersected at depth at Mont Chemin (Aurania Resources Ltd., 2013a, b; 2014).

Switzerland was home to four of the world's largest gold refineries, in terms of capacity: Balerna, owned by Valcambi S.A., with an annual refining capacity of 2,000 t of gold; Neuchatel, owned by Metalor Technologies S.A. (650 t); Castel San Pietro, owned by Produits Artistiques Métaux Précieux (PAMP) S.A. (450 t); and Mendrisio, owned by Argor-Heraeus S.A. (400 t) (Gold Bars Worldwide, 2014a–d). Swiss gold refineries experienced significant growth in recent years owing to higher demand for gold bars around the world in the aftermath of the global financial crisis of 2008. Demand was reported to have increased particularly from Asian countries such as China and India. Switzerland has become a key transit point and a trading hub for gold leaving Europe and moving to Asia. Switzerland's gold refiners have responded to the boom in this trade by melting down large 400-troy-ounce bars of precious metal from vaults in London and reprocessing them into smaller gold and silver products for consumers in Asia (Foulkes, 2012; Farchy, 2013; Els, 2014).

Argor-Heraeus completed the construction of a new ancillary plant that doubled its production space in Mendrisio in 2012. It also installed a solar panel and electricity generation system, which was reported to be one of the largest in the region (Gold Bars Worldwide, 2014a).

Cendres + Metaux S.A. in Biel and PX Precinox S.A. in La Chaux-de-Fonds, the two smaller Swiss refiners, were affiliated with the London Bullion Market Association, which issued the quality certification for gold refiners through its Good Delivery List. Unlike the four big refiners, however, the two smaller firms did not disclose annual refining capacities (Mariani, 2012).

Iron and Steel.—Swiss Steel AG launched a new waste disposal system at its Emmenbrucke plant and expanded its own landfill site in 2013. These two measures were undertaken to dispose of nonrecyclable waste from steel manufacturing in accordance with environmental regulations (Schmolz and Bickenbach AG, 2014).

Industrial Minerals

Cement.—In February, Holcim (Schweiz) contracted Thorwesten Vent of Germany for the design and assembly of a large-capacity silo for the storage of pulverized lignite at its Siggenthal cement plant. The 2,300-cubic-meter silo was designed to be 55 m high and 9 m in diameter. In December, Thorwesten completed the construction of the silo and released it to Holcim (Global Cement, 2014; Thorwesten Vent, 2014).

Salt.—Salines Suisses maintained its monopoly on the sale, trading, and importation of salt and salt mixtures in Switzerland. The company has held this position since 1973 owing to an agreement signed by all Swiss Cantons except Vaud, which transferred all rights and obligations regarding the salt trade to Salines Suisses. The company planned to merge in 2014 with Saline de Bex S.A., which was active in the extraction and production of salt as well in the generation of electricity in Vaud (Saline de Bex S.A., 2013; Salines Suisses, 2014).

Mineral Fuels and Other Sources of Energy

Switzerland's total primary energy supply was provided by petroleum and petroleum products (39%), nuclear power (26%), hydropower (13%), natural gas (12%), and biofuels and waste (9%). Among petroleum products, motor fuels accounted for 64% and fuel oils for the remaining 36%. Total electricity production was 68,312 gigawatthours (GWh), which was up slightly from 68,019 GWh in 2012. Hydropower supplied about 57.9% of the country's electric power, but production was 0.8% lower in 2013 compared with 2012. Nuclear powerplants supplied about 36% of electric power in 2013, and their production was 2.2% higher compared with the previous year. Other sources such as conventional thermal powerplants accounted for 5.7% of electric power and their production increased 2.7% in 2013 compared with 2012. The country was import dependent for 100% of its petroleum and natural gas supply (Honoré, 2014, p. 157; Orelli, 2014, p. 419; Swiss Federal Office of Energy, 2014b, p. 2–5).

Natural Gas.—In 2013, Switzerland did not produce natural gas and had no plans to start domestic gas production. Natural gas was imported to meet about 14% of the country's annual energy demand. About 80% of natural gas imports were transported by the Netherlands-Italy pipeline. Switzerland imported gas that originated from, in descending order of volume, the Netherlands, Russia, Norway, Germany, and Algeria (Orelli, 2014, p. 419–420).

Nuclear Energy.—Switzerland had five active nuclear reactors (Gosgen, Muhleberg, Leibstadt, Beznau I, and Beznau II) that supplied more than one-third of the country's energy supply. In May 2011, the Swiss Federal Council resolved not to replace any reactors and to phase out nuclear power by 2034 in the aftermath of the nuclear power incident at Fukushima, Japan. As a result, the five nuclear powerplants currently in operation would be decommissioned at the end of their safe service life and no new reactors would be built to replace them. In 2011, three pending general license applications for new nuclear reactors in the Cantons of Aargau, Berne, and Solothurn were suspended. In October 2013, BKW FMB Energy announced that it would shut down its Muhleberg nuclear powerplant in 2019 instead of the previously planned 2022 closure owing to political and regulatory uncertainty about nuclear energy in the country (World Nuclear News, 2013; Orelli, 2014, p. 414).

Petroleum.—In 2013, Switzerland did not produce any petroleum. All petroleum consumed in the country was imported by tanker (rail, road, and water) or by pipeline. About 80% of crude imports came from countries in northern and western Africa (Orelli, 2014, p. 419).

Tamoil (Suisse) S.A.'s Collombey refinery, which was one of two petroleum refineries in Switzerland, had a 78,000-barrel-per-day (bbl/d) capacity. In September 2012 and again in May–June 2013, the company had to shut the refinery for maintenance after the Canton of Valais ordered the cleanup of the 50-year-old plant by June owing to environmental concerns. Tamoil reported that it had invested about $13.5 million (CHF13 million) in the refinery in 2012 and $41.5 million (CHF40 million) during the past 5 years (Farge, 2012a, b).

In December, Vitol Group announced that it had entered into a joint venture with the Carlyle Group of the United States to establish Varo Energy B.V., a new energy midstream group with hydrocarbon refining and transportation operations across Europe including Switzerland. The new enlarged Varo Energy Group owned refining, storage, and wholesale distribution assets in Belgium, Germany, and Switzerland, with a combined refining capacity of 160,000 bbl/d, sales of 10 million cubic meters per year, and 1.7 million cubic meters of storage capacity. Varo Energy's assets included the Cressier refinery in Switzerland, which had a capacity of 68,000 bbl/d; storage facilities in Antwerp, Belgium, and in Germany; and a 45% share in the Bayernoil refinery in Bavaria, Germany (Prodhan and Bousso, 2013; Vitol Group, 2013).

Outlook

Precious metals refining and mineral trading are likely to remain as the two main mineral sector activities in Switzerland. The production and exporting of refined gold and silver are projected to continue to increase at a high rate owing to increased demand from Asian countries for such metals. Switzerland-based mineral trading is expected to continue to make an important contribution to the country's GDP. Increased regulation of Switzerland's precious metal refiners and commodity traders by both domestic and international authorities, however, may decrease their output and trading activity, respectively. New regulations on gold imports considered by the Swiss Financial Market Supervisory Authority (FINMA) and the London Bullion Market Association (LBMA) in order to address concerns about conflict minerals may reduce precious metal supply available for refining. Transparency in trading rules to be submitted by the Swiss Federal Council in 2014 may reduce mineral trading activity conducted in the country (Brülhart, 2013; Swiss National Bank, 2013; Hoffman, 2014).

Switzerland's mineral extraction sector is expected to remain a small component of the economy in the near future. Current gold, silver, and uranium exploration projects by NV Gold

and Aurania Resources are expected to identify economically feasible mineral deposits. Actual extraction and production of precious metals, however, hinges on whether local concerns about environmental degradation and increased migration related to mining employment opportunities are addressed adequately by mineral companies (Squires, 2012; Aurania Resources, 2013b; NV Gold Corp., 2014). The compositions of energy generation and energy consumption in Switzerland are both likely to change significantly in the long term. In accordance with the Energy Strategy 2050, hydropower generation and mineral fuel consumption are expected to increase as nuclear power is gradually phased out (Orelli, 2014).

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TABLE 1
SWITZERLAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Thousand metric tons unless otherwise specified)

Commodity[3]		2009	2010	2011	2012	2013
METALS						
Aluminum, secondary		30	25	25	50 r	50
Gold, refined	metric tons	2,190	2,330	2,670	2,260	3,080
Iron and steel, metal:						
Crude steel		984 4	1,330 4	1,350	1,400	1,400
Semimanufactures		600	700	700	700	700
Lead, refined, secondary	metric tons	5,000	5,000	3,000	2,500	2,500
Silver, refined	do.	2,060	1,660	2,060	2,290	2,900
INDUSTRIAL MINERALS						
Cement, hydraulic[4]		4,422 r	4,667 r	4,750	4,467 r	4,707
Gypsum		320 r	340 r	350 4	320 4	340
Lime		85 r	85 r	85 r	85 r	85
Salt[4]		615 r	679 r	501 r	528 r	652
Sulfur, from petroleum refining	metric tons	3,000	3,000	3,000	NA r	NA
MINERAL FUELS AND RELATED MATERIALS						
Petroleum, refinery products:[4]						
Liquefied petroleum gas	thousand 42-gallon barrels	204 r	170 r	184 r	119 r	193
Gasoline	do.	1,427 r	1,319 r	1,263 r	1,028 r	1,388
Naphtha	do.	--	--	20	20	20
Kerosene	do.	96	64	81	38	38
Distillate fuel oil	do.	2,381 r	2,269 r	2,209 r	1,703 r	2,593
Residual fuel oil	do.	383 r	377 r	344 r	275 r	365
Other	do.	325 r	314 r	306 r	241 r	318
Total	do.	4,816 r	4,513 r	4,407 r	3,424 r	4,915

rRevised. do. Ditto. NA Not available. -- Zero.
[1]Estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]Table includes data available through October 31, 2014.
[3]In addition to the commodities listed, a variety of crude construction materials (common clay, sand and gravel, and stone) were thought to be produced, but output was not reported, and available information is inadequate to make reliable estimates of output.
[4]Reported figure.

TABLE 2
SWITZERLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Novelis Switzerland S.A. (Hindalco Industries Ltd., 100%)	Plant at Sierre	130
Cement		Holcim (Schweiz) AG (Holcim Group, 100%)	Plants at Brunnen, Eclepens, Siggenthal, and Untervaz	4,300
Copper, alloy	metric tons	Schmelzmetall AG	Refinery at Gurtnellen	2,400
Gold, refined	kilograms	Argor-Heraeus S.A. (Heraeus Holding GmbH, Commerzbank International S.A., and Münze Österreich)	Refinery at Mendrisio	400,000
Do.	do.	Cendres+Métaux S.A.	Refinery at Biel-Bienne	NA
Do.	do.	Metalor Technologies S.A. (Astorg Partners S.A.)	Refinery at Neuchatel	650,000
Do.	do.	Produits Artistiques Métaux Précieux S.A. [MKS (Switzerland) S.A., 100%]	Refinery at Castel San Pietro	450,000
Do.	do.	PX Precinox S.A.	Refinery at La Chaux-de-Fonds	NA
Do.	do.	Valcambi S.A. (Newmont Mineral Holding B.V., 60.6%, and private equity, 39.4%)	Refinery at Balerna	2,000,000
Lead, secondary		Metallum Group	Smelter at Pratteln	3
Petroleum, refinery	barrels per day	Tamoil (Suisse) S.A. (Colony Capital LLC, 65%, and Government of Libya, 35%)	Refinery at Collombey	78,000
Do.	do.	Varo Energy B.V. (Carlyle International Energy Partners, 50%, and Vitol Group, 50%)	Refinery at Cressier	68,000
Platinum-group metals	kilograms	Produits Artistiques Métaux Précieux S.A. [MKS (Switzerland) S.A., 100%]	Refinery at Castel San Pietro	30,000
Salt		Salines Suisse (25 Cantons, except Vaud, 100%)	Saline plants at Riburg and Schweizerhalle	500
Do.		Saline de Bex S.A. (Canton of Vaud, 100%)	Saline Mine and plant at Bex	50
Steel		Stahl Gerlafingen AG (Beltrame Group, 100%)	Plant at Gerlafingen	720
Do.		Swiss Steel AG (Schmolz and Bickenbach AG, 100%)	Plant at Emmenbrucke	300

Do., do. Ditto. NA Not available.