The Mineral Industry of Hawaii

This chapter has been prepared under a cooperative agreement for collecting mineral data between the Bureau of Mines, U.S. Department of the Interior, and the Hawaii Department of Land and Natural Resources.

By Roy Y. Ashizawa

MINERAL output of Hawaii declined 1 percent in value to $14.8 million, despite a half-million-dollar gain in the value of cement shipments. Producers of portland cement on Oahu Island increased their shipments to 1.13 million barrels and captured practically all of the cement market in the State. Total consumption of cement by the construction industry in Hawaii was down 110,000 barrels from the 1.24 million barrels of local and mainland cement consumed in 1961. The combined value of stream and beach sand, stream gravel, and quarried stone produced for road base and concrete aggregate was $8.0 million, compared with $8.4 million in 1961. The use of volcanic cinder for construction and maintenance of plantation roads, particularly on Hawaii Island, also was less than in 1961.

Sugar mills and pineapple canneries increased demands for lime produced at plants on Oahu and Maui Islands. The yield of solar evaporated salt from sea water and demand for black coral gem material were appreciably higher. A substantial quantity of raw clay was mined by the new and only manufacturer of clay products.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>1961</th>
<th>1962</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Value (thousands)</td>
</tr>
<tr>
<td>Cement</td>
<td>1,076,800</td>
<td>$5,574</td>
</tr>
<tr>
<td>Gem stones</td>
<td>(2)</td>
<td>18</td>
</tr>
<tr>
<td>Lime</td>
<td>14,306</td>
<td>354</td>
</tr>
<tr>
<td>Pumice (volcanic cinder)</td>
<td>323,978</td>
<td>620</td>
</tr>
<tr>
<td>Salt</td>
<td>37</td>
<td>4</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>415,727</td>
<td>758</td>
</tr>
<tr>
<td>Stone</td>
<td>4,429,484</td>
<td>7,666</td>
</tr>
<tr>
<td>Values of items that cannot be disclosed: Clays (1962) and values indicated by footnote 8...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14,990</td>
<td>14,844</td>
</tr>
</tbody>
</table>

1 Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2 Weight not recorded.
3 Figure withheld to avoid disclosing individual company confidential data.
4 Revised figure.

Employment and Injuries.—Preliminary figures compiled by the Bureau of Mines under provisions of Public Law 87–300 (Sept. 26, 1961; 75 Stat. 640) showed that an average of 564 employees, excluding office workers, worked 946,000 man-hours in 1962, compared to the final figures of 711 employees who worked 1,287,000 man-hours in 1961. The losses in employment and man-hours were mainly at stone quarries. No fatal accidents occurred in the mineral industry, but 51 nonfatal lost-time injuries were reported, compared to 2 fatal and 46 nonfatal accidents in 1961.

Trends and Developments.—The construction boom which reached an unprecedented high in 1960 and slid somewhat in 1961, tapered off toward a slightly lower and more realistic level in 1962. This trend, predicted by leading economists in Hawaii, was reflected in the market for portland cement, structural concrete aggregate, and masonry lime, particularly on Oahu where more than 90 percent of the authorized construction in the State was located. The increase in building activity on the neighboring islands was not enough to offset the general decline.

Periodic dredging of deepwater harbors and clearing of offshore reefs continued to create surplus mineral materials in excess of quantities used in the immediate vicinity as fill for port facilities. These mountains of surplus coral limestone, sometimes amounting to more than a half-million cubic yards at a single location, were causing problems to Government disposal agents and consternation to commercial operators of coral limestone quarries with surplus stockpiles of fill material. Producers who were depending more heavily on State and Federal contracts were concerned over the rigid Government specifications which excluded from certain projects the use of crushed coral limestone, pukapuka bluestone (holey basalt), and coral stone sand, normally used for base course and as concrete aggregate for non-Government paving and building.

An exploratory drilling project, undertaken in mid-1961 by Hawaii Thermal Power Co. and Magma Power Co., to locate an underground source of live steam in the Puna rift, Hawaii Island, was discontinued. By this joint venture, the companies had hoped to find natural steam at sufficient pressure for use in generating low-cost electrical energy. Unfortunately, the project was not successful, apparently because of the porous nature of the underlying lava.

Bourlin Industries, Honolulu, announced plans for constructing a plant at Barbers Point, Oahu, to extract magnesia from sea water and produce magnesium carbonate to be used in creating marble-like textures in building tile and panels made with cement and sugarcane bagasse. Other intended products of the proposed magnesia plant included magnesium hydroxide, magnesium sulfate, magnesium chloride, magnesium oxide, and magnesium metal.

Legislation and Government Programs.—A comprehensive public land law, Act 32, was passed in the 1962 session of the State Legislature. Several provisions in Act 32 affected minerals and mining. Section 10 provided for classification of all public lands, including the following: "5. Quarry use. Lands having sufficient quantity and quality of rock, gravel and sand for purpose of commercial use." and "6. Mining use. Lands bearing sufficient quantity and quality of mineral products for purpose of commercial mining and use." Section 36 provided
that in all leases of public lands, mineral and metal rights shall be reserved to the State. Section 55 provided that the right to any mineral shall not be included in any lease, agreement, or sale, because such right was reserved to the State.

The results of metallurgical research on Hawaiian bauxite were published in a Bureau of Mines report which revealed that the American Bayer type digestion of the crude ore samples from Kauai, Maui, and Hawaii recovered 78.8, 73.1, and 70.0 percent of the total alumina, respectively. These recoveries were increased to 82.8, 85.5, and 79.5 percent, respectively, by modifying the treatment, consisting essentially of calcination and weak caustic desilication to provide a residue, which was then treated with quicklime and digested in a strong caustic solution to extract the alumina.

A Geological Survey report stated that profitable mining of ferruginous bauxite deposits would require a cheap method of upgrading the bauxite or a new or modified method for extracting alumina. Other unfavorable economic factors such as the high values of land, requirements for soil reclamation after mining, and lack of adequate power sources lessened the possibilities for the development of the deposits.

REVIEW BY MINERAL COMMODITIES

NONMETALS

Cement.—The two cement plants on Oahu produced 1,140,000 barrels and shipped 1,128,000 barrels in 1962, eliminating further need for the importation of general-use portland cement from the U.S. mainland. Shipments of cement from the two plants were as follows: To ready-mixed concrete companies, 56 percent; to concrete-product manufacturers, 22 percent; to building material dealers, 18 percent; to government agencies and miscellaneous customers, 4 percent. Nearly 902,000 barrels was in bulk, and over 226,000 barrels was in paper bags. Both plants used extensive dust collection systems to comply with air pollution regulations. Closed circuit television monitored each critical step in the complex production of high-quality federally approved cement. The combined plant requirements of electrical energy, supplied by Hawaiian Electric Co., Ltd., amounted to nearly 29.5 million kilowatt-hours. Hawaiian Cement Corp. added a new gypsum storage silo and a clinker belt-conveyor to its cement plant at Barbers Point. Permanente Cement Co., Waianae, completed expansion of its cement distribution facility at Pier 32, Honolulu, and construction of its cement distribution plants on the islands of Kauai, Maui, and Hawaii.

Clays.—Clay mining was reactivated on Oahu by the new and only manufacturer of brick, tile, flower pots, and vitrified sewer and drain pipe. The newly named Hawaii Clay Products, Inc., which was established in 1961 as Alii Enterprises, Inc., obtained raw clay near Waimanalo and Kaneohe for use in its clay-products plant at Barbers

Point. Raw clay output in 1962 was greater than the combined annual production rate of the two earlier clay-product manufacturers. The new company also conducted exploratory work at potential clay deposits in the Aiea and Waipio Gulch areas on Oahu, and announced plans for installing a $200,000 automated tunnel kiln, 212 feet long, to supplement its round downdraft kiln, and modern grinding, screening, pugging, and extrusion machinery.

Gem Stones.—Scuba divers continued to work deposits of black coral gem material in the deep channel waters off western Maui. This extremely hazardous exposure of the divers to the bends claimed the life of a Maui Island scuba diver in October 1961. During 1962, new locations of black coral trees were discovered in the waters off Makena, Maui Island, and off the northeastern Cape Kuikui section of Kahoolawe Island. Maui Divers of Hawaii, Ltd., at Lahaina, Maui, cut and polished the precious gem material at its lapidary, and used silver wire and mounts to fashion various jewelry items. None of Hawaii's olivine gem stone was collected in commercial quantities in 1962.

Lime.—The quantity of hydrated lime sold or used by producers on Oahu and Maui rose to 15,243 tons. The average value of the open-market and captive lime, f.o.b. plant, excluding cost of containers, advanced from $24.77 per ton in 1961 to $25.30 per ton. Substantial gains occurred in lime shipments to sugar mills for clarifying cane juice and to pineapple canneries for adjusting the acidity of pineapple juice. Increased sales of mason's lime to the consumers of neighboring islands offset declines in the masonry market on Oahu. Less lime was sold for use in food and food byproducts and for agricultural purposes, primarily for soil neutralization and conditioning.

Pumice (Volcanic Cinder).—The total output of trachyte, volcanic cinder, and volcanic ash, declined from 324,000 tons in 1961 to 232,000 tons. Seventy-seven percent of the output was used to construct and maintain secondary and tertiary roads and 23 percent was used for lightweight concrete aggregate, roofing granules, agricultural soil, and cushion under concrete slabs and drain pipes. Deposits on Hawaii Island yielded only 186,000 tons compared with 249,000 tons in 1961, and this was largely the result of the reduced use of cinder for plantation roads. Barge shipments to Oahu of trachyte from Hawaii Island and of cinder from Molokai were appreciably greater, because the demand continued for lightweight concrete aggregate and prestressed and precast concrete products, particularly for use in building high-rise structures.

Salt.—Commercial output of solar evaporated salt was limited to the yield from a 7.7-acre facility at Sand Island near Honolulu. The recovery of salt from sea water at this operation was appreciably greater than in 1961. The solar salt plant established in 1961 at Barbers Point, Oahu, was abandoned early in 1962 because the City and County of Honolulu refused to approve an application for zoning the saltpond area.

Sand and Gravel.—Increased quantities of basaltic gravel, cobbles, and boulders produced from stream and beach deposits for construction or repair of roads and embankments advanced the total sand and gravel output to 700,000 tons. The yield of coral beach and dune sands as well as basaltic beach and stream sand also increased. Sand
production from northern Oahu dropped sharply. Although substantially increased quantities of natural sand were barged from Molokai to Oahu, the total apparent consumption of coral concrete sand was proportionately lower on Oahu and higher on Kauai and Maui. Crusher run basalt and trachyte fines were used on Hawaii Island as a sand substitute, because coral sand was lacking. Much basaltic streambed gravel was produced on Maui for commercial use in ready-mixed concrete.

Stone.—Production of stone at commercial and Government-and-contractor operations declined from 4.4 million tons in 1961 to 4.1 million tons. This decrease was caused by the decline in commercial building construction; the termination of stone production at the site of an Oahu freeway project in 1961; and the substitution of basaltic beach and stream gravel for stone in the construction of roads and retaining walls. Although the quantity of basalt produced at commercial quarries on Hawaii, Kauai, Maui, Molokai, and Oahu gained nearly 100,000 tons in 1962, the total basalt output declined to 2.5 million tons. Total consumption of limestone quarried or dredged on Hawaii, Kauai, and Oahu decreased to 884,000 tons despite increased Government use of surplus dredged coral limestone for fill projects. The output at quarries, which supplied limestone aggregate for the manufacture of concrete building blocks, also decreased. Cement plants on Oahu consumed 256,000 tons of quarried limestone, in addition to 79,000 tons of basalt and trachyte (for their silica content) and imported silica sand and gypsum. Output of miscellaneous stone, including Hawaiian aa, fieldstone, and decomposed rock, was less than in 1961. Demand for moss rock and lava slabs as decorative interior and exterior building stone was much greater.

With the exception of dredged coral, all of the stone used in Hawaii was obtained by open-pit or surface strip mining methods. Basalt was drilled and blasted at single and multiple benching quarries; the relatively soft coral limestone was quarried with diesel shovels or bulldozers with ripper teeth; and miscellaneous stone was obtained with diesel shovels or front-end loaders. Moss rock, One-Man-Stone, and lava slabs were gathered by hand methods.

Vermiculite.—Vermiculite of Hawaii, Inc., operated an exfoliation furnace on Oahu to expand vermiculite for use as lightweight aggregate, acoustic, and roof insulation. The company obtained its raw material from the Zonolite Co. mine near Libby, Montana, the Nation's largest source of crude vermiculite.

MINERAL FUELS

Marking completion of phase two of its refinery building program, which included construction of a fluid catalytic cracking plant, Standard Oil Co. of California dedicated the first major oil refinery in Hawaii on January 11. Built at Barbers Point on Oahu at a total investment of $65 million, the refinery had a rated crude capacity of 35,000 barrels per day. Its products included three grades of automobile gasoline, four of aviation gasoline, two of jet fuel, two of light diesel fuel, four of asphalt, and four of heavy fuel oil, and liquefied petroleum gas and chemicals. Sulfur was removed from the refinery
gases to reduce pipeline corrosion and atmospheric pollution to make the gas more acceptable as a fuel and to provide a sulfur byproduct. The byproduct sulfur, stockpiled at the nearby acid plant, was utilized to make sulfuric acid for refinery use and for sale to local consumers.

REVIEW BY ISLANDS

Hawaii.—James W. Glover, Ltd., quarried and crushed substantially larger quantities of basalt and aa rock at its Hilo quarry, at the 299th Hawaii National Guard pit, and at a deposit near Kalopa. The material was used in the increased building and paving projects on the island, including the redevelopment of Hilo, the extension to pier 1 at Hilo Harbor, the extensions to runways at Lyman and Kona airfields, and the construction of roads near Kumukahi, Kapoho, and the South Point missile tracking station.

The 299th Hawaii National Guard pit and other aa, decomposed rock, and volcanic cinder deposits on the island were also worked by major contractors, including Kuwaye Bros., Inc., and Yamada & Sons, Inc. Under a joint-venture State highway contract, Kuwaye supplied aggregate material for improving the winding road between Honokaa and Mud Lane, located midway between Honokaa and Kamuela. Yamada quarried much of the Hilo Sugar Co., Ltd., requirements of road construction material from the 299th Hawaii National Guard pit and the Akolea quarry and also supplied road aggregate to the Hakalau Sugar Co., Ltd., and the Onomea Sugar Co. Plantation crews worked the Hilo Sugar Co. Halai Hill quarry, Hawaiian Agricultural Co., Ltd., at Pahala; Honokaa Sugar Co. at Haina; Kohala Sugar Co. at Hawi; and Pepeekeo Sugar Co., also were among the many plantation operators who utilized volcanic aggregate from company pits for continued maintenance of their sugarcane haulage roads.

<table>
<thead>
<tr>
<th>County</th>
<th>1961</th>
<th>1962</th>
<th>Minerals produced in 1962 in order of value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>82,054,724</td>
<td>12,774,610</td>
<td>Stone, sand and gravel, pumice (volcanic cinder), cement, stone, lime, sand and gravel, pumice (volcanic cinder), salt, stone, pumice (volcanic cinder), sand and gravel, sand and gravel, stone, lime, pumice (volcanic cinder), gem stones.</td>
</tr>
<tr>
<td>Honolulu</td>
<td>12,165,816</td>
<td>11,771,417</td>
<td></td>
</tr>
<tr>
<td>Kauai</td>
<td>208,032</td>
<td>284,065</td>
<td></td>
</tr>
<tr>
<td>Maui</td>
<td>561,106</td>
<td>1,012,380</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14,990,000</td>
<td>14,944,000</td>
<td></td>
</tr>
</tbody>
</table>

1 Revised figure.

The Kapoho and Pahoa areas were sources of lava slabs about 4 inches thick, obtained by several producers for decorative building stone. A volcanic ash and cinder pit near Kapoho supplied cinder for various subdivision road jobs and ash which was screened for use at the Keaau Orchard, the largest single source of macadamia nuts in the world. A small quantity of volcanic cinder and basaltic rock was produced from deposits near Kamuela for use in rockwalls, cesspools, for cattle ranch roads, and for building purposes. State highway forces worked the Kohala Mountains pit and a pit near Keaumoku along
the Saddle Road for aggregate material used to stabilize road shoulders. County crews produced nearly 27,000 tons of cinder at various locations for road construction and maintenance.

Volcanite, Ltd., mined trachyte at the Puuwaawaa quarry about 18 miles southwest of Kamuela, near State Highway 19. Gyratory and roll crushers were utilized to process the material from the large and unique deposit of unconsolidated trachyte; which was used locally as lightweight concrete aggregate and was barged to Oahu via Kawaihae Harbor for use in lightweight building blocks and concrete high-rise structures. Much of the excess dredged coral limestone at Kawaihae Harbor was crushed and used for the soil conditioning of agricultural lands. J. M. Tanaka Contractors, Inc., quarried basalt and aa rock from deposits southeast of Kailua-Kona for use in asphaltic and portland cement concrete. Hawaii National Park crews and contractors produced road material from cinder and lava deposits in the volcano area.

Kauai.—Grove Farm Co., Ltd., Kauai’s sole commercial producer of basalt rock near Pahi and of limestone near Koloa, added a new sand roll to its processing equipment to obtain a wider range of basaltic concrete aggregate required for the accelerated building activity on the island. The company made stockpile withdrawals of crushed limestone and also worked its Koloa cinder deposit for surfacing its well maintained heavy-duty haulage roads. Some of the crushed limestone was screened to 1/8-inch mesh for agricultural use.

Lihue Plantation Co., Ltd., which had made extensive use of the coral dredged from the Kapaa reef since 1959, supplemented its requirements for road construction material with volcanic rock quarried in the Kapaia Valley. Virtually all of this material was used for improvements at the company-developed fee-simple residential subdivision near Hanamaulu. The McBryde Sugar Co., Ltd., Kapekula cinder hill near Kalaheo was a source of greater quantities of aggregate material use in concrete and for road base and surfacing. An increased volume of coral sand and basaltic sand and gravel used in concrete and for patching secondary roads was obtained from accessible beach and stream deposits extending from Haena to Kealia to Bonham.

Lanai.—Dole Corporation supplied crushed rock to Government crews and contractors for construction and maintenance of public works facilities on the company-owned island. The crushed rock was from the company’s stockpile of aggregates purchased from commercial producers on Oahu and transported in pineapple bins on the return trips of the barges to Lanai.

Maui.—Kahului Railroad Co. quarried increased quantities of basalt at its fixed-plant operation near Puumene and operated its portable crusher near Lahaina to process field stones for use as road fill and concrete aggregate. The company produced its own requirements of railroad ballast and supplied a substantial part of the concrete aggregate used in the construction of new buildings on Maui, including the new resort facility at Kaanapali.

Maui Concrete & Aggregates, Inc. (formerly Maui Aggregates, Inc. and Nix Readil-Mix Co., Ltd.), processed a large volume of streambed gravels near Waikapu for use at its ready-mixed concrete and concrete products plant near Naska. During the latter part of
1962, the company moved its portable crusher to Kula to supply base-course material for the $2 million Lower Kula Road project.

The Hawaiian Commercial & Sugar Co., Ltd., lime plant, which was ½ mile west of Lower Paia, utilized a 5- by 110-foot rotary kiln and a continuous hydrator to produce hydrated lime for sugar mills, pineapple canneries, agricultural liming, and masonry mortar. Coral sand from the nearby beach was used as raw material to produce the lime. Company crews operated a power shovel to obtain volcanic cinder from the Puuhele pit and processed the material for construction of a company-developed subdivision.

Maui Pineapple Co., Ltd., a newly merged corporation of the former Baldwin Packers, Ltd., and Maui Pineapple Co., Ltd., worked the Honokohau Ash Pit with a bulldozer to produce material for the construction and maintenance of company roads. County crews operated the pit during the last half of 1962. Public works crews also obtained cinder for roads from various other deposits, including the Puu Pane, Ulupalakua, and Launiupuko pits, and from stockpiles maintained at the Puunene Naval Air Base cinder area. Hawaii National Park crews at the Haleakala Crater produced a small tonnage of cinder near Red Hill for road surfacing. The Kaa beach and Wailuku dunes were sources of coral sand used in concrete and for general road repairs.

Black coral was collected in the deep waters between Maui, Lanai, and Kahoolawe Islands. Maui Divers of Hawaii, Ltd., Lahaina, used the gem material to create Hawaiian jewelry and decorative objects for the expanding market.

**Molokai.—**Molokai Aggregates, Inc., made improvements in its basalt crushing and conveying systems at Manawaimui Gulch, near Kau-nakakai, to keep pace with the increased demand on the island for concrete aggregate. Requirements of crushed basalt and stone sand for the maintenance of primary roads on Molokai were also supplied by the company. The Puuluahine and Kapaakea cinder pits, administered by the Department of Hawaiian Home Lands, were principal local sources of volcanic cinder used for construction of secondary and tertiary roads and for building projects, including the new Molokai General Hospital.

Honolulu Construction & Draying Co., Ltd. (HC&D), produced coral sand at Papohaku Beach and lightweight volcanic cinder at Waieli and shipped increased quantities of both of the materials through Lono Harbor to Oahu Island for use in concrete, as roofing granules, and for sandblasting. The contract for barging the sand and cinder 42 miles from Molokai to Oahu required a minimum guarantee of 150 trips per year at $900 per trip. An unprecedented storm in December virtually destroyed the company’s sand loading tunnel at Papohaku Beach.

**Oahu.—**The combined value of the portland cement shipped from the Hawaiian Cement Corp. dry-process plant at Barbers Point and from the Permanente Cement Co. wet-process plant at Waianae amounted to $6 million of the total value of Honolulu County mineral output. Nearly 2.3 million tons of basalt and 849,000 tons of coral limestone were sold or used on Oahu. The output of both of these basic construction materials was less than in 1961.
Pacific Cement and Aggregates, Inc. (PCA), which operated a 3-million-barrel-capacity cement plant and 13 sand and gravel pits and stone quarries in northern California, was the principal commercial producer of stone on Oahu and in the State. PCA quarried basalt at the Halawa quarry near Aiea and limestone near Lualualei. Pacific Concrete & Rock Co., Ltd., produced limestone at the Kailua quarry and basalt rock near Ewa at the Palailai quarry where a fine reduction plant was added to the processing equipment. HC&D quarried and processed basalt at its Kapaa quarry near Kailua for concrete and road aggregate, as roofing granules, and for stone sand used at shipyards for sandblasting. HC&D also was the principal supplier of coral concrete sand and lightweight red volcanic cinder, which were barged to Oahu from the company's $1.5 million sand and cinder facility on Molokai. A mixture of two-thirds No. 2 crushed limestone from the Kailua quarry and one-third No. 2 crushed basalt from the Kapaa quarry was used by Nordic Construction Co., Ltd., for the exposed aggregate in the tilt-up walls of the first Safeway supermarket in Honolulu.

Nanakuli Paving & Rock Co., Ltd., made stockpile withdrawals of limestone at the Testa quarry near Nanakuli and operated the nearby Valley quarry crusher and batch plant using purchased basalt. Hawaiian Bitumuls & Paving Co., Ltd., formerly Hawaiian Rock & Supply Co., Ltd., worked a 30-foot face at the Kaena basalt quarry near Camp Erdman, mainly for aggregate in asphaltic concrete. Oahu Aggregates, Inc., produced limestone aggregate and stone sand at Barbers Point, mostly for sale to manufacturers of hollow block. Hawaiian Cement Corp. at Barbers Point obtained its raw material requirements of limestone from a nearby company quarry. The Maile quarry near Waianae supplied Permanente Cement Co. with raw limestone for its cement plant, where the minus 3/4-by 0-inch crusher discharge was belt-conveyed to a sand processing facility.

An appreciable quantity of select basaltic borrow and untreated basaltic base material was used for a freeway project in Honolulu. The primary and secondary crushers, used by Morrison-Knudsen Co., Inc., to produce a large amount of basalt aggregate in 1961, were dismantled and shipped out of the Hawaiian Islands.

Field boulders from the Kamilonui Valley and black cinder from Makiki Round Top were processed for use in making concrete building products for the Kaiser Hawaii-Kai Marina sub-division. Substantial quantities of the cinder from Makiki Round Top also were sold for use as cushion material under drain pipes and concrete slabs, fill for horsepens, decorative fill, and soil for exotic plants.

The Kahuku Plantation Co. Malaeakahana quarry near Kahuku was one of the few limestone deposits where drilling and blasting was required to break the material. Maintenance crews crushed the stone for use on the plantation haulage roads. Ewa Plantation Co. crews quarried an increased volume of coral limestone from a 15-foot pit, mainly for construction of new roads to facilitate maneuvering a portable overhead irrigation pumping unit. Joe's Moss Rock Co. worked approximately 18 acres of the Waianae area to meet increased demand for their hand-gathered decorative building stone. An Army engineer battalion at Schofield Barracks worked the multiple-benched
basalt quarry and crushing plant at the nearby Kolekole Pass. Government crews at other installations used quarried and dredged coral limestone to construct and rehabilitate roads and runways.

GasprO, Ltd., produced hydrated lime at its 50-ton-per-day plant near Waianae for use at sugar mills and pineapple canneries and for masonry mortar and agricultural liming of fields. Equipment at the plant included a 6- by 90-foot rotary kiln and a 4- by 15-foot hydrator. Limestone was supplied by a nearby commercial quarry operator. Hawaii Clay Products, Inc., obtained raw clay from State lands near Waimanalo and from the Kaneohe Ranch land near Kaneohe to manufacture clay products at Barbers Point. Tamotsu Tanaka recovered salt from sea water by solar evaporation at Sand Island near Honolulu. Smith Chemical Products, Inc., which had leased a 9.25-acre site at Barbers Point in October 1960, constructed a pilot salt plant and made test runs in 1961, abandoned the operation in 1962. A request to zone the salt bed area was denied by the City Planning Commission. Crude vermiculite from Montana was expanded by Vermiculite of Hawaii, Inc., Honolulu, to supply island builders with special lightweight aggregates.