

The Mineral Industry of Florida

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The value of mineral production in Florida totaled over \$1 billion in 1974, more than \$400 million or 74% above that of 1973. This increase was directly attributable to the 134% increase in value of petroleum production and a 114% increase in phosphate rock production value. Peat, lime, natural gasoline, magnesium compounds, and zircon concentrates showed significant increases in production over 1973 levels.

For the 81st consecutive year, Florida led the nation in phosphate rock output. Florida also ranked first in the production of fuller's earth, zircon, and monazite; second in ilmenite, third in peat and Florida was the only producer of rutile and staurolite.

Florida and North Carolina supplied 81% of the domestic phosphate rock market and was the second leading exporter to world markets. Florida exports were through the Ports of Tampa, Boca Grande, and Jacksonville.

During the year the phosphate industry added 68,000 kw of new load to Tampa Electric Co.'s system, and it is planned that an additional 120,000 kw of demand will be required over the next 5 years to meet increased production by the phosphate industry.³

Uranium Recovery Corp. announced construction of a \$4 to \$5 million uranium recovery plant to go onstream in late 1975. The operation reportedly will be located in Polk County in close proximity to existing phosphate mining and fertilizer operations. The system includes uranium recovery equipment at several wet-acid plants to strip the uranium from the phos-

phoric acid. Uranium Recovery has signed contracts to recover uranium from International Minerals & Chemicals Corp. and W. R. Grace & Co.

Gulf Oil Corp., one of the Nation's largest uranium producers, announced it is arranging joint ventures with phosphate mining companies in Polk and Hillsborough Counties to extract uranium from phosphates. Gulf has demonstrated its process in a \$500,000 pilot operation at Agrico Chemical Co.'s operation at Pierce. It is expected that the first 300,000-pounds-per-year extracting plant will go onstream in 1975.

Westinghouse Corp. also actively explored the possibility of extracting uranium from phosphoric acid process streams. The company has been working with Gardinier Inc. on a uranium extraction pilot plant, which has demonstrated the basic feasibility of its process, according to Westinghouse.

Ashland Oil Co. announced that it was considering building an oil refinery, an offshore port, and a sizable town in St. Lucie County on Florida's east coast. The company was considering a medium-size refinery with a capacity to process 250,000 barrels a day. The refinery would be supported by an offshore port facility where medium and small tankers could pipe crude oil, via a submarine line, to the onshore refinery.

The Belcher Oil Co. of Miami proposed to construct an oil refinery at Port Mana-

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³ Tampa Electric Co., 1974 Annual Report, 1974, p. 7.

tee that would be connected to a deep-water tanker terminal offshore in the Gulf by two 48-inch submarine pipelines. The terminal, first of its kind off U.S. coastal waters, is slated to be located 24 miles west from Anna Maria Island. The refinery would have a capacity to process 200,000 barrels a day initially with the capability of expanding to 400,000 barrels.

Tampa Electric Co. purchased the remaining 50% of the Cal-Glo Coal. Co. of Harlan, Ky. The Kentucky mine has a present annual output of 275,000 tons. It is estimated that production can be increased to 750,000 tons annually. The coal contains about 1.3% sulfur and reserves are estimated at 26 million tons, or enough to last 30 years at an annual production rate of 750,000 tons.

Oil exploration began on the Outer Continental Shelf (OCS) leases in the eastern Gulf of Mexico off Florida's coast. Exxon Corp., Shell Oil Co., Sunoco Oil Co., and Texaco Oil Co. drilled exploratory wells on their OCS leases. No oil or gas were found in commercial quantities.

Exxon Corp. began operating a sulfur recovery unit at its Black Jack Creek field in Santa Rosa County.

The Jay Oil field, composed of 85 producing wells on 13,000 acres, was unitized to extend the life of the field. Without unitization it was estimated the field would last through 1977, and with unitization the field should produce at least until 1995. Exxon Corp. was named as the operator.

The Blackjack Creek Oil field was unitized in December 1974. The unitization was completed before any wells were producing. This action authorized pressure maintenance procedures in the reservoir to be instituted immediately and it is calculated that the total oil produced will be doubled.

Legislation and Government Programs.—

The U.S. Congress passed Public Law 93-440. This Act established the Big Cypress National Preserve in the State of Florida. Under the Act the Secretary of the Interior shall develop rules and regulations as he deems necessary and appropriate to limit or control the use of Federal lands and waters with respect to: Exploration for and extraction of oil, gas, and other minerals; and such other uses the Secretary determines must be limited.

Public hearings were held on phosphate leasing in the Osceola National Forest. The

Secretary of the Interior has taken the testimony under advisement and requested additional studies covering the economic impact of mining in the Osceola National Forest.

The Governor and Cabinet, sitting as the Administrative Commission on January 15, 1974, created the Office of Petroleum Allocation and Energy Conservation for the express purpose of dealing with hardship cases of fuel shortages caused by the Organization of Petroleum Exporting Countries (OPEC) oil embargo. The two functions of the office were allocation to administer the State-set aside, and conservation and planning to develop appropriate plans relating to energy conservation, provision of fuel to meet emergencies, and to develop emergency distribution and availability plans.

The Florida Energy Committee responsible for: (1) Studying in detail the present policies affecting energy conservation and use in Florida; (2) studying the available sources of energy for use in Florida; (3) recommending a comprehensive system of energy policies to meet the needs of Florida; and (4) recommending any other administrative, statutory, or constitutional changes which the Committee deems necessary to improve energy policies, published its first report entitled Energy in Florida.⁴

The Governor of Florida signed into law a bill entitled, the Florida Resource Recovery Management Act. The Act provides for State and local resource recovery and management programs; establishes a resource recovery and management grant fund and advisory council; provides for a State pilot project; and where economically feasible, may require municipalities to operate a resource recovery program. The Act will be administered by the Florida Department of Pollution Control.

Florida's tough oil spill law was modified by the 1974 legislature. The previous law placed unlimited liability on the owner of a vessel that had a spill, it was contended that it made it difficult for some municipalities to obtain bids for oil. The law has been altered in the following manner:

A \$14 million liability or \$100 per gross ton, whichever is less, has been established for shippers to pay for the

⁴ Florida Energy Committee. Energy In Florida, A Report and Recommendations on Energy and Energy Policy In Florida To the Governor and the Florida Legislation. Mar. 1, 1974, 191 pp.

cost of an oil spill or other pollutants in Florida waters. The liability for terminals is \$8 million. A \$35 million trust fund is being created to pay for damages to private and personal property. This fund will be financed by a 2-cent per gallon tax on oil shipped to Florida ports.

The phosphate slimes dewatering cooperative program between the Federal Bureau of Mines and the Florida Phosphate Council, representing 10 phosphate rock mining companies, was continued for a second year at a total funding level of about \$600,000. During the year characterization, electrophoretic mobility, cation exchange capacities, quantitative mineral composition, flocculation, and other studies were carried out under the project.

The Bureau of Mines Tuscaloosa (Ala.) Metallurgy Research Laboratory also worked on upgrading waste gypsum from phosphate rock processing; and beneficiation of the phosphate-bearing Hawthorne Formation limestone to determine if recovery of the phosphorite in the Formation is feasible. Under the cooperative clay testing and utilization program waste clays from a Florida sand operation were benefi-

ciated, tested, and found to be a high-quality ball clay, suitable for ceramics applications.

The Bureau's Albany (Oreg.) Metallurgy Research Center, continued to work on direct acidulation of Florida phosphate matrix to improve P_2O_5 recovery and to eliminate slimes. Results on a number of Bureau of Mines programs relating to Florida were published.⁵

The Florida Bureau of Geology, Department of Natural Resources continued studies of mineral resources throughout the State and published the second in its Environmental Geology Studies.⁶

Hillsborough County passed a mine control ordinance modeled after the State's oil spill law. Manatee, Hardee, DeSoto, and Bradford Counties also passed mine control ordinances.

⁵ Edgerton, C. D. Effects of Urbanization Upon the Availability of Construction Minerals in South-eastern Florida. BuMines IC 8664, 1974, 20 pp.

Wang, K.-L., B. W. Klein, and A. F. Powell. Economic Significance of the Florida Phosphate Industry. BuMines IC 8653, 1974, 51 pp.

⁶ Wright, A. P. Environmental Geology and Hydrology, Tampa Area, Florida. Bureau of Geology, Florida Department of Natural Resources, 1974, 94 pp.

Table 1.—Mineral production in Florida¹

Mineral	1973		1974	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Masonry ----- thousand short tons --	256	\$8,706	235	\$4,737
Portland ----- do -----	2,725	72,666	2,562	75,133
Clays ----- do -----	1,139	13,718	² 808	² 14,261
Lime ----- do -----	187	4,026	185	5,315
Natural gas ----- million cubic feet --	33,857	11,613	38,137	20,441
Peat ----- thousand short tons --	44	384	67	616
Petroleum (crude) ----- thousand 42-gallon barrels --	32,695	150,070	36,351	351,331
Titanium concentrates (rutile) ----- short tons --	9,045	1,212	6,446	996
Sand and gravel ----- thousand short tons --	20,167	21,415	24,372	33,400
Stone ³ ----- do -----	61,735	103,595	54,560	100,378
Value of items that cannot be disclosed:				
Clays, (kaolin) (1974), kynite, magnesium compounds, natural gas liquids, phosphate rock, rare-earth metals, staurolite, stone (dimension), titanium concentrates, and zircon concentrate -----	XX	^r 213,695	XX	437,287
Total -----	XX	601,100	XX	1,043,895
Total 1967 constant dollars -----	XX	440,666	XX	^p 499,191

^p Preliminary. ^r Revised. XX Not applicable.

¹ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

² Excludes kaolin; included with "Value of items that cannot be disclosed."

³ Excludes dimension stone and shell; included with "Value of items that cannot be disclosed."

Table 2.—Value of mineral production in Florida, by county^{1,2}
(Thousands)

County	1973	1974 ³	Minerals produced in 1974 in order of value
Alachua	\$1,971	\$3,245	Stone.
Bay	W	W	Sand and gravel.
Bradford	W	W	Natural gas.
Brevard	392	W	Stone, sand and gravel.
Broward	20,846	22,553	Do.
Calhoun	W	W	Sand and gravel.
Charlotte	W	—	—
Citrus	W	1,828	Stone, phosphate rock.
Clay	W	W	Ilmenite, zircon, rutile, staurolite, sand and gravel, clays, monazite.
Collier	8,762	6,008	Stone.
Dade	88,830	87,767	Cement, stone, sand and gravel.
DeSoto	—	W	Sand and gravel.
Escambia	30,735	W	Sand and gravel, clays.
Franklin	W	W	Sand and gravel.
Gadsden	W	12,794	Clays, sand and gravel.
Gilchrist	W	W	Sand and gravel.
Glades	W	W	Magnesium compounds, lime.
Gulf	W	W	Phosphate rock.
Hamilton	W	W	Sand and gravel.
Henry	18,978	W	Sand and gravel.
Hernando	W	23,186	Stone, lime, clays, phosphate rock.
Highlands	—	W	Peat.
Hillsborough	W	W	Cement, sand and gravel, stone, peat.
Jackson	W	W	Stone, sand and gravel.
Lake	2,160	3,869	Sand and gravel.
Lee	3,879	W	Stone.
Leon	W	W	Sand and gravel.
Levy	W	247	Stone.
Manatee	59	W	Cement, stone.
Marion	4,306	5,133	Stone, clays, sand and gravel, phosphate rock.
Martin	—	W	Sand and gravel.
Monroe	1,336	1,296	Stone.
Okaloosa	W	W	Sand and gravel.
Okeechobee	—	W	Stone.
Orange	W	W	Sand and gravel, peat.
Palm Beach	326	W	Stone.
Pasco	420	611	Do.
Pinellas	W	W	Stone, sand and gravel.
Polk	175,605	355,028	Phosphate rock, sand and gravel, peat, stone.
Putnam	W	2,749	Sand and gravel, clays, peat.
St. Lucie	W	383	Sand and gravel.
Santa Rosa	110,404	—	—
Sarasota	—	W	Sand and gravel.
Sumter	W	7,904	Stone, lime, peat.
Suwannee	W	W	Stone.
Taylor	W	W	Do.
Walton	W	W	Sand and gravel.
Washington	W	W	Do.
Undistributed ⁴	188,092	509,298	—
Total⁵	601,100	1,043,895	

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

¹ The following counties are not listed because no production was reported: Baker, Columbia, Dixie, Duval, Flagler, Hardee, Holmes, Indian River, Jefferson, Lafayette, Liberty, Madison, Nassau, Osceola, St. Johns, Seminole, Union, Volusia, and Wakulla.

² Values of petroleum are based on an average price per barrel for the State.

³ County data for 1974 petroleum and natural gas are not available.

⁴ Includes values of counties indicated by W and petroleum and natural gas values for 1974.

⁵ Values may not add to totals shown because of independent rounding.

Table 3.—Indicators of Florida business activity

	1973	1974 ^P	Change, percent
Employment and labor force, annual average:			
Total nonagricultural employment ----- thousands --	2,756.5	2,887.5	+2.9
Manufacturing ----- do -----	878.8	878.7	--
Mining ----- do -----	9.3	10.3	+10.8
Contract construction ----- do -----	277.3	265.1	-4.4
Other nonagricultural employment ¹ ----- do -----	2,096.1	2,188.4	+4.4
Personal income:			
Total ----- millions -----	\$37,799	\$42,852	+12.0
Per capita ----- do -----	\$4,880	\$5,235	+7.8
Construction activity:			
Housing units authorized ----- do -----	266,982	116,645	-56.8
Value of nonresidential construction ----- millions -----	\$1,446.1	1,135.7	-18.0
Highway construction contract awards ----- do -----	\$366.3	\$315.0	-14.0
Farm marketing receipts ----- do -----	\$1,921	NA	NA
Mineral production value ----- do -----	\$601.1	\$1,048.9	+73.7

^P Preliminary. NA Not available.

¹ Includes transportation and public utilities; wholesale and retail trade; finance, insurance, and real estate; service; and government.

Sources: Survey of Current Business; Employment and Earnings; Farm Income Situation; Construction Review; Area Trends in Employment and Unemployment; Roads and Streets; Highlights of U.S. Export and Import Trade; and Federal Bureau of Mines.

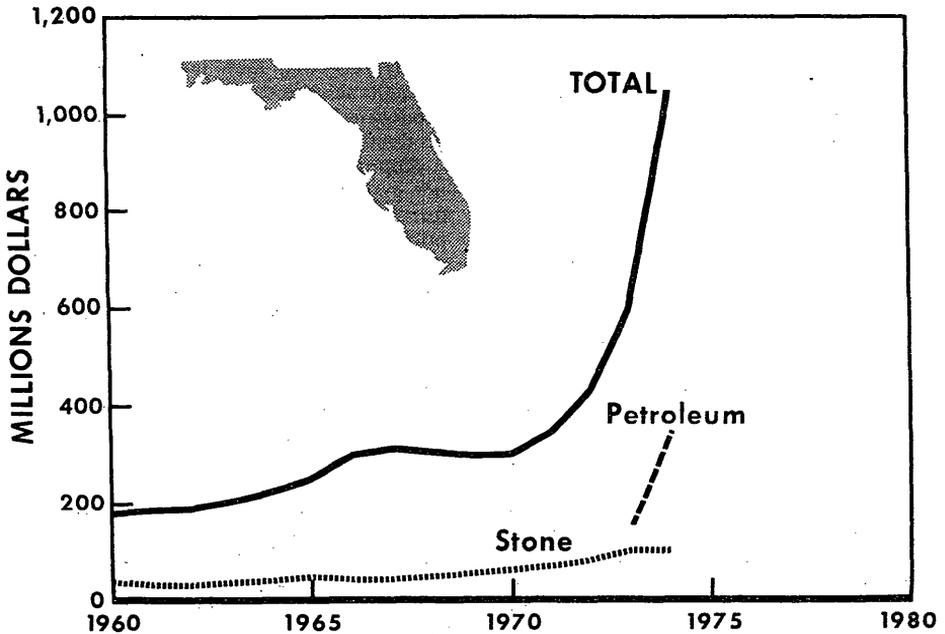


Figure 1.—Value of phosphate rock, stone, and total value of mineral production in Florida.

REVIEW BY MINERAL COMMODITIES

NONMETALS

Nonmetals accounted for 61%, fuels 37%, and metals 2% of the State's total mineral production value in 1974. The principal nonmetals produced, listed in order of value, were phosphate rock, stone, cement, sand and gravel, and clays.

Cement.—Shipments of masonry cement decreased both in quantity and value. Shipments of portland cement decreased 6% in quantity but increased 3% in value, reflecting the slowdown in Florida building construction and continued high prices paralleling that of the Nation.

Types I and II (general-use and moderate heat), Type III (high-early-strength), white cement, and pozzolan cements were produced. Most of the shipments were made within the State. Masonry cement shipments were principally within the State.

Portland cement shipments, mainly in bulk form, were made by truck (95%) and by rail (5%). Principal consumers were ready mix concrete companies, concrete products manufacturers, and building materials dealers.

Raw materials used in manufacture of cement were mined principally within the State and included limestone, clay, sand, and staurolite. Oolitic aragonite imported from the Bahamas was used exclusively by one company. Small amounts of blast furnace slag and gypsum were used, but it was obtained from out-of-State sources. Twelve rotary kilns were operated at the four plants. All plants used the wet process. Over 300 million kilowatt-hours of electrical energy were consumed in the manufacture of cement; 100% of the power was purchased.

Florida Mining and Materials Corp. of Tampa announced that they will construct a 3-million-barrel-per-year cement plant near Brooksville, Fla. The \$35 million project will be located adjacent to their 4,000 area holdings, and adjacent to the quarry. The mill is expected to go onstream late in 1975.

Clays.—Total clay output decreased 29%, while the value increased 4%.

Florida's fuller's earth production ranked second highest in the Nation. Fuller's earth output remained the same but its value increased 14%. Three producers were active in Gadsden County and one produced in Marion County. Fuller's earth was used for fillers, absorbents, pesticides, drilling mud, filter aids, and other uses.

Kaolin output decreased 2% and the value increased 13% from that of 1973. Kaolin was produced by one company in Putnam County; principal uses were in whiteware, pottery, and wall tile.

Miscellaneous clay output decreased 47% and the value decreased 41% from that of 1973. The decreases were in the clays used for cement and lightweight aggregate. The clays were used in the manufacture of cement, lightweight aggregate, and building brick. Mines were operated in Clay, Escambia, and Hernando Counties in 1974.

Fluorine.—Fluorine in the form of fluo-

silic acid was recovered from six plants as a byproduct of wet-process phosphoric acid manufacture. The fluosilicic acid was used to produce cryolite, aluminum fluoride, sodium silica fluoride, and for water fluoridation. The value of fluorine byproducts is not included in the State mineral production statistics.

Gypsum.—Imported crude gypsum was calcined by three companies for use in the manufacture of gypsum building products. U.S. Gypsum Co. and Kaiser Cement & Gypsum Corp. operated plants near Jacksonville, Duval County; and National Gypsum Co. operated a plant near Tampa, Hillsborough County. The three plants used calcining kettles, one rotary kiln, and one holoflite in processing gypsum and manufacturing of gypsum products, total capacity of the plants was about 1 million tons of calcined products. Crude ore for most operations was transported by ship from company-owned deposits in Nova Scotia, Canada, and Jamaica. A total of 547,000 short tons of calcined gypsum was produced, a decrease of 15% from 1973 production.

Approximately 100,000 tons of byproduct gypsum was sold by several phosphate fertilizer manufacturers for agricultural purposes.

Lime.—Basic Magnesia, Inc. in Gulf County, Chemical Lime, Inc. in Hernando County, and Dixie Lime & Stone Co. in Sumter County produced 185,000 tons of lime for magnesia, water treatment, sewage disposal, and other uses. Output was 1% below the 1973 record. The lime was used in Florida. Consumption of lime in Florida was 382,500 tons.

Magnesia.—Basic Magnesia, Inc. produced caustic-calcined magnesia, refractory grade magnesia, and magnesia hydroxides from seawater. Production was less than plant design of 60,000 tons per year. Shipments decreased 3% but value increased 64% compared with that of 1973.

Perlite.—Four companies produced expanded perlite from ore mined in Colorado and New Mexico. Production increased to 24,066 short tons in 1974 from 23,378 short tons in 1973. The 24,038 short tons sold or used was an increase of 6% over that of 1973. The value of the quantity sold or used was \$1,403,000, an increase of 9% over the 1973 value. Production from plants in Dade, Duval, Escambia, and Indian River Counties was used in plaster

aggregate, concrete aggregate, formed products, horticultural aggregate, and miscellaneous filter aids and fillers.

Phosphate Rock.—Marketable production of phosphate rock increased 6% in quantity and 114% in value reflecting a widening gap between supply and demand.

Florida's 1974 production data is combined with that of North Carolina to conceal the latter's output, because there is only one producing company in North Carolina. Combined marketable production from both States in 1974 was 36,980 million short tons, valued at \$409 million and represented 81% of the total national output. Marketable production sold or used totaled 39,920 million tons valued at \$437,158 million, an 8% increase over the 36,916 tons in 1973. Agricultural uses accounted for 26 million tons or 66%, industrial uses and exports accounted for the remainder. Exports from the two States were valued at \$183 million. Agricultural uses were for ordinary superphosphate, triple superphosphate, wet-process phosphoric acid, direct application to the soil, stock and poultry feed, and fertilizer filler. Industrial uses included the manufacture of elemental phosphorus.

Mine production of crude dry ore in Florida and North Carolina was 142 million tons with a P_2O_5 content of 18 million tons.

Land-pebble phosphate was produced at 16 mines by 10 companies in 2 counties. One company processed tailings from an abandoned mine.

Soft-rock phosphate was produced by four companies operating five mines in two counties. Total mine production was 38,813 tons with a P_2O_5 content of 7,700 tons, valued at \$571,000. The soft rock was used for direct application to the soil, in stock and poultry feed, and as fertilizer filler.

Marketable phosphate rock was produced from Florida land-pebble phosphate mines by Agrico Chemical Co., Borden, Inc.; Brewster Phosphates; Gardinier, Inc.; W. R. Grace & Co.; International Minerals & Chemical Corp.; Mobil Oil Corp.; Poseidon Mines, Inc.; Occidental Petroleum Corp.; U.S.S. Agri-Chemicals, Inc.; and Swift Chemical Co.

Agrico Chemical Co. began development of its new Ft. Green mine in Polk County. Construction of a washer and flotation

plant began. Design capacity of the operation is 3.5 million tons per year.

Construction of an \$18 million wet-phosphate rock shipping terminal at Big Bend, Hillsborough County began. The terminal will handle about 2 million tons of wet rock annually to be shipped by barge for domestic conversion to upgraded fertilizer products.

Beker Industries Corp., exercised its option to acquire about 9,000 acres of phosphate reserves from PPG Industries, Inc. It also acquired several other tracts for a total holding of 11,000 acres in Manatee County, 6,000 of which are to be mined. Most of the regional and State approvals were received and mine development was scheduled for late 1975, contingent upon approval of a Manatee County mining permit and a water-use permit.

Brewster Phosphates was granted a mining permit from Hillsborough County to operate a phosphate mine on its 18,000 acres in the Ft. Lonesome area of Hillsborough County. Of the 18,000 acres, only 9,800 contain marketable reserves. Brewster plans to produce about 3 million tons of marketable phosphate for 18 years at its Lonesome mine. Mine development was expected in early 1975, with the operations going onstream in 1976.

CF Industries' new 800-ton-a-day P_2O_5 wet-process phosphoric acid plant at Plant City went onstream during the year.

W. R. Grace & Co. expressed its intentions to submit a Development of Regional Impact Report on mining plans for its 12,000-acre tract in the Ft. Lonesome area lying in parts of Polk, Hillsborough, and Manatee Counties.⁷ Construction at its 2.5-million-ton-per-year Hooker Prairie mine continued.

International Minerals & Chemical Corp. was granted a mining permit by the Hillsborough County Commission to develop its new East Kingsford mine covering 6,000 acres in Hillsborough County.⁸ The Phosphoria mine and washer went onstream during the year.

Mobil Oil Corp. announced its intentions to open a phosphate mine in Hardee County in 1979.⁹

Occidental Petroleum Corp. of the United States, signed six contracts with the

⁷ The Tampa Tribune, Apr. 5, 1974.

⁸ The Tampa Tribune, Apr. 5, 1974.

⁹ The Herald-Advocate-Wauchula, Aug. 29, 1974.

Soviet Union worth \$20 billion in a chemical fertilizer barter. Under the 20-year agreement, Occidental's Florida plants will provide up to 1 million tons a year of superphosphoric acid to the Soviets. It will get in return, Soviet ammonia and urea.¹⁰

Occidental announced a two-phase expansion at its White Springs operations. Phase I included the addition of a 45-cubic-yard dragline at its Suwannee River mine and a 150% expansion at its existing chemical facilities. Development of a second mine in Hamilton County reportedly began with approximately a 3-million-ton-per-year capacity; reportedly it will utilize 3 additional 45-cubic-yard draglines. The second mine was scheduled to go onstream in January 1976. Phase II encompassed additional facilities required for the U.S.S.R. trade agreement that would include a third mine to be located in northern Columbia County, and a second chemical complex to be located in Hamilton County with an anticipated starting date in 1979.¹¹

Phillips Petroleum started pumping tests on its properties in Manatee and DeSoto Counties. The company owns 15,000 acres in these counties.¹²

Swift Chemical Co. announced that it planned to seek permits to mine phosphate rock on 11,000 acres it owns in Manatee County.¹³

Sand and Gravel.—Sand and gravel output totaled 24 million tons valued at \$33 million in 1974. This increased production was primarily due to increased statistical coverage. Polk County was the leading producer of sand used for building purposes and accounted for 17% of the output and 20% of the value. Nearly all of the sand was produced by commercial operators. There were 67 sand and gravel operations during the year; of these 20 produced between 500,000 and 1,000,000 tons, 27 produced between 100,000 and 500,000 tons, and 20 produced less than 100,000 tons. Ninety-one percent of the commercial output was transported by truck, 8% by rail, and 1% by water. The sand and gravel was mainly used for construction purposes with a small amount going into industrial uses.

Staurolite.—Staurolite was recovered as a byproduct of ilmenite production at the Highland and Trail Ridge plants of E. I. du Pont de Nemours & Co., Inc. in Clay County. Both output and value increased over 1973 levels. It was principally used in sand blasting and minor amounts for cement. Florida is the only State with a recorded production of staurolite.

¹⁰ Business Week. Aug. 13, 1974.

¹¹ Live Oak Independent Post. Sept. 3, 1974.

¹² Bradenton Herald. Nov. 5, 1974.

¹³ Bradenton Herald. Nov. 5, 1974.

Table 4.—Florida: Sand and gravel sold or used by producers, by county
(Thousand short tons and thousand dollars)

County	1973			1974		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
Brevard	1	57	165	1	W	W
Broward	3	1,480	1,455	6	3,461	4,990
Dade	5	2,541	3,389	5	3,414	5,309
Escambia	5	506	688	5	525	1,025
Hendry	1	1,529	1,816	2	W	W
Hillsborough	1	263	W	1	238	W
Lake	4	2,137	2,166	3	3,588	3,869
Polk	3	4,371	5,567	14	4,180	6,659
St. Lucie	—	—	—	1	574	333
Other ¹	23	7,335	6,175	24	3,849	10,667
Total²	51	20,167	21,415	67	24,372	33,400

W Withheld to avoid disclosing individual company confidential data; included with "Other."

¹ Includes Bay, Calhoun, Clay, DeSoto, Franklin, Gadsden, Glades, Jackson, Leon, Marion, Martin, Okaloosa, Orange, Pinellas, Putnam, Sarasota, Walton, and Washington Counties.

² Data may not add to totals shown because of independent rounding.

Table 5.—Florida: Construction and industrial sand and gravel sold or used by producers
(Thousand short tons and thousand dollars)

Use	1978		1974	
	Quantity	Value	Quantity	Value ¹
Construction:				
Processed:				
Sand -----			14,265	18,055
Gravel -----			4,051	7,264
Unprocessed:	19,466	18,578	5,829	3,995
Sand and gravel -----				
Industrial:				
Sand -----	701	2,837	727	3,940
Gravel -----			--	--
Total -----	20,167	21,415	24,372	33,254

¹ Value data may not be directly comparable to that in tables 1, 4, 6, and 7 because unit value of construction aggregate may be higher than the individual unit values for sand or gravel.

Table 6.—Florida: Construction aggregate and industrial sand and gravel sold or used commercially by producers
(Thousand short tons and thousand dollars)

Use	1974	
	Quantity	Value ¹
Construction aggregates:		
Nonresidential and residential construction -----	6,746	9,382
Highway and bridge construction -----	1,075	1,816
Other uses such as dams, waterworks, airports, etc. -----	195	301
Concrete products (cement blocks, bricks, pipe, etc.) -----	3,749	5,141
Bituminous paving (asphalt and tar paving) -----	529	672
Roadbase and subbase -----	755	1,227
Unprocessed aggregate -----	5,103	3,936
Fill -----	1,236	1,101
Other uses -----	727	3,940
Industrial sand and gravel -----	--	--
Total -----	20,115	27,516

¹ Unit value of construction aggregate may be higher than unit value of sand or gravel.

Table 7.—Florida: Construction aggregate sold or used for publicly funded projects by producers
(Thousand short tons and thousand dollars)

Use	1974	
	Quantity	Value ¹
Construction aggregates:		
Nonresidential and residential construction -----	W	W
Highway and bridge construction -----	1,849	2,111
Other uses such as dams, waterworks, airports, etc. -----	1,119	1,594
Concrete products (cement blocks, bricks, pipe, etc.) -----	--	--
Bituminous paving (asphalt and tar paving) -----	W	W
Roadbase and subbase -----	1,289	2,180
Unprocessed aggregate -----	W	W
Fill -----	W	W
Other -----	--	--
Total -----	4,257	5,885

W Withheld to avoid disclosing individual company confidential data; included with "Other uses such as dams, waterworks, airports, etc."

¹ Unit value of construction aggregate may be higher than unit value of sand or gravel.

Stone.—Florida stone (all limestone) is divided into two types—hard-rock and soft-rock. Each type has a different end use and value. Hard-rock is used as concrete, bituminous and macadam aggregates, and ranges in value from \$0.80 to over \$4.00 per ton. Soft-rock limestone is used as dense-graded roadbase material, surface treatment aggregate, and in the manufacture of lime; it ranges in value from \$0.64 to over \$2.50 per ton.

Hard-rock limestone was produced in Broward, Collier, Dade, Hernando, Lee, Monroe, Okeechobee, Palm Beach, and Suwanee Counties. Soft-rock limestone was produced in all of the counties listed in table 8. Soft rock limestone accounted for approximately 63% of the output and 57% of the value of the crushed limestone produced in 1974.

Crushed limestone output was 55 million tons valued at \$100 million, a decrease

of 12% in tonnage and 3% in value from 1973 level. The decreases were directly attributed to the slowdown in the construction and road building industries. Output came from 96 quarries in 19 counties compared with 89 quarries in 18 counties in 1973. The three leading producing counties were Dade, Broward, and Hernando, which supplied 66% of the State's total tonnage and 67% of the value. Eighteen companies operating 37 quarries accounted for 75% of the crushed stone output and 76% of the value. Of the total crushed limestone sold or used, agricultural stone accounted for 3% of the quantity and 5% of the value; concrete aggregate, 27% and 32% respectively; bituminous aggregate, 9% and 10%, respectively; and dense-graded roadbase stone, 35% and 24%, respectively. One company processed oyster shells for roadbase material.

Table 8.—Florida: Crushed limestone and dolomite sold or used by producers, by county
(Thousand short tons and thousand dollars)

County	1973			1974		
	Number of quarries	Quantity	Value	Number of quarries	Quantity	Value
Alachua	4	2,438	1,971	4	3,449	3,245
Brevard	1	196	227	1	173	220
Broward	17	10,271	18,391	18	9,185	17,563
Citrus	5	1,072	1,593	5	953	1,336
Collier	9	2,705	5,473	10	2,628	6,008
Dade	19	23,185	33,478	18	18,361	28,488
Hernando	5	10,399	21,353	8	8,670	20,838
Levy	3	304	W	3	236	247
Marion	6	1,543	3,032	7	1,255	3,119
Monroe	1	625	1,336	1	550	1,296
Okeechobee	—	—	—	1	66	W
Palm Beach	3	313	326	4	W	W
Pasco	1	300	420	2	352	611
Polk	1	127	145	1	112	141
Sumter	4	5,274	W	4	4,163	5,865
Undistributed ¹	10	2,983	14,351	9	4,409	11,401
Total²	89	61,735	103,595	96	54,560	100,378

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

¹ Includes Jackson, Lee, Manatee, Suwanee, and Taylor Counties.

² Data may not add to totals shown because of independent rounding.

Table 9.—Florida: Crushed limestone and dolomite sold or used by producers, by use
(Thousand short tons and thousand dollars)

Use	1973		1974	
	Quantity	Value	Quantity	Value
Bituminous aggregate -----	2,671	4,424	4,980	10,341
Concrete aggregate -----	20,067	40,176	14,918	32,309
Dense graded roadbase stone -----	22,930	34,139	19,114	24,590
Macadam aggregate -----	1,446	2,612	260	458
Surface treatment aggregate -----	828	1,392	5,407	13,699
Unspecified construction aggregate and roadstone -----	5,399	4,877	2,089	3,479
Agricultural purposes ¹ -----	1,425	4,326	1,478	5,154
Cement manufacture -----	1,775	2,271	1,840	2,412
Fill -----	1,020	1,476	1,802	2,756
Manufactured fine aggregate (stone sand) -----	2,210	3,297	1,779	3,130
Railroad ballast -----	295	566	W	W
Riprap and jetty stone -----	W	W	218	547
Other uses ² -----	1,669	4,039	725	1,504
Total³ -----	61,734	103,537	54,560	100,378

W Withheld to avoid disclosing individual company confidential data; included with "Other uses."

¹ Data include agricultural limestone, other soil conditioners, and stone used in poultry grit and mineral food.

² Data include stone used in other fillers and lime manufacture. 1973 data also include stone used in drain fields and uses not specified.

³ Data may not add to totals shown because of independent rounding.

Sulfur.—Recovered sulfur from petroleum production in Escambia and Santa Rosa Counties increased from 224,416 long tons in 1973 to 249,929 long tons in 1974. Sulfur sales increased from 225,407 long tons in 1973 to 248,627 long tons in 1974.

Vermiculite.—Exfoliated vermiculite was produced by two operators from four plants in Broward, Duval, and Hillsborough Counties from crude material shipped into the State. The vermiculite was used for lightweight aggregate, plaster aggregate, insulation, and other uses.

METALS

Metals accounted for only 2% of the State's total mineral production value.

Ferroalloys.—Two companies produced ferrophosphorus as a byproduct of elemental phosphorus manufacture. The value of ferroalloys is not included in the total State mineral production value.

Rare Earth Minerals.—Titanium Enterprises produced monazite concentrate from its Green Cove Springs plant. The monazite concentrate contains rare earth metals and thorium oxide.

Titanium Concentrates.—Shipments of ilmenite concentrate decreased 13% in tonnage but increased 10% in value from that of 1973, reflecting the worldwide increase in price.

E. I. du Pont de Nemours & Co. and Titanium Enterprises produced ilmenite

concentrate from their plants in Clay County. NL Industries, Inc. moved its dredge from the Folkston, Ga. mine into the Boulogne, Fla. area. The concentrate will be trucked back to its Folkston plant for beneficiation.

Titanium Enterprises produced rutile concentrate from its Green Cove Springs plant. Shipments decreased 29% in tonnage and 18% in value from that of 1973.

Zircon Concentrate.—Production of zircon concentrate at E. I. du Pont de Nemours & Co.'s Trail Ridge plant and Titanium Enterprises Green Cove Spring operations, both in Clay County, increased 16% over that of 1973. The value was 117% higher than that reported in 1973. The zircon sands were used in ferrous foundries, refractory shapes, and ceramics.

MINERAL FUELS

Mineral fuels produced were natural gas, natural gas liquids, crude petroleum, and peat.

Natural Gas.—Total net sales of natural gas in Florida in 1974 was about 31 billion cubic feet. The difference between the total net sales volume and the 38.1 billion cubic feet measured at the wellhead was a 12.3% H₂S, CO₂, and N₂ content, plus plant losses and in plant consumption for combustion purposes. All of the gas sold was from the Jay field, except for a small quantity that was produced from the nearby Mt. Carmel

field. The Florida Gas Transmission Pipeline Co. marketed most of the sales volume for intrastate consumption. The remainder was sold through Five Flags Pipeline Co. to industrial customers in the Pensacola area.

Prior to distribution by the Florida Gas Transmission Pipeline Co., the gas was stripped of natural gas liquids at its processing plant in north-central Florida. The British thermal unit value of the gas was reduced from 1,450 to 1,040 Btu per cubic foot before distribution through the intrastate pipeline.

Peat.—Peat production increased from 43,800 short tons valued at \$384,000 in 1973 to 67,300 short tons valued at \$616,000 in 1974. The 53.6% increase in production was accompanied by a 60.4% increase in value. Nine companies produced moss, reed-sedge, and humus peat. Shipments totaled 67,000 short tons and consisted of 34% moss, 14% reed-sedge, and 52% humus peat. All but a few tons were shipped in bulk and used to pack flowers, plants, and shrubs; for general soil improvement and potting soils; and for earthworm culture.

Petroleum.—Total oil production in Florida was 36.4 million barrels in 1974. The 11% increase was primarily attributed to further development of the Jay field. The Jay field yielded 86.8% of the total crude oil production in the State. The wellhead

value of northwest Florida high-grade crude ranged from \$9.07 per barrel in January 1974 to \$10.22 per barrel in December 1974.¹⁴ The yearly average value was approximately \$9.66 per barrel. Northwest Florida's oil production was primarily derived from the Jurassic Age Smackover Limestone Formation. Additional production from Blackjack Creek field, some 10 miles from Jay, was scheduled for 1975.

Crude petroleum production from south Florida was derived entirely from the Lower Cretaceous Age Sunniland Limestone Formation. The average depth of a development well in the Sunniland trend is about 11,500 feet. There are 72 producing wells in 8 fields in this trend. A new field in Hendry County, discovered in November 1973, was designated Seminole field. In July 1974, Exxon discovered Lehigh Park field 10 miles east of Ft. Myers.

Approximately 4.6 million barrels of crude oil ranging from 25° API to 32° API gravity, representing 12.6% of Florida's total production, was produced from south Florida's fields. Wellhead prices ranged from \$5.66 per barrel in January to over \$5.88 per barrel in December 1974 for old and new oil combined.

¹⁴ Based on 5% Gross Production Tax reported to Florida Dept. of Revenue.

Table 10.—Florida: Oil and gas well drilling completions, by county

County	Proved field wells ¹			Exploratory wells			Total	
	Oil	Gas	Dry	Oil	Gas	Dry	Number of wells	Footage
Alachua	—	—	—	—	—	1	1	3,840
Collier	2	—	—	—	—	4	6	74,852
Escambia	3	—	—	—	—	—	3	47,421
Gulf	—	—	—	—	—	1	1	13,284
Hendry	—	—	1	1	—	2	4	46,844
Holmes	—	—	—	—	—	1	1	11,201
Lafayette	—	—	—	—	—	2	2	6,760
Lee	1	—	1	1	—	3	6	71,285
Leon	—	—	—	—	—	1	1	10,466
Liberty	—	—	—	—	—	2	2	24,631
Ocala	—	—	—	—	—	1	1	15,250
Okeechobee	—	—	—	—	—	2	2	22,051
Pasco	—	—	—	—	—	2	2	13,794
Santa Rosa	1	—	6	—	—	1	8	180,042
Suwannee	—	—	—	—	—	2	2	9,016
Wakulla	—	—	—	—	—	1	1	13,489
Walton	—	—	—	—	—	1	1	14,515
Washington	—	—	—	—	—	1	1	14,044
Total	7	—	8	2	—	28	45	541,685

¹ Development wells as defined by American Petroleum Institute.

Source: American Petroleum Institute.

Table 11.—Principal producers

Commodity and company	Address	Type of activity	County
Cement:			
General Portland Inc -----	4400 Republic National Bank Tower, Box 324 Dallas, Tex. 75221	Plants -----	Dade and Hillsborough.
Lehigh Portland Cement Co. ¹ -	718 Hamilton St. Allentown, Pa. 18105	Plant -----	Dade.
Pennsoco Cement & Aggregates.	P.O. Box 2035 PVS Hialeah, Fla. 33012	--- do -----	Do.
Clays:			
Engelhard Minerals & Chemicals Corp.	Menlo Park Edison, N.J. 08817	Open pit mines -	Gadsden.
Mid-Florida Mining -----	Box 68-F Lowell, Fla. 32663	--- do -----	Marion.
Pennsylvania Glass Sand Corp.	Berkeley Springs, W.Va. 25411	--- do -----	Gadsden.
Gypsum (calcined) :			
Kaiser Cement & Gypsum Corp.	300 Lakeside Dr. Oakland, Calif. 94612	Plant -----	Duval.
National Gypsum Co -----	325 Delaware Ave. Buffalo, N.Y. 14202	--- do -----	Hillsborough.
U.S. Gypsum Co -----	101 S. Wacker Dr. Chicago, Ill. 60606	--- do -----	Duval.
Lime:			
Chemical Lime, Inc -----	Box 250 Ocala, Fla. 32670	--- do -----	Hernando.
Dixie Lime & Stone Co. ¹ -----	Drawer 217 Ocala, Fla. 32670	--- do -----	Sumter.
Magnesium compounds:			
Basic Magnesia, Inc. ² -----	Box 160 Port St. Joe, Fla. 32456	--- do -----	Gulf.
Peat:			
Raymond Johnson -----	Box 555 Zellwood, Fla. 32798	Bog -----	Orange.
Oxford Peat Co -----	Box 154 Oxford, Fla. 32684	Bog -----	Sumter.
Peace River Peat, Inc -----	P.O. Box 1192 Bartow, Fla. 33830	Bog -----	Polk.
F. E. Stearns Peat -----	Rt. 1 Box 347-1 Valrico, Fla. 33594	Bog -----	Hillsborough.
Traxler Peat Co -----	Box 10 Florahome, Fla. 32635	Bog -----	Putnam.
Perlite (expanded) :			
Airlite Processing Corp. of Florida.	Rt. 2 Box 740 Vero Beach, Fla. 32960	Plant -----	Indian River.
Armstrong Cork Co -----	Box 1991 Pensacola, Fla. 32589	--- do -----	Escambia.
Chemrock Corp -----	End of Osage St. Nashville, Tenn. 37208	--- do -----	Duval.
W. R. Grace & Co. ³ -----	62 Whittemore Ave. Cambridge, Mass. 02140	--- do -----	Broward.
Petroleum (crude) :			
Exxon Co., U.S.A -----	Box 2024 Houston, Tex. 77001	Wells -----	Santa Rosa.
Sun Oil Co -----	Box 2880 Dallas, Tex. 75221	--- do -----	Collier and Hendry.
Petroleum (refined) :			
Seminole Asphalt Refining, Inc.	Box 128 St. Marks, Fla. 32355	Refinery -----	Wakulla.
Phosphate rock:			
Agrico Chemical Co -----	Box 3166 Tulsa, Okla. 74101	Open pit mines and plants.	Polk.
Borden, Inc -----	Box 790 Plant City, Fla. 33566	Open pit mine and plant.	Do.
Brewster Phosphates -----	Bradley, Fla. 33835 -----	--- do -----	Do.
Gardiner, Inc -----	Box 3269 Tampa, Fla. 33601	--- do -----	Do.
International Minerals & Chemical Corp.	Box 867 Bartow, Fla. 38830	Open pit mines.	Do.
Mobil Oil Corp. ⁴ -----	Box 311 Nichols, Fla. 33863	--- do -----	Do.
Occidental Petroleum Corp ---	White Springs, Fla. 32096	Open pit mine -	Hamilton.
Swift Chemical Co -----	Box 208 Bartow, Fla. 33830	Open pit mines.	Polk.
U.S.S. Agri-Chemicals, Inc ---	Box 867 Ft. Meade, Fla. 33841	Open pit mine -	Do.

See footnotes at end of table.

Table 11.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Sand and gravel:			
General Development Corp ----	1111 S. Bayshore Dr. Miami, Fla. 33131	Pits -----	Brevard and St. Lucie.
Ortona Sand Co -----	First & East Tillman Lake Wales, Fla. 33853	Dredge -----	Hendry.
Seminole Rock Products, Inc -	8100 N.W. 74th St. Miami, Fla. 33166	---- do -----	Dade.
Standard Sand & Silica Co ---	Box 35 Davenport, Fla. 33837	Pit -----	Polk.
Warren Bros. Co -----	Fairfield, Maine 04937 ---	Pit -----	Sarasota.
Staurolite:			
E. I. duPont de Nemours & Co. ⁵	DuPont Bldg. D-10084 Wilmington, Del. 19898	Plant -----	Clay.
Stone:			
Florida Crushed Stone Co ----	P.O. Box 668 Ocala, Fla. 32670	Quarries -----	Hernando.
Florida Mining and Materials Corp.	Box 59351 Miami, Fla. 33159	Quarry -----	Dade.
Florida Rock Industries, Inc. ⁶ -	Box 4667 Jacksonville, Fla. 32201	Quarries -----	Collier, Her- nando, Lee, Sumter, Suwannee.
Houdaille-Duvall-Wright Co ---	Box 1588 Jacksonville, Fla. 32201	Dredge -----	Duval.
Maule Industries, Inc -----	Box 2601 Hialeah, Fla. 33012	Quarries -----	Broward and Dade.
Sterling Crushed Stone Co ----	Miami, Fla. 33163 -----	---- do -----	Dade.
Titanium concentrates:			
Titanium Enterprises ⁷ -----	Box 1036 Greencove Springs, Fla. 32043	Mine and plant.	Clay.

¹ Also stone.² Also lime.³ Also phosphate rock and exfoliated vermiculite.⁴ Also elemental phosphorus.⁵ Also titanium and zirconium concentrates.⁶ Also sand and gravel.⁷ Also zircon concentrate, and rare-earth oxides and thorium oxide in monazite concentrate.

S 2

Sand and gravel resources of Florida Main
QE99 .A32 no. 90



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