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sible for the mound known as Jefferson Island. Howe and Moresi[7] consider this salt spine secondary in origin and the flowage which produced it late Pleistocene or recent. Cap rock was found in only a few holes drilled over the spine and consisted of 18 to 24 inches of porous, gray limestone. Under the lake, however, the cap rock is thicker, and the logs of a number of wells show it to be 250 to 325 feet thick. The production of sulphur has come from the cap rock beneath the lake.

The first drilling on the lake was done from piers, but later a drilling barge permanently equipped with a complete set of drilling machinery was designed and erected to explore beneath the lake for sulphur. In drilling a well a 12-inch surface casing 40 feet long is first set to shut off the lake water and silt. A 10-inch hole is then sunk to cap rock, and an 8-inch casing is set in the hole and cemented. The hole is then drilled and cored to the bottom of the sulphur-bearing formation. Seventy wells have been drilled successfully.

The power plant, which was built and put into operation in 1932, is on the shore of Lake Peigneur about 1 mile from the producing wells. The pipe lines from the plant to the center of mining operations in the lake are supported on pile trestles. Booster pumps for forcing the water into the wells and collecting sumps for sulphur also are built over the lake. The liquid sulphur from the sumps is pumped through insulated pipe lines to vats on the shore near the railroad terminal.

The power plant is equipped with five 600-hp., Babcock & Wilcox, class H boilers designed to operate continuously at 200-percent rating.[8] Two of the boilers were added to the plant in 1933.

The water supply is obtained from a deep well equipped with an electrical pump, which discharges into a large, fresh-water, 50,000,000-gallon reservoir. The water is treated in two 40,000-gallon per hour, Cochrane, hot-process units using lime and soda ash for treatment.

CALIFORNIA

Production of sulphur in 1933 was reported from two properties in California, namely, the Queen Group near Bigpine in Inyo County and the Leviathan mine near Markleeville in Alpine County. No production in 1933 was reported from the Crater Group in Inyo County.

Leviathan Sulphur Co.—The property of the Leviathan Sulphur Co., which started production in 1933, is 10 miles east of Markleeville in Alpine County and about 3 miles from the Nevada State line. The main mass of the ore body is a volcanic rock containing about 40 percent sulphur. It is understood that substantial reserves have been blocked out by underground workings and diamond drills. Underground workings also have encountered amorphous sulphur and a black variety which is said to contain finely divided pyrite. Mining—mostly development work to date—is by underground methods through adits on the mountain side.

The ore is trammed from the opening to the plant, where it is crushed in a jaw crusher, separated into two sizes by a screen trommel, and conveyed to separate bins. The coarse ore is about 1-inch

[7] Howe, Henry V., and Moresi, Cyril K., Geology of Iberia Parish: State of Louisiana, Dept. of Conservation, Geol. Bull. 1, 1931, p. 149.
[8] O'Donnel, Lawrence, Mining Sulphur under Water in Louisiana: Chem and Met. Eng., vol. 40, no. 9, September 1933, p. 456.

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ring, and the fines are about 10-mesh. The ore is then drawn out into a 4½-ton retort car; the car is nearly filled with coarse ore, which is covered with a layer of fine ore. The car is then put in a steam retort and the charge heated for 1 hour. The melted sulphur passes out through the bottom of the car and into a steam-jacketed receiver; the charge in the receiver is drawn off through a steam-jacketed line to the cooling bin, where it is cooled and broken up for shipment. The recovery is poor, and a better process is being devised. The grade of the product, however, is 99.9 percent and virtually arsenic free.[9]

The shipping point is Minden, Nev., about 27 miles away. A new road was constructed in 1933 from the mine to a point on the main highway 14 miles south of Minden.

UTAH

The Utah Sulphur Industries reported production in Beaver County in 1933; this is the first production since 1929. In 1932 new equipment was installed at the plant to recover sulphur. The sulphur deposit occurs in the crater of an old volcano, and the sulphur is recovered from the ore by flotation. Thoenen[10] has estimated the cost of 85-percent sulphur concentrates at Sulphurdale as $7 to $12.90 per short ton.

OTHER STATES

New Mexico.—During 1933 it was reported that the New Mexico Acid Co. was building a new sulphur plant at Jemez, where extensive exploration revealed the presence of a sulphur deposit. No production was reported for 1933.

Alaska.—Early in 1932 the so-called Akun Island sulphur mine about 9 miles from Akutan post office was reported to have been sold to the Pacific Sulphur Corporation.[11]

WORLD PRODUCTION

World production of sulphur in 1933, including the sulphur recovered in Norway and Spain from the treatment of pyrites in Germany from gas manufacture, amounted to approximately 2,000,000 long tons.

The following table shows production in the principal producing countries during the last 6 years:

Production of sulphur in the principal producing countries, 1928–33, in long tons

Year	United States (sulphur)	Italy		Japan		Chile (sulphur)	Spain (sulphur)
		Sulphur	Ore	Sulphur	Ore		
1928	1,981,873	291,430	31,051	68,956	13,109	15,423	10,199
1929	2,362,389	318,722	21,149	64,430	14,849	16,043	11,715
1930	2,558,981	345,026	19,409	61,375	14,392	18,184	11,557
1931	2,128,930	348,132	19,502	60,528	2,195	5,018	10,867
1932	890,440	344,450	25,119	75,868	(1)	8,459	8,113
1933	1,406,063	[2] 356,000	(1)	102,412	(1)	[2] 16,000	[2] 8,000

[1] Data not available.
[2] Estimate.

[9] Mining and Metallurgy, vol. 14, no. 323, November 1933, p. 471.
[10] Thoenen, J. R., Economics of Potash Recovery from Wyomingite and Alunite: Rept. of Investigations 3190, Bureau of Mines, 1932, p. 9.
[11] Smith, Philip S., Mineral Industry of Alaska in 1932: U.S. Geol. Surv. Bull. 857-A, 1934, p. 76.

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