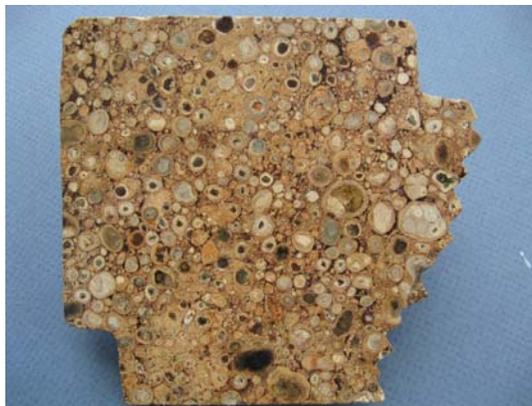


HISTORY OF BAUXITE IN ARKANSAS



DEFINITION

Bauxite "An off-white, grayish, brown, yellow, or reddish-brown rock composed of a mixture of various amorphous or crystalline hydrous aluminum oxides and aluminum hydroxides (principally gibbsite, some boehmite and diaspore), along with free silica, silt, iron hydroxides, and esp. clay minerals;...It is a common residual or transported constituent of clay deposits in tropical and subtropical regions, and occurs in concretionary, compact, earthy, pisolitic, or oolitic forms. Bauxite is the principal commercial source of aluminum;..."

Glossary of Geology
American Geological Institute
1980

USES

1. For producing the metal, aluminum.
 2. In the manufacture of abrasives and refractory materials.
 3. In various processes and products in the chemical industry.
 4. As a fluxing agent in the steel industry.
 5. For the manufacture of high-alumina cements.
-
-



STATE OF ARKANSAS
ARKANSAS GEOLOGICAL SURVEY
BEKKI WHITE, STATE GEOLOGIST
Revised 2007

HISTORY OF BAUXITE

Bauxite was first discovered by a French chemist, P. Berthier, in 1821 while investigating specimens found near Les Baux in southern France. The rock name bauxite was not used until many years later.

The development of the Bayer Process for the extraction of alumina from bauxite and the Hall process for the reduction of the alumina to metallic aluminum occurred during the period 1885 to 1890. As the metal aluminum became better known and its qualities recognized, many plants designed to utilize the Bayer and Hall processes were built.



Pisolitic bauxite that is very loosely cemented.

Bauxite in Arkansas was described in 1842 by Dr. W. Byrd Powell, who noted the peculiar character of this rock in Fourche Cove but did not recognize its true nature. John C. Branner, State Geologist, was the first to identify bauxite when he noted it in a sample brought to him by Ed Wiegel of Little Rock in 1887. The material was being used to surface the road from Sweet Home to Little Rock. Branner's first published report of the occurrence of bauxite appeared in 1891. This was only a few years after the first discovery of bauxite in America at Rome, Georgia, and three years after the Pittsburgh Reduction Company had been organized to commercialize the Hall process of aluminum production.

Active development began in 1895 with the purchase of land and mineral rights on large areas, and in 1896 the first 20 tons of ore were shipped. In 1898 about 633 long tons of bauxite were mined to make aluminum. Pittsburgh Reduction Company, a subsidiary of the Aluminum Company of America,

entered the Arkansas bauxite field in 1899 and produced 1,720 tons of ore that year. In the same year the General Bauxite Company also shipped some ore. During the next three years the production remained low, but in 1903 it rose to more than 25,000 tons. Production increased rapidly and reached nearly 200,000 tons in 1914. World War I resulted in a remarkable increase, and more than 560,000 tons were produced in 1918.



Active mining at Bauxite, Arkansas, February, 2007.

After the war, production dropped and oscillated from year to year. By 1923 the total was back to nearly 500,000 tons. This tonnage represented about one half of the world production for that year. After 1923, increased production of foreign ore, particularly the high-grade ores from northern South America, caused a decline in Arkansas production so that in 1929 it composed only about one-fifth of the world's production. Depressed economic conditions during the early 1930's reduced the output further, and in 1932 it was down to about 90,000 tons. However, in subsequent years production figures began to rise again. The all-time peak was reached during World War II when, in 1943, more than 6,000,000 long tons were produced. Until 1942 the only company mining bauxite in Arkansas primarily for use in the manufacture of aluminum was a subsidiary of the aluminum Company of America [renamed the ALCOA Mining Company in 1945]. Other companies, including the American Cyanamid & Chemical Corp., the Norton Company, General Abrasive Company, Dulin Bauxite Company, and Dixie Bauxite Company were mining bauxite for uses other than aluminum metal.

In 1942, the Federal Government, through Metals Reserve Company, undertook to build a large stockpile of Arkansas bauxite as insurance against the menace of German submarines. Caribbean bauxite and South American

sources were unavailable due to U-boat activity. The first contract was executed January 30 with the Reynolds Mining Corporation, a subsidiary of Reynolds Metals Company. An "open" schedule established by Metals Reserve in March, 1942 brought numerous other mining firms into production in the district. The first stockpile delivery was made May 15, 1942 by Dulin Bauxite Company.



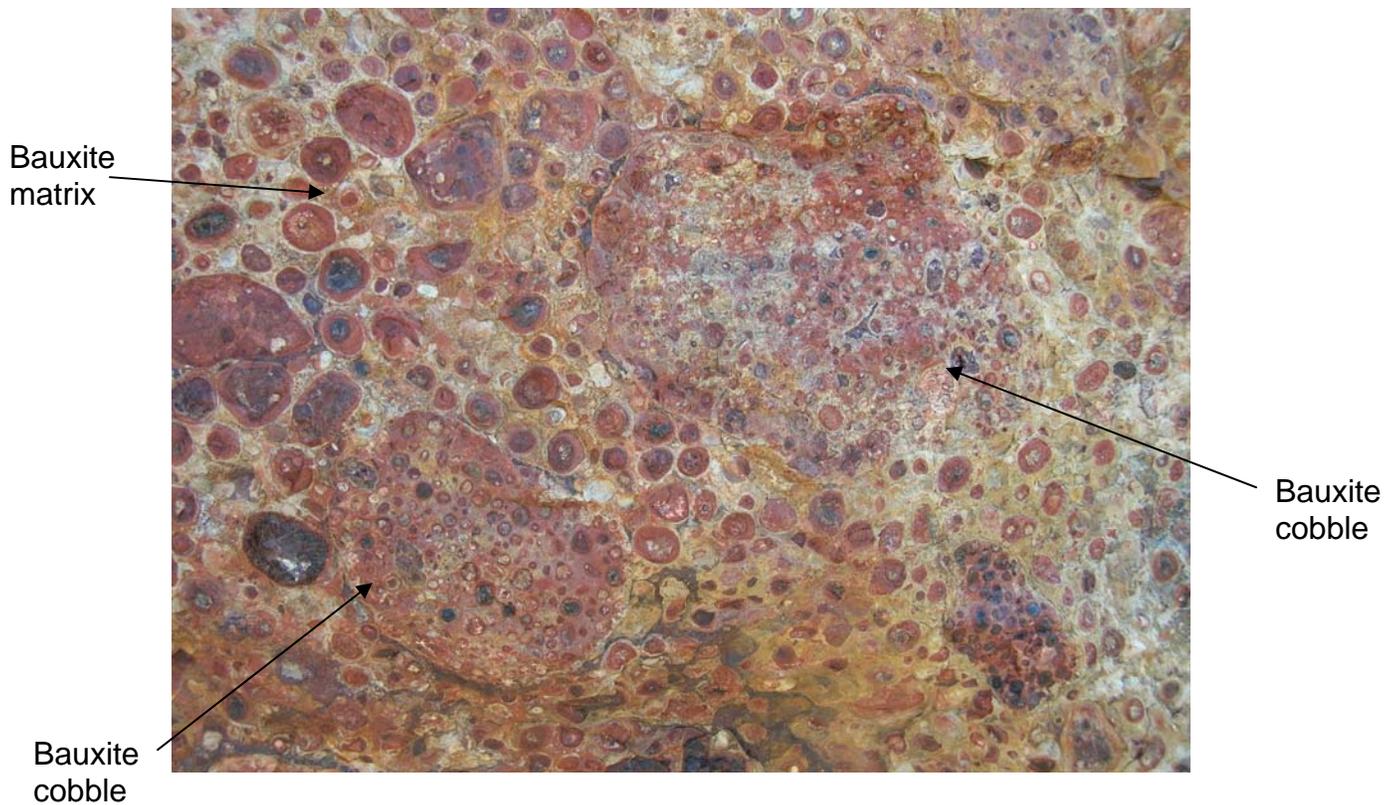
Very large pisolites in white matrix.

Early in October of 1943, the War Production Board, in view of the improved shipping situation, recommended reduction of stockpile deliveries to 250,000 tons monthly, and a month later recommended that arrangements be made to further curtail deliveries so that by July 1, 1944 the stockpile would contain not more than 2,000,000 tons. As a result, the small "independent" producers who had been drawn into the field by the Government program ceased operation. Consequently, by the end of 1945 only ALCOA, Reynolds, and the group of nonmetal producers active prior to 1942 remained as producers. War Production Board orders in the latter part of 1943 likewise drastically curtailed operations of all the larger producers. Since the end of World War II, Two major companies continued major mining operations in the bauxite area until 1991. ALCOA Mining Company and Reynolds Metals Company had refineries located near Bryant, in Saline County. However, early in 1982 the Reynolds Company ceased operation of their mine. Reynolds closed and disassembled their Hurricane Creek Plant near Bryant. ALCOA's chemical facility remains in production. Several other companies have been active in Arkansas bauxite: American Cyanamid Company, Norton Company, Porocel Corporation, Stauffer Chemical Company, and A.P. Green Company. Between the end of the war and 1981, the last year of available production, annual production has averaged nearly 1,700,000 long tons of bauxite.

Since 1996 McGeorge Contracting Co. has been mining bauxite. The ore is trucked to Ft. Smith where it is processed to create proppants, which are high density spherical grains that are used in the oil and gas industry to fracture formations and maximize gas or oil flow.

GEOLOGY OF ARKANSAS BAUXITE

The bauxite deposits in Arkansas are associated with intrusions of nepheline syenite in Pulaski and Saline Counties. They were formed by the lateritic weathering and leaching of silica from the aluminum-rich syenite when it was exposed in the Tertiary. The deposits crop out on the surface but in most places are covered by sands and clays of Tertiary age. Bauxite is essentially a paleosoil. Although some bauxite was mined underground, primarily during and immediately after WW II, most production has been by open cut methods. Two general types of bauxite are recognized: in situ (in place) and transported.



Transported bauxite showing bauxite cobbles within bauxite soil (matrix).

USES OF ARKANSAS BAUXITE

The principal use of Arkansas bauxite was in the manufacture of metallic aluminum. Present uses include the manufacture of artificial abrasive, chemicals, refractories, cements, absorbents, catalysts, and proppants.

Bauxite Production in Arkansas, 1898 – 1981

<u>Year</u>	<u>Long Tons</u>	<u>Year</u>	<u>Long Tons</u>
1898	633	1940	432,283
1899	5045	1941	856,196
1900	3445	1942	2,459,906
1901	867	1943	6,036,490
1902	4645	1944	2,695,317
1903	25,713	1945	910,049
1904	25,748	1946	1,050,347
1905	32,956	1947	1,153,563
1906	50,267	1948	1,395,341
1907	58,942	1949	1,094,924
1908	33,703	1950	1,307,335
1909	101,531	1951	1,815,274
1910	110,406	1952	1,603,833
1911	122,133	1953	1,529,976
1912	117,299	1954	1,949,368
1913	169,871	1955	1,721,243
1914	195,247	1956	1,668,432
1915	268,796	1957	1,356,898
1916	375,910	1958	1,257,916
1917	506,556	1959	1,631,643
1918	562,892	1960	1,932,070
1919	333,490	1961	1,178,898
1920	481,279	1962	1,270,124
1921	124,850	1963	1,478,047
1922	266,790	1964	1,561,984
1923	498,880	1965	1,593,085
1924	327,630	1966	1,781,390
1925	296,320	1967	1,573,000
1926	371,570	1968	1,582,000
1927	303,830	1969	1,755,000
1928	361,236	1970	2,227,037
1929	351,054	1971	2,284,420
1930	315,273	1972	1,960,029
1931	286,620	1973	2,031,932
1932	89,779	1974	2,124,250
1933	142,179	1975	1,895,065
1934	145,764	1976	1,667,000
1935	219,791	1977	1,676,000
1936	354,943	1978	1,446,000
1937	402,195	1979	1,430,000
1938	293,280	1980	1,299,000
1939	361,256	1981*	1,242,000

*Last Year for which production figures are available.



Uses of aluminum

RECYCLING OF ALUMINUM

The production of aluminum metal from bauxite requires huge amounts of energy -- much of it electrical while converting bauxite ore to metal, and when reclaiming mined-out lands. Aluminum metal can be produced much more efficiently (and economically) from salvaged aluminum, scrap because it requires only 5% as much energy to do so. As a consequence, the industry has steadily increased its use of scrap aluminum as a feedstock, and the general public has participated enthusiastically in a nationwide recycling program for practical, — and for economic reasons. It pays to salvage used aluminum products! In 2004, as a recent example, about 3 million tons of aluminum metals were produced from salvaged scrap. This accounted for about 19 percent of the nation's demand for that year. Of this tonnage, about 40 percent was obtained from used beverage cans—approximately 66 billion of them.

RECLAMATION OF MINED LANDS

Areas where bauxite was mined by open-cut methods after 1971 have to be reclaimed under Arkansas state law. Reynolds Metals Company has completed reclamation in their properties and ALCOA is reclaiming most of their former bauxite mines. This task involves moving millions of tons of waste rock material back into the large excavations created during mining. As the pits are being partially backfilled, the surrounding landscape is graded and shaped to provide drainage and eliminate high walls. At the conclusion of the needed earthwork, the top layer of the acid mine spoil is neutralized to create a new layer of soil for plant growth. The lands are then revegetated to prevent erosion. Reclaimed bauxite mines will be suitable for many different potential uses in the future,

including a new community airport, wildlife habitat, recreational areas, and pasture land.



Reclaimed area in Bauxite, Arkansas

Written by William V. Bush
Photos by Angela K. Chandler

For more information contact the Arkansas Geological Survey
at 501-296-1877