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PRINTED: 08-29-2012

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: RILLITO MILL

ALTERNATE NAMES:
CALIFORNIA PORTLAND CEMENT CO.
ARIZONA PORTLAND CEMENT
MARANA PLANT PIT

PIMA COUNTY MILS NUMBER: 29

LOCATION: TOWNSHIP 12 S RANGE 12 E SECTION 6 QUARTER SE
LATITUDE: N 32DEG 24MIN 38SEC LONGITUDE: W 111DEG 09MIN 02SEC
TOPO MAP NAME: MARANA - 7.5 MIN

CURRENT STATUS: PRODUCER-1998

COMMODITY:
MILL CEMENT

BIBLIOGRAPHY:
ADMMR RILLITO MILL FILE
REV. BY MILS 7-79
AZBM BULL 189, P. 103, 1974
HOUSER, BRENDA B., ED.,1992, INDUSTRIAL MINERALS OF THE TUCSON AREA AND SAN PEDRO VALLEY, SOUTHEASTERN ARIZONA, AZ GEOL. SOC. FIELD TRIP APRIL 4-5,1992, TUCSON, PP 3-4, 34-36

02/21/92

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

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ALTERNATE NAMES:
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ARIZONA PORTLAND CEMENT

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CURRENT STATUS: PRODUCER

COMMODITY:
MILL CEMENT

BIBLIOGRAPHY:
ADMMR ARIZONA PORTLAND CEMENT FILE
REV. BY MILS 7-79
AZBM BULL 189, P. 103, 1974
ADMMR PHOTOS A-1-25-

02/21/92

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: TWIN PEAKS QUARRY

ALTERNATE NAMES:
RILLITO QUARRY
ARIZONA PORTLAND CEMENT QUARRY

PIMA COUNTY MILS NUMBER: 28

LOCATION: TOWNSHIP 12 S RANGE 11 E SECTION 26 QUARTER SW
LATITUDE: N 32DEG 21MIN 26SEC LONGITUDE: W 111DEG 11MIN 29SEC
TOPO MAP NAME: AVRA - 7.5 MIN

CURRENT STATUS: PRODUCER

COMMODITY:
CALCIUM LIMESTONE
SILICON SILICEOUS LS
SAND & GRAVEL CRUSHED AGGR

BIBLIOGRAPHY:
ADMMR ARIZONA PORTLAND CEMENT FILE
MSHA METAL-NONMETAL MINE FILE REFERENCE
ELEVATORSKI, E.A., 1978, ARIZ INDUSTRIAL MINERALS, P. 49
AZBM BULL. 189, P. 103, 1974

ARIZONA PORTLAND CEMENT

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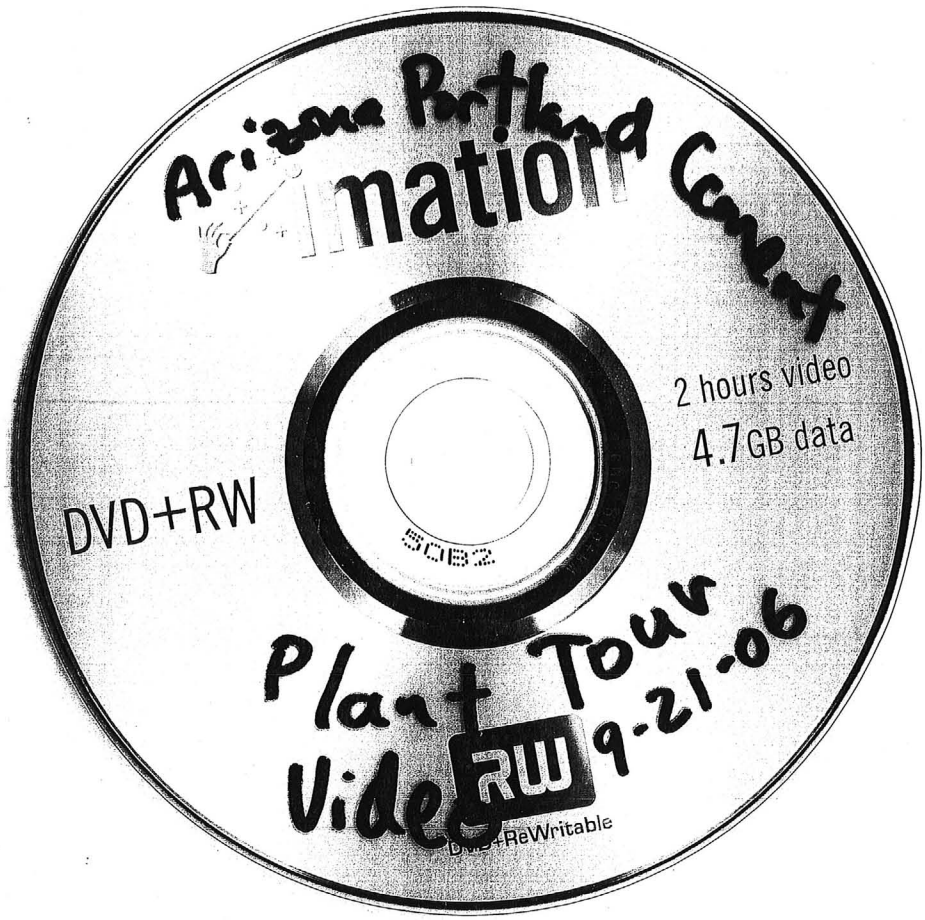
Pit & Quarry May 1973 p. 90

Skillings Mining Review, March 9, 1974, p. 27

Mining Congress Journal, March, 1974, p. 9


Arizona Portland Cement
nation
2 hours video
4.7GB data
DVD+RW
Plant Tour
Video
9-21-06
ReWritable

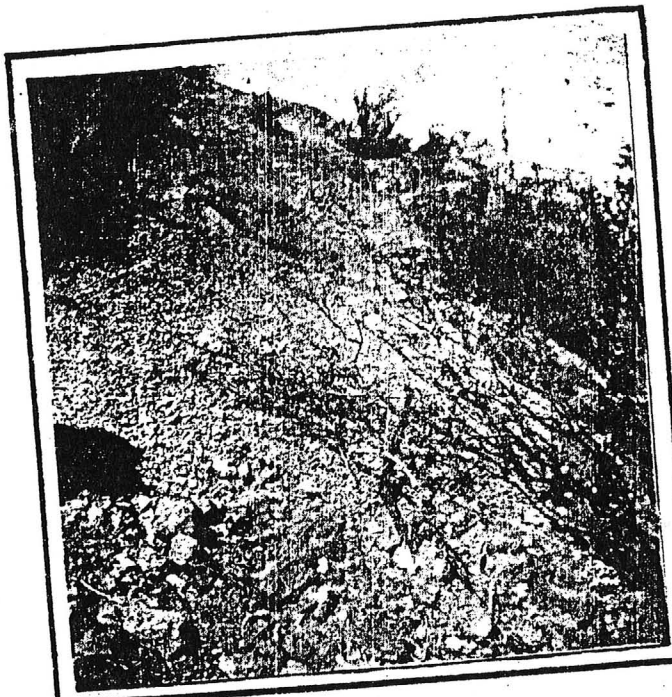
Arizona
Portland
Cement

Quarry Site - Lime

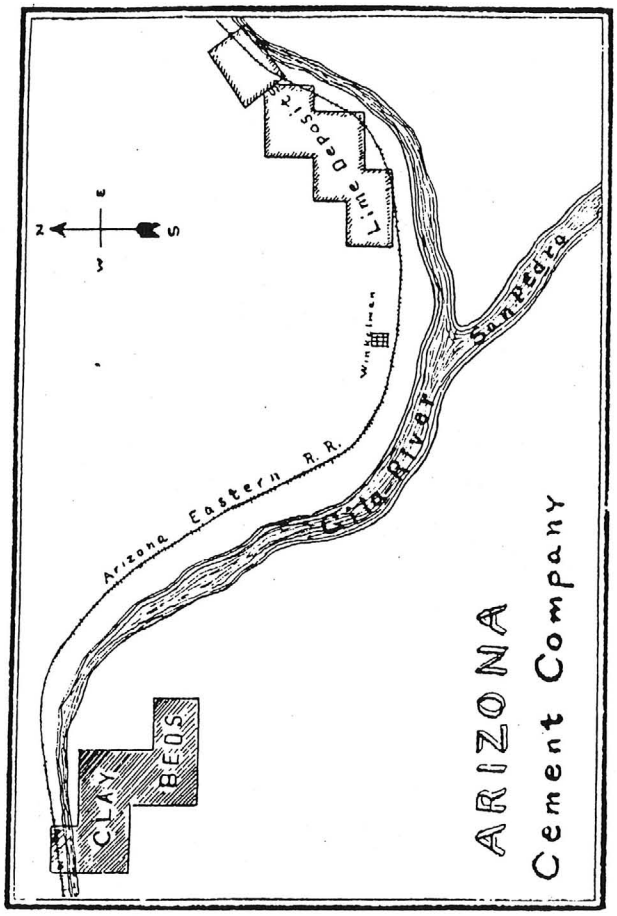
Lime Cliff near R.R. Grade

Lime Formation

Open Cuts Clay



Clay Deposits



E. POMEROY, Mesa, President

FRANK T. POMEROY, Mesa, Secretary-Treasurer.

National Bank of Arizona, Depositary

J. J. SWEENEY, (Cashier National Bank of Arizona) Disbursing Trustee

PORTLAND CEMENT

Requirements of Specifications American Society of Testing Materials

Adopted November 14, 1904
Amended August 15, 1908
Amended Augus 16, 1909

SPECIFICATIONS

10. The acceptance or rejection shall be based on the following requirements:

PORTLAND CEMENT

11. **Definition.**—This term is applied to the finely pulverized product resulting from the calcination to incipient fusion of an intimate mixture of properly proportioned argillaceous and calcareous materials, and to which no addition greater than 3 per cent. has been made subsequent to calcination.

SPECIFIC GRAVITY

"The Specific Gravity of cement shall not be less than 3.10. Should the test of cement as received fall below this requirement, a second test may be made upon a sample ignited at a low red heat. The loss in weight of the ignited cement shall not exceed 4 per cent."

FINENESS

13. It shall leave by weight a residue of not more than 8 per cent. on the No. 100, and not more than 25 per cent. on the No. 200 sieve.

TIME OF SETTING

14. It shall not develop initial set in less than thirty minutes; and must develop hard set in not less than one hour, nor more than ten hours.

TENSILE STRENGTH

15. "The minimum requirements for tensile strength for briquettes 1 inch square in section shall be as follows, and the cement shall show no retrogression in strength with'n the periods specified:

..Age	Neat Cement. Strength in Lbs.
24 hours—in moist air	.....175 lbs.
7 days— 1 day in moist air, 6 days in water	.....500 lbs.
28 days— 1 day in moist air, 27 days in water	.....600 lbs.
1 Part Cement, 3 Parts Standard Ottawa Sand	
7 days— 1 day in moist air, 6 days in water	.....200 lbs.
28 days— 1 day in moist air, 27 days in water	.....275 lbs.

CONSTANCY OF VOLUME

16. Pats of neat cement about three inches in diameter, one-half inch thick at the center, and tapering to a thin edge, shall be kept in moist air for a period of twentyfour hours.

(a) A pat is then kept in air at normal temperature and observed at intervals for at least 28 days.

(b) Another pat is kept in water maintained as near 70 degrees F. as practicable, and observed at intervals for at least 28 days.

(c) A third pat is exposed in any convenient way in an atmosphere of steam, above boiling water, in a loosely closed vessel for five hours.

17. These pats, to satisfactory pass the requirements, shall remain firm and hard and show no signs of distortion, checking, cracking or disintegrating.

SULPHURIC ACID AND MAGNESIA

18. The cement shall not contain more than 1.75 per cent. of anhydrous sulphuric acid (SO_3), nor more than 4 per cent. of magnesia (MgO).

CEMENT INDUSTRY.

The history of Portland cement and the fast increasing demand for this now indispensable staple, reads like the proverbial fairy tale.

Not many know why it is called PORTLAND cement. It is not made in any place by that name, nor was it invented by a resident of any of the many Portlands. The inventor, Joseph Aspdin of Yorkshire. England, named it Portland cement becase it resembled and surpassed the finest stone from the famous quarries of Portland. England

In 1880 the U. S. made and used 42,000 barrels. In 1890 it increased to 335,000. The following table shows the remarkable growth of the use of cement in Americca. Cement has made possible "sky scrapers," good streets, walks, indestructable bridges, Roosevelt dams and thousands of things we now accept as necessities.

Barrels per Year	Production of Cement
1900	8,484,000
1903	22,342,973
1904	26,505,881
1905	35,246,812
1906	45,610,822
1907	55,072,612
1908	58,000,000
1909	62,000,000

What the future demand will be can be judged somewhat by the past. As lumber becomes scarcer and therefore higner in price; as the rate of growth of cities and towns increases and as we demand more enduring structures the use of cement must continue to increase in the fture much faster than it has in the past.

Railroads alone consume more cement today than was produced ten years ago. No architect would plan a large building or bridge today without specifying a generous amount of cement, likewise street and sewer contractors would find it next

to impossible to execute their work without cement.

These facts explain why cement mills are grinding out cement 24 hours a day, every day in the year and, are grinding out fortunes for their share holders.

According to figures compiled in part from railroad statistics, Arizona consumed in 1908, approximately 150,000 barrels of cement exclusive of that product and used by the Government at Roosevelt. It is conservative to state that in 1910 the consumption will exceed 200,000 barrels. And this in the face of a very high cost of cement because of the long, expensive haul from the mills in California, Colorado and Kansas.

There is no cement produced nearer than 425 miles of central Arizona. El Paso, 440 miles east of Phoenix and Colton, Cal., the same distance west are the nearest producing points.

The transportation charge alone from these mills to Phoenix is $1.40 a barrel; from Colorado and Kansas where much of our supply is made the freight charge is $2.20 a barrel. Bear these figures in mind and you will realize why cement can be made and sold in Arizona at a handsome profit with absolute protection against outside competition. Bear in mind also that Arizona is a great, growing state.

The profit of cement mills and dividends to share owners can scarcely be credited, but the facts are a matter of public record.

The Standard Portland Cement Co., with mill at Napa Junction, Cal., earned $400,000 in one year.

The Iola Portland Cement Co. of Kansas earns $100,000 a month and has paid 30 per cent. dividends.

The Western Portland Cement Co., operating but three-fifths of its plant, earned $150,000 within a few months of starting.

The stock of the Utah Cement Co. is worth 25 times its par value.

There is no doubt about the Cement

business, provided you have the material to make standard cement.

THE ARIZONA CEMENT CO.

Incorporated in October, 1909, has been quietly but vigorously and intelligently developing its lime and clay beds, testing the material both in the laboratory and by manufacture, and are now prepared to commence the installation of machinery and the production of a Portland cement second to none in quality in the entire country. A sketch on the last page will show the location and the pictures herein convey but a faint idea of the inexhaustible supply of lime and clay.

Mr. Paul F. Bovard, the cement expert for the Government cement mill at Roosevelt, made thorough examination of the deposits and careful tests of cement made from the Arizona Cement Company's material. His report shows by comparison the value of the Arizona Cement Company's product.

Roosevelt, Ariz., Dec. 24, 1909.

Arizona Cement Co., Mesa, Ariz.

Dear sirs: I submit the following report on the testing of the materials sampled by me for the purpose of ascertaining their cement-making properties.

The following is the analysis of the clay sampled by me at the locality known as "Clay Bed" at station Branaman:

Silica, 45.27 per cent.; Iron, 7.14 per cent.; Alumina, 17.18 per cent.; Lime, 7.95 per cent.; Magnesia, 3.40 per cent.; loss on ignition, 16.95 per cent.

The following is the analysis of the limestone sampled by me at the locality known as Limestone Deposit at station Winkelman: Silica, 1.70 per cent.; Iron, .44 per cent.; Alumina, .71 per cent.; Lime, 54.50 per cent.; Magnesia, .43 per cent.; loss on ignition, 42.83 per cent.

These materials I combined and burned, producing a cement sound even from the fresh clinker, passing the boiling test C.K. without the addition of any other material as Plaster.

I send you a pat for your own inspection which you may exhibit as sound cement.

The setting time are as follows: Initial set, one hour and ten minutes; final set, six hours, showing a slow setting cement without the addition of Plaster of Paris.

The tensils strengths have not been tested as yet, but will be seven and twenty-eight days from this date.

I am pleased to say to you that the materials are suitable for making high-class Portland Cement, and the abundance and locality of these materials make the manufacture ideally practical.

At the dates indicated I will send you the Tensile Strengths of the briquettes made of this Cement.

Very respectfully yours,
PAUL F. BOVARD,
Cement Chemist, U. S. R. S.

Tests made at U. S. R. S. Cement Mill, Roosevelt, Arizona.

Roosevelt, Ariz., Jan. 31, 1910.

Arizona Cement Co., Mesa, Ariz.

Dear sirs: Supplementing my report of Dec. the 24th, 1909, on the raw materials and product from your limestone and clay deposits, I submit below the results of the tensile strengths and summary of the previous tests. The following are the tests on the final product:

Boiling test, O. K.
Fineness through 200-mesh sieve, 95.0.
Initial set, 1 hour 10 min.
Final set, 6 hrs.
Specific gravity, 3.13.
Per cent. Magnesia, 2.02.
Per cent. Sulphuric Anhydrids, none.

Tensils Strength.	Lbs. per sq. Inch.
7 day neat average	405
28 day neat average	610
7 day 1:3 sand average	85
28 day 1:3 sand average	215

I believe you will be much gratified at the results shown above, as they are certainly very good, and serve as additional demonstration of the value of your raw materials for cement manufacture.

Respectfully submitted,
PAUL F. BOVARD.

Supplemental Report by Mr. Bovard

The preliminary tests made on the limestone and clay from Winkelman were of samples from locations averaging each deposit.

Comparative Clay Analyses

	Silica	Iron	Alumina	Lime	Magnesia	loss
Arizona	47.19	6.43	17.42	8.46	4.15	14.56
Roosevelt	49.84	6.85	16.14	6.62	4.87	15.66
Cowell, Cal	50.85	5.78	21.35	2.75	1.90	14.55
Golden Gate California	58.44		26.50	1.70	1.88	10.63

In general it may be said that there can be great variations in clays for cement purposes, but the mixture with the limestone must be such that a cement can be produced conforming to specifications on page 2.

Arizona Cement Company's limestone compared with other high-grade limestones.

	Silica	Iron-Alumina	Lime	Magnesia	loss
Arizona	1.70	1.15	54.50	.43	42.83
Roosevelt	4.86	.56	53.02	.	41.82
Cowell, Cal.	4.36	1.12	52.48	.66	41.95
Pacific, Cal.	.41	.56	54.86	.21	43.74

The lime is the constituent used in the cement from the limestone. The extent of its use is dependent on the clay analysis and whether its combination with the clay will produce a hydraulic product conforming to specification.

On combining the limestone and clay and grinding to the finest intimate mixture and burned to incipient fusion, a clinker is produced which, when ground to specified fineness in suitable mills is Portland Cement.

The samples obtained from Winkelman were subjected to the above treatment as is customary in experimental tests and burned. Now, the results with the Rotary Kilns in

the mill are invariably better than the Laboratory Kilns, by reason of the limited conditions, hence it is gratifying to note the success of the materials of the Arizona Cement Company as compared to other plants.

Comparative Cement Analyses

	Silica	Iron	Alumina	Lime	Sul. An.	Mag.
Arizona	21.51	3.36	7.75	64.01	1.20	2.02
Colton, Cal	22.25		11.50	63.12	1.63	.90
Standard	21.96		11.80	62.52	1.34	1.02
Pacific	22.25	3.35	7.65	62.85	1.34	.78
Iola	22.03	3.17	6.83	62.73	1.08	1.17
Roosevelt	23.25	2.53	6.58	64.43		2.63

Comparative Tests of Cement

BRAND	FINENESS No.100	FINENESS No.200	Final Set H.M.	TENSILE STRENGTH Neat 7 days	TENSILE STRENGTH Neat 28 days	TENSILE STRENGTH 1 to 3 Sand 7 days	TENSILE STRENGTH 1 to 3 Sand 28 days	Soundness
Arizona	99.0	95.0	6.00	405	610	85	215	o. k.
Roosevelt	98.0	92.0	8.00	450	550	150	300	o. k.
Bud'heim	92.7	82.6	4.20	572	631	275	374	o. k.
Dragon	92.8	78.6	5.40	526	659	208	288	o. k.
Golden Gate	91.6	76.4	4.35	760	843	191	356	o. k.
Heidelberg	91.2	81.4	4.00	596	659	241	389	o. k.
Iola	92.	81.6	4.52	838		332		o. k.
Saturn	95.8	87.5	4.05	511	577	197	283	o. k.
Standard	97.3	90.5	6.30	732	748	305	404	o. k.
Strongh'ld	91.2	81.	4.18	629	831	233	337	o. k.
Washington	98.7	86.6	4.06	749	767	232	351	o. k.

In submitting his report Mr. Bovard says: "By comparison with other brands, from the cement expert's standpoint the material of Arizona Portland Cement Co. stands with the best."

The fact that Mr. Bovard was employed by the government in making the cement that went into the great Roosevelt dam attests his ability as a cement chemist, and the fact that the supervising engineer consented to Mr. Bovard examining and testing the Arizona cement is evidence that the government is interested in seeing a high-class cement produced in Arizona.

It is estimated by government engineers that no less than 600,000 barrels of cement will be required to cement the canals of the Salt River Valley.

The great reduction plant and smelter at Hayden one and one-half miles from the factory site of the Arizona Cement Co. will require 50,000 barrels to complete the construction of their 10,000-ton plant.

Phoenix alone will require enormous quantities of cement in street, sidewalk and sewer construction to say nothing of the increased amount that will go into building construction when sold at a reasonable price. There is no question about the market right in Arizona for the output of he Arizona Cement Co.

The Company owns 480 acres of clay beds and 300 acres of lime deposits. Neither could have been better located if made to order. The lime literally overhanging the mill site and railroad. The following from the Arizona Gazette of June 6th, indicates what the local sentiment is:

Interest is growing among those who have investigated the Portland cement proposition near Winkelman, mentioned in these columns a short time ago. Among others who have visited the clay beds and lime deposits

were I. T. Hosey, E. E. Pascoe, A. G. Hulett and Mr. Budie. All who have looked into these essentials for making cement pronounce the quantity practically inexhaustible and the quality unexcelled.

The location also could not be better had it been made to order. The lime is adjacent to the railroad and so situated that it can be broken down and dropped by gravity to a mill on the track. The clay beds are no less ideally situated, being near the rails and seven miles from the lime. It is planned to drop the clay on to the cars by an overhead cable and bucket system and switch it directly to the hoppers of the mill in self-dumping cars, thus saving all hand labor.

The Arizona Eastern Railroad has made the nominal rate of 15 cents a ton on the clay, as well as favorable rates on the finished cement to points of consumption. All details as to costs have been carefully figured and it is found that a superior cement can be made and delivered in Phoenix at a first cost less than the freight rate alone from California and about one-half the Colorado and Kansas rate, from which our supply is now largely drawn.

Novices and experts alike declare that in magnitude and quality the material available exceeds anything discovered in the west if not in the United States.

P. F. Bovard, government chemist at the Roosevelt cement mill, has made a thorough examination of the ground and material, has made elaborate tests both by analysis and producing cement from which exacting tests were made, and pronounces it exceptionally high class. Mr. Bovard went to Winkelman with some misgivings, but he returned an enthusiast.

Flattering offers and propositions have been made the Arizona Cement Company to take it over by outside capital but the officers, being local people, prefer to keep it a home enterprise.

The manufacture of cement is one of the most attractive "industrials," from a profit standpoint, that exists. Where the cement business is best known investors are greedy to get into it. There is no uncertainty about the results. Phoenix alone sends out of the territory enough money to build a cement mill every year. It is hoped that the Arizona Cement Company will soon add another industry to our local field which will very materially aid in building up the valley and cities.

The management of the Company is in careful, conservative hands. All money is handled alone by the disbursing agent under rigid rules to protect shareholders.

Considering that the freight cost of bringing cement to Phoenix from California, Colorado and Kansas will average $1.75 a barrel the following profit can reasonably be figured:

ESTIMATED PROFITS.

Five hundred barrels a day, average net profit $1.00 per barrel, or per day, $500.00.

If operated but 300 days a year, yearly profit $150,000.00.

This is 15 per cent. on the entire capitalization at par value.

It is not likely that the sale of the entire 500,000 shares of treasury stock will be required to construct the mill.

It has been carefully estimated that not to exceed 800,000 or 900,000 shares at the outside will stand against the property fully equipped, but the profits will conservatively pay 15 per cent. on the par value of $1,000,000. If investors are lucky enough to secure shares at 50 cents, their profits should be 30 per cent.

The directors have authorized the sale of a limited number of shares to those who will join in the initial expense of buying machinery at a price that is decidedly attractive.

Every safeguard has been provided by the Company to protect shareholders. The agreement between the Company and Mr. J. J. Sweeney provides that all money paid for stock goes into Mr. Sweeney's custody and can only be paid out for construction and other legitimate purposes in connection with the development of the property and the production of cement.

This is an opporunity that is seldom offered. Unlike a mining venture, there is no element of risk. The material is owned by the Company in practically inxhaustible quantities. The market is developed. The railroad is there with a certainty of an early connection with Globe. The El Paso & Southwestern Railway survey is adjacent to the mill site.

Early subscribers to shares will reap the greatest reward.

Arizona Cement Company.

IMPORTANT

Resolution was passed and agreement signed at a stockholders' and directors' meeting, July 14, 1910, increasing the treasury stock from 500,000 to 600,000 shares by transfer to the Company of 100,000 shares paid to the original owners for the property.

Further, the present officers agree to relinquish control and management to responsible purchasers of treasury stock, or those providing capital for the manufacture of cement from the Company's material,

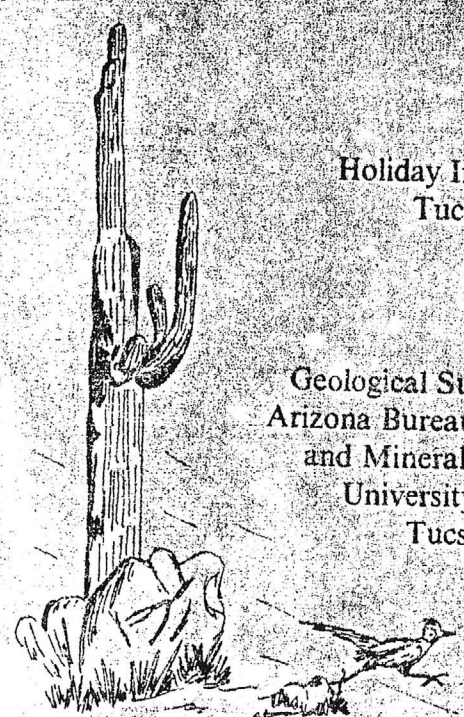
ARIZONA CEMENT CO.

21st Forum on the Geology of Industrial Minerals

Program With Abstracts

Aggregates to Zeolites (AZ)

April 9-12, 1985



at the
Holiday Inn Broadway
Tucson, Arizona

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Geological Survey Branch
Arizona Bureau of Geology
and Mineral Technology
University of Arizona
Tucson, Arizona

BENTONITE AND SPECIALTY SAND DEPOSITS IN THE BIDAHOCHI FORMATION

TED H. EYDE and DAN T. EYDE, GSA Resources Inc., 1235 E. Moonridge Rd., Tucson, AZ 85718

Specialty sand and bentonite are produced in the plateau province from the Bidahochi Formation near Sanders, Apache County, Arizona. It appears that deposits of both sand and bentonite formed during the Pliocene in a series of interconnected lakes along the west side of the Defiance uplift

The bentonite is an alteration product of airborne vitric ash that fell into these lakes. In the Cheto district, the individual bentonite horizons, which range from less than a foot to more than 10 feet thick, are restricted to the position of the medial volcanic member. Bentonite production began at the Allentown mine in 1924 and at the Chambers mine in 1926. In 1933, strip mining of the extensive deposits in the Cheto district commenced. Production increased each year to a peak of 270,000 tons in 1957. As a result of the introduction of synthetic zeolites into petroleum refining, production declined. At present, about 40,000 tons of bentonite are produced from the district each year. Bentonite is shipped and processed into desiccants, thickeners, and acid-activated clay products.

The specialty sand was derived from Permian sandstones and deposited in a deltaic environment where streams draining the Defiance Plateau entered the lakes. Although these stream channels are usually restricted to the upper member of the Bidahochi, stratigraphically above the bentonite horizon, a few actually cut through the bentonite. The well-sorted sand, suitable for use as a proppant in hydraulically fractured oil and gas wells, is localized in elongate lenses along the margins of the channels. These lenses range from 5 to 50 feet in thickness and often extend thousands of feet in both width and length. The sand is about 97 percent silica, has a yield of 40 percent in the minus-20 plus-40 mesh-size fraction, and has a roundness of .6 to .7 on the Krumbein scale. Production of this sand began about 1961. All of the current production, which amounts to about 40,000 tons per year, is sold in the petroleum-producing area near Farmington, New Mexico.

THE BOWIE CHABAZITE DEPOSIT

TED H. EYDE and DAN T. EYDE, GSA Resources Inc., 1235 E. Moonridge Rd., Tucson, AZ 85718

The Bowie chabazite deposit has yielded the most mined tonnage of any natural zeolite deposit in the United States. Since 1962 the deposit has yielded about 12,000 tons of crude chabazite, with an estimated market value of $30 million when sold as an activated molecular-sieve product.

Between 1,000 and 1,500 tons of high-purity, crude lump chabazite is now produced annually by stripping and selectively mining the lower, massive, half-foot-thick, "high-grade" bed. All of the chabazite is still shipped out of State for grinding prior to extrusion and activation.

Zeolite minerals were discovered at the Bowie deposit in 1875, when Oscar Lowe identified a hydrous silicate related to chabazite or stilbite from a tuff bed that cropped out in the San Simon Valley. It was not until 1959, however, that chabazite, erionite, and clinoptilolite were positively identified as the principal constituents of an altered vitric-tuff horizon that crops out in the area originally described by Lowe.

Shortly after this rediscovery of zeolite minerals in the San Simon Valley, several of the major producers of synthetic zeolites acquired land positions covering the outcrops, including projected extensions, and began exploration drilling. By 1980 all of the known chabazite reserves had been acquired by five companies and two individuals.

The more than 3,000 holes drilled to explore the deposit and the excellent exposures provided by the strip-mined areas indicate that the chabazite-bearing horizon (known as the marker tuff) is confined to a flat-lying lacustrine section known to the operators as the Green Lake Beds. The deposition of the parent airborne vitric ash and subsequent zeolitic alteration was controlled by many factors, including the lake-bottom topography, depth and cation content of the saline-alkaline lake water, and proximity to postdepositional erosion surfaces.

Zeolitic alteration was complete when an extensive system of younger paleochannels deeply eroded the Green Lake Beds. This left only a few erosional remnants of the marker tuff and the lower "high-grade bed" that constitute the present deposit. Both the channel gravels and the Green Lake Beds are overlain by a section of halite-bearing brown mudstones, known as the Brown Lake Beds. The Bowie chabazite deposit can be used as a model to guide the exploration and development of other zeolite deposits that formed in saline-alkaline lacustrine environments.

ARIZONA PORTLAND CEMENT COMPANY'S RILLITO OPERATION

J.W. RAINS, California Portland Cement Company, P.O. Box 947, Colton, CA 92324

Arizona Portland Cement Company's limestone deposit (called Twin Peaks) is approximately 4 miles southeast of the cement plant. The plant is adjacent to both the Southern Pacific Railroad and Interstate 10, about 17 miles northwest of Tucson.

Placer claims were filed on the Twin Peaks deposit in 1923. From that time until the present, geologic data have been accumulated and evaluated to define more closely the quantity and quality of the limestones.

The cement plant at Rillito was originally constructed as a one-kiln plant in 1949. Capacity was increased in 1952 and 1956, bringing the plant to an annual capacity of 440,000 tons of cement. In 1972 another expansion program was completed, brining annual cement capacity to 1.1 million tons.

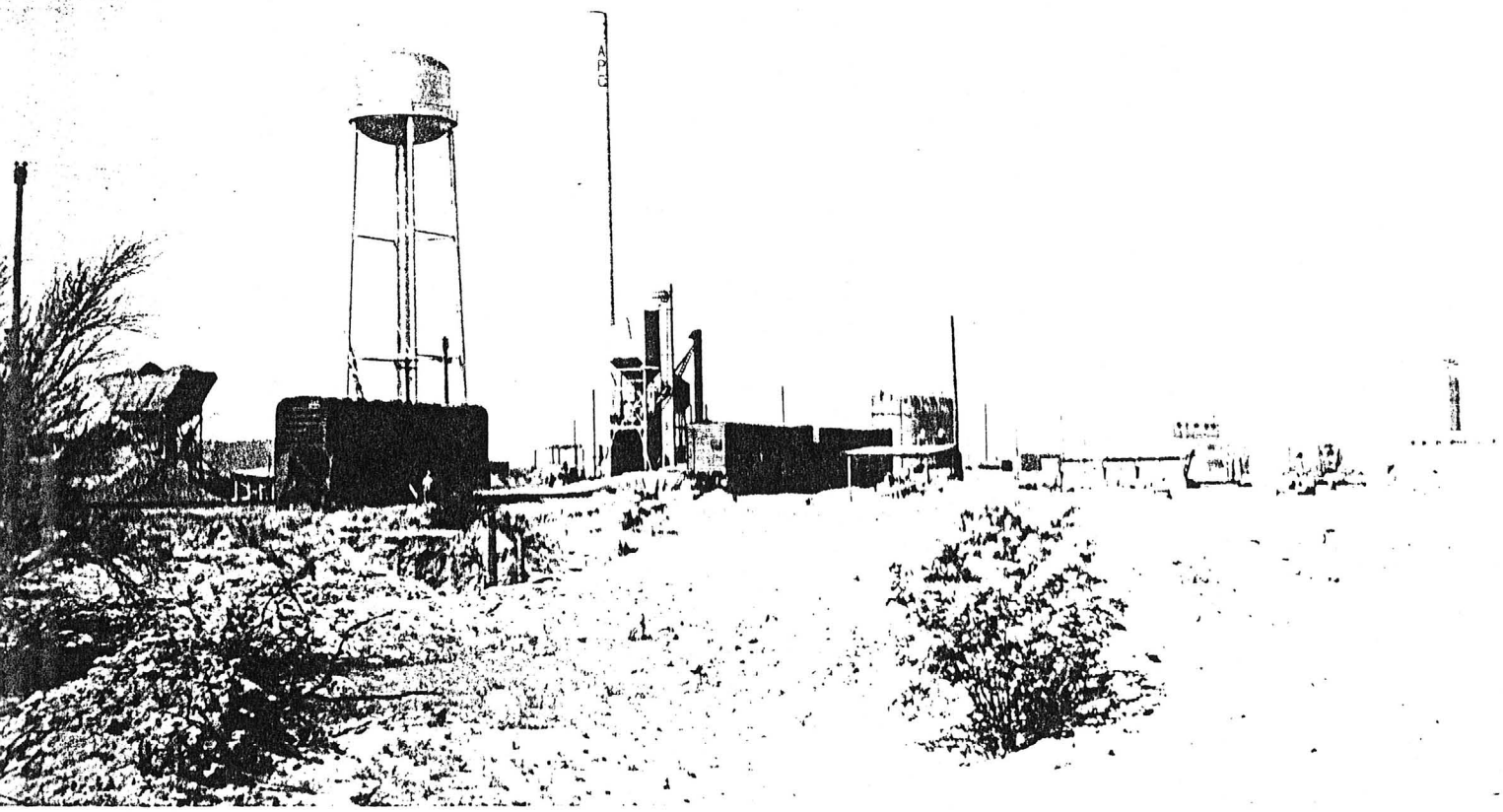
Geologically, the Twin Peaks contain formations ranging from the Precambrian Pinal Schist to the Pennsylvanian Naco Formation. Within this sequence, other exposed formations include the Cambrian Bolsa Quartzite and Abrigo Formation, Devonian Martin Limestone, Mississippian Escabrosa Limestone, and Pennsylvania Naco Formation.

Generally, the Escabrosa, Naco, and Martin Formations are the primary sources of limestone for manufacturing cement. The Martin Formation is basically a dolomite with bands of limestone, quartzite, and siltstone. These limestones are blended with outside source materials (clay and iron ore) to make a raw mix that will make specification cements.

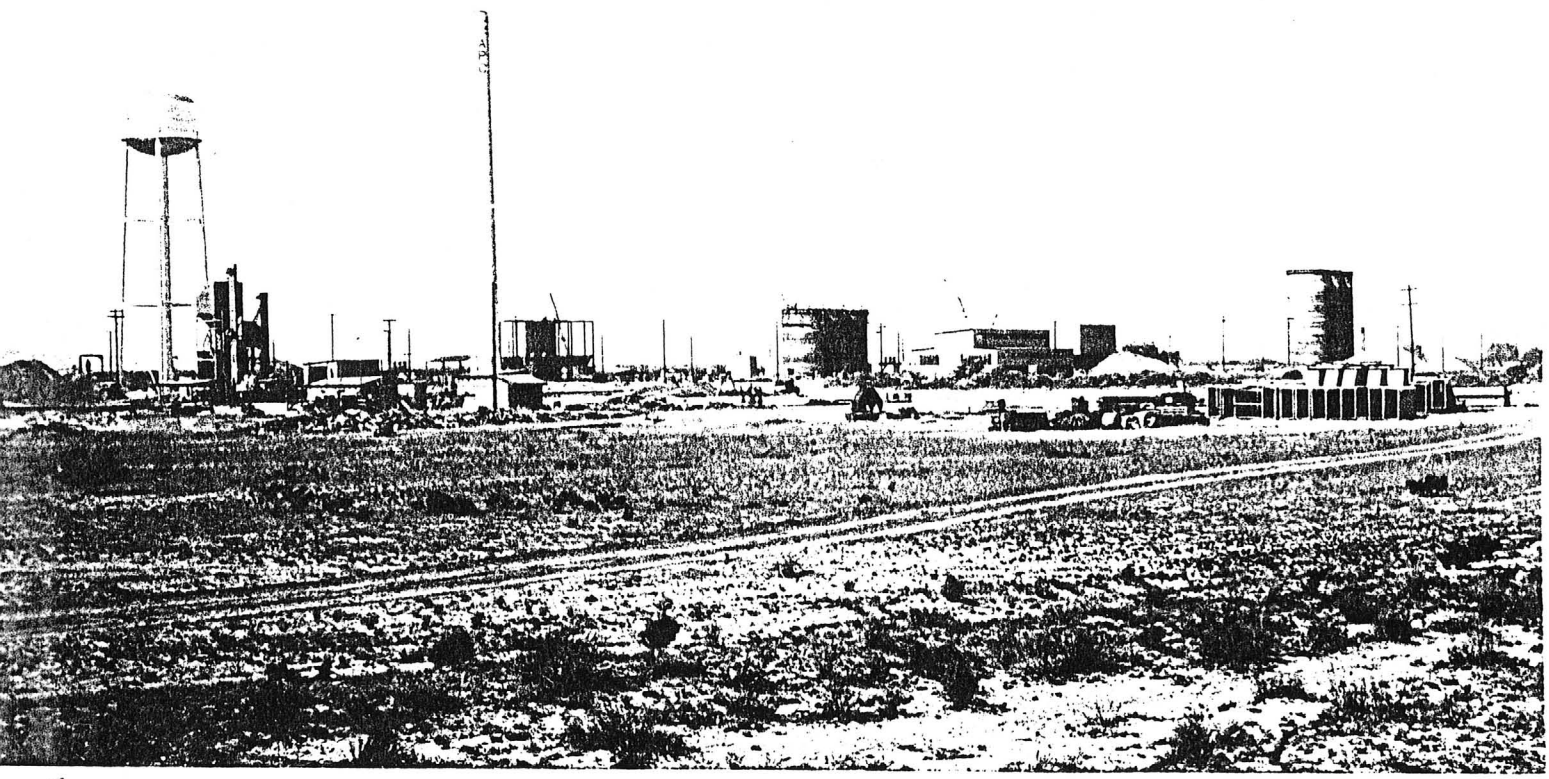
Several drilling programs were initiated between June 1946 and March 1982. Information derived from these programs provided the means to develop cross sections, geologic blocks, and grade blocks. The configurations of the geologic and grade blocks are the same. Block boundaries delineate the various formations on any particular level.

Cursory inspection of the structure would indicate a broad syncline elevated on the west side. A more detailed examination shows that the structure has been complicated by several periods of faulting and intrusion of igneous rocks.

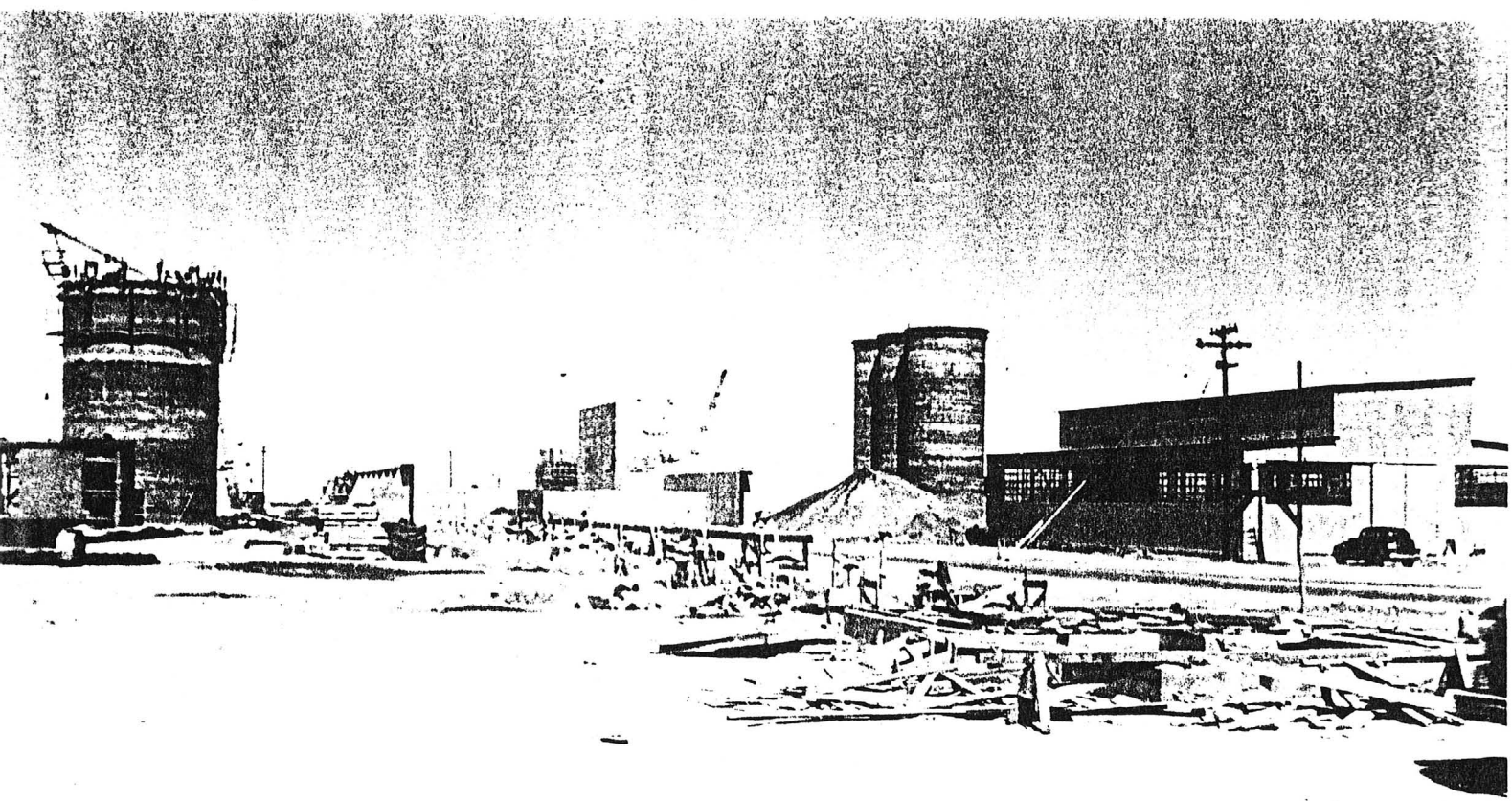
NOTES



A-1-27 1949



A-1-21 1949



1749

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Co. Plant & Quarry Date Feb. 24, 1961

District At Rillito, Pima County, Ariz. Engineer Axel L. Johnson

Subject: Present Status. Information from Vern Hendrickson.

References Report of Sept. 20, 1960

Production Activity Manufacture of Portland cement. Production about 7,500 bbl. per day. or 225,000 bbl. per month. Production on a 24 hr. per day schedule - 7 days per week. Total number of men employed ---- 184. Of these, 136 men are employed at the plant, 26 in the office, supervisory and sales force, and the remaining 22 in the quarry.

Ex MJ. 8/1965

Arizona Portland Cement, Pima Co
(file)

NEWS RELEASE
CONTACT: Margie Walsh
(928) 634-2261
Extension 8060

Denise D. Resnik
(602) 956-8834

FOR IMMEDIATE RELEASE

PHOENIX CEMENT PROCEEDS WITH PLANT MODERNIZATION; SUBMITS AIR QUALITY PERMIT REVISION APPLICATION TO ADEQ

CLARKDALE, Ariz. (August 18, 1999) - Moving forward with its planned modernization initiative, Phoenix Cement Company recently submitted an application to the Arizona Department of Environmental Quality (ADEQ) to modify its existing air quality permit. The revised permit will allow the company to update its 40-year-old cement production process and install an overall cleaner, more fuel efficient manufacturing system for the production of clinker, the principal component of portland cement.

"A revision application to an existing permit is a standard requirement of the ADEQ and the United States Environmental Protection Agency (USEPA) for major facilities such as a portland cement plant," said Mallory May, president of PSM International. "These applications are necessary to ensure that the planned modification will not result in exceedances of state and federal environmental regulations."

PSM, based in Dallas, spent two years assessing Phoenix Cement's emissions data. As a result, the company was able to confirm existing emissions quantities and determine that the modernization will result in significant reductions of emissions from Phoenix Cement's production process.

"This project represents the next big step towards reaching our objective for Phoenix Cement - a state-of-the-art facility that will allow us to increase cement production with less emissions," said Roger Smith, Jr., president of the company. "Phoenix Cement has a long history in the Verde Valley and Arizona as an employer and a neighbor. We're excited that this modernization will allow us to continue this tradition, and ensure the company's viability well into the 21st century."

"One of the reasons why Phoenix Cement is able to proceed with this project has been the federal restrictions placed on unfairly traded cement from Mexico," said Pete Kuehner, vice president of sales and marketing for the company. "Without those anti-dumping duties, CEMEX and the other large producers in Mexico would be free to flood our market with dumped imports as they did during the early part of this decade. These duties have leveled the playing field and enabled Phoenix Cement to invest in its future."

As part of the $105 million upgrade, Phoenix Cement will replace its current production equipment with a five-stage, low- NOx kiln system, which will be more environmentally friendly than its existing system. The new kiln, along with facility-wide improvements, will be provided by Fuller Company of

Bethlehem, Pennsylvania, a member of the F.L. Smidth-Fuller Engineering Group and a worldwide designer and manufacturer of cement process equipment.

"Phoenix Cement's new kiln system represents the leading edge of cement production technology, both operationally and environmentally," said Claus Bech, regional sales manager for Fuller Company. "In addition to its low fuel and power consumption features, it offers the best CO and NOx control standards in the industry."

Developed over three phases, the construction project is expected to employ between 250 and 450 construction workers and take approximately 22 months to complete.

Detailed engineering for the project has begun, and the ADEQ application review process should last about four months. No contractor has yet been selected for the project.

The Salt River Pima-Maricopa Indian Community (SRPMIC), which owns Phoenix Cement, approved the company's modernization plan at a Tribal Council meeting in May. The Council's approval concluded a lengthy evaluation process of existing technologies that were both cost-effective and environmentally friendly.

Phoenix Cement had several options for increasing cement production, including converting its current kiln system to a more efficient production format. This less costly option, although technically feasible, was dismissed by the company as impractical because it would have been less fuel efficient and less effective in reducing emissions.

"Phoenix Cement diligently researched this modernization for almost two years, working with vendors, customers and engineers to find the best economical and environmental system available," said Ivan Makil, SRPMIC president. "Our objective was to find a way to increase production while preserving and enhancing air quality. With the (Fuller) kiln system, I believe we'll accomplish that goal and continue our Community's commitment as caretakers for the environment." Makil added that, once the modernization is complete, Phoenix Cement would decommission its existing kilns.

The new Fuller 5-stage kiln will revolutionize Phoenix Cement's pyroprocess used in the manufacture of clinker. Phoenix Cement expects the new system to have a production capacity of up to 4000 tons per day.

The current kiln system burns all fuel at temperatures of up to 4000° F. The new system, however, will burn 50 to 60 percent of the total fuel in a low NOx precalciner at only 2000° F. The difference in temperature, coupled with less fuel burned, provides a reduction of energy necessary to produce clinker and, in turn, a reduction in the total mass emission rates of pollutants such as NOX, SO2 & CO.

For Phoenix Cement, the result will be an overall cleaner production process with all air pollutants significantly less than federal National Ambient Air Quality Standards (NAAQS), and significantly less than the allowable emissions of its existing permit.

The modernization will be conducted in phases allowing for the continued manufacture of portland cement during the construction period. The first phase of the modernization, which could commence by the first quarter of 2000, will be the addition of a new 4000 horsepower vertical roller mill that uses 25 percent less electricity than each of the current finish mills, to be used for grinding clinker into finished cement. Developed by Onoda Cement and Kobe Steel, the new OK mill will have a production capacity of 130 to 140 tons per hour.

Following installation of the mill, Phoenix Cement will convert an existing finish mill to a full time raw mill for grinding raw material into a "meal" from which clinker is formed. The new kiln will be completed during the modernization's final phase. In addition, the company will be adding a new two-story building for use as a central control room and laboratory.

Phoenix Cement Company is one of Arizona's leading manufacturers of portland cement and other building products. Founded in 1959 by the American Cement Company to supply materials for the development of Glen Canyon Dam, Phoenix Cement serves markets throughout Arizona as well as Colorado, California, Nevada, New Mexico and Texas. Phoenix Cement Company has been a division of the Salt River Pima-Maricopa Indian Community since 1987.

ARIZONA PORTLAND CEMENT

MG WR 12/11/87: The Rillito cement plant (file, Pima county) reportedly has limestone reserves that will last in excess of 50 years; this reserve includes ample high-grade calcium zones. Gypsum is supplied from the Winkelman-area gypsum mine operated by the Superior Companies. The cement plant has a 100,000 ton stockpile of iron (from Kaiser in California) that will last about five years.

ARIZONA PORTLAND CEMENT

Dale Kittle, Land Manager for Anamax, called and reported that they are making a deal with the Arizona Portland Cement Co. for the sale of gypsum and limestone from the old Mineral Hill area. GWI WR 5/10/76

Ken Santini, geologist for the Arizona Portland Cement Co., Rillito, came in to discuss the so-called kaolin deposit west of Morristown. He was shown a partial analysis which indicates it has less than 15% Al_2O_3; therefore, isn't a kaolin. He says their chemist has recommended the burning of high alumina clay with some high calcium rock to lower the sintering temperature in the kilns. The high temperature is causing relining at about 150 day intervals. Presently they are using clay from Pantano Wash which has about 15% Al_2O_3 and their high lime comes from near the Palo Verde cu deposit. GW WR 9/2/76

GW WR 9-7-77 - Mr. Gillespie, Pueblo, Colorado, called to learn which limestone quarry used a 3 mile long tram. After considerable discussion it was decided that the Arizona Portland Cement plant at Rillito is the only one with a conveyor system of that caliber. Made several calls, mostly unsuccessful, to determine whether Kerr-McGee, Homestake, Anaconda, United Nucler or Minerals Exploration would accept custom uranium ores for milling. Minerals Exploration is still making a feasibility study. Anaconda doesn't accept custom ores, neither does Homestake. United Nuclear hasn't replied to my call. Kerr-Mac will take small lots of outside ore but wants a 40-50 lb. sample submitted before shipments begin in order to determine the basis of payment. Nuclear Energy of Denver will send their buying schedule. 9-13-77 bh

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NJN WR 9/30/83: It was reported that Arizona Portland Cement Company is considering an expansion of their Rillito facility.

NJN WR 4/12/85: S. A. Kupferman of Kaiser Cement Corp., Permanente, Ca. 95014 reported at the Industrial Mineral Symposim in Tucson that the Arizona cement industry's capacity (includes Arizona Portland Cement Co (f), Rillito Plant and Phoenix Cement Co's (f) Clarkdale Plant) is 1.75 million tons a year. In 1984 the state's produced at about 65% of capacity.

NJN WR 5/9/87: While on the highway to Tucson, noted that the Arizona Portland Cement Plant (file) Pima County, sign now says "Calmat" above it. Apparently Calmat has acquired the operation.

ARIZONA PORTLAND CEMENT PIMA

The Rillito Cement plant construction continued as mentioned in the last report.
GWI QR Oct-Dec '71

ABM Bull. 180, p. 390, 394, 397

The Rillito Cement plant has put in a conveyor line from the mine to the Kiln. Construction of the new (relatively pollution free plant continued) (This company has had their problems with government pollution depts.) GWI QR Jan.-March'72

Rillito Cement Co's new conveyor belt is operating. They have drilled a better grade limestone adjacent to the twin peaks quarry. GWI 4 ¼ '72

Tel. Call. Mr. Lee Rice, Arizona Portland Cement Company, for information on films available. Referred him to Cement Association. Also wanted information on Co. statistics. They expect to change from Douglas slag to Globe iron ore for their plant by October 1. GWI WR 9/6/72

Active Mine List - Oct. 1972 - Empl. 210 (figures 1971, 4,200,000 BBLS)

---

245 employees; Production is up above what it says on Active Mine list but by the first of the year they will be up 30% more. A.P. Rice, plant foreman; Jerry Boyett, chief chemist; Howard Gray, asst. chemist. GWI Telephone Call 5/25/73

B.J. Daniels Trucking Inc. of Miami is contract mining and hauling hematite from the Old Dominion shaft to the Arizona Portland Cement Company plant at Rillito. There was no one at the pit but ore is stockpiled and shipped as required. FTJ WR 10/12/73

The Arizona Portland Cement Co. has completed their expansion. GWI AR 73-74

ARIZONA PORTLAND CEMENT PIMA COUNTY

Active Mine List Oct. 1961
" " " Feb. 1962
" " " Oct. 1963 - 35 men
" " " April 1966 - 175 men (AML)
" " " Oct. 1966 - 110 men (AML)
" " " April 1967 - 150 men (AML)
" " " Nov. 1967 - 123 men (AML)
" " " April 1968 - 150 men (AML)
" " " Oct. 1968 - 151 men (AML)

Arizona Portland Cement production continues as usual. GWI QR Dec. 1968

Active Mine List April 1969 - 130 men
" " " October 1969 - 139 men - Vern Hendrickson, Supt. (S26, 12S, 11E)
(S6, 12S, 12E)

The Arizona Portland Cement Company is running at capacity for the quarter. Capacity is limited by the grinding plant. The State reports that the Cement Company is considered as a manufacturing plant and so is assessed at 25% of valuation. GWI QR 3-1969

Arizona Portland Cement Company running at capacity, with plants to increase production by adding to the grinding capacity. GWI QR 9-1969.

Active Mine List May 1970 - 146 men - Vern Hendrickson, Supt.
Active Mine List Oct. 1970 - 159 men - Vern Hendrickson, Supt.

The Arizona Portland Cement Company is expanding their plant. GWI QR 2-27-70

Arizona Portland Cement completed. GWI QR 4-1-70

Arizona Portland Cement - $12 mil. exp. announced Jan. 1970. Increase from 3 to 4.2 mil. lbs./yr. About 18 months to complete. Nfw has 3 kilns. FPK 8-1970

Of note in Pima County has been the newspaper attack on the limestone operations on the Homestake Production Co. The Arizona Portland Cement Co. was not spared. GWI QR 4-1-71

Construction work at the Rillito Cement Plant of the Arizona Cement Co. is proceeding as announced. GWI QR 6-30-71

Dir. of Mining - August 1971 - 165 men.

Mine visit. Arizona Portland Cement Plant at Rillito. GWI WR 9/21/71

Construction work continues on new plant changes at Rillito Cement Plant. (Belt replaces truck from quarry to plant, new kiln, new polution control equipment, etc.) GWI QR 9/71

ARIZONA PORTLAND CEMENT CO. PIMA COUNTY

D. M. WHITLEY, Sales Manager, Arizona Portland Cement Co.
221 E. Camelback Road
Phoenix, Arizona

Letter to Lewis A. Smith - 10-10-60

Note: Ref. to
Copy of letter from W.H. Dresher
to John Rains 2-7-75

ONA DEPARTMENT OF MINER RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1L

1. Information from: Ken Santini (Geologist)
   Address: Az Portland Cement
2. Mine: CLAY — For Aluminum 3. No. of Claims - Patented
   Unpatented
4. Location: T16S-R17E 3 STATE LEASES 1. Private
   1 in S 14 & 3 in S23
5. Sec Tp Range 6. Mining District Vail. (Area)
7. Owner:
8. Address:
9. Operating Co.: Arizona Portland Cement
10. Address: Rillito Az
11. President: 12. Gen. Mgr.:
13. Principal Metals: 14. No. Employed:
15. Mill, Type & Capacity:
16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☐ (e) Rate tpd.
17. New Work Planned:
18. Miscl. Notes:
    Have 25 Drill holes expect to ~~strip~~ start stripping in April & will use 35000 - 65000 per year.

RECEIVED
FEB 21 1975
DEPT. MINERAL RESOURCES
PHOENIX, ARIZONA

Date: 2/18/75

G W Irwin
(Signature) (Field Engineer)

Arizona Portland Cement file

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1992

ARIZONA PORTLAND CEMENT COMPANY

State Sales Office
2400 N. Central, Suite 308, Phoenix, AZ 85004 - Phone 271-0069.
Senior Vice President Vaughn S. Corley
Vice President, Sales Craig Starkey
Rillito Plant & Quarry T12S R11E Sec. 26
P.O. Box 338, Rillito, AZ 85654 - Phone (Tucson) 622-3503 - Employees: 144 - Limestone quarry 5 miles from plant - Cement - Annual capacity 1,100,000 tons cement - Longest conveyor transport system in state.
Plant Manager Tom Brosnan
Plant Chemist J. Boyett
Plant Engineer John Frye
Plant Electrician Russell Hawks
Personnel Manager Fran Young
Quarry Supervisor Chuck Hansen
Purchasing Agent Tom Follett

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1991

ARIZONA PORTLAND CEMENT COMPANY

State Sales Office
2400 N. Central, Suite 308, Phoenix, AZ 85004 - Phone 271-0069.
Executive Vice President .....Vaughn S. Corley
Vice President, Sales ..... Craig Starkey
Rillito Plant & Quarry T12S R11E Sec. 26
P.O. Box 338, Rillito, AZ 85654 - Phone (Tucson) 622-3503 - Employees: 125 - Limestone quarry 5 miles from plant - Cement - Annual capacity 1,100,000 tons cement - Longest conveyor transport system in state.
Plant Manager ..... Tom Brosnan
Plant Chemist .....
J. Boyett
Plant Engineer .....
John Frye
Chief Electrician .....
Jack Meeler
Personnel Manager ..... Fran Young
Quarry Supervisor .....
Chuck Hansen
Purchasing Agent ..... Tom Follett

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1990

ARIZONA PORTLAND CEMENT COMPANY

State Sales Office
2400 N. Central, Suite 308, Phoenix, AZ 85004 - Phone 271-0069.
Executive Vice President .....Vaughn S. Corley
Vice President, Sales ..... Craig Starkey
Rillito Plant & Quarry T12S R11E Sec. 26
P.O. Box 338, Rillito, AZ 85654 - Phone (Tucson) 622-3503 - Employees: 125 - Limestone quarry 5 miles from plant - Cement - Annual capacity 1,100,000 tons cement - Longest conveyor transport system in state.
Plant Manager ..... Tom Brosnan
Plant Chemist ..... J. Boyett
Plant Engineer ..... John Frye
Chief Electrician ..... Jack Meeler
Personnel Manager ..... Fran Young
Quarry Supervisor ..... Chuck Hansen
Purchasing Agent ..... Tom Follett

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1989

ARIZONA PORTLAND CEMENT DIVISION
CalMat Inc.

State Sales Office
2400 N. Central, Suite 308, Phoenix 85004 - Phone 271-0069.

Senior Vice President ..... Vaughn S. Corley
Sales Manager ..... Craig Starkey

Rillito Plant & Quarry T12S R11E Sec. 26
P.O. Box 338, Rillito 85654 - Phone (Tucson) 622-3503 - Employees 125 - Limestone quarry 5 miles from plant - Cement - Annual capacity 1,100,000 tons cement - Longest conveyor transport system in state.

Plant Manager ..... Tom Brosnan
Plant Chemist ..... J. Boyett
Plant Engineer ..... John Frye
Chief Electrician ..... Jack Meeler
Personnel Manager ..... Fran Young
Quarry Supervisor ..... Chuck Hansen
Purchasing Agent ..... Tom Follett

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1988

ARIZONA PORTLAND CEMENT DIVISION
CalMat Inc.

State Sales Office
2400 N. Central, Suite 308, Phoenix 85004 - Phone 271-0069.

Senior Vice President ..... Vaughn S. Corley

Rillito Plant & Quarry T12S R11E Sec. 26
P.O. Box 338, Rillito 85654 - Phone (Tucson) 622-3503 - Employees 178 - Limestone quarry 5 miles from plant - Cement - Annual capacity 1,100,000 tons cement - Longest conveyor transport system in state.

Plant Manager ..... Tom Brosnan
Plant Superintendent ..... Michael Robertson
Plant Chemist ..... J. Boyett
Plant Engineer ..... John Frye
Chief Electrician ..... Jack Meeler
Personnel Manager ..... Fran Young
Quarry Supervisor ..... Chuck Hansen
Purchasing Agent ..... Tom Follett

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Quarry Date Sept. 26, 1957

District Near Rillito -----Pima County. Engineer Axel L. Johnson

Subject: Field Engineers Report ---- Information from Fred Kennett, Supt. & personal visit.

Location About 25 miles N.W. of Tucson. Drive 19 miles N. W. of Tucson on Hwy. # 84. Turn left, pass through the Rillito plant, and drive about 6 miles to the quarry.

Owners Arizona Portland Cement Co., a subsidiary of California Portland Cement Co., 612 Flower St., Los Angeles, Calif. Fred Kennett, Plant Supt.
Dominick Chiaro, Quarry Foreman

Principal Minerals Limestone and shale

Principal Mining Activity Quarrying limestone and shale rock to supply the cement plant. 35 men employed at the quarry and trucking to the plant.

Present Mining Operations Limestone rock is quarried from 4 separate open cuts along the sides of a limestone butte, projecting above the level of the valley. Shale rock is quarried from an open cut of two separate levels, which is on the same butte, adjoining the limestone formation.

1 Joy Rotary Drill and 1 Ingersoll Rand Rotary Percussion Drill are used for drilling holes used for blasting. The blasting holes are charged with (a) 80 % by volume of prilled ammonium nitrate energized with Diesel fuel oil, (b) 20 % by volume of Quarry 70% bag powder. (until a short time ago, carbonite was used for this) The blast is set off by use of primer cords. (electric blasting was abandoned about a year ago for safety reasons)

3 electric shovels are used for the rock exaavation and loading the trucks. Two of these are Bucyrus-Erie ~~2x12x~~ 2 1/2 yd., and the other is a P & H. 2 1/2 y 6 -- 30 ton Mack trucks with dual box are used for hauling the rock material from the quarry to the plant, a distance of a little over 5 miles.

The quarry is worked for 11 hours every day. Working force is 35 men, including the truckers.

Information from MINE INSPECTOR'S OFFICE - August 15, 1957

RILLITO QUARRY (3 Claims) - 5 mi. so. Rillito, Ariz. 5-2-57

Owner & Operator - ARIZONA PORTLAND CEMENT
Pres. E. E. Duque 612 S. Flower St., Los Angeles
Sec. Ed R. House " "
Mgr. & Agent - Al McCall " "
Supt. - F. A. Kennett, Rillito, Ariz.

48,000 tons - 43 men

L.A.S.

LIMESTONE

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: A. P. Rice Chief Chemist

   Address:

2. Mine: Ariz Portland Cement 3. No. of Claims - Patented

   Unpatented

4. Location: Rillito Az.

5. Sec Tp Range 6. Mining District

7. Owner: Same

8. Address:

9. Operating Co.: Same

10. Address:

11. President: 12. Gen. Mgr.:

13. Principal Metals: 14. No. Employed:

15. Mill, Type & Capacity: 3 Kilns approx 8000 Barrel Daily Cap.

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☒ (e) Rate tpd.

17. New Work Planned: Have a new (Lime) ore body in the flats below the peak. Putting in conveyor from mine to Plant Storage will cross Santa Cruz + 3 roads Crusher at Mine will crush to minus 2 inch. A $70,000 machine will furnish hourly assays that will make it possible to have the

18. Miscl. Notes: Conveyor dump mine run into new 30,000 Ton storage building ready for grinding & the kiln.
    A new 10,000 Barrel a day kiln is being installed (possible 12,000) it is about the same size as the originals but the reheat section will be a vertical Tank or Stack. New grinding equip being installed Limited to 45 Pounds particulates per hr. plant designed for 32 pounds per hr. (State may change to 22½)

Date: 9-21-71

(Signature) (Field Engineer)

A DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: A. P. Rice, chief chemist

   Address:

2. Mine: Arizona Portland Cement 3. No. of Claims - Patented

   Unpatented

4. Location: Rillito, Arizona

5. Sec Tp Range 6. Mining District

7. Owner: Arizona Portland Cement

8. Address: Rillito, Arizona

9. Operating Co.: Same

10. Address: Same

11. President: 12. Gen. Mgr.: Vern Hendrickson, supt.

13. Principal Metals: None 14. No. Employed: 139

15. Mill, Type & Capacity:

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☒ (e) Rate tpd.

17. New Work Planned:

18. Miscl. Notes: Recent drilling at Twin Peaks reveals sufficient lime for expansion of plant.

Date: 10-3-69

G.W. Irvin
(Signature) (Field Engineer)

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: A. P. Rice - Chief Chemist
   Address: Ariz Portland Cement
2. Mine: Rillito
3. No. of Claims - Patented _____
   Unpatented _____
4. Location: Rillito Az
5. Sec _____ Tp _____ Range _____
6. Mining District _____
7. Owner: Ariz Portland Cement Co
8. Address: _____
9. Operating Co.: Same
10. Address: _____
11. President: _____
12. Gen. Mgr.: _____
13. Principal Metals: _____
14. No. Employed: _____
15. Mill, Type & Capacity: _____
16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☒ (e) Rate _____ tpd.
17. New Work Planned: Plant increase as announced in paper.
18. Miscl. Notes: Employes at time of visit 139
    (Note) Recent exploration has increased reserves

Date: 10-3-69

(Signature) (Field Engineer)

A Z A DEPARTMENT OF MINER L S OURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Oliver Pierce

   Address: Rillito Arizona

2. Mine: Arizona Portland Cement

3. No. of Claims - Patented _____

   Unpatented _____

4. Location: Rillito Arizona

5. Sec 26&35 Tp 12S Range 11E

6. Mining District AMOLE

7. Owner: Arizona Portland Cement Co.

8. Address: as above

9. Operating Co.: same

10. Address: as above

11. President: _____

12. Gen. Mgr.: Verne Hendrickson , Supt.

13. Principal Metals: Cement

14. No. Employed: 130

15. Mill, Type & Capacity: _____

16. Present Operations: (a) Down ☐ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☒ (e) Rate _____ tpd.

17. New Work Planned: Now producing at full capacity of crushing plant.
    but not full capacity of the three kiln's.

18. Miscl. Notes: _____

Date: 3-26-69

(Signature) (Field Engineer)

June 7, 1978

Talked to Mr. Whitley (Sp.?) Phoenix office of Arizona Portland Cement. Told him the Secretary of Interior trying to get a handle on the conversion of mineral related facilities to coal. Asked if his Rillito plant was fully converted? He says it has been converted for 2 years. They have 3 small kilns and one large, all converted to coal. If all operated at capacity they would consume about 18,000 tons per month of coal (from their own mine at Price, Utah). At the moment they are using gas in the 3 small kilns "because it is available during the hot months" and creates fewer environmental problems.

"Nothing whatever confidential about this information."

Joe A

Arizona Portland Cement

Date Printed: 09/30/98

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION SUMMARY

Information from: **Dave Bittell, Plant Manger**

Company: Arizona Portland Cement

Address: P.O. Box 338
City, State ZIP: Rillito, Arizona 85654
Phone: 520-682-2221

MINE: **Arizona Portland Cement Plant**

ADMMR Mine File: Arizona Portland Cement
County: **Pima**
AzMILS Number: 29

SUMMARY

Current status and future plans for the Arizona Portland Cement Plant at Rillito were discussed with Dave Bittlel, Plant Manager. Together with their parent company, California Portland Cement and their corporate owner, Onoda they have received permits to expand the plant's capacity in phases. Over the next five years the Arizona plant's capacity will be increased to 2,300,000 tons of cement per year. The initial phase will increase capacity to 1,560,000 tons per year and involves installing a new raw feed roller mill and converting the existing raw feed mill into a finish mill. The second phase, planned for completion in 2003, requires installing a second pre-calcining tower.

Raw material sources for cement were also discussed. They have four sources of alumina. Shale zones in their limestone quarry is the first and must be balanced. The quantity of shale and its contained alumina is seldom sufficient for the alumina requirements of kiln feed. Additional sources are high alumina clays from the company's clay deposit at Pantano, Alumina Cement Additive (ACA) from slag produce by Imselco's secondary aluminum smelter in Goodyear, Arizona, and alumina fines from petroleum product processing waste in Texas. The ACA from Imselco is currently their favorite material. It is washed slag from a scrap aluminum recycling smelter. Washing is necessary to remove the sodium chloride salt used in the aluminum smelting process. The chloride salt is very detrimental to the cement manufacturing process. When the cement plant has used alumina fines from Texas they must be concerned about volatile organic compounds carried with them. Although

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION SUMMARY

such compounds are not a problem in the precalciner or cement kiln, they are a potential source of surface and ground water contamination during their outdoor storage

They currently have two sources of iron. They are magnetite from New Mexico and hematite from Mexico. For many years they had been using steel mill blast furnace slag from the Kaiser Steel Mill in Fontana California and had a very large stockpile at their plant at Rillito.

Dave Bittel reconfirmed that they are always interested in new possible sources of alumina and iron. Their limestone deposit has more than enough silica for their needs for that constituent. Zones in their Twin Peaks limestone deposit with excessive silica are crushed and size for aggregates.

At one time Cal Mat had operated an aggregate plant at Arizona Portland Cement's Twin Peaks limestone quarry producing rock products. Dave Bittel reported that Arizona Portland Cement acquired that plant when Cal Mat sold their Tucson sand and gravel business and plants to Sunward Materials. Arizona Portland Cement now operates that business as a separate entity under the name of Twin Peaks Rock and Stone, P.O. Box 803, Rillito, Arizona 85654, phone 520-682-7058. There are two employees.

Ken A. Phillips, Chief Engineer Date: September 29, 1998

Date Printed: 05/25/94

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

Information from: **Tom Potter**

Company: Arizona Dept. of Revenue

Address:
City, State ZIP: Phoenix, Arizona 85007
Phone: 542-3529

MINE: **Rillito Mill**

ADMMR Mine File: Arizona Portland Cement
County: **Pima**
AzMILS Number: 29

SUMMARY

Tom Potter, Arizona Department of Revenue, 542-3529, requested information on cement production and consumption in Arizona. He is working on a valuation appeal by Arizona Portland Cement. The company contends their three old kilns are worthless because of depressed market and unfair competition from cheap imports. They want the assessed value for that part of their plant reduced to zero. The Dept. of Revenue feels the kilns have some small value as standby capacity.

I discussed the cement industry with him and explained that exact production data was not available.

Ken A. Phillips, Chief Engineer Date: May 23, 1994

Date Printed: 12/09/93

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

Information from: **Steven A. Regis**

Company: Arizona Portland Cement

Address: P.O. Box 338
City, State ZIP: Rillito, Arizona 85654
Phone: 602-682-2221

MINE: **Rillito Mill (Arizona Portland Cement)**

ADMMR Mine File: Arizona Portland Cement mine file
County: **Pima**
AzMILS Number: **29**

SUMMARY

Specification data on a number of Arizona mined products was obtained for Gerd A. Zimmermann of Scottsdale, the U.S. contact for Hebel GmbH of Germany. They (Hebel GmbH) are interested in building a wall panel plant in the southwestern United States.

Steve Regis, Quality Control Superintendent, Arizona Portland Cement provided typical analysis on their Type I/II Low Alkali Portland Cement. Copies of the data provided by Mr. Regis has been made for the mine file.

Ken A. Phillips, Chief Engineer Date: December 9, 1993

ARIZONA CEMENTS

Rillito, Arizona

C E R T I F I C A T E O F T E S T

Dec 3, 1993

ARIZONA PORTLAND CEMENT TYPE I/II Low Alkali

A.S.T.M. Designation: C 150

Shipped Bill of Lading no.

To

CHEMICAL ANALYSIS:		PHYSICAL DATA:
Laboratory number	21852	Lot number 11-434
Silicon dioxide, SiO2	21.32 %	Fineness, Blaine: Specific surface (sq.m./kg.) 384
Aluminum oxide, Al2O3	4.05 %	Soundness Autoclave expansion, 0 .08 %
Ferric oxide, Fe2O3	3.06 %	
Calcium oxide, CaO	63.09 %	
Magnesium oxide, MgO	4.26 %	Compressive Strength, C109, P.S.I.
Sulphur trioxide, SO3	2.73 %	1 day 3 day 7 day
Loss on ignition	1.06 %	2020 3820 4870
Insoluble residue	.40 %	
Alkalies (% Na2O + 0.658% K2O)	.40 %	False Set: 90
POTENTIAL COMPOSITION:		Vicat Time of Setting: 145 Mins.
Tricalcium silicate, 3CaO.SiO2	55 %	Water: 24.6 %
Tricalcium aluminate, 3CaO.Al2O3	6 %	

Remarks: Apparatus and methods in use in this laboratory have been checked by Reference Laboratory of U.S. Bureau of Standards. Major oxides are analyzed by X-Ray Fluorescence Spectrometry.

STEVEN A. REGIS, QC Superintendent

Date Printed: 12/01/92

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

Information from: **Steve Regis**

Company: Arizona Portland Cement Company

Address: P.O.Box 338
City, State ZIP: Rillito, Arizona 85654
Phone: 602-682-2221

MINE: **RILLITO MILL**

ADMMR Mine File: Arizona Portland Cement
County: **Pima**
AzMILS Number: **29**

SUMMARY

While gathering information for the 1993 Directory Of Active Mines Steve Regis, Quality Control Superintendent, reported that only the new large kiln was now being used. Early in 1992 one or more of the older smaller kilns were also used.

Product retention time is about 2 minutes in the preheater/calcining tower, about 30 minutes in the klin, and 30 minutes in the klinker cooler. Reports of 10 - 12 minutes retention time in the system are incorrect.

Plant capacity continues to be reported at 1,100,000 tons of cement per year. The plant could probably produce more, but the shipping facilities could not handle the higher production in their current configuration.

Ken A. Phillips, Chief Engineer Date: December 1, 1992

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Co. Plant & Quarry — Date September 20, 1960

District At Rillito ---- Pima County — Engineer Axel L. Johnson

Subject: Present Status. Information from George Bideaux.

Reference: Report of Sept. 23, 1958 and Sept. 26, 1957.

Location: Plant is at Rillito, about 19 miles NW of Tucson along Highway #84. Quarry is about 6 miles west of the plant.

Owners: Arizona Portland Cement Co., a subsidiary of California Portland Cement Co., 612 Flower St., Los Angeles, Calif.

Vern Hendrickson, Plant Superintendent, Rillito, Arizona.
Richard Burton, Asst. Plant Supt., Rillito, Arizona.
George Bideaux, Public Relations Director.

Production Activity: Manufacture of Portland cement. Production 8,000 bbl. per day, or 240,000 bbl. per month. Production is on 24 hr. per day schedule - 7 days per week. About 200 men are employed. Of these, about 135 are employed at the plant, 30 in the office and sales force, and about 35 in the quarry.

Improvements: New storage and loading facilities are now being installed, this work being done on contract by M.M. Sundt Construction Co., Tucson, Arizona.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Co. Plant & Quarry — Date Sept. 23, 1958

District At Rillito --- Pima Co. — Engineer Axel L. Johnson

Subject: Present Status. Information from Fred Kennett, Plant Supt.

References Reports of Sept. 26, 1957.

Production Activity Production is 7,000 bbl. per day, or 210,000 bbl. per month. Production is on 24 hr. per day schedule -- 7 days per week.. 136 men are employed at the plant, about 30 men in the office and sales force, and 35 men at the quarry. Total employed about 201 men. 3 kilns are operating --- same as reported on Sept. 26, 1957.

Markets The product is sold only in the State of Arizona, with few minor exceptions. About 75 % of the cement is sold in bulk to cement block manufacturers and the ready mix industry, and the remaining 25 % is sold as sacked material to the various lumber yards. The past year, a considerable amount of cement has been sold to road contractors for use as Soil Stabilization on road construction. This is a new process, which replaces the ABC road aggregates, where the road base is suitable for this process. By this method, the road base is stripped off to a depth of 6 inches, and mixed with cement, water with about 4 % to 10 % of cement used, and replaced in its original position on the road. This method can be used only where the road base is composed of sandy or rocky material. The company maintains a sales office in Phoenix, Ariz. at 221 E. Camelback Road. W. M. (Milt) Whitley is now the sales manager of the Phoenix office.

Proposed Plans There are now no plans for the additions of more kilns to provide greater plant capacity. However, a plant modernization program is under way for gradually modernizing the plant to obtain greater efficiency of operation. The purchase of a good gypsum deposit is still being considered.

Reserves Mr. Kennett informed me that the company has approximately 100 years reserves of limestone rock in the vicinity of the present quarry.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Co. Plant Date Sept. 26, 1957

District At Rillito---- Pima County. Engineer Axel L. Johnson

Subject: Field Engineers Report ---- Information from Fred Kennett, Supt. & Personal Visit.

Location At Rillito, about 25 miles NW of Tucson along Highway # 84.

Owners Arizona Portland Cement Co., a subsidiary of California Portland Cement Co., 612 Flower St., Los Angeles, Calif.
Fred Kennett, Plant Supt.
Vern Hendrickson, Asst. Plant Supt.
O. F. Pierce, Chemist

Principal Product Portland cement. No other product.

Production Activity Manufacture of Portland cement. Production 7,000 bbl. per day, or 210,000 bbl. per month. Production on 24 hr. per day schedule--7 days per week. About 130 men are employed at the plant, and 30 additional men in the Rillito office and sales force.

Plant Operation The trucks dump the limestone or shale material on a pan feeder, which deposits it into an Allis Chalmers 42" x 48" jaw crusher, with jaws set at 4 1/2 inches. This minus 4 1/2 inch material is moved by conveyor belt and passed through 3/4 in. x 1 1/8 in. duplex screens, the undersize from the screens going by belt conveyor into Rock Storage bins, and the oversize plus 3/4 in. material going by belt conveyor to an Impact mill. The materail crushed by the impact mill then travels by another belt conveyor to a second set of 3/4 in. x 1 1/8 in. duplex screens, where the undersize goes by belt conveyor to the Rock Storage bins, and the oversize plus 3/4 in. material going back to the impact mill for regrind.

In the rock storage bins, the 3/4 in. material is mixed with a large crane bucket, approximating the correct proportions of limestone and shale. It is then hoisted by means of the crane bucket into a number of Mill Feed Bins, from where it is conveyed into Feeder Weights, where the material is again mixed to more exact proportions of limestone and shale. It is then conveyed to some more feed bins, from whence it is delivered into 4 -- 91/2 x 10 Allis Chalmers Ball Mills.

The ball mills, with the aid of Sturdevant Separators on a closed circuit, grind the material to 90 % passing a 200 mesh. From the ball mills and separators, the material is conveyed into the kilns for roasting.

Three kilns are used for treating the product -----
2 -- Allis Chalmers Rotary Kilns -- 9 1/2 ft. diam. x 335 ft. long
1 -- F. L. Smidth Rotary Kiln -- 10 ft. diam. x 335 ft. long.
The first two have a capacity of 2000 bbl. per day each.
The third one has a capacity of 3,000 bb. per day.
Total capacity of the three kilns is 7,000 bbl. per day.
The material is roasted in the kilns from 2 to 4 hrs under a temperature of 2700 deg. F., natural gas being used as fuel. It is burnt to incipient fusion, and calcined and klinckered, necessitating regrinding by additional ball mills.

From the kilns, the hot product is dropped into 3 Fuller Coolers --- 6 ft. x 33 ft. (one cooler for each kiln), where it is cooled by means of an air blast passing up through a pan feeder. From the coolers, the material goes to a set of Klinker Storage Bins, and from there to the Mill Feed Bins. From these feed bins, the material is passed to Feeder Weights, where the correct proportion of gypsum is added, varying from 2 to 4 % by volume. It is then conveyed into some more Mill Feed Bins, from where it is conveyed to the 5 Ball Mills for regrinding.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Arizona Portland Cement Co. Plant Date Sept. 26, 1957

District At Rillito ------ Pima County. Engineer Axel L. Johnson

Subject: Field Engineers Report (continued from page 1*)

5 Ball Mills, each 7 ft. x 26 ft. are used for regrinding the material. These ball mills, with the aid of Sturdevant Separators on a closed circuit, grind the material to minus 200 mesh. From the ball mills, the finished product is conveyed to 18 Storage Tanks, each having a capacity of 18,000 barrels (1 barrell is equal to 376 lb.)

The company has a generating plant for generating their own electricity. 5 Cooper Bessemer Generators are used. These are driven by 3 - 8 cyl. Diesel Fuel engines and 2 - V 12 Natural Gas engines.

Company also operates 2 Air Compressors,----- one 1,000 c. f. m., and one 500 c. f. m. to supply the needs of the plant.

Markets The Portland Cement product is sold only in the State of Arizona, and is the only Portland Cement plant in Arizona. About 75 % of the cement is sold in bulk, and the remaining 25 % is sacked. About 1/2 of the product is shipped out by train, and the remaining 1/2 is sent by truck. (this applies to both the bulk and the sacked material) The bulk material is sold to the cement block plants and to the ready mix industry, while the sacked material is sold mostly to the various lumber yards. The company maintains a sales office in Phoenix, Ariz. at 221 E. Camelback Road, with Walter Coleman as sales manager.

Past History

(1) First kiln started operation in 1948.
(2) Second kiln installed and brought into operation in 1951.
(3) Third kiln was added in 1955.
(4) Plant operated at about 60 % capacity through 1956, and the first two months of 1957.
(5) Plant has operated at full capacity of 7,000 barrells a day since Mar. 1, 1957.

Proposed Plans

(1) Present plans call for installing one additional kiln to go into production the first part of 1958.

(2) Company is also considering the purchase or lease of a gypsum deposit for supplying their needs for gypsum used in cement manufacture. (Gypsum is now purchased from the Arizona Gypsum Corporation). Mr. Kennett inquired from the field engineer for the location of such a deposit.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine: Arizona Portland Cement Co. Plant — Date: Sept. 26, 1957

District: At Rillito ------- Pima County. — Engineer: Axel L. Johnson

Subject: Field Engineers Report (continued from pages 1 and 2)

FLOW SHEET

Trucks
↓
Pan Conveyor
↓
Allis Chalmers
42" x 48" Jaw Crusher
↓ -4.5"
Screens
3/4" x 1 1/8" duplex ← plus 3/4" → Impact Mill → Screens 3/4" x 1 1/8" duplex → (plus 3/4" back to Impact Mill)
↓ - 3/4"
Rock Storage Bins ← - 3/4"
↓
Mill Feed Bins
↓
Feeder Weights
↓
Mill Feed Bins
↓
Allis Chalmers Ball Mills
4 -- 9 1/2' x 10 '
↓ closed circuit
Sturdevant Separators
↓ -200
Proportioning Silos
↓
Kiln Storage Silos
↓
Kilns
2-- Allis Chalmers 9 1/2 ' x 335'
1-- F. L. Smith ----10' dia. x 335'
Capacity all 3 ------ 7,000 bbl. per day → To top of page

from bottom of page →
Kilns
(as shown below)
↓
3 Fuller Coolers
each 6' x 33'
↓
Klinker Storage Bins
↓
Mill Feed Bins
↓
Feeder Weights
(2 to 4 % Gypsum added here)
↓
Mill Feed Bins
↓
5 Ball Mills
each 7' x 26'
↓ closed circuit
Sturdevant Separators
↓ -200
18 Storage Tanks
8,000 bbl. capacity each
Total Capacity ---- 144,000 bbl
↓
Markets

Additional

(1) Fuel -- El Paso Nat. Gas
(2) Power -- Generating plant for generating electricity, 5 Cooper-Bessemer Generators driven by 3-8 cyl. Diesel Fuel engines and 2- V 12 Natural Gas engines.
(3) Air -- 2 Air compressors--- one of 1,000 c. f. m. capy. and one of 500 c. f. m. capy.