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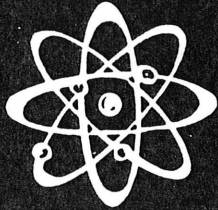
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AEC



**UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545**

No. J-270
Tel. 973-3335 or
973-3446

FOR IMMEDIATE RELEASE
(Thursday, December 1, 1966)

AEC, EL PASO NATURAL GAS COMPANY
TO NEGOTIATE CONTRACT TO CONDUCT PROJECT GASBUGGY

The Atomic Energy Commission has authorized the negotiation of a contract with the El Paso Natural Gas Company (EPNG) to conduct a proposed government-industry project called "Gasbuggy" to determine whether or not nuclear explosives can be used to increase natural gas production. The action follows an extensive review of the proposed project by the AEC and Department of the Interior agencies, particularly the U. S. Bureau of Mines (USBM) which will represent Interior in the negotiations and also be a participant in the project. Preparations for the experiment could be completed by the late spring or early summer of 1967.

The contract negotiations stem from a proposal by the company to the AEC in June 1965, that a nuclear explosive be detonated deep underground at a site in the San Juan Basin of New Mexico, 55 air miles east of Farmington. EPNG's proposal followed an 18-month feasibility study by the company, the USBM and the AEC, with technical assistance from the AEC's Lawrence Radiation Laboratory at Livermore, California. The study team investigated the proposed use of nuclear explosives to fracture "tight" gas-bearing formations to improve gas recovery and production. The study concluded that the concept is feasible and recommended that a nuclear experiment be conducted at the San Juan Basin Site.

The study outlined an experiment with a nuclear explosion at a depth of about 4,000 feet. The current tentative design concept envisages about a 20 kiloton explosion. The depth tentatively chosen is related to the depth of the gas-bearing formations and their geology and is more than adequate to contain the explosion.

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(NOTE TO EDITORS AND CORRESPONDENTS: This information also is being issued by the Commission's Operations Offices at Albuquerque, New Mexico; Las Vegas, Nevada; and Berkeley, California.)

Pipeline Crosses Four Southwestern States

EL PASO, Texas — An army of pipeliners in construction spreads stretching from Pecos, Texas, to the California-Arizona border is pushing a new steel pipeline through rugged mountains and across dusty plateaus to bring increased gas supplies to a four-state southwestern area this year.

The construction is El Paso Natural Gas Co.'s "310 Project" designed to supply an additional 310 million cubic feet of west Texas natural gas daily to California, Arizona, New Mexico and west Texas. The project is a looping of El Paso's present system and will allow the transmission company to increase its gas delivery to this region by about 10 percent.

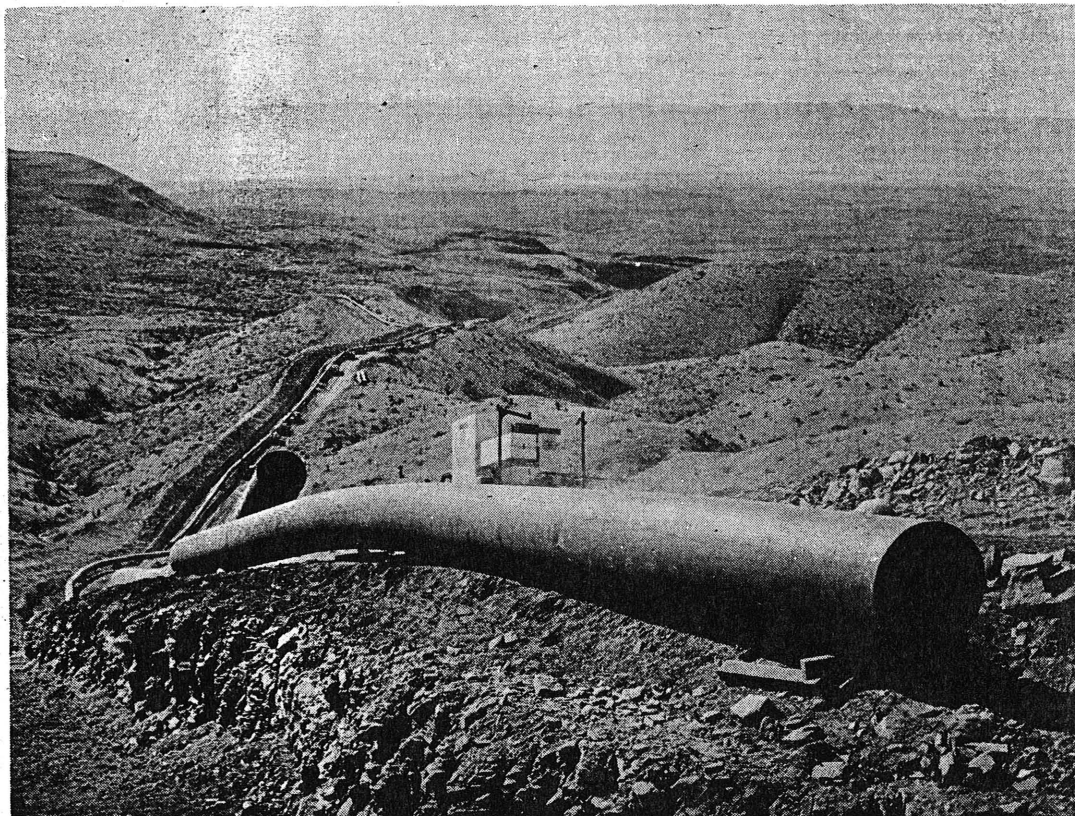
Growing industrial and residential demands for gas in the region have generated the need for the new line.

For the \$120 million expansion project, U.S. Steel, a major supplier of the X-60 double submerged arc-welded pipe in 36, 30, and 24-inch O.D. sizes, is shipping pipe from Utah and Pennsylvania to locations in Texas, New Mexico and Arizona. Paralleling much of El Paso's existing pipeline to California, the new construction includes mainline, gathering, field and loop pipelines.

Moving westward from Pecos and El Paso's Waha Plant, pipeliners have pushed new 36-inch O.D. mainline pipe across the Texas plateau at an average elevation of 2700 feet until reaching the rugged terrain of the Delaware Mountains. In the Delaware Mountains-Guadalupe Mountains region—former stronghold of the Mescalero Apaches—elevations increase to an average 3900 feet.

On the western edge of the Delawares, the pipeline had to be built over a 5317-foot escarpment named "Wolverton Hill" by the pipeliners. Coming down the western face of the escarpment through dolomitic limestone and some sandstone, equipment had to be lowered by cable over the 20 to 30 degree slopes.

To facilitate construction over the mountainous right-of-way, the 40-foot-long, 36-inch O.D. (mostly in .438-inch wall) pipe from U.S. Steel's Geneva Works in



Pipeline Snaking Through West Texas

Utah was delivered by rail to Van Horn, Texas, for double jointing into 80-foot lengths. From Van Horn the 80-foot sections were trucked to the pipeline right-of-way. Van Horn is one of four double jointing yards established at various points along the route.

From the Delaware Mountains to Wilcox, Arizona, average plateau elevation of the construction is 3900 feet.

According to El Paso Natural Gas Co., lowest elevation to be traversed on the total project is

the Ehrenberg, Arizona, Colorado River crossing at 320 feet. The highest elevation faced is 5690 feet in the Winchester Mountains near Wilcox.

When completed in the summer of 1969, the new construction will transport gas from the prolific Delaware and Val Verde basins in west Texas through two new sections of 30 and 36-inch O.D. mainline pipeline totaling 360.5 miles and through 193.2 miles of 30-inch O.D. loop pipeline. The remaining

116.4 miles of construction work consists of 8-5/8-inch O.D. through 24-inch O.D. pipe for gathering and field lines.

Southern California is scheduled to take delivery of 154 million cubic feet of gas daily from the new supply when it goes on stream. Northern California will receive about 103 million cubic feet of gas daily. About 53 million cubic feet daily will be delivered from the new lines to Arizona, New Mexico and west Texas.

Beginning after 1980

Firm will buy natural gas in Algeria for Southwest

Special to The Republic

HOUSTON — The El Paso Natural Gas Co. announced Monday it will buy 650 million cubic feet of gas per day from Algeria to supply the American Southwest, but the effect in Arizona was unknown.

The natural gas importation to supplement El Paso's gas fields will not begin until after 1980 and will have no effect on possible cutbacks to industrial users in Arizona this winter, an El Paso spokesman said.

THE ARIZONA REPUBLIC

OX (Section B) Page 1
Tuesday, Oct. 12, 1976

Paul Dean is on vacation. His column will resume when he returns.

A spokesman for Arizona Public Service Co. said it is unknown at this time if an increase in El Paso's available gas supply will result in any corresponding increase in the gas allotment from El Paso to APS. Last year APS purchased an average of 65 million cubic feet of gas per day from El Paso. All of APS' gas supply is purchased from El Paso.

The APS supply of natural gas from El Paso is limited by the Federal Power Commission to the level of supply available as of Oct. 31, 1974. It cannot grow without a new determination by the FPC.

The APS spokesman said if the imported gas to El Paso is additional supply it may postpone a predicted cutback to Arizona residential users in the 1980s. However, if the Algerian supply is only supplemental to a decreased availability of gas from U.S. fields the impact may not be felt at all, he said.

The contract with Sonatrach, an Algerian oil and gas company, must be presented for approval to the FPC, said El Paso's Joseph T. Arnett.

The contract covers the importation at Texas gulf ports of one billion cubic feet of gas per day from Algeria. Arnett said 650 million cubic feet per day of that amount will be made available to El Paso's existing customers in west Texas, New Mexico, Arizona, southern Nevada and California. The remaining 350 million cubic feet per day will be used in other parts of the country.

The natural gas from Algeria will be delivered in liquid form through facilities to be constructed, owned and operated by El Paso in the Texas gulf coast area, Arnett said.

The project, called LNG2 by El Paso, follows LNG1 which is a contract with the same firm in Algeria to import one billion cubic feet of gas per day to ports on the East Coast. Importation on the East Coast should begin by the latter part of 1977, Arnett said.

APS predicted last week that industrial and large commercial users of natural gas might face 181 days of service curtailment this winter. Last winter, there were 108 days of curtailment, the utility reported.

Jerry Human, APS vice president for customer services, said cutbacks and

shortages could reach the small commercial and residential customers in the early 1980s, unless there is an improvement in the supply situation.

In June, the state Corporation Commission directed APS to make no more gas service connections after December 1976.

DEC 1 1966

ARIZONA PRESS CLIPPING
BUREAU - Phoenix

El Paso Natural Gas Co.

Mine, Mill Cost Estimate To ¹²⁶

Operation Near Duval Mine To Employ About 35 Total

The Mohave County mine and mill of El Paso Natural Gas Co. will be considerably smaller than first reports stated last week, a spokesman for the company said this week.

Contacted in El Paso, a spokesman for the firm said a newspaper account of the firm's plans was "grossly exaggerated." He said cost of the plant would be less than \$1 million. The published report gave an estimate of \$28 million. Total employment for the operation will be about 35, he said.

The El Paso operation is around the site of the old Emerald Isle mine about 15 miles northwest of Kingman and about three miles south of Chloride. The Texas firm purchased from C. G. (Pat) Patterson of Chloride 28 mining claims containing 560 acres. Also purchased in the area were several other claims with "no proven ore value," the spokesman said. A number of claims in the area have also been filed by El Paso.

Capacity of the mill is to be about 800 to 850 tons of ore per day. The end product is to be "cement" copper of between 60 and 70 per cent purity. The concentrate is to be sold to a broker

and will then have to be refined and smelted, the spokesman said.

Ore will be concentrated in the mill by leaching, precipitation and flotation. All plans for the mill have not been finalized, the spokesman said, and structural details are not known.

The name of the supervisor for the initial operation is not available since the man who will be in charge has not yet been notified by the company, the company spokesman said.

The M. M. Sundt Construction Co. of Tucson is now removing an estimated 1½ million tons of overburden to open the mine. The mine is scheduled to go into production in the summer of 1967.

Announcement of the new venture followed by less than a week, the announcement by General Cable Co. of construction of a new copper wire, rod and cable manufacturing plant to be built at a cost of \$10 million at the Kingman Airport.

Patterson, who sold the mining property to El Paso, had developed and operated his own concentrating system for several years prior to the sale.

Patterson said he bought seven claims about 11 years ago from Edith Downie of Los Angeles. He later staked out 21 of his own. He said the original claims had been located about 60 years ago by several different people whose names he didn't know.

Patterson had worked the claims in 1955 and 1956 and about three years ago built a heap leaching plant which produced copper concentrates of about 50 to 55 percent purity. The ore is chrysocolla and tenorite and ran about 1.2 to 1.5 per cent copper and contained no other metals, he said.

After trying for several years

to interest major companies in building a plant, Patterson built his own simple leaching system. He credits it with enabling him to sell the property to El Paso.

The ore, dug from an open pit mine, was placed in piles on a one-acre area which had been waterproofed by compacting a four-inch layer of clay over a four-inch layer of old tailings. Water and sulphuric acid from concrete mixing vats was sprayed over the ore, leaching out the copper.

The acid solution flowed to one corner of the leaching area to a plastic pipe which led downhill to concrete leach vats which contained old tin cans. By electrolytic action, similar to a car battery, the copper replaced the iron in the cans.

Patterson has been in mining for nearly 40 years, the last 20 as a small mine operator. He worked at mines in New Mexico and at Miami, Ariz., before coming to Chloride about 25 years ago.

He is a native of De Leon, Texas, and was reared there, going to New Mexico in 1931.

Patterson and his wife, Gladys, live in Chloride. They have two grown sons, Earl, who has been with Central Intelligence Agency for 20 years, and Don, an attorney in Amarillo, Texas. They also have two grandchildren.

Asked what he plans to do now that he has sold the mine, Patterson said he, "Had been at it a long time and would like to do a little resting."

He said he also plans to do some fishing.

Be Near \$1 Million

Pay Dirt 11-29-71

El Paso Gas Plans Plant To Convert Coal into Gas

El Paso Natural Gas Company has announced that it plans to construct the world's first commercial plant for the conversion of coal into a BTU gas suitable for pipeline transmission.

The plant will be located in New Mexico near El Paso's existing pipeline system. Construction of the plant will involve capital expenditures of approximately \$250 million, the company said.

Howard Boyd, chairman of the board, said that the project—designed to produce 250 million cubic feet of gas per day — will aid the company in maintaining its present level of deliveries for an additional period of time.

An application will be filed with the Federal Power Commission within the next few weeks for authority to construct the new facilities. Initial work on the plant is expected to begin shortly after authorization by the Federal Power Commission, and assuming prompt approvals, first deliveries could begin by 1976.

Gasification of coal is a technology for the conversion of coal deposits into a synthetic gas—a pollution-free form of energy. El Paso has been active in this field since the early 1950's. The company contemplates the use of the Lurgi process for coal gasification.

El Paso Natural Gas has acquired recoverable coal deposits in the magnitude of 900 million tons in the area of the location of its pipelines. Mining plans are well advanced and include careful consideration of the environment. Boyd said that additional coal deposits in the region are available to El Paso.

El Paso Natural Gas Company is a diversified natural gas transmission firm which serves customers in 11 western states through a 23,000-mile pipeline network. In addition, it has interests in the fields of petrochemicals, plastics, synthetic fibers,

textiles, agricultural chemicals, insurance, wire fabrication, oil and gas production, mining and the utilization of nuclear explosives for industrial purposes.

Pay Dirt 6/26/72

Of Mines and Men

Heavy test drilling activity is reported presently underway in the Ajo area by three firms, two of them from out of state, according to our Ajo correspondent.

El Paso Natural Gas Company has two rigs working three miles southeast of town in the Ajo Valley.

Beeman Drilling Company of Salt Lake City and the C. & S. Drilling Company of Casa Grande are working at several locations southwest of Ajo and also in Ajo Valley, between Darby Wells and Growler.

All test drilling is being done on claims that border on property presently owned or operated by the New Cornelia Branch of Phelps Dodge Corporation. Beeman and C. & S. operations also border on the Cabeza Prieta Game Refuge.

El Paso Gas to spend \$28-million on Arizona copper project

EL PASO NATURAL GAS CO. has announced the development of an open-pit copper mine and concentrator on the Emerald Isle mining claims near Chloride, in Mohave County. El Paso purchased 560 acres of mineral land from C. G. Patterson of Chloride, former operator of the Emerald Isle.

S. M. Runke, chief metallurgist for the firm, said the copper mine and plant would be in operation by the fall of 1967. C. F. Elwanger will be transferred from El Paso's Tuba City office to be superintendent in charge of construction. His office will be at Kingman.

The M. M. Sundt Co. of Tucson has

the contract to remove 1.5-million cubic yd of overburden for the open-pit development. Sundt has a fleet of 35-yd scrapers, bulldozers and drills operating one shift a day currently on the job. Bob Husky is project foreman for Sundt.

Construction of a 900-tpd flotation plant began shortly after Jan. 1, 1967.

E/MJ 2/1967

El Paso To Import Gas, But Arizona Forecasts Poor

El Paso Natural Gas Company announced October 11th it will buy 650 million cubic feet of gas per day from Algeria to supply the American Southwest, but the effect in Arizona is not yet known. The natural gas importation to supplement El Paso's gas fields will not begin until after 1980.

A spokesman for Arizona Public Service Company said it is not known at this time if an increase in El Paso's available gas supply will result in any corresponding increase in the gas allotment from El Paso to APS.

The APS supply of natural gas from El Paso is limited by the Federal Power Commission to the level of supply available as of October 31, 1974. It cannot be increased without a new determination by the FPC.

The APS spokesman said if the imported gas is additional supply it may postpone a predicted cutback to Arizona residential users in the 1980's. However, if the Algerian supply is only supplemental to a decreased availability of gas from U.S. fields the impact may not be felt at all, he said.

The contract with Sonatrach, the Algerian national oil and gas company, must be presented for approval to the FPC, said Joseph T. Arnett, a spokesman for El Paso.

The contract covers the importation at Texas gulf ports of one billion cubic feet of gas per day from Algeria, transported in liquid form in special tankers. Arnett said 650 million cubic feet per day of that amount will be made available to El Paso's existing customers in west Texas, New Mexico, Arizona, southern Nevada and California. The remaining amount will be used in other parts of the country.

El Paso has a previously completed contract with Sonatrach to import another one billion cubic feet of Algerian gas per day to ports on the East Coast. Deliveries should begin in the latter part of next year, Arnett said.

A few days before the announcement, Arizona Public Service Company said in Phoenix October 8th that industrial and large commercial users of natural gas might face 181 days of service curtailment this winter. Last winter there were 108 days of curtailment, the utility reported.

"If the 1976-77 winter heating season is a normal winter, our gas supplier projects six

months, 181 days, of partial or total curtailment from November 1976 through April 1977 for our low-priority customers," said Jerry Human, APS vice president for customer services.

"Furthermore, from a long-range viewpoint, present indications are there will not be any substantial amount of industrial gas after December 1976 and that small commercial and residential gas customers could expect shortages in the early 1980's, unless there is an improvement in the supply situation," he said.

PAY DIRT for October 24, 1976

WALL ST. JOURNAL August 2nd 1967

El Paso Natural Gas Agrees to Acquisition Of Narragansett Wire

Gas Firm to Issue 800,000 Shares Initially, Additional Ones Based On Narragansett Profit to 1969

By a WALL STREET JOURNAL Staff Reporter

NEW YORK—El Paso Natural Gas Co. announced an agreement with stockholders of closely held Narragansett Wire Co., Pawtucket, R.I. to acquire all the stock in that electrical wire maker. Narragansett is already engaged in a joint copper-mining venture with El Paso.

Terms of the agreement call for initial issuance to Narragansett holders of 800,000 shares of El Paso common stock, with later issuance of additional shares, based on earnings of Narragansett in the three-year period ending Dec. 31, 1969.

On the basis of the closing price of El Paso common of \$20.25 a share on the New York Stock Exchange yesterday, the initial transaction involves El Paso shares having a current market value of \$16,200,000. Closing of the transaction is scheduled for the fall.

The acquisition is a further diversification for the already highly diversified El Paso. Principally an operator of 20,000 miles of natural gas transmission lines in 11 Western states, El Paso also has extensive operations in petrochemicals, fertilizer, plastics, textiles, mining and oil and gas production.

Howard Boyd, chairman of El Paso, noted that the move is a logical extension from the company's decision last year to enter copper mining. El Paso and Narragansett are developing a mine near Casa Grande, Ariz., and El Paso, alone, is opening another Arizona mine. Both will go into production shortly, he said.

Current management and personnel will be retained at Narragansett, which makes electrical wire for residential, commercial and industrial use, Mr. Boyd said.

El Paso Natural Gas Company has asked the Federal Power Commission for authority to increase its rates to wholesale customers on its Southern Division to compensate for higher costs in providing natural gas service. The company says the increase is necessary because of higher costs of gas supplies, borrowed capital, labor, materials, supplies, taxes and the unavailability of domestic sources of natural gas necessary to fully utilize the company's facilities.

Under the application to the FPC, rates to El Paso's Southern Division customers in Arizona, California, southern Nevada, New Mexico and west Texas would be increased by an average of about 7 cents per thousand cubic feet of gas. This would result in total additional revenues of approximately \$70 million annually.

The proposed rates are expected to provide a rate of return of 9.25 percent on invested capital, the company said.

PAY DIRT for February 25, 1974

Two new, four - year scholarships have recently been established in the College of Mines at the University of Arizona for American Indians by El Paso Natural Gas Company.

The scholarships will go to Indian students in mining, geological, chemical or metallurgical engineering. Each scholarship amounts to \$800 per academic year and will be awarded beginning September 1975.

El Paso Natural Gas also funds two, four - year scholarships for black students and two scholarships for Mexican - American students in the UA College of Mines. Established in 1966 at \$500 each, these scholarships will be increased to \$800 next fall.

El Paso Natural Gas also provides its scholarship recipients with summer jobs.

Pay Dirt 11/24/74

Earnings for the second quarter of 1975 of El Paso Natural Gas Company, which supplies all of Arizona's natural gas, increased, but earnings of its parent company, the El Paso Company, dropped about 50 percent.

Actual profit figures of the gas subsidiary were not available, a company spokesman said. The company earned \$9.5 million, compared with profits of \$18.5 million for the second 1974 quarter.

Howard Boyd, chairman, said lower profits in the petrochemical subsidiary and substantially lower profits for the synthetic fibers and textile division were responsible for the drop in earnings.

PAY DIRT for August 25, 1975

El Paso Natural Gas Company has established six four - year minority scholarships within the University of Arizona College of Mines. Each scholarship will amount to \$800 per academic year.

The scholarships, which will be awarded beginning in September 1975, will go to minority students in mining, geological, chemical or metallurgical engineering. In addition, the company will provide its scholarship recipients with summer jobs.

PAY DIRT for October 28, 1974

The University of Arizona has announced that two four - year scholarships recently established in the UA College of Mines have been designated for American Indians.

The scholarships, funded by the El Paso Natural Gas Company, will go to Indian students in mining, geological, chemical or metallurgical engineering. Each scholarship amounts to \$800 per academic year and will be awarded beginning September 1975.

El Paso Gas also funds two four - year scholarships for black students and two scholarships for Mexican - American students in the UA College of Mines. Established in 1966 at \$500 apiece, these scholarships will be increased to \$800 next fall. The company will also provide its scholarship recipients with summer jobs.

PAY DIRT for October 28, 1974

An agreement has been reached between Hecla Mining Company and American Smelting and Refining Company providing for treatment of Hecla's one - half share of the copper concentrates to be produced by the Lakeshore mine near Casa Grande for a period of six years, with continuation year to year for an additional four years unless terminated by either party on one year's notice.

Asarco will purchase 40 percent of the accountable copper on the basis of Metals Week U.S. producer price and will return 40 percent of the accountable copper on toll.

El Paso Natural Gas Company, owner of the other half of production from Lakeshore, has entered into an identical agreement for treatment of its half of the copper precipitates.

It is anticipated that the property will come into production in the first half of 1975.

PAY DIRT for December 23, 1974

● El Paso Gas Asks Rate Hike
El Paso Natural Gas Company has asked the Federal Power Commission for authority to increase its wholesale natural gas prices to 5.38 cents a thousand cubic feet, or 7.5 percent. El Paso said the increase which would raise annual revenue by \$50 million, is needed to cover higher costs of gas and operational expenses.

The increase would affect customers in Arizona, California, southern Nevada, New Mexico and west Texas.

PAY DIRT for February 23, 1976

Pay Dirt 7/24/72

without interruption.
American Smelting and Refining Company

Smelter Operators Preparing For Natural Gas Shortage

In preparation for impending shortages of natural gas this coming winter, Arizona copper smelter operators and mining companies are busy this summer adding tanks to provide storage for many millions of gallons of fuel oil so operations will not have to be curtailed.

El Paso Natural Gas Company this spring advised large industrial gas users that the shortage this winter will be more acute, especially if there should be a prolonged cold spell anywhere in its distribution area.

One mining executive said, "When they (El Paso Gas officials) came to us and told us what to expect in the way of gas supplies and the percentages by which we would be cut back, we looked back and compared their previous predictions with what actually occurred. When we looked at those figures, we decided we had better believe them."

As a result, smelter operators throughout the state are increasing fuel oil storage capacity. As the tanks are completed they are being filled at the rate of so many gallons per month prorated amongst the companies on the basis of how many million gallons a month can be allocated through the pipelines terminating in Tucson to fuel oil as the lines also carry supplies of gasoline, diesel and oil and other petroleum products.

It is planned to have all the tanks filled by October 1st or shortly thereafter. During cold weather, the oil companies will not be able to keep up with consumption but will replace consumed oil as rapidly as possible.

Phelps Dodge Corporation is adding extensive capacity at its Morenci smelter and at its new mine at Tyrone. Company officials did not have exact figures at their fingertips, but said it would be sufficient for 30 days of continuous operation.

The fuel oil storage at Tyrone is needed for operation of the company's powerplants which use dual fuel (gas or oil) engines. The percentage cuts would also apply to these engines, so the company is increasing fuel oil storage.

Phelps Dodge said it already has sufficient fuel oil storage at its smelters in Douglas and Ajo for at least a 30-day supply.

At Kennecott's Ray Mines Division, the Division and W&B, Inc. of Las Cruces, New Mexico completed arrangements early this summer to lease fuel oil storage facilities of 4.25 million gallons for the next five years.

A 250,000 gallon tank will be erected at the mines plant where there currently is storage for 46,000 gallons.

At the smelter, a 4-million-gallon tank will be erected. Currently there is storage for 950,000 gallons at the smelter.

Kennecott has recently been advised that gas shortages may be such that even this storage capacity may have to be sharply increased if operations are to continue

is adding 2 million gallons to its fuel oil storage capacity at its Hayden Smelter, bringing the total to 2.5 million gallons. The company has had one 500,000-gallon tank and is now adding two tanks of 2 million gallons each. The work is being done by Garland Steel and is to be completed by early September.

M. J. Winkel, manager of the Asarco plant, said new burners to utilize fuel oil have been added. He estimated fuel oil consumption would be about 50,000 gallons per day.

At the big Magma smelter at San Manuel, four tanks of 2 million gallons each are being added to the present capacity of 400,000 gallons, making a total of 8,400,000 gallons.

Two of the tanks are already up and are being filled with the other two under construction and scheduled to be completed shortly.

The company believes these will be adequate for the smelter to operate for an extended period without any natural gas deliveries.

Up at Inspiration there is already sufficient storage capacity, installed last year, for the smelter of Inspiration Consolidated Copper Company to operate for about 30 days. R. C. Cole, vice president and general manager, said that they wouldn't be putting in any more fuel oil storage capacity, of course, because the company is constructing an electric furnace as its approach to elimination of air pollution and would have no further use of gas or oil for the smelter once it has been completed.

Estimates of the fuel cost to fire the smelters with oil run from two to two-and-a-half times that for natural gas. One company estimated the costs at 40 cents per million btu's for gas and \$1.03 for fuel oil. But it is still cheaper, of course, than having to shut down for even a few days, to say nothing of the lost production and interruption of the smooth operation of a complex plant.

Disturbing to the industry is the expectation the situation is going to get worse unless substantial new supplies are discovered and brought into production.

Arizona Republic 9/28/68

Testing confirms copper discovery

Central Arizona Bureau

CASA GRANDE — A large body of copper ore has been discovered 25 miles south of here, but further testing must be done to determine the feasibility of mining it, the El Paso Natural Gas Co. said yesterday.

The firm said an independent mining consulting firm has confirmed the presence of an estimated 96 million tons of copper sulfide ore, averaging nine-tenths of 1 per cent copper.

"We don't know how much further testing will be required, but the results will determine when we'll be able to operate commercially and whether it will be feasible as an open pit or underground mine," said Truett Hollis, head of the Lakeshore mining operation for El Paso.

THE NEW discovery is in the general vicinity of the company's Lakeshore properties open pit operation, which was started a year ago.

The new ore body, which is about 700 to 1,000 feet below the surface, is overlaid by very low grade copper oxide ore deposits, a spokesman for the company said.

Lakeshore Properties is owned jointly by El Paso Natural Gas and Narragansett Wire Co., which was acquired by the El Paso firm a year ago. Most of the land the firm is using is leased from the Papago Indian tribe.

New Copper Processing Plant To Be Located Near Kingman

KINGMAN (AP) — The El Paso Natural Gas Co. plans to have a multimillion dollar copper processing plant in operation near Kingman by mid-1967.

Utility spokesmen declined to reveal exact cost of construction and equipment, but it is estimated at about \$28 million.

News of the new operation

provided Kingman with its second big economic boost of the week.

EARLIER, THE General Cable Corp. announced it will build a \$10 million copper rod and wire plant at the Kingman Industrial Park. The payroll is estimated at \$1 million annually.

S. M. Runke, chief metallurgist for the utility, said the fully automated plant will be capable of processing 900 tons of copper ore per day.

He said about 25 to 30 men will be needed to operate the mill, to be located about 15 miles northwest of Kingman and three miles from the Duval Corp.'s mine-mill complex.

THE SUNDT Construction Co. of Tucson has already begun removing 1.5 million cubic yards of overburden to allow for the mill.

First phase of the construction will be under the direction of C. F. Elwanger, formerly of El Paso's Tuba City, Ariz., office.

It has not been determined if El Paso's mill will serve as the chief supplier for General Cable's operation.

Kingman's population has jumped from 3,700 to 9,000 in four years, since the Duval Corp. began its copper mining operation.

Ariz. Republic
11/26/66
El Paso
Firm Will Also Mine

By BILL NIXON
Northern Arizona Bureau

KINGMAN — Plans to build and operate a near-million-dollar copper mine and mill in this area were confirmed last night by the El Paso Natural Gas Co.

The Sundt Construction Co. of Tucson is now removing 1.5 million cubic yards of overburden to make way for the open pit mine and mill, described by an El Paso spokesman as a "relatively small copper operation."

News of the development came on the heels of announcement earlier this week that a \$10 million copper rod and wire manufacturing plant will be built here by a national cable company.

The two projects, however, are unrelated, according to the El Paso firm.

The El Paso spokesman said total cost of the mine-mill complex will be "something less than \$1 million."

THE SITE is approximately 15 miles northwest of here and within 3 miles of the Duval Corp.'s copper mine and mill installation.

S.M. Runke, chief metallurgist for the gas company, told The Arizona Republic by telephone from his Texas home that the new plant will be in full production by mid-1967. It will be automated and capable of processing 800 tons of copper ore per day, he said.

Runke said 35 to 40 men will be employed to operate the complex.

El Paso said it has a working partner in the Kingman operation, but the name of the firm and the extent of its interest were not revealed.

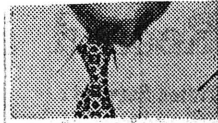
The new construction site is on the old Emerald Isle mining claim property formerly owned by C. G. Patterson of Chloride. El Paso was reported to have purchased a 560-acre claim from Patterson for an undisclosed price. The firm also is said to have purchased 60 other mining claims adjacent to the Patterson property.

Five days ago it was announced that the General Cable Corp. of New York will build a multimillion-dollar copper rod and wire plant at Kingman Airport Industrial Park, to have an annual payroll of \$1 million.

ALTHOUGH El Paso said there was no connection between its mine-mill and General Cable's manufacturing plant, the latter firm plans production shortly after the new mining venture is under way.

Until three years ago, Kingman was principally a U.S. 66 tourist stop for motorists heading for Las Vegas, Southern California and Lake Mead. In 1962 the city's population was 3,700. It rose to 7,500 in 1965, and estimates now place it a near 9,000.

The burgeoning population is credited mainly to the Duval Corp.'s copper mining operation. Duval employs approximately 400 men.



ARIZ. REPUBLIC 2/16/66
 Two new copper developments were announced to boost the economy of the Kingman area. . . The General Cable Corp. will build a \$10 million rod and wire manufacturing plant at Kingman Airport Industrial Park, with a \$1 million annual payroll. . . El Paso Natural Gas Co. announced a smaller copper mine and mill development nearby. . .

HATHAWAY

The Arizona Commission on Economic Development will decide this week

EL PASO NATURAL GAS WILL ACQUIRE NARRAGANSETT WIRE

El Paso Natural Gas Company has announced an agreement with stockholders of the closely held Narragansett Wire Company, Pawtucket, Rhode Island, to acquire all the stock in that electrical wire maker. The acquisition is a further diversification for the already highly diversified El Paso concern. Principally an operator of 20,000 miles of natural gas transmission lines in 11 western states, El Paso also has extensive operations in petrochemicals, fertilizer, plastic, textiles, mining and oil and gas production.

Howard Boyd, chairman of El Paso, noted that the move is a logical extension from the company's decision last year to enter copper mining. El Paso and Narragansett are developing the old Lakeshore property, near Casa Grande, Arizona, and El Paso, on its own, is opening the Emerald Isle mine near Kingman. Both mines are scheduled to go into production shortly, he said.

PAY DIRT for AUGUST 18, 1967

INITIAL SUCCESS REPORTED FOR THE PROJECT GASBUGGY

A nuclear explosion 4,240 feet underground was successfully detonated by the Atomic Energy Commission on December 10, near Farmington, New Mexico.

The explosion, Project Gasbuggy, was the first industry-government nuclear explosion for commercial purposes. It was designed to unlock natural-gas deposits trapped in rock formations too dense to be tapped by normal drilling methods. Participating with the AEC in the \$4.7 million joint project are the Bureau of Mines and El Paso Natural Gas Company.

Officials reported that the experiment went as planned, that there was no release of radioactivity and no reports of damage from ground shock. Initial drilling into the zone of broken rock started immediately to collect samples for pre-

U.S. Bureau of Indian Affairs has signed a mineral contract with officials of Transarizona Resources Inc., a firm representing El Paso Natural Gas Co. Contract will cover 2,677 acres of land within the Papago Indian Reservation. A bonus check for \$100,000 was delivered to the Papago Tribal Council at the time the contract was signed. Royalty payment to the council will be 10% of the net smelter return. Leased property reportedly has been test drilled and found to contain more than 1.4 million tons of copper oxide. EY MJ 12/1966

EL PASO NATURAL GAS LEASES NEAR PHOENIX

El Paso Natural Gas filed 720 acres in Maricopa County, believed to be in preparation for underground gas storage. A large salt section was drilled late last year in this area, and the feasibility of mining the salt by solution techniques and then storing natural gas in the cavities, is under consideration.

Arizona Natural Resource Service 5/15/69

El Paso Natural Gas and Hecla will develop major copper find in Arizona

EL PASO NATURAL GAS Co. and Hecla Mining Co. announced the signing of agreements for the development of a major new copper discovery made by El Paso on its Lakeshore properties near Casa Grande, Ariz. The discovery, announced last September, has been described as one of the larger orebodies discovered in the U.S. in recent years. El Paso reported that an independent mining consulting firm has confirmed that additional drilling on the properties has resulted in increased estimated reserves.

In a joint announcement, Howard Boyd, chairman of the board of El Paso, and L. J. Randall, chairman of the board of Hecla, said that the agreements provide that Hecla will be the operator of the mining properties and will advance all

funds necessary to put them into production. It is estimated that this will require initial expenditures of \$100-million. These capital expenditures are to be recouped by Hecla out of future revenues from the properties.

The Lakeshore properties are presently owned jointly by El Paso and by Transarizona Resources Inc., subsidiary of Narragansett Wire Co. Narragansett was acquired by El Paso in October 1967.

As part of the agreements, Hecla will acquire Transarizona's 50% interest in the copper properties in exchange for 1-million shares of Hecla common stock. The transactions are subject to approval by the shareholders of Hecla and Transarizona.

Boyd disclosed that the report of the

independent mining consulting firm confirmed that drilling operations on the Lakeshore properties, which have been continued by El Paso over recent months, have increased the estimated reserves to 472-million tons consisting of 24-million tons of tactite sulphide ore averaging 1.69% copper, 241-million tons of porphyry sulphide ore averaging 0.70% copper, and 207-million tons of copper oxide ore averaging 0.71% copper. The limits of the orebody have not yet been ascertained, Boyd said.

Randall stated that the transactions will make Hecla one of the country's important copper producers. The firm is the nation's largest domestic silver producer and has interests in lead, zinc, and copper properties.

Copper Projects of El Paso Gas in Arizona

Emerald Isle and Lakeshore

In the state of Arizona, El Paso Natural Gas Co. is engaged in two projects totaling about \$2,600,000 that are scheduled to commence the production of copper in the current year of 1967.

At a site about 15 miles northwest of Kingman in Mohave county, El Paso Natural Gas Co. is developing the Emerald Isle deposit, which is a relatively small orebody estimated at 1,500,000 tons of 1% oxide copper ore. The company will use open pit methods and is constructing an 800-ton per day mill incorporating a leaching-precipitation-flotation process to recover a medium grade cement copper. By mid-summer, El Paso Natural Gas expects to commence production at the Emerald Isle plant employing about 40 persons.

On the Papago Indian Reservation 28 miles south of Casa Grande, El Paso Natural Gas Co. is conducting at the Lakeshore property a development program including the reactivation of the open pit and its eventual expansion to mine a relatively small oxide orebody containing 1,500,000 tons averaging 1.75% copper. In addition, the



company is modifying and enlarging the mill to provide a capacity for 800 tons of ore per day.

At this plant, El Paso Natural Gas will use a process known as copper segregation, which involves heating an oxidized ore with a reducing agent and a halide salt in a direct-fired kiln. The company then will recover a medium copper concentrate by standard flotation procedures. By about July, El Paso Natural Gas expects to place in operation the Lakeshore plant, employing 30 to 35 persons.

El Paso Natural Finds Large Copper Deposit At Casa Grande, Ariz.

Firm Says Additional Exploration, Studies Needed to Determine Project's Economic Feasibility

U St Journal - 9/30/68
By a WALL STREET JOURNAL Staff Reporter

HOUSTON—El Paso Natural Gas Co. said it has discovered an estimated 96 million tons of copper sulfide ore on its lakeshore properties near Casa Grande, Ariz.

The company said that "extensive additional economic studies and exploration will be required to determine the commercial feasibility" of the project.

The discovery, which El Paso said has been confirmed by an independent mining consulting firm, averages 0.9% copper. Geophysical and drilling operations have been conducted on the properties for the past two years and, to date, 41 deep-test holes have been drilled, 35 of which indicate "significant mineralization," the company said.

El Paso added that the major sulfide ore body, the top of which lies at depths from 700 to 1,000 feet, is overlain by "large quantities of very low-grade copper oxide ore deposits," but the company said it isn't presently economically feasible to recover these oxide deposits by strip-mining.

The discovery is located on properties owned jointly by El Paso and Narragansett Wire Co., which El Paso acquired in October 1967.

The company said a smaller ore body is being mined from 4,200 acres in the same area which for the most part are being leased from the Papago Indian tribe.

SUNDAY, OCTOBER 29, 1967

El Paso Natural Gas Co. has now acquired all of the Narragansett Wire Co. of Pawtucket, R. I. At the close of business Thursday, Narragansett stockholders received 800,000 shares of El Paso common stock in return for 100 per cent of the Narragansett stock. Narragansett fabricates electrical wire for the residential, commercial and industrial building industries. *ARIZ. DAILY STAR*

El Paso Natural Gas To Build Copper Plant in Arizona

The El Paso Natural Gas Co. is beginning work on a multi-million-dollar facility for processing copper near Kingman, Ariz., the *New Mexico Miner* reports. The mill is scheduled for full operation by the middle of this year. It will be entirely automated with a capacity for processing 900 tons of ore a day. According to S. M. Runke, chief metallurgist for El Paso Natural Gas, the new operation will require a staff of about 25 to 30 men. The company refused to give a precise figure for the cost of the facility and related equipment, but it is thought to be approximately \$8 million.

Mining Engineering 3/1967

COPPER DISCOVERY IN CASA GRANDE

A large body of copper ore has been discovered 25 miles south of Casa Grande, but further testing must be done to determine the feasibility of mining it, the El Paso Natural Gas Co. reported last month.

The firm said an independent mining consulting firm has confirmed the presence of an estimated 96 millions tons of copper sulfide ore, averaging nine-tenths of 1 per cent copper.

Truett Hollis, head of the Lakeshore mining operation for El Paso, said the results of the testing will determine whether it will be feasible as an open pit or underground mine.

The new discovery is in the general vicinity of the company's Lakeshore properties open pit operation, which was started a year ago.

The new ore body, which is about 700 to 1,000 feet below the surface, is overlaid by very low grade copper oxide ore deposits, a spokesman for the company said.

Lakeshore Properties is owned jointly by El Paso Natural Gas and Narragansett Wire Co., which was acquired by the El Paso firm a year ago. Most of the land the firm is using is leased from the Papago Indian tribe.

El Paso Gas Discovers Huge Casa Grande Copper Deposit

El Paso Natural Gas Company has reported the discovery of a large body of copper ore 25 miles south of Casa Grande. Test drilling indicates the presence of an estimated 96 million tons of copper sulfide ore.

El Paso's announcement said the ore averages nine-tenths of one per cent copper. Top of the major ore body is 700 to 1,000 feet deep and overlaid by large quantities of very low-grade copper oxide ore deposits, which cannot now be strip-mined economically.

The big ore deposit is near a small ore body already being mined by El Paso Natural Gas on a 4,200-acre site, mostly leased from the Papago Indian Tribe.

Company officials say further exploration and economic studies will be required to determine if the discovery is commercially feasible, either as an open pit or underground mine.

Citizen 4-23-69

PAGE 43

Hecla, El Paso To Split Lakeshore Copper Mill

Hecla Mining Co. is planning to pay \$1.5 million cash for a half interest in a copper mill which El Paso Natural Gas Co. has on its Lakeshore properties near Casa Grande.

Hecla, stockholders will be asked at the annual meeting May 29 to approve the milling plant outlay, along with an agreement under which Hecla would develop a major new copper deposit on the Lakeshore properties. Initial cost of the project is estimated at \$100 million.

The new deposit was discovered near a shallow open-pit operation which El Paso has been carrying on. Ore from this pit has been treated at the mill, which has a capacity of 800 tons of ore daily.

Hecla would acquire a half interest in the Lakeshore properties, and the other half interest in the mill, in exchange for 1 million shares of Hecla stock, under the proposed agreement.

Golconda Mining Corp., largest shareholder in Hecla with about 13.5 per cent of its stock, has said it would oppose the Hecla-El Paso agreement.

The two companies announced last February that Lakeshore copper ore reserves were estimated at 472 million tons. The estimate was said to include 265 million tons of copper sulfide ore and 207 million tons of copper oxide ore.

"The potentially mineable — by open pit — material consists of a deposit among the largest ever found in the United States," Hecla says in its notice to shareholders.

"The copper content also compares favorably with that of the large low-grade domestic copper deposits being mined by the open-pit method."

Exploratory drilling is continuing on the properties with five drill rigs, Hecla says.

Ariz. N. Mex Contractor
April 1969

El Paso Natural Gas Co. To Spend \$13.8 Million

El Paso Natural Gas Co. of El Paso has applied to the Federal Power Commission for authority to spend about \$13.8 million in new facilities in New Mexico, Arizona, and Texas.

A company official said the expansion would increase the capacity of the southern distribution system by 80 million cubic feet of gas a day.

Planned are installation of an 8,500 hp gas turbine compressor unit at El Paso and modifications at 13 other compressor stations. Also proposed is construction of about 45 miles of new pipeline in Dona Ana and Luna Counties, N.M.

The compressor stations in Arizona include those at San Simon (Cochise County), Vail (Pima County), and Gila (Maricopa County).

Meanwhile five contractors are nearing completion of a 30" line from Ft. Stockton to El Paso and on into New Mexico and Arizona. This is a \$310 million project which includes 26.5 miles of pipe in Arizona from Maricopa to a point south of the South Mountains in Phoenix.

The \$13.8 million program above is in addition to the \$310 million expansion.

12/1968
Arizona Professional Engineer

Ariz. N. Mex Contractor
April 1969

May 7, 1969 - The El Paso Natural Gas Co. 4/1/69



Another big copper ore deposit is to be developed on the Papago Indian Reservation some 39 miles south of Casa Grande. Following negotiations with the Papagos, El Paso Natural Gas Company has announced an agreement with Hecla Mining Company of Wallace, Idaho, for a \$100 million program.

Known as the Lake Shore Mining property, it is presently owned jointly by El Paso and Trans-Arizona Resources, Inc., a subsidiary of Narragansett Wire Co. The latter firm was acquired by El Paso in October, 1967.

Test drilling has provided an estimate of a deposit of 472 million tons of copper ore, consisting primarily of 265 million tons of sulfide and 207 million tons of oxide. The ore averages 75 per cent copper.

Hecla officials said, "We will produce metal copper from this property, which will involve construction of a mill plus a smelter.

Under the agreement, Hecla will operate the mine and advance all funds necessary to put it into production. The agreement will make Hecla one of the country's important copper producers. It is now the nation's largest domestic silver producer and has other interests in lead, zinc, and copper properties in this country and Canada.

Discovery of the new ore deposit was first announced by El Paso Natural Gas last September. The site covers 4,200 acres and the top of the major ore body is about 700 to 1,000 feet deep. However, it is overlain by large quantities of low grade copper oxide, which could be strip-mined economically. □

'Always check market'

Republican 3/8/70

Pickles and golf played backstage roles in the planning and researching of The Lakes, \$60 million lakeside community to be developed 3 miles south of Tempe.

Diversified Properties, Inc., of Scottsdale and El Paso Natural Gas Co. are joining in the development of the community, masterplanned around a 50-acre man-made lake.

When the community is completed in late 1975, 5,000 persons will live on its 322 acres.

Behind the project is 46-year-old Arnold R. Dahlberg, inventor, investor and Arizona booster, whose own business accomplishments are also impressive.

His debut as an entrepreneur, however, was a minor disaster. As a Wisconsin farm boy, 12, Dahlberg was aware of the existence of a pickle factory in a neighboring town. As he tells the story:

"Knowing that pickles start out in life as cucumbers, I talked my father out of his best 4 acres on which to grow my

crop. It was a good year for cucumbers . . . they grew like school kids in a new district.

"Came picking time, my friends were on hand to help me with the harvest and soon we were off, with my first truckload of cucumbers, to the pickle factory where I was about to collect my first big check.

"As we approached the factory gate and a very quiet surrounding, uneasiness crept over me. Heartbreak followed when I learned the pickle factory didn't open 'that year!' I had failed to check my market."

It was an invaluable lesson. Dahlberg since hasn't failed to check his market. And he has been involved with a wide variety of products — among them electronics equipment, communications systems, hearing aids, audio-video tape recorders and now, land.

Dahlberg has been in love with Arizona ever since World War II when he spent 18 months at Williams AFB as a

Codeveloper of Tempe lakeside community learned that business lesson at age of 12

cadet learning to fly. His older brother Ken, like Arnold a cadet and then an instructor at Williams, went on to become a leading ace in the European theater. He was credited with shooting down 15 German planes and himself was shot down three times, always escaping unscratched.

Following the war, Arnold enrolled at the University of Minnesota as a business administration major. To supplement his GI Bill of Rights stipend, he worked part-time as a manufacturer's representative for a communications equipment company based in Cleveland.

While still a student, he answered a newspaper ad in 1947 and wound up with the Minnesota franchise from a Denver-based manufacturer of hospital products. An "under - the - pillow radio" was its most popular item. Dahlberg racked up a sizeable batch of sales before he learned the firm "wasn't making deliveries." He immediately went to Denver to investigate — only to find out

the firm had just "gone out of business."

Returning to Minneapolis, he founded The Dahlberg Co. and "made good" on his radio sales contracts. The company prospered and ultimately expanded into three major divisions — hospital communication systems, hearing aids, and military products — with Arnold as the firm's executive vice president and general manager.

Before the company was sold to Motorola in 1959, Dahlberg had developed a package of electronic products which led to it becoming the world's largest manufacturer and supplier of hospital communications equipment.

The hearing aid division later was sold by Motorola to Ken Dahlberg. Now known as Dahlberg Electronics, Inc., and with Arnold as a director, it, with Zenith and Beltone, ranks as one of the nation's three largest manufacturers of hearing aids.

EL PASO GETS REFUND

Arizona's counties will have to refund to El Paso Natural Gas Company their pro-rated share of \$360,000 in property taxes under a court settlement agreed to November 13th in Tucson. A five percent reduction in the full cash value of the company's Arizona properties—from \$221 million to \$210 million—was approved by Superior Court Judge Richard N. Royston. El Paso had paid about \$7 million in taxes under protest last September.

The settlement, affecting El Paso's property throughout the state, was agreed upon by attorneys for the State Department of Property Valuation, Maricopa and Pima counties and El Paso Gas. 12/29-
PAY DIRT

Bureau Reports Cheap Method To Stabilize Tailings

A simple, inexpensive chemical method for stabilizing fine particles of troublesome mineral processing wastes has been successfully developed and demonstrated by the Bureau of Mines, according to a report by the Department of the Interior.

Known as tailings, such wastes are potential sources of pollution when exposed to erosion by wind, and the bureau has been seeking economic methods for stabilizing them. Bureau engineers report that by they were successful in treating 34 acres of tailings at an abandoned uranium processing operation on the Navajo Indian Reservation near Tuba City, Arizona.

The chemical method's total cost per acre, including the cost of chemicals and their application by an automatic sprinkling system, was \$335. This, the bureau said, is substantially cheaper than the costs of vegetative or physical stabilization techniques. The treated area will be kept under observation to determine how long the treatment remains effective.

The work was carried out in cooperation with the El Paso Natural Gas Company, former operator of the plant, under the direction of scientists from the bureau's Salt Lake City Metallurgy Research Center. The Arizona Atomic Energy Commission inspected the treated tailings and found that the chemical had penetrated into the finely ground wastes to create a strong, wind-resistant crust.

The new method is said to be flexible in the way it can be used and is particularly attractive for use in climates too arid for the successful application of other stabilization techniques.

Full details of the methods and test are given in Bureau of Mines Report of Investigations 7288, "Chemical Stabilization of the Uranium Tailings at Tuba City, Arizona," by Richard Havens and Karl C. Dean. A single copy of the report can be obtained
PAY DIRT 5/18/70

El Paso in

1970 A

The annual meeting of the El Paso Natural Gas Co. was held in Wilmington, Del., April 28, 1970. The annual meeting proved more eventful than usual due to the long looked for higher rate for natural gas in the firm's southern territory, resulting in higher earnings, and the announcement of El Paso's full half interest in a large low-grade copper

orebody under development by Hecla Mining Co. (owner of half interest).

EARNINGS UP, DIVIDEND

Earnings of El Paso Natural Gas Co. increased in 1969 to \$1.66 per common share from \$1.35 earned in 1968. At the annual meeting of the company's board on May 1 the second quarterly dividend was declared on the common stock, payable June 30.

Howard Boyd, chairman of the board of El Paso Natural Gas Co., stated that natural gas is in short supply. In 1969, for the second year in a row, more natural gas was consumed than was discovered. In 1969, El Paso Natural Gas produced from its own sources about 12% of the gas it marketed.

INTEREST IN COPPER MINE

In another field, El Paso received one million shares of common stock of the Hecla Mining Co. of Idaho in payment for one-half interest in the Lakeshore copper deposit situated 28 miles south of Casa Grande, Ariz. In addition, next year El Paso Gas will begin receiving from Hecla advance annual payments totaling one million dollars on this new and large reserve of low-grade copper ore now being actively developed.

Subsidiaries of El Paso Natural Gas Company and Columbia Gas Systems, Inc., a distributor of natural gas on the East Coast, have signed an agreement covering the purchase of 300 million cubic feet a day of natural gas imported into the United States from Algeria in liquified form. El Paso will be importing one billion cubic feet of LNG daily into this country, brought from Algeria in special cryogenic tankers. The arrangement is seen as one measure to alleviate the growing shortage of natural gas.
PAY DIRT 9/28/70

HECLA-EL PASO GAS

SPOKANE—El Paso Natural Gas said production from the Arizona copper properties it owns jointly with Hecla will probably begin in three years, according to Mining Hi Lites. Hecla will advance the necessary funds to put the properties into operation and will pay El Paso \$250,000 a quarter in minimum advance royalties.
min record 4/15/70

Weather Energy Crisis

21

AMM/MN

December 31, 1973

Salt River Project, a public utility here. Harper said SRP has already warned of a possible curtailment in February. No conclusions have yet been developed, he said.

Duval Corp., Tucson, uses liquid fuels in its mining operations and natural gas in its molybdenum roasters. Although it can switch from gas to oil for roaster usage, it is stuck with diesel fuel for its mining haulage trucks.

Currently, Duval is checking to determine if truck engines can be altered enough to permit use of heavier fuels.

Added New Trucks

The firm has added a few new trucks, of greater capacity than it had up to now, but this is resulting in only minor fuel conservation, it was said.

Despite the ability to use either gas or oil in the roaster operation (molybdenum disulfide is converted into molybdenum trioxide), there is the possibility it could be shut down if fuel curtailments exceed projections.

At the Twin Buttes operation of Anamax Mining Co., a stripping contractor ran out of fuel and had to shut down three or four days until he could get an emergency allocation.

While this did not halt the mining operation (the stripper was removing overburden), it is indicative of the Twin Buttes situation, according to Robert D. Lynn, president. "We are now operating on our fuel inventory and are asking the Office of Oil and Gas for some relief."

Anamax is working on reducing inefficient uses of fuel and is making an intensive survey on fuel losses which could occur in handling the tremendous quantities it does. This includes making sure all devices, containers, hoses and connections are in good repair, Lynn said.

The company president also said Anamax would try cutting off engines, a practice not often followed because it is often less expensive to let them run than incur maintenance costs through shutdown.

"We will try to strike a balance between fuel costs and maintenance costs," he said.

The copper producer is also trying to get a local bus company to give service between Tucson, some 25 miles away, and the mine, to reduce individual employe driving. Many employes are in car pools, and extension of this is encouraged.

Ariz. Copper Men Feel They Can

(Continued from page 17)

near the San Manuel smelter, has been provided for. Magma does not operate diesel trucks — it mines are underground — so this fuel is no large worry.

Electricity generated through the use of smelter waste heat accounts for about 20 percent of Magma's kilowatt requirements.

No Lost Production

R.B. Meen, general manager of the Southwestern Mining Department of American Smelting & Refining Co., Tucson, said there has been no lost production at mines because of the energy situation.

However, he said, fuel allotments on some of the firm's properties are insufficient, depending upon the property.

A particular problem is the new mine at Sacaton, which will come into production in a few weeks. The ore has been uncovered, but if Asarco cannot get its requirements for mining, Meen said, production and tonnage would be low, costs would increase and it would be necessary to layoff some employees.

Diesel Fuel Allowance

He said the Department of Interior, Office of Oil and Gas in San Francisco had made an allowance for additional diesel fuel, but it is not enough.

For instance, he explained, oil suppliers at Sacaton allowed them 75 percent of oil consumption last year when some 100,000 gallons a month were used.

With the opening of the mine, some 230,000 to 250,000 gallons a month are needed. The Office of Oil and Gas has doubled the allotment based on last year — to 150,000 gallons. This, Meen said, is still almost 100,000 gals less than needed.

"So far," he said, "we have been able to keep going. We go any place for the fuel." An 85-ton truck consumes 17 to 18 gallons of No. 2 diesel fuel an hour, he added.

Meen said some effort is being made to see if engines may be adjusted to accept a different grade of fuel, but "they will not take too much variation."

About the only way the mining operation can conserve fuel is by limiting stripping operations (although Sacaton is an exception to this), but the effect is to shift a shortage from near to long term.

At Asarco's Hayden smelter, J.M. Winkel, general manager, said no production has been halted because of the energy situation but production could be lost if curtailment of fuels is greater than anticipated.

May Become Critical

He said natural gas supplies may become critical in January and February, the period which historically finds the most curtailments. If oil is obtainable a natural gas shortage will not be disastrous.

Some parts of the operation must rely on gas, so if there is a severe curtailment, like down to 10 percent of normal usage, "we could be hurt even though we have enough standby oil because we cannot make substitutions in some instances."

Places where oil may not be substituted for gas include deoxidizing work on anode furnaces, and to some extent heating requirements throughout the plant, he said.

"Although substituting oil for gas energy is the only thing we can do at the present time," he said, "we are investigating the possibility of using coal in the future. It is not an easy problem to solve. In addition to determining the cost of establishing such a system, the cost of operating it after it is in, and the cost of getting the coal to where we want it, we must consider the impact on the environment," Winkel said.

Oil Storage Facilities

At Kennecott Copper Co.'s Hayden smelter major storage facilities for oil were installed beginning as long ago as 24 months, according to J.S. Nebeker, reduction plant superintendent. Storage units were filled with oil before the current shortages developed, he said.

"We are also making efforts to change over to use the heavier, high ignition point oils," he said. "We anticipate supplies of these may be greater than those we now use, although we may not be able to get what we need. Compared with what some of the power companies use, our need would be small. But they are also becoming more difficult to get."

The energy situation has had no

affect on expansion plans, he said, because no large forward commitments have been made. However, studies are under way to determine fuel needs, along with their availability, four or five years hence.

H.D. Harper, general manager of Inspiration Consolidated Copper Co. at Inspiration, reported that "at the moment, we are all right so far as the fuel situation is concerned. But if future diesel oil allotments are cut appreciably, we could be in for some tough sledding."

Although Inspiration has experienced some curtailment of natural gas, it has been able to maintain production by switching to oil. Should diesel fuel be seriously curtailed, "we'll be out of business so far as out haulage trucks are concerned," he said. "There is no alternative fuel for these trucks."

Changeover to Oil

Harper said Inspiration could replace 80 percent of its gas load with oil, if necessary. The changeover could be accomplished for reverberatory furnaces and most of the smelter facilities, the power plant to some extent, and a few other areas.

The ability to alternate gas with oil may not be much of an asset "as the oil shortage deepens," Harper said. "Oil may wind up being in tighter supply than gas."

Inspiration is reviewing its curtailment program to determine which facilities have priorities. Consideration must be given, for example to its new electric furnace which is supplied energy by

Arizona Copper People Cautious, But Optimistic, in Energy Crisis

By BILL PYLE

PHOENIX, Ariz. (FNS) — Arizona's copper mines and smelters are reasonably optimistic that potential energy shortages will not be so severe as to curtail production, perhaps all the way through 1974.

It is a sort of finger-crossed-optimism interlaced with a lot of "ifs." If the expected shortage of diesel fuel gets no worse than currently anticipated, supplies and allotments should see them through.

If the demand for natural gas, both in the Southwest and other parts of the country, isn't so great that supply curtailments exceed projected maximums. If the power companies, from which they buy electrical energy, can come through with the kilowatt schedule now worked out.

If the energy measures already taken and anticipated help keep demands in better alignments.

Many "Ifs"

Those are a lot of "ifs" to overcome, but copper firms, alerted as much as three years ago that there would be a natural gas shortage about now, installed some pretty large oil storage facilities — and had them brimming before the recent big scare said "boo." El Paso Natural Gas is the big supplier in this area, both to copper firms and public utilities.

M.P. Scanlon, vice-president of Phelps Dodge, said in Douglas, Ariz., that PD, with three years warning, took measures to insure

ample (hopefully) oil supplies to replace gas to get it through the winter.

So far as diesel fuel is concerned, Phelps Dodge believes it can weather the winter because of storage facilities put in, Scanlon said.

PD, along with the other smelters in the state, uses waste heat from its smelting operations to generate electricity. Although Scanlon was unable to say how much energy is produced by smelting reaction heat, he did say it was substantial and that all three smelters had such generators.

4 Open Pit Mines

In addition to the three smelters, Phelps Dodge operates four open pit mines and one underground mine in Arizona.

Scanlon said interruption of natural gas supplies during the winter months is not new to smelters and "we have experience in reacting to gas curtailments.

Perhaps this gives us some advantage over operations elsewhere which have not had that experience."

Magma Copper company's operations, like PD's, have not had any setback because of an energy shortage.

Sufficient oil is on hand to see Magma's smelter, at San Manuel, through natural gas curtailments this winter. Current capacity of the smelter is 1-million tons, annually, of concentrate.

Oil storage facilities should provide adequate amounts, based on previous year's shortages, plus anticipated additional shortages, to insure no major curtailments of production. This is coupled with no greater than expected loss in oil allocations as well as lower gas supplies.

Fuel to operate Magma's railroad, which transports ore from its mine near Globe, and the one

(Continued on page 21)

The Atomic Energy Commission has been conducting a number of nuclear experiments during the past few years that have been studied very carefully by the mining industry. Among other things, the tests have indicated that nuclear explosives can so shatter certain formations that the contained minerals might be leached in situ, or, in other cases, be mined by solution methods. Later this year, the AEC will carry out a nuclear explosion—Project Gasbuggy—as the first attempt to use atomic force to stimulate natural gas production. Being carried out in conjunction with El Paso Natural Gas Co. the explosion will occur in a low-permeability gas formation. If a successful nuclear fracturing technique can be developed as a result of Project Gasbuggy, the AEC believes it may find widespread application in other "tight" formations in the U.S., principally in the Rocky Mountains. *E. W. 711 9. 3/19/67*

AEC's Project Gasbuggy is still on schedule . . .

El Paso, Hecla To Develop Copper Find

2/14/69
From Our Wire Services

Am Metal Market

HOUSTON — El Paso Natural Gas Co. and Hecla Mining Co. announced signing of agreements to develop a major new copper discovery made by El Paso on its lakeshore properties near Casa Grande, Ariz.

The discovery announced last September has been described as one of the larger ore bodies discovered in the United States in recent years.

El Paso said Thursday an independent mining consulting firm has confirmed that additional drilling on the properties has resulted in substantially increased estimated reserves.

Howard Boyd, chairman of El Paso and L.J. Randall, chairman of Hecla, said the agreements provide that Hecla will operate the mining properties and will advance all funds necessary to put them into production.

It is estimated this will require expenditures of initially approximately \$100 million. These capital expenditures are to be recouped by Hecla out of future revenues from the properties.

William H. Love, president and general manager of Hecla Mining Co., declined comment on an earlier announcement by Golconda Mining Corp. in which Golconda opposed the joint venture of Hecla and El Paso Natural Gas to develop the discovery made by El Paso.

Mr. Love said Hecla believes the venture is "very important for us as far as the long-term earnings and growth of the company are concerned."

He said Golconda's percentage ownership of Hecla stock is about 13.5 percent.

El Paso Gas Ore Discovery Rises To 150 Million Tons

Size of a copper discovery at its lakeshore properties near Casa Grande jumped to 150 million tons, according to El Paso Natural Gas Company—and exploratory drilling continues to add to the size of the orebody.

Howard Boyd, chairman of the board, announced the increased figures and said the deposit will be sunk, probably before the end of 1969.

Boyd said that El Paso Natural Gas has been approached by "virtually every major copper producer in the country and several other mining companies, seeking an arrangement to participate in the exploitation of this discovery."

First announcement of the discovery of the orebody was made in October, at which time Boyd said "an independent mining consulting firm has confirmed discovery of 96 million tons of copper sulphide ore, averaging nine-tenths of one percent copper."

The top of the deposit lies between 700 and 1,000 feet below the surface and is overlain by large quantities of very low grade oxide ore. In announcing the increased tonnage, Boyd said the average grade had dropped slightly, to 87/100 of one percent.

"Extensive additional economic studies and exploration will be required to determine whether the orebody will support economic mining operations," Boyd stated.

Another orebody, small in size, is being mined by El Paso Natural Gas from this same area of approximately 4,200 acres, leased for the most part from the Papago Indian Tribe.

The milling operation there is reported to be the only one in the United States using the "segregation" process, developed by the U.S. Bureau of Mines and tested at the Colorado School of Mines at Golden. Crushed ore, together with measured quantities of finely ground coke and salt, is fed into one end of a 200-foot-long kiln heated to approximately 1,600 degrees Fahrenheit. As the kiln rotates slowly, the heat results in a chemical reaction which causes the copper to plate onto coke particles.

The ore from the kiln is quenched in water, cooled and ground to a fine powder, then put through a froth flotation process, producing a concentrate containing 40 to 50 percent copper. The concentrate is trucked to Hayden. There, in the smelter, the coke is burned off, leaving the copper.

Ray Dirt 12/68

Pipeline Crosses Four Southwestern States

EL PASO, Texas — An army of pipeliners in construction spreads stretching from Pecos, Texas, to the California-Arizona border is pushing a new steel pipeline through rugged mountains and across dusty plateaus to bring increased gas supplies to a four-state southwestern area this year.

The construction is El Paso Natural Gas Co.'s "310 Project" designed to supply an additional 310 million cubic feet of west Texas natural gas daily to California, Arizona, New Mexico and west Texas. The project is a looping of El Paso's present system and will allow the transmission company to increase its gas delivery to this region by about 10 percent.

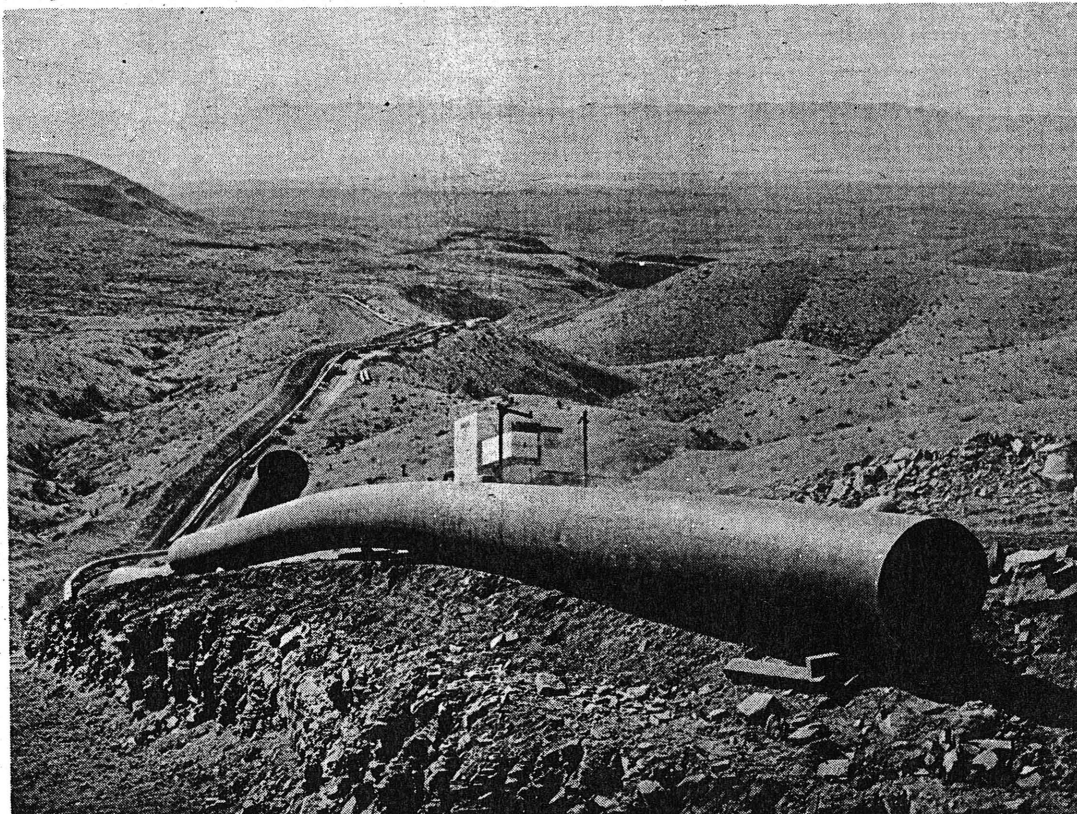
Growing industrial and residential demands for gas in the region have generated the need for the new line.

For the \$120 million expansion project, U.S. Steel, a major supplier of the X-60 double submerged arc-welded pipe in 36, 30, and 24-inch O.D. sizes, is shipping pipe from Utah and Pennsylvania to locations in Texas, New Mexico and Arizona. Paralleling much of El Paso's existing pipeline to California, the new construction includes mainline, gathering, field and loop pipelines.

Moving westward from Pecos and El Paso's Waha Plant, pipeliners have pushed new 36-inch O.D. mainline pipe across the Texas plateau at an average elevation of 2700 feet until reaching the rugged terrain of the Delaware Mountains. In the Delaware Mountains-Guadalupe Mountains region—former stronghold of the Mescalero Apaches—elevations increase to an average 3900 feet.

On the western edge of the Delawares, the pipeline had to be built over a 5317-foot escarpment named "Wolverton Hill" by the pipeliners. Coming down the western face of the escarpment through dolomitic limestone and some sandstone, equipment had to be lowered by cable over the 20 to 30 degree slopes.

To facilitate construction over the mountainous right-of-way, the 40-foot-long, 36-inch O.D. (mostly in .438-inch wall) pipe from U.S. Steel's Geneva Works in



Pipeline Snaking Through West Texas

Utah was delivered by rail to Van Horn, Texas, for double jointing into 80-foot lengths. From Van Horn the 80-foot sections were trucked to the pipeline right-of-way. Van Horn is one of four double jointing yards established at various points along the route.

From the Delaware Mountains to Wilcox, Arizona, average plateau elevation of the construction is 3900 feet.

According to El Paso Natural Gas Co., lowest elevation to be traversed on the total project is

the Ehrenberg, Arizona, Colorado River crossing at 320 feet. The highest elevation faced is 5690 feet in the Winchester Mountains near Wilcox.

When completed in the summer of 1969, the new construction will transport gas from the prolific Delaware and Val Verde basins in west Texas through two new sections of 30 and 36-inch O.D. mainline pipeline totaling 360.5 miles and through 193.2 miles of 30-inch O.D. loop pipeline. The remaining

116.4 miles of construction work consists of 8-5/8-inch O.D. through 24-inch O.D. pipe for gathering and field lines.

Southern California is scheduled to take delivery of 154 million cubic feet of gas daily from the new supply when it goes on stream. Northern California will receive about 103 million cubic feet of gas daily. About 53 million cubic feet daily will be delivered from the new lines to Arizona, New Mexico and west Texas.

Huge copper deposit located

Refining process only one

used in U.S.

8-A The Arizona Republic

Phoenix, Sunday, Dec. 15, 1968

By VINCE TAYLOR

Central Arizona Bureau

CASA GRANDE — A 200-foot-long "oven," 10 feet in diameter, at the isolated Lakeshore Mine south of here would be big enough to roast enough Christmas turkeys to feed the population of Phoenix with enough left over for Tucson and Yuma.

Instead, it roasts metallic copper ore in a process unique to Arizona and the nation.

IT IS THE only one of its kind, but officials of El Paso Natural Gas Co. and Narragansett Wire Co., partners in developing the oven to extract copper from low-grade ore, don't refer to it as "experimental."

"It is unique in that this is the only copper deposit in the United States using this method," explained L. O. Davis, superintendent. He said a similar process is in operation in Mauritania in north-west Africa.

Davis oversees the operation at the Lakeshore Mine extraction mill, 30 miles south of here on the Papago Indian Reservation.

The method, developed by the U.S. Bureau of Mines and tested at the Colorado School of Mines at Golden, is called the segregation process, as distinguished from the two common methods of copper extraction, flotation and leaching.

"On this particular ore, this method is the only known process of extraction," advised S. M. Runke, chief metallurgist for the El Paso Natural Gas firm. The mineral in the ore, he said, is known as chrysocolla, a copper silicate.

OFFICIALS said they have not determined yet whether the outcropping now being mined is part of a huge body of copper ore recently discovered under the area.

El Paso announced several weeks ago the presence of an estimated 96 million tons of copper sulfide ore on its Lakeshore properties.

Since then, on the basis of further drilling, an independent mining consulting firm estimates an additional ore re-

serve "in the magnitude of 46 million tons."

"The total reserves — approximately 142 million tons — now estimated by the consulting firm average about 87/100 of 1 per cent copper, a slight reduction from the 9/10 of 1 per cent copper previously reported," El Paso board chairman Howard Boyd told stockholders in his recent quarterly report.

"Extensive additional economic studies and exploration will be required to determine whether the ore bodies will support economic mining operations," Boyd's report stated.

MEANWHILE, as geophysical and drilling operations continue, the "melting pot" at Lakeshore continues to segregate pure copper from what appears to the uninformed as "just plain rocks."

The M. M. Sundt Contracting Co. of Tucson is stripping the present open pit operation, dumping the ore into a crusher similar to operations

familiar to Arizonans.

The crushed ore, together with measured quantities of finely ground coke and salt, is fed into one end of the long oven heated to approximately 1,600 degrees Fahrenheit.

As the oven rotates slowly, the mixture moves through the interior, the heat resulting in a chemical reaction which causes the copper to plate onto coke particles as it is separated from the extremely hot mass.

THE ORE from the kiln is quenched in water, cooled and ground to a fine powder, then put through a froth flotation process, producing a concentrate containing 40 or 50 per cent copper.

From the mill, the concentrate is trucked to Hayden. There, in the smelter, the coke is burned off, leaving pure copper.

Officials said ore capacity of the extraction mill is about 800 tons per day. They estimate a ton of ore will yield 33 pounds of copper.

Lakeshore currently employs approximately 35 persons.

What will the new discovery mean? Apparently no one knows. The Papago Indians, from whom El Paso leases 4,200 acres in the area, are hopeful. The development could bring a bonanza.

In its announcement of the new deposit, the company emphasized that extensive additional economic studies will be required to determine the "commercial feasibility" of the discovery.

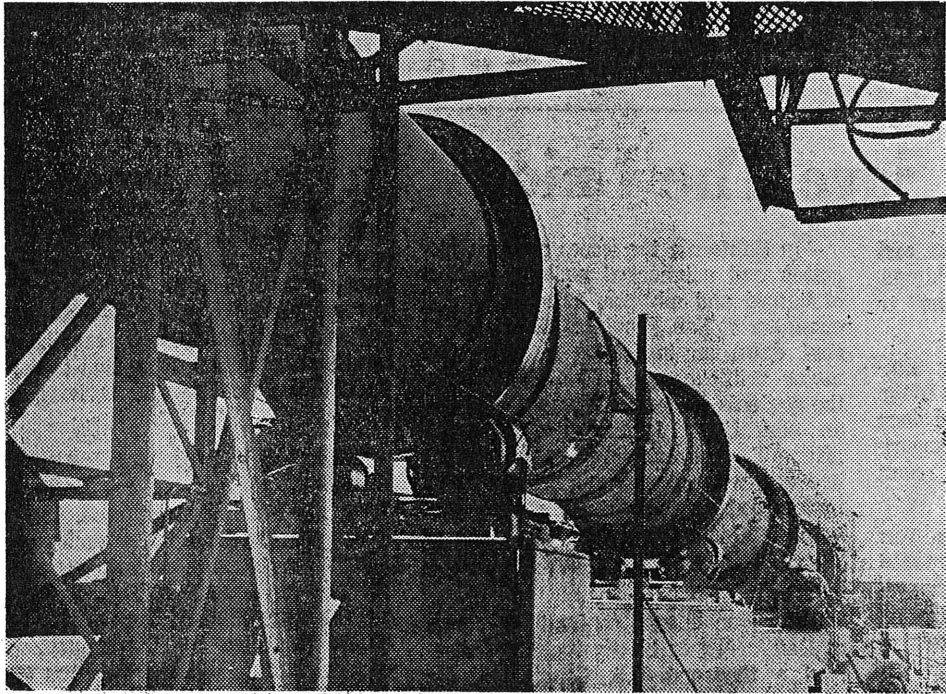
To date, more than 41 deep test holes have been drilled, 35 of which indicate significant mineralization, according to mining officials. The company said its exploration effort continues to add to the size of the ore body.

EL PASO SAID the major sulfide ore body, the top of which lies at approximate depths of from 700 to 1,000 feet, is overlaid by large quantities of very low grade copper oxide ore. Officials said it is not presently economically feasible to recover these oxide deposits by strip-mining.

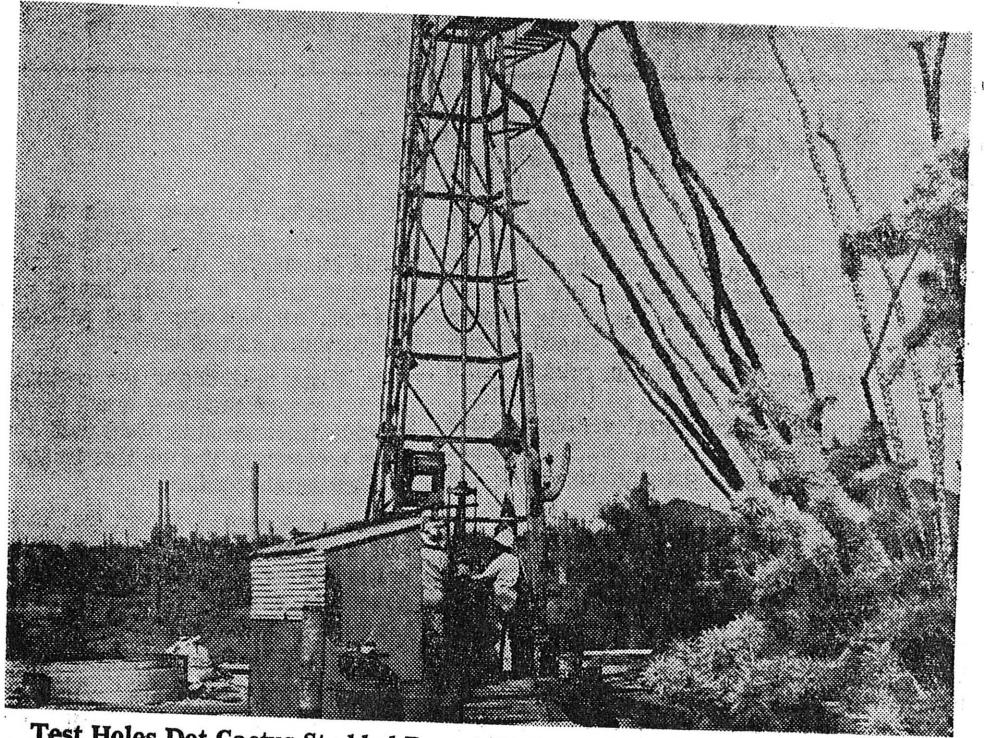
Howard Boyd, El Paso

board chairman, said an exploration shaft will be sunk probably before the end of 1969, to "determine the full extent of the economics" of the discovery.

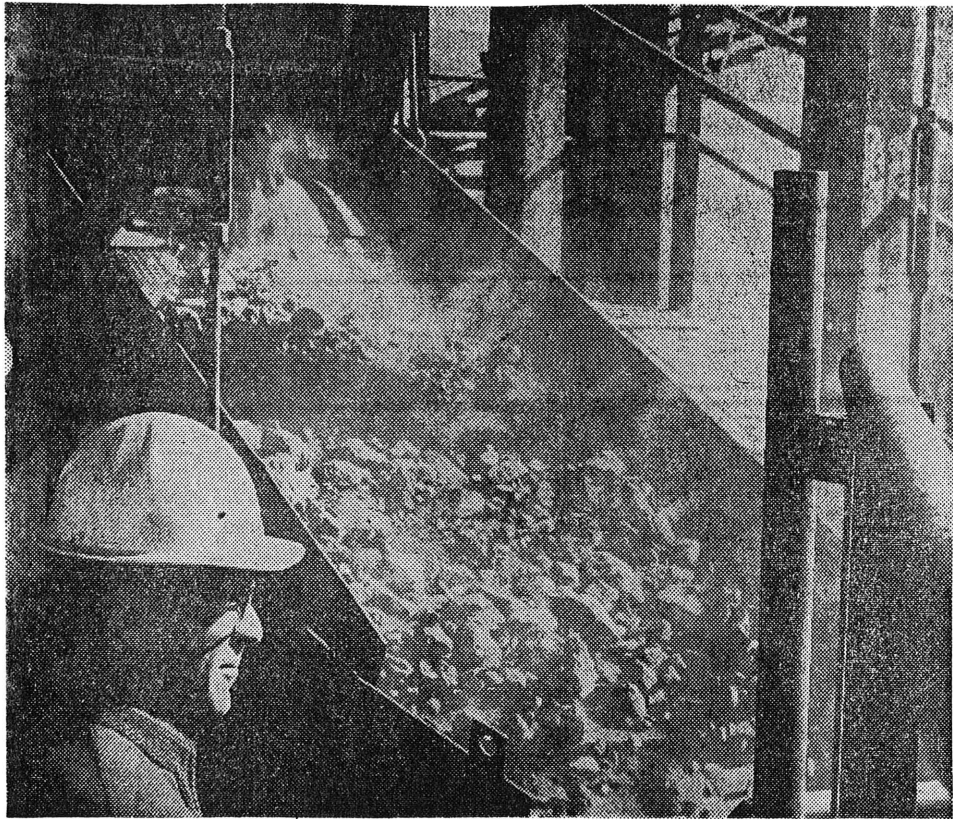
Boyd said El Paso has been approached by "virtually every major copper producer in the country and several other mining companies, seeking an arrangement to participate in the exploitation of this discovery."



Unique 200-foot Kiln At Lakeshore Mine "Roasts" Copper Ore



Test Holes Dot Cactus-Studded Desert To Learn Extent Of New Discovery



Copper Ore Is Crushed Into "Bite Size" Rock, Important Step In Process

EL PASO NATURAL GAS CO.

see Austin Carter case

Mining Congress Journal Feb. 1967 p. 6
Mining Congress Journal Sept. 1967 p. 20
Mining Congress Journal Nov. 1968 p. 8-9
Mining Congress Journal Jan. 1969 p. 16 (Lakeshore) in file

E&MJ Feb. 1967 p. 202
E&MJ June 1967 p. 242 Vol 168
E&MJ Nov. 1968 p. 146 Vol 169 (Lakeshore)
E&MJ Mar. 1969 p. 172

E/Mj March, 1974, p. 211
" November, 1974, p. 204 (scholarships)

World Mining May 1967 p. 41

Mining Engineering Feb. 1968 p. 81 (Emerald Isle & Lakeshore)
Mining Engineering Feb. 1969 p. 12-14 (Lakeshore)
Mining Engineering March 1969 p. 6 (Hecla)

Pay Dirt March 24, 1969 (Hecla)

News clippings in Hecla Mining Co. (file)

Skillings Mining Review, February 9, 1974, p. 6
" " " June 15, 1974, p. 8
" " " December 21, 1974, p. 23 (transfer of all assets from its mining
div. to El Paso Mining & Milling Co. (texas))

EL PASO NATURAL GAS CO.

Visited El Paso Natural Gas and Sid Runke, chief metallurgist, who said the plant was handling about 500 tons per day and that it would be phased out in about a year as it is located on a portion of the ore deposit. GW WR 8-14-70 (Lakeshore)

El Paso Natural Gas is reported to be drilling at the Corncob mine area in Buehman Canyon, Bellota Ranch quadrangle. GWI QR 12-31-70

El Paso Natural Gas' mill at Lakeside has been shut down since Dec. 31, 1970 due to an unfavorable tax situation. By operating in any part of 1971, it is understood, they would have had to pay \$100,000 more tax than if they didn't. S. M. Runke said some time ago they intended to phase out the mill sometime in 1971 due to it being located on a portion of the ore deposit. GW WR 1-22-71

The El Paso Natural Gas Co. plant, which was closed December 31, 1970, is being rehabilitated by Hecla for use as a pilot-plant concentrator. Hecla has moved into the new office-changeroom bldg. GW QR 4-8-71

Met S. M. Runke, Les Mead and Bill Elwanger at El Paso Natural Gas Company. GW WR 3/3/72

Royal Mining and Exploration Company, just across the line in New Mexico is shipping to the El Paso smelter fairly high grade gold silver ore, this does come down to be shipped to the siding at Duncan, Arizona, and also thought they would do some more drilling at his fluorspar claims north of Duncan but has not started at the present time. GWI WR 10/11/72

Active Mine List - October 1972 Empl. 42 - (1971 figures 275,000 T Ore)

El Paso Natural Gas Company has some geologists looking for favorable Cu and Au prospects in the western part of the state. GW Annual Report 6/29/73

Newmont, Inspiration & El Paso Natural Gas all looked over Austin Carter property and turned down any sort of an option based on the unlikely potential of a large orebody (copper). KAP WR 8/1/75

Austin Carter called regarding geophysical anomaly found on his claim by Mr. Gear of El Paso Natural Gas Company. He said he dug down to the deposit indicated and found it was about 6 feet thick and rather soft (altered). Mr. Gear sampled it. It is about 200 feet N. of his previous diggings on a \pm 6" streak of Au-quartz. GW WR 3/1/76

See Emerald Isle Mine Folder 8/29/77 pp

EL PASO NATURAL GAS COMPANY

El Paso Natural Gas Co. representatives say it has 96 million tons of 0.9% copper sulphide ore at its Lakeshore property near Casa Grande, Arizona. Company officials say that additional exploration and economic studies are needed to determine if the find is of commercial worth.

In July, 1967, p. 108, E&MJ reported that El Paso had a fleet of 35 ton carry-alls and Cat dozers working on a two-phase, two-year program to expand its Papago Indian Reservation open pit and was to rebuild its 500 tpd segregation plant.

The new ore find is located on property owned jointly by El Paso and Narragansett Wire Co., which El Paso acquired in Oct. 1967. The major sulphide body lies at depths from 700 to 1,000 ft. and is capped by submarginal copper oxide which are too low in grade to work now. This new ore find may make it possible for El Paso to run its concentrator on the Papago Indian Reservation at greater capacity, after the new property has been evaluated and if it is developed. E&MJ Oct. 1968 p. 13

An exploration shaft is to be put down at the copper discovery of El Paso Natural Gas Co. near Casa Grande, Arizona late in 1969. The company reports that estimates of copper ore present have been increased to 150 million tons averaging 0.87 percent copper, up from a previous estimate of 96 million tons. The exploration shaft is expected to permit the company to better evaluate the deposit. Mining Congress Journal Jan. 1969

After some disagreement with allied Golconda Mining Corp., the stockholders of the Hecla Mining Co. of Idaho approved the development with El Paso Natural Gas Co. of the Lakeshore properties south of Casa Grande. An enormous copper ore body has been indicated by drilling. JHS QR 8-1-69

El Paso Natural Gas is exploring in the Carlyle area just across the New Mexico border east of Duncan. They have staked a great many claims and optioned others. While the above activity is out of Arizona, Duncan is the shipping and possibly the milling point for this area, as the only access is from Arizona. GWI QR 2-27-70

El Paso Natural Gas Company continues production from the Lakeshore mine. Announcement of management personnel by Hecla has been made. Two large inclined shafts minus 15 degrees will be started about a mile southeast of the present mine and driven under orebody. GWI QR 2-27-70

El Paso Natural Gas Co. is continuing their mining and milling operations at Lakeshore and will probably do so until they are in the way of Hecla Operations. GWI QR 4-1-70

EL PASO NATURAL GAS COMPANY

Visited Emerald Isle mine - Patterson said El Paso Gas has option but no decision has been reached. FTJ WR 9-10-65

Visited Emerald Isle - Mr. Patterson was cleaning up vats and preparing to let El Paso Gas take over on Jan. 10. The delay in takeover is due to unclear title. The claims (8) were located in 1906. The Federal Government withdrew the 8 claims for a power site in 1953. This was unknown to Patterson who had to amend locations to cure title before El Paso would consummate the agreement. FTJ WR 1-7-66

Visited El Paso Gas at Emerald Isle. They are drilling with a truck mounted rotary drill using air for sample collection. Four holes have been drilled to date with encouraging results. H. W. Horst is in charge of the work and resides at Holiday House, Kingman. FTJ WR 3-4-66

El Paso Gas are actively exploring the Emerald Isle deposit and are examining other prospects in the county. FTJ QR 7-8-66

Visited El Paso Natural Gas Tuba City Mill - Mr. Davis, supt., had left for a visit to Emerald Isle. 61 men employed and they will be finished milling Dec. 31 when their allotment will have been reached. FTJ WR 5-14-66

Mr. Harold Horst, Mining Engineer for El Paso Natural Gas Co. visited office and said El Paso Gas is involved in the Lakeshore Property, south of Casa Grande. FTJ WR 8-5-66

John Reynolds, said El Paso Gas had done some geophysical work and had come up with a couple of interesting anomalies, one of which had indicated sulphides. This may be drilled in the near future. According to the watchman at the Lakeshore a survey party had been in the area in the past few weeks. Memo LAS 9-21-66 John Reynolds is Chief Engineer, Minerals Div.

Visited L.O. Davis, supt. of El Paso Gas Mining Division at Tuba City. Most of the usable equipment has been moved to either the Lakeshore or Emerald Isle. Mr. Davis will be supt. of the Lakeshore operation. FTJ WR 5-12-67

Gibson Mine near Casa Grande reported sold to a syndicate headed by El Paso Natural Gas Co. for \$1,000,000. CLH WR 2-24-68

Transarizona Resources Inc., now a wholly owned subsidiary of El Paso Natural Gas Co., has been conducting an exploratory diamond drilling program, and has nearly completed a segregation plant which was about ready to go into production at the end of March. About 250 to 350 tons of ore were mined and stockpiled for treatment in the new plant. CLH QR 4-1968
