



CONTACT INFORMATION  
Mining Records Curator  
Arizona Geological Survey  
416 W. Congress St., Suite 100  
Tucson, Arizona 85701  
520-770-3500  
<http://www.azgs.az.gov>  
[inquiries@azgs.az.gov](mailto:inquiries@azgs.az.gov)

The following file is part of the  
James Doyle Sell Mining Collection

### **ACCESS STATEMENT**

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

### **CONSTRAINTS STATEMENT**

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

### **QUALITY STATEMENT**

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

# Ore haul line is artery linking mine and plant

Story and Photos By JOE KANE

**This is the second in a series of articles that follows the path copper ore takes through the mill division.**

There's something about riding on a train that gets in your blood.

Maybe it's the smell of diesel or the rhythmic clacking of the wheels as the cars sway gently down their steel highway.

Railroading is a way of life for a group of Magma people who make up the ore transportation department in the mill division.

Full cars, no ore spills and fast load and dump times are the goals of the seventeen members of the ore transportation group.

They are responsible for hauling up to 65,000 tons of ore per day from the mine to the plant for further processing.

The ore transportation group consists of 5 locomotive engineers, 4 brakemen, 4 car loaders and 4 supervisors working with a 36 car train, each bottom-dump car holding 100 tons of ore.

Car loading is a delicate operation requiring a lot of skill on the part of all involved.

The cars are loaded by the brakeman and car loader while the train is moving.

The engineer must regulate the speed of the train to allow the people loading the cars enough time to fill them up.

The brakeman and car loader must coordinate the operation of their loading

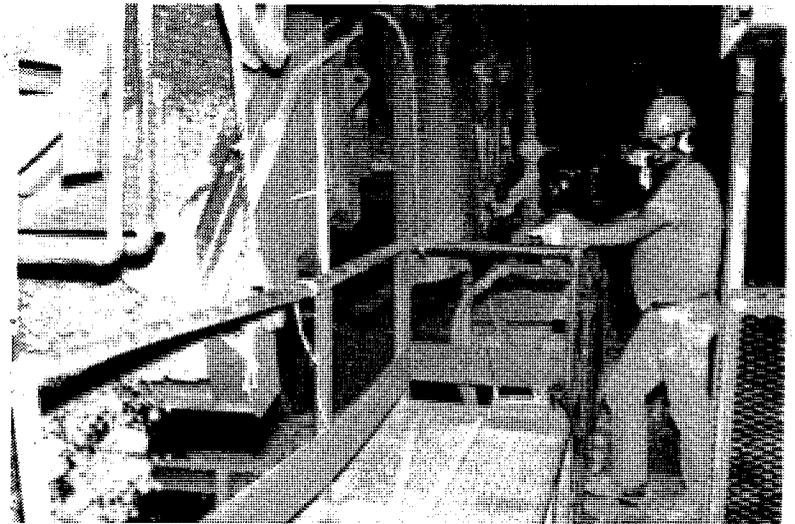
chutes to the speed of the train in order to fill the cars to capacity in the shortest time possible.

When the train is loaded and the brakeman is aboard, the engineer throttles the 1600 horsepower Alco locomotive up to cruising speed, about 30 mph, for the seven-mile trip to the plant.

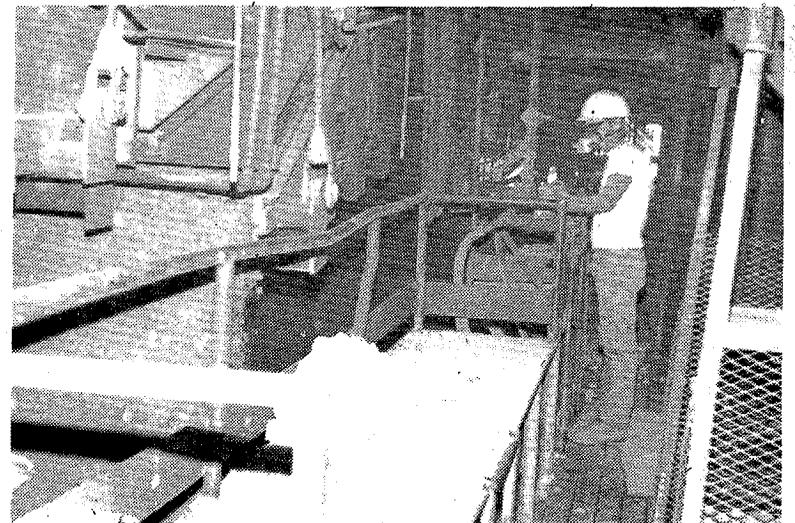
The engineer and brakeman monitor track conditions, as well as the operation of the train while enroute to the plant.

The crew is in constant radio communication with their supervisor, the plant, track maintenance crews, and SMARRCO switching crews in the area. (SMARRCO is the San Manuel Arizona Railroad Company, our short line, which is another story to be told later.)

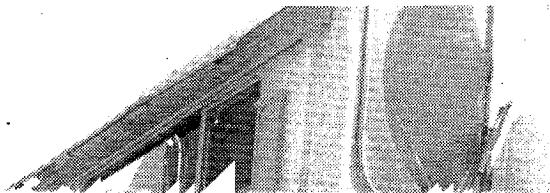
What are the critical times in ore transport-



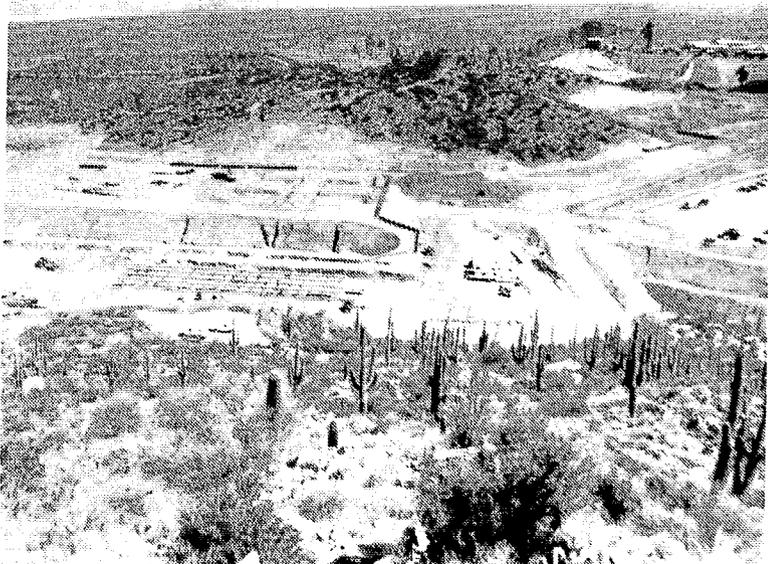
**MARCELLO MARTINEZ, brakeman, controls loading mine ore from fine ore bins into 100 ton ore cars as they pass by.**



**DENNY RANDALL, car loader, operates remote controls at mine ore bins to load ore cars moving slowly through loading station.**

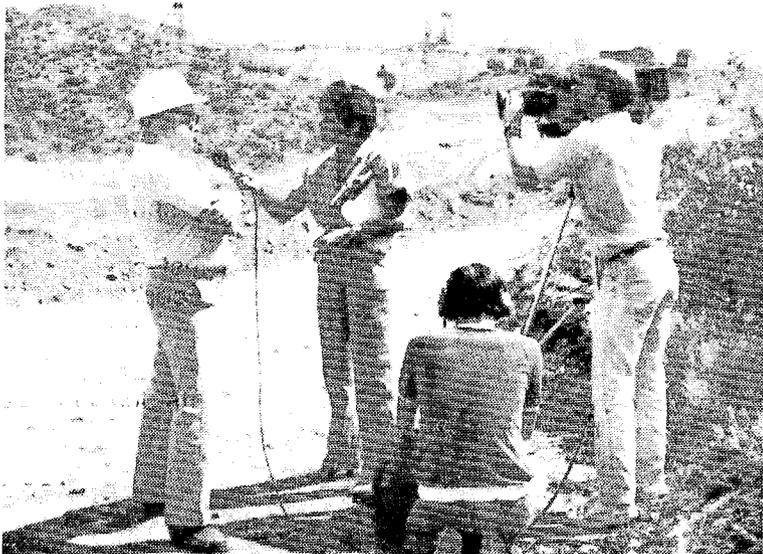


## Progress can be seen at oxide project site



FOUNDATIONS for SW-EW tankhouse can be seen at left center as earthwork defines sites of various other facilities.

Photo by Richard Cole



THE OXIDE PROJECT was the subject of this TV interview with Brian Woolfe, left, executive vice president. KUAT's Kimberly Kraft was reporter for the feature seen on the nightly Arizona Illustrated news show.

Photo by Richard Cole

### By STEVE HILDEBRAND

During the past month, the first phase of the earthwork at the oxide project has been completed and construction of the electro-winning tankhouse is progressing rapidly.

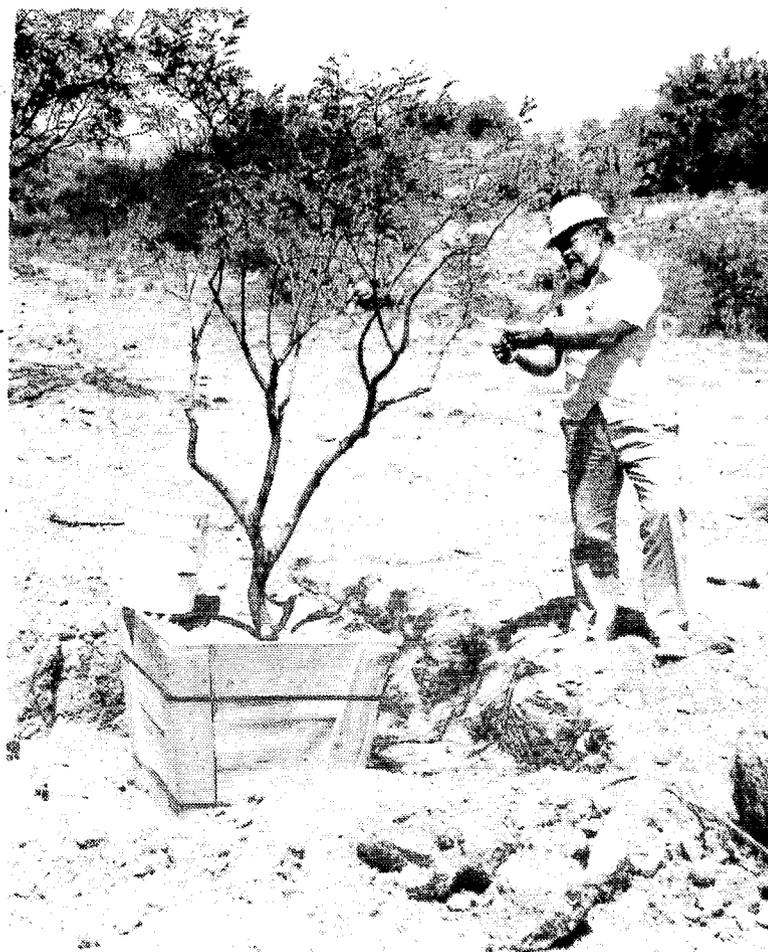
Concrete cell support beams have been installed and footers and support pillars for the tankhouse building are being framed and poured.

Deliveries of a multitude of pipe sizes and types are being made daily.

A 12"-36" HDPE fusion welding pipe machine and generator has arrived and pipe shop employees were trained to use this equipment.

Equipment purchasing for the open pit segment of the oxide project is continuing at full speed as Magma will be doing the mining.

Preparation and planning for the large scale in situ leaching test program is accelerating because start-up of this program will coincide with the start-up of the rest of the oxide project.

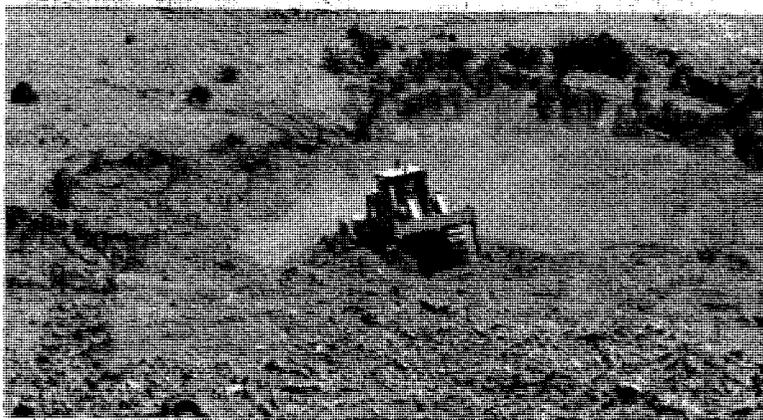


SALVAGING native plants at the site of the oxide leach pads is a program supervised by Bob Hockett, senior geologist. Bob works with professional landscapers who identify specific plants for transplant and prepare them for removal. They'll also be seeking decomposed granite and decorative rocks.

Photo by Richard Cole

# Oxide project starts on schedule

*Magma Digest, Vol. 1, No. 6, May 1985.*



**GROUND BREAKING** for the San Manuel oxide project's SX-EW (solvent extraction electrowinning) facilities started April 19. This phase consists of grading and leveling ground for the solution feed ponds and plant facilities. The Granite Construction Company has 45 days to complete the work being supervised by Bechtel Civil and Minerals Engineering Co., of Scottsdale.

Photo by Richard Cole

## By STEVE HILDEBRAND

Massive earthwork has begun on the oxide mining project and the former mine salvage yard has been transformed into a construction vehicle depot.

A fleet of scrapers, dozers, haulage trucks, loaders, compactors, graders, water trucks, and service vehicles can be seen working 24 hours a day.

Excavation began on April 19, 1985 and the extent of the excavation work for the electrowinning tankhouse, the tank farm,

and the solvent extraction area can now be seen.

Portable light stands for night work and air track drills are also at the site.

The excavation crew is encountering some hard rock in the area and must drill and blast.

The ground clearing and excavation work for the processing facility is expected to be completed in June, after which construction of the plant buildings will begin.

Work on the open pit and the leach dumps is still in the design stage.



### *The good old days*

LOADING an ore car at Superior is shown in this undated photo. Orecar held about one ton and dumped from the side, possibly into the ore pass in the lower left corner. Heavy timber supports indicate heavy ground in this area. Also note narrow and broad gauge tracks to accommodate both old and new equipment.

## In situ leaching tests to go forward

The Magma board of directors has authorized the spending of \$3,998,000 to test the in situ leaching of our oxide ore reserves which lie deeper than the oxide open pit which will begin operation in mid-1986.

"In situ" means "in place" and the in situ leaching process is conducted without removing the ore from the ground.

In the open pit process, ore is removed to leach dumps where weak acid solutions trickle through the heaps and absorb copper mineral from the rock.

In the in situ process, the weak acid solution will be introduced directly into the oxide ore body by means of deep drill holes. It will then trickle downwards and the copper rich leach solutions will be collected in the existing network of old drifts underlying the leach area and pumped to the solvent extraction - electrowinning plant (SX-EW).

The oxide ore reserves lie above portions of the mine which are either no longer in production, or will be depleted by the time in situ leaching begins.

Thus, the in situ leaching activity will not interfere with on-going underground operations, nor will employees be exposed to any of the leaching solutions.

There are about 204 million tons of ore available for the in situ mining and we estimate a possible recovery of 1.1 billion pounds of copper over a 20-year period at an extremely low unit cost.

The authorized testing is scheduled to coincide with the start-up of the open pit SX-EW plant in mid-1986.

Installation of test facilities and systems will begin at once and will require about a year to complete and the tests will be conducted for another year.

If the tests confirm the feasibility of the in situ process at San Manuel, the SX-EW plant will be expanded to accommodate the additional volume of copper rich solutions.

Preparation for the tests will consist of drilling 26 injection holes through a caved area above the 2375 level where a collection system and pumps will be installed.

The tests will measure the relative efficiency of different acid solutions, flow rates, temperatures, and other variables in order to determine the best metallurgical and economical in situ approach to our ore.

Smaller lab tests conducted here in recent months have shown that the oxide minerals can be extracted but the year-long large scale test must prove the process.

In addition five holes have been drilled through the subsidence area and water has been injected to demonstrate the feasibility of the injection process in the zones where the overburden has been caved.

If the tests are successful, additional expenditures of up to \$50 million would be required to bring the process into full production.

savings.

Repair it in time and fix it right the first time. Don't let a piece of equipment run to destruction -- fix it before it requires costly and time consuming repairs.

Listen to ideas from other people -- two heads are better than one.

Always look at a job with the thought in the back of your mind that there could be a better, quicker or cheaper way to do it. If you have an idea for an improvement let's hear it.

Don't abuse equipment. Most machinery is designed with definite limits in mind -- don't break something by trying to make it do what it wasn't designed for. If you're not sure, ask and learn.

When you finish a job and another has not been assigned, why not ask your supervisor for another assignment?

If you're assigned a job and it looks like you can complete it in a short time, why not ask your boss what you can do after you complete that job.

Health and fitness -- keep healthy. Nobody enjoys being sick! This reduces absenteeism and healthy people are more alert, which makes them more efficient and less accident prone. If you have friends who are suffering from alcohol and/or drug problems, persuade them to get help to get these habits under control. A person who is not properly in control of himself is a safety hazard and can also be a threat to those who work with him or her.

\*\*\*\*

There are two upcoming changes you might want to hear about.

Soft drink vending machines will be installed in some plant locations on a trial basis. Please ensure that this does not lead to untidiness or unnecessary interruptions in work. If no problems are encountered more vending machines will be installed in other areas.

In August there will be some major changes in the staff organizations at both the mine and the plant. These changes are being made to reduce the number of levels of supervision, to eliminate "one-on-one" situations and to try to delegate specific responsibilities in a more efficient manner. Effort to improve the staff organization will continue as we continue to work toward better teamwork at Magma.

## First names, please

By BRAD FRAZIER

Has anyone noticed a change in their name on mailing lists, checks and earning statements?

Magma employees are not just another number in the computer; and to emphasize this we are now printing both first and last names on various documents and lists.

The change to the new format will require several weeks, during which time you will notice your initials being replaced by your first name and middle initial.

Some errors may occur in this process and if you notice your name is incorrect please notify the payroll department.

vnamomez, Wynn Bohn, Jim Marcias, Frank Castro, Floyd LeGrand. Not shown: Dan Salcido, John Baird, Jim Rupert, Don Wright, Harold Lopez, John Traynor.

Photo by Richard Cole

# Electricians save hoist motor

By ALAN OSHIKI  
&  
FLOYD LeGRAND

Lonnie Lisk, a journeyman electrician at the mine, has very good hearing.

On May 26, he notice a clicking noise in the 4000-horsepower induction motor that powers 3A production hoist.

He called his foreman, Floyd LeGrand, and together they discovered two wedges had fallen

loose from the stator.

Jack Hudson, general hoisting foreman, was also called in to check the problem.

Jack determined that no damage had been done, but that the entire motor-generator set (armature and stator) would have to be changed.

This was scheduled for the following day.

During disassembly of the motor, the crew found approximately 50% of the stator wedges were loose -

a condition which, had it gone unnoticed, would have severely damaged the motor and required and complete rewinding of the stator coil.

Lonnie's alertness saved thousands of dollars by preventing costly repairs and lost production.

In addition, the electricians, mechanics, and riggers who worked together to change the motor established a new record for the jobs, 12 hours and 44 minutes.

## Tech club will meet July 30

The newly formed Magma Technical Club will have its first meeting Tuesday, July 30 at the Elks Lodge meeting room in San Manuel.

Interested engineers, technicians, or any employee, can attend the program which is scheduled to begin at 4:45 p.m.

A social hour is scheduled to begin at 4:00 p.m. and the program should be over by 5:30 p.m.

The subject of the first meeting of the technical club will be an overview of the oxide project, presented by Bob Zerga, manager of planning and development.

This overview is intended to provide an idea of the financial and technical hurdles that Magma had to cross in order to institute an oxide project.

## Retiree Frank Bunch heads state Legion

It looks like one Magma retired employee is starting on his second career.

Frank Bunch, former general mechanical foreman at the mine was just elected Department Commander of the American Legion for the State of Arizona.



FRANK BUNCH

Photo by Richard Cole

Frank retired in 1983 after 30 years at San Manuel and has been an active member of the San Manuel Legion Copper Hill Post 48 for 14 years.

Frank's World War II service was in the U.S. Navy as a Chief Motor Machinist's Mate. He served around the world and his many medals include the Purple Heart, Asiatic Pacific, European-African Middle East (3 Battle Stars), American Area, Good Conduct, and World War II Victory.

As Arizona commander, Frank will be attending the National Convention in New Orleans, meetings at Legion Headquarters in Indianapolis, Indiana, and tours of Legion Posts throughout Arizona.

Frank was born in Tucson and now lives in San Manuel with his wife, Jean, who is also an active leader in the local Legion Auxillary.

# Magma Update

Vol. 1, No. 7.

San Manuel, Arizona

June 1985

## Oxide project on schedule



**CONSTRUCTION ON THE OXIDE PROJECT** is on schedule and the first concrete has been poured for the solvent extraction-electrowinning plant (SX-EW). Work continues day and night at the project.

Photo by Richard Cole

### By STEVE HILDEBRAND

Earthwork for the SX-EW processing plant portion of the oxide project is progressing.

The raffinate (barren leach solution) pond and the plant feed pond are defined, and final leveling of the site for the solvent extraction settlers and the tankhouse is nearly complete.

Construction of the

processing plant has begun; concrete forms for the tankhouse were being erected on June 4.

During the month of May, 17,000 lbs. of ammonium nitrate explosive was used in drilling and blasting the site.

More than 500,000 tons of rock and common excavation material have been moved at the site.

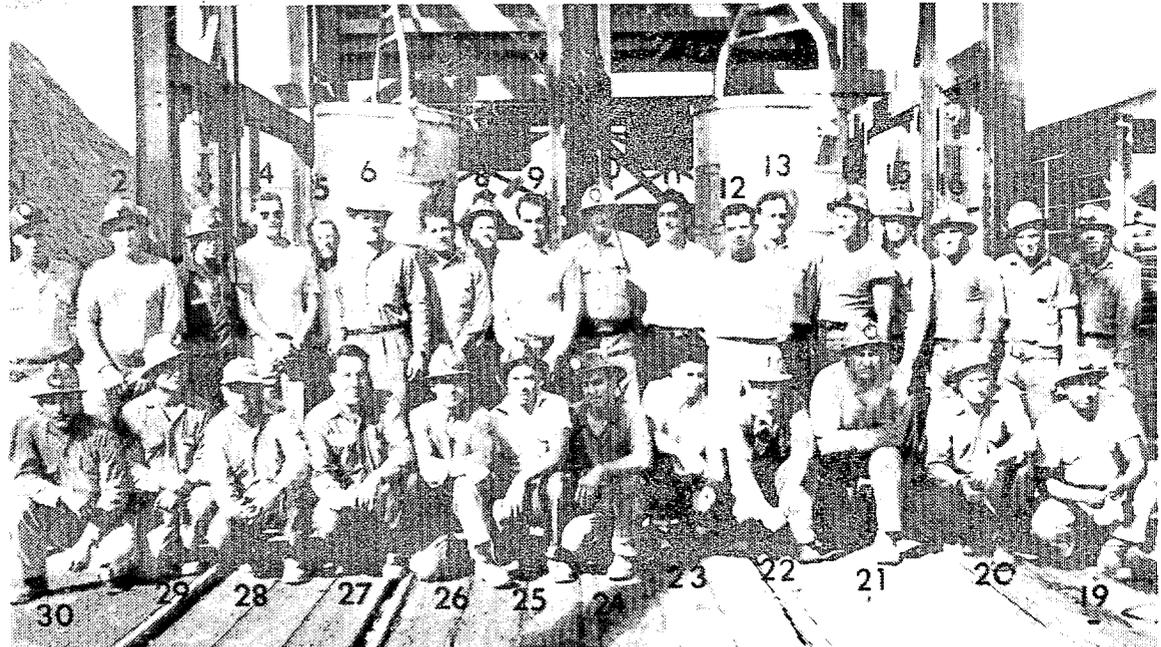
In this phase of the earthwork for the plant,

approximately 85% completion was reached at the end of May.

Also, during May, Sergeant, Hauskins and Beckwith, geotechnical engineers, were at the mine appraising and evaluating the dump leach site. Much drill and rock mechanic work has been undertaken.

Project engineer Bill Young has recently moved to San Manuel.

## From our scrapbook . . .



### They sunk the #3 shaft

FILE PHOTO SHOWS CREW which sunk #3 shaft in 1950-54. Names on back of photo are 1-C.R. Pillar (mine superintendent), 2-L. Yubeta, 3-Art Hendrickson, 4-Jim Wilson, 5-John Buchanan (general manager), 6-Frenchie Babalu, 7-Frank Amador, 8-Harvey Ashby (mine foreman), 9-Angel Campa (shaft leadman), 10-Curt Mohney (shaft foreman), 11-Abe Yanez, 12-Ralph Juvera, 13-Nicho Vindiola, 14-Ralph Herrera, Jr., 15-George Matthews, 16-George Torrell, 17-Pinky Montgomery, 18-Dave Abeldano, 19-Chilo Madrid, 20-Bill Whiting, 21-Frank Svob, 22-Jose Romo, 23-Billy McKay, 24-Avelino Vindiola, 25-Pete Valenzuela, 26-Eddie Lomeli, 27-Ralph Ramsey (hoistman), 28-Joe Borbon (hoistman), 29-Frank Sosa, 30-Willie Madrid.

### *Environmental impact of oxide plant studied*

By **ELDON HELMER**

As you might guess, it takes a great deal of planning to make a large project, such as the San Manuel open pit mine and oxide leaching project, become a reality.

Nowadays this involves environmental concerns, as well as the usual "nuts and bolts" planning, to lessen the impact on our

economically and preserves our environment and water resources.

Possible impacts on air quality were also studied in depth, and included the use of a computer model to evaluate possible impacts from dust emissions.

To prevent heavy emissions of dust the open pit mine and the haulage roads will be watered ex-

### **New mill supervisor**



# Refinery material handling keeps copper moving

By **RANDY ROBERTS**

Photos by Sam Yang and Randy Roberts

Everywhere in the refinery, straddle cars and forklifts scurry about giving testimony that, without the services of the refinery material handling department, the tankhouse and rod plant operations would grind to a screeching halt.

Material handling operations begin at the smelter as straddle car operators pick up 37,000 pound bolsters of anodes for weighing and then deliver the bolsters to the tankhouse.

Straddle cars also service the starter sheet assembly machine and weigh and deliver empty scrap boats to the tankhouse and full scrap boats

to the smelter.

After finished cathodes are removed from the tankhouse cells and washed, straddle car operators whisk away four stacks of cathodes at one time, each stack containing 25 cathodes, to be weighed, stored, and eventually delivered to the rod plant charge deck for melting or to the loading dock for shipping.

Large forklifts are the work horses of the refinery. The many duties include "packing" the anode scrap into scrap boats, hauling scrap coils, Pinto Valley cathode, and crop bar.

The pace slows for the forklift operator when 16,000 pound palletized lay coils are produced for AT&T's Phoenix cable plant, our major customer.

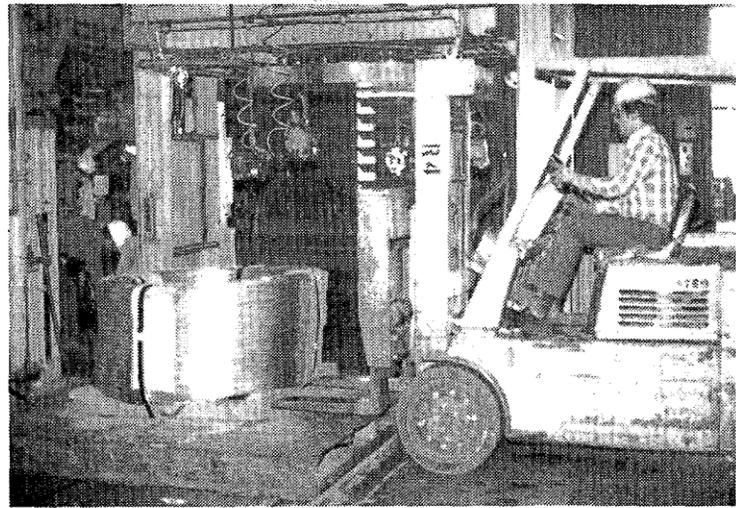
The operator has 12 minutes to remove the banded coil, double weigh it, place the coil in storage, and then return to the rod plant coiler.

To load the 16,000 pound lay coil on trucks, the forklift operator skillfully places the coils over the truck's axles to evenly distribute the weight of the coils.

Small forklifts are the ponys of material handling -- small but powerful.

The small forklift operators also support the tankhouse pull and charge crew by removing full suspension bar boxes from the washing machine to be delivered to starting sheet assembly area and by transporting supplies.

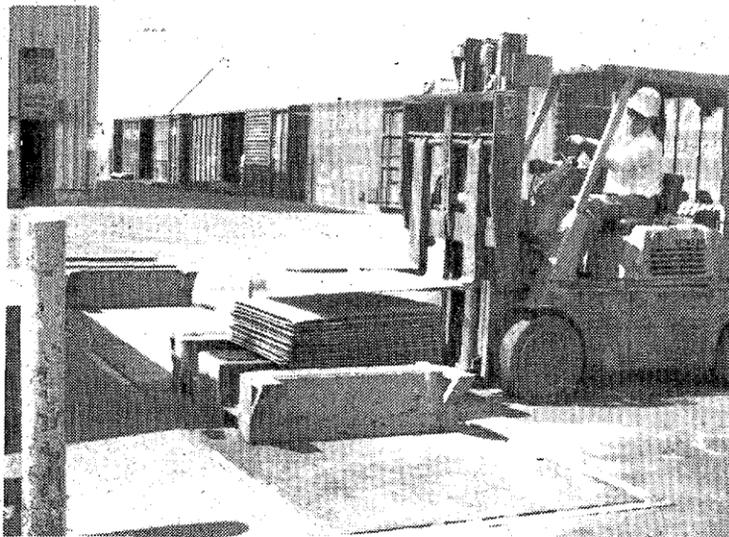
Darting in and out of the rod plant, the small forklift



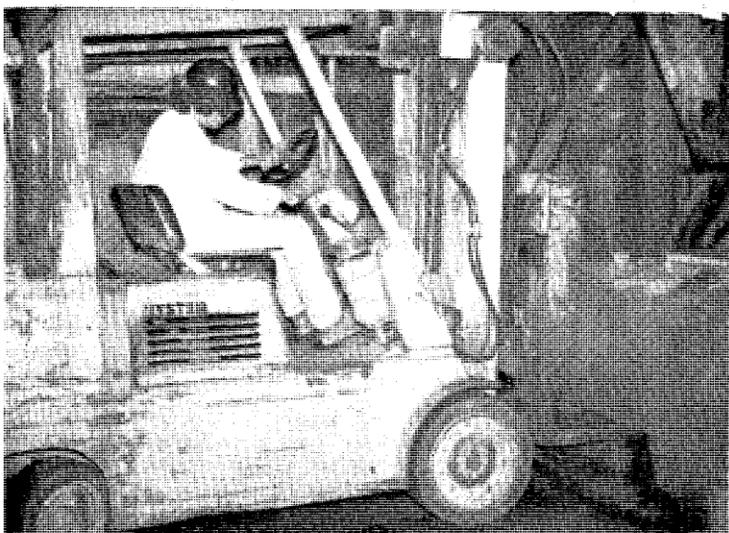
**OSBALDO ALCARAZ** prepares to pick up a brand new coil from coiler conveyor.



**DAVE TURRUBIATES** and his straddle car.



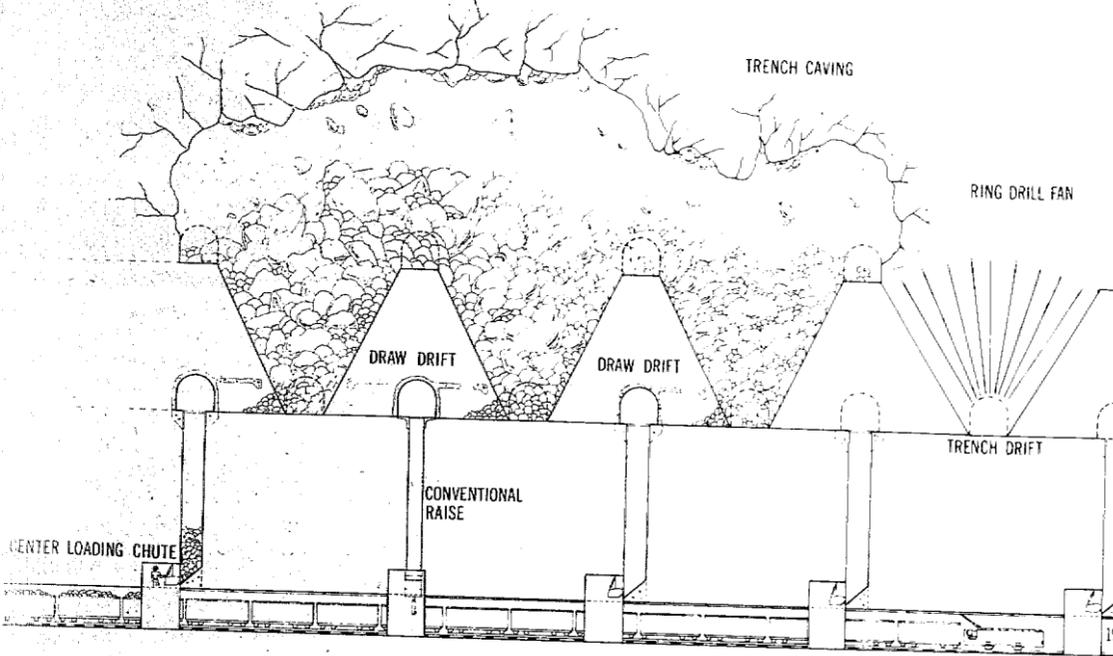
**ROY CARTER** carefully removes just one cathode to "make weight" for a 4,000 pound bundle.



**BOB VELASQUEZ** removes a box of red hot crop bar in rod plant.

# The mine fights back

## Mechanized mining method eliminates undercut level



TRENCH CAVING process, now in use at the mine eliminates all the work and expense of the conventional undercut excavation above the draw level.

Drawing by Matt Ford

Second In a Series  
By ALAN OSHIKI

The success of our new LHD mining system (reviewed in the July Update) depends heavily upon a technologically advanced undercut system.

Once the underground production areas are developed, the ore above must be caved by undercutting prior to mining.

The conventional method, still used in older areas of the mine, was to drive an undercut level above the draw production level and blast it to initiate caving of the ore.

The new ring drill method, however, allows undercutting to occur from the production level itself - eliminating the need for a separate undercut level.

Ring drill undercutting is a four-stage process.

First, a trench drift is driven between two draw drifts.

Next, fan-shaped patterns of vertical holes are drilled in successive rings along the length of the trench drift.

When all rings are completed, they are loaded with an ammonium nitrate/fuel oil explosive (ANFO).

The drillholes are then blasted and mining begins.

"We've made some minor changes along the way," says Scott Santii, an engineer for the project.

"But the concept is working well. From what we've learned so far we'll be using even less explosives in the future.

"The fragmentation we've been getting has been exceptionally good.

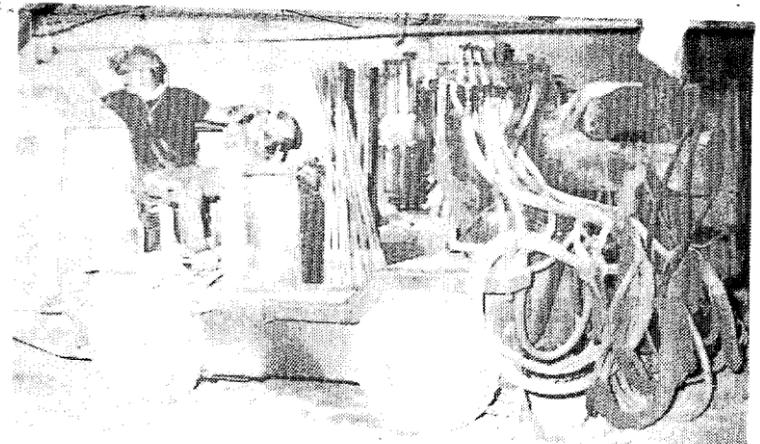
"Efficiencies and blasting results show that undercutting from the draw level works very well.

"This should significantly reduce mining costs by eliminating the undercut level."

"Employees doing the drilling deserve all the credit," says Ed Sutich, project engineer for the program.

"Everybody is new to this type of undercutting method and already they're approaching efficiencies experienced by other operations that have been ring drilling for years."

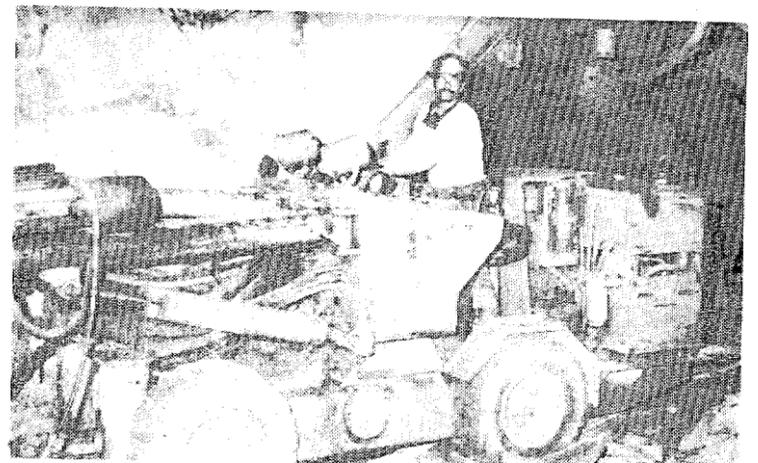
The current record for feet of hole drilled in a shift with a pneumatic ring drill is held by Richie Nickels and Jerry Roepke, mechanical miners of Group One with 454 feet.



HARRY BURLESON, mechanical miner on ring drill outfit.



SAMMY TELLEZ, mechanical miner drives ANFO loader.



PEDRO VIGIL, mechanical miner on new mini borer jumbo with DOSCO roadheader in background. Photos by Richard Cole

# Magma Update

Vol. 1, No. 9

San Manuel, Arizona

August 1985

## SX-EW plant construction underway at oxide project

By **STEVE HILDEBRAND**

As the picture indicates, the first electrowinning tankhouse precasted concrete cells were installed in July.

To date, 47 concrete cells are in place, half the final number in the tankhouse.

According to Bob Young of Bechtel, erection of the tankhouse building could possibly begin later this month.

Much of the electrical conduit work has been completed both in the tankhouse and in the solvent extraction area and the

project is on schedule or slightly ahead.

Mark Vancas has been given responsibility for running the plant, once it is in production and Mark Yarbro, who was transferred from the mill, will be the plant engineer.

Concerning the leach dumps, massive earthwork should begin near the end of August.

The first haulage road construction for the open pit has begun with Billy McKay operating the mine's D-9 dozer and Frank Tapia directing the work.

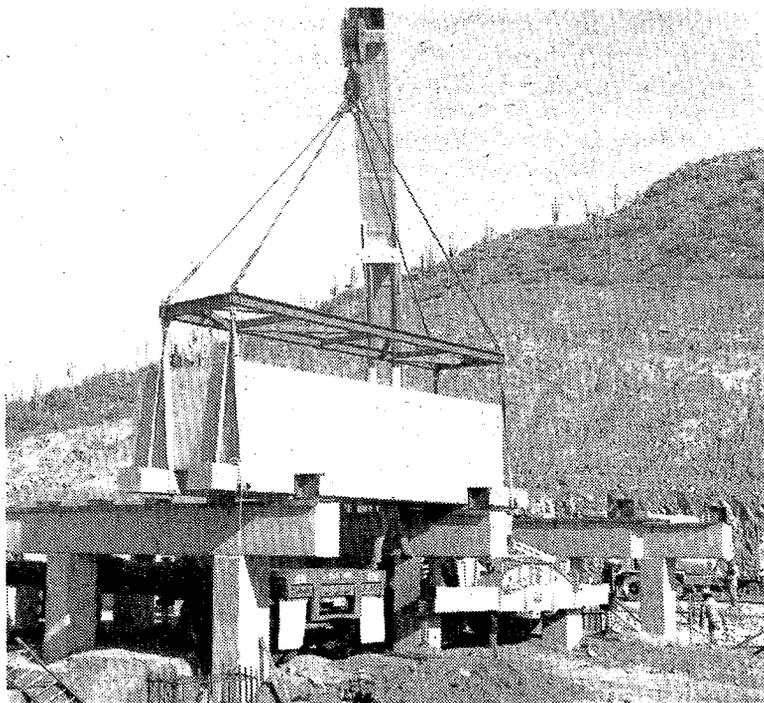
According to Steve Walsh, six 100-ton Unit-Rig electric drive haul trucks have been ordered.

One P&H 13-yard hydraulic shovel was also selected.

Two Ingersoll Rand blast hole drills and various Caterpillar support equipment have been chosen.

With the 1000 gallon in-situ test, designing and planning are progressing on schedule.

Leach solution injection into the surface drill holes is scheduled for July 1986, coinciding with the SX-EW start-up.



**ELECTROWINNING CELL** is hoisted onto its supporting piers at the SX-EW plant. The 20 ton pre-cast concrete cells are 20', 3" long by 4', 2" wide, and 4', 6½" deep. Redwood timber will be placed across the open bottom to support the heavy PVC cell liner.

Photo by Mark Vancas

# Letters

## To the editor:

I want to take this opportunity to thank Magma and everyone else responsible for my early retirement.

I would also like to take time to express something else: I have seen many changes take place in my 36 years, 11 months I have been an employee of Magma Copper Company.

At this time, I see the greatest change and I believe it will be for the greatest improvement ever. When I first started mining in Superior, we used a wheelbarrow to haul muck, then came 1/2 ton cars, then the 3/4 ton, then the 3 ton, then 7 ton, then 10 ton and now, we use 14 and 18 ton cars -- Progress -- as for mucking, first was only a muck stick, then the 12B, the 21B, the 40 Eimco the Haggland, and now we have the LHDs, -- Progress.

I wish you all the best in your new endeavor. As for the way I feel now in regard to my leaving the Company: I wish I could have my torso bronzed and placed at the top of 3B headframe.

Lyrics that I compose  
For simple reasons  
I suppose

Sprinkle my ashes  
into the cave  
Into which my life,  
I gladly gave

And that my ashes  
come to rest

In the place where I was  
my very best

"Oh", I only have one regret, sorry that I only have one life to give to my Company.

Respectfully,  
Ralph Herrera

## John Goss is elected director



JOHN GOSS

John W. Goss, vice president and general manager of the San Manuel Division was elected to the Board of Directors of Magma Copper Company at the Board's July meeting.

John joined Magma in 1948 as an underground laborer while a student at the University of Arizona.

Following graduation from the U of A College of Mines in 1953 he worked as an underground mucker for a short time before serving a tour of duty as Lieutenant in the U.S. Army Corps of Engineers.

John returned to Magma in 1955 as a miner and also worked as a rodman and surveyor, shift boss, research engineer, contract engineer, systems engineer, and general mine foreman.

He became mine superintendent in 1972

## Superior gives scholarship

By MIKE MCGUCKIN

A Magma Scholarship was awarded this year at Superior High School's 61st graduation exercises to Monica Jesse Da Rugna. Monica, who was valedictorian for her class is attending Arizona State University and plans to earn her degree in nursing.

Magma awards scholarships to an academically outstanding graduating student each year at both Superior and San Manuel.

The recipient must attend an Arizona university

Monica is the daughter of Jess and Patti Da Rugna of Superior.



## **Magma board approves mine project**

Magma Copper Co. directors this week approved a project that will extend underground mining in San Manuel into the next century and provide continued jobs for 1,300 workers.

Tucson-based Magma announced yesterday that it is committing \$135 million to develop the deep Kalamazoo ore body adjacent to the San Manuel ore body, North America's largest operating underground copper mine, 45 miles northeast of Tucson.

Going forward with development of the lower Kalamazoo can boost Magma's copper output by an estimated 2.3 billion pounds over 12 years.

The San Manuel ore body is expected to be depleted by 1997.

*Details on Page 12C.*

## Magma decides to proceed with 'the K' project

By Richard Ducote  
The Arizona Daily Star

Tucson-based Magma Copper Co. yesterday said it will commit \$135 million to develop another underground ore body in San Manuel that could extend 1,300 jobs through the year 2009.

The long-awaited decision was reached Thursday by Magma's board of directors, meeting in Phoenix, and announced early yesterday.

The deep Kalamazoo ore body is adjacent to the San Manuel ore body, which has been a mainstay of the area's economy for decades.

Magma CEO J. Burgess Winter said Kalamazoo, which contains an estimated 2.3 billion pounds of recoverable copper, is "an important component of our long-term growth strategy."

Development of San Manuel began in 1949, and production started in 1956. Mining in the San Manuel ore body is expected to end with the depletion of its ore in 1997, ending work for about 1,300 people.

But Kalamazoo could extend underground mining in the Magma complex 45 miles northeast of Tucson through the year 2009.

A critical part of Magma's decision to go forward with the project was the labor-relations revolution at the company in recent years.

Magma and a coalition of unions signed an unprecedented 15-year labor agreement in late 1991 that virtually eliminates the threat of strikes for the first eight years.

The agreement is considered a key to making Kalamazoo a viable project. The ongoing 18-month, \$5 million feasibility study for development of Kalamazoo was Magma's third, and likely last, attempt to get pay dirt from the deeper "sister" of the San Manuel mine.

The San Manuel and Kalamazoo ore bodies are both part of what was once a single cylindrical shell of ore grading about 0.7 percent copper. But the Kalamazoo, once the upper part of the shell, was sheared off at a geological fault line and fell below the San Manuel ore body.

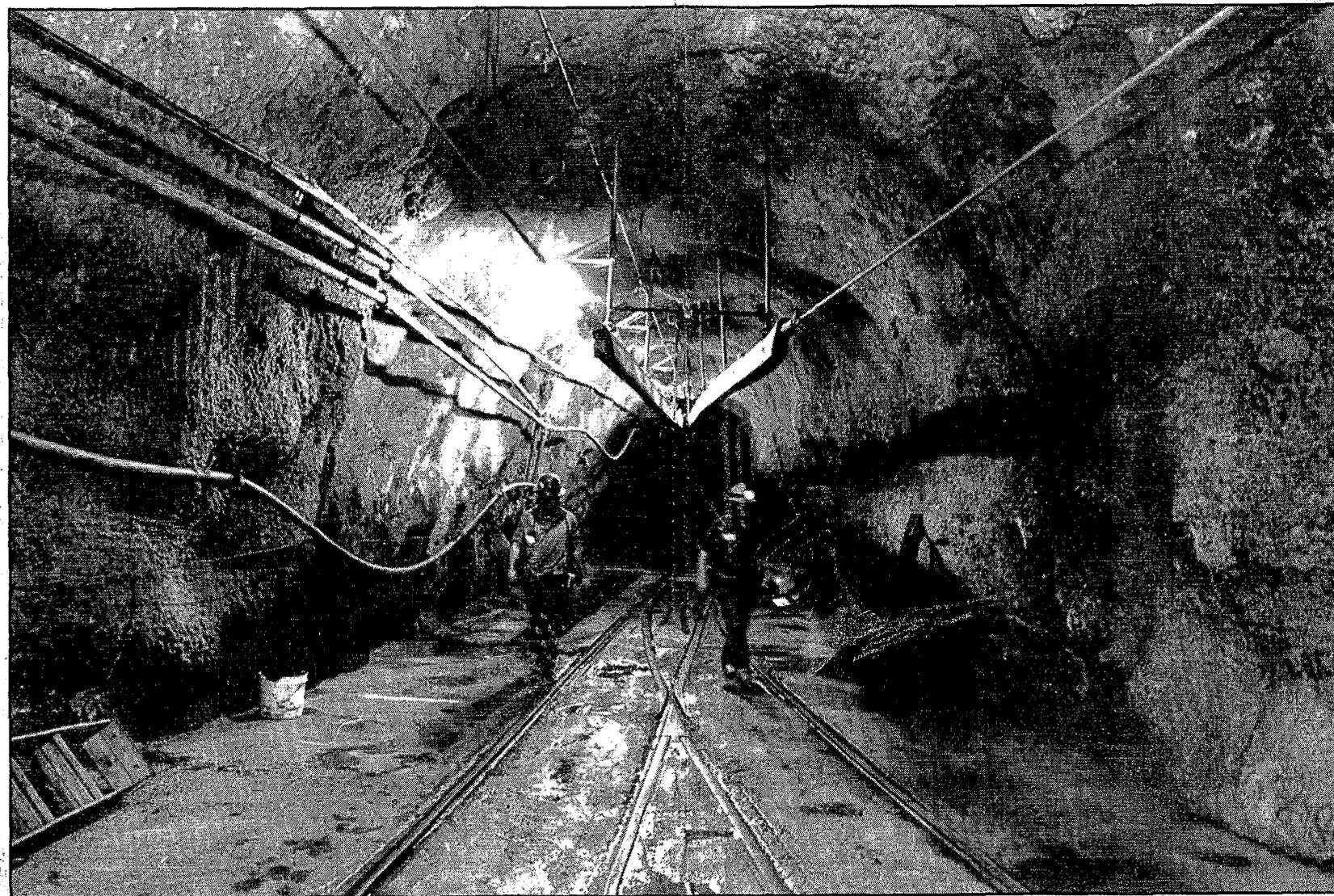
The working production level of the current mine is 2,615 feet below ground. The planned production level of the lower Kalamazoo is more than 800 feet deeper.

All previous attempts to go into "the K," as it is called, were abandoned as too difficult and expensive.

But yesterday, Winter said San Manuel's underground employees "have worked hard to increase productivity to levels which make mining the Kalamazoo attractive. The cost reductions resulting from the improvements will continue."

F.E. "Dee" Durazo Jr., Magma vice president and general manager of the San Manuel mining division, said yesterday that the innovative labor pact was "without a doubt" an important factor in going forward with Kalamazoo.

Durazo said that under employee-involvement and teamwork programs at Magma, average under-



1991 Star photo

Magma Copper Co. will develop the Kalamazoo, or "the K," ore body in San Manuel as part of its "long-term growth strategy"

ground mining costs have dropped in the last two years from \$5.75 per ton of ore to just below \$4, the benchmark set by the Magma board to develop and make "the K" pay.

"Three years ago, I would have said we had as much chance of mining Kalamazoo as mining copper on the moon," Durazo said.

Both Winter and Durazo said continued improvement is necessary as

the Kalamazoo project proceeds.

The Kalamazoo mining plan targets \$3.27 a ton, and Durazo says he is confident "we can do better."

The green light for Kalamazoo "is a bellwether event" for San Manuel, Durazo said. "This is what our focus has been; this is what drove management and unions to get behind the effort" to improve productivity. "It's of critical importance to Magma."

Preliminary development of Kalamazoo is already under way, Durazo said, because of "the critical timing" to get the new mine into production in late 1996 as San Manuel production begins to ebb.

Magma people were "ecstatic" on hearing of the final decision on Kalamazoo, Durazo noted. "People get a lot of juice behind something like

this. We've got a lot of work ahead of us, but it's also going to be a lot of fun," said the 18-year Magma veteran.

"The K" was given its name by an official of Quintana Minerals, Corbin Robertson, who liked the Glenn Miller Band hit "I've Got a Gal in Kalamazoo." Quintana sold its claim to Kalamazoo to Magma in 1968 for \$27 million in cash and stock.

# Fenno seeking fourth straight Tucson Marathon victory

By Alan D. Fischer  
The Arizona Daily Star

Record-setting performances are expected as 1,600 high-tech shoes hit the pavement in tomorrow's 23rd annual Tucson Marathon, which will get under way at 6:30 a.m. in downtown Tucson.

More than 800 runners are expected to compete in the Blue Cross, Blue Shield of Arizona-sponsored event, which also includes a marathon team relay event and a 5-kilometer run.

The event begins on Granada Avenue in front of the Tucson Convention Center. It finishes 26.2 miles later on Alameda at El Presidio Park after crossing to the far eastside, using Broadway and Speedway.

Tucsonan Rick Fenno is going for his fourth consecutive Tucson Marathon victory, and hopes to break his course record. Fenno and Blair Johnson have three wins each, but Fenno's came consecutively. He likes the city center course, having won the race each time since it was changed to its present configuration in 1990.

"It is a personal thing for me to win four in a row. Nobody has ever done that before," he said.

He set the course record at 2 hours, 25 minutes, 45 seconds in 1990 and believes a new standard is possible. "My training has been going great. I'm ready to go," said Fenno, 36, who has been running 95 to 100 miles weekly to prepare. "I'm looking for a real good race. I have a real good feeling the course record can definitely go."

And being marked as race favorite does not bother Fenno.

"I thrive on pressure," he said.

Tracey Varga is favored to win the \$1,000 prize as first women's finisher and expects to set a course record in the process. Varga, who won the Arizona Marathon in Phoenix on Jan. 13 with a time of 2:55, said the existing course record of 3:00.33 by Carol Pedretti in 1990 should fall tomorrow.

"I want to do it. I hope to go around 2:55. I don't see any problem with breaking 3 hours," said Varga, 30,

whose personal best is 2:47.

Varga, who works for Valley National Bank in Phoenix, has been running 70 to 80 miles per week, and even though she is getting over a cold, she feels up to the challenge.

She said the \$1,000 prize, the first money offered at the Tucson Marathon, will add to her efforts.

"It is a little incentive," she said.

Race director Robert Lester said several factors are responsible for the increased number of participants expected this year. The race date, normally in late January or early February, was moved back, which lessened the conflict with the mid-January Arizona Marathon in Phoenix.

"We've been able to pull runners down from Phoenix," Lester said.

The Tucson Marathon is offering cash prizes for the first time. Besides \$1,000 prizes for the top male and female finishers overall, winners of the top man and woman in the masters category for runners over 40 will receive \$250.

"It is the first time we've ever offered prize money. It puts us equal with the other marathons in the state," said Lester.

Lester warned motorists to be aware of marathon participants on Tucson city streets tomorrow morning. The runners will follow a course that heads east on Broadway to Camino Seco, north to Speedway, and back downtown using Speedway, Wilmot, Country Club and Third Street.

"The course is going to have two to three officers at each intersection to direct traffic. The runners will have the right-of-way. Broadway and Wilmot will be a heavy area, as will Campbell at Third. The runners will begin at 6:30 a.m., and the course will be closed at noon. But some runners will still be out there later than that," he said.

Lester said entries are still being accepted. Registration is open today from 10 a.m. to 5 p.m. at the Holiday Inn City Center. Race day registration will be from 5:30 a.m. to 6:30 a.m. near the start line on Granada in front of the TCC.

## Cats

Continued from Page 1C  
ahead during the stretch;

● Why couldn't the Wildcats combat Santa Clara's spread offense? It resulted in six layups in the second half.

"We practiced against it this week," Olson said. "I thought it helped us. It got us back in the game (in the first half). But it hurt us late when Ed had to defend Pete Eisenrich (the Broncos' versatile 6-foot-9 forward). We had no option there."

But Santa Clara guard Steve Nash said the spread offense was a key to the upset.

"I heard the Arizona people say it helped them, but that's not true," Nash said. "It made it a shorter game. If you can get into the final five minutes, anything can happen. That's all we wanted."

Nothing worked for the Wildcats. When Reggie Geary left the game with 18.6 seconds left and the UA trailing 62-57, Dylan Rigdon was inserted to shoot the free throws. He missed the first, made the second.

Santa Clara coach Dick Davey thought Geary was feigning the injury. Geary is a 44.7 percent foul shooter; Rigdon has made all five of his free throws this year.

"Dylan is our best free throw shooter," Olson said. "If Reggie had hurt his left elbow, I probably would not have made the change. But he hurt his right (shooting) elbow."

Perhaps the most symbolic play came with 7.3 seconds remaining. Stoudamire fouled Nash, who had made eight straight free throws.

This time he missed both attempts, and Mills, perhaps the best natural rebounder Olson has coached at Arizona, jumped for the ball as it came off the rim.

Somewhat, it went through his arms. The Broncos' Kevin Dunne grabbed it and was fouled with 5.1 seconds left. Dunne also missed both free throws, but the UA had lost 2.2 critical seconds — the difference between a good shot and a desperation heave.

"As an indication of what kind of night it was, the guy with as good a set of hands as I've seen anywhere has a free throw go through his hands," Olson said.

# UA coach's planned response: 'No comment'

By Jon Wilner  
The Arizona Daily Star

SALT LAKE CITY — A day later — sorrow.

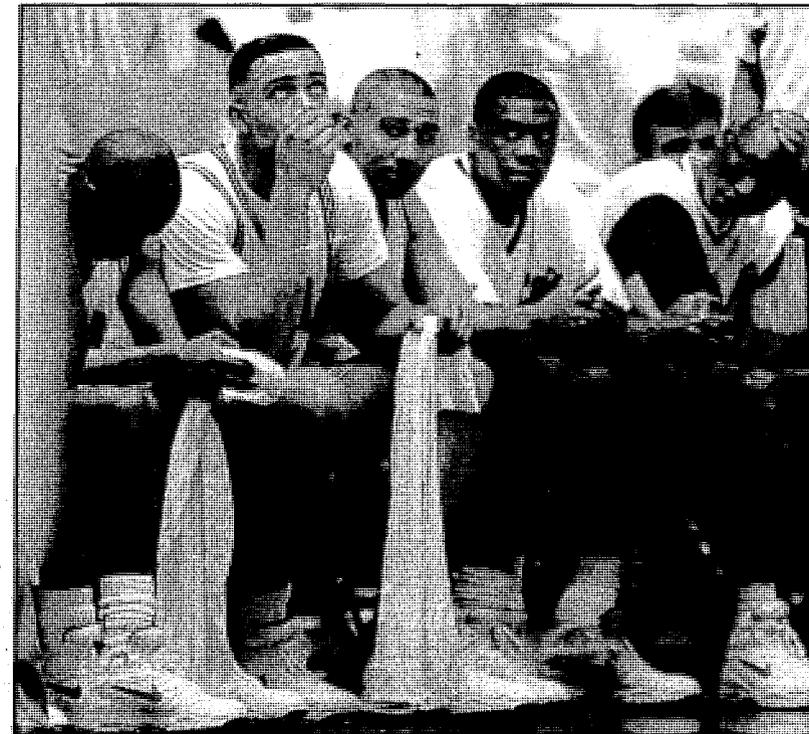
"It's one of the biggest disappointments I've seen as far as a team is concerned," Arizona coach Lute Olson said of the Wildcats' 64-61 loss to Santa Clara in the first round of the NCAA Tournament on Thursday.

"I don't know if I've ever seen a group of guys more dedicated and focused on a season and on accomplishing things. This team came as close to reaching its potential as any team. That's why it's difficult to go out this early and the way we did."

The No. 2 seed Wildcats did it in the most humiliating way possible — blowing a 13-point, second-half lead to a 15th seed — and now they must deal with the criticism.

"It's like Reggie (Geary) said getting on the bus: 'I suppose we'll have to hear this for another year,'" Olson said.

"The only thing we can do — and I made a mistake not doing this earlier — is each time it is brought up, the players should just say, 'No comment.'"



The Associated Press

Dejection was the name of the game for the Arizona Wildcats

A poor showing in the Tournament can erase any regular-season accomplishments. In the Wildcats' case, that means 24 wins, a Pac-10 title and a school-record 19-game winning streak.

"At the beginning of the year, no one thought this team would be capable of that record," Olson said. "No one will focus on the 24 wins. The entire focus will be on the last loss."

Then Olson was asked about the effect of the loss on his program.

"I have no comment about the early loss," he said. "Let's just start right now."

When pressed, he said: "The program is successful. We've won six of the last eight Pac-10 titles. For all the tremendous positives, the one negative is all anyone wants to talk about, and I'm not a negative person."

So he looked to the future, to a 10-game trip to Australia and New Zealand in May. The Wildcats will play in Melbourne, Perth, Brisbane, etc., against professional teams in the midst of their seasons.

"It'll be against stronger competi-

# Performance incentives produce results

## Magma's pay plan one of the best in rewarding workers

From staff and wire reports

A decade ago, San Manuel might have been the last place one would expect to find harmonious labor-management relations.

But the mining community northeast of Tucson can now boast one of the most sweeping and innovative cultural changes of any American industrial company.

Incentive pay is one of the earmarks of the Magma revolution — and there are other examples elsewhere.

Recently, all 3,000 employees in General Mills' Golden Valley, Minn., offices and laboratories got something dear to the hearts of working people everywhere: more pay.

The giant food and restaurant company calls it a "performance incentive." Employees call it money.

The extra pay, based on how well the company performed during the fiscal year that ended in May, is part of a four-year revolution in the way General Mills pays the 15,000-plus employees in its food and corporate divisions.

In changing its pay structure, General Mills has joined a growing number of companies — service and manufacturing companies, union and non-union firms — that are shedding tradition by pegging a portion of employee compensation to company performance.

Paying for company performance isn't new — many companies tie a portion of upper management pay to some measure of it. What's new is the scope — it's for all employees, not just upper management — and the willingness of companies like General Mills to look at compensation as a strategy, not as merely another cost of doing business.

### Rewards for all

Tucson-based Magma and its union coalition have spent years designing a system to reward all employees for meeting productivity goals and cost-reduction targets.

The company's "gain-sharing" plan is based on cost-savings to Magma from "working smarter" through innovation.

Safety is one of the components of the Magma incentive plan; a reduced level of accidents yields greater financial reward for employees.

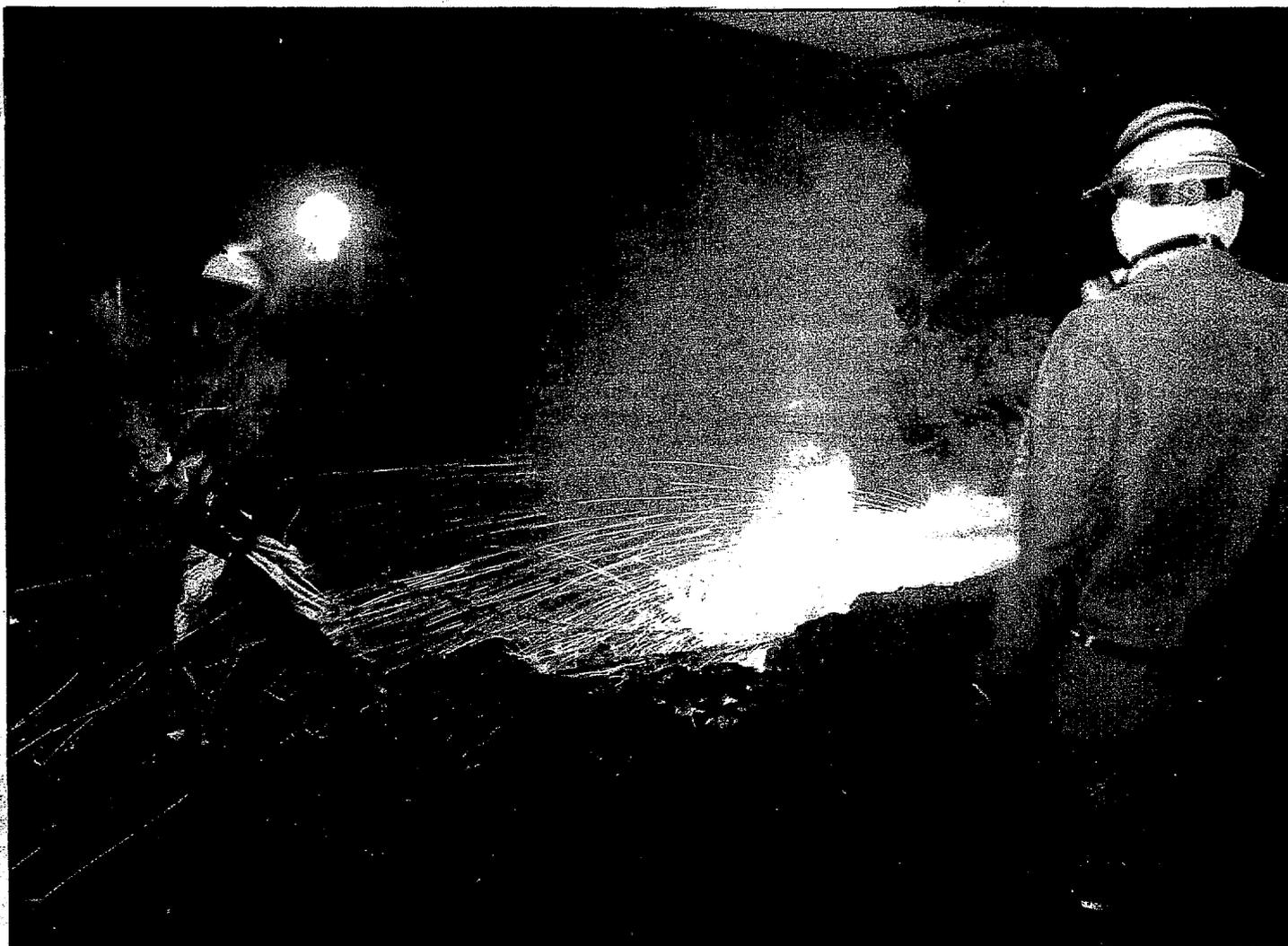
Magma recently boasted that its gain-share plan beat out other plans across the nation for paying back employees for improved performance.

Magma said in a recent issue of its employee newsletter that a 5 percent incentive payout was typical for one of the country's better known incentive plans. Magma, by contrast, calculated an 11 percent payout in the first quarter based on productivity improvement at its Magma Metals Co. unit.

Paying for company performance often accompanies another radical workplace change: teamwork. Studies of firms that have reorganized along team lines indicate that such fundamental changes in the way people work won't succeed unless employees are paid for any increases in productivity.

Employee involvement is an important part of the Magma program — perhaps the key part.

The company has spent millions of dollars and thousands of worker hours in the past few years to stimulate employee involvement in a team effort to reorganize the company from top to bottom.



1988 Star photo

**Workers at San Manuel smelter are members of a growing fraternity whose pay depends on a company's success**

Although pay specialists agree that the movement to change pay is significant, it's hard to determine exactly how many companies are involved. A University of Southern California study of Fortune 500 service and manufacturing companies noted that most companies increased their use of non-traditional pay from 1987 to 1990.

However, companies that commit entire work forces to some kind of variable pay system are a distinct minority.

For instance, a dramatic increase in any use of "gain-sharing," a form of compensation linked to company performance and other measures, occurred between 1987 and 1990, from 16 percent of companies studied to 39 percent. But USC researchers found far fewer companies using gain-sharing extensively in their businesses, even though the proportion increased from 7 percent of companies in 1987 to 11 percent in 1990.

Still, as USC Professor Jerry Ledford says, that's a big increase, and an indication of a trend by American companies to move away from strictly time-based pay systems.

"American business is dramatically transforming the way it rewards people," said Marc Wallace, a University of Kentucky professor of industrial relations who has studied non-traditional pay.

### Forced re-examination

Pay structures are changing because of profound market changes in the past decade that are forcing American firms to re-examine everything they do to improve performance and cut costs. In the '80s, the business environment turned inside out, thrusting sometimes-sleepy American companies into a global mar-

ketplace they had never had to attend to before.

"The '80s was a decade of change for virtually every business in society," Wallace said.

General Mills was by no means a sleepy company waking up to reality when it began changing the pay structure for its 15,000 food-sector employees four years ago.

Its food business is highly competitive, and the corporate culture encourages aggressive work habits to meet domestic competition. Company officials say the new pay approach merely streamlines a good thing.

"The old way worked, but we think this will work better," said Alan Ritchie, vice president for compensation. "We believe we can get a significant competitive advantage by innovating and creating a strong linkage between pay and performance."

The changes vary from unit to unit within General Mills. In the Golden Valley offices, the extra pay varied from about 5 percent to 7 percent of a secretary's \$25,000 salary, to up to about 50 percent of the salaries of top officials.

Gain-sharing, a variation on the pay system in Golden Valley, went into effect recently at General Mills' 650-worker packaged-food plant in Lodi, Calif.

It was an alternative to a tradition that once defined American industry: piecework. In the 1930s, about a third of the American work force was paid by the piece, a system that rewarded only individual effort.

### Conservation encouraged

Individual effort can still be rewarded under variable pay plans, supporters say. The gain-

sharing plan at General Mills' Lodi plant began with a lump-sum payment to each employee of \$500, not tied to company performance. The payment, handed out June 1, was to encourage workers to conserve ingredients and take other cost-saving measures, said Ron Hutton, president of the union's Lodi local.

Those efforts will be rewarded in the future by tying subsequent payouts to company performance as part of a gainsharing plan, he said.

"The way you get better is to get employees more involved, to have incentive-based pay systems for them," Norah said.

Companies have fashioned a variety of pay-for-performance plans. In a recently published study of 432 firms that use company-performance pay extensively, the American Compensation Association found rewards were determined by operational measures, such as productivity, quality and attendance; financial results, such as profits or returns; or a combination of those measures.

Like most companies that pay for company performance, General Mills also is trying to change the way employees work. Several work units and plants have begun to use what the company calls "high-involvement work processes" in which employees are supposed to be more involved in making decisions about how they work.

About 94 percent of the pay-for-performance plans in the American Compensation Association survey had employee-involvement programs. Those that did reported better results.

Minneapolis-St. Paul Star Tribune reporter Diane Alters and Arizona Daily Star business reporter Richard Ducote contributed to this story.

# J.S. investors buying into Japan

The Tokyo stock market hit a 6½-year low last week, prompting the Japanese government to take action to stop the slide.

But bargain-hunting small investors on this side of the Pacific weren't shaken: in hopes of cashing in on an eventual rebound in Japanese stocks, they have recently poured millions of dollars into mutual funds that invest exclusively in Japan, according to data gathered for Money Magazine's Small Investor Index.

For instance, the \$353 million Scudder Japan Fund has taken in \$121 million from customers in the

last five months, up from \$16 million during the same period in 1991, despite a 23 percent drop in the fund's share price this year.

Similarly, the \$84 million G.T. Japan Growth fund has enjoyed a net cash inflow of \$44 million since April, even though shares in the fund have lost 25 percent of their value in 1992.

Since the Nikkei index of Japanese stocks peaked at 38,915 in December 1989, weakness in the Japanese economy and banking system has helped drive the index down by more than 60 percent.

In an effort to restore confidence

in the market, the Japanese government last week relaxed banking regulations that had forced financial institutions to dump stocks.

Wall Street analysts warn that Japanese stocks could decline by 20 percent over the next few months. But in the long run, they say, small investors' confidence in Japan will pay off.

Last week, the Small Investor Index, which tracks the average individual's portfolio, gained \$16 to \$45,563. Stocks rose \$1 and bonds gained \$4. Certificates of deposit and money funds contributed \$11.

# Partnership buys St. Philip's Plaza loans

By Ernie Heltsley  
The Arizona Daily Star

St. Philip's Plaza owners no longer have to deal with the federal Resolution Trust Corp., and that's good, an attorney says.

A partnership headed by Dr. Robert E. Selby, a Tucson dermatologist and internist, recently bought \$9 million in defaulted loans from the thrift regulators at an as yet undisclosed, but presumably discounted, price.

The upscale retail and office complex is at North Campbell Avenue and East River Road.

For Selby's group, it is the second major purchase on River Road this year. In January, the group paid the RTC a discounted \$715,000 to buy \$2.6 million in defaulted loans and interest charges on the "River Road Boys Club" office building at 2195 E. River Road. The Selby group also made other arrangements with the original owners to acquire the build-

ing and real estate, nicknamed after the partnership that built it.

The latest purchase involves no change in ownership of St. Philip's, but it does substitute the buyers of the notes for the RTC as the lender in Chapter 11 reorganization negotiations. The stay order in the bankruptcy prevents any foreclosure on the property without the judge's approval.

Ralph Seefeldt, attorney for the plaza's owner, Mark Herder, said recently that the plaza still has to contend with \$9 million worth of debts, but the sale of the notes by the RTC has temporarily postponed a hearing on the owner's plan of reorganization and disclosure statement.

The RTC took over the loans in January 1990 from the failed Mera-Bank, but it never foreclosed on the St. Philip's Plaza property.

"We've got someone to talk to rather than the RTC. It's a live body to talk to rather than a bureaucracy. I think we're better off," Seefeldt

said.

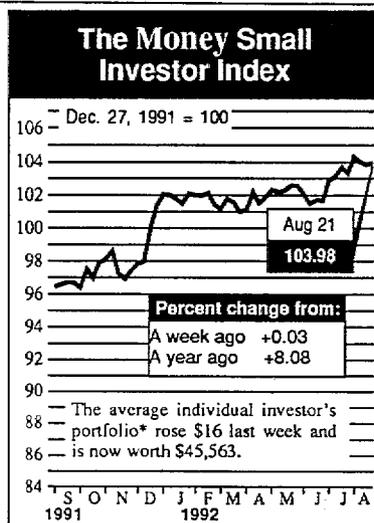
Seefeldt's earlier plan asked the judge to order that \$7.8 million of the debt be reduced in a "cram-down" procedure to \$3.1 million, which Herder claims is the present value of the plaza.

Walter "Skip" Wood, the Selby group's attorney, said, "If he (Seefeldt) is pleased it's because we can make a decision and RTC can't. It doesn't have to go to a committee."

Wood declined to say how much the Selby group paid for the notes, and Selby did not return a reporter's telephone call.

Herder placed St. Philip's in reorganization in July 1991, more than a year after he bought it for \$10,000 from a partnership controlled by his father, Peter Herder. The elder Herder and his wife, Recie, filed for personal bankruptcy last September.

Peter Herder is a former president of the National Home Builders Association.



\*The value of the average investor's portfolio is determined by dividing the total assets held by Americans by the number of U.S. adults.

MONEY magazine via AP

**MAKE YOUR RESUME A GREAT IMPRESSION**

**COPY BOY**

**Attention**  
Self employed & Small Business Owners

Health Insurance at Group Rates

Beck Consulting  
888-0321  
(800) 264-0243

**QUALITY COMPUTER SYSTEM**

**FREE!!** Windows 3.1, Mouse with Pad and Pouch

**486 DX33 System**  
256K Cache, AMI BIOS  
4 MB RAM, Full Tower 250W Power Supply, 1.2 and 1.44 Floppy drives, 120 MB Hard Drive, 2 serial, 1 parallel, 1 Game Port, Paradise VGA w/512K RAM, Super VGA Color Monitor w/29mm dot pitch, Enhanced 101 Keyboard w/soft cover, DOS 5.0

**\$1995**

**386 DX33 System** This Month ONLY!  
128K Cache, AMI BIOS same as above in a Mini Tower with 220W Power Supply

**\$1595**

**United Systems & Software**  
298-8486

8361 E. 22nd St.  
1110 S. Columbus  
130 W. Duval Mine Rd. Green Valley

**THE EXPO '92**  
Tucson's Premier Business to Business Exposition

**100%** of the recommended daily allowance of Vitamin B-business Complex

Directions: TAKE ONE A YEAR.

Good Sept. 23-25, 1992 T.C.C.

contains 200 BOOTHs

**You take good care of your body... take good care of your business by exhibiting in the Expo '92!**

Recommended Daily Allowance of...  
Client Contacts.....100%  
Market Exposure.....100%  
Seminars & Training.....100%  
Networking.....100%  
Innovative Ideas.....100%

For Direct Exposure to Tucson Business Professionals...  
**THE EXPO '92 - IT'S JUST WHAT YOUR BUSINESS NEEDS**

**September 24 & 25**  
**Tucson Convention Center**  
*Good Exhibition Spaces still available!*

For more information on Tucson's premier business-to-business show, contact the Tucson Metropolitan Chamber of Commerce, 792-2250

# ARIZONA TRAIL

## SANTA CATALINA MOUNTAIN PASSAGE



### Magma sponsors trail signs

Magma is sponsoring two major information signs at access points on the new Arizona Trail system.

Now open from Mexico to Oracle with 80 miles completed, the trail will eventually cross Arizona with 700 miles of improved, if sometimes rugged, passage for hikers.

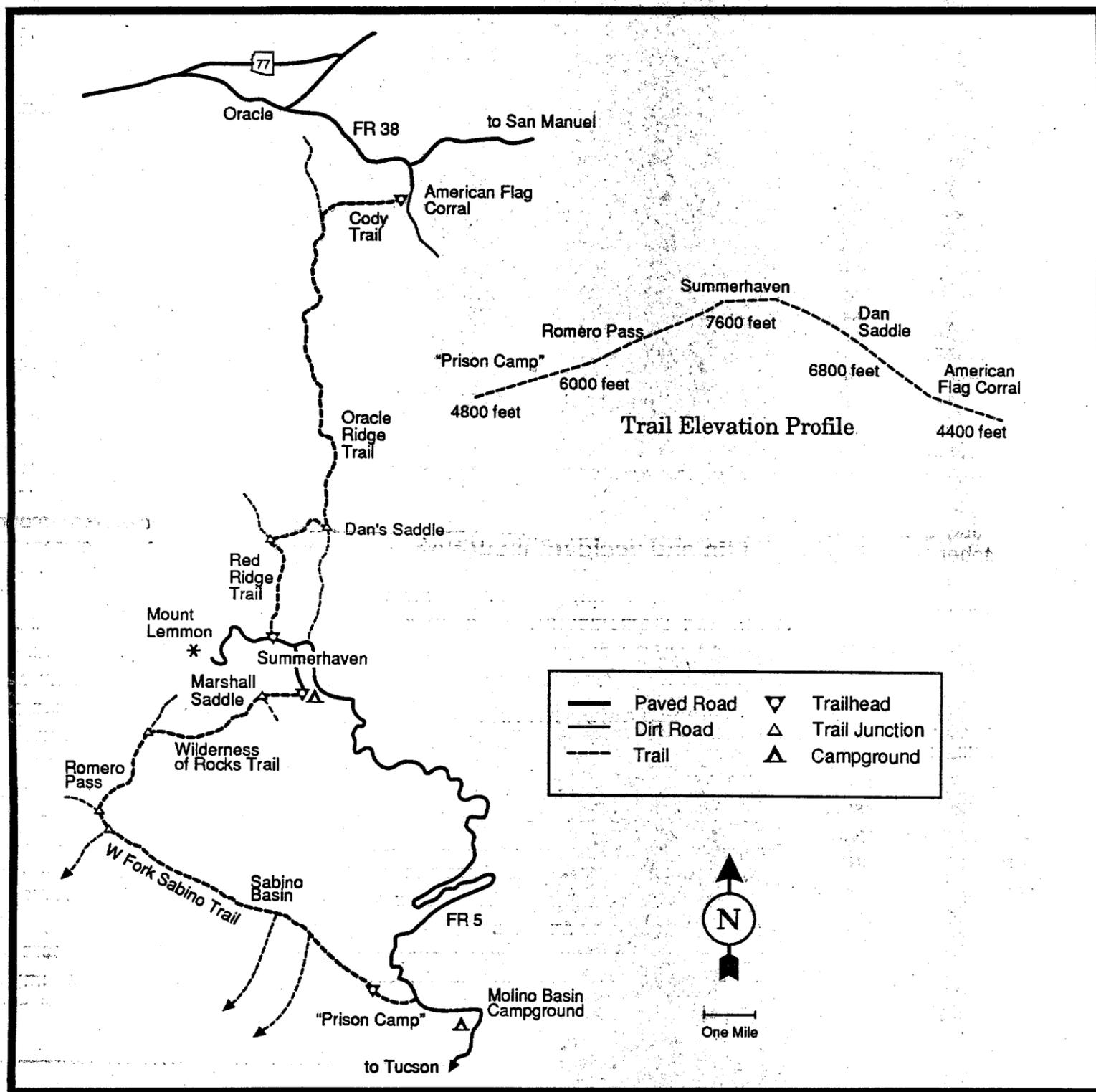
Magma's participation is in the form of large information signs located at the Oracle and Rincon trail access points.

The signs display detailed maps of the trail segment and give vital information to hikers.

If you're interested in this type of recreation you can

obtain full information and maps from the Coronado Forest Service office at 5700 N. Sabino Canyon Road; Tucson, AZ 85715.

If you're really into it ask for the Trail Newsletter from Dale Shewalter, Arizona Trail Coordinator, Kaibab National Forest, 800 South 6th Street, Williams, AZ 86046.



This segment of the Arizona Trail is managed by the USDA Forest Service, Coronado National Forest, Santa Catalina Ranger District (RD). Two temporary trailheads will be used. On the Catalina or Mt. Lemmon Highway, a site commonly called the "Prison Camp" will serve as a temporary trailhead until Molino Basin Campground is changed by the highway widening project. Molino Basin will eventually be the trailhead and will connect with Redington Pass and the Rincon Mountains. The American Flag Corral, an historic site, will serve as temporary trailhead near Oracle. It is hoped that the permanent trailhead will be located at or near the developing Oracle State Park.

As with the other "desert island" mountain passages, trail users will travel through several different vegetation communities (life zones) as they cross the Santa Catalinas. Water is found seasonally in the upper canyons, but must be considered unsafe for human use unless properly treated.

#### TRAIL ROUTE DESCRIPTION

The turn-off to the "prison camp" trailhead is along

the Mt. Lemmon Highway, 2.2 miles uproad from the Molino Basin Campground sign. It is recommended that trail users park vehicles near the highway and follow the 4WD road 1.4 miles to the saddle overlooking Sycamore Canyon. A motorized-mechanized closure sign and structure is at the saddle. The trail goes 2.1 miles to Bear Canyon Trail Junction. Proceed another 2.1 miles to Sabino Basin. Follow the West Fork Sabino Trail 6.8 miles to Romero Pass. From the pass, take the Mt. Lemmon Trail north 1.9 miles to the Wilderness of Rocks Trail. Follow the Wilderness of Rocks Trail 4 miles to Marshall Saddle, then 1.2 miles down Marshall Gulch to the campground near Summerhaven.

From the campground, it is about 1.3 miles through Summerhaven to the Mt. Lemmon Highway. At the highway, turn west (left) for about one half mile to the Red Ridge Trailhead on the northside of the road. **Extreme caution must be used while walking or riding along the highway.** Descend the Red Ridge Trail 3.1 miles to "Catalina Camp" on the Canada del Oro drainage. Climb 1.7 miles to Dan's Saddle and the

junction with the Oracle Ridge Trail. Follow the Oracle Ridge Trail about 8.5 miles to the Cody Trail. The Cody Trail is marked with Arizona Trail decals on Carsonite posts. This route winds easterly about 2.5 miles to the American Flag Corral Trailhead.

#### BICYCLES

Most of this route is managed as wilderness. Bicycles and other mechanized equipment are not allowed in wilderness. "Mountain" bicyclists may ride the Redington Pass Road from Tucson to Redington, then north along the San Pedro River to San Manuel and Oracle. **CAUTION:** This route is not signed and there are no services in Redington.

#### RESOURCES

Santa Catalina Mountain Trail and Recreation Map. Published by Southern Arizona Rescue Association. Coronado National Forest Map, Santa Catalina Mountains.

Coronado National Forest, Santa Catalina RD, 5700 N. Sabino Canyon Rd., Tucson, AZ 85715, 602-749-8700.

# Scholarship recipients have varied goals



SCHOLARSHIP WINNERS are, from left, Alejandro Bertoldo, Cecilia Johnson, Carrie Stotts, and Shannon Tannar.

Photos by Bebe Burwell

By **KIM HUFFMAN**  
human resources  
secretary

The 1989 Scholarship Awards have been made to four outstanding students, sons and daughters of Magma

employees, who will begin university studies this fall. Each scholarship is in the amount of \$1,000 per year, renewable for four years.

Magma Scholarship winners are:

Cecilia Johnston, daughter of ore transportation engineer Kenneth Johnston, will study nutrition at the University of Arizona.

Alejandro Bertoldo, son of mill operating foreman Alex

Bertoldo, will study economics at Harvard University.

Magma Employee Fund Scholarship Winners are:

Shannon Tannar, daughter of mine mechanic journeyman

Eddy Tannar, will study ; nalism at the U of A..

Carrie Stotts, daughter mill superintendent Ge Brunskill, will study busi adminstration at the U of

## Electricians maintain hoist signals

By **JERRY MILLER**  
mine mechanical foreman  
As with most things which work well, we take it for granted that they will always

work well. Such is the case with the electronic signals on our employee hoist conveyances, called "cages".

Everytime you step onto the cage you expect the signals to function properly.

Most of us care not how they work, as long as they work.

But two mine electrician journeymen, Pete Lopez and JR Estep spend much of their work day making sure the signals work properly.

There are a total of 13 hoists with a combined total of 21 cages and skips, each of which is equipped with the electronic signals.

Each shaft has its own audio system for coordination of shaft operations.

In addition a dial telephone system connects underground and surface hoisting, maintenance, and operations.

When Pete and JR were first assigned to work on the cage signals the job was complicated by the fact that no two signal systems were alike.

After many hours of work, our signal equipment now is standardized making it much simpler to work on.

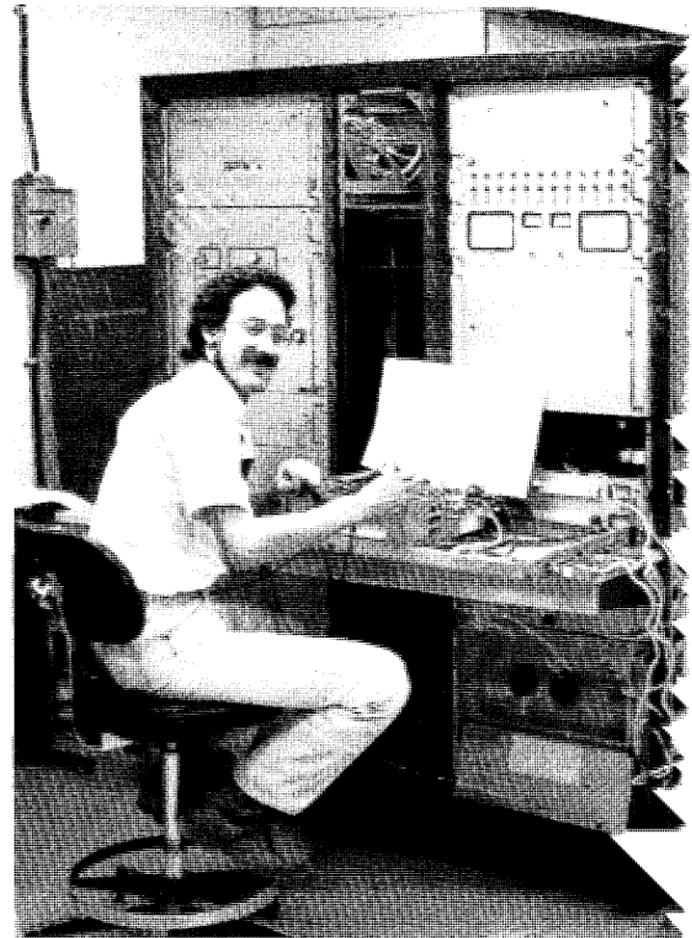
At times you will see Pete and JR around the shafts working on the signals, and when you see them remember that its through their effort we can communicate with the hoistman operating the hoist we ride on each day.

With the type of team work exemplified by Pete and JR, Magma has become a safer and better place to work.



INSPECTING electronic signals for #5 main hoist are electrician journeymen, from left, Pete Lopez and JR Estep.

Photo by Richard Cole



ASSAYS of smelter process materials are performed on x-ray fluorescence spectrometer being fine-tuned by instrument shop technician Larry Sawicki.

Photo by Lynn

## Faster assays for smelter

By **RICHARD AROS**  
senior chemist  
metallurgical department

What is all that whistling about in the new smelter metallurgical lab?

The technicians are all smiles with the addition of our new ARL 74,000 x-ray fluorescence unit used for production assay of smelter process materials.

The restored unit replaced an x-ray unit and has greater reliability and faster around times for each analysis.

A very special "thank you" to instrument shop technician Larry Sawicki, chief chemist Thad Appelman, chemist Margaret Schofield, and our technicians for their tremendous efforts in getting the instrument on-line.

# *We did a lot of work in the first six months*

Production for the first six months of 1989 compared with 1988 and 1987.

Includes toll processing where applicable.

		<u>First 6 Months</u>		
		<u>1989</u>	<u>1988</u>	<u>1987</u>
<b><u>SAN MANUEL</u></b>				
Underground	tons of ore hoisted	8,411,000	8,300,000	8,157,000
Open Pit	tons of ore mined	4,448,000	3,673,000	3,447,000
	tons of waste mined	11,298,000	9,480,000	8,871,000
	tons of sulfide ore mined	-0-	14,000	-0-
	tons of ore milled	8,512,000	8,342,000	8,109,000
Mill	tons of slag milled	394,000	764,000	850,000
	pounds of moly produced	1,521,000	1,687,000	1,691,000
	tons of concentrate smelted	450,284	347,522	371,591
Smelter	tons of new copper	196,117	107,116	106,029
	tons of sulfuric acid	386,033	231,339	218,907
	SX-EW	pounds of copper from heap leaching	31,459,000	28,765,000
pounds of copper from in-situ		2,901,000	1,149,000	829,000
pounds of copper from refinery leachate		1,634,000	1,208,000	-0-
Refinery	pounds of copper produced	200,000,000	212,772,000	218,288,000
Rod Plants	San Manuel, pounds of rod	142,027,000	174,328,000	156,423,000
	MCR, pounds of rod	122,013,000	124,270,000	111,981,000
<b><u>PINTO VALLEY</u></b>				
Open Pit	tons of ore mined	10,273,000	11,034,000	10,792,000
	tons of waste mined	16,204,000	13,829,000	14,179,000
Mill	tons of ore milled	10,760,000	11,250,000	11,110,000
	pounds of moly produced	587,000	463,000	452,000
SX-EW	Pinto Valley unit, pounds copper	5,311,000	7,768,000	5,997,000
	Miami unit, pounds copper	5,052,000	4,730,000	4,414,000

from the County and the Miami-Inspiration Hospital is being formed to prepare a detailed business and financial plan for a new hospital corporation.

They have agreed in principle that a single hospital would best meet the needs of the Miami and Globe communities and that it would have the best chance of succeeding in the existing 80-bed county

new corporation can be debt free.

Pinto Valley has no ownership in the Miami-Inspiration Hospital but has utilized it heavily for employee and retiree medical care.

The hospital was organized in 1911 as a joint venture between the Miami Copper Company and Inspiration Consolidated Copper Company.

Representing Pinto Valley is vice president and general manager Glenn Martin and representing Cyprus Miami Mining Company is senior vice president Jake Timmers.

We are strongly supporting the consolidation to ensure that the area continues to have comprehensive medical care available to employee's families.

# Productivity means working smarter

By MARSH CAMPBELL

In the past, being more productive often meant working harder - putting in more physical effort. Today, productivity means thinking creatively about your job, how you apply the resources related to it and making a better application of those resources, including your own efforts.

Look at your job and the resources which are used. Which ones are being lost or wasted? Over time, many resources and resource losses are accepted as a normal practice or procedure -- "things have always been done that way."

Resources fall into seven major groups: money, labor, material, equipment, energy, tools and facilities.

Material resource losses occur when items such as parts, paper, chemicals, etc., are misused, wasted, destroyed, lost or misplaced.

Energy is used to operate our equipment and facilities. Energy is lost when used inappropriately or wasted. Using a 100-watt bulb when a 50-watt bulb will do and running equipment when not in use are examples of energy waste.

All resources cost money and there is no endless supply, even for a large company. Money is wasted when large inventories purchased with borrowed money sit idle in a warehouse while interest is being paid on the debt. Money is wasted when supplies are purchased that are above specification and cost more -- or

when a poor quality part is ordered and does not hold up.

The above are resources used in processing areas. Some resources are used over and over -- equipment, tools, and facilities. Equipment is a resource loss when misused, not used or inefficiently operated. Tool resource losses occur when left unused, misused or lost. Facilities are also a source of resource loss. Unused or poorly designed floor space is a waste.

Labor is a critical and costly resource. Employees' control all the other resources. Labor resources are lost when employees are not working as productively as they could be. This may result from poor scheduling of work causing waiting time, poorly distributed work assignments, inadequate training or employee attitudes that result in wasted time or poor quality work that must be redone.

Working smarter involves reducing or eliminating resource losses in your work area. Working smarter also involves spotting and taking advantage of opportunities to use resources more wisely. This could include the use of resources that appear to be unwanted or unusable. One company converted ash from an industrial boiler into a fertilizer. Another company reclaimed used oil and sold it back to a local refiner. As you see resources being used, question if they are being used efficiently and, if you have an idea on how resources might be better utilized, discuss it with your supervisor.

*Magma Update Vol 5, No. 9 Aug 1989*  
**Superior could open next year**

The Board of Directors has given permission for the dewatering, rehabilitation, and possible re-opening of our historic high grade underground Magma mine at Superior.

Under the proposed project the mine could operate for possibly eight years and produce an average 14,000 tons of copper per year in concentrates for smelting and refining at San Manuel.

In addition the mine would produce approximately 6,400 ounces of gold and 278,000 ounces of silver per year.

The mine has been flooded since 1982 when it was closed because of low productivity and high costs.

Until the shafts, mine openings, and stopes are pumped dry and an inspection made of their condition, we cannot be certain that we can reestablish mining on a profitable basis.

Should the project be attractive, production could begin in the 4th Quarter, 1990, with full production achieved by January, 1991.

Initial mining would be limited to approximately 1,000 tons per day of approximately 5% grade copper ore utilizing the undercut and fill procedures previously used in the mine.

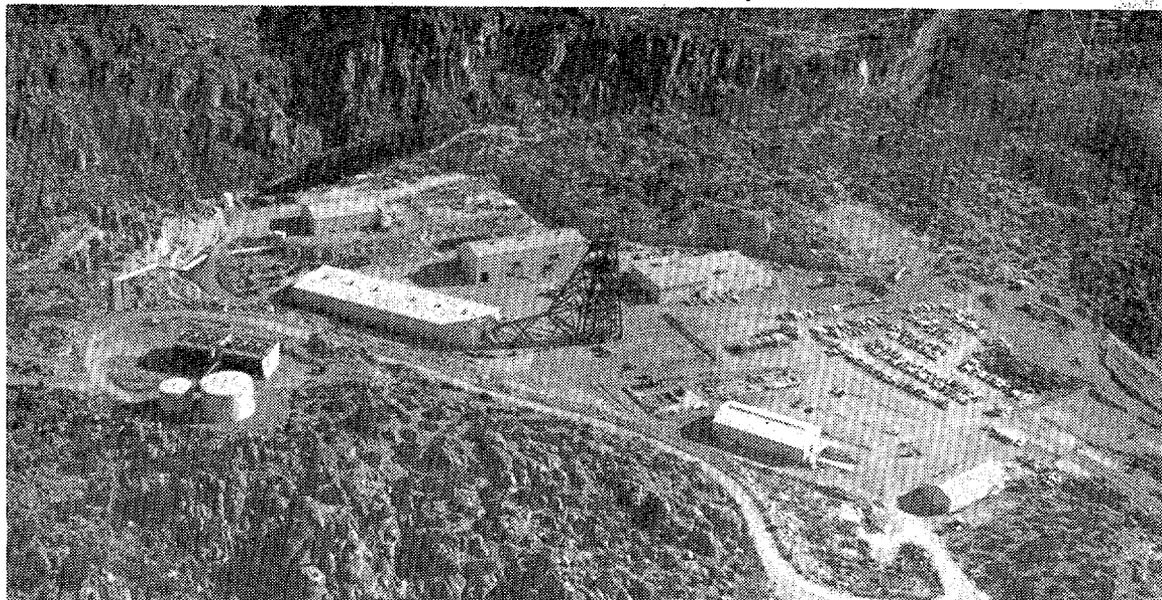
If the project proceeds, approximately 300 employees would be required to operate

the mine and concentrator in an innovative organization based on the concept of high performance teams working limited shifts with high incentives for efficiency and productivity increases.

The Magma mine produced more than 25,000,000 tons of copper ore between 1911 and 1982.

It earned distinction because of its high grade veins of bornite and because, in 1937, it was the first deep underground mine in the U.S. to be equipped with refrigerated air conditioning.

In 1925 at Superior, Magma was the first mining company in Arizona to offer life insurance to its employees.



**THE #9 SHAFT and mine yard of the Magma mine is the center of activity for investigating the possible reopening of the Superior Division.**

## From our scrapbook . . .

its way from Tucson, Arizona to  
San Manuel Copper Co. mine at  
Tiger, Arizona



### *Bringing in an engine - 1951*

**THIS IMPRESSIVE CONVOY** was enroute to the San Manuel Mine in December, 1951 hauling this behemoth 16 cylinder, 2,400 horsepower gas-diesel engine. There were two 8-cylinder engines plus this one at the mine powerhouse which generated 5,500 kw of electricity for mine development. They were all dismantled in the mid 60's. In the photo the articulated truck shows 24 wheels and its truck was attached to the lead truck with a bar for extra power to climb the 2,000 plus foot grade to Oracle. From Oracle we bladed an old wagon road to the mine for fewer curves and a less steep downgrade than the highway. The man in the photo looks like he is walking alongside the rig was doing just that; and, it was walked all the way from Tucson to guide it around the narrow, sharp and steeply banked curves of the old highway. The State Highway Department was alarmed at the weight of the thing, probably around 100 tons, and put stress measurements on the bridges, vowing to fine Magma for any damage. Contributing their recollections to this story were retired engineer Vin Coxon, operator El Ragsdale, and master mechanic Earl Snodgrass.



## *Smelter construction - 1923*

THE FOUNDATIONS for the Superior smelter required lots of horsepower seen in this photo taken March 1, 1923. The smelter began operating in March, 1924 with a production of 1500 tons per month of blister copper "pigs". A brick works was established at Superior to provide bricks for the smelter stack and plant with the surplus bricks going to the community for the new high school, business buildings, and company houses. The mine had been shut down for two years and we believed that with a new smelter we could lower operating costs. We did, and the mine reopened and Superior continued to operate for many profitable years.



**JIMMY DOMINGUEZ** saved an expensive piece of heavy equipment from burning at the smelter.

Photo by Gilbert Rodriguez

## *Magma's impact on Arizona*

Magma Copper Company makes a big economic impact on the state of Arizona as seen by these amounts paid out in 1988.

### Payments to State

Arizona property taxes	\$ 8,061,801
Severance taxes	6,095,810
Arizona sales taxes	4,785,295
Vehicle taxes	44,985
Mineral royalties	<u>413,976</u>
Total payments to State	\$ 19,365,867

### Payments to Arizona Employees

Salaries and wages	\$166,852,344
Fringe benefits	13,864,203
Supplemental employment benefits	2,334,119
Workmen's compensation	<u>1,900,865</u>
Total payments to employees	\$184,951,531

### Other Payments

Pensions to Arizona residents	\$ 3,673,179
Supplies purchased in Arizona	<u>239,504,507</u>
Total other payments	<u>243,177,686</u>
Total all payments in Arizona	\$447,495,084

Considering that our 1988 sales were \$607,066,000 we paid out 74% of that amount into the Arizona economy. In other words, 74¢ out of every dollar we produce in Arizona stays in Arizona!

Dominguez for preventing a costly loss of equipment.

Thanks Jimmy!

## **60% of houses now held by homeowners**

A total of 747 or 60% of the homes in San Manuel are now in private ownership.

This includes the 200 homes previously owned by individuals and the 547 homes sold in the current sales campaign.

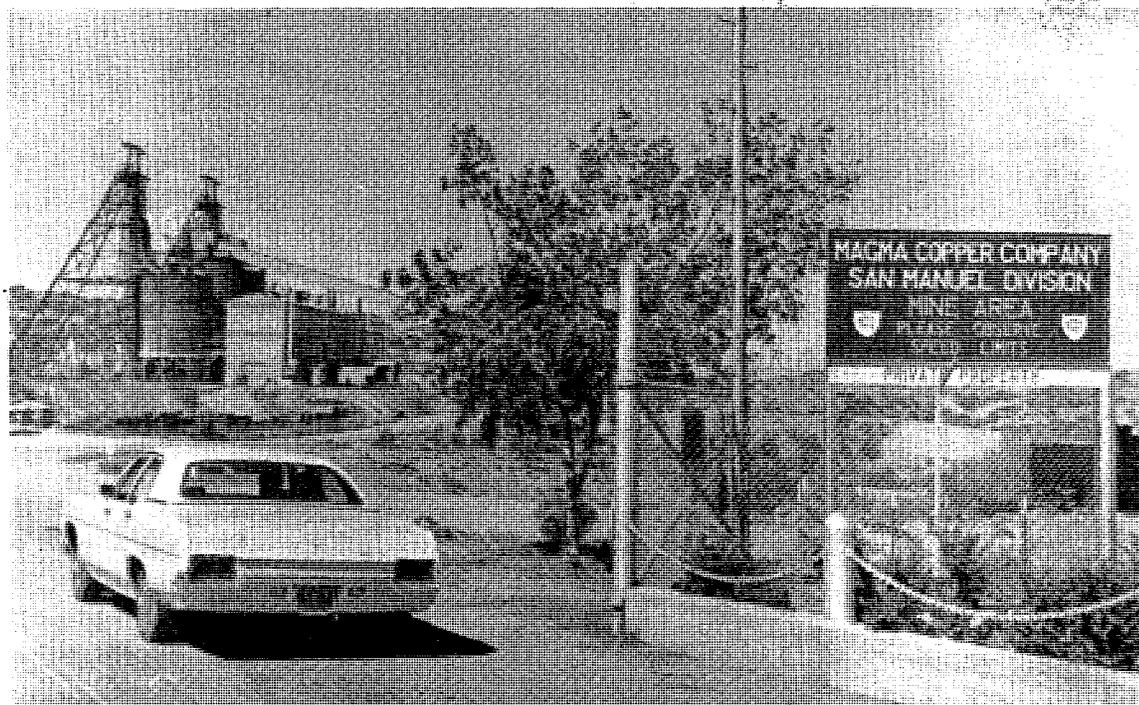
The sales campaign has brought in \$10.2 million in cash and an additional \$1.9 million has been received for sales of commercial property in San Manuel.

This additional revenue has been used in production operations and helped lower the amount of bank borrowing last year.

Seventy of the sales were financed through the low income program available through the Farmers Home Loan Administration.

Others have utilized FHA, VA and conventional mortgages and a few have been cash sales.

The rate of sales has slowed to about six per month because of the recent lay off, rising mortgage rates, and seasonal factors.



## *Mine entrance - 1970*

**EXPANSION** from 45,000 to 65,000 tons per day of mine production was underway in 1970 with sinking the 3C and 3D shafts and installing additional primary crushers and new ore bins. This was the main mine gate which was never closed because the road was open to the public and was used by folks going to Mammoth and the company houses at Red Hill. The photo was taken in October 1970 by a photographer from the Arizona Republic who was here doing a profile on the company's \$250 million program to expand the mine, mill, and smelter. The "watchmen" always kept a beautiful garden surrounding the entrance including the roses seen in the photo, other flowers, and occasional vegetables. We think we remember at least one stand of tall sweet corn as well as several peach trees around the guard shack. If anyone remembers please drop us a note.

... bonus than production and sales requirement not being met.

No bonus is payable in any quarter the company does not produce and sell the required amount of copper.

The preliminary accounting of 1st Quarter production and sales indicates that approximately 60% of budget was

sell 92,139,000 pounds, which is 80% of the budgeted 115,173,500 pounds for each quarter in 1989.

Efforts continue to correct problems with the flash smelting furnace that have precluded operation at design capacity since the July start up (see related story).

Because actual production

the failure to meet the production requirement.

Plans are going forward as previously announced to revise the current bonus plan for salaried employees beginning January 1, 1989.

Any revision to the hourly plan is subject to negotiation with unions representing certain employees at Magma.

## We're in the Fortune 500!

Magma joined the Fortune magazine list of 500 major U.S. industrial companies this year with the ranking of 439.

The list is based on sales with the highest of \$121 billion

for General Motors and the lowest of \$500 million for Chemed Corp. of Cincinnati.

Only one other Arizona firm, Phelps Dodge, is on the list and it ranks 182nd with sales of

\$2.3 billion.

Magma ranked 22nd largest among the 25 metals companies listed with Phelps Dodge ranking 9th and ASARCO 10th.

## *Annual report is published*

Magma Copper Company's 1988 Annual Report has been published and is being distributed to stockholders.

In addition to detailed financial data the report includes a review of Magma's operations and a discussion of the achievements the company made in 1988.

The report is visually appealing and includes full color photographs, drawings, charts

and graphs.

Based on the theme "Breakthrough", the report shows how Magma is a new and different company in terms of operations, technology, quality, organization, and economic development.

The report represents the first detailed look at Magma for most stockholders, as well as professional investors, metals analysts, stockbrokers, and

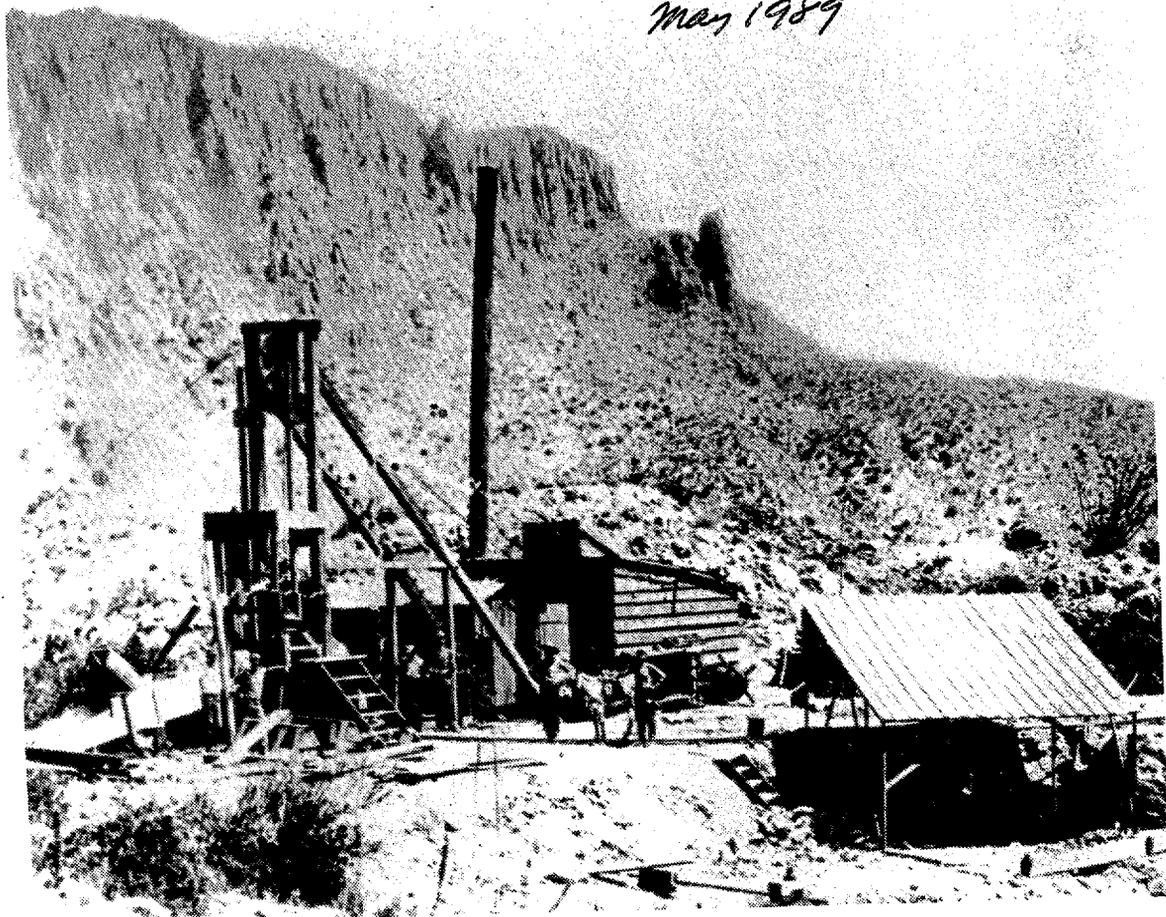
the business press.

The report was prepared by the treasurer's department and was edited by assistant investor relations officer Sandy Gerdon.

Any employee who would like to have a copy of the annual report can obtain one from Sandy at the administration building or by calling her at extension 521 (385-3521).

From our scrapbook . . .

*Magma Update  
Vol. 5, No. 6  
May 1989*



## *Magma - 1910*

**THIS IS ALL THERE WAS** on May 5, 1910 when Magma Copper was incorporated. Located near Superior, Arizona Territory it was formerly the Silver Queen Mine and was purchased for \$130,000 by our founder, William Boyce Thompson, not for the silver, but for the rich copper vein which his geologist, Henry Krumb, had identified. Magma Copper Company was organized with initial capitalization of \$1,500,000 which was enough to pay for underground development and a new flotation mill with a capacity of 150 tons of ore per day. Magma came into production in 1915 and in the first year the mine produced 44,000 tons of ore with a grade of 8.19% copper. Concentrates and direct smelting ore were shipped to the smelter at Hayden until we built our own smelter at Superior in 1924. Also in 1910, about 35 miles east of Superior, another rich copper mine, The Miami, was starting up. It continues to produce copper today through in-situ leaching and treatment in Pinto Valley's Miami Unit SX-EW plant. So, Happy 79th Birthday, Magma Copper Company.

common stock	20,737	16,799
Earnings per share of common stock, primary	0.76	0.44
Average common shares outstanding, primary	27,417	38,097
Earnings per share of common stock, fully diluted	0.56	0.44
Average common shares outstanding, fully diluted	40,786	38,097

The company is proceeding with plans for the \$100 million offering of Subordinated Notes due 2001 and Common Stock Purchase Warrants.

Proceeds of the offering will be used to repay a portion of existing bank debt and for general corporate purposes.

## *Rick keeps mine phones ringing*

**Story By PAUL AYALA,  
mine electrical foreman**

Meet mine electrical journeyman Rick Hanson, who with the help of his unique style of transportation, installs, maintains and troubleshoots the telephone system at the mine.

Rick's responsibilities consist of a Prelude 400 PBX, over 320 telephone extensions, CRT terminals, modems and miles and miles of telephone cables.

The mode of transportation used by Rick enables him to get from job site to job site very quickly.

He carries in his trailer all the required tools, cable and equipment to effectively install, maintain or repair any telephone problem which may arise.

We expect our phones to work day in and day out and



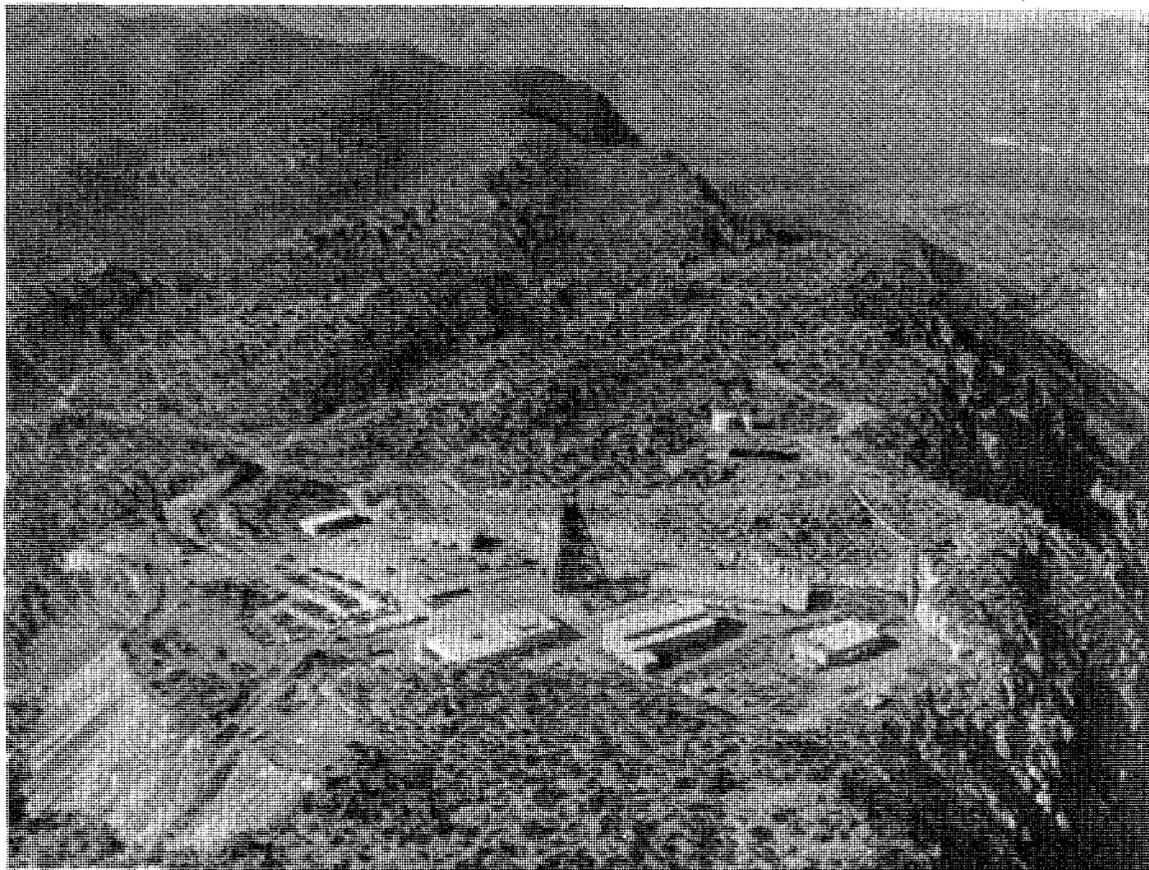
**RICK HANSON**

Photo by Richard Cole

many times we "take it for granted" that they will work!

Rick's transportation is one of the new Honda four wheel-

ers which have replaced the three wheelers previously used throughout the company.



## *Superior - 1970*

**PROSPECTS** at Superior were good enough in 1969 that Newmont Mining Corporation was willing to invest \$75 million in a new shaft, haulage tunnel, shops and a new mill. The new facilities were the most modern obtainable and Superior operated through the 70's without much problem. But then came 60¢ copper and it was "Adios Superior". The end came gradually, starting with a hiring freeze in 1981, then reduced work weeks, and finally suspension of operations and lay off of 1,250 hourly and salaried employees on August 15, 1982. It wasn't an easy decision but the company could not continue to support the deepening financial losses at Superior. It's an old story in mining - boom or bust. The newly restructured copper industry has learned this lesson and is concentrating its efforts on low cost efficient operations which are designed to provide better job security and continued operations during periods of low copper prices.

Company filed a Petition for Bargaining Unit Clarification with the National Labor Relation Board.

If approved by NLRB, the seven unions at San Manuel would be "jointly certified" as a bargaining unit and only one contract would be negotiated and signed.

used at the Pinto Valley Division since February 7, 1974.

There, each union retains its identity, collects its own dues, and processes grievances in its designated area.

Only one agreement exists at Pinto Valley containing common language for seniority and protecting senior craft

employees who, in the event of a lay-off, can bump junior employees.

During negotiations the various unions would bargain as a single unit and with one voice as the company must do.

No one knows how soon the NLRB will act on the petition or if it will give an answer during current negotiations.

## *e from dedicated crew*



**rell Derrick and Dave Decent,  
in Ellis and Beryl Walden and  
Photo by Richard Cole**

**Story by JERRY MILLER  
mine mechanical foreman  
Photos by Richard Cole**

Magma's underground mine has a total of 13 hoists to bring ore out from underground and to deliver employees and materials vital to our underground operations.

A small group of skilled employees keep our hoist operation effective twenty four hours a day, seven days a week.

This group consists of hoist mechanic leadman Val Hudson, mechanic journeymen Wynn Bohn and Don Graham, hoist oilers Dave Decent, Murrell Derrick, Kevin Ellis and Beryl Walden.

Charged with the responsibility of service, preventive maintenance, and a large job of housekeeping, each employee shares the responsibility of knowing it takes a team effort to achieve the desired results.

From the oldest hoist, #1-Main, manufactured in 1914, to the newest, 3D Production hoist installed in 1975, a vast amount of knowledge and skill are required to keep them operating full time.

Whatever the job is, from sweeping the hoist floors to a major repair during the night, each one of these skilled employees can be depended on to do a safe professional job.

With the help and cooperation of these employees it has helped to make hoists and mine run smoother.

The 22 hoist and related motors generate approximately 54,450 horsepower which is one of the greatest concentrations of controlled energy anywhere.

They range from 200 to 6000 horsepower and are kept in immaculate condition at all times.



## *San Manuel - 1956*

JANUARY 14, 1956

**SAN MANUEL HAD BEEN IN PRODUCTION for one week when this aerial photo was taken. The smelter processed 8,350 tons of concentrate in January and poured 1,677 tons of anode copper. The concentrator produced 5,754 tons of concentrate from 251,465 tons of mine ore. At the mine, all hoisting was from 3B shaft but that had to be halted for four shifts to extricate a skip from the dumping scrolls where it had crashed at full speed. There were 1,620 employees with a net gain of 149 that month. The rustling line formed at the little square building in the middle of the intersection of Highway 76 and McNab. The employment office was located there until 1970 when it was demolished to make way for the new highway.**

# Cyprus contract in doubt

Cyprus Mines Corporation has claimed that it has terminated the 10-year toll smelting agreement upon which much of our business plan has been built.

Magma notified Cyprus on June 27 that the smelter was ready for commercial

operation and that the contractual Commencement Date had been achieved.

Cyprus thereafter purported to terminate the agreement, and has filed a lawsuit in Pima County Superior Court which seeks a declaration that its claimed termination was

proper, and that it is entitled to \$10,040,000 in liquidated damages, and other damages under this agreement.

Magma disputes Cyprus' actions and considers them to be a breach of contract.

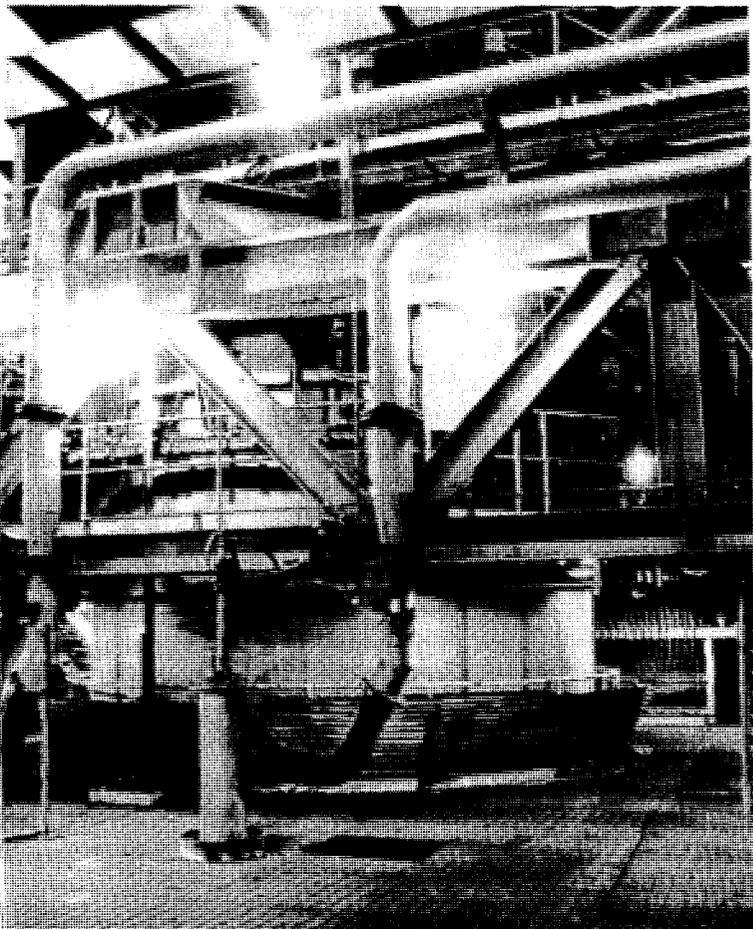
We have filed motions in the court which, among other things, could result in arbitration for all the disputes between the parties.

The Cyprus agreement was for the delivery and toll smelting and refining of approximately 25,000 tons of concentrates per month beginning July 1.

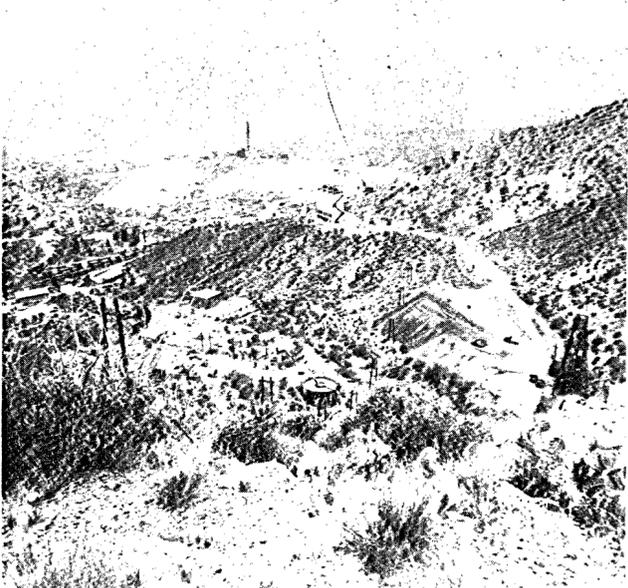
As a result of Cyprus' actions, Magma has entered into a multi-year contract with Compania Minera de Cananea, S.A., for the purchase of over half the tonnage that Cyprus was to provide on a yearly basis.

In addition, Magma has agreed with Cyprus, subject to a complete reservation of rights, to smelt and refine concentrates for Cyprus for the remainder of this year.

And, should it become necessary to fully replace the concentrates that Cyprus was to have provided under the long-term toll smelting agreement, Magma believes that various alternate sources of concentrates are and will be available on competitive terms.



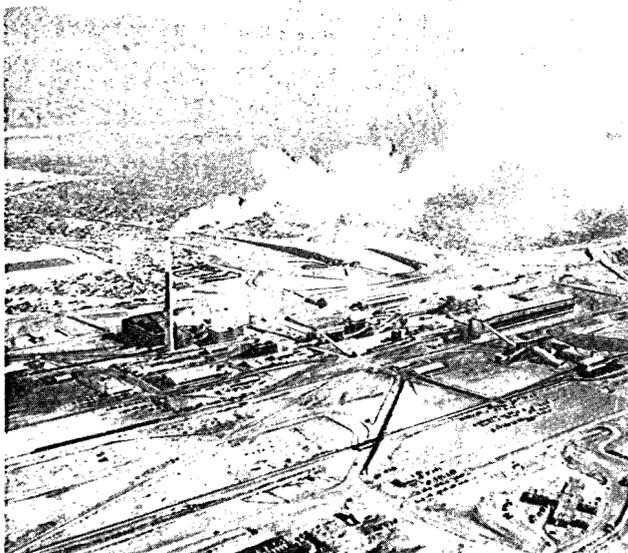
**REACTION SHAFT** of the San Manuel flash furnace, part of the smelter which now holds 21% of the smelting capacity of the United States.



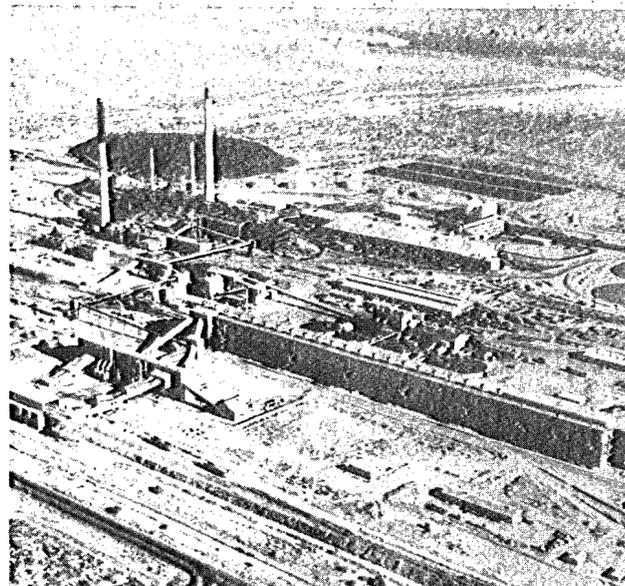
Superior in 1953



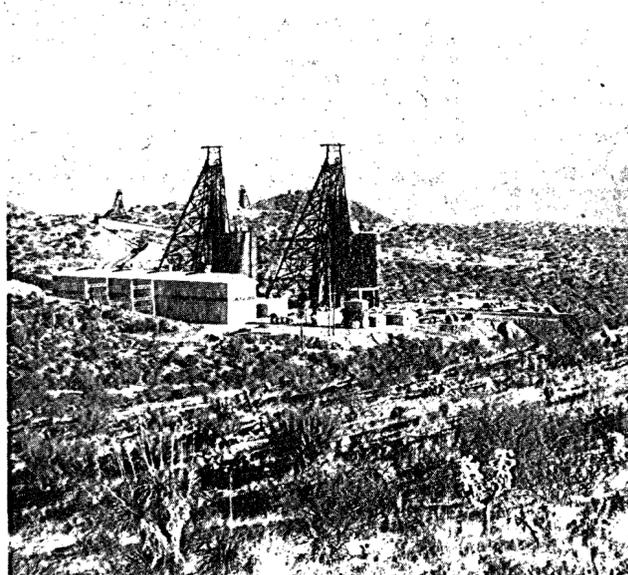
Superior in 1975



San Manuel in 1956



San Manuel in 1981



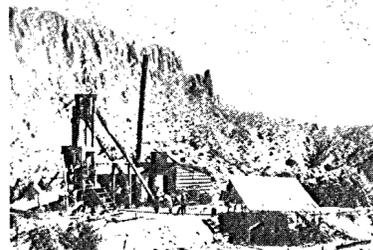
San Manuel in 1956



San Manuel in 1981

Our history is reviewed

# Magma's 75 years of growth



SILVER QUEEN MINE

Since its first production in 1915, Magma has produced more than one and one-half billion dollars of value in copper, molybdenum, gold, silver and other metals, from an investment of more than \$600,000,000 in its mines at San Manuel and Superior.

Beginning with a worked-out silver mine near Superior, Arizona Territory, purchased for \$130,000 in 1910, Magma now ranks as one of the major copper producers in the nation.

The worked-out silver mine was the Silver Queen, and the investor was William Boyce Thompson who had been instrumental in the establishment of mining successes including Inspiration, Kennecott and Texas Gulf.

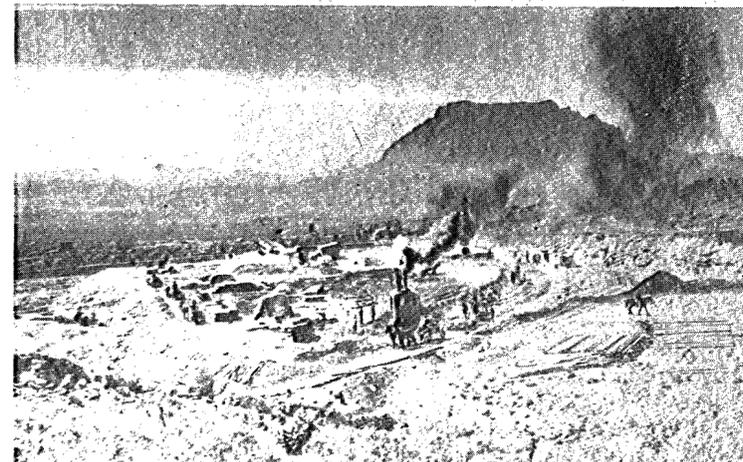
The Silver Queen itself was no particular bargain. Two claims, the Irene and the Hub, comprised the Silver Queen which was staked out on March 29, 1875, seven days following the staking of its more famous neighbor, the Silver King.

The Silver King was a bonanza with assays running as high as \$20,000 per ton, and the owners, first Charles Mason of Florence, then a Yuma merchant named James Barney, had invested \$10,000,000 and were in the silver business.

Barney also organized the Silver Queen Mining Company, but soon sold it to a New York company which by 1882 had sunk a shaft to 400 ft. Although some silver was extracted, there are no records of production, and it was sold to a group of businessmen from Globe in 1906.

In 1910, William Boyce Thompson, mining engineer, financier and mineral developer, always seeking new properties, purchased the mine outright after his trusted geologist, Henry Krumb, gave a tentative recommendation to take an option on the Silver Queen to investigate the indications of copper.

Thompson promptly organized the Magma Copper Company on May 5, 1910, with an initial capitalization of \$1,500,000, purchased the contiguous claims, and immediately began deepening the shaft and driving crosscuts. The main vein proved to be 8 feet wide and assayed \$800 per ton



FOUNDATIONS OF THE SUPERIOR SMELTER were a job for lots of horsepower, seen in this photo dated March 1, 1923. Steam shovel (or crane) was probably burning oil.

copper and \$1,000 per ton silver.

Supplies were brought from Florence to Superior with five teams of six horses each, with ore hauled back on the return trip. At Florence the ore was loaded on railcars for shipment to an El Paso smelter.

The shipments to El Paso continued until 1914 when a new smelter was built by American Smelting and Refining Company at Hayden, with a new connection by rail to Florence.

As the ore shipments by horse wagons from Superior to Florence were a costly burden, Magma undertook the establishment of a railroad, and the Magma Arizona Railroad Company went into operation in 1915 on a 30.4 mile narrow gauge track from Superior to the Magma Junction connection with the Arizona Eastern Railroad near Florence.

Production was successful and the demand was good during the period of the First World War. In 1918, copper sold for 25 cents per pound and Magma reported its production cost to be 16.425 cents per pound. Rising smelting costs led to a decision to build a smelter which started production in 1924.

A brick works was established near Superior to provide materials for the smelter stack and plant, and provided bricks for the high school, local business buildings, company houses for employees, and an Italian Renaissance mansion for "Colonel" Thompson, perched on a precipice above Queen Creek Canyon as it meandered near the base of Picket Post Mountain.

Thompson, whose second love was horticulture, had the creek dammed and

imported plants from arid regions around the world. The gardens now form the University of Arizona Desert Biology Station and the Boyce Thompson Southwestern Arboretum.

While he did visit Picket Post House occasionally, arriving in a private Pullman parlor car, Thompson conducted the business of Magma from his offices on the 15th floor at 14 Wall Street in New York City.

It was there, in 1921, that he formed the Newmont Mining Corporation by placing \$8 million of his mining investments into a holding company which could in turn be used to finance additional mineral enterprises.

Magma retained its identity with Newmont holding less than 14% but the great depression brought copper prices below seven cents per pound and for the first time, profits declined.

The smelter did not operate for five months in 1931 and in 1932 the mine, mill, and smelter were shut down for six months as the company recorded a loss.

In 1933 Magma regained profitability but the smelter was again shut down for six months.

Meanwhile, the veins were followed to as deep as 4,000 feet by 1937, requiring the need for an air cooling system and two 140 ton air conditioning units were placed in operation, a pioneer application of air conditioning in underground mining, which lowered temperatures 10 degrees and made continued operation possible.

Zinc was discovered in 1938 and was mined at various periods through 1952 and there continued to be veins, ore shoots, and replacement beds of rich copper ores - bornite, chalcocite, and chalcocopyrite - and by 1955 mining had advanced to depths of 4,800 feet.

In 1944, faced with an antiquated plant and rising costs from mining levels the company installed a new, more efficient mill which was completed just in time to benefit from a post-war rise in copper prices.

At about the same time, a Newmont consulting geologist, John Gustafson (later, Chairman of the Board of Homestake Mining Company) visited Superior and before he departed, changed the destiny of Magma.

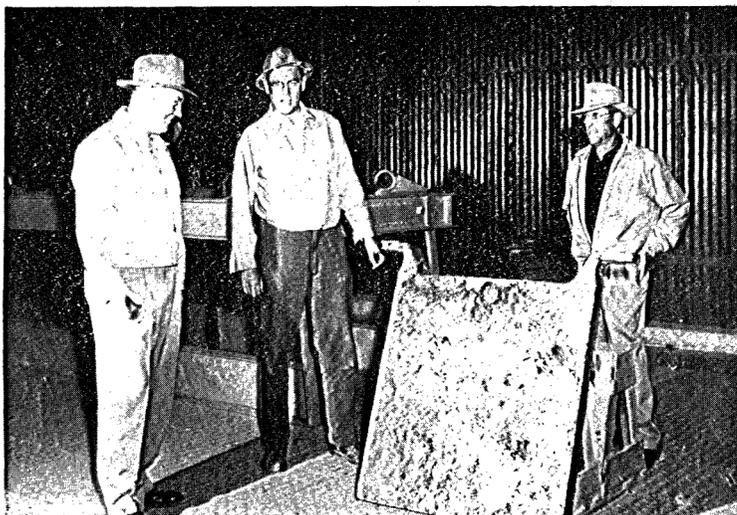
Gustafson suggested exploratory drifting and drilling to the east of Superior into the thick limestone beds behind the Apache Leap Escarpment. There the crews found zones of replacement by rich copper minerals, and by 1960, most of the mining was from the eastern limestone replacement zones.

In 1965, even thicker and richer replacement zones were discovered and further exploration developed an ore reserve.

Continued on page 6



PICKS AND SHOVELS were useful tools on the Superior smelter project on May 1, 1923. This gang was working up a sweat and we presume the guy standing at the right was the boss.



FIRST ANODE produced at San Manuel on January 8, 1956 weighed 700 pounds and was admired by, from left, Wes Goss, president, Bob Wilson, smelter superintendent, and J.F. "Buck" Buchanan, assistant general manager. Original smelter was designed to produce 70,000 tons of anodes per year.

Continued from page 5

The discoveries justified modernization and by 1973, \$75 million had been invested in a totally new mine, plant and concentrator which resulted in doubled production and better operating efficiencies.

Gustafson's second contribution came as a result of a casual remark overheard in the geology office at Superior, when someone mentioned that the U.S. Bureau of Mines had found copper in an exploration hole on "Nick's prospect."

Nick turned out to be Henry Nichols, a Magma assayer, and his prospect was a group of old mining claims between Oracle and Mammoth, known as San Manuel.

The Bureau of Mines was drilling there as part of a federal program to locate new copper deposits in an effort to increase domestic production of the vital metal.

Nichols' partners in the prospect were Superior merchants James Douglas, Burns Giffen, and Victor Erickson. Douglas had been deeded the claims from their previous owner, Anselmo Laguna, who had held them since 1925.

Upon a field investigation at San Manuel the next day, he quickly perceived the potential, and immediately telephoned A. J. McNab, president, who agreed to try to obtain the property for Magma.

The negotiation was conducted by Gustafson and W.P. Goss, then general manager, and completed in August 1944. The following month adjacent claims were staked.

The government carried out the original drilling program, and then Magma continued it further into 1948 when the existence of 462 million tons of copper ore, with an average grade of .782 percent, were proven -- enough to develop a new mine.

It was A.J. McNab, together with Wesley P. Goss, who steadfastly held to their concept that a large volume mining enterprise could most efficiently handle the vast new ore body. They faced discouragement from private financiers and the government, and were opposed by many at Newmont who believed that the project was too extravagant.

Their persistence was rewarded with a loan of \$94 million from the Reconstruction Finance Corporation and a contract with the Defense Materials Procurement Agency for first copper production.

The project included not only the mine, concentrator and smelter with capacity to produce and treat up to 30,000 tons of ore per day, but also paved highways, a railroad, and a complete residential community for employees.

For the mine, a massive deposit with minerals disseminated through a deep lying granite, none of the old methods were available, and would have required in a pit

with a diameter of some three miles.

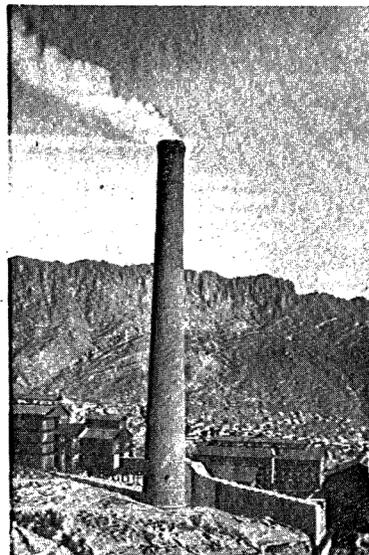
Goss selected the procedure of block caving, which had been applied successfully in similar deposits but never to the depths and on the scale contemplated at San Manuel.

The process was so successful at San Manuel that in 1965 ore production was expanded from 30,000 to 40,000 tons per day; and in 1972 up to 65,000 tons per day. Accompanying expansions were made at the concentrator and smelter.

Funds for expansion came both from earnings and from increased participation by Newmont whose investments in Magma grew until, in 1969, a merger of the two firms reorganized Magma into a wholly owned subsidiary of Newmont.

The merger brought new technical and management resources into Magma and a feasibility study for an electrolytic refinery and rod casting operation for San Manuel.

Traditionally, Arizona copper was sent east to refineries and fabricators near industrial markets. However, some of these markets were moving west and the wire and cable industry, large users of copper, was by the late 60's, establishing plants in California, Texas and Arizona. Money could be saved by eliminating cross-country transportation rates, refining copper at home, and casting rod close to the new markets.



SUPERIOR SMELTER photographed on April 4, 1924, shows roaster on the left and long of blister copper "pile" per year.



1910-1915  
WILLIAM B. THOMPSON



1915-1918  
WALTER ALDRIDGE



1918-1949  
CHARLES AYERS



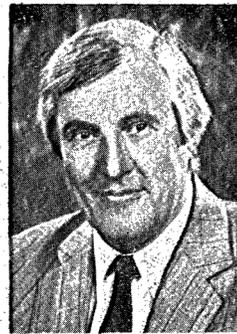
1949-1956  
ALEXANDER J. McNAB



1956-1972  
WESLEY P. GOSS



1972-1984  
WAYNE H. BURT



SINCE 1984  
GORDON R. PARKER

## The presidents of Magma Copper Company

A \$34,000,000 refinery and continuous rod casting plant went into operation at San Manuel in 1972, and immediately secured a share of the rod market with high product quality and a customer service approach to business.

But the greatest immediate challenge was the completion of Magma's air quality maintenance systems and the meeting of state and federal regulations for air pollution controls.

Magma committed \$40 million to the program and construction was underway on the large sulfuric acid plant, to process sulfur dioxide gas from smelter converters into a useful product.

Up to 2,000 tons of acid a day would be available from the smelter, and for a time it appeared as if the whole lot would have to be neutralized and thrown away -- a process that would cost as much as the acid production itself and consume large amounts of water and limestone.

But with persistence and legwork, markets for the acid were developed, and by September 14, 1974, the date of the acid plant startup, Magma had acid customers.

Magma's air quality control plans met with state approval in 1972. The Superior smelter was closed in 1971 and production from Superior's Magma Mine was shipped to San Manuel for smelting.

Magma's plan called for the acid plant to control sulfur dioxide, a new electrostatic precipitator to control particulates, and a sophisticated air monitoring system to provide data required to maintain the control necessary to meet ambient air standards.

The system was financed in part by the Pinal County Industrial Development Authority, which issued tax free bonds in a program which became the prototype for air pollution control and industrial expansion in other Arizona counties.

A second issue of the bonds was made in 1984 as Magma studied alternate, state-of-the-art smelting methods which would bring the smelter into compliance with new air pollution rules.

That project had to be placed on standby, however, until tests of new mechanized and lower cost mining methods are proven to be capable of mining the adjacent Kalamazoo ore body at a profit.

The "K" ore body, purchased in 1968, contains as much mineral as the San Manuel ore body but is at deeper levels and will be more costly to operate.

The smelter, in turn, cannot be operated without the assurance of continued low cost production from both the San Manuel and "K" ore bodies.

That's the dilemma which faces Magma on its 75th anniversary.

The problem is complicated by the lowest world-wide copper prices since the depression and Magma's three years of unprofitable operations and a growing debt.

It's a problem which forced the shut down of the Superior Division in 1982 and which shows no sign of relief for Magma and other U.S. copper producers who must and sell lower cost, heavily subsidized copper products.

By WESLEY P. GOSS  
Chairman emeritus,  
Magma Copper Company

William Boyce Thompson acquired the property now known as the Magma Copper Company in a somewhat roundabout manner. A young mining engineer named Henry Krumb, working for a firm sampling and evaluating what is now the Ray mine, learned of a prospect north of Ray called the Inspiration.

Henry visited the property and was favorably impressed. He thought it was very similar to the Ray deposit and decided to take an option on the property.

He didn't have much money and was only able to secure the option for a short time, but he expected to be able to sell the option to his employers before the option ran out.

His employers didn't see why they should pay Henry anything for the option because they knew Henry didn't have the money to exercise the option and they could then deal directly with the owners.

Henry didn't give up -- he figured that he had found a very promising prospect and that he was entitled to a reasonable finders fee.



ORE CAR in loading drift at Superior about 1949.

Henry took a train to New York to see if he could get someone interested in the Inspiration property before his option expired. He succeeded in interesting William Boyce Thompson, who picked up the option, acquired Inspiration, and employed Henry Krumb.

While the Inspiration deal was being put together, an associate of Mr. Thompson, a knowledgeable mining man, heard about an idle property over the hill from Inspiration that might be of interest.

Henry Krumb and this associate were favorably impressed and they persuaded Mr. Thompson to purchase the property known as the Silver Queen.

Mr. Thompson was not enthusiastic about the Silver Queen and it took considerable persuasion on the part of Thompson's associate and young Henry to get Mr. Thompson's acquiescence to the purchase.

Thompson renamed the property Magma Copper Company in 1910.

As an aside, Krumb felt that the property's potential value was the probability of a rich bedded replacement deposit in depth where the main vein intersected some relatively flat dipping limestone deposits.

Magma's vein system was the only known source of ore until 1945, some 35 years later, when a diamond drill hole searching for a faulted segment of a vein encountered ore in the limestone beds.

The bedded ore, not vein ore, was the sole source of ore from the Magma mine in recent years.

When I took over as general manager of Magma in July, 1944, Magma's future was somewhat uncertain.

Proven ore reserves did not extend for more than three years.

The mill was obsolete, and rock temperatures underground were reaching the limit of existing refrigeration equipment.

Management in New York had employed Mr. John Gustafson as a consulting geologist to evaluate the possibility of increasing Magma's reserves and to see if any properties in this vicinity might bear investigating. Mr. Gustafson's employment was a very fortunate and timely move on the part of Magma.

He recommended some exploration drilling that turned up the bedded ore mentioned above.

He examined several prospects in the vicinity of Superior and he heard of some drilling being done on an oxidized copper outcrop near Mammoth, Arizona, some 60 miles south of Superior.

These claims were owned by four partners in Superior.

One partner owned and operated a saloon, one owned and operated a garage and auto sales agency, one was a retired former Magma millwright, and one was an engineer and Magma assay department supervisor.

The drilling was being done by the Federal Bureau of Mines.

The partners had applied for an RFC grant to explore the property.

Reconstruction Finance Corporation had considered the application and though they denied the request they thought the property had potential and they suggested the partners contact the Federal Bureau of Mines which had some funds for looking for possible sources of metal.

The partners approached the Bureau of Mines, which agreed to do some drilling.

The Bureau's drilling indicated the possibility of favorable results.

Gustafson contacted the partners and arranged for a visit to the property.

The partners in the meantime had approached several other mining companies as to their possible interest.

Gustafson was favorably impressed by the partners' property.

He received permission from Magma to try and obtain from the partners a lease and option to purchase the property on behalf of Magma.

Gustafson was able to convince the partners that Magma was making an offer with terms closest to what they had in mind.

They wanted any prospective purchaser to immediately start exploration and evaluation of the property.

The term of the lease and option was for one year only -- in other words, Magma had to decide within one year if it wanted to purchase the property, under terms in the agreement to purchase, or if it would relinquish the property to the partners.

Some of the partners had great faith in the property and wanted to retain a certain percentage interest in it.

If Magma decided to exercise the option to purchase they would have to form a separate corporation with the partners being given shares of stock therein.

Each partner would receive a minimum number of shares plus additional shares depending on the net sulphide copper grade and the tonnage of copper ore above a given underground level.

Magma employed what drilling contractors it could find to carry on the evaluation of the property.

The war was on and the federal government had all major drilling contractors and their equipment tied up so Magma had to rely on small operators to do its drilling.

We had as many as five different drill owners on the property at one time.

Magma decided to exercise its option to purchase the property and did so before the option ran out by the end of 1945.

The San Manuel Copper Corporation was formed, shares of stock were distributed to the partners, and an exploratory shaft sinking was started.

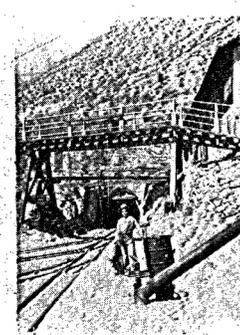
The federal government put pressure on Magma to bring the property into production and agreed to loan Magma money for that purpose.

It soon became apparent that in the interest of timely progress the San Manuel Copper Corporation should be liquidated and absorbed by Magma Copper Company.

The partners agreed to a final settlement for the property and they accepted a fixed number of shares of Magma Copper Company stock in exchange for their San Manuel Copper Corporation stock thus allowing Magma as the sole owner to liquidate the San Manuel Copper Corporation, and form the San Manuel Division.

This thumbnail sketch of the acquisition and bringing of San Manuel into production doesn't seem like too much of a job.

Well, Magma negotiated the lease and option to purchase the property late in 1944 and never stopped working on the project until the first copper anode was poured in January 1956 some eleven years later.



MAIN ENTRANCE to Magma Mine at Superior was the portal of this adit on the 500 level, seen here behind an unidentified employee in 1949. After moving the mine yard to the new #9 shaft area east of Superior in 1974, the 500 level continued to be used for access.

# MAGMA

A PUBLICATION FOR  
MAGMA FAMILIES

# Update

June - May 1985



**Shift change at #4 shaft**

Photo by Richard Cole



## Smelter maintenance crews achieve safety record

'A' SHIFT smelter maintenance employees who have worked nearly two years without a lost time injury are: Front row kneeling, Bob May, John Stanford, Bill Brown, Felipe Garcia, Rick Molinar, Gary Sunderland, Harold Wright, Rudy Espinoza, Alan Miller, Bob Elder, Gary Goodwell, Bobby Pinedo, Tino Saiz, Carlos Anaya, Jim Brassel. 2nd row standing: Andy Webber, Carlos Olivás, Tommy Fuentes, Mike Moreland, Nuffy Baeuerlen, Charlie Ivy, Joe Aguilar, Frank Aragon, Ken Brunson, Tony Bell, Charlie Looney, John Cline, Gary Tetlowksi. Third row standing: Richard Gradillas,

Herb Saunders, Tom Mitchell, Dave Montez, Roger Maestas, Bob Cassarino, Maurice Bradford, Randy Camron, Freddie Diaz, Sam Willard, Roger Scott. Fourth row standing: Ray Beneitone, Vic Gonzalez, Marv Armbrust, Bob Malanga, Ray Cline, Danny Large, Joe Croci, Al Merten, Ted Dahlin, Bob Schmidt, Phil Garcia, Scotty Wright, Jack Gorham. Missing from picture were Jack Pritchard, Terry Fisher, Art Ramirez, Al Perry, Ron Doran, Zane Dahlin and Roger Norton.

Photo by Gilbert Rodriguez

# MAGMA

A PUBLICATION FOR  
MAGMA FAMILIES

# Update

May 1985



## Magma's roots are in Silver Queen Mine

MAGMA COPPER COMPANY started in 1910 with this unimpressive layout, all that was left of the once-rich Silver Queen Mine near Superior, Arizona Territory. William Boyce Thompson purchased it for \$130,000 and parlayed it into a multi-million dollar enterprise which is now Magma Copper Company. Read the history of Magma on page 5.

MAGMA Update  
A PUBLICATION FOR  
MAGMA FAMILIES

Published for employees and their families  
by Magma Copper Company, a subsidiary of  
Newmont Mining Corporation, P.O. Box M,  
San Manuel, Arizona 85631.  
Telephone 385-2201, extension 256.

### STAFF

Editor - Frank Harris. Graphics - John Mikell.  
Secretary - Gloria Acosta. Refinery - Melinda Nay, 285.  
Metallurgical - Lynn Feldt, 398 & Farlow Davis, 374.  
Engineering and Technical Services - Harry Rossi, 276.  
Personnel - Bob Burwell, 181.  
Mine - Sandy Gordon, 404 & Shirley Fletcher, 477.  
Mill - Joe Kane, 350 & Jim Sorensen, 258.  
Smelter - Jack Gorham, 259 & Gilbert Rodriguez, 106.  
Safety - Grant Kempton, 240. Purchasing - Fred Hays, 202.  
Warehouse - Cheryl Crown, 178. Accounting - Rick Akers, 281.  
Environmental - Eldon Helmer, 393.  
Superior - Mike McGuckin, 202.  
Production assistance by the San Manuel Miner.

HALEY FERN L  
939 E 7TH DRIVE  
MESA, AZ  
85204

Bulk Rate  
U.S. Postage Paid  
Permit No. 902  
Tucson, Arizona

Address Correction  
Requested

MAGMA Update  
A PUBLICATION FOR  
MAGMA FAMILIES  
May 1985

## Happy 75th Anniversary, Magma!

On our 75th anniversary, we should all pause and reflect on the events of our long and eventful history which is told beginning on page 5 of this issue.

Col. William Boyce Thompson started Magma in 1910 when he picked-up a bankrupt silver mine near Superior.

It became a dynamic and prosperous enterprise and the keystone of Newmont Mining Corporation.

Magma has survived cycles of bonanza and depression and through the years has grown and changed.

The quantum leap forward for Magma was the development of San Manuel in the early 1950's.

And, it's interesting to note that the entire San Manuel project cost \$94 million, which is less than our 1984 payroll and benefits cost of \$113 million.

The lessons of our history are clear. Capital investment produces wealth.

Employees benefit from a company's ability to make a profit. Mineral is not ore unless you can sell it at a profit. New technology is vital. Supply and demand are alive and well.

What the future will bring to Magma is anyone's guess.

The ore is here. The investment is substantial. The employees are capable. Willingness has been demonstrated to make many changes which so far have enabled us to weather a serious depression.

That spirit of willingness is the determining factor which will decide if Magma will be around to observe a 100th anniversary.

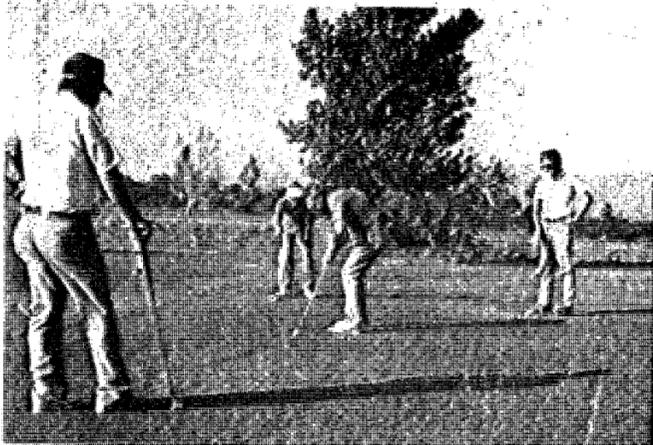
Because the lessons of history are clear, if we don't return to profitability, we'll be just like the Silver Queen Mine in 1910, bankrupt and waiting for a speculator to come along and pick up the pieces.

Happy Birthday, Magma!

!Feliz Cumpleanos y Prospero Futuro!

Update—Sports

Miners take to links



RAMON FELIX, general mine electrical foreman, prepares to sink his putt for admiring partners, from left, Bob Kelly, mine general mechanical foreman, Errol Anderson, LHD consultant, and Greg Fauquier, mining engineer.

Photo by Richard Cole



SLOW AND EASY says Ward Lucas, mine safety engineer, watched by teammates Guido Miranda, mine mechanical foreman (standing) and Jose Tapetillo, mine office engineer (kneeling).

Photo by Richard Cole

By RICHARD COLE

Mine employees are getting into the game of golf.

Six foursomes have gone out after shift for several matches at the San Manuel Golf Club.

Players draw numbers to form their foursomes and usually get in 9-holes before dark.

Organizing the events has been Jim Gamble and joining him are players Ron Allum, Errol Anderson,

George Barksdale, Dave Bullock, John Bunch, Bob Collins, Brian David, Dee Durazo, Eddie Encinas, Greg Fauquier, Ray Felix, Bob Gibbens, Cip Haro, Bill Jones, Bob Kelly, Ward Lucas, Guido Miranda, Tom Rinaldi, Hank Seaney, Harry Smith, Jose Tapetillo, Leon Thomas, and Rudy Vindola.

The first tournament was won by the team of Gibbens, Lucas, Miranda, and Tapetillo who brought in a score of 33.

Smelter teams formed

By JACK GORHAM

Smelter maintenance employees have challenged smelter salary staff to at 16" softball game sometime in June at the Mammoth ball park.

The staff whipped the maintenance group two years ago by a 15 to 4 score.

Maintenance employees have been practicing since then, hoping to get revenge.

Salary personnel expected to play are: Phil Garcia, craft foreman; Bob Malanga, general maintenance foreman; Jack Gorham, section foreman; Joe Croci, mason foreman; Al Merten, brickmason foreman; Danny Large, section foreman; Ted Dahlin, craft

foreman; John Bryant, anode general foreman; Butch Norton, reverber general foreman; Rick Zwinglberg, converter general foreman; Roy Cline, maintenance planner; Bob Schmidt, craft foreman; Scotty Wright, craft foreman; and Ray Beneitone, master mechanic.

Mechanical employees expected to play are journeymen mechanics Danny First, Zane Dahlin, Charlie Ivy, Randy Camron, Bill Brown, Gary Goodwell, Ken Brunson, John Cline, Terry Fisher, Tino Saiz, Rick Molinar, Sam Willard, Harold Wright, and Alan Miller, journeymen welders Roger Maestas, Freddie Diaz; and journeyman pipe-fitter Andy Webber.

Rodeo family rides together

By JIM SORENSEN

Juan Echeverria, a plant crusher employee in the mill division, is a member of the Pinal County Sheriff's Posse and is in charge of the "Fun Day" rodeo events sponsored by them.

Juan is in charge of all organization and planning of the events, some of which he has developed himself in which both horsemanship and running are involved.

Juan has been involved in rodeo since he was 15 years old, which amounts to nearly 17 years of experience.

Anna, Juan's wife, has been involved in rodeo for about 12 years and assists Juan with this project as well as competing.

Anna and their son, Juanito, rode in the Fiesta De Los Vaqueros in Tucson for the last 5 years and Anna was the flag bearer for the Oracle Quadrille Team and played Annie Oakley for the Oracle Historical Society's entry in the parade.

Juanito has been involved in rodeo since he was 2 years and 8 months old.

The Echeverria family live in Oracle and have accumulated 79 trophies and nearly 2000 ribbons among them.

Juan says they compete in any event to which they can afford to travel, both in state or out.

The first "Fun Day" rodeo was held on April 27, 1985, but due to rainy weather only the children's



JUAN, ANNA, AND JUANITO ECHEVERRIA

Photo by Jim Sorensen

events were able to be held.

Events are held in all age groups and are intended as family outings where everyone can be involved.

Winners in the children's events received trophy belt buckles as well as prize money from entry fees.

They were, in the 6-9 year-old bracket, first place Juanito Echeverria, second Jarrod Kingsolver (his father Paul is a development foreman at the mine), third Rene Owens (father Dave is an operator in the mill concentrator), fourth Mindy Walden (father Larry is a welder at the mine).

In the 5 and under bracket the winner was Jackie Braunstein (father Jack is a truck shop foreman).

And in the 2 and under bracket the winner was Amber Townsend (father Tim works for the ore

transportation department).

The youngest contestant, who won a teddy bear for the honor, was Mistle Starlin, the 22-month old daughter of Clyde and Tammy Starlin of Oracle.

Clyde is employed as a guard at the Florence Prison facility.

An all-around winner, with a chance at a trophy buckle, will be determined on a point system after three Fun Day shows have been held, so those who want to get involved may do so and still have a chance at the all-around title.

Another Fun Day has been tentatively scheduled for June 8, all those wishing to attend or get involved can contact Juan. Everyone is invited.

The events are held at the Pinal County Arena, just north of the San Manuel Trailer Park.

Big game hunter works here

By TED JOHNSON

Duwane Adams, 30-year-old heavy equipment operator with the plant construction shop, has turned a hobby into a lucrative business.

A native of San Manuel, Duwane acquired a love for the outdoors and hunting early in his life.

A licensed hunting guide in Arizona for three years, he is now the owner of "Arizona Big Game Hunts", a professional hunting guide business.

Duwane now has five people who help him with his growing business from September through January.

Frank Morales, a journeyman mechanic, Bryce Evans, a forklift driver in the refinery, Butch Saunders, a heavy equipment operator, and Jerry Flick, a supervisor in the mill, are all licensed guides. Dave Wagner, also a heavy equipment operator, is the cook.

Already, nine different articles about Duwane and his talents have been published in magazines



DUWANE ADAMS

Photo by Anker Bergh

Alaska, Saudi Arabia, Austria, Holland and Chihuahua, Mexico to hunt in Arizona with Duwane.

He guides for Couse whitetail deer, mule deer, javelina, desert sheep, black bear, elk, antelope and gambel and scale quail.

In 1984, he guided hunters that killed ten whitetail bucks, three of which are in the S.C.I. record book, nine javelina including six records, one antelope (a record).

Frank Morales guided five black bear kills which included 3 records.

Duwane personally has three typical Couse whitetail in the S.C.I. record book, the #1 non-typical Couse whitetail in S.C.I., the #7 black bear in S.C.I. and the #17 javelina in the S.C.I. record book.

Duwane gives a lot of credit to his wife Mary, his two children, Luke 6, and Mary, 4, for their support, as well as his parents who devoted many hours to his early hunting days, thus making his business successful today.

such as "Sports Afield", "Outdoor Life", and "Peterson Hunting".

His list of clients include Dwight Shoe, editor of "Outdoor Life", Larry Jones, a writer for "Wilderness Call", Craig Bonnington, editor of "Peterson Hunting", and Reed Pertson, outdoor section writer for the Mesa Tribune.

Clients have come from New York, Connecticut,

# Rod plant makes quality copper rod in modern precision casting and rolling process

STORY AND PHOTOS  
By RANDY ROBERTS

The combined efforts of hundreds of Magma employees as the ore is blasted, hauled, crushed, floated, smelted, and refined are directed toward providing a consistent, high-quality feed for the rod plant.

The 42 hourly and salaried rod plant employees see to it that the cathode feed is safely and efficiently melted, cast, and rolled into coils of quality rod ranging from 6,000 to 16,000 pounds.

The following is a step-by-step description of how cathode becomes rod.

### Feeding the furnace

Cathode bundles are charged into the mouth of the 26-foot tall shaft furnace by the charger sub-operator according to a certain blend schedule based on the availability of Magma and Pinto Valley cathode as well as our own recycled copper.

Three rows of natural gas-fired burners at the bottom third of the furnace melt up to 40 tons per hour of copper.

The furnace operator makes sure that the burners are operating properly and controls the furnace melting rate in response to production demands.

The molten copper leaves the shaft furnace hearth at about 2020°F and flows through a covered, heated launder to the cylindrical holding furnace.

Rotating the holding furnace controls the molten copper flowrate and allows the holding furnace to serve as a temporary reservoir for the copper during "band changes" at the cast wheel.

### Casting copper

While casting, the molten copper flows through a second covered, heated launder into which air is injected to burn off and control the oxygen content of the copper.

This launder empties into the pour pot which has a tapered spout through which the copper flows into the cavity of the casting wheel.

A special camera observes the "puddle" of copper in the casting cavity and automatically positions a metering pin at the spout entrance to maintain a constant puddle size at all casting speeds.

A thin steel band is held firmly against the casting wheel as the wheel rotates to form the outer wall of the casting cavity so that no copper escapes.

Two torches apply an acetylene soot to the casting cavity and band to prevent the molten copper from sticking.

### Copper bar produced

The wheel and band are cooled by high pressure water sprays which gradually cool the copper to a 1750°F orange-colored bar of a six square in. cross-sectional area.

One cast wheel operator sits at the cast wheel controls located ten feet above the deck in the "crow's nest" and controls holding furnace rotation and assumes manual control of the casting process as needed.

The second cast wheel operator adjusts the water spray flows, the sooting torches, the band pre-heater, and the torch that keeps the spout tip free of copper build-up.

As the bar leaves the cast wheel it proceeds into the "bar prep" area where the upper pointed corners of the bar are shaved-off by steel cutting blades.

The copper shavings are collected and recycled back into the shaft furnace.

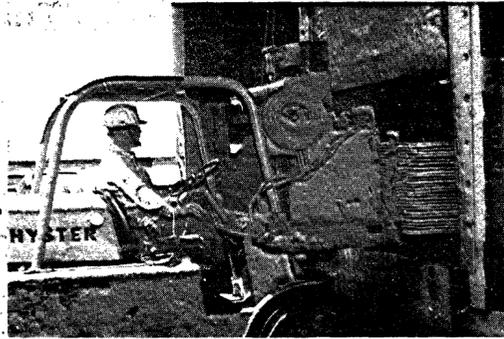
The bar then passes through a series of high pressure soluble oil sprays that scrub the oxide layer off of the bar surface so that the oxides won't get rolled into the bar by the mill rolls.

### Four rougher mills

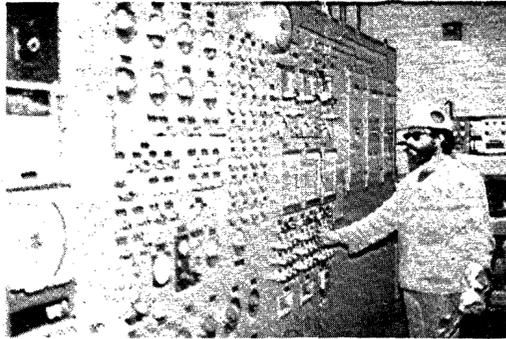
The bar enters the "roughing mill" at 1600°F and is gradually reduced to a 1 1/4-inch diameter bar by four pairs of rotating steel rolls.

Each pair of rolls turns faster than the pair before it because the bar is progressively rolled to smaller sizes.

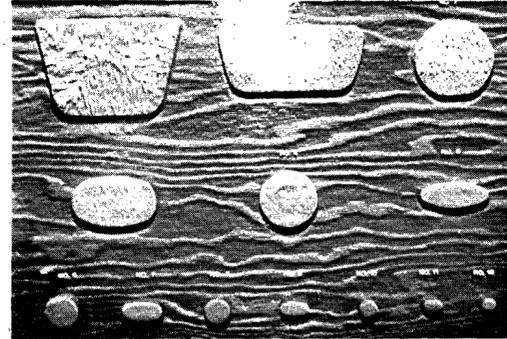
Hundreds of gallons per minute of a water-based soluble oil are sprayed at high



KENNY LONG charging a cathode bundle into the shaft furnace.



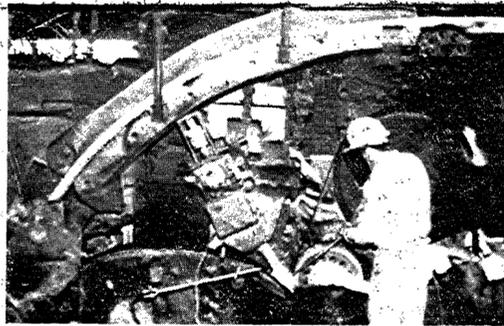
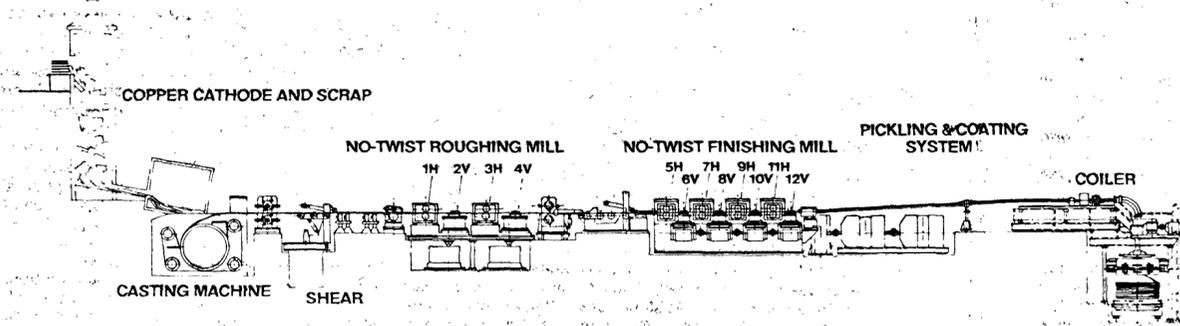
JOHN WARNE at the shaft furnace controls.



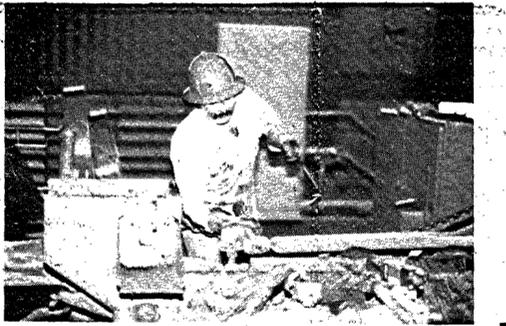
THE 12 STEPS of size reduction in the rolling mills.



MAGMA'S COIL PACKAGE size options are second to none. Clockwise from left foreground: 6,000 pound palletized (3/4" rod); 8,000 pound palletized; 16,000 pound standard pack; 6,000 pound palletized; 4,000 pound Magbar bundle; and 4,000 pound cathode bundle.



JIM LUCERO burning-off accumulation from the pour pot spout tip.



REUBEN MORALES blunts the sheared tip of the cast bar as he guides it into the rolling mills. Bar can be cut here to make Magbar, another product.



LEE THURSTON using a micrometer to check the rod size at the coiler.

**MAGMA**  
Our company logo symbol represents our name written in continuous cast rod.

pressure onto the rolls and bar to lubricate and cool the bar as it passes between the rolls.

### Finishing mills

The 1 1/4-inch bar leaves the roughing mill and enters the finishing mill where the bar is further reduced by eight pairs of rolls to 5/16-inch diameter rod.

To make large rod sizes (13/32, 9/16, or 3/4-inch diameter) the last two, four, or six pairs of rolls in the finishing mill are removed and a "dummy pipe" is installed in their place through which the larger rod passes.

The interior of the finishing mill is also sprayed with soluble oil throughout.

The rod diameter must be held within 0.015-inch either side of 5/16-inch by varying the roll-to-roll parting of the last pair of rolls and by adjusting the finishing mill speed with respect to the roughing mill speed.

The mill operator is responsible for all mill roll parting adjustments, mill speed changes, roll changes, and soluble oil additions.

### The pickle line

The rod exits the finishing mill at 4,000 feet per minute and 1,000°F and enters a 110-foot long pipe called the "pickle line."

A sulfuric acid and water solution is injected into the pickle line at several

locations to strip-off the oxide layer from the rod in the 1 1/2 seconds it takes the rod to travel through the line.

Following the pickle line are several air wipes and rinse chambers that remove the last traces of acid from the rod surface.

The rod then passes between a pair of pinch rolls that pull the rod through the pickle line and force it into the coiler.

Just before entering the coiler the rod is coated with a wax to prevent oxidation of the shiny rod surface.

### Coiling

The rod is then sent through a rollerized arch and down into the rotating coiler which lays the rod in loops onto a pallet.

The coiler is driven by a variable speed motor that speeds-up to allow the coiler to lay 36-inch loops, or slows down to lay loops up to 72 inches in diameter.

As the coiler speed varies the coil is gradually built-up layer by layer until the desired weight is reached at which time a set of iris fins closes to catch the next loops while a new pallet is brought under the coiler.

The iris fins then open to let the loops fall onto the new pallet to begin another coil.

The coiler operator is responsible for laying coils of the correct diameter, height,

and weight and controls the pickle, rinse, and wax pumps.

It takes about 5 minutes to lay a 6,000 pound coil and about 13 minutes to lay a 16,000 pound coil.

### Packaging the coil

All coils are compacted under a hydraulic press and banded while in compression for a tight coil package.

Two laborers are responsible for compacting and banding each coil. Several feet of rod is cut from each completed coil for analysis by the two cast lab technicians.

From cathode to rod takes about 90 minutes at normal casting speeds and there are dozens of operating standards along the way which must be kept within close tolerances to make a consistent, quality rod.

The twelve employees on each crew understand what a huge effect their job assignments have on the quality of the rod Magma produces.

Great improvements have already been made in the rod plant operation over the years and further improvements are planned to keep Magma rod competitive.

## Quality control lab tests every coil of rod produced

By MARLIN ROBINSON

Quality control cast lab technicians Ken Small, Bob O'Brien, Bob Linzy, Don McHugh, Jim Little and Josie Sarracino assist refinery rod plant personnel in the production of quality continuous cast copper rod.

They perform a number of analyses and inspections starting with the sampling of molten copper from the shaft furnace and ending with the final decision on whether or not a coil should be shipped to the customer.

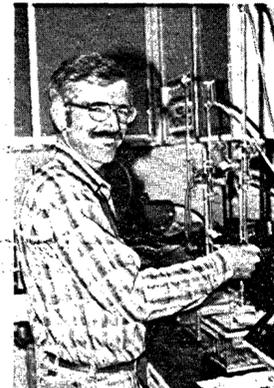
At the start of production, samples of molten copper are taken at four points between the shaft furnace tap hole the casting wheel.

Oxygen analyses on each sample are used by production personnel to make burner, gas flow, and other adjustments to help control gasses in the copper which could produce rod unsuitable for some wire drawing operations.

Many wire drawing customers need rod with low surface oxides, no residual acid or other corrosive products on the surface, and a bright finish.

Cast lab technicians assist in satisfying these requirements by determining amounts of copper and acid in the pickle solutions, percentages of oil and alcohol in soluble oil from the rolling mills, percent oil in the protective wax coating, and pH (degree of acidity) of all solutions.

In addition analyses for phosphonates, phosphates, and chlorides enable production to add just the right amount of chemicals to control bacterial growths and undesirable deposits in the cooling tower waters.



DON McHUGH performs analysis on pickle solution. Photo by Sam Riechers

Purpose of this test is to define any rolling or surface defects on the rod.

Surface oxides are measured every 30 minutes using a computerized test unit to determine effectiveness of oxide removal.

All 1 1/4" bar from the rougher mill and rod from the finishing mill are continuously inspected in-line with eddy current units for any surface and subsurface defects.

Data collected from each coil is reviewed by a cast lab technician who notifies production when there are any indications of a problem.

Any coil of questionable quality is given a thorough visual examination before release for shipment.

During rod production samples are taken from every coil.

Size is measured and cannot deviate from the nominal diameters more than 0.015 inches.

Oxygen is analyzed and must be less than 500 parts per million.

A twist test is performed by turning the rod 10 turns forward then 10 reverse turns on a mechanical twist tester.

After a railcar has been loaded, an inspection is made to insure that all coils are secured and protected by cardboard at all contact points.

This care prevents the coils from moving and rubbing against one another or parts of the railcar in transit and becoming damaged through wear abrasion.



BOB LINZY makes adjustment on eddy current unit. Photo by Sam Riechers

# Mill tests large scale, improved floatation cells

By JIM SORENSEN

The mill division at Magma is currently testing and evaluating improvements in our floatation method in the concentrator and aiming at reducing operating costs.

Floatation is the method by which copper bearing ore is processed to produce a final copper concentrate suitable for smelting.

Current rougher floatation consists of a section of six parallel banks of twenty six, 40-cubic foot Galigher floatation cells, each, or three banks of 300-cubic foot Wemco floatation machines. Each section produces a collective concentrate of approximately 10 to 12 percent copper.

This product is then reground, and cleaned in a cleaner circuit to produce a final copper concentrate of 30 to 31 percent copper, which is sent to the smelter.

Two of the most promising improvements to the current rougher operation are the retrofitting of the 40-cubic foot cells with Outokumpu style agitators and the introduction of large capacity floatation machines, Maxwell floatation cells, to replace a portion of the currently operating rougher cells.

Testing of the Outokumpu style OK-15 agitators is going on in the concentrator's No. 3 floatation section in four of the six banks.

The advantages which have become apparent in the initial test are a power consumption savings of nearly 20 percent over the Galigher style with equal or slightly improved copper and moly recoveries.

The Outokumpu design provides better air dispersion and finer bubbles in the floatation cells, which is believed to account for the improved metallurgical performance, as well as improved wear characteristics resulting in lower maintenance costs.

Because of the



LARGE SCALE floatation tests are made in this 2000 cubic foot cylindrical cell which is 14' high and 14' in diameter. Linda Warner, mill operator, checks it out.

Photo by Joe Kane

successful use of the OK-15 agitator, it is now being used as a replacement for worn out Galigher 40-cubic foot equipment in the rougher floatation sections.

Outokumpu-Oy is the largest mining company in Finland, employing some 9,500 people at twenty production and research units.

The Maxwell MX-14 cell is a cylindrical cell 14 feet in diameter and 14 feet in height with a volume of 2,000-cubic feet.

The current test cell was installed at the head end of No. 4 rougher floatation section in late 1978.

Initial testing showed that the four minutes of extra floatation time gained in this cell resulted in increased moly and copper recoveries at coarse grinds. However, current tests

show recoveries in the section with the MX-14 to be running about the same as a standard rougher section.

The installation of Maxwell cells for each individual ball mill is being evaluated. These cells would be located on the grinding floor.

This would allow for the shut down of three existing rougher floatation banks on each section of Nos. 1 through 5 rougher floatation sections.

This results in substantial savings of maintenance and power costs while maintaining recoveries.

The testing of new chemical reagents, reagent schemes and process equipment is continuing to further improve, both in quality and cost, concentrator performance.

# George and Johanna are telethon workers

By SANDY GERDON

For most of us, Labor Day means a day at the lake, picnics, or just a day to kick back, but for George and Johanna Burgess it is the busiest day of the year.

George and Johanna have been responsible for coordinating the Jerry Lewis Muscular Dystrophy Labor Day telethon in the tri-community area for the past 13 years.

Until 1982, the phones were manned out of the Burgess household but are now set up in the Century 21 office in Oracle.

Last year the combination of the telethon, a bake sale and a volleyball game in Mammoth organized by Ron Loy raised over \$4,100 in the tri-community area.



JOHANNA AND GEORGE BURGESS

Photo by Richard Cole

Although the telethon is the major fund raising project, the Burgesses work is not just limited to that weekend. They are now making plans for a bike-a-thon and walk-a-thon to be held this spring and are also involved in planning for the MD summer camp.

The Burgesses became involved in Muscular Dystrophy 15 years ago when their children collected door to door for the telethon in Tucson.

When they moved to San Manuel in 1971 and realized there was no MD telethon effort in the community, they contacted MD headquarters in Tucson and volunteered to set up the pledge station in San Manuel.

George adds that during the years he has received invaluable help from area residents Tom Robira, Betty Grier, Al Metcalf, and Heath Gruwell and organizations such as the American Legion and Rainbow Girls.

When asked what the greatest reward from their efforts has been, George replied, "Seeing kids that might not be alive now if it were not for the advancements that have been made in the past 10 years."

George and Johanna Burgess have certainly contributed their share to those advancements.

George is a journeyman electrician at the mine.

# Two see idea become reality

Story and photos by Gilbert Rodriguez

Recently two employees from the smelter material handling department, Joe Yanez and Frank Castaneda, developed an idea which cut handling of oxide scale by 50%.



JOE YANEZ

The settling cells collect water coming from the anode copper pouring wheels and the water contains oxide scale that carries 40 to 80% copper.

The heavy particulate material settles to the bottom of the tank and periodically has to be cleaned out so that the oxide scale can be mixed in with concentrates and re-introduced into the smelting process.

The job of cleaning out the setting tank used to take two days to complete but now is done in one day.

Joe and Frank came up with the idea of installing a trough in the cell and when the water is emptied out, the employee can enter the tank and shovel the oxide scale into the trough, and then let water carry the oxide scale out into a container.

Before the innovation the employee had to put the oxide scale into a wheelbarrow then transfer the material from the wheelbarrow to another container outside of the tank.



FRANK CASTANEDA

# Dick Kay standardizes parts at mine

By A.C. "Bud" Vogt

In the 16 years he has been with Magma, Dick Kay has contributed many useful suggestions which have reduced both job time and cost figures considerably.

With the current expansion of underground mining methods testing taking place, new pieces of hydraulically operated equipment are being purchased from different manufacturers.

As this equipment is being brought in and put into service, our need for different types of repair



DICK KAY

Photo by Richard Cole

items has grown significantly.

Dick started researching this problem and developed an impressive solution.

All of the hydraulic cylinders on the different makes of machines could be easily modified to accept the same basic type of O-rings, seals, and cups.

By reducing the special needed inventory required for the different makes of cylinders, and by standardizing parts, Dick has shown how a minimum of \$30,000 a year will be saved if only one cylinder per week is overhauled... an impressive savings.

# Crew has accident free year

By A.C. "Bud" VOGT

March 21, 1985, marked the anniversary of an accident-free year for craft foreman J.C. Zuniga and his crew of machinists and mechanics.

Zuniga and his surface crew are responsible for

the mechanical repair of underground mining equipment such as the new Dosco drilling machines and ring drills and older equipment like jumbos, muckers, and backhoes.

This shop deals with the largest machinery down to

the smallest set screw of an electrical relay.

Daily safety talks by the shop foreman and sincere feelings by each member of the crew for others' personal safety has helped in leading to this one year period without a reportable accident.



AN ACCIDENT FREE YEAR was observed by mine machinists crew, from front to rear, left to right are: Bud Vogt, section foreman, J.C. Zuniga, machinist foreman, Don Burch, Harry Miller, Willy Alderete, Chino Martinez, Henry Navarro, Mike Gray, Rob Roberts, relief foreman, Chuy Becerra, Mike Valdez, Bob McGlone, Cecil Ringler, Bob Weaver, Larry Bunch, Fernie Romero, Jack Hanna, Jerry Bribiascas, Bud Lummus, Bob Sweetman, Rubio Ortiz, Dick Kay, Dave Smeltzer, and Leo Magallanes. Benny Cruz was on vacation.

Photo by Richard Cole

# Mine pumpmen start safety contest

By GARY CRIPPEN

In January, a safety contest was started in the pump and pipe department to award a prize every three months to a member of a group which had no accidents or dispensary visits.

The 71 pumpmen and pipefitters were broken down into four groups, with each group having one group representative.

At the end of a three month period, the groups which had no accidents or dispensary visits were eligible for the drawing.

The group representatives for the past three months chose a portable air compressor for a prize.

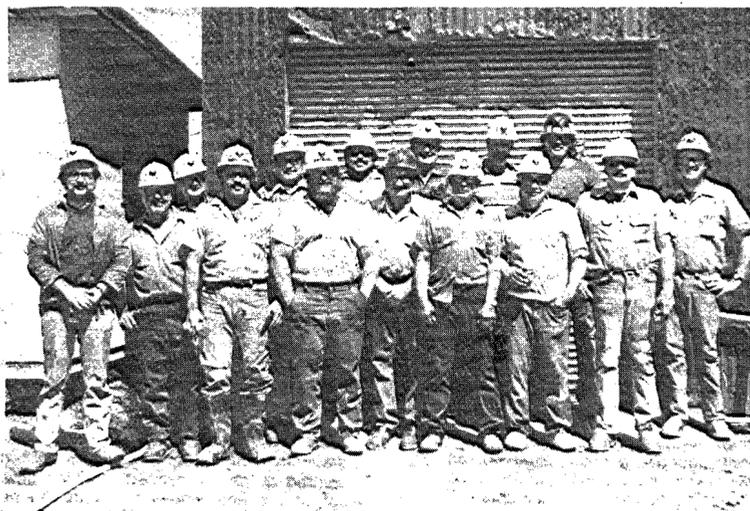
Three of the four groups were eligible for the drawing, but, the fourth group had one dispensary visit.

Al Meisterhans was

drawn to receive the prize and John Garcia, group representative, awarded Al the air compressor while Gary Crippen, supervisor of the winning group, added congratulations.

The pumpmen and pipefitters have not had a reportable injury since July 19, 1984.

The next three month prize will be belt buckles awarded to two men.



MINE PUMP CREW, front row, left to right: Joe Dietz, Tom Garcia, Fred Velasquez, Lynn Schroyer, Bill Davis, Al Meisterhans, Sam Pacheco, Sam Pyritz, Gary Crippen.

Top row, left to right: John Garcia, Ben Apodaca, Ray Maldonado, Ron Sanson, Jim Bingham, Julian Acevedo.

Photo by Richard Cole

# Know your benefits

By VERONICA CELAYA, Personnel Administrator

## Tuition refunds - take advantage!

Employees who plan to enroll in summer courses under the Newmont-sponsored Tuition Aid Plan are urged to apply soon to ensure timely processing of their applications.

Be sure to have your application first reviewed by your department and division heads and then submitted to the personnel office before the first day of class.

Although the Plan provides that completed applications should be submitted to the Personnel Office at least thirty days prior to enrollment, executive consideration will be given as long as the application has been checked by the division head and received by the Personnel Office before the starting date of the course.

During the current semester, thirty employees are attending classes under the Plan. Participation is encouraged for all employees interested in improving their qualifications and furthering their education.

All full-time Magma and SMARRCO employees are eligible to participate if they have one year of full-time company service and have either a high school diploma or G.E.D. certificate.

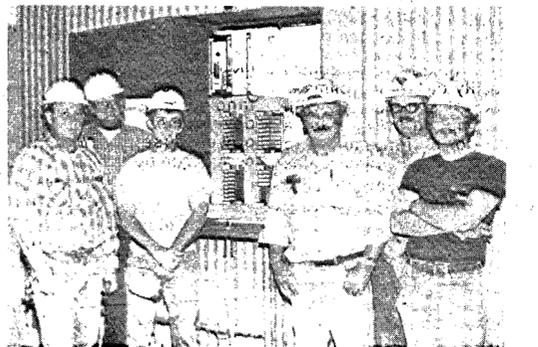
Courses subject to approval are those related to an employee's present position or a probable future position. Unrelated courses that are a requirement for an approved degree program will also be allowed.

Attendance must be at an approved, accredited college, university or adult education institution after normal working hours. Correspondence courses are not covered.

Upon completion of the approved course and provision of acceptable grades and receipts for books, tuition, and fees, Newmont will reimburse participants for those expenses.

Applications and further information may be obtained at the personnel office. Keep in mind the deadline for timely submission to personnel is prior to the course starting date.

# Electricians complete mill job on schedule



CREW from plant maintenance department's mill electric shop are from left, Jim McGovern, Tom Harrison (foreman), Gary Walker, Jack Huber, Mark Hearon, and Richard Woodward. Others, not shown, are Ernie Dykes, Al Laguna, Al Vasquez, Art Garza, Pete Austin and George Madrid.

Photo by Anker Bergh

By HARRY ROSSI

The mill's no. 12 grinding section was equipped with a programmable controller (PC), to allow the section to be shutdown within 59 seconds of the command to start the electric power interruption procedure.

Power interruption is the practice of curtailing certain operations to reduce the incoming electrical load on the APS system to comply with the company's new interruptible power contract with APS.

The installation was made by the plant maintenance departments mill electric shop and was completed within one month, on schedule.

Being a new application for PC technology, the unit was installed utilizing Ted Rydberg, electrical engineer, for field engineering, with the craft expertise and mill knowledge of the shop's electrician force. The PC was programmed by Ted Rydberg, electrical engineer, and Jim McGovern, journeyman electrician.

## 1984 in review

# Higher productivity lost by lower copper prices

Magma's annual financial report has been released for 1984 and it shows our fourth straight year of loss -- for 1984 amounting to \$44,069,000 before U.S. income taxes.

But the loss was an improvement over the \$53.3 million before U.S. income taxes lost in 1983, especially since the price

of copper was 12% higher in 1983, and considering that production increased 31% in 1984.

Total sales were \$247,106,000 in 1984 compared to \$201,831,000 in 1983, another increase amounting to 22%.

But even though we received a lot of money from sales, we spent more

than we took-in and thus recorded the \$44 million loss.

The financial facts are contained in the 1984 Annual Report to the Shareholders which must be sent to all Newmont stockholders prior to the corporation's Annual Meeting in May.

The report devotes one page to a review of Magma operations and notes that we achieved significant reductions in operating costs in 1984.

But, these savings were cancelled out by the decline in the price of copper which reached its lowest level since the great depression of the early thirties.

Prices for Magma copper averaged only 66¢ per pound in 1984, compared to 75¢ per pound in 1983.

The report notes the Superior Division, closed in 1982, remained on care-and-maintenance status last year because its production costs were so high.

At San Manuel the mine operated at 90% of its capacity and produced 20.3 million tons of ore with an average grade of 0.638% sulfide copper.

Ore production represented an increase from 18.3 million tons in 1983 but a decrease in ore grade from 0.642% in 1983.

Altogether we produced 143,623 tons of refined copper in 1984 compared to 109,249 tons in 1983. Of this amount, 23,278 tons were produced for other companies including Pinto Valley, Cyprus Bagdad, and ASARCO.

Continued on page 2

# Staff produces survival budget



FINAL BUDGET projections and reports were distilled from thousands of documents by these staff employees, from left, Bob Zerga, manager of planning and development, Marshall Gray, accounting director, Marty Martinez, accounting supervisor, and John Dorsey, chief mine planning engineer.

Photo by Grant Kempton

A multitude of staff employees from all divisions and departments has been working over the past year to produce and assemble a monumental volume of data which was all focused in an attempt to answer the question, "Can Magma survive?" and prepare a 1985 operating budget.

Over 20 man years of work was performed by engineers, accountants, and computer systems personnel, along with the detail work of clerks, secretaries, and the print shop.

Computers printed enough analytical data to fill a good size room but in the end, it was all condensed into a single report which showed that Magma still has some time to demonstrate how lower operating costs can be achieved.

First, more than 100 possible budgets were

prepared based on various possible levels of production. Others looked at both temporary and permanent shut down costs, some evaluated operating only the smelter, others only the refinery and rod plant. All these variables were then matched against several possible future price trends.

All the studies looked for the bottom line of profitability and cash flow which would enable Magma to continue to mine the San Manuel orebody and later the Kalamazoo orebody.

The first large group of budgets were based on historical costs and all showed the same result - costs were unacceptable and there was no alternative to a total shut down.

Unwilling to give up, we began a second round of studies, this time based on new operating techniques, reduced costs, and wage concessions.

Eleven alternative budgets were finally prepared and from those, one was chosen by Magma and Newmont to guide us in 1985.

Now, Magma has some time to demonstrate our ability to cut costs through new programs and the willingness of all employees to give reasonable wage concessions.

As for the dozens of staff employees in every department who spent unpaid hours of overtime and weekends in this budget process, and performed their regular assignments as well, they have the satisfaction of a good job well done.

## The big question

Why is Magma still operating if we are losing so much money?

Basically because we have an efficient mine and plant in which some \$609 million has been invested and where 3,232 skilled employees are now working. Yes, Magma has lost money for the last four years but before that this company was a profitable operation for many years.

We still have large ore reserves in the San Manuel and Kalamazoo orebodies. However, "ore", is only "ore" if you can make money mining and processing it!

We're like the family farm which has fallen on hard times. You don't just walk away from it after a losing year or two. No one wants to see all the years of hard work, the investment, and the skilled work force just disappear without a fight.

You look at the market and at the operation to see if it can be turned around and you try everything you can before you quit.

Well, prices and markets are very unpredictable in this day and age, and so you must look primarily at ways and means of cutting costs. You must look at ways and means of making the operation more efficient. From this information plans are developed, many different plans, using different possible prices for the commodity you are selling, to see what changes there are to return to profitability. If there is no chance, well, you have to shut down. If there is a chance, if there is hope that the old homestead can be saved, then you roll up your sleeves and go to work!

Obviously we do believe there is a chance of turning Magma around and making it a profitable operation again or we would not still be operating.

We believe the copper price will improve somewhat, but it is unlikely to improve very much. Also, because there are a lot of open pits that are moth-balled, if the price does reach new heights it is unlikely stay there for very long because the moth-balled mines will be brought back into production and the resulting abundant supply of copper will bring the price back down. Copper has always been and always will be very sensitive to the law of supply and demand.

However, we do believe we can improve our operating efficiencies and cut our costs and we have prepared plans which include all our new ideas. (See adjacent article on budget process.)

What we must do, and are busy working on right now, is demonstrating the various objectives in our plans are obtainable. Many of these schemes, such as mine mechanisation, require costly new equipment and considerable time to put fully into operation.

Naturally our shareholders, who are putting up the money for these projects, are not going to wait forever for us to show what can be done. They have given us additional time to come up with results, and if everything falls into place, we should be able to convince them it would be good business and good sense to keep operating.

It was with this objective in view that Magma reduced hours for most employees rather than reduce the total work force through lay-offs. We wanted to keep our employees together as much as possible because we believe we can turn things around. We know those who had their hours reduced were not happy with their smaller pay checks but the only alternative to that was to lay off their fellow employees. Rightly or wrongly we chose not to put more people on the street but to maintain some level of employment for as many of our employees as possible.

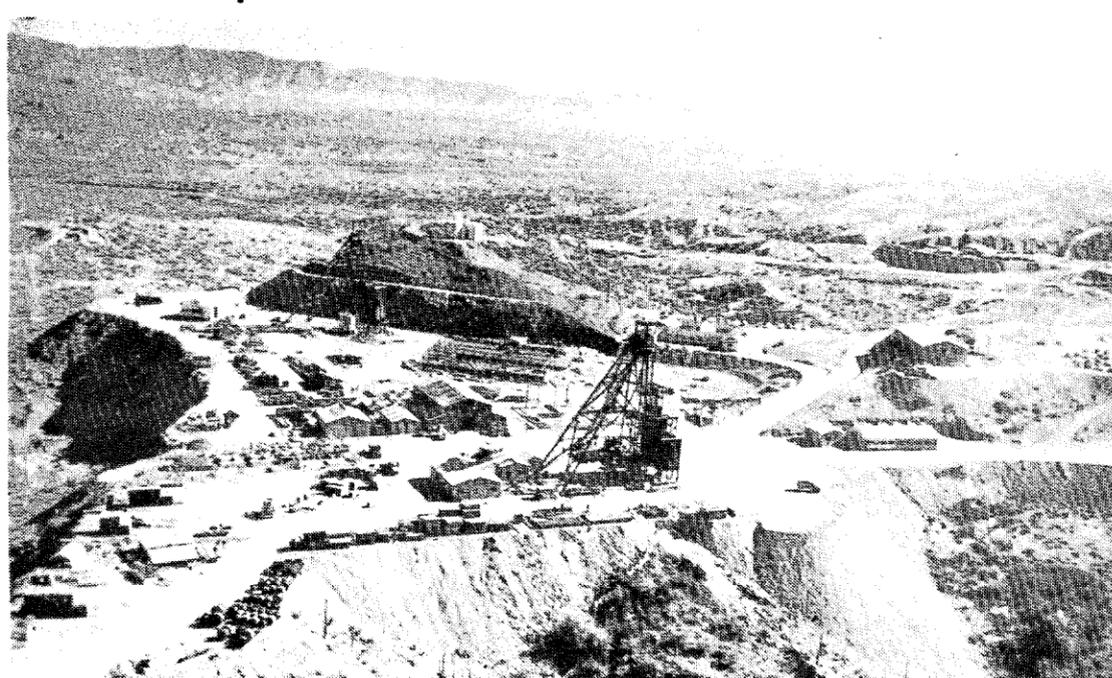


## Safety celebration

SAFETY award ceremony at mine carpenter shop for 86,320 accident free manhours of work was attended by, from left: Roscoe Gordon, Bill Kelly, Bob Wolfe, Alex Mendibles, Ward Lucas, Rudy Lopez, Peter Read, Fernando Garibay, Hank Seaney, Martin Rodriguez, Brian Woolfe, Bill Wood, and Harry Smith.

Photo by Richard Cole

## From our scrapbook . . .



## The mine in 1953

MINE was in development on December 3, 1953 for the 1415 level. Number 4 shaft, left, and number 1, right, and number 2, in upper right, were in use and 3A and B were under construction. No. 1 headframe was brought from the Ray Mine where it had been in use since 1913. No. 2 was in general use until 1958, then used as an underground winze for several years until it was abandoned in the subsidence. Warehouse is building on hill, right center, and change room is directly below. Lamp room is smallest of three buildings in left center. Mine was in development for 8 years before ore production began in 1955.

## Corrections, Mill foremen replaced

omissions,  
apologies,  
etc. . .

from the editor

We've been printing about 175 names per issue so don't be surprised to see some misspelled names or incorrect titles. We apologize to all concerned.

In the second issue we got the Arriaga family all mixed up and said Pat Riggs was a depot clerk -- she's SMARRCO's rail traffic controller.

Last issue we said Dee Durazo is assistant mine superintendent, but he's assistant general foreman.

We misspelled Gar Kuntz's name and left the "h" off Anker Bergh's photo credit lines.

We also left Mike Zazueta's name off the mine rescue crew list and omitted Bruce Farr from the group from Superior now working at San Manuel. Bruce is special accountant for the oxide project.

Our reply to Rayner Leslie's letter last month implied the problem of wood chips in ore will be solved by using steel mine supports. But, we'll always have wood chips, from the old mined out levels, so the plant engineers need to continue to work on that problem.

My solution -- run the crushed ore conveyors through long tanks of water -- long enough for the wood to float to the top.

You say that's a dumb idea? So what, I made it and maybe it will give somebody else a better idea!

Don't be afraid to express your ideas in your quality circle or safety meeting. Your ideas will help us all!

By JOE KANE

Two metallurgical engineers, George Boulter and Mark Yarbrow, recently joined the mill division as foremen to replace other foremen.

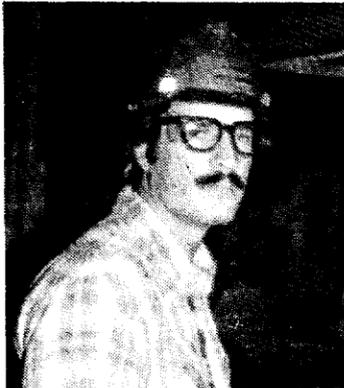
George Boulter holds a masters degree in metallurgy from Montana Tech in Butte, Montana and previously worked for ASARCO at their Silver Bell mine as a metallurgist.

The Boulter family, George, his wife and their one child live in Tucson.

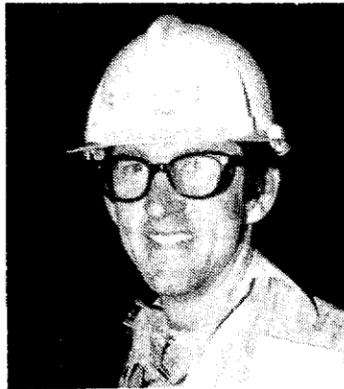
Mark Yarbrow received his degree at the University of Arizona.

Prior to joining Magma, Mark worked for Duval Corporation, most recently at their Battle Mountain, Nevada property as assistant mill general foreman.

Mark, his wife Elizabeth and their two children, Christopher and Holly will make their home in San Manuel.



MARK YARBROW



GEORGE BOULTER

Photos by Joe Kane

## Retirements

Congratulations and Thanks!

April 1, 1985

**CECIL T. BROGDON**, San Manuel, from leadman, San Manuel. Joined as a painter journeyman, June 2, 1971.

**CLINTON H. KILPATRICK**, Winkelman, from chute blaster, San Manuel. Joined as chute tapper July 6, 1957.

**KENNETH L. KILPATRICK**, Miami, AZ from utility miner, Superior. Joined as a mucker on August 2, 1965.

**ROBERT R. MARTINEZ**, Tucson, from toolroom man, San Manuel. Joined as a chute tapper February 15, 1957.

**RAYMOND VILLALOBOS**, Globe, from mechanic journeyman, Superior. Joined as laborer May 24, 1948.

**RUSSELL N. WEBSTER**, Superior, from chief geologist, Superior. Joined as a miner October 20, 1950.

May 1, 1985

**LOREN E. ELLS**, Superior, from shift boss, Superior. Joined as laborer January 7, 1940.

**EPIFANIO GUERRERO**, Oracle, from mechanic journeyman, San Manuel. Joined as a laborer April 26, 1955.

**FRANCIS L. LORADITCH**, Tucson, from drift foreman, San Manuel. Joined as a miner November 30, 1955.

**BONITA PITTS**, Parls, TX, from nurses aide, Superior. Joined as an aide April 22, 1956.

## Annual review

Continued from page 1

## Inventory

We also purchased 19,842 tons of refined copper to take advantage of low market prices and to place in our copper inventory which stood a 33 million pounds at year end 1984, compared to 47 million pounds in 1983. The current copper inventory represents about a 6-weeks schedule of shipments.

## Precious metals

Helping reduce our 1984 loss was the sale of byproducts. Residue from the refining process contains gold and silver values and we sell these "slimes" to precious metals refiners.

Last year our refinery slimes shipments contained 28,365 troy ounces of gold valued at \$9.9 million and 549,417 troy ounces of silver valued at \$4.3 million. This income was reduced from 1983 because, as with copper, market prices for precious metals were lower. Gold declined from an average price of \$420 per ounces in 1983 to \$355 per ounce in 1984. Silver showed the same declining trend with an average price of \$8 per ounces in 1984 compared with \$11 per ounce in 1983.

## Molybdenum

Our major byproduct is molybdenum concentrates and our 1984 shipments contained 4,029,900 pounds of molybdenum compared to 3,478,000 pounds in 1983. These sales were valued at \$11.8 million in 1984 and \$10.4 million in 1983.

## Sulfuric acid

Another byproduct, sulfuric acid, is produced to utilize sulfur dioxide produced in the smelter and in 1984 we produced 315,000 tons which was sold at a loss.

A highlight of 1984 was our acquisition of AT&T's Hawthorne rod plant in Chicago and the establishment of our MCR Products, Inc. subsidiary. MCR will increase our capacity for continuous cast rod to 300,000 tons per year from 160,00 tons. Trial shipments to Chicago area customers began in March from the MCR plant.

## Financial reports

The periodic reporting of the financial results of Magma's business efforts is a regular function of the controller's department and monthly and annual reports of the financial results are reported by means of financial statements. Brian Woolfe, executive vice president and George O'Brien, controller, are personally responsible for all facts reported in the financial statements.

All financial reports are examined by the auditing firm of Arthur Andersen & Co., an internationally recognized firm of experts in the field of financial statements.

This firm has consistently reported that Magma's financial statements fairly present the financial results and the financial position of the company.

The executive vice president and the controller annually affirm in writing to Arthur Andersen & Co. that -

"We are responsible for the fair presentation in the consolidated financial statements of financial position, results of operations, and changes in financial position in conformity with generally accepted accounting principles.

"The accounting records underlying the financial statements accurately and fairly reflect, in reasonable detail, the transactions of the Company and its subsidiaries.

"The Company and its subsidiaries have satisfactory title to all such owned assets, and there are no liens or encumbrances on such assets nor has any asset been pledged."

## Federal reports

These financial statements are included in Newmont's financial report filed with the Securities and Exchange Commission of the United States Government.

## Debts

During the last five years (1980-1984) our financial statements have reported that Magma has lost \$107,122,000 as a result of its business activities and that our debt was \$215,093,000 at the end of 1984.

Cash has been borrowed during the period to cover our losses and also the substantial investment in the Kalamazoo orebody, purchase of equipment to modernize our production facilities, invest in the Chicago rod plant, and make a temporary investment of cash borrowed in late 1984 to be used only to retrofit our smelter to meet EPA standards.

## Tax returns

These financial statements are then used as the basis for compiling tax returns to:

1. The United States Government Internal Revenue Service.
2. The Arizona Department of Revenue.
3. The State and City of New York.
4. The City of Chicago.
5. The States of Massachusetts, Delaware and Illinois.

All these tax returns are filed over the signatures of the executive vice president and/or the controller. You can see from all the foregoing that we have a long way to go to turn things around. Let's hope 1985 will be the turning point!