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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: SANCHEZ TEST PLANT

ALTERNATE NAMES:
MARCONAFLO

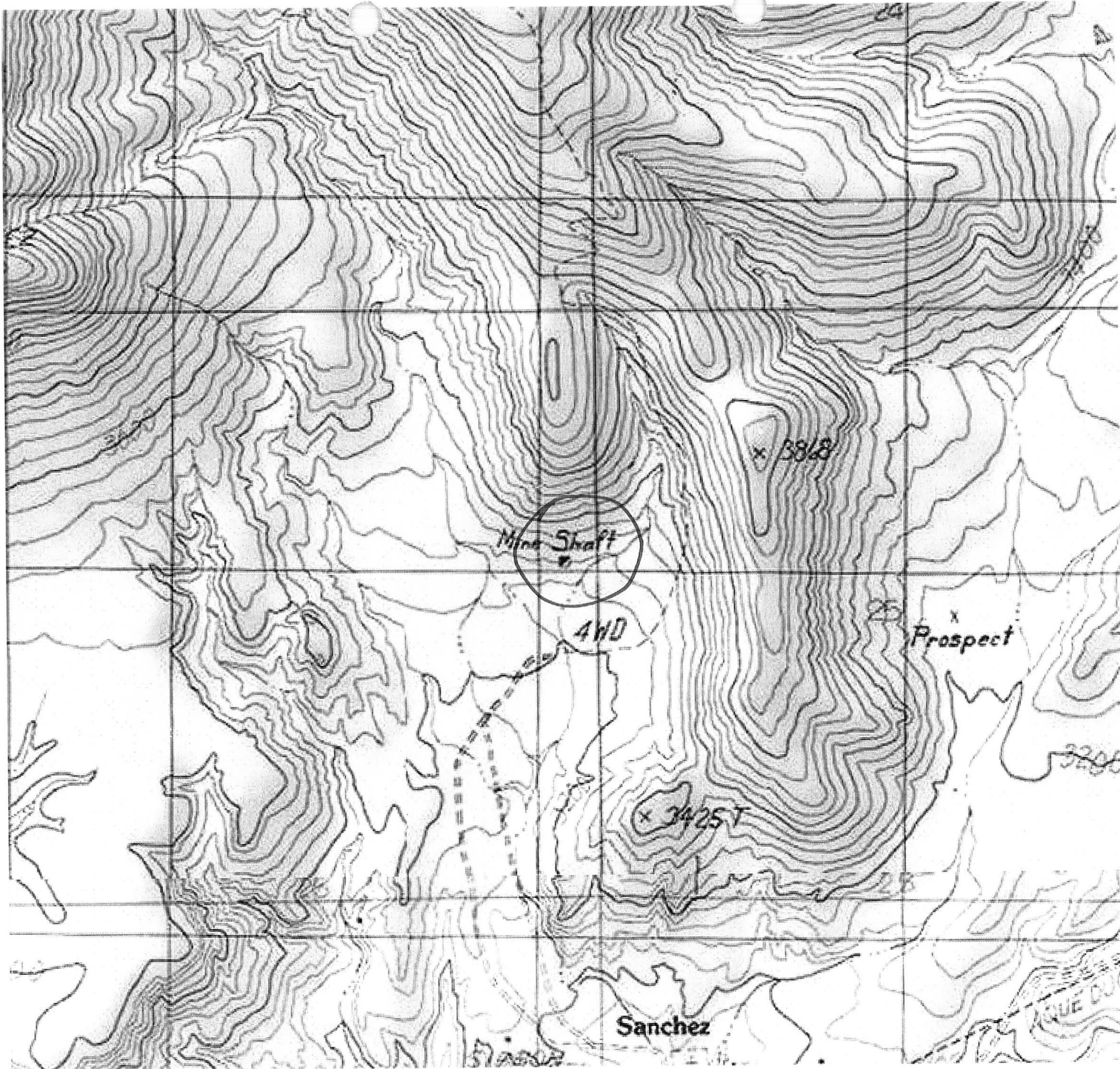
GRAHAM COUNTY MILS NUMBER: 315

LOCATION: TOWNSHIP 6 S RANGE 27 E SECTION 25 QUARTER
LATITUDE: N 32DEG 53MIN 00SEC LONGITUDE: W 109DEG 32MIN 46SEC
TOPO MAP NAME: LONE STAR MOUNTAIN - 7.5 MIN.

CURRENT STATUS:

COMMODITY:
COPPER

BIBLIOGRAPHY:
ADMMR SANCHEZ TEST PLANT FILE



Sanchez Test Plant

Marconaflo

E/MJ, April, 1974, p. 149

" July, 1974, p. 27, 29 (gen. info.) p. 107 (personnel)

" June, 1974, p. 137 (personnel)

" December, 1974, p. 112 (personnel); p. 120 (gen. info.)

" January, 1975, p. 120 (personnel)

Mining Congress Journal, April, 1974, p. 17

Mining Journal, May 31, 1974, p. 446

" " October 25, 1974, p. 361, 369 (Marconaflo, Inc., wholly-owned subs., established) & personnel

" " Dec. 13, 1974, p. 515 (personnel)

" " Jan. 3, 1975, p. 17 (personnel)

" " January 10, 1975, p. 25

Mining Engineering, June, 1974, p. 56

" " January, 1975, p. 50 (personnel)

" " February, 1975, p. 88 (personnel)

Coal Mining & Processing, July, 1974, p. 22

Skillings Mining Review, Oct. 12, 1974 (personnel) SMR, 2/1/75, p. 4 (personnel)

" " " October 26, 1974, p. 9 (personnel) SMR, 2/8/75, p. 15 (personnel)

" " " October 5, 1974, p. 34 (Dynajet)

" " " November 9, 1974, p. 25 (estab. of Marconaflo, Inc.)

" " " December 21, 1974, p. 5 (personnel)

" " " Jan. 11, 1975, p. 36 (personnel)

" " " Jan. 4, 1975, p. 17 (personnel)

" " " Jan. 11, 1975, p. 8 (personnel)

Mining Magazine, August, 1974, p. 123 (personnel)

Calif. Mng. J., 12/74, p. 25 (gen. info.)

Skillings Mng. Rev., February 15, 1975, p. 26 (gen. info. re: Dynajet)

MARCONAFLO

Dave Rabb called wanting to know the location of the Marcona-Kaiser plant. GI WR 4-16-74

Kaiser-Marconaflo are supposed to be experimenting at Duval Sierrita. GVI WR 7/9/74

New uranium ores leaching system

Continuing efforts to expand basic MARCONAFLO technology have established evidence of an important new hydrometallurgical concept for leaching ores.

From its focus on copper ores, this development program now has been expanded to uranium, with MARCONAFLO Inc. sponsoring a research project by the Colorado School of Mines Research Institute to establish commercial feasibility.

In brief, the new concept is to leach ores as a continuous process, using high pressure MARCONAJETS mounted in the bottom of specially-designed reactors to agitate the material with the leaching solution. This process is an effective counter current flow system with the leach solution flowing up through the reactor as the solid mass moves downward, providing intimate particle exposure to the solution.

The CSMRI project indicates that the process offers the potential for substantial reductions in capital costs.

MARCONAFLO also is exploring the possibility that this new leaching technique is applicable to precious metals, specifically gold and silver. Technical studies are encouraging, indicating additional efforts are warranted to further develop data.

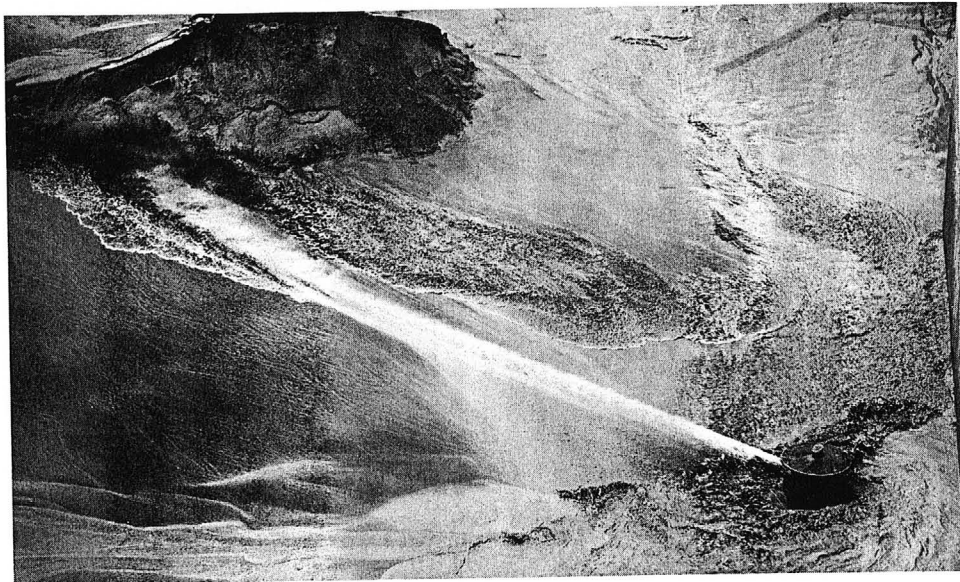
MARCONAFLO'S background of experience in this new hydrometallurgical process is now substantial, extending back a full three years to its design and installation of a prototype reactor at its San Francisco Research Center.

Favorable results from 18 months of prototype tests led to the construction in late 1974 of a 25 TPD pilot plant at Cyprus Mine's Pima copper mine near Tucson, Ariz. Nine months of test operations at this plant produced extraction in excess of 85% of soluble value, with between 12 and 16 total hours of retention time in the leaching and wash reactors.

U.S. STEEL TEST

U.S. Steel engineering officials will have a first-hand opportunity to observe a portable DYNAJET in action at their Pilotac plant in Mountain Iron, Minn., in a one-week test demonstration which was scheduled to start at the end of October.

The MARCONAFLO unit will be operated in a number of stockpile areas as a portable reclaim system, supplementing pellet feed produced at two U.S. Steel concentrate plants in the area.



Close-up photo of one of the MARCONAJETS permanently installed in large International Minerals & Chemical Corp. phosphate rock ponds clearly shows the powerful, concentrated, high-pressure stream of water emitted by the slowly oscillating nozzle. Jet undercuts and collapses the solids, forming a slurry flow which is then pumped to the processing plant on a continuous feed basis. Camera tends to foreshorten the approximate 100' length of the jet stream.

I.M.C. systems operational

Six months operational, four major MARCONAFLO slurry transfer systems are maintaining their rated performance specification of feeding ten million tons of phosphate material annually to an International Minerals & Chemical Corp. flotation plant in Florida. The identical systems are installed at IMC's Phosphoria and Noralyn facilities, two in each storage pond.

Through controlled transport of solids — up to 1,400 DTPH, with pulp densities maintained by an automatic system and uniformity of feed in the 40% range, by weight—IMC can operate its processing plant independently of surges in mining and washing operations.

Among other advantages established by operations of the new systems to date:

- Important improvement in desliming due to high-pressure MARCONAJET washing of the phosphate rock.
- Economy in power consumption approximating 25% in the transport of phosphate slurry from wash plant to flotation plant, due to the constant feed at a consistent pulp density. Additional efficiencies result from the MARCONAFLO systems' flexibility in operating from the ponds independently or simultaneously as required.
- Increases in the active storage capacities of surge ponds, as a result of MARCON-

AFLO's high pressure jetting action undercutting and repulping material normally left in storage facilities.

- A corresponding decrease in transport pipeline and booster pump wear.

IMC's MARCONAFLO in-plant slurry transfer systems are sophisticated bulk materials handling installations closely patterned after those developed by MARCONAFLO for regular use at the Peruvian mining operations of its parent Marcona Corporation.

Each system is installed in a two-section pond approximately 300' in diameter and 25' deep with a live storage capacity up to 30,000 tons of plant material. Sumps with built-in self-sealing MARCONAJET units in the bottom of each section feed a common slurry pumping station.

In normal operation, phosphate rock in one section is repulped by the MARCONAFLO system to feed the flotation plant as the other section is being filled and decanted. MARCONAJETS emit a high-pressure water stream while slowly oscillating at the bottom of the pond, causing solids to collapse into the jet stream, form a slurry, and flow to sumps surrounding the jets for pipeline transport. As each section is emptied, operations are switched to the alternate side and the first compartment refilled.

First skid-mounted units in Morocco

Some 15 million metric tons of tailings containing recoverable quantities of lead and zinc will be reprocessed by a leading Moroccan mining company, with the aid of a major MARCONAFLO slurry reclaim system currently being installed.

The project is significant in several aspects in addition to the total volume of material to be moved. It also:

- Represents the first time MARCONAFLO units have been mounted on portable skid platforms.
- Exceeds one million dollars in value of MARCONAFLO system equipment when the total installation is complete.

Purchaser is Zellidja S.A., which has been mining and processing a lead/zinc deposit for more than ten years.

Tailings have been deposited within a sand-built berm roughly 200' long and 1,800' wide, ranging in height from 20' to 110'. Coarse particles, fine particles and slimes have been pumped into the containment area in a fashion which layered the three different material sizes, thus forming a somewhat unstable deposit.

A primary concern was that the material be moved safely as well as economically, without endangering the stability of the deposit or its surrounding berm.

MARCONAFLO designed a total system encompassing two skid-mounted 90 DTPH capacity caisson capsules, with a third 90-ton unit to be permanently bridge-mounted for use at the 110-foot high upstream berm. Each job-fabricated skid will be 40' x 25' and mount a 70' long boom. These units will remine tailings in 15' deep passes. The bridge capsule will travel down a braced group of pilings as required by the variable level of material.

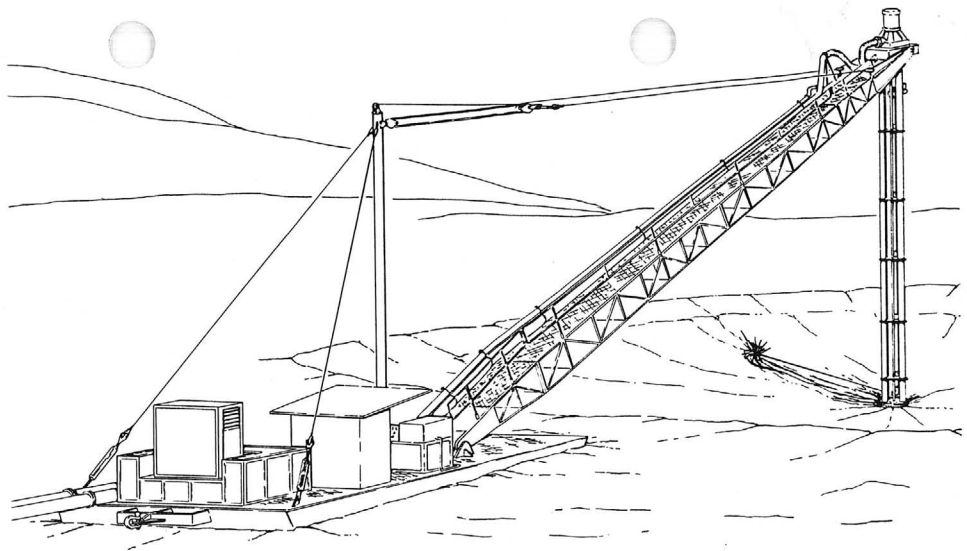
MARAD STUDY

A major feasibility study on the application of slurry technology in marine transport and handling of bulk mineral commodities—with MARCONAFLO Inc. performing a key role—is currently underway. It is being conducted under a \$60,000 grant by the U.S. Maritime Administration.

Principal objective is to improve and enhance the position of U.S. flagships in world trade.

Support work for the study, scheduled for completion at year-end, is being provided by the Marine Division of Marcona Corp. and the Colorado School of Mines Research Institute. Both MARCONAFLO and CSMRI had participated in a development project in 1973, exploring various methods for transporting coal from the U.S. eastern seaboard to Japan. Findings indicated the viability of using slurry technology, leading to this second development project.

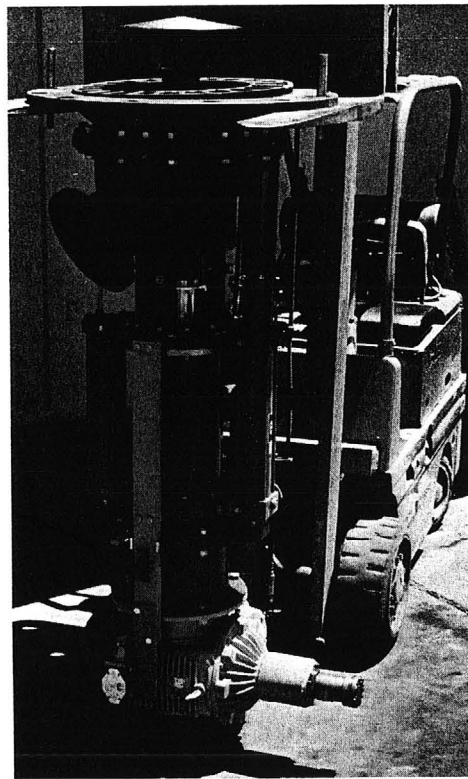
This study phase focuses on transporting selected commodities through inland waterways by barge to major receiving points. There, cargoes would be transferred to bulk mineral tankers for shipment to foreign countries or to coastwise vessels.



Artist's sketch shows general configuration of the first MARCONAFLO caisson capsules to be mounted on a portable skid platform. Two of these units presently are being job fabricated and assembled in Morocco to remine lead/zinc tailings at the Zellidja S.A. property. The skid-mounted capsules are designed to make 15-foot deep passes through a large, unstable tailings deposit area.

PHELPS DODGE TEST

A contract test which is being monitored with interest is underway at the Morenci (Ariz.) operation of Phelps Dodge Corporation, using a special stainless steel MARCONAFLO caisson capsule to remove leached ore from a series of 30' diameter tanks.



Ready for final inspection check before shipment is a MARCONAFLO unit bound for Botswana, Africa, where it is to be permanently installed in a pyrrhotite storage tank as a slurry transfer system. Customer is Banangwato Concessions, Ltd., and the property is its Silebi Pikwe mine. Installation of the new MARCONAFLO system in a 55' diameter tank was nearing completion as this issue of the Newsletter was published.

Marconaflo Expands Rental Program

Spurred by widespread industry interest in its unique concept of portable slurring systems for materials handling MARCONAFLO has expanded its stock of DYNAJET rental units.

Manufacture of additional equipment has been completed at the company's production center in South San Francisco.

While mining and minerals processing have constituted the principal markets for DYNAJET operations, units proved effective in coal reclaiming on three separate occasions during the past year. Applications in the chemical, pulp and paper, and water control/sanitation industries also have been established.

Solids densities up to 65% by weight have been effectively handled in the diversified installations to date.

Virtually complete self-containment enables DYNAJET units to service a wide range of short-term or emergency requirements. The specially-designed cylindrical steel capsule housing a series of high pressure jets and a slurry pump, is transported to the jobsite on a 40' trailer which also contains the system's support components, hydraulic system, high-pressure water pump and operating controls.

To repulp and move solids from settling, storage and emergency tailings ponds, or from water reservoirs or materials stockpiles, the capsule is lowered into the material and its jet activated. Integrated streams of high-pressure water slurrify all material within a significant distance, which the eductor and slurry pump then remove at controlled rates through flexible hose connected to an adjacent pipeline.

DJ-2000 rental models are rated up to 2,000 GPM, with a slurry output ranging up to 580 DTPH based on a solids density of 60% by weight and a specific gravity of 5.0. For long-term or permanent installations, DYNAJET units with capacities ranging from 500 to 4,000+ GPM can be provided.

Mining oil-sands, uranium bodies

Two major development programs to establish the technical and economic feasibility of using MARCONAFLO technology in mining sands—one for underground mining of uranium ore bodies and the other to pump oil-bearing sands to the surface—are currently in progress.

The uranium study is a continuing program jointly sponsored by Rocky Mountain Energy Co. and MARCONAFLO Inc. which involves the use of a unique MARCONAJET/slurry pump system expected to be particularly effective for relatively small, low-grade or irregular ore deposits at depths of 150' to 350'.

Projected substantial increases in the demand for uranium over the next 20 years give increased importance to establishing a system which can make use of these marginal deposits, not possible to mine economically by conventional methods.

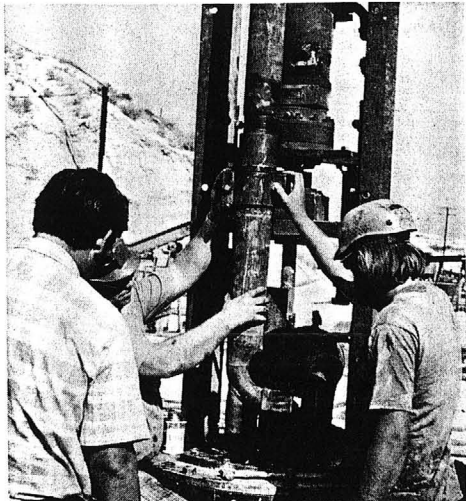
Earlier tests having demonstrated the system's ability to pump sands to the surface, primary objective of the present phase is to evaluate economic and technical considerations relating to commercialization of the process.

In the companion oil sands program, MARCONAFLO and a major oil company have a joint field test underway in a producing field. If successful, the system will provide a vast new quantity of oil.

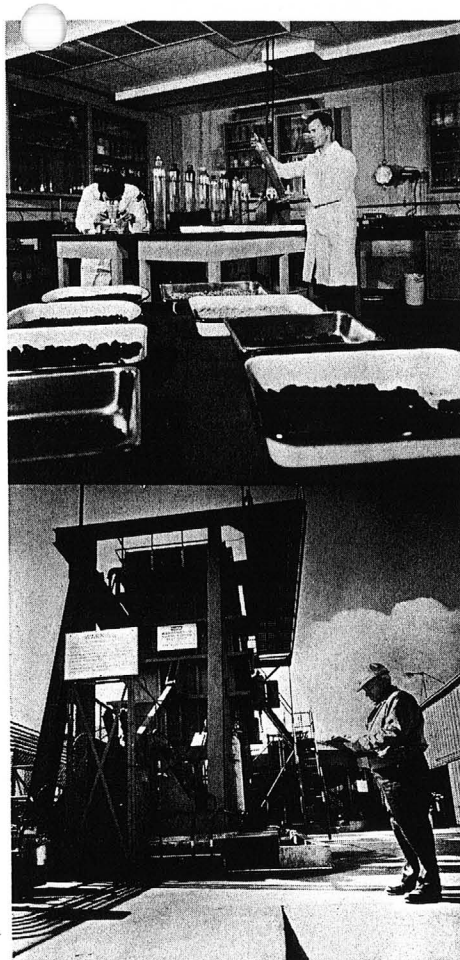
The test also utilizes MARCONAFLO's underground mining system to jet and pump oil-bearing sands to the surface. After processing, these sands will be back-filled into the cavities to minimize environmental problems.

Also scheduled in the project is the evaluation of alternative methods of separating the oil from the sand.

Importance of this study is apparent from the almost limitless deposits of oil-bearing sands throughout the world. Up to this point they have not been of commercial value due to the substantial cost of getting the material to the surface.



Preparing to lower a specially-designed MARCONAFLO unit into a casing, in a feasibility test of pumping oil-bearing sands to the surface, engineers attach the system's jet nozzle element to high pressure water lines.



Both laboratory and outside test facilities exist at MARCONAFLO's unique Research Center, now available for outside contract work. Lab facilities range from minerals crushers to sophisticated equipment for gravimetric analysis and magnetic separation. Bottom photo: slurry development projects can be carried through shipboard slurry carrier hold simulation in this 90-ton steel test tank which simulates both engine vibration and ship rolling motions.

ON TARGET AT OXY

Important increase in the live storage capacity of a phosphate feed bin plus uniformly high solids density in the feed itself, has been obtained by installing a MARCONAJET assembly at the Suwannee River (Fla.) mine of Occidental Chemical.

The permanent installation was completed in early August. After two months of repulping operations, officials report, the electric-driven system is exceeding its design specifications of 1,450 DTPH at 40% solids by weight. Live storage capacity of the 28' high, 100' diameter bin has been increased by an estimated 20%-30%.

Tests to determine additional desliming values—the result of high pressure washing by the MARCONAJET—are scheduled for the near future.

Oxy and Marconaflo engineers made full utilization of existing facilities in the installation, suspending the MARCONAJET assembly from a bridge spanning the bin to take advantage of in-place discharge (suction) pipes and the pump used prior to the MARCONAJET installation.

Research Center accepts contracts

MARCONAFLO has recently decided to make its unique Research Center facilities in San Francisco available for outside contract work on research and development projects.

The 25,000-square foot center, 5,000 of which is covered laboratory area, has been in operation for six years. Its lab sections and outside test area are suited to a broad spectrum of minerals work, well beyond the slurry system technical support for which it was originally designed.

Covered facilities include sections designed for extensive sample preparation, wet laboratory for analytical support, minerals engineering laboratory, slurry development laboratory, and the necessary shop and office support areas.

In addition to unit operations for slurry development projects, the open outside area is suitable for large pilot scale operations. One of its most innovative features is a 90-ton steel test tank, said to be the world's only slurry carrier hold simulator. In it, test cargoes can be subjected to simulated engine vibrations and ship rolling motions—conditions which compact cargo into a hardened mass during an ocean voyage slurry discharging.

MARCONAFLO Research Manager A.K. Anderson lists the specific expertise of Center technical personnel and equipment available as enabling the company to provide interested parties with:

- Controlled crushing of rocks up to six-inch size and pulverizing of analytical samples down to minus 200 mesh size.
- All the necessary sample preparation equipment to perform splitting, riffing, grindabilities, wet and dry screen analyses, etc.
- Analytical support of gravimetric and atomic absorption analyses for most chemical elements.
- Minerals engineering equipment for grinding, flotation, gravity and magnetic separation, and hydrometallurgical extractions.
- Specific slurry development apparatus for moisture, specific gravity, bulk density, settling, compaction, drainage, flocculation, turbidity, rheology and porosity analyses.

FOR YOUR INFO...

Experimental work leading to successful development of the basic MARCONAFLO system for moving bulk materials in liquid suspension began in 1967, and technological developments have been recorded continuously ever since in both systems and products.

However, it was not until late 1974 that MARCONAFLO Inc. was established as a separate, independent subsidiary of its parent Marcona Corporation—rather than an integrated division—principally as a means of accelerating the marketing of its now proven and patented developments.

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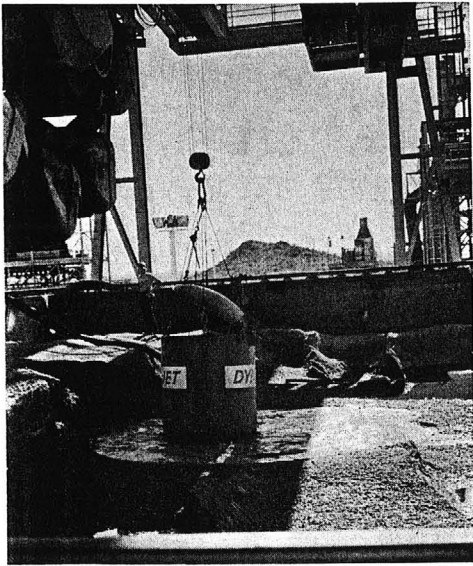
Wajax is named rep for Canada

Appointment of the prominent Wajax industrial distributing firm as MARCONAFLO sales representatives for Canada has been jointly announced by executives of the two companies.

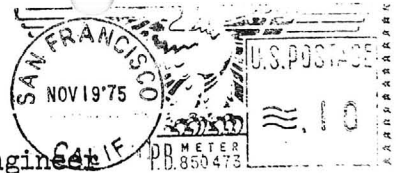
The Mining Equipment division of Wajax Industries Ltd., principal sales member of the Wajax Ltd. group of companies, will be responsible for MARCONAFLO's DYNAJET products as well as assist in the sales of other systems.

A century-old diversified industrial organization, Wajax maintains 18 sales and services offices the breadth of Canada, as well as three outlets in northern U.S. states. Gross revenues for the publicly-owned and Ottawa-headquartered company exceeded \$84 million in 1974.

MARCONAFLO's patented DYNAJET slurry systems are expected to become immediately available throughout Canada's important mining industry, since Wajax offices are strategically located to serve key centers of mining and mineral processing activity. Wajax presently distributes numerous other well-known mining and industrial products.



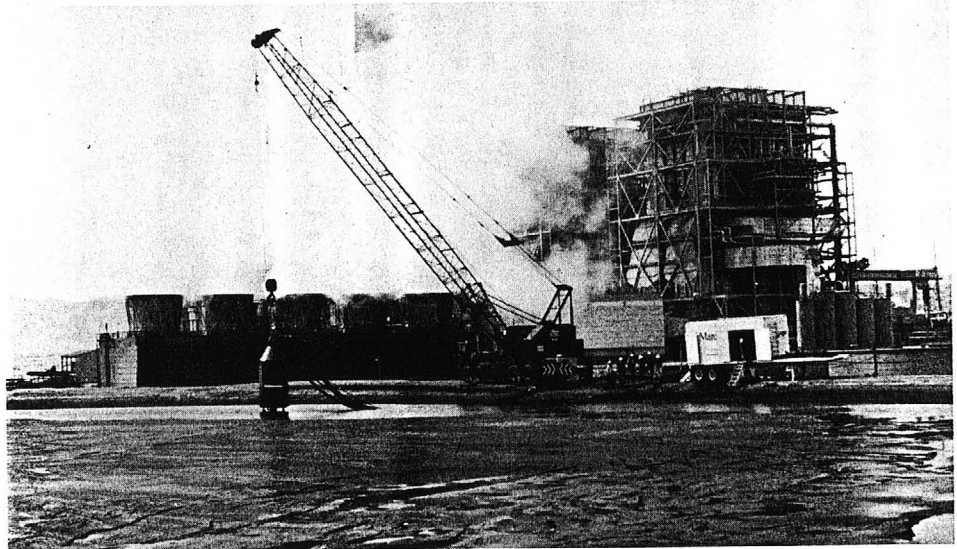
First field demonstration for the new DYNAJET 1000—cleaning out coarse copper oxide ore from leach vats—is proving to be a most challenging one, as anticipated. Early results confirm the expected difficulty in achieving a pumpable slurry, due to the extreme coarseness of the material. Test site is the Lakeshore Mine (Ariz.) property of Hecla Mining Co.



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Mobile crane lowers a DYNAJET into one of the inactive coal storage ponds at the Mohave generating station of Southern California Edison Co., to begin repulping and moving the material to tanks supplying the steam generators. A series of recent contracts proved the MARCONAFLO slurry system was an effective alternate method of fuel supply during emergencies or periods of interrupted coal delivery.

Dynajet in coal reclaiming

Proof of its capability to repulp and move significant quantities of coal in slurry form has been demonstrated on three separate occasions by a DYNAJET unit on contract operation at the Mohave generating station of Southern Calif. Edison Co.

The DYNAJET functioned as the heart an emergency coal reclaim system on the most recent occasion, providing an alternate method of supply to insure continued plant operations during a period of interrupted coal deliveries. MARCONAFLO engineers noted it made possible for the first time the reclaiming of wet coal which could not be handled with conventional earth-moving equipment.

The DYNAJET was adapted as a back-up slurry reclaim system to transfer coal from two 600' diameter inactive storage ponds. Each of these reservoirs contained some 90,000 tons of coal—a sufficient supply to

operate the Mohave station for six days per pond at its rated capacity.

The portable DYNAJET capsule was lowered into the pond by a mobile crane, and its series of high-pressure MARCONAJETS were first activated vertically to create a cavity for the capsule. Horizontal jetting repulped the settled material, which was then pumped to active slurry storage tanks supplying the steam generators.

A solids density averaging 40% by weight was reported, despite the fact the material often was submerged in water ranging in depth from 6" to over 3'.

Success of the DYNAJET system operations, and the significant economic advantages over alternate reclaim methods available in both wet and dry form which it demonstrated, is expected to lead to expanded use of MARCONAFLO slurry systems by coal and utility industries.

AREAS OF MARCONAFLO APPLICATION

