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CONVENTIONAL

OIL FIELD PUMPING UNITS



AND SHIP PROPULSION

PACIFIC COAST DIVISION

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COVERS

Front: LUFKIN Conventional Pumping Unit Ventura, California

Inside Front: LUFKIN Conventional Pumping Unit

San Luis Obispo County, California

IABC

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◄ Unseen and unheard, LUFKIN 640 and 456 Air Balanced pumping units operated by Del Amo Energy are surrounded by the city of Torrance, California.

This Installation

riving through the city of Torrance in southern California, one sees an occasional pumping unit tucked away here and there, but not enough to suggest the city sits atop a producing oil field.

This field, first drilled in 1921, was abandoned sometime after the Second World War when production declined and oil companies moved on to search for more productive fields. The city soon gobbled up the oil field. Developers hauled away the rusting remnants of the early days oil industry and with their subdivisions, village shopping centers, and parking lots erased all but a few reminders that an oil field ever existed there.

But beneath the city, millions of barrels of oil lay waiting for a better time, better technology and better economics. Waiting, as it had for millions of years before it was first tapped, for someone industrious enough to find a way to make it worthwhile. That time came in 1978.

When the price of crude oil began rising in the late 1970s, the Torrance field was one of many abandoned fields oil companies considered worth redeveloping.

Unlike most oil fields that were simply grown over with grass, the Torrance field was a well-developed residential location and the residents wanted it to stay that way.

In 1978, Great Lakes Properties created Del Amo Energy Company and made plans to re-develop the Torrance field. High prices for crude oil and new secondary recovery techniques made ls ''Outta Sight''

Coexisting with highly developed residential areas is one of the obstacles oil companies must face today.

By David Willmon



Del Amo Energy drilled 65 directional wells from this 2.8 acre space to re-develop the old Torrance field.

such a plan feasible. A request for a drilling permit was filed with the city of Torrance.

John Parkin, vice president and operations manager of the project, who joined Del Amo Energy about that time, recalls the many obstacles his company faced at the beginning of the project.

"There was a lot of resistance from the residents here in Torrance which forced us to come up with a way to meet their conditions and still produce this field," he says. "We decided to fence the entire drill site, then lower the floor of the site to hide the pumping units from view. From the top of the fence to the floor of the drill site is 31 and a half feet, the exact height of the units at the top of their stroke."

After two years of studies including an Environmental Impact Report which took nearly eight months to complete, the city issued a "conditional use" permit which included nearly 70 special conditions the project would be required to meet.

"For instance, we were limited in what we could do during the night hours. We couldn't be banging pipe around during the evening hours, so we ran logs and things like that at night," Parkin says.

The project involved drilling 65 directional wells, 41 producing wells and 24 injection wells, to an average depth of 4,800 feet.

"The top of the producing zone is actually about 3,100 feet deep, but the measured depth of the holes varies from 4,700 to 6,000 feet because they are directional," Parkin explains.



"It took us an average of eleven days to drill each of the injection wells and fourteen to drill the production wells. Even working under the special conditions, we drilled 65 wells in twenty five months



"beneath the city lay millions of barrels of oil waiting for a better time, better technology, and better economics"



with one drilling rig, so we were going lickity-split."

Parkin says local residents haven't issued any complaints since the project began in 1981.





Walking around the project, Parkin explains more about the project, pointing out things here and there. Around us, the air was filled with the collective whines of 41 LUFKIN Air Balanced units at work.

"We selected LUFKIN air balanced units because of their reputation for economy and trouble-free operation. We looked at all the alternatives, but submersibles and hydraulic units were prohibitively expensive and a lot of trouble," he says.

The units are arranged in precise rows and are all neutral tan color except for one black unit.

"We'd never thought about the color of the units until the first one arrived," he said, laughing. It will soon be repainted, as will all the tan units, dark green which Parkin believes will hide the oil better.

The project with its 41 pumping units, injection equipment and storage tanks is crammed into a 2.8 acres of working space surrounded by a grasscovered embankment and a concrete wall.

Everything about the site, even the thick grass on the embankments, works to contain the noise of the operation within the walls. The heavy grass acts as an acoustical material and the sloping configuration of the banks channels the noise upward.

"It was just blind luck," Parkin admits candidly. "The configuration of the site worked much better than we ever expected. We can run a cement truck down here on the floor and out of the sidewalk you can't even hear it. When the trees get bigger, it will help even more."

Currently the project produces nearly



LUFKIN Air Balanced units were selected because of their economy and trouble-free operation.

"Maybe we did our job so well, nobody knows we're here."



a thousand barrels of oil per day at a ratio of six barrels of water for every barrel of oil. Parkin expects production to improve another 500 barrels per day as pressure in the formation builds.

Parkin says the project has worked so well that his company may use the same approach in other residential areas in the future providing economics again make it feasible.

T o understand better the plight of many in the oil industry today, as well as the rising price of gasoline at the pump, consumers would do well to study the Del Amo project. The decision to proceed with the project and its expensive complications, excavation, directional wells and waterflooding, was based on a projected price for crude oil of \$55 per barrel. Today, Parkin says they receive less than half that, only \$22 per barrel.

Like Del Amo Energy, other producers are going to greater expense than ever before. They are drilling deeper, using more expensive technology, facing hostile environments, and all the while keeping cautious eye on declining crude prices.

Until the economics make it feasible once again for a similar project, Del Amo Energy's Torrance project is a unique installation. Company officials expected more visitors once the project was completed. The company built a complex model of the project expecting groups could better visualize the project by looking at the model. But, Parkin admits there has been little interest in the project from the community.

"Maybe we did our job so well, nobody knows we're here," he says.



LUFKIN C-640D-365-144 Unit, Union Oil Company, Santa Barbara County, California.



LUFKIN M-228D-173-100 Unit, Chevron USA, Fresno County, California.



LUFKIN C-114D-143-64 Unit, Mobil Oil Co., Kern County, California.



LUFKIN M-456D-253-144 Unit, Union Oil Co., Santa Maria, California.



LUFKIN A-1824D-470-240 Unit, Shell California Production Inc. Santa Barbara County, California.



LUFKIN C-160D-173-100 Unit, Union Oil Co., Kern County, California.



LUFKIN M-228D-173-100 Units, Chevron USA, Fresno County, California.

Maintenance: A good investment

Glamorous it's not, but a good maintenance program brings a healthy return on investment.

D reventive maintenance is one of life's cruel jokes. It is the most unglamorous of jobs in an industry proud

of its reputation for being glamorous, exciting and fast-paced, and it is a big part of every producer's daily operations, or should be.

But how many times have you heard preventive maintenance mentioned in an episode of *Dallas* or *Dynasty*? You haven't and you probably won't either. It is even less likely you will see commercials where muscle-bound, bare-chested roughnecks grease one last center-bearing before settling down with an ice cold can of their favorite beer.

The old saying "Time is Money" is especially true in the oil industry. Time spent, or invested, in preventive maintenance can bring sizeable returns. If you don't think so, compare the cost of greasing a center-bearing on a LUFKIN pumping unit with the cost to replace that bearing. Just the cost of the crane alone would make that a good investment.

Most likely, operators don't forget maintenance, but they too often allow other "must-do-today" tasks take its place.

The design of a LUFKIN pumping unit represents more than sixty years of research and testing. LUFKIN engineers pioneered most of the basic pumping unit configurations in use today, and developed standards for the design and material of many pumping unit components. Each year, changes in materials or manufacturing techniques are introduced that increase the life of a LUFKIN pumping unit. But, all of these improvements are of little value if the equipment is poorly maintained.

A good maintenance program will include weekly visual inspections, a monthly check of reducer oil level and structural bearings, and a complete lubrication, including a change in gear reducer oil, every six months.

Possibly, most important are the weekly inspections. Engineers have found that most pumping unit wrecks could have been prevented by weekly checks for bolt tightness and unit alignment.

At least once a week, operators should look for changes in the clearance between the pitman side members and cranks. Also, a change in the tracking of the wireline away from the center of the horsehead could indicate the unit alignment has changed. Changes in alignment are usually caused by loose hold

Structural bearings can be easily lubricated from the ground.

down bolts or a settling of the foundation.

During the weekly inspection, check all bolts for proper

tightness and retighten if necessary. Belts should be checked for proper tension and alignment. Check wirelines for fraying or rusting. A rusty wireline should be cleaned with a wire brush and recoated with a good wireline lubricant, not crude oil.

At least once a month, check the oil level in the gear reducer and visually check structural bearings for leaks.

The oil level in the reducer should be between the low and full marks. Check the oil for dirt, sludge, water or excessive foaming.

If foaming conditions become a problem, add one teaspoon of Dow Silicone 200 (using more than is recommended may effect the lubricating qualities of the oil). If at any time the lubricant has an abnormal appearance or smell, collect a sample and have your oil supplier determine if the oil should be replaced.

Every six months, LUFKIN recommends a complete relubrication of all structural bearings, and the replacement of gear reducer oil.







Many operators seldom change gear reducer oil, say LUFKIN engineers, but regular replacement can add many years to the life of the gear reducer.

If temperatures before the next scheduled relubrication are not expected to be lower than zero degrees Fahrenheit, lubricate all roller bearings, except tapered roller crank pin bearings, with a premium NLGI No. 1 lithium soap base grease with a lead napthanate extreme pressure additive. The oil in the grease should have a viscosity of approximately 1000 SSU at 100 degrees Fahrenheit. Do not use a soda soap grease.

Bronze bearings and tapered roller bearings should be relubricated as needed to maintain proper oil levels. Use an EP 140 extreme pressure oil with an extreme pressure additive and a pour point of 15 degrees Fahrenheit or lower. If available, use a heavier oil with a viscosity up to 6600 SUS at 100 degrees Fahrenheit.

Replace gear reducer oil with an AGMA No. 5 EP (ISO VG 220) premium mild extreme pressure lubricant, preferably a sulphur-phosphorous type, with rust and oxidation inhibitors and an anti-foaming agent. Pour point of the oil should be five degrees Fahrenheit or lower.

If temperatures before the next scheduled relubrication are expected to be as low as-30 degrees Fahrenheit, lubricate all roller bearings, except tapered roller crank pin bearings, with a premium NLGI No. 0 lithium soap base grease with a lead napthanate extreme pressure additive.

Bronze bearings and tapered roller crank pin bearings should be relubricated to maintain proper oil level with an EP 80 or EP 90 extreme pressure oil with an extreme pressure additive and a pour point of -10 degrees Fahrenheit.

Replace gear reducer oil with an AGMA No. 4 EG (ISO VG 150) premium mild extreme pressure lubricant, preferably a sulpher-phosphorous type, with rust oxidation and foaming inhibitors. Pour point of the oil should be -15 degrees Fahrenheit or less.

LUFKIN engineers recommend using a reputable oil supplier, one experienced with oil field lubricants, to ensure that the specified lubricants are used. Good record-keeping is another good practice, another "boring" detail of a good maintenance program.

But, if maintenance is too boring for you, just forget it. Soon there will be plenty of glamorous work around your lease, cranes and muscle-bound riggers, and with all the activity someone may choose to make a beer commercial there. You may even get a small part and be discovered by the producers of *Dallas* or *Dynasty*. Is this a great way to make a living or what? —By David Willmon Photos by Kurt Martin Copied from an original at The History Center, Diboll, Texas. www.TheHistoryCenterOnline.com 2013:023

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ADDISON KELLEY, JR.

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Elliott Company

Elliott Company









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Champlin Petroleum

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JOHN GEGUS

Anaheim, California

Turbodyne

JOHN REPSHAS Dresser Clark Los Angeles, California



JEFF MOJO Shell California Bakersfield, California

BRENT MATHEWS Terry Steam Turbines Carson, California







Chuck Stevenson, manager of photographic services, spent two weeks in early June documenting LUFKIN customers and equipment in the company's Pacific Coast Division for this issue of The Lufkin Line. He traveled 2,700 miles by car and used 40 rolls of film recording remote oilfield installations and photographing

many of the region's key industry executives. "The people I met were friendly and professional," he says, "and I want tothank everyone for their hospitality in making a country boy feel right at home."







Chuck Davis retiring

Keeping a finger in the oil patch

After 40 years in the oil patch, LUFKIN'S Chuck Davis, division manager of the Pacific Coast Division, is retiring. Davis, who began his career with LUFKIN in 1966, says working in the oil industry was "fantastic." Although retiring from service with LUFKIN, Davis intends to remain active.

"I'm going to keep my finger in the oil patch," he says. "I plan to do some consulting. I also plan to do some teaching.

"Education is an ongoing thing. There's new people coming in every year and education is very important. It's one of the things LUFKIN has always stressed."

That Davis should know about. After beginning his career with LUFKIN as a representative in the Ventura, California, area, Davis was transferred to the Rocky Mountain Division as district manager in the Casper, Wyoming, office for most of his 18 years with LUFKIN. Although he never expected to return to California, he did so in March 1980.

"We had always hoped to return to California, since our children we're here, but had never thought we could."

He and his wife hope to relocate in the Santa Maria area, which is just "far enough away from the kids so they can still come see us, but too far to just drop in," he says, laughing.

Davis served as district manager in the Bakersfield office from 1980 until 1983, when he was named division manager upon the retirement of John Swanson. During his years of service in Bakersfield, Davis opened the company's first gear box repair facility.

Retirement will be a big change, he says. "It's not something you do lightly. I wake up in the morning and wonder if I'm doing the right thing.



If Bishop, second from right, needs any help, he can expect plenty from an able crew in Bakersfield which includes: (I-r) Danny Kizzia, 1 year; James Copeland, 6 years; Lee Stevens, 23 years; Harold Stevens, 11 years; and, Jerry Mullens, 22 years. Also, not pictured, Gary Seaton, 19 years, and Jackie Campbell, 14 years.

"But, by the end of the day, after a few people have chewed on me, I'm saying 'stop this thing so I can get off.' "



Chuck Davis



David Bishop

Learning the pumping unit business again

Bishop to Division Manager

David Bishop has been named to succeed Davis as manager in the Bakersfield office. Bishop, who initially was to be a LUFKIN pumping unit salesman but chose to sell gears instead, says he has much to learn even though he comes to California with 28 years of experience as a LUFKIN representative.

Bishop who joined the company in 1957, switched in the middle of his training program in Lufkin from a pumping unit to gear salesman. He was one of the company's first gear salesmen, spending most of his career working to establish LUFKIN as a supplier, opening gear offices in Cleveland, Ohio, and Atlanta, Georgia, for the company.

"The oil industry is much faster paced. Customers have a better idea of what they want and in the gear business our customers gave us a bunch of conditions and we would look at a number of alternatives," Bishop says.

After all the years of facing wellestablished competition in the gear industry, the oil industry is a refreshing change for Bishop. "Out in California, we're No. 1," he says.

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Our new "two-point suspension system" reduces installation costs for conventional units.

This same concept has proven successful with our Mark II units.

By re-designing the sub-base and sampson post arrangement on our conventional pumping units, we have directed structural loads into two basic areas. This twopoint concept, introduced in our Mark II pumping units many years ago, has proven very successful in the field.

CRANK	P.R.	PITMAN	C'BERG	REAR POST	REAR FDN	FWD FDN
ANGLE, A1	LOAD, W	LOAD, R3	LOAD	LEG LOAD	LOAD, Z1	LOAD, Z2
0	17300	17621	36799	10957	4153	30593
15	17300	18076	37257	8214	3107	31679
30	17300	18384	37493	5184	2201	32704
45	17300	18419	37394	2316	1495	33599
60	17300	18167	36994	148	1036	34305
75	17300	17734	36462	-981	854	34774

The "two-point" suspension improves durability and reduces installation costs.

These design changes further improve the durability of our Conventional pumping units, but most of all, the new "two-point conventional unit" allows significant savings on installation costs. Now operators will be able to use portable concrete or fabricated pads, or timbers, successfully when installing these conventional pumping units.

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