The LUFKIN Line

FALL/WINTER 1984

MACHINERY DIVISION

SALES AND SERVICE OFFICES

ABILENE, TEXAS
209 S. Danville
Bldg. C, Suite 107
Phone: 915-695-7610

BAKERSFIELD, CALIFORNIA
2500 Parker Lane
P.O. Box 10839
Phone: 805-327-3563

BALTIMORE, MARYLAND
2003 Rock Spring Road, Suite 2A
Forest Hill, Maryland
Phone: 301-879-9264

BIRMINGHAM, ALABAMA
5157 Kirkwall Lane
Phone: 205-969-0102

CASPER, WYOMING
610 North Warehouse Road
P.O. Box 1849
Phone: 307-234-5346

CHICAGO, ILLINOIS
18 Grant Street
P.O. Box 382
Crystal Lake, Illinois
Phone: 815-459-4033

CLEVELAND, OHIO
6500 Pearl Road, Suite 215
Phone: 216-842-7879

DALLAS, TEXAS
717 Meadows Bldg.
Phone: 214-691-6133

DENVER, COLORADO
4 Dry Creek Circle
Suite 240
Littleton, Colorado
Phone: 303-795-9253

HOUSTON, TEXAS
810 Highway 6 South
Suite 206
P.O. Box 440069
Phone: 713-870-9151

KILGORE, TEXAS
Interstate 20 & State 42
P.O. Box 871
Phone: 214-984-3875

LOS ANGELES, CALIFORNIA
Brea Village Plaza
259 S. Randolph Ave.
Suite 280
Brea, California
Phone: 714-529-1862

NEW ORLEANS, LOUISIANA
4636 Sanford Street
P.O. Box 73373
Metairie, Louisiana
Phone: 504-885-2841

NEW YORK, NEW YORK
100 Menlo Park Office Bldg.
Room 408
Edison, New Jersey
Phone: 201-549-1021

ODESSA, TEXAS
Highway 80 East
P.O. Box 1632
Phone: 915-563-0363

OKLAHOMA CITY, OKLAHOMA
2300 S. Prospect
P.O. Box 95205
Phone: 405-677-0567

PITTSBURGH, PENNSYLVANIA
201 Penn Center
Suite 304
Phone: 412-241-5131

SAN ANTONIO, TEXAS
The Crossroads
1635 N.E. Loop 410
Suite 202
Phone: 512-828-8142

SAN FRANCISCO, CALIFORNIA
1200 Sacramento Street
Suite 402
Phone: 415-885-5425

TULSA, OKLAHOMA
2865 E. Skelly Drive
Suite 203
Phone: 918-749-6846

VENTURA, CALIFORNIA
198 Barbara Street
Oakview, California
Phone: 805-649-2757

WILLISTON, NORTH DAKOTA
417 First Avenue East, Suite 216
P.O. Box 1968
Phone: 701-774-3831

EXECUTIVE OFFICES &
MANUFACTURING PLANT
P.O. Box 849
Lufkin, Texas
Phone: 409-634-2211
R.L. Poland, Chairman
Frank Stevenson, President
Ben Queen, Vice-President,
Sales Manager

LUFKIN INDUSTRIES CANADA LTD.

CALGARY, ALBERTA
CANADA
225 McDougall Place
808 Fourth Ave., S.W.
Phone 403-234-7692

NISKU, ALBERTA
CANADA
P.O. Box 240
1107 8th A. Street
Nisku Industrial Park
Phone: 403-955-7566

INTERNATIONAL DIVISION

SALES AND SERVICE OFFICE

HOUSTON, TEXAS
12941 Interstate 45 North
Suite 302
Phone: 713-580-5835
Telex: 79-4309
Cable: "LUFFO" Houston

The LUFKIN Line

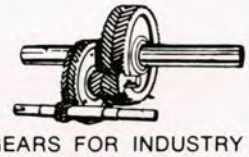
Fall/Winter 1984 • Volume 60 • Number 2

CONVENTIONAL

AIR BALANCED

OIL FIELD PUMPING UNITS

MARK II



GEARS FOR INDUSTRY
AND SHIP PROPULSION

ROCKY MOUNTAINS DIVISION

COVERS

Front:

LUFKIN Conventional Pumping Unit
Weld County, Colorado

Inside Front:

LUFKIN Air Balanced Pumping Unit
Park County, Wyoming

IABC
Member of International Association
of Business Communicators

Published to promote friendship and goodwill among its customers and friends and to advance the interest of its products by Lufkin Industries, Inc., Lufkin, Texas. Produced by the Corporate Communications Department, Rick Pezdirtz, director; David Willmon, managing editor; Chuck Stevenson and Kurt Martin, photographers. Unless noted otherwise, all photographs in this issue by Chuck Stevenson.

67,050 HP gear a record for LUFKIN

The NF2207C is two times larger than anything LUFKIN has built during 45 years in the gear business, but the biggest challenge is still ahead.

When LUFKIN sales representative George Adda, Pittsburgh, met with Westinghouse Canada, Inc. officials well over a year ago to discuss a gear for their plant in Hamilton, Ontario, it's possible he never opened a LUFKIN gear catalog. There was no point in it. None of the thousands of different combinations listed in the catalogs came close to what Westinghouse Canada needed to test their gas turbines, turbines that produce enough power to generate 50 megawatts of electricity.

While on the phone with Adda and John Finney, northeastern Division sales manager, following the meeting, Jim Partridge, chief engineer, industrial and marine gearing, made rough calculations in his head. ''A megawatt is a million watts and so that's 50 million watts of power or converted to horsepower, that's 67,000 horsepower,'' said Partridge. That's a super gear.''

There was nothing in LUFKIN's arsenal of gear drives that even came close. In fact, a 67,050 HP gear was 67 times the horsepower of many LUFKIN gear drives.

Although most LUFKIN gears are custom designed for the customer's application with lubrication systems, vibration and temperature probes, oil coolers and other equipment, the gears and housing are one of over a thousand standard catalog designs. In reality, few gear drives are totally custom designed ''from the ground up'' as the term implies.

Such was not the case for Lisa Ford and Ken Beckman, engineers on the Westinghouse Canada project. The gear would be two times larger, in its HP rating, than anything LUFKIN had ever built during more than 40 years in the gear business (A 36,000 HP gear, built in 1974 for NASA, was the old record). And, it would have to be custom designed from the ground up to fit an existing test stand.

LUFKIN engineers began work on the ''super gear'' over a year ago and immediately discovered there was little known throughout the industry about such high horsepower gear drives.

''We couldn't find any design or performance data on gear units like this,'' says Beckman. ''We couldn't even obtain pictures of other units this size.''

According to Ford and Beckman, the design work for the NF2207C was done exclusively on the company's Computer-Aided-Design (CAD) system for accuracy and speed. Beckman credits Ford with much of the design work on the NF2207C which included a number of features unique to this gear.

LUFKIN engineers designed a hydraulic balance piston which developed 140 psi of pressure from a 15 psi external oil supply to counteract some of the thrust load from the turbine. This required a two-piece input shaft design with two special floating oil seals, one a 6½-inch diameter labyrinth seal and the other a 15-inch babbitted seal ring.

Pressure dams in the bearings, designed by LUFKIN for optimum performance, helped to simulate the shaft loads during the high-speed testing.

The design work was further complicated because the gear had to fit Westinghouse Canada's installation.

''There were a number of things our design had to match to fit on their test stand,'' Ford says. She holds a manilla folder on the project that is six inches thick, crammed with drawings and correspondence accumulated during the project.

''For instance, the gear drive's

low speed shaft was designed to accommodate an overspeed trip assembly which Westinghouse Canada uses in their test stand to shut off fuel to the turbine in case it overruns,'' says Ford.

Such details complicated the design work and further magnified the importance of accuracy during the production of the gear unit in the company's new multi-million dollar gear manufacturing facility.

''Accuracies were so important on this project,'' says Partridge, ''that we called everybody together, even the machine operators, to discuss the critical points and how best to achieve the accuracies we needed.

''We had to be as close as two-tenths of a thousandth of an inch, in some places. That's .0002, or 1/15th of a hair to us Aggie engineers,'' he says with a smile.

''From the beginning, we were mostly concerned about the unit's dynamics, vibration and lubrication, because we had no performance data on units this large,'' says Partridge.

(l-r) Lisa Ford, design engineer, George Adda, LUFKIN sales representative, Pittsburgh, and Rick Masters, design engineer, check gear tooth contact on the NF2207C prior to testing.

The pitch-line velocity (PLV) of the elements at operating speed was almost 36,000 feet per minute. During overspeed testing of the NF2207C on LUFKIN's test stand, PLV was as high as 39,400 feet per minute.

Early in the project, it was clear modifications to the company's test stand, designed to test units up to 25,000 HP, would have to be made in order to test the unit. The engineers projected it would take 1,570 HP just to spin the gear without a load. A 1,000 HP electric motor was purchased to work in tandem with an existing 880 HP motor. It was necessary to extend the test stand floor 12 feet in order to handle the double arrangement of motors. Construction crews installed larger supply lines for city water used for cooling and beefed up electrical service to the test stand area.

Although the modifications were made in order to test the NF2207C, the changes give the test stand more flexibility for the future. With two large motors, separate gear tests can now be run simultaneously.

With the challenges of designing and manufacturing a record 67,050 HP gear behind them, all employees involved in LUFKIN's industrial and marine gear manufacturing face even greater challenges in the future.

Westinghouse Canada officials say they will need additional gear units in this horsepower range for their turbine-powered generating packages, but LUFKIN's prospects for repeat business will depend upon how well the company faces its competition. Four or five gear manufacturers in the U.S. and at least ten foreign suppliers will be bidding for these orders, says Partridge.

''In the future,'' he says, ''we're going to have to do more than build them right, we're going to have to build them at a competitive price.''

"Keeping' a Low Profile"

The company's latest wrinkle in pumping units, the Low-Profile, looks different but uses proven LUFKIN components.

On display this fall in the company's booth at the Permian Basin Oil Show in Odessa, was LUFKIN's latest wrinkle in pumping units, the "low-profile" unit. Like other pumping unit configurations which Lufkin has pioneered during sixty years in the business, the "low-profile" is a strange departure from the familiar shape of pumping units.

Like the Mark II pumping unit, the geometry of which was a shocking change from the conventional pumping unit designs when it was introduced in the early 1960s, LUFKIN's Low-Profile unit promises to quickly become a familiar shape in some oil fields. Especially valuable in areas where oil producing wells and production equipment must co-exist with agriculture irrigation equipment, this new pumping unit offers the oilman/farmer a relatively big pumping unit in a small package.

A LUFKIN LP-114D-133-54 on location near Levelland, Texas. (Opposite page) From a distance, the unit is almost lost in a tall stand of milo grain sorghum and dwarfed by the traveling overhead sprinkler system.

According to Milton Walther, chief engineer, oil field division, the new pumping unit was designed specifically for situations where pumping units are located in fields irrigated by overhead traveling sprinkler systems. And, though it may seem very different at first glance, the new pumping unit uses many of the same components as conventional LUFKIN pumping units.

"The Low-Profile unit uses standard LUFKIN components wherever possible," he says. "Components which have been tried and proven through many years of service and are interchangeable in many cases with parts for conventional units."

The Low-Profile uses a standard LUFKIN gear reducer with modified cranks, but the familiar walking beam and horsehead arrangement have been replaced by a "walking head," says Walther.

"We've designed a one-piece 'walking head' which utilizes a standard LUFKIN wireline and carrier bar assembly. As far as we know, this is the first use of a 'walking head' feature."

The unit is available in four sizes. The smallest is the LP-114D-133-54 designed for a maximum 13,300-pound polished rod load and a 54-inch stroke. The largest is the LP-320D-246-86 designed for a 24,600-pound polished rod load and an 86-inch stroke.

The overall height of the assembled LP-114D unit is only eight-feet, six inches, providing ample clearance for traveling sprinkling systems.

And, the unit is small enough that LP-114D units are assembled complete at LUFKIN's final assembly and shipping plant and shipped on a standard float, representing a substantial savings to the customer.

The units are designed to fit portable two-point foundations which is another cost-saving feature of the new unit.

The first Low-Profile pumping unit was unveiled at the company's annual sales conference last January. Since then, several Low-Profile units have been sold and are now in operation. Most of these are located in West Texas.

"The customers in this area who are using the Low-Profile have really been impressed with it," says Doyle Herndon, district manager, in LUFKIN's Odessa sales and service office.

"They feel comfortable with the 'Low-Profile' because it's not that different from conventional LUFKIN units. The Low-Profile has a LUFKIN gear box and wireline assembly, and those are the two most important things to our customers." — ***David Willmon***

LUFKIN

Installations

ROCKY MOUNTAIN DIVISION

LUFKIN C-912D-365-168 Unit, Puma Petroleum Company, Campbell County, Wyoming.

LUFKIN T5A Conventional Unit, Conoco, N. Tisdale Unit, Johnson County, Wyoming.

LUFKIN M-1280D-427-216 Unit, Cities Service Oil and Gas Corporation, Campbell County, Wyoming.

LUFKIN M-640D-365-144 Unit, Southland Royalty Company, Streeter #1, Johnson County, Wyoming.

A Service Center For The Rockies

Factory Authorized service for LUFKIN customers at a fraction of the downtime and freight costs they once faced.

The names—Salt Creek, Dead Horse Creek, Lost Soldier, Little Buffalo, Poison Draw—remind us of movies and books about a frontier that vanished long ago.

But for oil producers in the Powder River and Big Horn Basins of northern Wyoming, these are familiar names of producing reservoirs scattered throughout this rugged territory which is still today, geographically, a frontier of sorts.

For oil producers in this area, freight charges to ship heavy equipment from manufacturers well over a thousand miles away add thousands of dollars to the price of new equipment or to the cost of repairing it at the factory. For instance, a LUFKIN customer needing a major repair job on a M-912 gear box could expect to pay $2,000 to ship the gear box back to the plant in Texas. Until recently, this was just part of doing business in this frontier.

During November, LUFKIN opened a repair facility in Casper, Wyoming to provide complete gear box and bearing

repair for oil field customers in the Rocky Mountains. For LUFKIN customers in this area, the new facility will provide factory authorized service locally for a fraction of the downtime and freight costs they once faced.

"We're now able to provide our customers in this area rapid service even on major gear box repairs which were once practically impossible in this area," says Robert Hail, district manager in the Casper area.

The new facility is adjacent to the company's sales and service offices in Casper. During June, 1984, work was begun on the facility and during November the new machine tools were installed. Company officials estimate the total cost of the project at over $500,000.

In the new Casper facility, there's room for loading a 40-foot truck-trailer rig while repair work is in progress. (Opposite page) LUFKIN's Casper, Wyoming sales and service offices with the new repair building and the Rocky Mountains in the background.

According to Hail, major repairs on all sizes of LUFKIN pumping unit gear reducers up to the API 1824 can be made in the new repair shop. The operation is a full-service repair shop for pumping unit gear boxes of all makes. If parts are available, the facility can provide repair on other brands of pumping unit reducers.

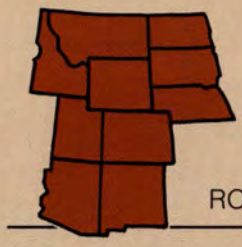
The shop is equipped with a 20-ton overhead crane, a 400-ton press, and engine lathe, a drill press, a 100-ton puller, grinder and key-shaper.

The parts inventory was also upgraded to include a wider selection of bearings, slow speed shafts, and gear sets to keep the customer's downtime at a minimum.

With the completion of the facility in Casper, LUFKIN now has gear box repair facilities for the major oil producing territories of California, West Texas and the Rocky Mountains. A repair facility in Odessa, Texas was completed during 1983.

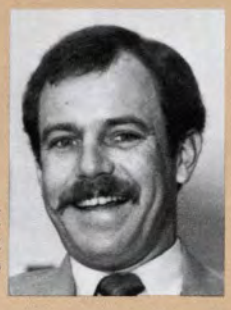
—Photos by ***DAVID FREEZE***

LUFKIN Snapshots



ROCKY MOUNTAIN DIVISION

JOHN RICHARDSON
Diamond Shamrock
Denver, Colorado



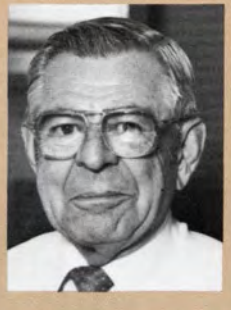
KIRK SMITH
Diamond Shamrock
Denver, Colorado

R.L. CODY
Mobil Oil
Denver, Colorado

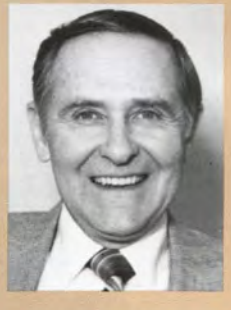
A.A. BROWN
Mobil Oil
Denver, Colorado

PAUL GAYER
Sage Energy Company
Denver, Colorado

ALAN AMBLER
Sage Energy Company
Denver, Colorado



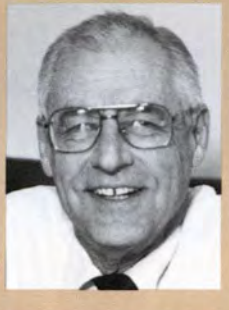
L.A. DOTY
Mobil Oil
Denver, Colorado



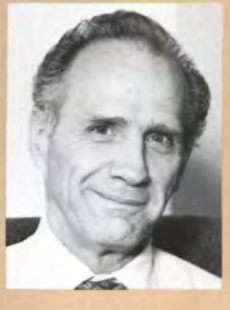
JOHN HEFFNER
Mobil Oil
Denver, Colorado

LARRY PALMITIER
PanCanadian Petroleum
Denver, Colorado

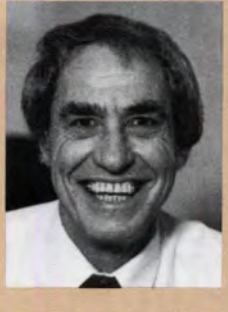
GLEN JAMESON
PanCanadian Petroleum
Denver, Colorado



DALE PICKING
Home Petroleum
Denver, Colorado



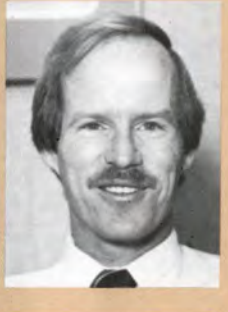
M.J. LaBAUVE
Home Petroleum
Denver, Colorado



ROBERT CRUTCHFIELD
PanCanadian Petroleum
Denver, Colorado

JIM KEISLING
PanCanadian Petroleum
Denver, Colorado

STEVE ADAM
Anadarko Production
Englewood, Colorado



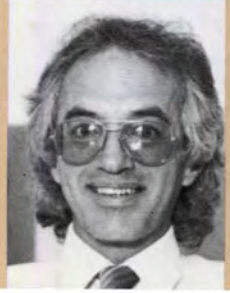
JACK McWILLIAMS
Century Oil & Gas
Englewood, Colorado

ROBERT MARTIN
Coastal Oil & Gas
Denver, Colorado

STEVEN FIELDS
Coastal Oil & Gas
Denver, Colorado

TED BROWN
Century Oil & Gas
Englewood, Colorado

PAUL STEWART
Century Oil & Gas
Englewood, Colorado



PATRICK FITZGERALD
Coastal Oil & Gas
Denver, Colorado

O.L. TAULMAN
Mobil Oil
Denver, Colorado

KIM LUCKS
Wintershall Oil & Gas
Englewood, Colorado

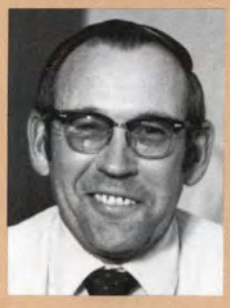
ROBERT SEARLS
Cotton Petroleum
Denver, Colorado

DAVID TALBOTT
Cotton Petroleum
Denver, Colorado

GLENN GARVEY
Cotton Petroleum
Denver, Colorado

WILL LEHMANN
Tenneco Oil
Englewood, Colorado

STEPHEN RAWLINGS
Tenneco Oil
Englewood, Colorado

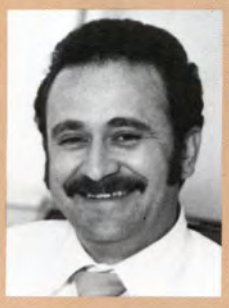


D.E. WOOD
Cotton Petroleum
Denver, Colorado

LESLIE STREEB
ANR Production
Englewood, Colorado

PETER ABT
Tenneco Oil
Englewood, Colorado

DON MORRISON
Tenneco Oil
Englewood, Colorado



SAM PRUTCH
ANR Production
Englewood, Colorado

ROBERT KOFF
ANR Production
Englewood, Colorado

D.D. FYOCK
Texaco USA
Denver, Colorado

SCOTT ELKINGTON
Texaco USA
Denver, Colorado

C.E. LINDBERG
ANR Production
Englewood, Colorado

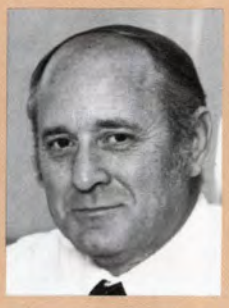
ROBERT DAWSON
Milestone Petroleum
Englewood, Colorado

JOHN BALTZ
Texaco USA
Denver, Colorado

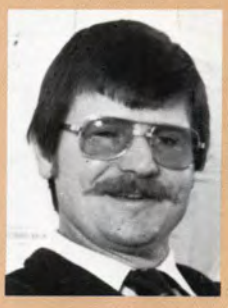
DARRELL BURTON
Texaco USA
Denver, Colorado

JEFFREY CARLSON
Monsanto Oil
Englewood, Colorado

STEVEN HARDY
Monsanto Oil
Englewood, Colorado



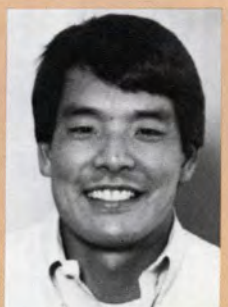
PAUL MAUPIN
Ensource Inc.
Englewood, Colorado



GARY BRUNE
Samedan Oil
Denver, Colorado

KEITH EBNER
Monsanto Oil
Englewood, Colorado

STEVE COURSEY
Tenneco Oil
Englewood, Colorado

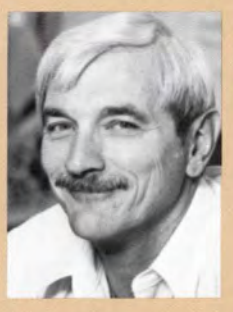


FRANK TSURU
TXO Production
Denver, Colorado

RUSS GILLIS
TXO Production
Denver, Colorado

PHILLIP KRIZ
TXO Production
Denver, Colorado

RONALD DASHNER
TXO Production
Denver, Colorado



P.B. HAMMAKER
Phillips Petroleum
Casper, Wyoming

MIKE GASTINEAU
Phillips Petroleum
Casper, Wyoming

MARK REPASKY
TXO Production
Denver, Colorado

BRUCE WRIGHT
TXO Production
Denver, Colorado

A.E. STUART
Phillips Petroleum
Casper, Wyoming

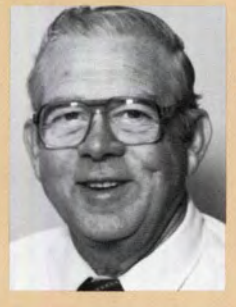
GARY ALLEN
Phillips Petroleum
Casper, Wyoming

TAMMY WILLIS
TXO Production
Denver, Colorado

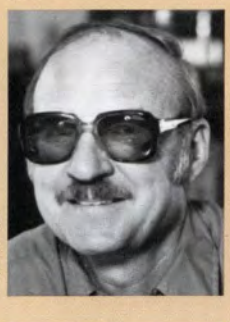
ANNETTE CALLAHAN
TXO Production
Denver, Colorado

STEVE RICHARDSON
Burton/Hawks, Inc.
Casper, Wyoming

LARRY ROHDE
SOHIO Petroleum
Casper, Wyoming



GAYLORD SMITH
Mobil Oil
Denver, Colorado

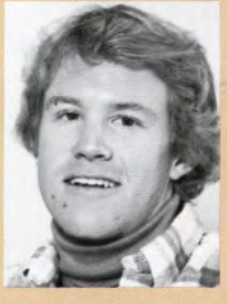


CHARLES KORITNIK
ARCO Oil & Gas
Casper, Wyoming

DAVE BLY
Conoco
Frannie, Wyoming

DARYL ROTMAN
Marathon Oil
Cody, Wyoming

KEITH JONES
ARCO Oil & Gas
Casper, Wyoming



BOB BRENNAND
ARCO Oil & Gas
Casper, Wyoming

MARTY HEEG
Marathon Oil
Cody, Wyoming

STAN LANG
Puma Oil Company
Gillette, Wyoming

SAM FRENCH
ARCO Oil & Gas
Casper, Wyoming

STEVE AKIN
Diamond Shamrock
Casper, Wyoming

We've been improving pumping units every year for the past 60 years.

Since we began building pumping units in 1923, we've developed every significant breakthrough in the pumping unit industry. Patented improvements that are still standards in pumping unit design today.

We patented the first adjustable crank balanced pumping unit in 1925.

In July, 1925 LUFKIN introduced the Trout Adjustable Counterbalanced Crank, the first major breakthrough in the industry. In 1931, we introduced the twin crank unit, still the standard of pumping unit design today.

We pioneered the use of nodular iron gears for pumping unit reducers.

LUFKIN was the first to propose nodular iron as an improved material for pumping unit reducer gears in the early 1950s. As a result of our testing, nodular iron gears became an accepted API practice. Then in 1959, we marketed the patented Mark II Unitorque pumping unit, the most advanced pumping unit design to date. Today we offer the largest selection of sizes and unit designs of any pumping unit manufacturer in the world.

Division Offices:
Calgary, ALTA, 403/234-7692
Dallas, TX, 214/691-6133
Houston, TX, 713/870-9151
Tulsa, OK, 918/749-6846
Pittsburgh, PA, 412/241-5131
Bakersfield, CA, 805/327-3563
Denver, CO, 303/795-9253
International offices:
Houston, TX, 713/820-9884:
Executive offices & plant:
Lufkin, TX, 409/634-2211

LUFKIN®
INDUSTRIES, INC.
LUFKIN, TEXAS

LUFKIN INDUSTRIES, INC.
P.O. Box 849 Lufkin, Texas 75902-0849

Address Correction Requested

BULK RATE
U.S. POSTAGE
PAID
Houston, Texas
Permit No. 5340

OILFIELD PUMPING UNITS • INDUSTRIAL AND MARINE GEARS • TRUCK-TRAILERS

"Quality Equipment Since 1902"

LUFKIN
INDUSTRIES, INC.