

**A&M researcher says:**

# Nitrogen may increase oil yield

By TERESA ROACH  
The injection of nitrogen at high pressures is being studied as one possible method of increasing the oil recovery in Texas oil fields, said Dr. Paul Crawford, assistant director of Texas Petroleum Research Committee and professor of petroleum engineering at Texas A&M University.

"In a usual oil reservoir one ordinarily recovers 20 percent of the oil in place when the reservoir has to be abandoned, because it is no longer economical to produce by primary methods," Crawford said.

"By injection of gas or water, one can get a second crop of oil (usually of quite as big as the first) so that overall we expect to recover one-third of the oil in place when the reservoir has to be abandoned," Crawford said.

"This is true using the current oil and gas recovery methods and today's economics."

"In Texas 150 billion barrels of oil have been discovered since the beginning of time. Without additional research we expect to recover 50 billion barrels of oil. This leaves 100 billion barrels of oil as a challenge to research," Crawford said.

"We have produced approximately 40 billion barrels of oil in Texas. This leaves 10 billion barrels of oil yet to be produced with current concepts," he said.

The Texas Petroleum Research Committee has been doing research to determine the feasibility of increasing oil recovery by injecting nitrogen at high pressures, Crawford said.

Nitrogen is injected using either electrical motors to drive nitrogen compressors or gas engines to drive reciprocating nitrogen compressors, he said.

Laboratory researchers have obtained oil recoveries greater than 90 percent of the oil originally in place,

but the recovery in an oil field would only be half of this due to irregularities in the rock, Crawford said.

Nitrogen is obtained by cooling air to minus 300 degrees and separating the nitrogen and oxygen by distillation, a process that drives gas or vapor from liquids or solids by heating and condensing to liquid products. Crawford said that this process results in a pure, dry, non-corrosive nitrogen that can be injected into a petroleum reservoir.

"Pure nitrogen can be used in oil reservoirs that have light crude oils. That is, that crude oil that pours like water, not that which is thick and pours like honey," Crawford said.

Nitrogen may also be used for pressure maintenance and in condensate reservoirs, he said. Condensate reservoirs are reservoirs where pressures are lowered to produce liquid.

The shortage of natural gas, together with high prices, has required that suitable substitutes be developed to replace natural gas," Crawford said.

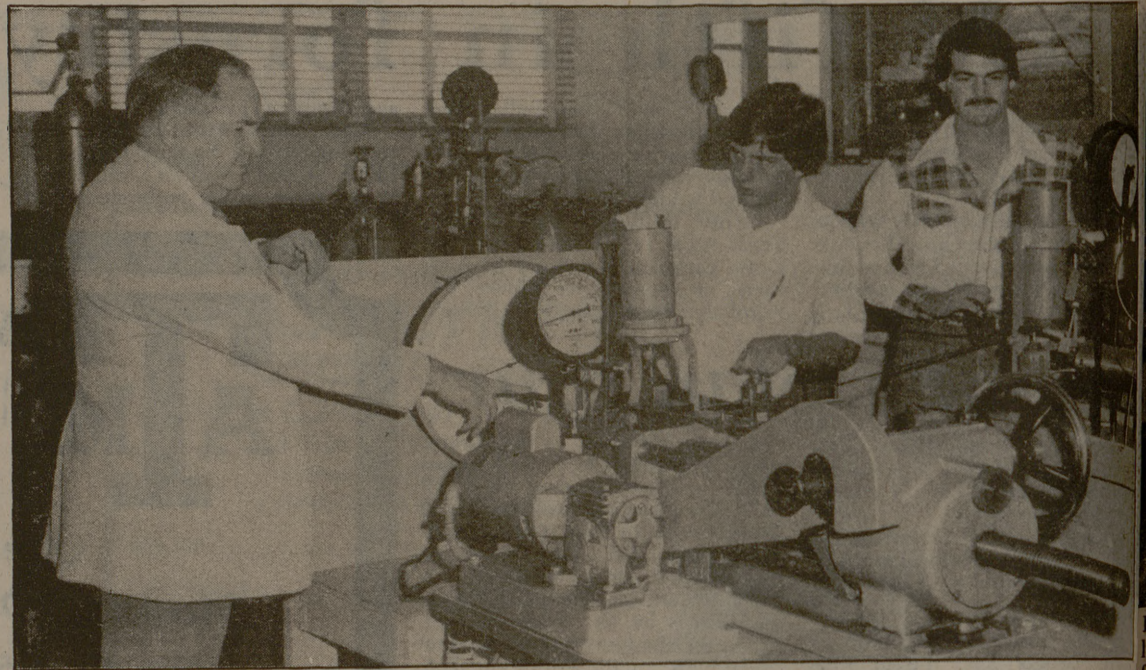
"Nitrogen is readily made from the air," he said. "It can be used as a substitute for natural gas."

"Nitrogen is not quite as good as natural gas, but natural gas is in very short supply and it costs four times as much as nitrogen," Crawford said.

The first plant using pure nitrogen has been in operation for more than a year, he said. A second plant was installed seven months ago. Both plants are located in the Fordoche Field in Louisiana.

Crawford said additional plants can be expected to begin operation this year.

Approximately \$25,000 is spent on laboratory research per year and over \$1 million is spent on field tests per year, he said.



An experiment related to oil recovery of high-pressure nitrogen injections is conducted by Dr. Paul Crawford, assistant director of Texas Petroleum Research Committee and

professor of petroleum engineering, Tim Murray and Jim O'Leary, research technologists (from left to right).

Battalion photo by Teresa Roach

## Absentee voting

Absentee voting for A&M Consolidated trustee, place 6, is underway today in the school administration offices, 100 Anderson St. Absentee voters may cast their ballots in the runoff election between 8 a.m. and 5 p.m. weekdays until April 11. Candidates are Ann Jones and Bruce Robeck. The regular runoff election will be held April 15.

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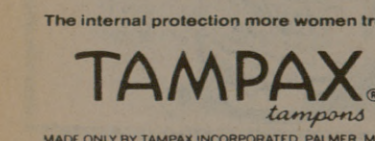
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# Swimming, tennis show lowest injury rate

United Press International  
**NEW YORK**—Does an injured offspring short circuit your nervous system? Spare yourself and talk your son or daughter into taking up swimming or tennis in high school sports.

A study of injuries in high school sports shows the two activities score the lowest in injury rates for both sexes.

Football and wrestling account for

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the highest injury rates, according to sports health detectives reporting in Pediatrics, journal of the American Academy of Pediatrics.

Dr. James G. Garrick and his associate, Ralph K. Requa, both with the department of orthopedic surgery at the University of Washington, base their report on a two-year study of injuries among participants in sports at four high schools in the Seattle area.

At least 5.5 million American youths participate in high school athletics.

The study showed injuries occurred in women's sports at a rate of 22 per 100 participants; among men, at a rate of 39 per 100.

"In spite of improvements in safety equipment, training and conditioning programs, as well as more sophisticated medical surveillance, the number of athletes injured as a result of sports participation continues to increase," Garrick reported.

"Providing routine medical care for 5.5 million teenagers is logistically difficult, and placing these youngsters in a highly competitive active sport environment compounds the problem."

"Obviously there simply are not enough physicians, athletic trainers, nurses or other medically trained individuals to be present at every competitive event in the 33 high

school sports to say nothing of the practice sessions.

"Just providing physician coverage for more than 5,000 high school football games each fall is an impossible task."

The information, according to the investigators, can help school officials

to make decisions regarding insurance coverage and assigning medical or paramedical personnel to athletic events and practice sessions likely to have high injury rates.

Four Seattle area high schools with an average enrollment of nearly 1,300 were involved in the study. In

the four schools, 3,049 participated in 19 sports. There were 1,197 injuries — 39 per 100 participants.

Injuries by sport: football, 81 per 100; wrestling, 75 per 100; men's tennis, 3 per 100; men's swimming, among 77 participants; women's swimming, 7 among 82 participants.

# Bob Hayes charged with possession, sale of cocaine

United Press International  
**DALLAS** — Former Dallas Cowboys wide receiver Bob Hayes and another man were arrested early today and charged with the sale of cocaine.

Hayes, 35, and Bob Adler, 29, were arrested at a North Dallas home by suburban Addison police officers and investigators of the Dallas County Specialized Crime Division.

A spokesman said the arrests culminated a three-month investigation by a Dallas undercover officer assigned to the Addison Police Department.

Hayes, vice president of Dymally International Inc., was charged with three counts of the sale of cocaine, and one count of possession of a controlled substance.

Adler, a Dycos salesman, was charged with one count of the sale of cocaine and one count of possession of cocaine. Bond was set at \$10,000 for each man.

Hayes, once the world record holder in the 100-meter run and winner of two gold medals in the 1964 Olympics, joined the Cowboys in 1965. He played with Dallas until he was traded to the San Francisco 49ers in 1975 where he ended his career. Hayes, who played collegiate ball at Florida A&M, is the Cowboys all-time leader in scoring and receiving.

## English TA award endowed by gift

A new award for English composition teaching excellence has been established at Texas A&M University in memory of the late Stanley Creswell, who taught English here for years.

The annual Stanley Creswell Award will honor a graduate teaching assistant. It was endowed by \$1,000 gift from Sam H. Creswell, Del Valle, son of the retired faculty member who died Nov. 31, 1977.

"I hope this award will offer incentive for teaching assistants to teach well," Creswell said. "The financial impact of the award is great, but a young Ph.D. may find an advantage to have an award teaching English composition in his file."

The \$70 cash award will be presented for teaching ability, number of student conferences held, and interest in students.

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**University Center Scheduling Notice**  
Applications for Meeting Rooms in the University Center Complex for recognized student organizations, clubs, and governing bodies will be accepted for the 1978 Fall Semester (Aug 28-Dec 15) in the Scheduling Office, 2nd floor, Rudder Tower beginning at 8 a.m., Monday, April 17, 1978. Application forms may be obtained in the Scheduling Office.

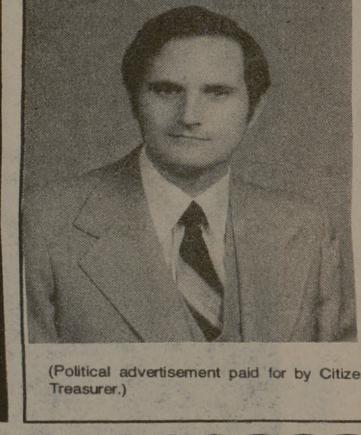
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