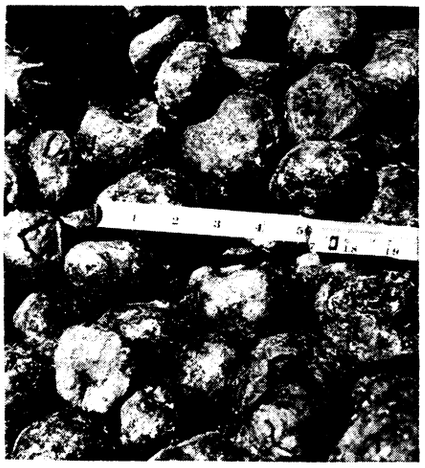
This week an experimental operation was concluded seeking to prove that a new system for retrieving the nodules can be commercially attractive. The effort is the first large field test of a $10 million research and development investment by Deepsea Ventures Inc., a subsidiary of Tenneco Inc. Preliminary results are highly encouraging.

The Deepsea Miner, a seagoing test platform for the dredging equipment, left Charleston, S.C., late in July for a point some 150 miles east of Jacksonville, Fla., in the Atlantic. There, the crew assembled a prototype lift system and lowered it to Blake Plateau, more than 3,000 feet below.

Resembling a giant vacuum cleaner, the dredge head was slowly drawn over the ocean bottom and tons of muck and nodules poured into the ship.

"Success of the venture is astounding," stated a radio report from the ship last week. Engineering chief Raymond Kaufman reported also that the hydraulic mechanism, designed for a 400-ton-a-day lift rate, was raising material four times faster than planned. In fact, the operating speed had to be lowered because the material delivery was exceeding the ore separator capacity.



Tenneco

The target: Manganese nodules.

The Atlantic site was selected for convenience, not for the metal content in the nodules, which is low. After separation, engineering and production measurements are made and the nodules are returned to the sea.

The vessel was to return to Charleston late this week and test results were to be evaluated soon after, according to Tenneco. If the Deepsea Ventures' concept is proved commercially practical, a new industry will come into being.

To make deep ocean bottom mining commercially attractive, Kaufman estimates that a nodule bed must contain a density minimum of 2.5 pounds per square foot. Beds having such concentrations and extending for hundreds of miles already have been located by the firm. All are in the Pacific at depths of 12,000 to 16,000 feet, he says.

The two-year-old company, located in Gloucester Point, Va., is directed by its president, John E. Flipse, who began studies of the mining method and its potential in 1962. He then was in the Research Department of Newport News Shipbuilding & Dry Dock Co. in Newport News, Va.

In 1968 Tenneco acquired the shipbuilding firm and established Deepsea Ventures as a separate subsidiary. The prototype dredge head and pipe are about half the size required for a commercial system.

The Deepsea Miner is a converted 320-foot cargo ship fully outfitted to assemble and deploy the dredge-lift mechanism. Once at the test site, nearly a full day was required to string and lower the massive suction head, support truss, and more than 3,000 feet of 10-inch pipe assembly.

In operation, a compressed air stream flows down the pipe and into the 16-by-16-foot head. There, a slurry of water, silt and the manganese nodules is forced into the suction pipe and upward to the ship's separator. It was given time, money and a charter to develop the ocean mining concept and a metal extraction plant.

If results of the two-week experimental operation reflect the early success reported, Deepsea Ventures will proceed with plans to build an 800-foot dredging ship. Equipped with a 30-by-30-foot head and a 20-foot diameter pipe, the ship will be designed to operate to 20,000 feet in depth. It will have a capacity for lifting and processing 25,000 tons of manganese nodules a week—worth more than $3 million at today's prices. Tentative target date for the commercial mining venture is 1975. □

NUCLEAR FUEL

Puzzle from South Africa

The adage, "Build a better mousetrap and the world will beat a path to your door," conjures up a picture of streams of eager buyers. It also implies anxious job hunters first in line.

Such a situation may have been the design of South African officials last month with their sudden claims of success in developing a wholly new process for enriching uranium. Nuclear engineers in the United States report no forewarning of the claimed technological breakthrough, nor do they admit having any knowledge of the enrichment process involved.

And they have not been enlightened since. Officials in South Africa have been highly secretive in their public disclosures. Prime Minister B. J. Vorster made the first announcement on July 20, but he offered no details beyond saying that the process is unique and that a pilot plant already is under construction. The Prime Minister also indicated that a full-scale facility will follow whose output would be competitive with Western enriched fuels. Reportedly, the pilot plant is funded at about $70 million.

Dr. A. J. A. Roux, the chairman of South Africa's Atomic Energy Board, later was quoted by Dagbreak, a Johannesburg newspaper: "It is not the gas-diffusion process, as many think. Neither is it the gas-centrifugal system. It is an entirely new principle."

Responses by officials of the U.S. Atomic Energy Commission in Washington, D.C., are mixed. One said he is "skeptical of any previously unknown process that is claimed to be commercially practical," and another declared there is "no attractive process known today" other than gas-diffusion or gas-centrifugal enrichment; but a third disclosed he is "taking their claims at face value."

South Africa, although small, is well-heeled and well-laden with uranium, largely due to its extensive gold-mining operations. But the country has not been known as a leader in the nuclear field and, at least publicly, it has supported only a modest research effort during the past decade.

It does have two research reactors at Pelindaba, near Pretoria, and a 400-megawatt (electric) power station under construction near Capetown is scheduled for completion by 1977.

A hint may have been revealed some six months ago that something was brewing when atomic energy officials there showed new interest in enriched fuel reactors. Previously, says an AEC official, their interest had been in use of natural uranium.

But that gives no clue to the new process. Several processes have been investigated in the past. One is an electromagnetic technique which was tried in the American Manhattan Project during World War II, but was abandoned in favor of gaseous diffusion. Others include thermal diffusion and even chemical separation. None of these proved practical for large-scale production. The West Germans are studying a high-velocity nozzle process, employing a kind of mass separation method, but this is believed still experimental.

An AEC source who considers the South African claims serious expressed doubts that the nation has a present capability to engineer the plant. Although associated with international nuclear activities, he denied knowledge of any recent migration of fuel specialists to South Africa.

But the line may be forming. □