30TH REUNION OF PROJECT TEKTITE

GOVT of VIRGIN ISLANDS

The Tektite Programs, conducted in Great Lameshur Bay, St. John, during 1969 and 1970, were one of the world's most comprehensive underwater research projects.

A sophisticated underwater habitat, built by the General Electric Company, housed, under fifty feet of water, a series of research teams to live and work underwater - not as visitors, but as residents! The first mission by four aquanauts/scientists lasted sixty days, establishing a new world record for continuously living and working in the sea under potentially hazardous "saturated" diving conditions. Subsequent teams were made up of marine researchers from seven nations, including an all-woman team.

The four major partners in Tektite were the General Electric Company, the National Aeronautics and Space Administration, the U.S. Navy and the U.S. Department of the Interior. Tektite was the first undersea program to be undertaken by a group of U.S. federal agencies in cooperation with private industry and educational institutions.

The 30th reunion of Tektite I and II participants, featuring an undersea symposium, "Thirty Years After - Thirty Years Hence", will be held during the first two weeks in June, 1999 at the base camp and underwater habitat location at Great Lameshur Bay (including placement of a commemorative plaque), with some activities at a luxury resort (to be announced).

The purpose of the reunion is trifold: to celebrate an historic scientific effort to explore the sea; to refocus the attention of the international marine scientific community on the U.S. Virgin Islands; and to promote the Virgin Islands Environmental Resources Station (VIERS) located at the original Tektite base camp and support their local environmental, educational and research efforts.

Dr. Sylvia Earle, a Tektite Mission Team Leader and a noted underwater explorer and scientist, will serve as Honorary Chairman of the reunion. Members of the "On-island" Steering Committee include Debby Ballard, Russell Berry, David Boaz, M.D., Dr. Jack Dammann, Ginger Garrison, John Garrison, Dr. Lavern Rayster, Dr. Caroline Rogers, Dr. Ed Towle, and Reunion Coordinator Alvin White. Everyone involved in Tektite is invited.

For information and invitations, contact:
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

IN REPLY REFER TO:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
INTEREST IN TEKTITE I

A study will be made of the performance of highly qualified scientists under conditions of stress to assess methodologies and obtain data points for use in predicting man's behavior on long duration space flights. The undersea study will provide a unique opportunity for conducting research under experimental conditions related to the manner in which members of a four-man crew interact when confined in a small habitat for a period of 60 days performing meaningful work.

The four scientists will experience a true feeling of isolation since they cannot return to the surface readily. Reactions to their living, working and recreation environment will be assessed by systematic observation, by automatic event recording, and by subjective opinion. Measures will be made of group cohesiveness and the manner in which each of the four crew members adjusts to the other crew members, to the environment and to his assigned duties. The marine scientific mission provides a meaningful goal which is necessary in order to maintain a continuous high level of motivation. With such motivation, the behavioral measures become significant and meaningful for future long duration space flights.

The ability of the crew members to carry out the marine science mission and their willingness to attempt tasks that are not directly related to their own scientific training will be evaluated, as will the extent of their dependence on an outside technical crew.

Biomedical measures will be made periodically to assure crew safety. Heart rate and EEG sleep measurements will be made to evaluate the effects of activities inside and outside the habitat on the physiological functions of the crew. The data and methologies derived from the biomedical and behavioral programs will be useful in future manned space flight programs. In NASA, these studies are being supported by the Office of Manned Space Flight, the Office of Advanced Research and Technology, and by the Office of Space Medicine. Both the Langley Research Center and the Manned Spacecraft Center are providing experimental inputs for this research.

DEPARTMENT OF THE NAVY
OFFICE OF NAVAL RESEARCH
WASHINGTON, D. C. 20360

IN REPLY REFER TO

NAVY INTEREST IN TEKTITE I

Navy interests in TEKTITE I are reflected in program management and coordination, development of the TEKTITE I behavioral and biomedical scientific mission objectives, and operational and technological program support.

The Navy is the "lead agency" of the three sponsoring agencies supporting TEKTITE I. Through the Office of Naval Research, the Navy has the responsibility for overall program management and for administration of the General Electric TEKTITE contract. An additional Navy responsibility in TEKTITE, and perhaps the most important, is mission safety, in both the scientific and operational conduct of the program.

A scientific management responsibility of the Navy, through the Office of Naval Research, is the planning of the behavioral and biomedical programs, and the integration and coordination of the overall TEKTITE I scientific program. Navy laboratories have contributed significantly to the TEKTITE I mission objectives in these programs. For example, from laboratories such as the Naval Medical Research Institute have come the behavioral program elements relating to crew selection and work performance studies. The microbiology element of the physiological program was developed by the Naval Biological Laboratory.

In addition to the stated scientific goals in the mission objectives, TEKTITE I provides the Navy an opportunity for exploration in related areas of underwater technology. These areas include underwater medicine and safety, and engineering and construction, to name but a few. The experience gained by the Naval Submarine Medical Center and the Naval Facilities Engineering Command in the TEKTITE program will have impact on future long duration scientific studies, and will provide new tools for Naval operation readiness.

The Navy is providing the operational direction for implementation of the scientific mission plans and objectives. Naval command experience will provide the operational leadership necessary to carry out the scientific program. In addition, practical operation requirements are being met by the Navy, such as transportation, logistics, and communication and facility requirements for the scientific personnel who will be at the project site for the conduct of the mission.

It is anticipated that the Navy effort in TEKTITE I will be of benefit not only to the agencies involved, but to the national interest at large. The basic information to be gained regarding man's response to living under a hazardous and isolated condition has the promise of usefulness not only in national defense, but also in undersea scientific endeavor and the peaceful exploitation of resources of the sea.

PRESS INFORMATION

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FOR RELEASE: AT WILL #351-68

GE UNVEILS FOUR MAN UNDERWATER LABORATORY

VALLEY FORGE, PA., December 16 -- General Electric's Missile and Space Division unveiled the TEKTITE I underwater laboratory during ceremonies conducted at the Philadelphia Naval Shipyard today. TEKTITE I will be the home and laboratory for four aquanaut-scientists who will conduct a 60-day marine sciences and behavioral mission early in 1969, 50 feet below the water's surface at Great Lameshur Bay, Virgin Islands National Park, St. John Island. The unveiling marked completion of the first two GE phases in the Navy, Department of Interior, NASA, and General Electric program.

Basically, the three phases are: (1) to develop plans for the operational and scientific programs of the Tektite program, (2) to build an underwater habitat and suitably modify it for the specific scientific mission of phase I, and (3) to provide technical support and integration of operations on site.

"The current TEKTITE I program is an important initial step in providing the marine science community with an important new capability", said Howard M. Wittner, GE manager of Advanced Requirements Planning. "Now, marine scientists have available to them an underwater laboratory designed to provide the diver-scientist with an extremely high degree of flexibility in conducting long-duration, in-situ experiments and observations."

The TEKTITE I habitat could be used in future marine sciences missions. In fact, the same basic GE-designed habitat could be used, with re-supply, for missions lasting six months or more in duration and at depths of several hundred feet.

"The pioneering role of TEKTITE I,in furthering the technologies of underwater habitats and saturation diving techniques, promises an expanding horizon of marine missions that may be effectively carried out in this manner, " added Wittner. "It should now be possible to fully exploit the shallow regions of the ocean for the benefit of science and mankind."

DEPARTMENT of the INTERIOR

news release

PROJECT TEKTITE--THE INTERIOR DEPARTMENT'S ROLE

The Department of the Interior is taking part in Project TEKTITE to help determine what useful marine research can be accomplished by placing man in the sea. For years marine scientists have speculated on the advantages of having direct access to the undersea environment for extended periods of time. To this end, SCUBA gear and research submersibles have provided only partial solutions. Surface diving with SCUBA gear has distinct time and depth limits. Dives with submersibles are also limited in duration and suffer the additional disadvantage of restricted vision and little or no direct access to the environment. Pressurized ocean floor stations or manned habitats offer a third approach which appears to have many advantages for prolonged studies at Continental Shelf depths.

The fundamental purpose of the TEKTITE Project is to accomplish a diversified research program with a small group of marine scientists using saturation diving techniques. A saturation dive is one in which the body tissues become saturated (after 24 to 36 hours) with the gases in the breathing mixture. This technique permits divers to live and work on the ocean floor for long periods, after which they must go through an extended decompression period before returning to the surface. The scientists will be monitored by television to insure their safety and welfare. Latest concepts in engineering will be employed to fulfill the operational requirements of the multi-agency program.

The overall objectives of the Department of the Interior in the ocean floor program are:

1. To determine the advantages of saturation diving as a research technique for marine scientific studies.

2. To carry out an operational research program on the ocean floor to demonstrate that scientists can live and work effectively in the ocean environment.

Although TEKTITE has been preceded by several underwater living experiments, some at considerable depth, it will be the first such project in which research on biological and geological processes are given special attention. The behavioral and medical studies to be conducted by other Federal agencies concurrent with the ocean floor program are designed so that there will be little or no interference with the marine research program.

Five Bureaus in the Department of the Interior are participating in Project TEKTITE--Bureau of Commercial Fisheries (BCF), National Park Service (NPS), U.S. Geological Survey (USGS), Federal Water Pollution Control Administration (FWPCA), and the Bureau of Land Management (BLM). The Bureau of Commercial Fisheries has been designated the lead agency for Interior's portion of the project.

ST. THOMAS This Week

Weekly Guide for Island Visitors Including St. John

VOL. XI - NO. 18

WEEK BEGINNING MAY 2, 1970

Five Aquanauts Now Living Under The Sea As Part Of Tektite Exploration Program

Ian Koblick, special assistant on undersea programs to the V.I. Governor, is one of the aquanauts now living below the surface of the sea.

Early last week five aquanauts submerged for a three-week sojourn of underwater living in a combination home-laboratory anchored in 50 feet of water at the bottom of Lameshur Bay on St. John. Sponsored by federal and local governments, private industry and universities, the project, called Tektite II, will last through October.

The same clear, warm water and abundant marine life that attracts thousands of snorkelers and scuba divers to the islands every year, also provides ideal conditions for conducting underwater scientific studies. The scientist-aquanauts will live in the sea for extended periods ranging from two to four weeks while they conduct research in oceanography, ecology, lobster behavior, fish trap evaluation, effects of artificial reefs and testing of new equipment.

The five-man habitat consists of two eighteen-foot-high steel cylinders, each twelve feet in diameter. The aquanauts swim from the habitat to reefs where they conduct research, wearing scuba gear or a newly designed close-cycle breathing apparatus, then return to their underwater home.

Scale models of the Tektite habitat and its location on the ocean floor can be seen at the Visitor's Center of the V.I. Fishing and Watersports office in the historic Camille Pissarro Building on Main Street.

SHOP Talk

Imports from around the sold at bargain prices shopping part of the fun o gin Island vacation. Sho each side of Main Stre spill down roads and lane ing to the waterway a bloc They are open from 9 to to 6, except Sundays a days.

Around the corner o Gade MAISON DANOISE some of the world's most ful china. Shelves are with Wedgwood, Spode, Bing & Grondahl and th famous Royals — Doulton, hagen and Worcester. I same glassware they ca fors crystal for one and the name of Georg Jense

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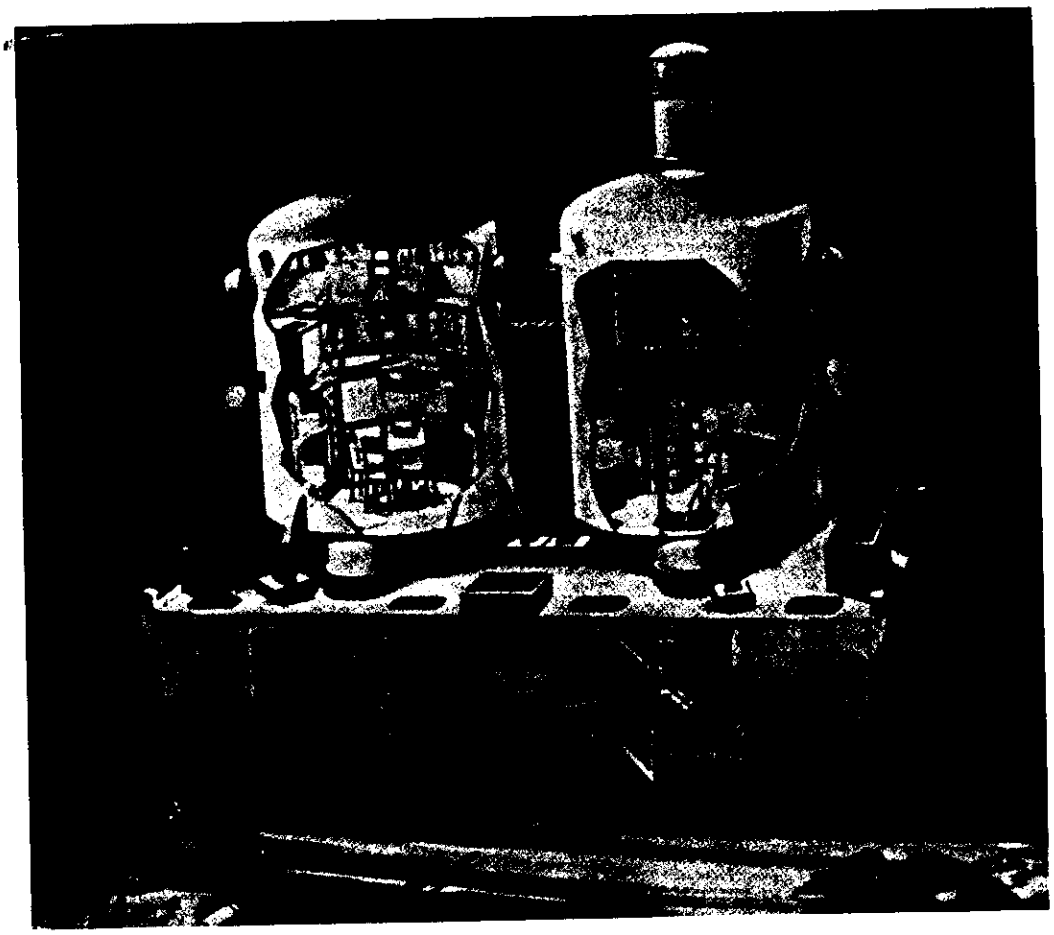


TEKTITE II HABITAT will house teams of scientist-aquanauts and engineers for periods of two weeks to 30 days in this year's Tektite program. Each of the two vertical structures of the habitat measures 12.5 ft in diameter and 18.1 ft high.

TEKTITE II

This year's program will have a series of 17 missions. Innovations include an all-female crew on one mission and an international crew on another

Clyde La Motte, Washington Correspondent

LAST YEAR's federally sponsored man-in-the-sea program, Tektite I, is being followed up in ambitious fashion this year with an expanded venture, Tektite II.

Last year four aquanauts made headlines by living and working below the surface of the ocean off St. John Island in the U.S. Virgin Islands, the same site as the Tektite II operation this year.

Beginning April 1, this year, 62 marine scientists, engineers and doctors are participating in a series of 17 missions over a span of seven months.

The mission has several important 'firsts'

- For one thing, there will be a crew of women manning one of the missions. (Oceanographers relish in pointing out to women that no U.S. female has been invited on any space mission.)
- There will be an international crew (male) on another mission, staffed by scientists from Japan, England, France, Australia, Canada and West Germany. Observers from Russia, which also has a man-in-the-sea program, will be on hand, too, although they will not be members of a mission team.
- There will be two habitats this time instead of one. The larger of the two will carry a five-man crew of scientists and engineers while the smaller—called a minitat, naturally—will house a two-man team.
- There will be tests at 100 ft as well as at 50 ft, last year's depth.
- There will be some new equipment used in this year's tests, and the scientific scope of the missions will be greatly broadened. Last year the primary purpose was to determine how man could get along below the sea for an extended period.

New type underwater breathing device

One piece of new equipment getting special attention is an underwater breathing device used for the first time by marine scientists.

The unit, developed by the Ocean Systems Program operation of General Electric's Re-Entry and Environmental Systems Division, is lighter than conventional twin-tank SCUBA gear. (See "Breakthrough in underwater breathing technology" page 89.

Its big advantage is that it will permit the scientists to venture outside the habitat for up to six hours.

Equally interesting is the fact that the device is bubble-free, so that the aquanauts can move about in the underwater environment with a minimum of disturbance of the fish and other undersea life.

There are no bubbles with the closed-cycle breathing unit because the exhaled gas is returned to the diver with the unused oxygen after it is passed through a scrubber which removes the carbon dioxide. The small amount of oxygen actually consumed during the breathing cycle is automatically replaced by means of a newly developed partial pressure oxygen sensor and control system.

Another new twist to the 1970 venture is the use of nitrogen-oxygen breathing mixtures rather than helium in the habitats.

One reason for this is that the nitrogen-oxygen mix is cheaper than helium, a factor to be considered in extended or multiple below-sea operations. Also, it eliminates the effect helium has on the human voice—the Donald Duck garble—and therefore makes voice communication easier and more reliable.

The missions will also be used to evaluate swimmer propulsion gear which will enable the scientists to move about more readily and cover a greater area while outside the habitat.

All in all, Tektite II will be the most ambitious underwater exploration program ever attempted.

Of the 17 missions, 10 will be at 50 ft and 7 at 100 ft. The five-man habitat

will be located at 50 ft while the minitat will be at 100 ft.

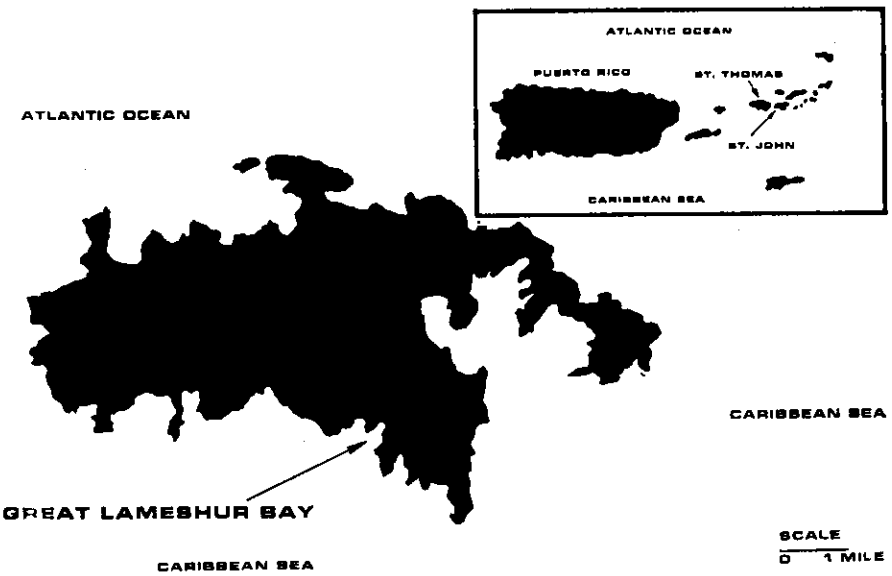
Each crew of the 50-ft missions consists of four scientists and one engineer. The scientist-aquanauts will be primarily occupied with research efforts while the engineer-aquanaut will be responsible for maintaining the habitat systems in safe operating condition. In addition, he will serve as a back-up diver.

Organization of the venture

The Tektite II venture is a cooperative effort involving government, private industry and universities. The Department of Interior has the role of lead agency. Other participants are the National Aeronautics and Space Administration (NASA), National Science Foundation, the government of the Virgin Islands, Department of Navy, Smithsonian Institution, U.S. Coast Guard, the Department of Health, Education and Welfare, and the General Electric Co.

General Electric designed and built the five-man habitat while Worldwide Development Corp. built the minitat and its supporting catamaran.

The minitat consists of two rooms, the upper chamber being an 8-ft-diameter cylinder 11 ft high and the lower a 9-ft square by 6-ft high room. The upper chamber is the main living quarters and serves as a decompression chamber when the minitat is on the surface. The lower chamber is a work room for gear storage, sample preparation, etc.



SITE FOR TEKTITE PROGRAM will be Great Lameshur Bay in the U.S. Virgin Islands.

A catamaran with two 5-ft-diameter by 35-ft-long hulls supports the minitat and carries extra gas bottles.

In operation the catamaran is towed to the site and the hulls are flooded in order to lower the entire assembly. At the conclusion of an experiment water is blown from the hulls to permit the assembly to float to the surface.

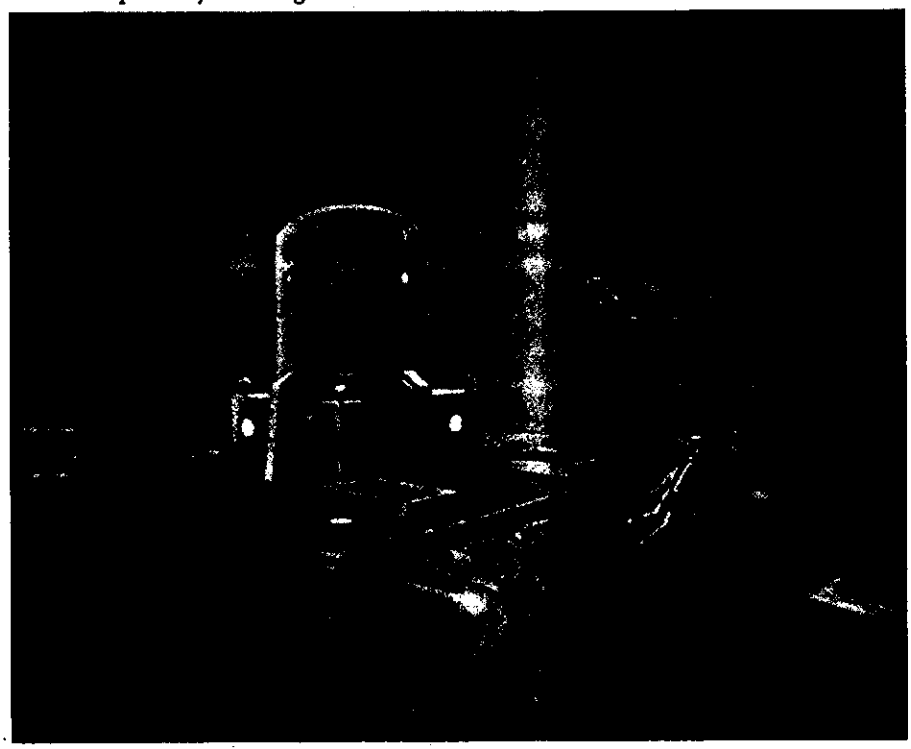
The minitat main chamber is detachable from the catamaran so that decompression can be accomplished on land or on board a support ship.

The five-man habitat consists of two interconnected vertical cylinders 18.1 ft high and 12.5 ft in diameter mounted on a base structure. Each of the cylinders contains two compartments, one housing the crew and the bridge or control room and the other houses the engine room and a wet room. It also supports a 2-ft-diameter cupola mounted on top of the cylinder for additional observation purposes.

Interior Secretary Walter J. Hickel presided at a press conference in Washington recently in which plans and objectives of Tektite were spelled out by officials involved in the program.

Hickel said Tektite II is an important project but that it is just a small start in the federal government's marine science program planned for the next 10 years.

He ventured the prediction that by the year 2000 a great amount of the food and minerals the nation's huge population will be consuming will come from the oceans.



SCIENTIST-AQUANAUT prepares for an extended stay away from Tektite habitat in the waters off the U.S. Virgin Islands. Underwater geologic studies will be an important part of the Tektite II program.

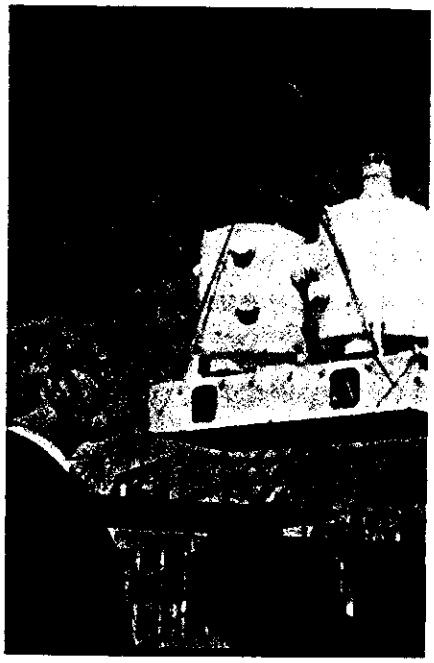
Objectives

The objectives of Tektite II, as spelled out at the press conference, include these:

► To accelerate the development of ocean science and technology and provide impetus for a national man-in-the-sea program.

TEKTITE II 'MINITAT' will serve as home and laboratory for seven two-man crews at a depth of 100 ft for two weeks south of Great Lameshur Bay.

PROGRAM MANAGER. Dr. James W. Miller, U.S. Department of Interior, will be program manager for Tektite II.



BOUND FOR VIRGIN ISLANDS. Edward F. Batutis, atmosphere chemist who will be the habitat engineer on the first mission, watches as the habitat is loaded aboard the "USS Plymouth Rock" in the Philadelphia Naval Shipyard.

► To expand upon Tektite I successes by implementing a broad scientific program involving more than 60 diving scientists in all marine disciplines.

► To train these diving scientists, now limited to short bounce dives, in saturation techniques to permit direct and time-dependent research.

► To amplify and extend the Tektite I behavioral program and further develop crew selections and performance criteria for manned undersea and space missions.

► To conduct biomedical studies and operational procedures necessary to extend saturated nitrogen diving to 100 ft.

► To evaluate new diving equipment for marine undersea research, such as the closed-cycle rebreathers and swimming propulsion gear described earlier.

Some observers felt that last year's Tektite I program was somewhat thrown together without a great deal of advance planning of details or determination of objectives. Tektite II seems to be off to a little better start, although the involvement of so many agencies apparently has led to some confusion and uncertainties.

For instance, it was first announced that the makeup of the five-woman crew had not been finally determined and, therefore, that the names could not be provided. Later in the conference it was decided to supply the names. Their 14-day mission will be in July.

Similarly, there were other indications that the "committee approach," involving the various agencies, had left some questions unsettled up to that point—about a month before the first dive was scheduled.

Even so, there was a great deal of interest and enthusiasm in evidence, suggesting that the agencies are hopeful that Tektite II will be an important step forward for the man-in-the-sea program.

Although the missions are primarily scientific, there will be some applied science and practical aspects, too.

For example, one objective of the first of the 17 missions is to study the behavior of fish and to experiment with various types of gear, including fish traps, to seek ways of improving the catch of fish.

Perhaps the venture will not attract nearly the attention the space shots draw, but it may very well help attract more attention to the nation's marine science program and thereby create support for a bigger and broader program in the decade ahead. ■