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U. S. NAVAL TECHNICAL MISSION TO JAPAN
CARE OF FLEET POST OFFICE
SAN FRANCISCO, CALIFORNIA


31 January 1946

RESTRICTED

From: Chief, Naval Technical Mission to Japan.
To : Chief of Naval Operations.
Subject: Target Report - The FUKURYU Special Harbor Defense
and Underwater Attack Unit - Tokyo Bay.
Reference: (a)"Intelligence Targets Japan" (DNI) of 4 Sept. 1945.

1. Subject report, dealing with Target S-91(N) of Fascicle S-1 of reference (a), is submitted herewith.

2. The investigation of the target and the target report were accomplished by Comdr. M.H. Pryor, USNR, assisted by Lieut. K.C. Lamott, USNR, and Lt.(jg) P.S. Gilman, USNR, interpreters and translators.


C. G. GRIMES
Captain, USN

30681

RESTRICTED

S-91(N)

**THE FUKURYU SPECIAL HARBOR DEFENSE
AND UNDERWATER ATTACK UNIT
TOKYO BAY**

**"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945
FACILE S-1, TARGET S-91(N)**

JANUARY 1946

U.S. NAVAL TECHNICAL MISSION TO JAPAN

SUMMARY

SHIP AND RELATED TARGETS

THE FUKURYU SPECIAL HARBOR DEFENSE AND UNDERWATER ATTACK UNIT - TOKYO BAY

There is no questioning the fact that the Japanese have developed self-contained diving equipment that will enable a man to work under water over eight hours in depths up to eight meters. This equipment appears to embody no new or novel idea but is merely the combination of proven elements. However, it is not known that any self-contained equipment now used in the United States permits anything near this length of continuous submersion. Further, an examination of this Japanese equipment indicates its rather crude construction and suggests that further refinements would increase the scope and flexibility of the gear.

The effectiveness of underwater combatant troops has not been demonstrated. Their operation in a medium which has such a high capacity for transmitting the effect of explosion presents an obvious hazard. The development of proven data (if not already available) as to safe distances underwater under varying conditions seems to be indicated. The Japanese were quite aware of this hazard and were doing all they could to decrease it. They were particularly afraid of a high concentration of small bombs dropped from aircraft. They were counting heavily on the element of surprise in the use of underwater combat troops.

The existence of fixed underwater torpedo installations in the hulk of sunken merchant vessels has not been absolutely established. However, enough data has been developed to indicate the possible nature of such an installation and, hence, the actual proof of their existence is not considered vital.

There are only a few technical questions unanswered in such an underwater installation. The self-contained diving equipment explained herein makes access and exit thoroughly feasible. It appears quite reasonable that men could exist for substantial periods in watertight compartments as is now done in submarines. The problem of generation of electricity or its necessity in such an installation is at present unanswered. The answers to most of the other questions appear self-evident.

It is considered that the possibility of the above methods of offense and defense deserves consideration in any future plans.

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REFERENCES

Location of Target:

Entrance to TOKYO Bay - See Enclosure (G).

Japanese Personnel who Assisted in Investigation:

Tsunekito ISEKI, a medical student at Keio University, volunteered the first information on this subject and was most cooperative throughout. He was assured that he would be protected in this co-operation and every effort was taken to fulfill the assurance.

Japanese Personnel Interviewed:

Comdr. Goro MATSUEDA, Minesweeping Department, Navy Ministry, TOKYO.

Capt. K. SHINTANI, at end of war CO 71st TOTSUGEKITAI (ARASHI) or Special Attack Unit at YOKOSUKA.

Lt. Comdr. Fumio MIZUNO, Navy Civil Engineer at YOKOSUKA.

Rear Adm. Sueso OBAYASHI, (line officer) at end of war CO Surface Vessel Special Attack Unit at YOKOSUKA.

Capt. Yoshikata HIRAOKA, in charge of minesweeping at KURIHAMA.

Warrant K. TAKAHASHI, diving instructor at FUKURYU school, KURIHAMA.

Lieut. Masayuki SASANO, in charge of experimental unit FUKURYU development at KURIHAMA.

LIST OF ENCLOSURES

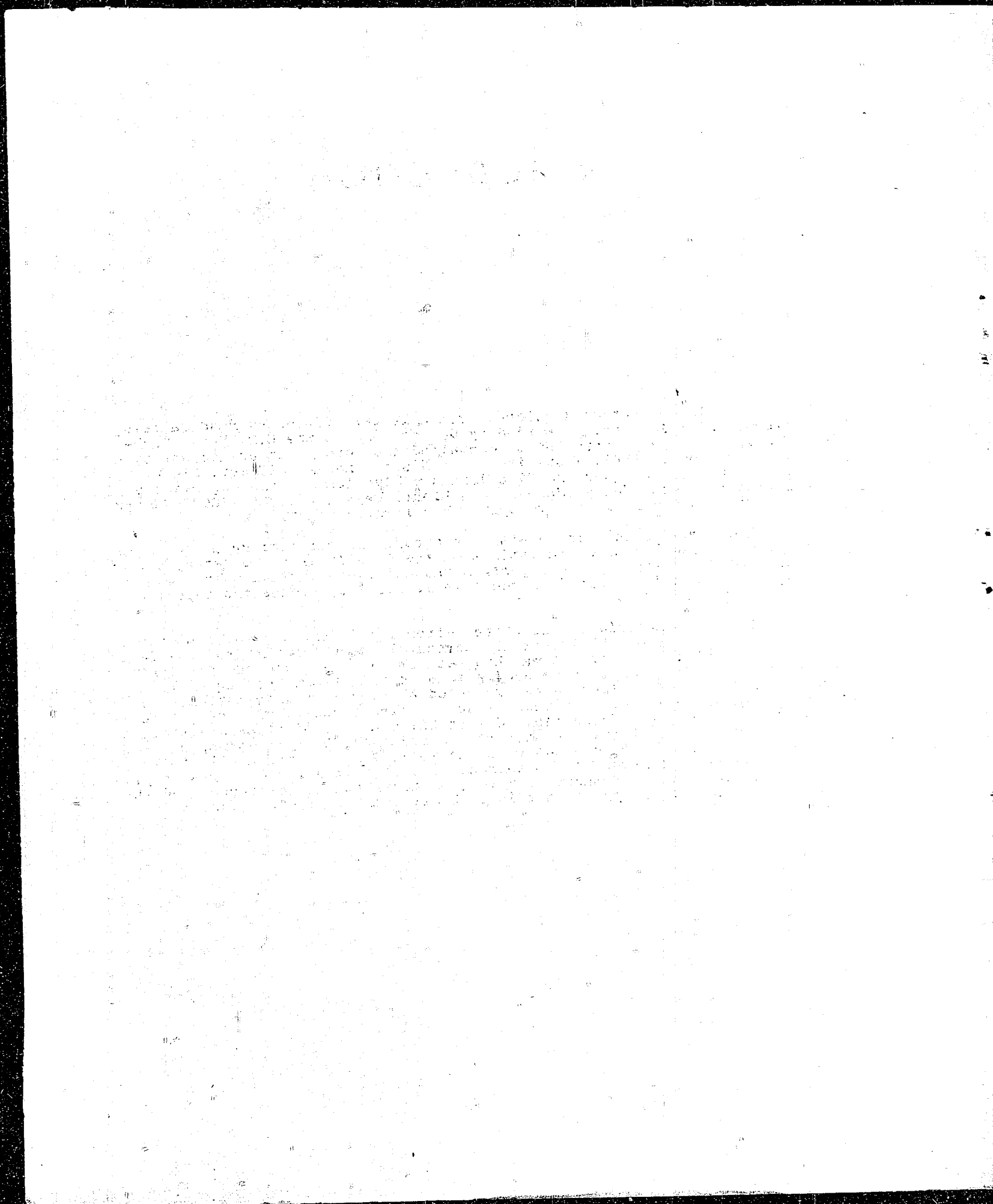
- (A) Front View of FUKURYU Diving Equipment.
- (B) Back View of FUKURYU Diving Equipment.
- (C) Diagram of FUKURYU Self-Contained Diving Equipment.
- (D) Diagram of Attack Mine, Type 5.
- (E) Schematic Diagram of Proposed FUKURYU Installation in Sunk Cargo Vessel.
- (F) List of FUKURYU Diving Equipment Shipped to U.S.
- (G) Chart of TOKYO Bay.

INTRODUCTION

This investigation developed from a letter written by Headquarters, 97th Infantry Division, and forwarded by G-2 of SCAP to the U.S. Naval Technical Mission to Japan. This letter contained the details of an account by a young student, named ISEKI, Tsunekito, to a Nisei language officer, Lieut. TANAKA, attached to Headquarters 97th Infantry Division, of the experiences of his war-time roommate, Ensign SAKURAI. A Lieut. Payne, Co. "M", 386 Infantry Division, was instrumental in developing this first contact.

The above account deals with the special harbor defense phase of the problem, but in the course of investigation the details of the underwater attack units were developed. The report on the underwater attack unit, or FUKURYU, is presented in Part I, since this logically precedes the report on the special harbor defense.

It was emphasized in the above letter and in the several subsequent direct interrogations of ISEKI that all personnel connected with the special harbor defense at the end of the war had been sworn to secrecy and cautioned to give misleading information regarding this installation. Consequently, ISEKI urgently requested that he be protected as source of information. Every effort was taken to do so. For this reason, a direct questioning of Ensign SAKURAI was avoided, but ISEKI visited with him a number of times and brought back additional information. An attempt was made to obtain the names of other persons who had had direct contact with the special harbor defense installations but, while last names were obtained, lack of initials and addresses prevented an interrogation of them. However, as developed in the report and the summary it is not considered that this lack was fatal to the conclusions reached.



THE REPORT

Part I - UNDERWATER ATTACK UNIT

The FUKURYU, or underwater attack units, grew out of the decision made in 1944 at the anti-submarine school that an American invasion of the homeland was to be expected within a year. It was proposed to find more effective methods of defending the beaches from landings than the use of swimmers equipped with explosives. Considerable research and development was undertaken but not until February 1945 was real pressure applied to find a cheap and effective anti-landing craft weapon suitable for mass production.

It was pointed out by Capt. SHINTANI, a former destroyer commander, who since April 1945 was in charge of development of underwater attack warfare, that for a considerable period the FUKURYU project was entirely sponsored by the YOKOSUKA District. Apparently, as our landing on the homeland became more imminent, interest in this project increased. The Navy Ministry became greatly interested and the tempo was constantly accelerating. The final program hinged around the use of the two chief products of the development program: the self-contained diving suit and the Attack Mine, Type 5.

The self-contained diving suit (see Enclosures A, B, and C) was equipped with two tanks, each holding 3.5 liters of compressed, pure oxygen. The chemical air purification device was similar to that used in submarines. A liquid food was developed, to be used by the diver by means of a rubber tube. An effective working depth of 15 meters was determined. It was found that the diver could ascend and descend at will from a depth of 10 meters but, when coming from a 15 meter depth, it was necessary to pause about two minutes at the 10 meter depth to prevent "bends". It was reported that after a short training period a man could easily maintain any desired depth, could move along the bottom at 2,000 meters per hour, and readily manage torpedoes and mines. It was planned to develop the equipment so that men could remain under water for 15 hours. Progress was made by increasing the size of the air purification unit. Thus, men could enter the water in the morning while dark and stay until dark in the evening. By the end of the war, men were able to stay under water over eight hours.

The Type 5 Attack (Suicide) Mine was essentially a charge of explosive mounted on a stick equipped with a contact fuse (see Enclosure D). Immediately behind the charge was a floating chamber. The weapon could be balanced so that it was readily handled underwater. Its use was simple. The diver rammed the front end against the bottom or side of a boat. He was, of course, destroyed. Hence, the FUKURYU were the underwater equivalent of the KAMIKAZE. Overall length of the mine was 3.3 meters. The charge and floating chamber were .56 meters. The "horn" attached to the fuse extended about .12 meters. The remainder consisted of the stick. This weapon was adopted as it was easy to carry, enabled a man to work deep enough to avoid air detection, and was relatively simple to produce. Computations indicated that a charge of 20 kg of TNT or TNA would be safe to another man at a 40 meter distance. Based upon tests made upon a target boat of double-bottomed construction, it was decided that a 10 kg charge would accomplish the desired result and the production run was ordered with a 10 kg charge.

The 40 meter interval for safety was derived by computation and it was planned to use an interval of 60 meters to be safe. However, this latter figure was subject to question in some quarters. Until definite experience was developed, the question was settled by decreasing the charge to 10 kg and by continuing experiments with rockets and torpedoes instead of "stick mines". Time did not allow any conclusive results. When asked why the matter of

spacing was so important since, if one man was to die with a charge, why not two, it was explained that from a morale standpoint, while a man was willing to die when he himself made the charge, he was not willing to die as a "by-product" of another man's charge.

In the early stages, the FUKURYU personnel were all volunteers recruited from air corps trainees. Later, conscription was introduced. At the end of the war the force was about evenly divided between volunteers and draftees.

As would be imagined, production difficulties were acute. On 7 May 1945, 1,000 diving suits were authorized. By 15 August most of these had just been completed. A few had been produced earlier for use in training. This quantity was increased to 8,000, scheduled for 30 September. 10,000 of the Type 5 Attack Mines were ordered, but by 15 August none had been completely assembled. Training was done with 400 dummy mines, of which 20 were rigged to show the diver when he had made a target contact.

It was planned to have a total of 6,000 men in this branch by 30 September and to be completely ready for combat on 15 October.

The organization was as follows:

- 6 men - 1 squad
- 5 squads - 1 platoon (1 leader and 3 runners, total 34)
- 5 platoons plus 1 maintenance platoon - 1 company
- 3 companies - 1 battalion (approximately 650 total)

The 71st ARASHI stationed at YOKOSUKA was to consist of two trained battalions plus four in training. At the end of the war there were 4,000 men there of whom 1,200 were trained.

The 81st ARASHI at KURE was planned for 1,000 men to be built around 250 trained by the 71st. The KAWATANA unit at SASEBO was similarly planned for 1,000 men. On 30 July there were only 60 diving suits each at KURE and SASEBO and 450 at YOKOSUKA.

The overall anti-landing defense for sloping beaches was planned as follows: Outboard in water from 10 to 15 meters would be a row of mines anchored to the bottom and resting there until released by a trip rope operated from a distance. These mines were to be laid by the FUKURYU divers and later released by them from their positions. Next would come three rows of FUKURYU armed with their suicide mines. The rows were to be 50 meters apart and the men were to stand 60 meters apart, but so staggered that there would be a man every 20 meters. These men were to operate at a depth of 4-6 meters. Further inboard would be a row of magnetic mines in three meters, and last would be numerous beach mines in 1 meter of water.

It was discovered that the divers could communicate for a distance of two to five meters by using their breathing units as megaphones. Beyond that range communication was by means of hitting together pieces of metal. This was effective in excess of 300 meters. The men were all equipped with flashlights and wrist compasses. Platoon leaders had special periscopes.

Plans were made to construct underwater positions holding six to 18 men. It was intended to build these ashore of reinforced concrete in a variety of shapes to minimize risk of detection and then sink them in depths of not over 15 meters. They were to be equipped with a transfer compartment and a living compartment. Construction was scheduled for August. One proposed plan to utilize inoperative cargo vessels for this purpose is shown in Enclosure (E). Experiments were also conducted with underwater "fox holes". These were sections of large concrete pipe equipped with steel doors. Preliminary tests with dogs indicated that they were quite effective in diminishing the effects of explosions in water.

It was planned, where the shoreline made it possible, to construct underwater entrances, thus making it unnecessary for the men to stay submerged from dark to dark. Construction difficulties made this almost impossible except along high, sharp shore lines. The element of surprise was apparently considered of great importance. Capt. SHINTANI said that it was felt that, if discovered by enemy forces, counter measures would be taken that would greatly decrease the effectiveness of the FUKURYU. He thought such counter measures might best consist of many small bombs dropped from planes. He pointed out the danger to the diver from both the shorts dropped by American ship batteries and those from the Japanese land batteries.

Capt. SHINTANI stated that as the war progressed, the FUKURYU program was regarded more and more highly by the Navy Ministry. It was recognized that planes and suicide boats were few and their effectiveness was decreased by our policy of using numerous small craft in landing. At one time it was planned to use 40,000 men in this work, but Capt. SHINTANI revised this to 6,000, owing to the many difficulties of supply and training. SHINTANI admitted that this program was pretty much of a last ditch defense and did not believe that in itself it would be conclusive but felt that his "underwater guerillas" might be a considerable nuisance to any landing we might have attempted.

It is interesting to note that each diver was given an ensign to wear, placing him in the same category as a combatant ship. The idea was to bolster morale on the theory that each man was taking the place of a ship which had been put out of the fight.

Lt. SASANO, who was in charge of the development group, stated that in mid-July he had stayed under water continuously for eight hours and 25 minutes in water three to eight meters deep. No ill effects were noticed except the immediate extreme fatigue. This was the record of the group and was accomplished by doubling the size of the chemical air purifier. During this period he was walking most of the time. He stated that 15 meters was considered the maximum safe depth, but that it was expected to increase this to 35 meters.

A complete set of the subject diving gear was shipped to the Ordnance Investigation Laboratory, Indianhead, Maryland, for forwarding to the Bureau of Ships. A list of the individual items is shown in Enclosure (F).

* * * * *

Part II - SPECIAL HARBOR DEFENSE

According to ISEKI, his war-time roommate Ensign SAKURAI was in charge of one shift manning three fixed underwater torpedo positions in the entrance to TOKYO Bay. These positions consisted of water-tight compartments built into non-operative merchant vessels which were then sunk in position. The details were given as follows:

Construction: Water-tight compartments were constructed on non-operative merchant vessels of approximately 5,000 tons at either YOKOSUKA or YOKOHAMA. The entire construction and armament work was done on the surface and, when completed, the ships were towed to the point where the under-water position were to be installed and sunk there by blasting holes in other compartments of the ship. The construction consisted of three separate compartments: water chamber, living quarters and torpedo room. Men were taken out in boats to the location of the pillboxes and dropped into the water in diving suits. Entrance was made into the water chamber, after which the watertight door was closed and the water pumped out. After the water was pumped out, the men removed their clothes and entered the other compartments. The floor space of the entire pillbox was approximately 1440 square feet. (It should be noted that this description has much in common with the proposed "living quarters" shown in Enclosure E).

Armament: Three traversable torpedo tubes and a sound detector.

Capacity: Accommodations for 40-50 men.

Supplies: All food supplies were canned and were dropped upon the rotation of men every ten days.

Communications: No communication was established with the surface. Communication between pillboxes was accomplished by tapping out Morse code signals on the wall of the compartment, the sound carrying through the water to the other pillboxes.

Location: Three pillboxes were installed at the mouth of TOKYO Bay at three shallow points (20 meters depth) in the water between MISAKI and SUNOZAKI. It was reported that there were also such installations along the beach of KIJUKURIHAMA and KAJIMAGAURA, which were also under the command of the Yokosuka Naval Base; however, further details are not known. The 71st ARASHI Force was responsible for the underwater defenses in the TOKYO area. The MAIZURU and KURE naval bases are known to have established similar installations in their sectors.

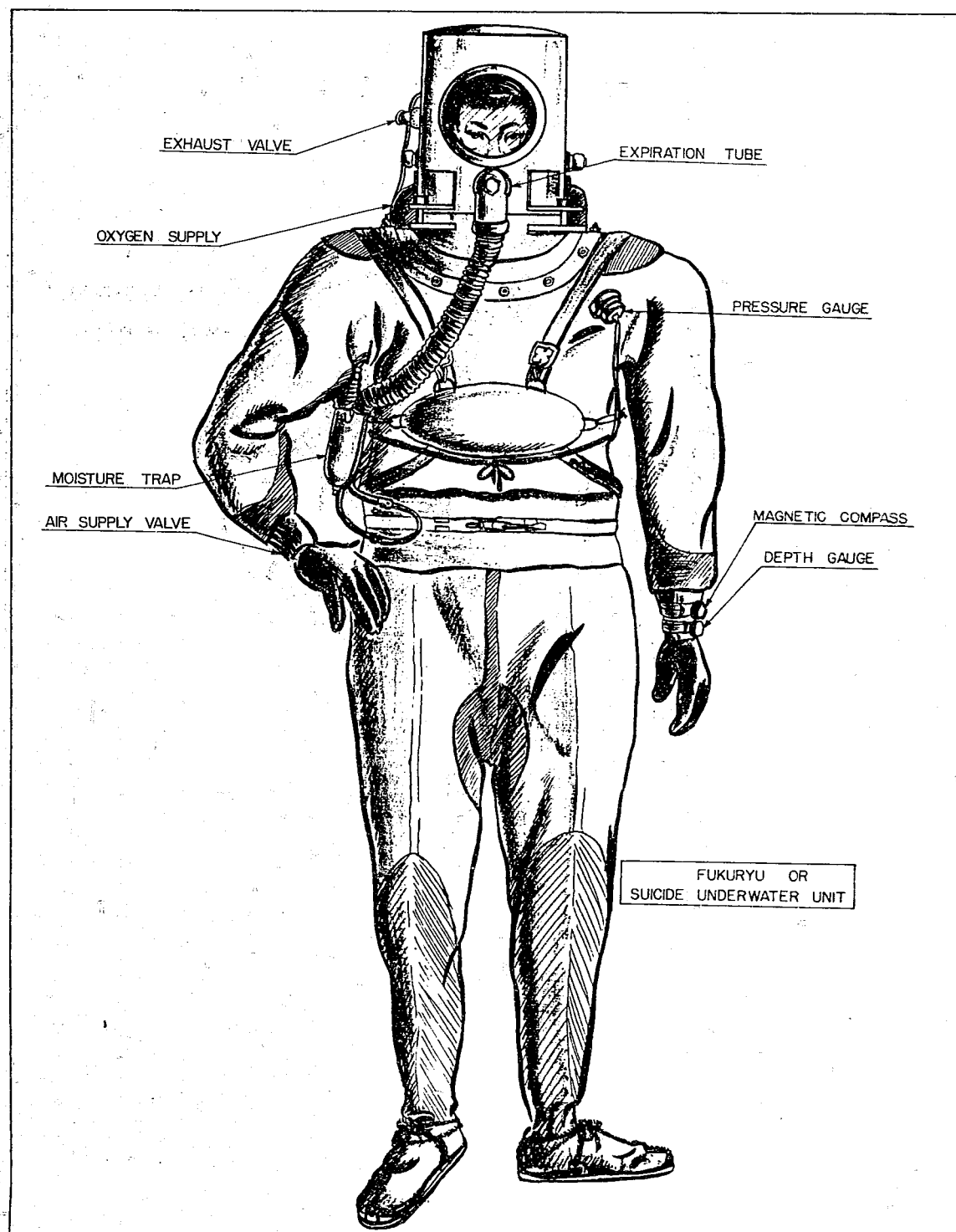
It was reported that the TOKYO Bay installation was under the command of Captain SHINTANI, C.O. 71st ARASHI Force. Captain SHINTANI, on 10 December 1945, flatly denied under interrogation that any under-water defense installations had been built by the Navy. He stated that plans included the use of inoperative vessels, but that none had been put into use. Rear Adm. OBAYASHI, on 24 December 1945, also denied under interrogation any knowledge of underwater torpedo positions and stated that he would have known had there been any in TOKYO Bay. However, it was pointed out in the first contact that upon demobilization all personnel connected with these installations were instructed to give false information if ever questioned by U.S. authorities.

Since the information as to location was fairly specific, it was decided to search the area with echo-ranging devices. In cooperation with the U.S. FIFTH Fleet, a sweep was made by PC 1137 on 31 December and by DD 706 on 3 January. In both cases positive results were obtained in the area considered most promising, based on the available information. PC 1137 was equipped with Sonar and a non-recording Fathometer. One contact was made in the suspected area. DD 706 was equipped with a recording Fathometer, a Sonar, as well as more and better trained operators. In addition the sound conditions were said to be excellent at the time of the DD sweep. Four good contacts were established, the difficulty being that they appeared to be in about 180 feet of water, while they were expected in about 100 feet. These four contacts located at 35° 06.5N and 139° 43.75E are shown in Enclosure (G).

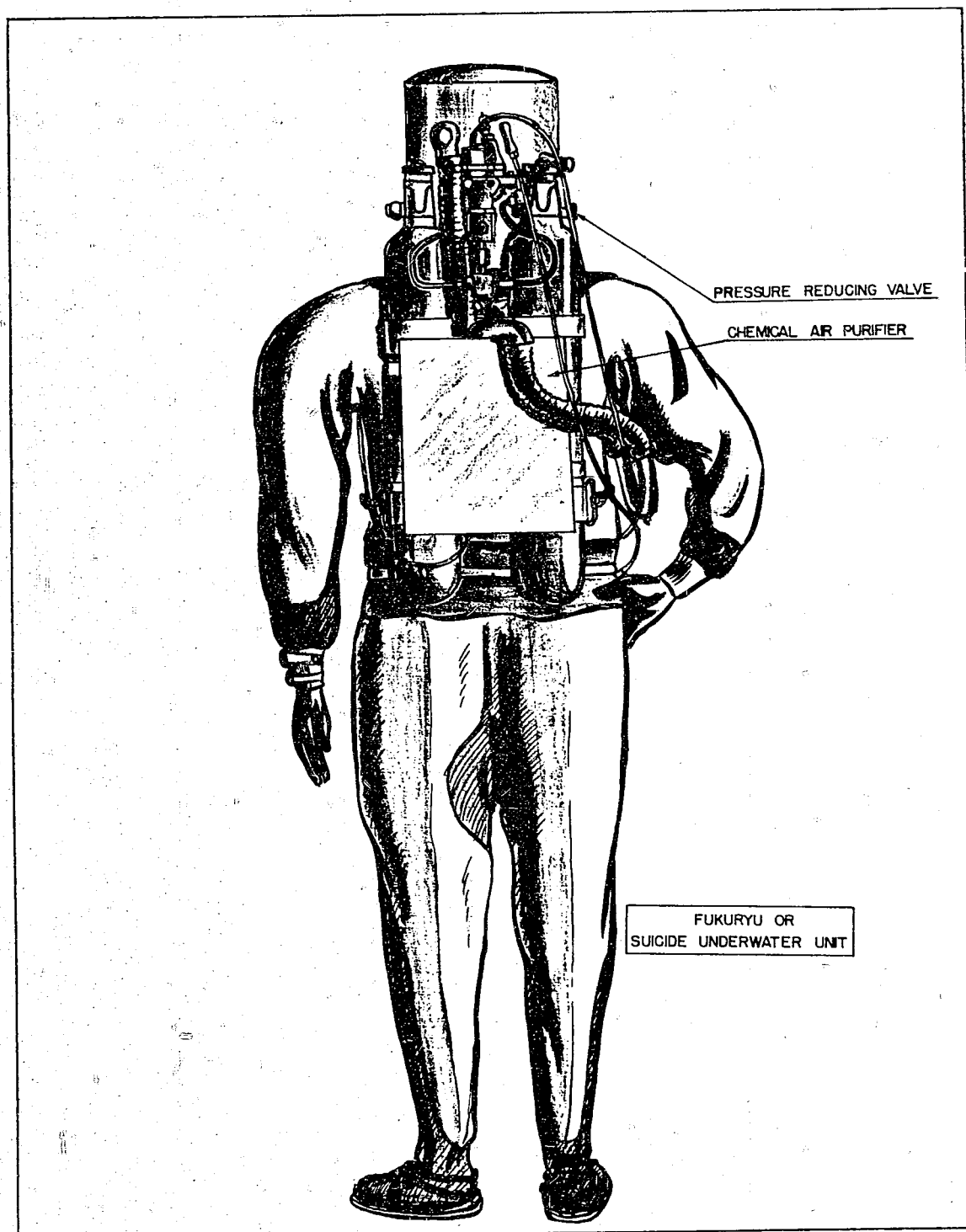
In conference with the NavTechJap Salvage Officer and the Fleet Salvage Officer it was determined that it was inadvisable to send divers down under the known conditions with the diving gear available. Consequently, it could not be determined whether the suspected installations actually existed. But, as pointed out in the Summary, the actual physical existence of the installation is not considered vital. If their existence were proved, a number of Japanese naval officers could be punished for lack of cooperation. But the possibility of such an installation has been proved and hence can be taken into consideration in any future plans.

By separate correspondence it has been recommended that the contacts established as shown in Enclosure (G) be depth-bombed with as large a charge as possible to prevent any possible further exploitation by the Japanese.

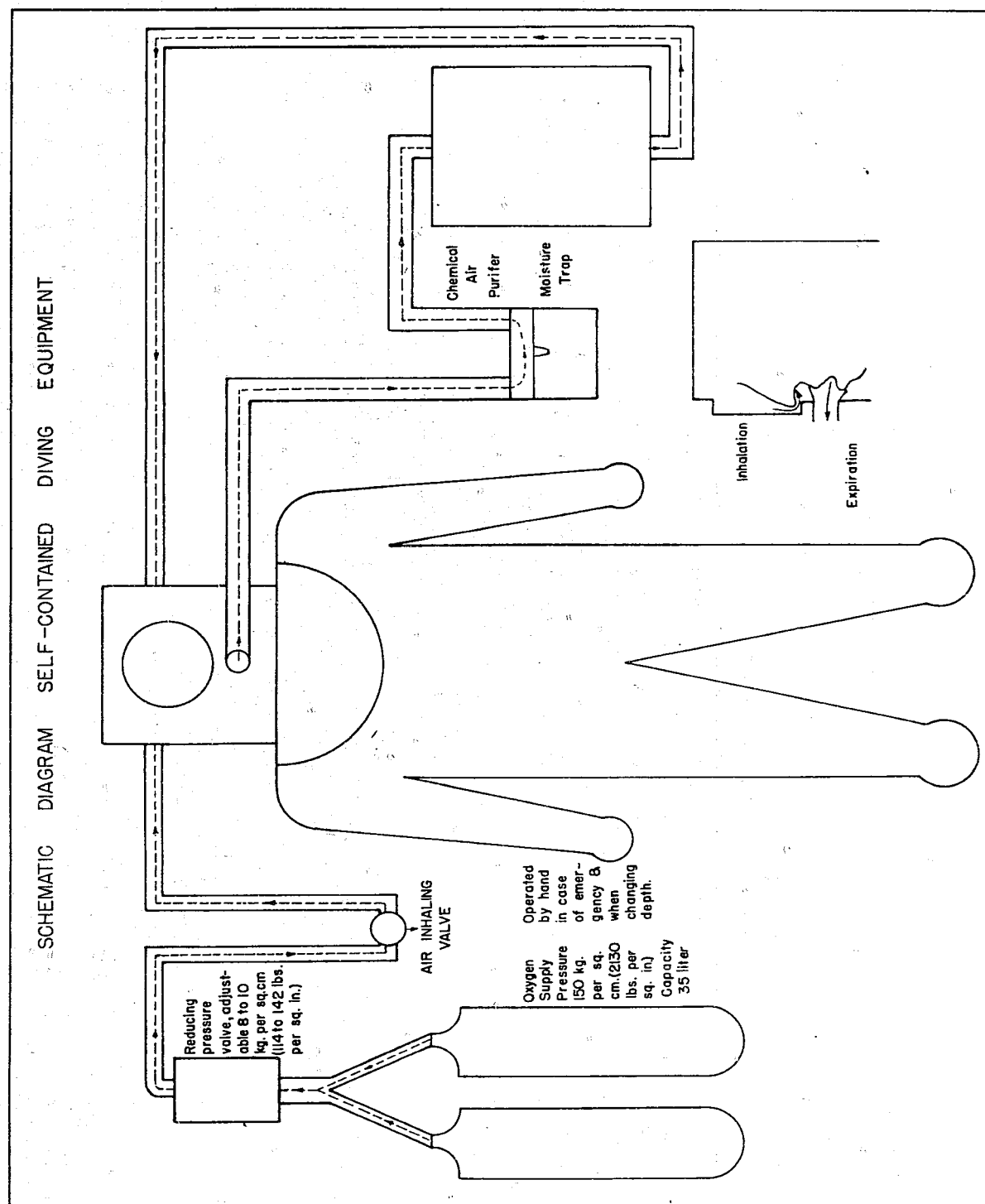
ENCLOSURE (A)



ENCLOSURE (B)

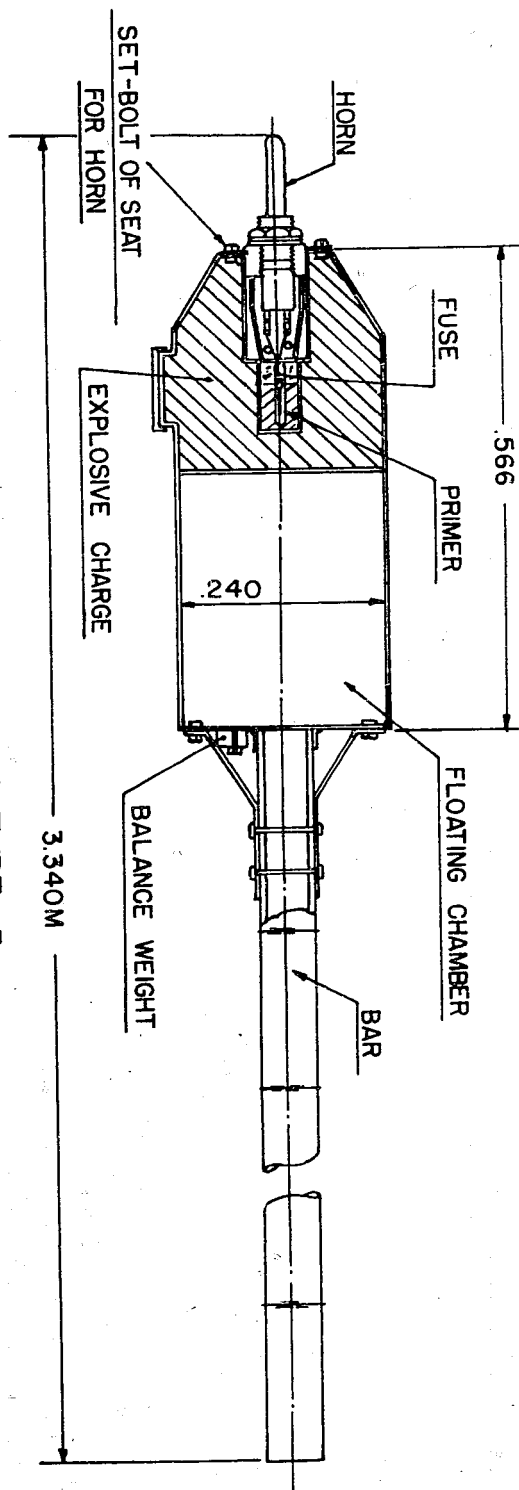


ENCLOSURE (C)



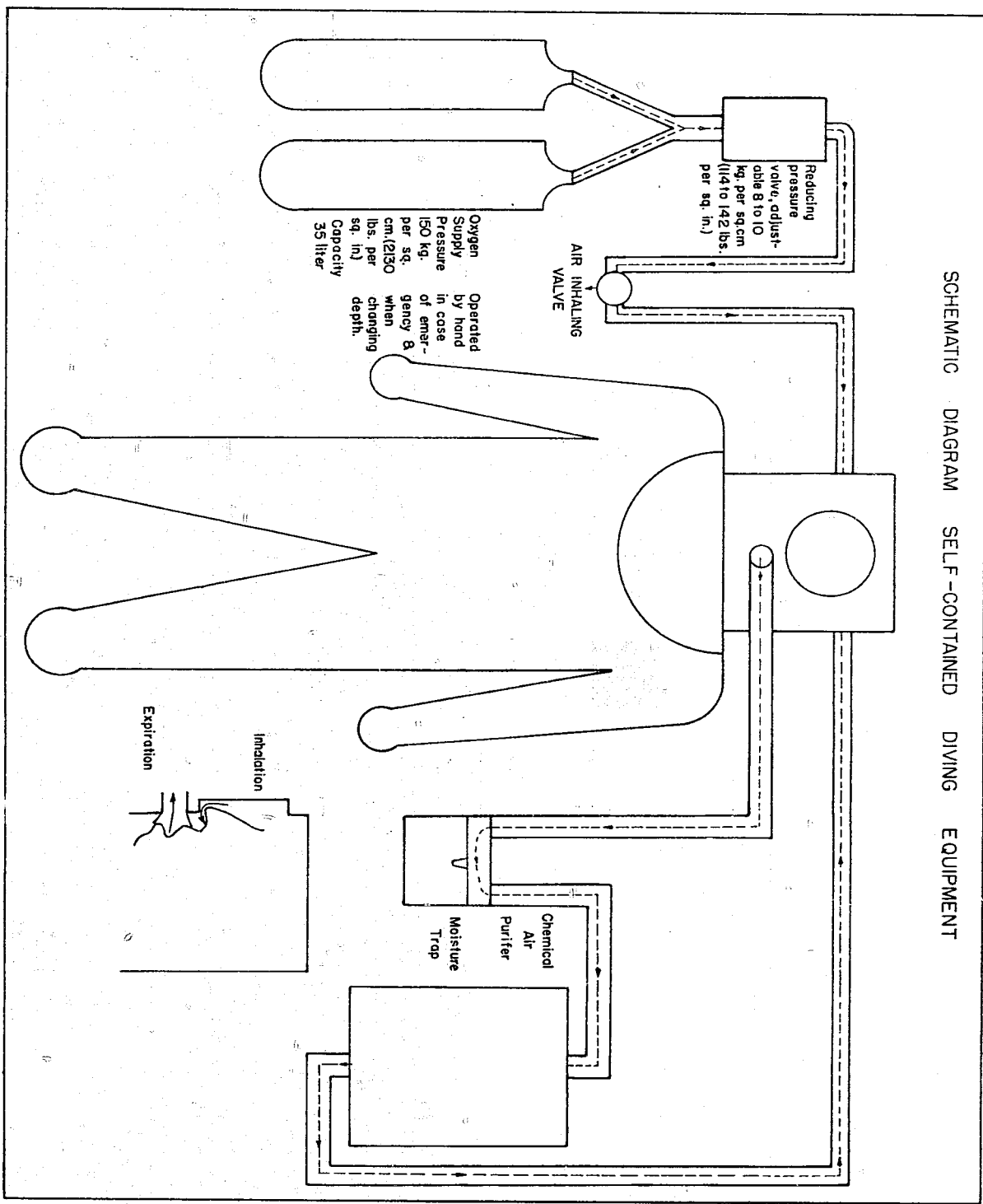
ENCLOSURE (D)

ATTACK MINE TYPE 5
FUKURYU OR SUICIDE UNDERWATER UNIT

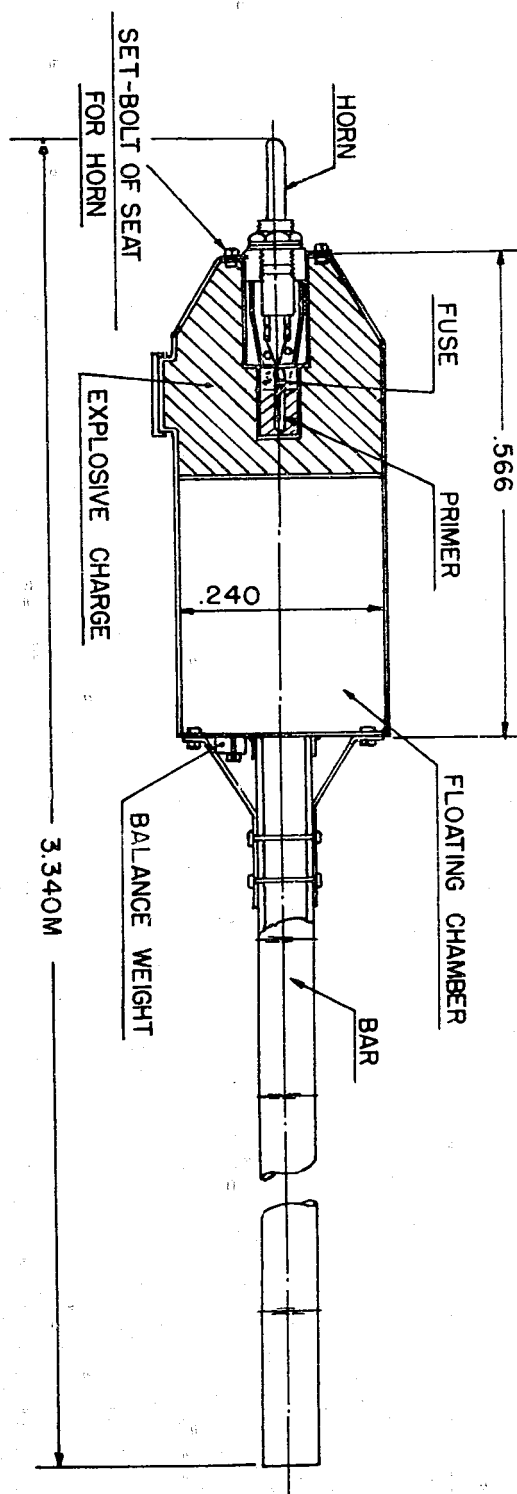


ENCLOSURE (C)

SCHEMATIC DIAGRAM SELF-CONTAINED DIVING EQUIPMENT



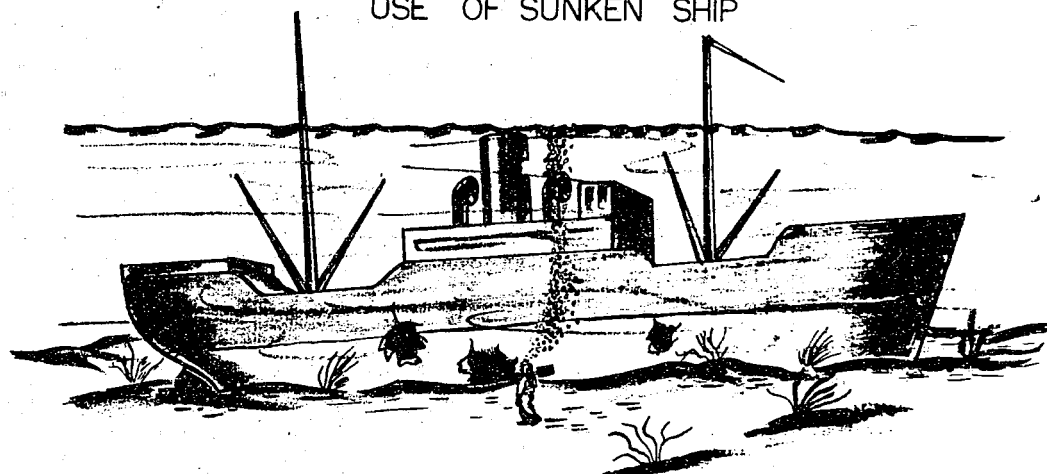
ENCLOSURE (D)



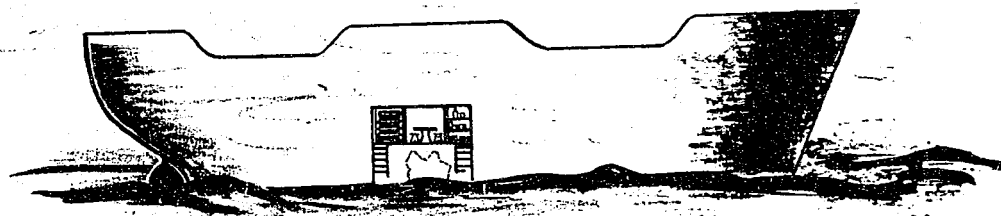
ATTACK MINE TYPE 5
FUKURYU OR SUICIDE UNDERWATER UNIT

ENCLOSURE (E)

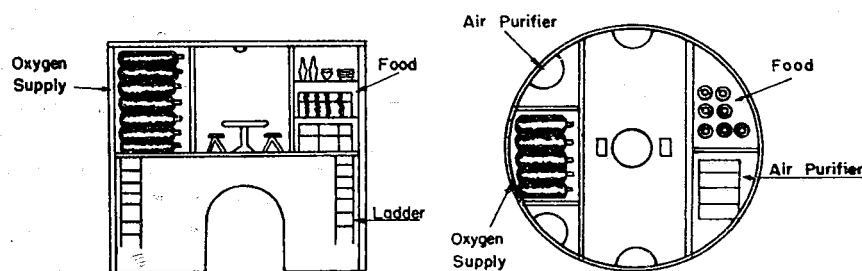
USE OF SUNKEN SHIP



INSTALLATION WITHIN SHIP



Cross Section of Installation Plan of Installation

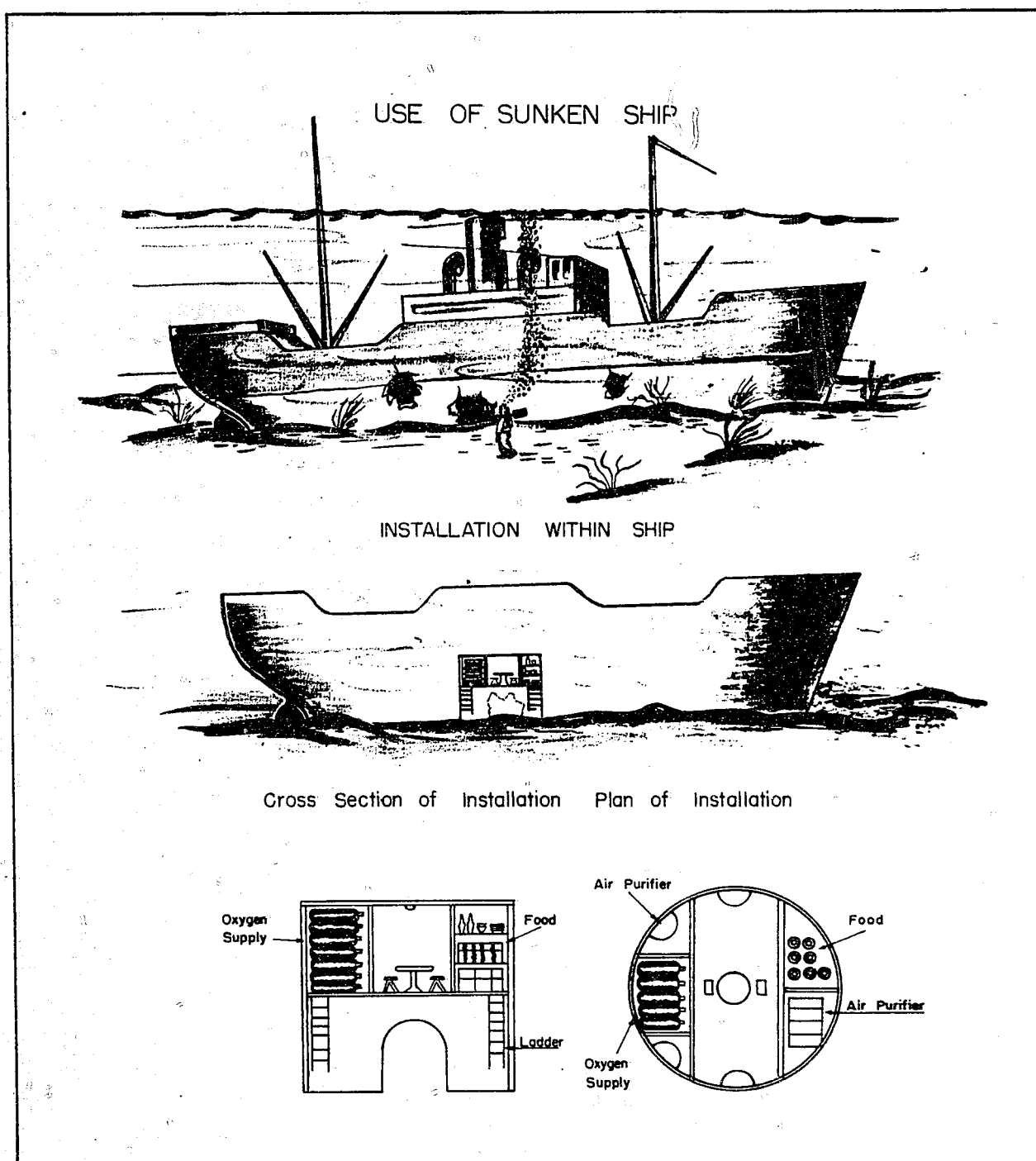


ENCLOSURE (F)

LIST OF ITEMS SHIPPED TO OIL, INDIANHEAD, MD.
FOR FORWARDING TO BUREAU OF SHIPSNavTechJap
Equipment No.Item

JE-50-1135.1	Self-contained diving suit - upper half. Early development.
JE-50-1135.2	Self-contained diving suit - lower half.
JE-50-1135.3	Self-contained diving suit - oxygen supply. Early development.
JE-50-1135.4	Self-contained diving suit - oxygen supply. Improved model with pressure gauge visible to diver.
JE-50-1135.5	Self-contained diving suit - air purifying cannister.
JE-50-1135.6	Self-contained diving suit - air purifying cannister.
JE-50-1135.7	Self-contained diving suit - lead weight.
JE-50-1135.8	Self-contained diving suit - lead weight.
JE-50-1135.9	Self-contained diving suit - oxygen tube (2).
JE-50-1135.10	Self-contained diving suit - spare parts and hand tools.
JE-50-1136	Self-contained diving suit - improved type fabric for suits.

ENCLOSURE (E)



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