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PALOMARES SUMMARY REPORT

#844

PALOMARES SUMMARY REPORT

15 JANUARY 1975

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DEDICATION

WRIGHT HASKELL LANGHAM, PhD.

1911- 1972

"Knowledgeable, eloquent and effective" -- a few of the many descriptive phrases that have been applied to Wright Langham, "Mr. Plutonium." We of the Department of Defense remember Dr. Langham of the Los Alamos Scientific Laboratory as a friend and ready advisor. It is particularly fitting that this summary of the Palomares accident, one of many specific instances of Dr. Langham's valuable assistance to the DOD, be dedicated to his memory. We do so in fond appreciation.

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FOREWORD

The accident which occurred over Palomares, Spain on 17 January 1966 and its subsequent recovery operation attracted worldwide interest. This report is designed as a summary which collects the most pertinent data under one cover.

The authors, in assembling the records and recollections of the period, are certainly aware of the problems of assigning relative worth to historical records. The many decisions which had to be made in preparing this summary were based on the answers to two questions. First, "Did the occurrence impact on the Palomares operation or political situation?", and second, "Might a record of the occurrence aid in the prosecution of a similar operation at some time in the future?" If the answers were affirmative, we have attempted to include the information in this summary.

We are indebted to many individuals and organizations for access to their files and memories. Nine years have passed since the operation, so files and memories were sometimes dusty and sometimes destroyed. To each request for information, however, a positive and sincere attempt was made to satisfy our requirement. For this effort, we express our appreciation.

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SECTION 1

THE ACCIDENT

BACKGROUND:

For some years prior to the Palomares accident, the Strategic Air Command (SAC) had been engaged in Operation Chrome Dome, the use of airborne alert aircraft carrying nuclear armament. This concept generally involved mid-air refueling rendezvous at one or more points during a bomber's lengthy mission (Fig. 1-1). As of January 1966, air refueling operations were supported by the Sixteenth Air Force (16AF) with headquarters at Torrejon Air Base near Madrid. Refueling was accomplished by tanker aircraft stationed at Torrejon AB and Moron AB, further to the south (Fig. 1-2).

COLLISION:

On the morning of 17 January 1966, two Operation Chrome Dome B-52Gs, Tea 12 and Tea 16,* rendezvoused with two KC-135As, Troubadour 12 and Troubadour 14,** in the Saddle Rock refueling area at 31,000 feet. At approximately 0922Z (local time in Spain is Zulu + 1 hour) the boom operator in Troubadour 12, while refueling Tea 12, reported to his pilot that he had observed fireballs and what appeared to be a center wing section in a flat spin. This report of disaster was the first of many dealing with the accident and its aftermath. Tea 16 and Troubadour 14 had collided while engaged in the final stages of hookup for refueling. Other aircraft, on other days, and at other places had collided in mid-air. Tea 16, however, was carrying four nuclear weapons. The events summarized in this report were the direct result of that aircraft accident involving nuclear weapons.

The crews of the other B-52 and KC-135 could not immediately determine the source of the falling debris. Troubadour 12 completed the refueling (10-12 minutes) of Tea 12 and then returned to the Palomares area to provide reconnaissance. Attempts to communicate with Troubadour 14 by radio were unsuccessful. Subsequently descending to 4,000 feet, Troubadour 12 sighted unidentifiable burning wreckage and, later, what appeared to be the tail section of a B-52. Other reports reached the Command Post at Moron AB from passing Spanish ships, a British ship, and a civil air liner. The Spanish Guardia Civil (Government Police) began reporting parachute sightings and the status of survivors. When these reports were radioed to Moron AB and passed to Torrejon, the full impact of the accident became apparent.

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* Crews and aircraft assigned to the 51st Bomb Squadron, 68BW, 822 AD, 8AF, SAC and based at Seymour Johnson AFB, North Carolina.

** Aircraft assigned to the 97th AREFS, 97th BW, 42 AD, 2 AF, SAC Crew assigned to 910th AREFS, 340th BW, Bergstrom AFB, Texas, and was on temporary duty at Moron AB.

Figure 1-1 KC-135 Refueling B-52

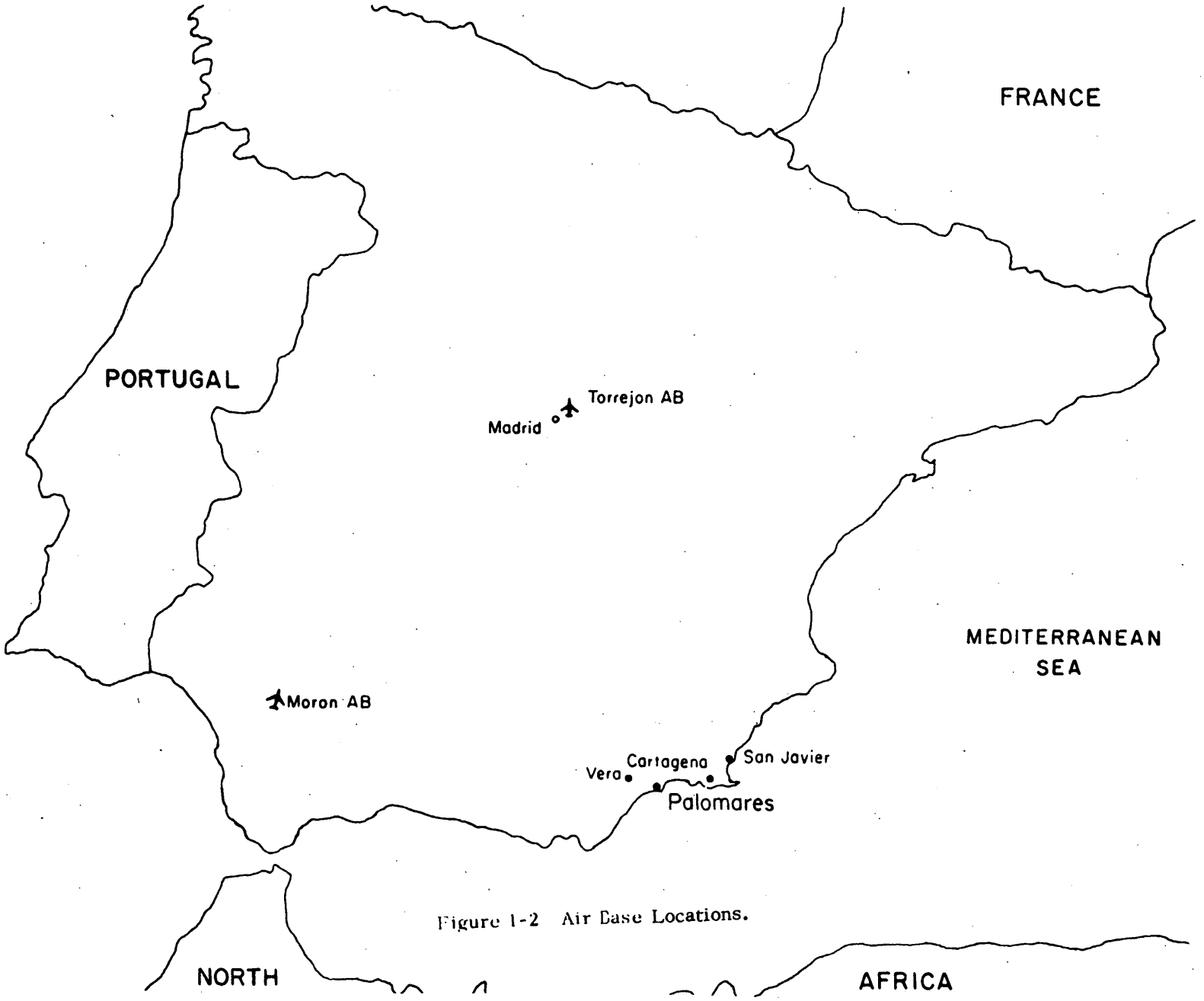

Figure 1-2 Air Base Locations.

Eleven men were involved in the collision, four as crew members of the KC-135 and seven on the B-52.

TABLE 1-1

CREW OF THE COLLIDING AIRCRAFT

Crew of KC-135, #61-273, Troubadour 14
17 January 1966

Name and Grade	Service Number	Position
*Chapla, Emil., Maj	FV803557	Pilot
*Lane, Paul R., Capt	FV3064432	Co-Pilot
*Potolicchio, Lloyd. MSgt	AF32960258	Boom Operator
*Simmons, Leo E.. Capt	FV3104001	Navigator

Crew of B-52, #58-256, Tea 16
17 January 1966

Name and Grade	Service Number	Position
Buchanan, Ivans, Capt	FV3023677	Radar-Navigator
*Glessner, George J., 1/Lt	FV3122847	Electronic Warfare Operator
Messinger, Larry G., Maj	FV764067	Staff Pilot
*Montanus, Stephen S., 1/Lt	FV3139365	Navigator
Rooney, Michael J., 1/Lt	FV3131638	Co-Pilot
*Snyder, Ronald P., TSgt	AF23914516	Gunner
Wendorf, Charles J., Capt	FR66865	Instructor Pilot

*Deceased - did not survive the accident

Of the four survivors, all from the B-52 crew, Captain Buchanan was the only one to come down on land. He was aided by Spanish residents and taken to the Clinic Jacinto Gonzales in Vera,** about 7 kilometers distant. Captain Wendorf and Lieutenant Rooney were picked up by the fishing boat, Dorita.*** Major Messinger was recovered by the fishing boat, Agustin y Rosa.**** Both boats put into Aquilas, a nearby port, where the three survivors were taken to the local hospital and treated. Later that afternoon, they were transferred to San Javier, a Spanish Air Force base about 117 miles up the coast, and from that point were

** In pickup truck of Senor Manuel Gonzales Navarro.
*** Bartolome Roldan Martinez, master
**** Alfonso Orts, master

evacuated to Torrejon. Captain Buchanan, the most seriously injured of the four survivors, was treated at Vera and transferred by civil ambulance to San Javier and evacuated to Torrejon.

As is indicated in Table 1-1, seven of the men were killed as a result of accident. Members of the Spanish Guardia Civil under command of Captain Isidoro Calin took charge at the accident site. Remains were recovered and placed in caskets.* Seven bodies were identified by the afternoon of 18 January with the help of dental and other records. The remains were returned to the United States on 20 January.

INITIAL COMMAND RESPONSE:

The Commander, 16AF, Major General Delmar Wilson, was notified through his command post and passed the report to Major General Donald W. Eisenhart, Hq SAC, at Offutt AFB, Omaha, Nebraska. These notifications set the "Broken Arrow"** response system in motion. The Disaster Control Team from Torrejon was alerted and prepared to travel to the scene. At 1136Z Maj Gen Wilson and three members of his staff*** departed Torrejon by T-39 and surveyed the accident site from the air, landing at San Javier at 1230Z. At 1134Z a C-97 departed Torrejon with 33 members of the Disaster Control Team and three accident investigation personnel and arrived at San Javier at 1240Z. An H-43 from the Torrejon rescue unit and a C-54 carrying jet fuel to support the H-43 were the last aircraft into San Javier on the first day. At 1221Z 17 January, a Disaster Control Team under Maj Gen A. J. Beck, Deputy Chief of Staff, Materiel, SAC, left Omaha arriving at San Javier at 0114Z, 18 January, and at the accident scene at 0630Z.

At 1125Z on the day of the accident, the Joint Nuclear Accident Coordinating Center (JNACC) at Sandia Base (now Kirtland Air Force Base), New Mexico, received word of the accident. JNACC is a joint Department of Defense/Atomic Energy Commission (DOD/AEC) organization charged with coordinating assistance for recovery from nuclear accidents. Its files contain information covering status and capability of DOD and AEC accident response teams throughout the world. In addition it has ready access to the technical capabilities of the atomic community centered in Albuquerque, New Mexico. The Air Force Nuclear Safety Directorate at Kirtland AFB advised JNACC that a team of four of their staff had air transport to Spain and offered space for other response personnel. Representatives of JNACC, Los Alamos Scientific Laboratory**** and Sandia Corporation**** were alerted and departed Albuquerque on the aircraft at 1800Z, 17 January.

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* In the face of tragedy, people-to-people response lightens our load. On the evening of the accident the remains of the victims were brought to the Town Hall of Cuevas del Almanzora, northeast of Palomares. There, among burning candles, services were held by a Spanish priest. Maj Gen Wilson received the remains and they were transported to San Javier and from there, to Torrejon.

** Broken Arrow is the code term used in notifications of nuclear accidents.

*** One of these was an interpreter.

**** Los Alamos Scientific Laboratory and Sandia Corporation are organizations which develop atomic weapons under contract to the USAEC.

As the official contact between USAF and the Government of Spain (GOS), the Joint United States Military Group (JUSMG) was notified of the accident at once. Chief of the JUSMG, Maj Gen Stanley J. Donovan, called on the Spanish Air Minister and on General Augustin Munoz Grandes, Chief of the Spanish General Staff, informing them of the accident, and then proceeded by plane to San Javier.

The United States Embassy in Madrid was notified by the Torrejon Command Post. The Ambassador, Angier Biddle Duke, on being advised, proceeded to the Spanish Foreign Office and reported the available details to the Spanish authorities.

The Spanish-American Agreement in existence then,* defining responsibilities in case of an aircraft accident, provided:

> In case of accident occurring to United States military aircraft or to air carriers which operate under contract to the United States Government, the Spanish and United States authorities will cooperate in the adoption of rescue measures with primary responsibility belonging to the United States authorities. Measures to take charge of and remove the damaged aircraft and its technical equipment are the responsibility of the appropriate United States authorities. Spanish military or police forces shall have primary responsibility for the external security of such damaged aircraft; however, United States military forces, if first on the scene, may assume the responsibility pending the arrival of Spanish military or police forces.

Spanish Guardia Civil personnel were the first government representatives on the scene. They began immediately to secure the area and continued to perform in that and similar capacities for the duration of the recovery operation.

By the evening of the day of the accident, 17 January, 49 U.S. personnel had arrived at Palomares. That number would increase in the days that followed to more than 650 at the accident site. The tone of the recovery operation was set when President Johnson, while breakfasting in his bedroom at the White House, was advised of the accident and that the situation involved four thermonuclear weapons. He phoned the Secretary of Defense, and after checking on the danger of a nuclear detonation, instructed that we should "do everything possible to find them."

PALOMARES:

The village of Palomares lies near the southeastern coast of Spain (Fig. 1-2) in the province of Almeria. It is so small that it is not included on many maps, nor was it included in the census. At the time of the accident, its population was estimated to be approximately 2,000 persons. By American standards Palomares would be considered a poor village, although

*Procedural Agreement No. 14 to the 26 September 1953 Agreements, Operation of Military Aircraft," 12 November 1954

probably somewhat richer than most in Almeria, the forty-ninth of Spain's fifty provinces in per-capita income. The area was once rich in metals, with evidence of mining activity dating from as early as 3500 B.C. It was later settled and its metals extracted to support the far-reaching commerce of the Phoenicians. Metals, however, no longer contribute to the area's economy. The abandoned mine shafts are the only remains of this industry. The presence of these diggings in the area was to play a part in the search for a missing bomb.

Palomares is also sufficiently arid that its only industry, agriculture, must depend on deep well irrigation. Relying on this irrigation, the village had been able to enjoy a modicum of prosperity. Farming the irrigated land produced alfalfa, beans, cotton and two wheat and two tomato crops in 1965. The tomatoes accounted for the village's principal economic input in that year, about $250,000.

Electricity, provided by a local generator, came to Palomares in 1958 and with it, radios and a few television sets. These modern media which were to carry the Palomares story to the world would also involve the people of that barriada (hamlet) in the diplomatic and propaganda maneuverings of the nuclear powers.

The people of Palomares are farmers and farm laborers, but the waters off the Palomares coast were the harvest grounds of many fishermen from nearby ports and villages: Villaricos, Aguilas, and Garrucha. These people, after playing the major part in the rescue of the surviving airmen, were to be excluded from parts of their fishing grounds by the extensive underwater salvage operation which was to follow. (Section III).

One can imagine the response of individuals on the ground to the collision 30,000 feet above them. The refueling operations were not new to the residents of Palomares. Many "hook-ups" had been witnessed on other occasions. This day, however, was to be different. Some saw the collision; others looked up only when they heard the explosion. What all saw was the burning aircraft wreckage falling about their village and farm plots. The B-52 had broken apart at high altitude. The KC-135, however, remaining fairly intact as it plummeted to earth, apparently exploded just before ground contact (1600 ft) and again on contact. Engines, wing sections, gear and other smaller pieces fell about the countryside, in back yards and open fields. The debris pattern on land was spread over several square miles. Father Serraro, a circuit priest from Cuevas del Almanzora who tended to Palomares parishioners, suggested that "the hand of God" had protected the village. Aside from being frightened, no person or animal was injured nor was any structure damaged - other than broken windows and the like.

THE BOMBS:

As the first Americans arrived in Palomares, the priorities of the task before them were fairly obvious. First, there was concern for people, crew members of the aircraft and residents of the village. After Maj Gen Wilson had seen to the condition of the surviving airmen in Aguilas and the remains of the deceased in Cuevas, he was assured by local authorities at Palomares that no injuries had been sustained by the populace. Some members

of the response force had performed initial radiation surveys, predominantly around the areas of major wreckage. These surveys indicated that there had been no nuclear explosion. Somewhere, in the gathering darkness, four nuclear weapons had to be located. There were many stories to be told by the Spaniards who had seen parachutes with projectiles attached, but there were few of the Americans who could understand the language. Just before dark, Sgt Ramond Howe, who had been conducting radiation monitoring of some of the wreckage, learned of a possible weapon from a member of the Guardia Civil. That report led the team to its first find about 900 feet from the beach and southeast of the village (Fig. 1-3). The weapon was only slightly damaged on impact. It apparently had fallen against a soft, high bank and rolled to the bank's base (Fig. 1-4). Radiation checks were negative. The team decided to leave render-safe* procedures until morning as it was now too dark to accomplish the task. Air Force guards were posted at the weapon. The weapons were given numbers in the order in which they were found. The team spirit rose at the relative ease of the Number 1 find and at its good condition.

Darkness and the rugged terrain in another search area a mile west of the village made it necessary to postpone this search until morning.

At first light, the small force gathered at the B-52 tail section which was to be used as a command post (Fig. 1-5). All available personnel were pressed into the search effort. By 0930 hours**, the second weapon was located. Number 2 turned out to be the bomb that had evaded location the previous evening. Unlike Number 1, however, Number 2 had been substantially damaged upon impact. Part of the weapon's high explosive had detonated but as designed, no nuclear detonation had taken place.***

Portions of the weapon were in a crater of about 20-foot diameter and 6 feet in depth. Other parts of the weapon assembly were found as far away as 100 yards. Weapon render-safe procedures were not required here. The primary concern with Number 2 was the plutonium contamination that must have been released by the high explosive detonation. Radiation detection equipment indicated the presence of significant alpha contamination in the area.

At approximately 1030 hours, one hour after Number 2 had been located, Number 3 was discovered within the limits of the village of Palomares. It's high explosive had also detonated but again there had been no nuclear detonation.*** Parts of the weapon were strewn to distances of 500 yards. Plutonium contamination was also present at this site.

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* Render-safe refers to the procedures employed to insure that a weapon's firing system is disarmed.

** Times are local unless indicated otherwise.

*** The term used to describe this required design feature is called one-point safety. It is defined as a probability no greater than one in one million that if a nuclear weapon undergoes detonation on any one point at anyplace in the high explosive system the weapon will not produce a nuclear yield of energy in excess of 4-pounds TNT equivalent.

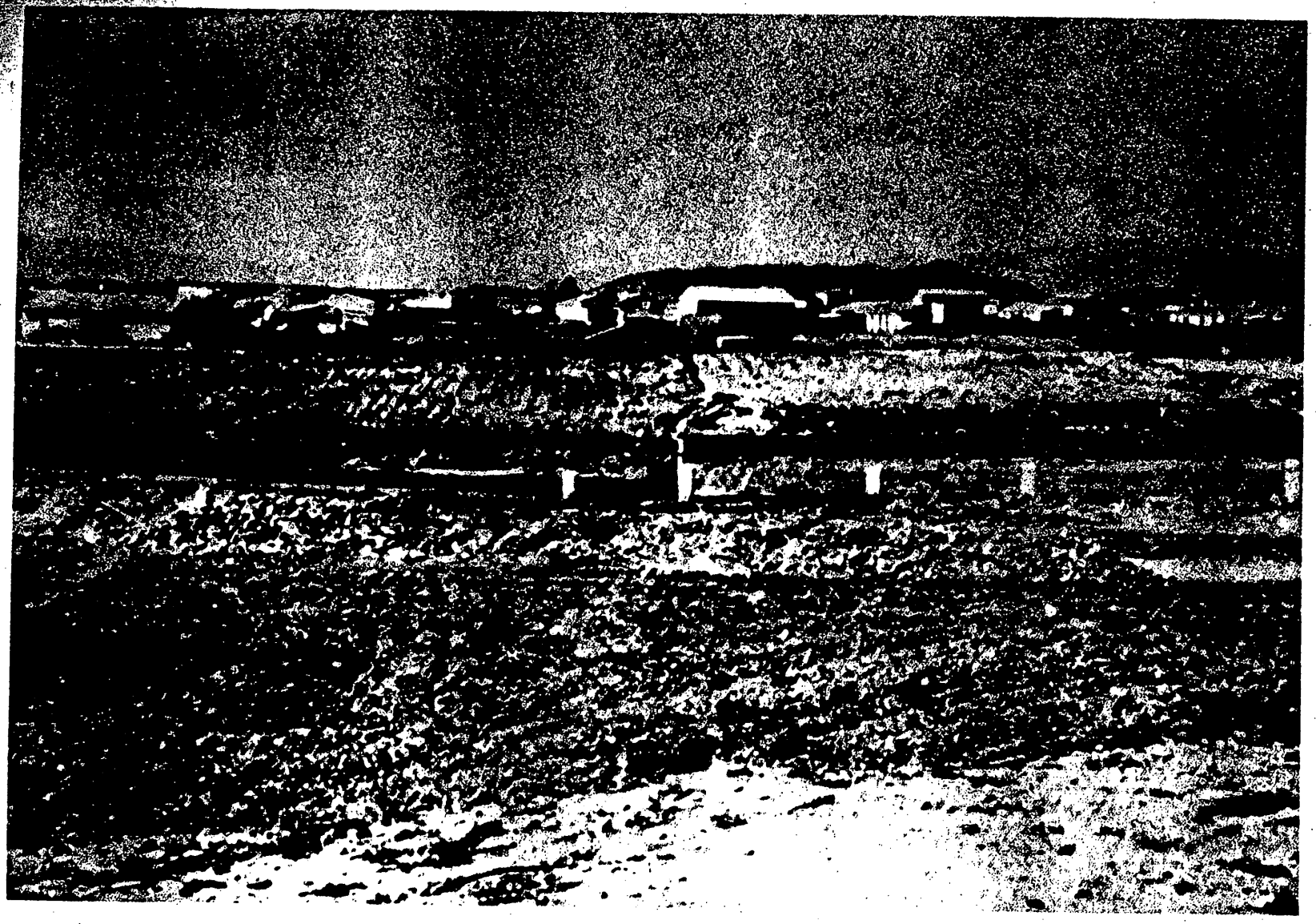

Figure 1-3 Embankment SE of Palomares

Figure 1-4 Weapon at Base of Embankment

Figure 1-5 B-52 Tail Section

Weapon Number 1 was lifted by helicopter and loaded on a truck. Debris from Numbers 2 and 3 were collected by Explosive Ordnance Disposal (EOD) personnel and boxed for shipment. Heavy debris could not be lifted by helicopter at sites 2 and 3 because downdrafts caused by the craft's rotors would have caused spread of contamination. The packaged debris was trucked from Palomares to San Javier and flown to Torrejon on 20 January. There it was repacked, minimizing the opening of the temporary containers. Before the shipment was airlifted to Amarillo, Texas, it was used at Torrejon as a calibration source for an aircraft mounted radiation detection system (Section 2). The shipment left Spain on 30 January 1966.

The location and recovery of weapon Number 4 is covered in Section 3. It suffices here to say that the weapon had fallen offshore with its main parachute deployed. It was not recovered from the sea until 7 April 1966. The weapon was essentially intact and not contaminated. Render-safe procedures were conducted by 16AF personnel on board the recovery vessel.

SAFETY CONSIDERATIONS:

Small as it is, the probability of a nuclear yield in an accident makes nuclear weapon safety the first concern at all levels of military command, including that of the Commander-in-Chief. In response to our national policy with regard to nuclear safety, weapons designers employ a number of means to insure against an unplanned nuclear detonation. In general, weapons are designed so that a positive event or sequence of events peculiar to its planned mode of delivery or attack must occur before a weapon will produce a significant nuclear yield. It is reassuring that the safety engineering that was employed in the weapons was successful in preventing a nuclear explosion at Palomares and it is important to note that there has never been an accidental nuclear explosion involving United States weapons.

SECTION 2

LAND OPERATIONS

Recovery operations subsequent to the accident covered 81 days and involved activities both on land and at sea. The types of operations and methods involved in the two environments are sufficiently different that it seems reasonable to treat land and sea operations in separate parts of this narrative. Where significant interaction between the two operations occurred, it will be noted. Otherwise the reader should remember that the operations proceeded concurrently. (Refer to Section 3 for Sea Operations.)

ESTABLISHING CAMP WILSON:

Though the remaining daylight time was limited when Maj Gen Wilson and the Disaster Control Team arrived at the scene, it was recognized that this would be a major recovery operation. Even before it was known that one weapon would be difficult to locate and recover, the task of cleaning up the debris was such that several weeks could be required. It remained the responsibility of the 16AF Commander to actually coordinate all recovery efforts, to judge what was needed to do specific tasks, and to request the necessary assistance in both personnel and material support.

Not realizing that a pattern was being set that would be followed for some 80 days, the evening of 17 January 1966 was spent in planning the work for the next day. From what had been seen of the wreckage, it was decided to bring personnel in from the two Spanish bases, Moron and Torrejon. Movement started at 0100Z on 18 January from Moron, followed by a second convoy at 0310Z. A total of 126 U.S. personnel were transported in six buses. Accompanying the convoy was an ambulance, and a van and truck carrying bedding, food, water, and radios. From Torrejon the first of the two convoys started at 0137Z, the second at 0202Z, with 175 persons in six buses, and an accompanying ambulance. It soon became apparent that some personnel did not have the necessary gear to participate in such activity, but it was almost impossible for those at Torrejon and Moron to realize the conditions at the accident site. It was a 12- to 14-hour drive to the southern coast, so that the first of the buses arrived about 1300Z, and the last about 1700Z. The first night of their stay meant sleeping any place possible: in buses, on the ground, and a fortunate few in hotels. Meals consisted of in-flight rations which had accompanied the personnel or which were flown in through San Javier. The area used for the camp, and where it remained until the following Friday, was at the impact site of the B-52 tail section (Fig. 1-5).

Tent City:

Tents and related equipment were requisitioned late January from Gray Eagle* stocks at Wheelus Air Base, Tripoli. With this equipment a temporary camp had been established at the dry river bed site by Wednesday, 19 January (Fig. 2-1). By Friday, earthmoving

* The concept of prepositioning forward operating base assets in support of tactical air deployments.

Figure 2-1 Temporary Camp Site

equipment had leveled a more suitable area on higher, firmer ground 3 1/2 miles east of Garrucha. This site lessened a dust problem and eliminated the potential of flash flooding. The 75-tent camp with its helicopter landing area and motor pool served until 3 April as "forward base" for the specialized task of cleaning up the Spanish countryside. From 3 April to 11 April, the camp closed and moved nearer to Garrucha.

Population:

From the original Disaster Control Team of 36 that went to the scene from Torrejon, the numbers grew rapidly, reaching a peak by 31 January (Table 2-1). Two-thirds of these personnel were involved in either hunting for the weapon or in cleaning up the debris, while the remaining were air police, communications, medical, claims, and other support personnel. Of these, 598 were Air Force, 64 Army, and 19 Navy, with those listed as Air Force including 4 technical representatives. As of 31 January, Maj Gen Wilson listed the functional alignment of U.S. people as listed in Table 2-1.

TABLE 2-1

PERSONNEL AND FUNCTIONS

200	ground search
200	detection, decontamination, harvesting
23	accident investigation board
23	civil engineering
30	camp support
6	legal claims
5	medical
58	communications
2	helicopter operations
41	air police
7	information and public relations
19	Navy ordnance disposal
4	technical representatives
7	Army engineers
36	transportation
20	command and staff

All except some of the officers were housed in the camp itself. Those few were quartered in two hotels close to the accident scene, one of these having opened specifically to house these personnel.

Population at the camp varied, but from the 31 January high there was a gradual reduction until the camp was closed on 11 April. The initial high was reduced gradually as the diposal of aircraft debris was accomplished, although about two hundred were still engaged in search for the missing weapon and about the same number in decontamination activities.

The first major reduction occurred on 9 and 10 February when about 50 of the cleanup personnel and the 40-man ordnance disposal team left. Gradual reductions then took place as the ground search was finally considered as complete as possible, and Maj Gen Wilson recommended to U.S. Air Force on 4 March that it be terminated. A slight upswing occurred from 11 to 17 March during the period of filling of 4,810 barrels with contaminated soil and crops preparatory to shipment to the United States for disposal.

Other personnel at the camp site, although not housed there, were the approximately 126 Guardia Civil and the 39 Spanish personnel (maximum number hired) who worked along with the Americans in the cleanup of the aircraft debris, as well as some who were hired in the camp for work in the kitchen. Table 2-2 shows the camp population.

TABLE 2-2

PERSONNEL AT CAMP WILSON AND SAN JAVIER
17 January - 11 April 1966
(as of Monday, weekly)

	Camp Wilson Americans	Spanish (less Guardia Civil)	San Javier Americans	Total
Jan 17	49	0	1	50
24	583	0	50	633
31	665	37	73	775
Feb 7	666	25	53	744
14	632	36	51	719
21	661	36	47	744
28	618	33	50	701
Mar 7	522	33	42	597
14	471	32	31	535
21	330		31	361
28	144		28	172
Apr 4	34		12	56

The primary mission of the medical support organization was to provide emergency medical treatment, to supervise field sanitation, and to furnish assistance in bioenvironmental work in connection with potential radiation exposure. While no cases of hazardous radiation exposure were treated, all other cases requiring treatment beyond the emergency type were air evacuated to either Torrejon or Moron, with the majority going to Torrejon. Support was furnished to the Navy when required and included evacuation of several cases to Torrejon.

One tent was assigned as a dispensary type medical facility and manned by personnel from both bases (Fig. 2-2). By 21 January there were two medical officers, both of whom were specialists in aviation medicine, and six airmen.

The majority of the medical problems involved upper respiratory infections since the weather was quite cool and windy much of the time. There were sprains and blisters suffered by those who were walking in the fields and hills in the search parties. However, only 33 cases were listed as requiring air evacuation from 19 January through 1 March.

Water Supplies:

During the first three days, acceptably pure drinking water had to be trucked 81 miles from Cartegena. The next week a source at Lorca (48 miles away) was used. Following this, Camp Wilson was supplied at the beach site by the Navy. Proper medical precautions prevented any gastrointestinal disorders, although the Navy had reported cases of gastroenteritis from an unclean storage tank aboard a cruiser. Storage capacity of drinking water was only approximately 2500 gallons. Local sources provided water for showers and decontamination (Fig. 2-3; 2-4).

Sanitation:

Although bathing facilities were of an improvised nature until 31 January, regular monitoring revealed no contamination. On 31 January, a detachment of Company A, 308th Supply and Service Battalion, arrived to establish laundry-bath facilities (Fig. 2-5). Daily personnel decontamination procedures required bathing and clean clothes for each person possibly exposed to alpha radiation.

As an aid to personal hygiene, a local barber was permitted to establish a "shop" at the camp (Fig. 2-6).

Heating:

Daytime temperatures reached as high as 80-90 degrees. Wind conditions and sea dampness along with 40-45 degree night temperatures made tent heaters necessary to avoid a too-high rate of respiratory infections. Accordingly, kerosene (Aladdin) heaters were in use by 3 February. Briefings on proper use and strict fire patrol procedures precluded any problems in their use.

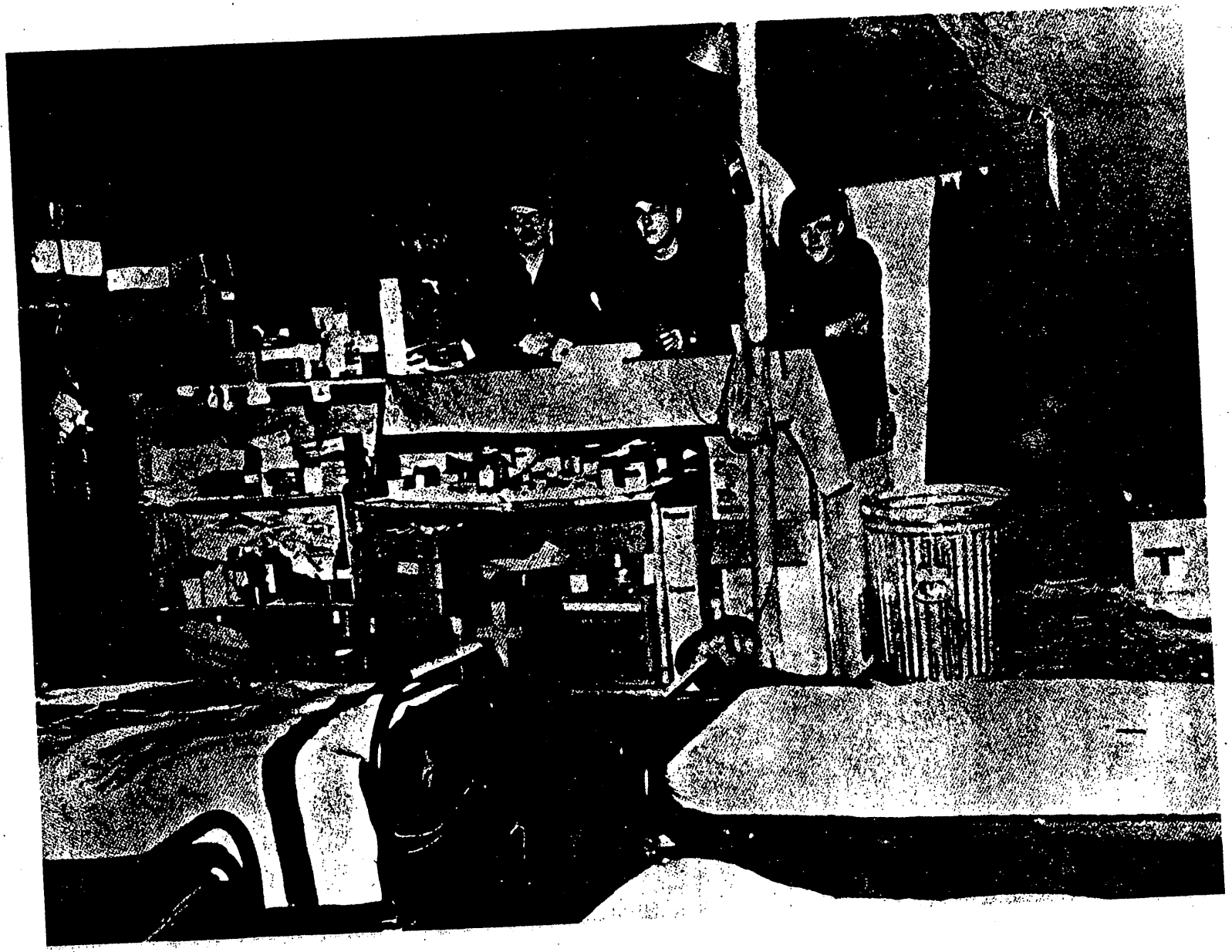

Figure 2-2 Tent Dispensary

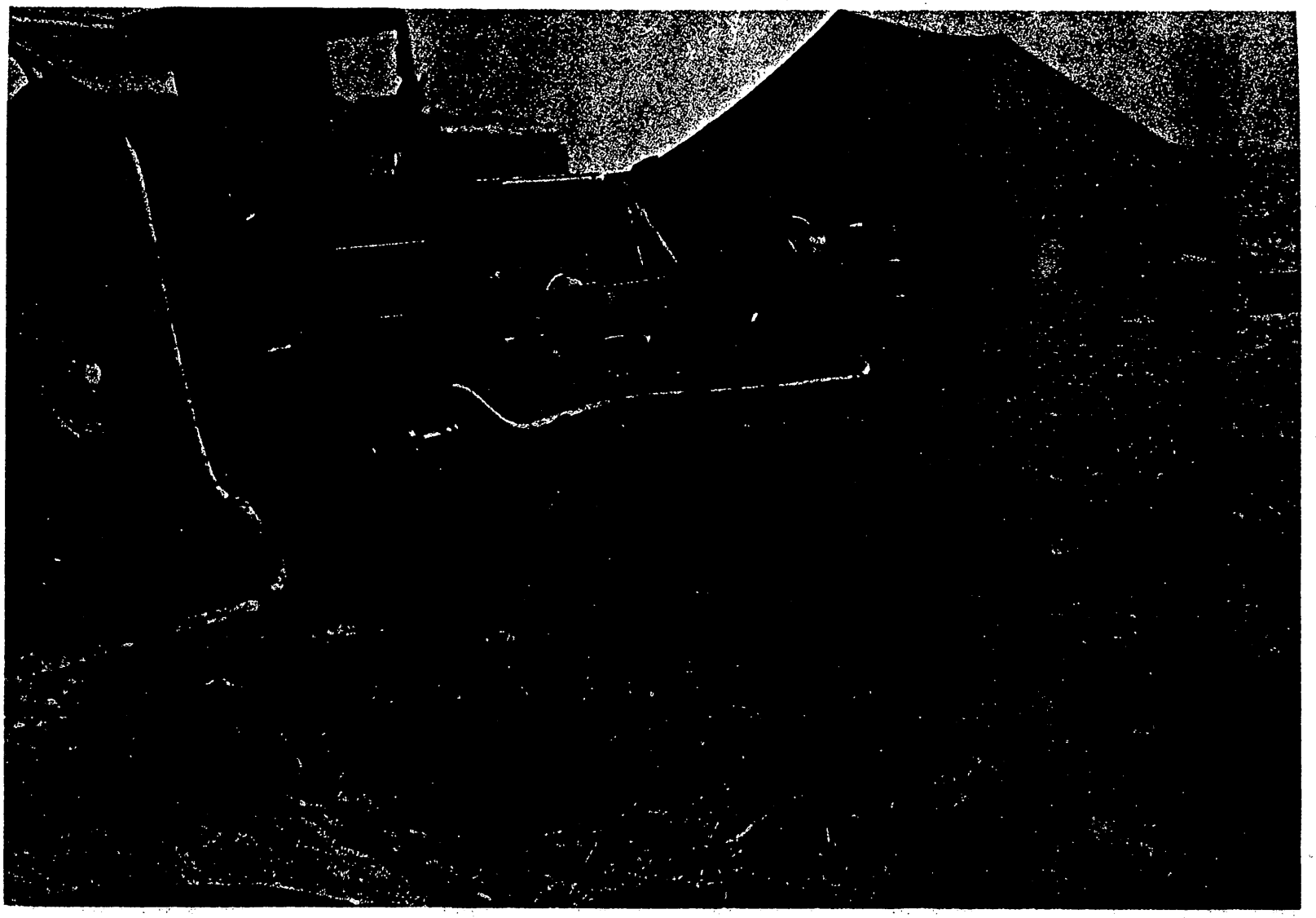

Figure 2-3 Decontamination Tent

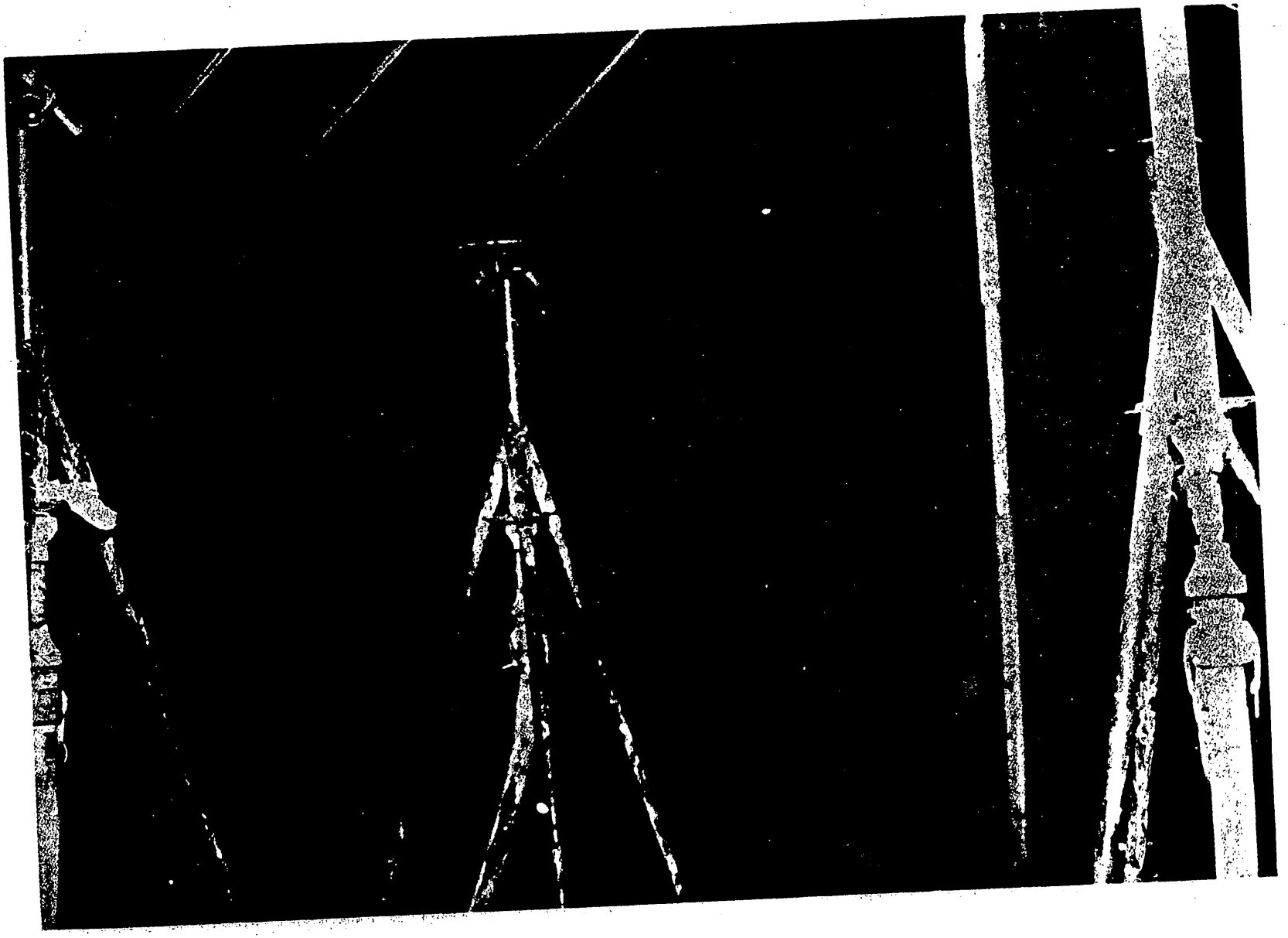

Figure 2-4 Decontamination Showers

Figure 2-5 Camp Wilson Laundry Operations

Figure 2-6 Local Barber

Messing:

After Gray Eagle equipment became available, hot meals were served (Fig. 2-7; 2-8). Daily courier flights from Torrejon to San Javier, with transfer to helicopters, permitted milk and fresh bread to be flown in along with the necessary rations. Tomatoes were harvested during the crop disposal program, and those free of contamination were purchased and used for troop feeding.

Some Guardia Civil and Spanish laborers, who worked with the Americans at the site, were also furnished meals.

Discipline and Morale:

There were no serious disciplinary problems. Stringent shore leave and off-limits policies were in effect. Movies, sports such as volley ball, soft drinks and beer were available in camp. A USO show was presented on 20 February.

Certain gimmicks, such as specially devised emblems, search unit nicknames, and banners, helped smooth out the ups and downs. Clearly spelled out rotation and R&R (rest and recuperation) policies helped balance out the frustration of the long search for the missing weapon. In general, the camp was efficient and well run with local resolution of all problems that occurred.

LOGISTICS AND SUPPLY:

Logistics for Operation Recovery was a major function in its total support. The accident site had none of the essentials for support. Every item of supply had to be transported in, most of it over a very poor road network. Maj Gen Wilson decided early in the operation that his force should be supported so as to create as little impact on local residents as was possible under the circumstances. Thus, a field camp situation was necessary as there was no local housing available.

Gray Eagle:

Gray Eagle supplies, airlifted from Wheelus AB, provided immediate basic camp necessities and eased the Operation Recovery effort considerably. Normal Gray Eagle packaging for deployment did not allow access to specific items. For instance, when Operation Recovery required machetes, 60 cases might have to be opened to satisfy the requirement. In all, 306,853 pounds of Gray Eagle equipment were provided to Camp Wilson. Although it had been airlifted to Spain, it was returned to Wheelus AB via ship from Cadiz.

Figure 2-7 Camp Wilson Field Kitchen

Figure 2-8 Camp Wilson Dining Area

Surface Transportation:

Camp Wilson had no airstrip. Most of its logistic support was flown into the area via San Javier and then trucked to the site. During one period, 148 vehicles were involved in Operation Recovery, 21 by the unit at San Javier and 127 at Camp Wilson. Types of vehicles used were varied: supply and personnel vehicle, tank trucks and pumpers, road grading equipment, limb shredders, wreckers, forklifts and tractors are examples. These vehicles were augmented by commercial truck and rail as required.

Sixteenth Air Force vehicle assets were exhausted by the effort, and requests went to other commands for support. A long-lived major problem was vehicle maintenance. The problem was aggravated by parts supply problems and apparently because vehicles in poor condition had been supplied by agencies involved. At one point in the operation, the 16AF sent a TDY (temporary duty) team to the United States to expedite the flow of supply parts.

Table 2-3 provides an indication of the vehicle requirements of the operation as of 15 February. By 13 April, all surface transportation except for a station wagon used by the Claims Office were returned to home stations. The vehicles that were not owned by 16AF were repaired before their return.

Radiation Detection:

In the field of radiation detection instrumentation, portable equipment for alpha detection has historically been troublesome for open terrain surveys. To a large extent the problems with this instrumentation are inherent to their design and to the characteristics of alpha particle radiation. The plutonium alpha particle has a very short range in air (3-4 cm), and cannot penetrate a blade of grass or a thin film of ground moisture. Thus, the alpha detector must be positioned extremely close to the surface to be monitored, so close that even in the hands of experienced personnel, there is danger that the surface irregularities (grass, rock, etc.) will penetrate the extremely thin window of the detector's wand (Fig. 2-9; 2-10).

Because the PAC-1S was the only alpha detector available, it should not have been surprising that logistical problems would be encountered in Operation Recovery. The instruments suffered an unusually high failure rate. Maj Gen Wilson stated that the U.S. Air Force was unprepared to provide adequate detection and monitoring for its personnel when an aircraft accident occurred involving plutonium weapons in a remote area of a foreign country.

To provide an adequate number of detectors in commission at any one time, a large number of instruments had to be available at the site. Sixteenth Air Force asked USAFE and SAC for all the instruments that could be spared. To fulfill this request, PAC-1S detectors were brought in from eight European locations, fourteen U.S. sites, and one from Africa.

Several lessons were learned from the use of the PAC-1S instrument during this operation. These were:

TABLE 2-3

VEHICLES AT CAMP WILSON, 15 FEBRUARY

Type	Description	Quantity
Bus	29 Passenger	10
Carrier	3/4-ton, 4 x 4, M-37	2
Caterpiller	D-6	1
Compressor	Air	3
Forklift	6,000 pound	1
Grader	Road	3
Jeep	1/4-ton, 4 x 4	11
Mixer	Concrete	2
Pumper	530 B	3
Shredder	Tree	2
Trailer	Water	3
Trailer	Refueling	2
Trailer	10-ton, semi	3
Tractor-Trailer	5-ton, semi	1
Tractor	Farm	3
Truck	6-passenger, pick-up	9
Truck	3-passenger, pick-up	3
Truck	1 1/2-ton, stake & platform	2
Truck	2 1/2-ton, IH, Cargo	7
Truck	2 1/2-ton, Refueler	6
Truck	Water Distributor	16
Truck	Ambulance	2
Truck	Dump	13
Truck	2 1/2-ton, 6 x 6	5
Wagon	Station	5
Wrecker	--	3

1. Acceptable radiation levels had to be established at varying values according to the texture of the terrain before adequate monitoring could become effective.

2. SAC, USAF and AFLC* identified a requirement to develop a more reliable alpha monitoring instrument for field use in monitoring radiation from plutonium 239.

3. Due to limited training and the problems of alpha particle detection using the PAC-1S, the more experienced, maturer airmen augmentees to the Disaster Control team were more effective than lower-grade airmen.

*Air Force Logistics Command

Figure 2-9 Monitoring in Rough Terrain

Figure 2-10 Alpha Monitoring with PAC-1S

4. In conjunction with the above lesson, all monitors for this type of accident had to be given extensive training before they could conduct a first-class monitoring program. Familiarization training on what the instrument looked like and how it operated was not sufficient.

5. Under no circumstances, should PAC-1S instruments be deployed to the field again without pertinent directives and a repair capability.

The experience at Palomares was to be a major forcing function on the requirement for a new plutonium detection system. One was developed and was available in prototype when the B-52 bomber nuclear weapon accident occurred at Thule, Greenland, in January 1968. Rather than detecting the alpha radiation, this instrument was designed to detect the low energy, but relatively more penetrating gammas and X-rays present in weapon plutonium. A normal alpha detector would have been useless in terrain survey at Thule. Drifting snow would have masked any chance at alpha detection.

Airlift Support:

Sixteenth Air Force requested and received aircraft assistance from several sources. The Army provided HU-1 helicopters (16AF provided JP-4 fuel) to conduct search operations. Airlift consisted of tankers from Torrejon and Moron, theater aircraft, and unrestricted use of eight Military Airlift Command (MAC) C-124's and C-130's until they were released on 7 March by 16AF. In addition, MAC used three civilian Boeing 707's to deliver Operation Recovery equipment on four occasions.

One aircraft accident occurred during the recovery operation. A MAC C-124 crashed at Granada, Spain, 12 February. The entire aircrew was killed and the logistic supplies, two buses and lights for Camp Wilson, were lost.

Communications:

Communications, like logistics, was a "build it up" process for Operation Recovery. Although the Compania Telefonica National de Espana pointed with pride that, "At a minimum, every village in Spain had at least one telephone," there were none at Palomares. Thus, when Maj Gen Wilson set up shop at Palomares, the nearest telephone was located at Vera, about 10 miles distant - 40 minutes to travel and a general wait of an hour for a circuit. Priority was given for establishment of SSB (single side band) capability. Units had been brought by the team arriving at Palomares on the evening of the accident. By 1859Z that night, communications were established with Torrejon. At this stage, secure communications were not available. Air Rescue cover aircraft also provided early relay service to San Javier.

The Spanish government, recognizing that San Javier would be heavily utilized for the operation, offered its air defense microwave system with terminal at that base. A telephone connection to this system was established at San Javier on 18 January.

The next increment of communications capability came on line at Camp Wilson on 22 January, providing a secure teletype service to Torrejon among other capabilities. This service was provided by U.S. personnel and mobile equipment of the Second Mobile Communications Group of Toul Rosieres AB, France. This circuit was relayed through Croughton, England. Several attempts were made by a second unit from the French base to establish direct communications from Palomares to Torrejon, but the quality of the service did not equal that of the Croughton link, and attempts were abandoned on 3 February.

Maj Gen Wilson desired that at least two methods of communication be available in case one system should fail. A necessary link in this program was the lack of wire service from Palomares to Vera. The Spanish telephone/microwave system could provide service from Vera to Torrejon. At 1230Z, 22 January, a request for a landline to fill the gap and for an in-camp telephone system was initiated with U.S. Army support units in Europe. By 2200Z, on 23 January, the Palomares-Vera line had been laid, and by the next moring the in-camp net had been installed. The reaction can only be described as meritorious.

With the arrival of Task Force 65 in the waters off Palomares, ship-to-shore communications had to be implemented. Single side band (SSB) and VHF links were established and operated satisfactorily throughout the operation.

Helicopter operations in the area also required communications support. Air Force helicopters were UHF equipped, while those of the Army used VHF. Both services were established with satisfactory results.

One last communications service should be mentioned. The search operations covered considerable territory. Portable radios were used by the several teams which were spread over the area. For this purpose, as well as for all radio operations in the area, coordination was required with the Spanish government for allocation of frequencies. Authorization was received in all cases on a priority basis.

FIELD OPERATIONS:

Table 2-1 provides an indication of the many activities which were underway at Camp Wilson. Three topics were uppermost in all minds. These were the search for Weapon #4, decontamination, and the completion of the accident investigation. Each of these activities was supported by a fourth, the cleanup of aircraft and weapon debris.

Aircraft Accident Investigation Board:

The Board gathered eye witness statements, reconstructed the path of flight of the aircraft and the probable contact area, and collected all available facts concerning the cause of the accident. The first formal board meeting was held on 20 January in a building in the village of Palomares. The Board was assisted and advised by a team from SAC, Deputy Inspector General for Safety, Oklahoma City Air Materiel Area, the Boeing Company, 8AF, and 2AF. Interviews were conducted in Palomares, Vera, Aquilas, Cuevas, and as far away as Murcia, Spain. An interpreter was required since witnesses were Spanish fishermen, farmers, and

shepards. The structures and aerodynamics group of the Board required a crane to turn wreckage so that fire pattern areas, structural failure points, etc., could be detected. On 28 January, the Board returned to Torrejon to continue formal proceedings, interview surviving crew members, and complete the investigation. The aircraft accident investigation was completed and the report forwarded by 8 February.

Search For Weapon #4:

The basic problem was to analyze ballistic trajectory, define the search area, and locate the fourth weapon. The Board theorized that the B-52 and all weapons experienced deceleration as a result of the breakup of the aircraft. The tail cover assembly from Weapon #4 was found northeast of the B-52 tail area and in line with Weapons #2 and #3. After the initial B-52/KC-135 collision, a rupture of one longeron occurred just aft of the B-52 trailing edge. The forward fuselage pitched downward with ultimate loads snapping the left wing off. The weapons were then tossed out. Weapon #2 was found with a major piece of the bomb rack still attached, and after theorizing, it was determined that high G-loading had occurred, causing the relatively massive weapons to separate at approximately 4 to 5 seconds after the initial longeron failure. Weapons #1 and #3 apparently did not tumble, and they initiated chute deployment in the first few seconds after release. It was reasonably certain that Weapon #2 was tumbling when it fell. Weapon #1 was found with its chute intact and it did not incur an HE* explosion. Weapon #2 experienced an HE explosion. Case fragments and approximately 10 pounds of HE were found within 300 feet of its crater. Weapon #3 also had an HE explosion on impact, scattering approximately 80 pounds of HE and plastic within 100 feet of its crater. One fragment was found approximately 1500 feet from the crater.

The main effort of the camp was now directed toward locating the missing weapon and sensitive documents and equipment. The search started from beyond the last known wreckage and worked toward the sea. Searching was conducted with personnel lined abreast, under the direction of three search leaders equipped with portable non-tactical radio units (Fig. 2-11). A relay point for the radios was located atop a small peak in the vicinity of the Command Post. Each day search areas were laid out and instructions given to the personnel as to what type of equipment they were to look for. Maintenance personnel and aircraft investigation and disaster control teams were on the search, mixed with other personnel, so that anything spotted could be duly noted, identified, and reported to the intelligence specialists for plotting on maps.

During the first week there were no adequate maps on which to plot each day's search. Existing maps from Spanish sources proved to be inaccurate and did not show the village of Palomares. On 24 January the first of the mosaics prepared from the 18 January aerial reconnaissance arrived, and serious plotting of wreckage impact points and search areas could then be done.

As photo mosaics became available, search areas became more definitive, and coverage could be more accurately determined without duplication of effort. After technical theorists

* High Explosive

Figure 2-11 Searchers

in the Sandia Corporation had studied the report of aircraft track, wreckage pattern, the locations of the weapons that had been found, and the prevailing winds at the time of the accident, they requested that certain areas be searched and researched for possible location of parts of the fourth weapon.

North American Aviation offered the use of its newly-designed "Advanced Nuclear Detection" equipment for possible location of missing weapon components. This equipment was installed in a 16AF C-54 on 27 January and calibrated on 28 January. Search sorties were flown on 29 and 30 January in the area of the crash at very low altitudes (200 and 100 feet). Radiation readings were detected by the equipment in the areas of previously known readings. There were no new developments. The project was terminated and ground search continued.

Further theories regarding possibilities of a mid-air collision and detonation of the fourth weapon were advanced. In an effort to fix the location of the fourth weapon, Maj Gen Wilson requested that an analysis group be formed and furnished with all the data available at the site. A systems analysis team (SAT) of experts was formed of personnel from Sandia Corporation, Wright-Patterson AFB, and Eglin AFB. The SAT Theory which they developed offered several conclusions regarding Weapon #4. One of these was that the weapon collided in air with another object, resulting in an HE air detonation. A major part of the weapon continued in the general flight path of the aircraft, and the weapon case with attached parachutes deployed drifted out to sea. Ballistic trajectories were computed, and the area of probable impact received a thorough search for craters, wells, and mine shafts.

While many indentations were covered when the troops walked the fields and were checked for radiation and for any sign of disturbance, there were also numerous abandoned shafts, wells, and just plain holes that might well have hidden either the weapon or parts of it. While any such area was suspect during the first two weeks of the hunt, it was in early February that serious study of such places started. The men that were walking marked them with lemon-colored flags. They were then checked for radiation and for disturbed appearance that might indicate that some type of debris might have fallen there. They were plotted on maps, given serial numbers, and ticked off as either clear or as needing further study. Maj Gen Wilson asked USAF to provide him with a geologist who would be able to recognize deviations from the normal that might indicate a hiding place for the elusive weapon. The request was made to USAF on 8 February, OSD* approved it, and on 23 February Mr. Donald Kingery of the U.S. Bureau of Mines, Department of Interior, arrived at Torrejon, was given a briefing, and the following day went to the site via the early morning aircraft and the helicopter shuttle run.

Plotting of shafts and wells, as mentioned above, had started prior to his arrival. Some had been eliminated due to physical appearances, such as undisturbed grass or closed covers, but others had been listed as requiring further investigation. The daily log kept by Mr. Kingery listed 169 sites checked out, using criteria established at the site. The observations of the shaft walls were made to determine possible damage due to an impact, the bottoms were inspected for cratering. Where water existed, the

* Office of the Secretary of Defense

elimination was based on the shaft diameter and physical condition of the walls. The impact distances within the shafts were calculated for openings of varying diameters, of from 1 to 3 meters, for an object with an impact angle of 2 to 3 degrees from vertical, based on the estimated trajectory. This work went on until 3 March, and was concluded when all known locations had been surveyed as well as possible, this coincided with the period when decision was made to discontinue the ground search.

A test was conducted at White Sands Test Range to determine what a probable crater would look like in similar ground. Colored photos were airmailed to the site for visual briefing aids to the ground and air search parties. A total of 300 craters, wells, and mine shafts were identified, and a systematical search of each depression and/or hole was undertaken by Search Operations, assisted by personnel from Los Alamos and Sandia Corporation and the U.S. Bureau of Mines.

Ground search of the disaster area was one of the most comprehensive activities of the Broken Arrow operation. Two high probability areas were designated for primary search. One of these areas covered approximately 4 square miles, and the other, 2 square miles. Search leaders were briefed each night on the area to be covered the next day, and by 2 March the search areas had been covered in "finger-tip to finger-tip" line abreast formation, both longitudinally and laterally, an average of five times, and in some cases as many as nine times. As new information became available, new areas were identified and searched. Each night at approximately 1730 hrs, the search teams would return with bits and pieces of aircraft wreckage that had been overlooked, but nothing was recovered that indicated that the fourth weapon had impacted whole or that its HE had detonated and scattered over land. Each piece was examined nightly by the Los Alamos and Sandia Corporation personnel, and all pieces were identified as aircraft debris or equipment.

On 3 March, after intensive ground search of the entire area and thorough investigation and elimination of 232 soil depressions, mine shafts, wells, and reservoirs, a message was sent by Maj Gen Wilson to General Ryan recommending termination of the ground search. The message was coordinated and concurred in by members of the AEC and Sandia Corporation. The fact that all of the debris and material which had been collected and examined by USAF and civilian weapons specialists failed to substantiate a fourth weapon breakup and impact on land and the testimony of fishermen who were witnesses to the accident and who reported seeing what was obviously a 64-foot white parachute descend and sink into the sea left no doubt in the minds of the team and members of the search organization that termination of the ground search was in order. The AEC and Sandia Corporation personnel departed Camp Wilson to brief higher headquarters in Washington on 8 March and the CINCSAC* on 9 March. On 9 March, a message from CINCSAC to CSAF** concurred with Maj Gen Wilson's recommendation that the ground search be terminated, and on 10 March CSAF made the same recommendation to the Assistant to the Secretary of Defense (Atomic Energy), with the provision that the capability to regenerate a land search be maintained as long as there was a potential need for same.

* Commander-in-Chief, Strategic Air Command

** Chief of Staff, U.S. Air Force

At that time the DOD established a charter for a Search Evaluation Board, with the chairman being Dr. Sproule of the research organization of the Secretary of Defense, and representation from the Department of State, AEC, Joint Chiefs of Staff (JCS), Chief Naval Operations (CNO), and USAF. The purpose was to evaluate the search effort and to prepare a decision on "when to conclude the search operations short of success." A briefing for the board was requested to be presented by SAC/16AF on 16 March, and two each SAC and 16AF officers went to Washington, D.C. for that purpose. They had all been at the site and were completely familiar with the entire operation.

At the time this presentation was being given, word had reached Washington, D.C. that the U.S. Navy had discovered a parachute-shrouded object on the ocean floor. While it could not be definitely determined that the object was the bomb since the chute could not be lifted from it, photographs and testimony of the Alvin crew made it almost a certainty that the search was over. Thus, on 18 March, Maj Gen Wilson said that the ground search was being suspended "pending further investigation and recovery operations of Navy."

Radiation Surveys:

Operations were conducted in terms of Counts Per Minute (CPM) on the PAC-1S. There is a discrepancy among the available reports as to the correspondence of CPM readings to surface contamination in micrograms per square meter. Dr. Langham quotes a correspondence of 13,000 CPM and 100 $\mu g/m^2$. Another report suggests an equivalence of 100,000 CPM and 1,000 $\mu g/m^2$. These equivalences fall outside of the PAC-1S specification which required linearity to within ± 10 percent. The manufacturer was contacted during preparation of this summary. Under perfect and theoretical conditions of a infinite thin source, the correspondence would be 11,250 CPM and 100 $\mu g/m^2$. Any self-shielding in the source or by ecological material would significantly change these figures and represents just one more difficulty in terrain monitoring with an alpha detector. Considering that Dr. Langham's figures were the basis of the first proposals, and that the slight (11,250 - 13,000) difference can be accounted for by variations in the distance between probe face and terrain surface, it seems reasonable to provide table 2-4 based on his estimates. The figures provided represent significant peg points used in the negotiations.

TABLE 2-4

EQUIVALENCES FOR PAC-1S AS EMPLOYED AT PALOMARES

PAC-1S (CPM)	Surface Level ($\mu g/m^2$)
100,000	770
60,000	462
10,000	77
7,000	54
700	5.4
500	3.8

Terrain:

By the evening of the day of the accident, 17 January, a small monitoring team equipped with PAC-1S portable alpha detectors was at the site. Weapon #1 was found and surveyed. No contamination was present - the weapon was intact. On 18 January, Weapons #2 and 3, both of which had suffered HE detonation, were located. The monitoring team, operating primarily in support of Explosive Ordnance Disposal (EOD) personnel, found that alpha contamination was generally present in the area. At Site #2* the tail section of the weapon had been displaced some 250 feet by the detonation. Readings on this weapon section "pegged" the instrument at 2,000,000 CPM.**

On 19 January 1966, first attempts were made to delineate the area and extent of contamination. On this date the remainder of the Torrejon Hazard Survey Force arrived to assist in monitoring. Priority was assigned to recovery of weapons parts over detailed area monitoring. The first function was to assist EOD personnel in their task, by providing local monitoring around the immediate crater areas. Radial line plots, however, were begun at the same time. Personnel and PAC-1S's were still somewhat limited. Because of this, on 20 January all monitoring activity at Site #2 was stopped. Site #3 was located on the edge of the village of Palomares, and the potential political implications of this were already suspect. The contamination was found to extend into the valley below the crater to a distance of approximately 4500 feet after 4 to 5 days of detailed monitoring. It included farms and cropland.

As at Site #3, the contamination at Site #2 was found to extend a considerable distance in the downwind (roughly east) direction and again included much cropland. A note on the survey report sheet of Site #2 for 19 January indicates that monitoring was stopped at that location after 15 minutes of work due to an instrument malfunction - no replacements available. Refinements of this contaminated area was finished on 10 February 1966. Monitoring in the villiage of Palomares, in conjunction with Spanish nuclear energy commission (JEN) personnel, was begun on 24 January 1966. This consisted initially of monitoring houses and random crop monitoring. By 3 February 1966, however, it was established that a pattern of contamination ran through the village and connected Sites #2 and #3, thus making one complete pattern.

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* Site locations were numbered for identification purposes as follows:

Site 1: location of first weapon found;
Site 2: location of second weapon found, west of the village of Palomares;
Site 3: location of third weapon found, east of Palomares;
Site 5: village of Palomares, between and connecting Sites 2 and 3;
Site 6: east of river bed near B-52 tail section impact site; a continuation of Site 3.

** A PAC-1S will not read over 2,000,000 CPM, unless percentages of the probe face area are covered and the readings extrapolated accordingly. This was never done, however, because of time factors and no operational requirement for the information. The readings were recorded as "instrument pegged," or "+2,000,000." With the exception of small, fragmented areas, the terrain yielded few readings of this magnitude.

Initial radial lines around the two craters were run until readings of less than 1,000 CPM were found. The method of further definition of the contaminated area consisted of taking 6 to 12 readings in each field and averaging. This average figure was placed on a sketch, as no maps were initially available. In final form, this appeared as a rather jumpy and random plot of the contamination, but it proved to be a practical approach, particularly when decontamination actions commenced.

The initial surveys were never redone in total. Refinement of the contaminated area at later stages consisted on monitoring and flagging isolines of 7,000 CPM and above and 700 CPM and above (to conform to limits established during negotiations). These were then transferred to maps of the area. On 30 and 31 January 1966, a zero contamination line was run around the entire pattern and staked with red flags.

During the early days of the survey operation, it was obvious that the prevailing wind and the limited operations near the two craters were causing a shift in the contamination pattern. Plutonium was being resuspended from the ground. The total extent of the spread will never be known. Hindsight (that of a Health Physicist on the scene) suggests that an early effort to fix the heavy contamination near the craters would have paid dividends. Of course, the search for weapon parts in the same area was a competing activity.

Another contaminated area was located north of the village of Villaricos, approximately 4,000 feet from the eastern boundary of Site #3. The area was approximately 3/4 square mile in size. Contamination levels were low, the maximum being 7,000 CPM, with most levels in the less than 500 CPM range. This area is isolated, rocky, and contains no cropland. For this reason little concern was devoted to this area, other than delineation of the extent of contamination. The area was monitored jointly with JEN representatives and is believed to have been contaminated from Weapon #3, with prevailing weather conditions at the time causing the break in the pattern.

These radiation surveys were necessary to delineate the extent of contamination and to provide a basis for definition of the decontamination operation to follow. Terrain surveying was a continuing program during the operation. It required many man-hours of backbreaking work, extending from relatively easy terrain to that which was much more difficult. In the end, final surveys were performed on all decontaminated land before it was turned back to its owners. It was a difficult job performed under trying circumstances.

A hazard control line, as such, was impractical. The politics of the situation negated establishment of strict area control procedures and the placing of "contaminated area" signs. The low levels of contamination in most of the pattern did not actually make this necessary.

For initial weapons recovery actions, EOD personnel wore gloves, anti-contamination coveralls, and gas masks when working in the crater. Surgical masks were later found to be

more practical for this type of work.* Control points at the two areas of major activity, #2 and #3 craters, were established. Monitoring of personnel was routine and by 24 January a 500-gallon water trailer was in use at Site #3 for decontamination of personnel and equipment. By 27 January, a similar unit was available for Site #2; however, by that time major recovery actions at that location were complete. In the interim, decontamination was done by means of buckets and bags of water, brushes, and soap.

A shower was installed in the base camp on 25 January. This proved to be a great asset in personnel decontamination. On 3 February, a similar unit was set up at Site #3 for use by personnel working in the contaminated areas. Personnel involved in clean-up operations were issued protective clothing - gloves, coveralls, surgical masks, surgical hats and boots in accordance with standard procedures covering the various cleanup operations.

There was continuous air sampling to determine the significance of airborne contamination. Particular attention was paid to those operations which generated dust. Resuspension of the plutonium was negligible. Urine sampling of personnel was begun within three days of the accident. The initial samples were 24-hour volumes, but it was found that this was not practical, as it required personnel to carry the sample containers into contaminated areas (a logical reason for the high levels in some of the initial samples). This function was later given to the camp medics, to handle on a routine basis. Initial results from the Radiological Health Laboratory were encouraging, except for a few people who had apparently received extremely high body burdens. Cases subsequently proved to be contaminated samples. Repeat sampling indicated that no person received any significant body burden. JEN officials handled a program of urine sampling for Spanish civilians. Initial samples were collected on 30 Spanish personnel by U.S. personnel. Primary emphasis was placed from the beginning on urine samples as an indicator of personnel exposure. Other techniques included some nasal swabs and an early use of film badges. The film badges being sent to Wright-Patterson AFB for evaluation. To further control personnel radiation exposure and to insure that no contamination had been carried into the base Camp, the base Camp was monitored daily.

During the early stages, before the setup of showers and a base laundry, elimination of contamination on personnel and clothing was awkward and difficult. Proper decontamination of coveralls was not possible until 1 February 1966. Personnel showers were in use on 25 January; a laundry was installed on 31 January. Many personnel came to camp with only limited clothing, because they were told they would only stay for a few days. Developments proved

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* It is doubtful that the use of the surgical mask served more than a psychological barrier to plutonium inhalation. These masks were not designed as filters for micron particulates nor do they fit to the face without leakage. An interview with one of those present at the site indicates that control of their use was not stringent. One would see them hung about the neck or perched atop the head as often as over the mouth and nose. It is significant in this regard that air sampling indicated a negligible resuspension problem. Had it been otherwise, it is probable that larger body burdens would have been registered. The masks were more comfortable than plutonium respiratory devices, that's all.

this to be extremely conservative. If contamination was found on the skin during personnel monitoring, individuals were instructed to wash the contamination off and be remonitored. If contamination was found on clothing they were instructed to change immediately and to wash the contaminated apparel. All personnel were informed of the importance of following these directions. Supervisors were instructed of the necessity of complying with these instructions. At later stages more exact precautions were possible, such as issuance of work clothes at each control point, and then removal at the end of the day. These clothes were monitored prior to being reworn.

An instance occurred when 7th Army minesweeper personnel arrived in Germany with some contamination on various articles, even though their equipment was checked before leaving Camp Wilson. This resulted in establishment of a firm program to insure that no one left the area exceeding permissible levels of contamination.

In summary, the types and the number of samples taken as listed in the final bio-environmental report, were as follows:

TABLE 2-5

ENVIRONMENTAL AND BIOLOGICAL SAMPLES, PALOMARES
17 January - 7 April 1966

Type	Number
Personal	
Urine	1,370
Nasal Swabs	109
Film Badges	22
Air	439
Water	
Locally Tested	75
Sent to RHL	22
Soil	43
Vegetation	
Beans, Cabbage, etc.	28
Tomatoes	74

Negotiations:

Negotiations on levels and methods of decontamination proved a difficult task, for there were varied opinions on what was acceptable. The Spanish government had not established criteria for permissible levels, which is completely understandable because plutonium-producing facilities and nuclear weapons were nonexistent in Spain. Significantly, there were no criteria in the United States for accident situations. The available criteria pertained only to plutonium processing plants and laboratories. There were, however, the broad guidelines established from the Nevada tests. A sense of urgency prevailed, primarily from a political standpoint, to arrive at criteria and begin the clean-up.

Dr. Wright Langham and other representatives from the AEC, Los Alamos Scientific Laboratory, recommended the following proposal for handling the contaminated areas; "Based on present information which is summarized in the 1 May 1963 training manual of the Atomic Weapons Group, the following procedures and activities seem quite adequate to control any possible lifetime hazards associated with Areas 2 and 3:

"1. All areas in which alpha counts per probe area are 100,000 CPM or above will be removed to a depth of at least 5-6 cm and buried in an appropriate pit which will not permit seepage into the water table.

"2. All areas with counts between 100,000 CPM and 7,000 CPM will have the present crops removed and buried. In all cases where the ground shows counts of 7,000 CPM to 100,000 CPM the soil will be sprinkled with water and plowed to a depth of at least 10 cm. After it is plowed, it will be sprinkled again and another monitoring survey conducted. Any spots that read above 7,000 CPM will be replowed and resprinkled until all readings are below the 7,000 CPM value.

"3. All areas reading between 500 CPM and 7,000 CPM will be sprinkled with water to leach and fix the activity in the soil to minimize spreading by the wind. After sprinkling, the areas that read above 1,000 CPM will be resprinkled."

This proposal was presented to the Spanish JEN for consideration. Although agreeing in principle with U.S. Air Force decontamination methods, they did not agree on the levels at which various types of decontamination actions would be taken. Several days of discussion and negotiations took place, and the following agreement was reached on 2 February 1966:

1. Select a place with adequate conditions to build a disposal pit where highly contaminated soil and products will be deposited.

2. Build the pit with proper safety provisions for public health.

3. Annual vegetable crops with a reading above 200 CPM will be removed to the disposal pit, buried, and decomposed with quick lime.

4. Fruit orchards will be carefully water-washed to remove all contamination.

5. The ground areas treated as indicated in paragraphs 2 and 4 above, will be remonitored after completion of water-washing operation and depending upon the level found at that time, one of the following three procedures will be observed:

a. Soil above 7,000 CPM will be removed and deposited in the disposal pit. Soil will be replaced to the extent to which it was removed and refertilized.

b. Soil areas between 7,000 and 700 CPM shall be wet down, plowed, and remonitored for contamination. If the count does not come down to less than 700 CPM, the soil will be treated again until less than 700 CPM is reached.

c. Soil areas below 700 CPM will be soaked with necessary water to bring contamination down to very low level and remonitored for reading.

6. All monitoring will be done with the PAC-1S.

It is significant to note that the clean-up criteria desired by the Spanish was considerably more conservative than that recommended by Dr. Langham. Although the Spanish agreed in principle to the U.S. proposal, the more stringent requirements were based on psychological reasons.

During the period 3 February 1966 to 1 March 1966 the following changes and/or amendments were agreed upon by the JEN and the U.S. Air Force:

1. On 4 February 1966, agreement was reached with Eduardo Ramos, M.D., Chief Health Physicist for the JEN, that watering, following plowing would not be a requirement. This decision was based on the fact that plowing followed by rototilling reduced the surface count to non-detectable.

2. On 8 February 1966, agreement was reached with Eduardo Ramos, M.D. (JEN), to permit hauling of harvested crops having a count of 200 CPM or less to the river bed for burning.

3. On 10 February 1966, agreement was reached with Eduardo Ramos, M.D. (JEN), to raise the counts per minute on harvested crops which could be burned to 400 CPM.

4. Changing attitudes on leaving the contamination in Spain resulted in negotiations being conducted by the U.S. Embassy and JUSMG-MAAG with their Spanish governmental counterparts during the week of 14 February 1966. There was considerable concern in both governments about leaving a "monument" to the accident in the form of a burial pit. These parties reached an agreement which, in effect, stated that only that soil having a surface contamination level of 60,000 CPM would be removed from Spain. (Plowing to a depth of 8

inches of an experimental tract of 0.09 acres which had a surface count of 40,000 CPM, followed by a second plowing to a depth of 4 inches, demonstrated that this procedure would maintain the surface contamination level at non-detectable.)

5. On 24 February 1966, agreement was reached with Lt Colonel Santiago Norena (JEN) to permit burial of the previously scraped and piled soil in Area 2 (with a surface count above 7,000 CPM but less than 60,000 CPM) in the pits which had been dug for permanent burial of the highly contaminated dirt.

Difficulty was encountered in applying the original criteria to hilly, rocky, uncultivated areas. This problem was resolved by a meeting at Camp Wilson on 28 February 1966, which had in attendance Generals Donovan and Wilson, Dr. Wright Langham (Consultant), Eduardo Ramos, M.D. (JEN), and other members of the JEN and the U.S. Air Force. The following agreement was reached and represents the last of the amendments to the agreements on decontamination levels and methods:

1. Follow-up cleanup requirements in the uncultivated land areas would be limited to Area 2. Earth would be removed from:

a. Hot spots which showed counts of 60,000 CPM or above. This earth would be included with that to be shipped from Spain.

b. Land surface showing counts in excess of 10,000 CPM would be washed, scarified, or dug up and raked.

c. Land surface showing surface counts of less than 10,000 CPM would be watered down where practical.

2. The permissible level of contamination was accepted as 10,000 CPM.

3. No work would be accomplished in Area 6.

This is a summary of the amended agreements concerning decontamination levels and methods employed at Palomares.

1. Soil above 462 $\mu g/m^2$ scraped and removed from Spain.

2. Soil between 5.4 - 462 $\mu g/m^2$ water, plow.

3. Soil below 5.4 $\mu g/m^2$ - water.

4. Soil below 77 $\mu g/m^2$ - permissible where other measures could not be applied.

In actual use, the pit at Site #2 was employed as a holding area only. The vegetation and scraped soil from other areas which was placed there was later barreled and removed from Spain. The pit was decontaminated and filled.

Implications of Decontamination Levels:

The stated policy of the U.S. Government in relation to the Palomares operation was to decontaminate to levels which were more than adequate by U.S. safety standards. The United States recognized that the Spanish Government desired levels far beyond safety requirements in the interest of combating psychological consequences of the accident. The chance that the decontamination levels agreed to at Palomares would be pointed to as "safety standards" should a subsequent contamination incident occur was a natural concern of U.S. authorities. Even though safety standards for plutonium decontamination exist, their employment in future incidents will probably be used as a talking paper for negotiations - a starting point to be overridden by psychological and political concerns.

Decontamination:

Once the areas of contamination had been defined, removal of contaminated crops and soil started. To keep track of the work in the contaminated areas, they were divided into plots, basically following the outlines of the fields and gardens. These 844 plots covered 385.68 acres, with contamination readings running from 0 to over 100,000 CPM. Within this area there were demarcation lines for areas of less than 60,000 CPM where decontamination was to be accomplished, while the areas above that level was to have the soil removed.

Vegetation was also marked since that vegetation under 400 CPM could be burned. Subsequently 3,970 truckloads of vegetation (at 4 cubic yards per truck) were hauled from the area and destroyed. For the remaining contaminated areas, both soil and vegetation, leaching by watering, and washing down was accomplished to reduce readings to as low a level as possible.

Eleven days after the accident, the JEN, AEC, and engineers discussed the location of a temporary burial or storage facilities and agreed on an area at Site #2. Using the construction equipment that had been brought in originally to build a road to the impact sites and handle the wreckage, a temporary pit was dug. This pit was a trench-silo type with an approximate 1,000 cubic yard capacity constructed so that trucks could be backed up to it for unloading (Fig. 2-12). It was to this area that the debris went while awaiting decision on its disposition. As there was only a very small amount of the nearby area used for gardening and there were no houses in the immediate vicinity, no problem existed in using that spot. Upon completion of the disposal activity it was filled in by returning the dirt that had been excavated during its construction.

The crop removal activity started on 22 January, plowing (Fig. 2-13) and scraping on 27 January. As the work was in progress, dust control was accomplished by use of water spray (Fig. 2-14) or light sprays of diesel oil, with the latter being used primarily on highly contaminated areas. Roads were sprayed to prevent truck traffic from spreading

Figure 2-12 Temporary Burial Pit

Figure 2-13 Plowing Operations

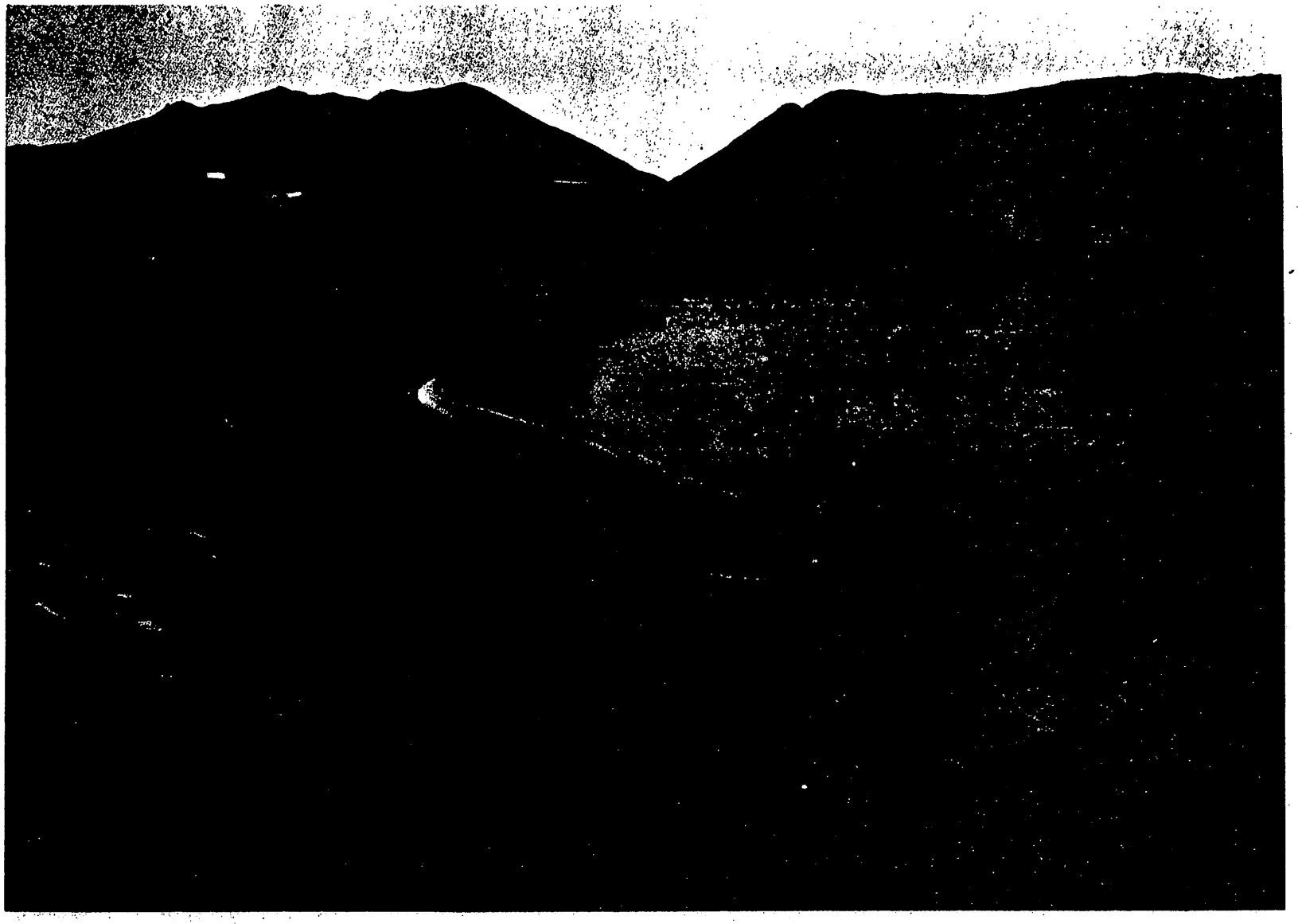


Figure 2-14 Wetting Down Contaminated Area

contamination. To further guard against contamination spread, the truck beds were equipped with wooden boxes with a hinged flap on the back of the box that was closed during time of movement. By 10 February, the equipment in place to do this work included:

16 water distributor trucks
11 dump trucks
3 road graders
2 bulldozers
2 front end loaders (2 cubic yard buckets)
5 gang plows
5 soil mulchers
3 tree limb shredders

In a normal day of operation, 140 truckloads were moved either to the burning area or to the storage location. The area for burning was at the dry river bed near the impact point of the B-52 tail. This operation was accomplished at night when winds were toward the sea. In late February this area was moved closer to the shore and a new road was completed from Site #3 to the beach, avoiding inhabited areas.

Harvesting was a matter of pure physical labor. Machettes were requisitioned from Gray Eagle supplies to cut tomato and other crops. As tomato crops required cane poles for their growth, three tree-limb shredders were requested from and purchased by SAC. The first of which arrived within 24 hours from the time it was requested, on 2 February. Cane poles were pulled from the ground, shredded, and the remains loaded into the trucks for delivery to the storage site (Fig. 2-15; 2-16).

Soil removal was accomplished by the use of road graders, where possible, with it first being moved into windrows, and then into piles and finally loaded into trucks. Where graders could not be used, as in the isolated, hilly area around Site #2, the work had to be done by hand. When scraping left small hot spots, plowing and/or hand removal was necessary. For low contamination, scarifying of the soil, with minimum turnover, dropped the count to an acceptable limit. This minimum movement of surface area was primarily important in Site #2 where it was feared that major movement of top soil in the fragile area would create a dust bowl.

Constant monitoring by the PAC-1S was necessary to detect contamination spread, but, in general, no problems were found. Occasionally a truck would turn up with positive readings and would require washing down. Operators of scrapers and plows were mostly unaffected, while personnel using shovels at times had some contamination on shoes, gloves, and outer clothing.

Washing of three buildings and some fences started on 30 January. Other buildings were washed but in cases this was not sufficient to lower the contamination level to the acceptable limit, and whitewashing had to be done. Rock wall fences were washed, and

Figure 2-15 Crop Cutting

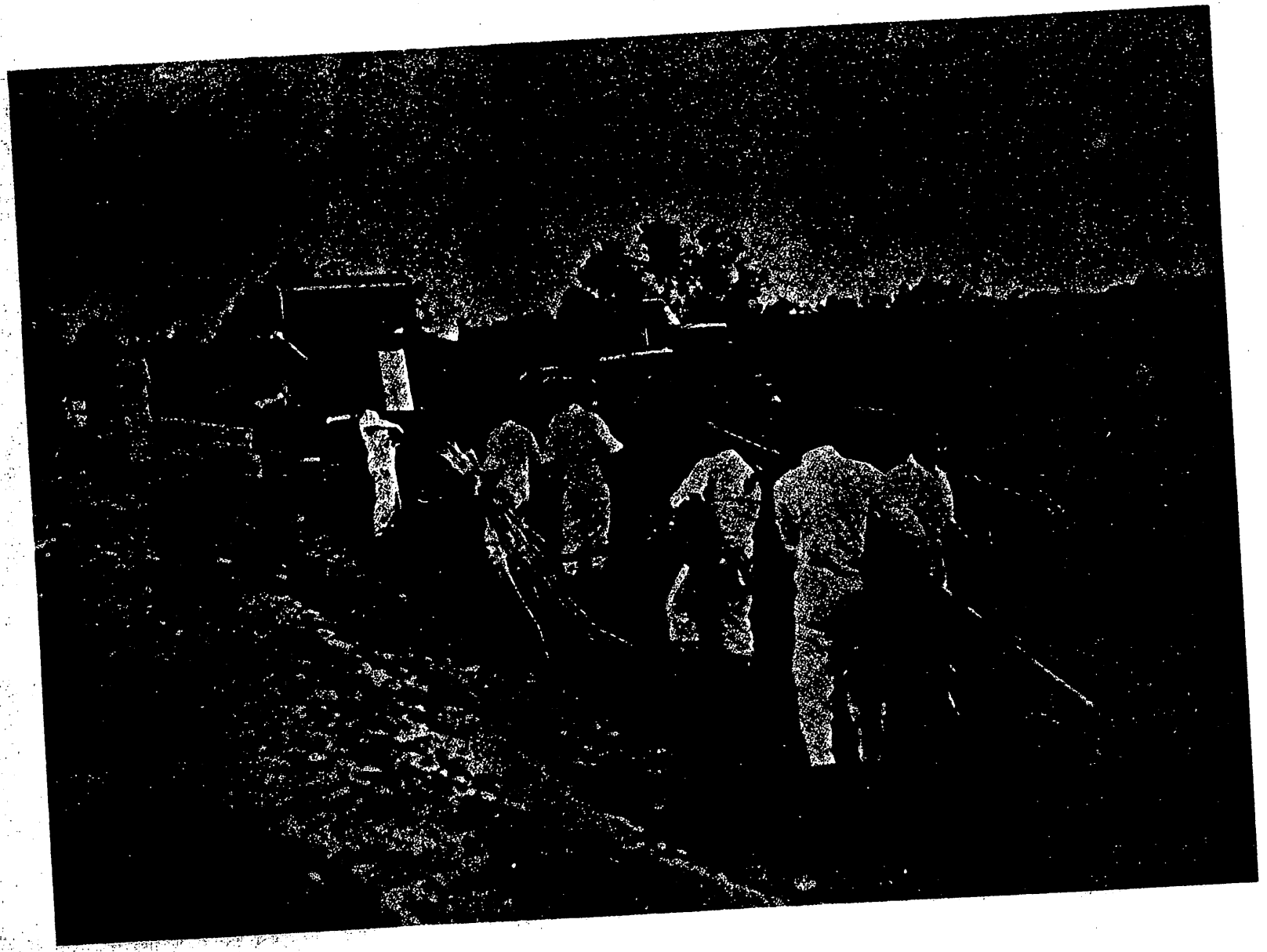


Figure 2-16 Mulching and Loading

where vegetation which defined boundaries had been removed, either markers or walls of concrete block or tile were constructed to mark divisions. Hot spots on embankments of the irrigation ditches were washed down to below 500 CPM.

The zero-count line surrounding the contaminated area at Site #2 was defined by 31 January, and by 2 February the 7,000 CPM line had been marked. The area of 7,000 CPM covered approximately 35 acres. Constant monitoring permitted establishment of the 100,000 CPM area by 10 February, consisting of about 4 acres. Scraping of the soil, and/or plowing, was started on 1 February. Vegetation removal started on 2 February. Although no one record exists of the number of truckloads hauled to the burial site, it was estimated to be approximately 400. About 470 truckloads of crops were hauled to the destruction site for burning. Use of water at this area was at first difficult since there was a road only to the crater area, and not through the area. At first a fire truck was used for washing purposes since the pumped stream would reach the desired distance. Later, regular water distributing trucks with spray bars were used. As crops and soils were hauled away, the zero line was moved, and by 6 March all cane and vegetation as well as the soil over 60,000 CPM readings had been removed.

Site #3 was located at the edge of the village of Palomares, with the area over 7,000 CPM being about 11-1/2 acres, of which approximately 10-1/2 acres were cultivated. The area over 100,000 CPM was established by 10 February as 1-1/2 acres. Removal of crops started 22 January and was completed by 28 February, with 2,815 truckloads being burned and about 165 going to the disposal trench. Removal of the soil started about 1 February and completed by 5 February. By 7 February the first land was returned to the owners.

Site #5 was identified on 2 February, consisting of approximately 9-1/2 acres. The contamination level was not as high, and cleanup procedures were not as difficult. Crop removal was completed by 18 February, with 402 truckloads taken to the burning area. Plowing was done the following day, and by 24 February all land had been declared acceptable for use and returned to the owners.

The contamination spots at Site #6 were found on 4 February, and by 16 February a zero line had been marked. Some question arose as to the origin of the radioactivity, and U.S. Air Force asked that samples of the soil be sent to the AEC. Due to the rocky terrain and the sparse soil covering, machettes were used to shave off a layer of soil, and in that manner usually less than 1/2 inch could be removed. A total of 12 samples were taken with surface readings varying from 500 to 2,000 CPM. At one time there had been a mining operation here, and one of the samples was taken from an old ventilation tunnel of the mine.

Tables 2-6 and 2-7 indicate the general extent of the decontamination operation.

TABLE 2-6

LEVELS OF CONTAMINATION*

Area #2	
1. 60,000 to over 100,000 CPM**	4 acres
2. 7,000 to 60,000 CPM	32 acres
3. Highest reading (soil contiguous to weapons chunks reading 2 x 10^6 CPM)	1.5 x 10^6 CPM
Area #3	
1. 60,000 CPM to over 100,000 CPM	1.5 acres
Some areas between 7,000 and 60,000 CPM included.	9.5 acres
2. 7,000 to 60,000 CPM	
3. Highest reading (on 25 Jan. 1966 at 30 ft from crater)	700,000 CPM
Area #6 (Village of Villaricos) (~1.0 mile ENE of Site #3)	
1. Range of values within village	low hundreds CPM
2. Highest (among some rocks southwest of village)	5,000 CPM
Total Areas	
1. Within zero line	630 acres initially 650 after winds occurred
2. Within 700 CPM line	500 acres
3. Between 7,000 CPM and 60,000 CPM lines	41.5 acres
4. Within 60,000 CPM line	5-1/2 acres
5. Above 7,000 CPM	47 acres

* Some apparent overlap among the data, probably due to varying levels within a given isopleth.

** 130,000 CPM corresponds to about 1,000 $\mu g/m^2$ - the DOD safety criteria for surface contamination.

TABLE 2-7

GENERAL POINTS

Soil - removed	1088 cubic yards from 5-1/2 acres
Soil - plowed: all cultivated land above 700 CPM	285 acres
Soil - watered: (20 Jan - 10 Mar)	285 acres
water use	100,000 gal/day
(During prolonged high winds fuel oil sprayed on stored material)	
Vegetation: (a) removed, mulched, stored (400 CPM or higher on vegetation)	400 yd^3
(b) burned (less than 400 CPM on vegetation)	3,700 truckloads (2 1/2-ton dumptrucks)
(c) all removed from areas where soil was above 700 CPM	285 acres

The Soil Shipment:

As discussed previously, soil with greater than 60,000 CPM and vegetation with greater than 400 CPM were to be removed from Spain. Although several methods of movement were considered, it was decided to place the waste in 55-gallon barrels. The barrels were fabricated by a contractor in Naples, Italy for delivery by 9 March. On 23 February, the plan for removing the debris was firm enough that DOD summarized it as follows:

Sixteenth Air Force has collected approximately 1500 cubic yards of contaminated soil and vegetation for removal from Spain. This will satisfy removal criterion agreed to by Government of Spain (GOS).

Sixteenth Air Force proposed the use of oil drum-like containers. Number required is 5,500, and these have been contracted for in Naples, Italy.

CSAF has arranged with CNO for pickup of drums by the USNS Card and delivery to Cartegena as soon as possible after production of drums is complete.

After filling, containers will be shipped to destination to be specified, but probably near Charleston, South Carolina, for rail shipment to, and disposal in, an AEC disposal area.

The delivery of the drums to Cartegena was opposed by the 16AF since it would then be necessary to transport them overland to Palomares, followed by carrying them back to Cartegena. Air movement of the empties was also considered, but since such aircraft as the C-124 could only carry 200, this was impractical; and, with San Javier as the nearest airfield, there would still be an over-the-road movement. DOD also pointed out that due to the sensitivity of this situation and the urgency of the matter, that "overland transport in Spain of contaminated debris should be minimized." It was suggested that if the barrels could be delivered by the Navy directly to Palomares, then the Navy could also pick them up there. The Navy was then asked to arrange such service. However, 200 of the drums were airlifted to San Javier and trucked to Palomares to permit testing.

Consideration was given to using either the SS Alma Victory or the USNS Cammon for movement of the empty barrels, with the USNS Boyce for transportation of the filled barrels to the States. None of these ships could load at the temporary pier at the beach, and landing craft would have to be used for lighterage (Fig. 2-17). The Alma was ordered from Suez to Naples, loaded the drums, and sailed for Palomares 1500Z, 9 March. The Boyce was routed Aden-Suez-Palomares, and arrived on 17 March. The U.S. Army's 1418th Transportation Terminal Unit, Cadiz, Spain, was given the task of handling the barrels from ship to shore and back again. A Military Sea Transport Service representative was assigned to duty to assist this operation. The Navy had one LCU and LCM6 and two LCM8 for use in shore-to-ship movement.

For the movement back to the States the Navy requested:

Dunnage, lashings and stevedores for shipboard handling, stowing, and securing of cargo.

One radiological survey team with proper radiac equipment to escort and monitor barrels while in transit to CONUS.

The need for a courier to accompany the shipment could be avoided if:

Each barrel were painted with consecutive numbers,

The words "Poison Radioactive Material" were painted in blue or red on the top, bottom, and sides of each barrel.

The 16AF did not feel that the labeling was in line with the spirit of the operation: minimum attention to the shipment. Also, since the barrels were being carried on Navy ships such warnings would not be required, at least until the barrels reached the United States and were prepared for overland shipment. Thus guidance from DOD was requested. DOD settled most of the questions by stating that due to the sensitivity of this shipment and the fact that no health safety hazard existed from the containers:

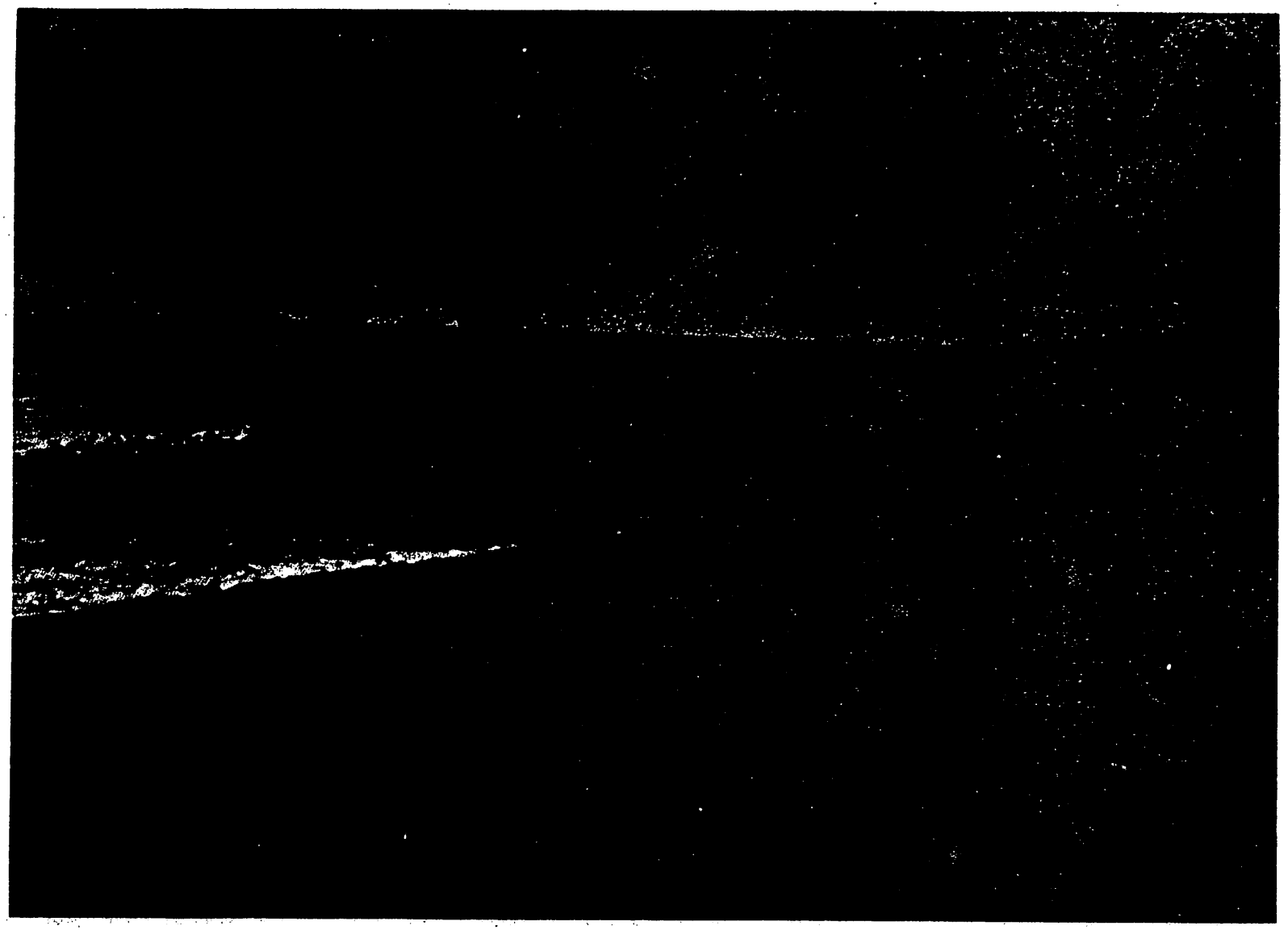


Figure 2-17 Camp Wilson Temporary Pier

Basic guidance continues to be to minimize visibility of the subject activity. Although it is recognized the soil removal task will be in full public view, the use of photogenic marking with scare words would seem to be unnecessary advertising.

Standard radiation warning markings will be required for common carrier in CONUS rail shipment. These, however, can be affixed at CONUS dockside.

In regard to the radiation monitoring team, the CNO was asked to comment. Navy decided that the barrels should be monitored before and during loading, and aboard ship during and after unloading. If that was done, no team would be required.

The Savannah River Facility, Aiken, South Carolina, was named as the receiving location. The docking site was to be the U.S. Navy Ship Yard, Charleston, which was to be responsible for:

Working on a 24-hour basis;

offloading 5300 sealed 55-gallon metal drums containing Spanish debris from USNS Boyce;

steel strapping 4 drums to a pallet;

loading drums into railroad cars and blocking/bracing cars as required.

The AEC would support by:

supplying 1,530 wing type hardwood pallets, 48" x 48";

arranging for about 30 railroad cars;

arranging for customs, agriculture clearances, and radiation monitoring services;

couriers to escort rail shipment to Augusta, Georgia;

reimburse expenses incurred in Charleston yards.

After these preparations, the filling operation began. Sixty-five airmen were sent from Moron and Torrejon to augment the camp force, including 12 carpenters, 3 welders, and the remaining 50 to work at filling and handling the barrels (Fig. 2-18). Personnel manning the shovels wore respiratorsor surgical masks, white coveralls, head coverings, and gloves. As each barrel was filled and covered, its sealing ring was affixed, the bolt tightened and welded in place, and two bands, placed at right angles, were spot welded into place. Each was checked for contamination at approximately 72 points, 12 on top, 48 on sides, and a

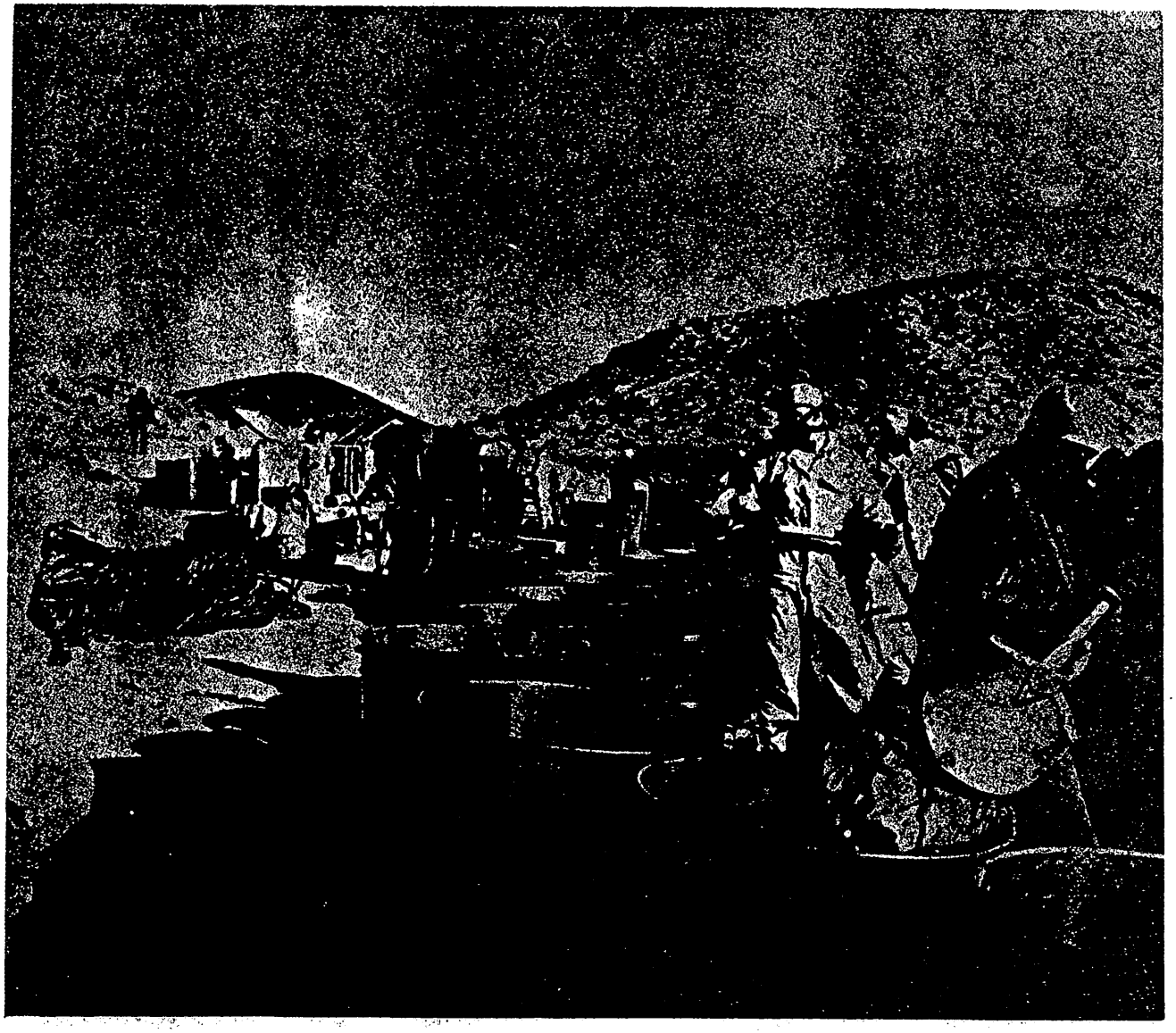


Figure 2-18 Barrel Loading Operations

final 12 on the bottom, before the barrels left the filling area (Fig. 2-19). A flatbed transported them to the beach, where radiation was spot checked. A roller conveyor system was used to move the barrels to the ships, with a square of plywood under each to permit easier moving. The goal was to move one barrel off the assembly line each 40 seconds (Fig. 2-20). It was found that only a very brief contact of the PAC-1S was needed to show if contamination existed; thus, with two monitors working top and sides, and a third for the bottom readings, the goal could be accomplished.

Four shifts of workers were used to fill the drums: 0600-1000, 1000-1400, 1400-1800, and 1800-2200 hours. Until the shredded vegetation supply ran out, the barrels were filled about 1/3 full with vegetable matter, and the remainder with soil.

When on 11 March, the SS Alma Victory arrived, the 200 barrels that had already been air-shipped were filled and waiting on the beach. Since the Alma arrived late in the afternoon, it was not until 12 March that the first barrels were off-loaded. The USNS Boyce arrived on 17 March. Some delays were encountered due to weather, and, at times due to the unavailability of LSU's or LCM's for carrying the drums to the Boyce; however, all work was completed by 24 March, as shown in Table 2-8. No radioactive contamination detected during entire operation. Appreciate outstanding cooperation/assistance Mr. Bastin/Mr. Hopkins and other AEC representatives.

TABLE 2-8

FILLING, LOADING, CONTAMINATED MATERIAL, DRUMS, PALOMARES
11-24 March 1966

Date	Empty On Beach	Filled On Beach	Aboard USNS Boyce
March 11		200	
12	3000	580	
13	5500	1214	
14		2221	
15		3180	
16		4062	
17		4810	
18			1550
22			3240
24			4810

At 241205Z March, the last barrel was moved off the beach, and at 1600Z the USNS Boyce sailed to arrive at Charleston at 052100Z April. Subsequently, USNS Boyce reported:

Figure 2-19 Monitoring Barrels

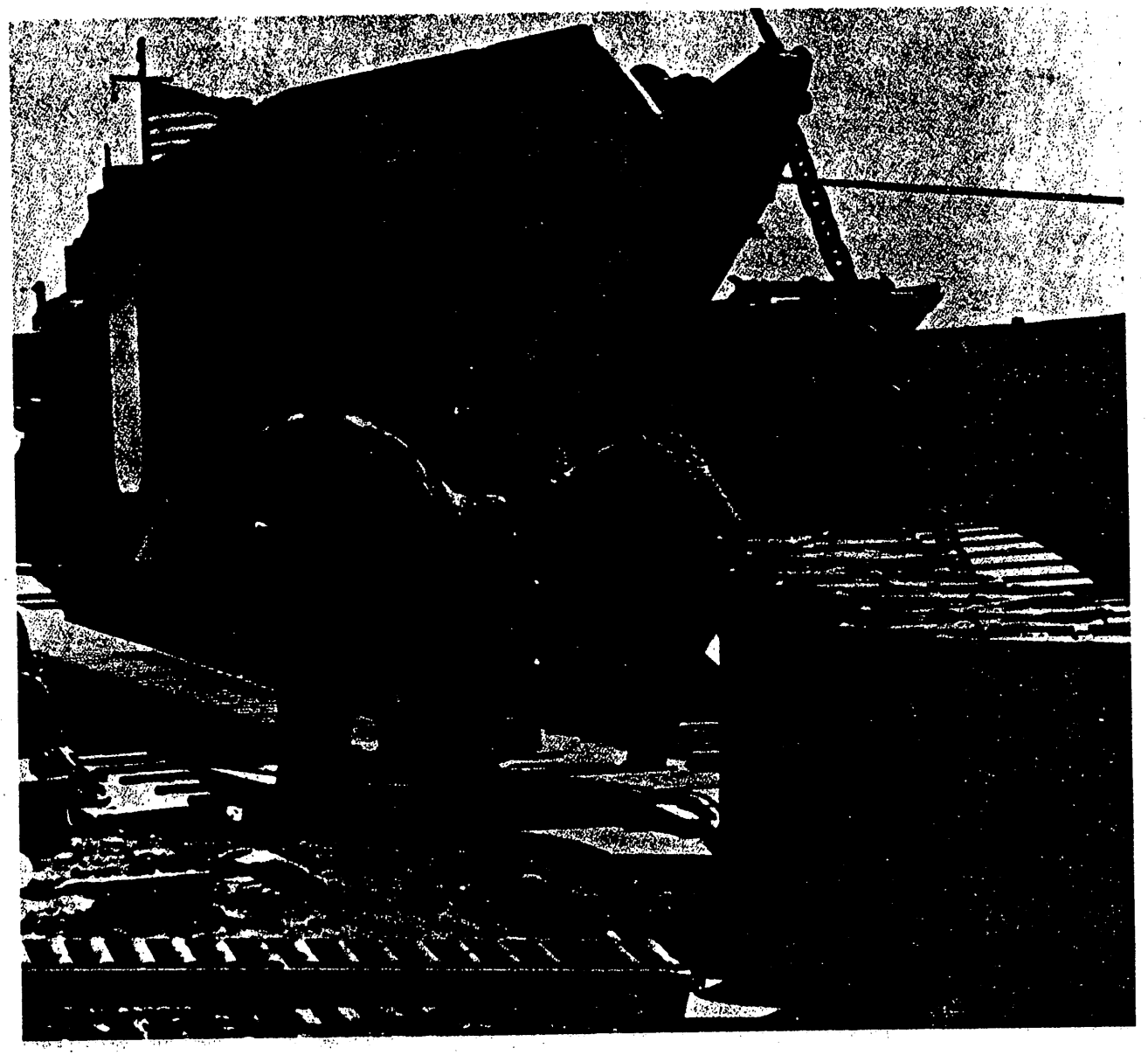


Figure 2-20 Barrel Loading Operations

Inspection by AEC representatives revealed drums arrived in satisfactory condition and off-loading from Boyce completed 060700Z. USNS Boyce departed Charleston 062300Z.

Completed loading drums into railroad cars 071040Z. Twenty-six cars accompanied by two AEC couriers in the caboose scheduled to depart Charleston 080130Z via Atlantic Coast Line Railroad, estimated time of arrival, Dunbarton, South Carolina, 081200Z.

From the accident site a summary of the contamination readings was sent to AEC. None of the drums showed exterior contamination, with the material in the drums carrying readings varying from zero to 300,000 CPM, with most of it at levels well under 40,000 CPM. Drums with soil that had come from an area of particularly high readings could not be identified since the moving and mixing process had caused a loss of identity. Two of the barrels were destined for Los Alamos, for Dr. Langham. They had been requested for research purposes. This left 4,808 for disposal in the trench grave prepared at the disposal site.

At the accident site the completion of this second phase of the disposal activity permitted release of 147 personnel from Camp Wilson for return to their home stations.

Return of the Land:

As the land was cleared of contaminated soil, some of the top soil was replaced, with the primary source being the dry river bed near the camp. As other areas were plowed and/or washed down to zero readings, the land was monitored by the U.S. Air Force and JEN, who agreed on its cleanliness and turned it back to the owners. Seven local tractors were rented for the plowing and harrowing, and a local farmer was put in charge of the operation. Some complaints were made on the results, primarily that the land was not left in a uniform level condition. Thus, some of this was reworked with the owners present and remaining until the job was completed on each plot. By the evening of 1 April all land within the contamination zone had been placed in the condition desired by the owners. All damaged culverts, irrigation ditches, bridges, concrete block fences (which replaced some of the cactus fences that had been removed), had been replaced, painted, repaired, or whatever other work was required to return the countryside to its original condition. On file in the City Hall of Cuevas De Almanzora was a map showing the plots of the land. From this map, each area was identified, and a Certification of Decontamination Action was prepared to show the method of decontamination, the date, and it was signed by both the JEN and the USAF representatives. This was an unofficial record used as a file copy by the two agencies. Next, a document was prepared that returned the land to the owner, with this also being signed by both JEN and U.S. Air Force, as well as the Spanish agronomist at the site, and the two commanders. The forms are shown on the following page. These were filed with the claims office of the Judge Advocate; one copy went to the land-owner, and one to General Montel, the Spanish commander for this project. A total of 856 were prepared.

DOCUMENTS FOR RETURN OF LAND TO OWNERS, SPAIN
February 1966

DOCUMENT I

Certification of Decontamination Actions

Removal of contamination from Plot ____, Site ____, has been accomplished as of _____ _____. The method of decontamination was _____. The undersigned jointly certify that this plot was monitored by JEN and USAF Representatives on _____, and the surface was found to be free of contamination. The monitoring instruments were calibrated PAC-1Ss, manufactured by the Eberline Instrument Company, Santa Fe, New Mexico, U.S.A. Monitoring was done by placing the probe face in direct contact with the surface. JEN Representative _____. USAF Representative _____. I certify that this plot can be returned to the landowner(s) for his use.
Date _____

DOCUMENT II

In Palomares (Almeria) on _____ of _____ 1966 the following were present _____ _____ representing the Sixteenth Air Force of the United States, and _____ _____ as a member of the Nuclear Energy Commission of Spain, and Mr. _____ _____ as a representative of the Department of Agriculture of the Province, and were in complete agreement. THEY DECLARE AND CERTIFY: That the contamination may be considered eliminated as of the date of this document in the property _____ identified in the map which is on file in the City Hall of Cuevas de Almanzora with the No. _____ zone _____, the decontamination having been accomplished by plowing, irrigation and grinding, and was tested by the Nuclear Energy Commission of Spain and by the North American technicians on _____. The instrument was the PAC-1S, made by the Eberline Instrument Company of Santa Fe, New Mexico, U.S.A., and the testing was done by direct contact with the surface of the ground. That with respect to the condition of the fertility and safety of the land in question in this document, at this moment, the same conditions exist as were present prior to the 17th of January 1966 and such land should be returned at this time to its owners for normal use. And to go on record, we herewith issue and sign this document in quintuplicate for this purpose with the approval of the Commanding General of the Zone, as well as the Commander of the United States Air Force in the place and date indicated above.

Representative, NEC	Representative, USAF	Representative, Department of Agriculture, Province of Almeria

Approved	Approved
Commanding General of the Zone	Commander, Sixteenth Air Force

SECTION 3

SEA OPERATIONS

BACKGROUND:

Situation:

At 0922Z, on 17 January 1966, the collision of an Air Force B-52 SAC bomber and a KC-135 Tanker aircraft caused some 250 tons of debris to plunge to the surface of the earth in the vicinity of a Spanish hamlet called Palomares. Because of the proximity of the collision point to the coastline (Fig. 3-1) and the prevailing wind conditions, much of the debris fell into the Mediterranean Sea. The purpose here is to summarize the actions that resulted in the at-sea search, identification, recovery and wrap-up of Aircraft Salvage Operations Mediterranean (AIRCRAFT SALVOPS MED).

Authority:

In response to a verbal request from the Sixteenth Air Force Command for search and rescue assistance, the Commander in Chief, U.S. Naval Forces Europe directed Commander, Sixth Fleet to send a ship to the area. As a result of this order, a fleet tug (Fig. 3-2) arrived off Palomares just 7 hours and 8 minutes after the accident. Since the recovery of survivors by Spanish fishermen had occurred several hours previously, the Navy ship was released by the Air Force on-scene commander the following day. However, since only three of the four hydrogen bombs carried by the B-52 could be located ashore, the Air Force requested Navy participation in an at-sea search and the recovery of the debris resulting from the collision. Again, Commander, Sixth Fleet, responded, this time by ordering three ocean-going mine sweepers and a four-man EOD team to the area. This contingent was only the forerunner of the eventual thirty-four vessels that were to be manned by some 3425 civilian and military personnel. This task force was to be augmented by an assortment of four manned submersibles, three unmanned vehicles, and numerous systems designed to aid in, the search, identification, and recovery of objects located on the ocean floor.

Meanwhile, the DOD took action within its means to provide the necessary support to insure that the missing weapon would be recovered in the most expeditious manner possible. The Assistant to the Secretary of Defense (Atomic Energy) requested, through the Assistant Secretary of the Navy (Research and Development) that the Navy use all means to accomplish the task before them. On Sunday, 23 January, the CNO established AIRCRAFT SALVOPS MED and directed mobilization of Navy resources to assist in the search and recovery of the lost nuclear weapon. Since the Navy is responsible for the disposal of explosive ordnance discovered within the ocean, the task of locating the missing weapon was set about in earnest.

In the main, the CNO order resulted in two primary actions, one on site and the other within the Naval establishment. Task Force Sixty Five was organized from the assets of the Sixth Fleet. Rear Admiral William S. Guest, USN, Deputy Commander, Naval Strike and Support

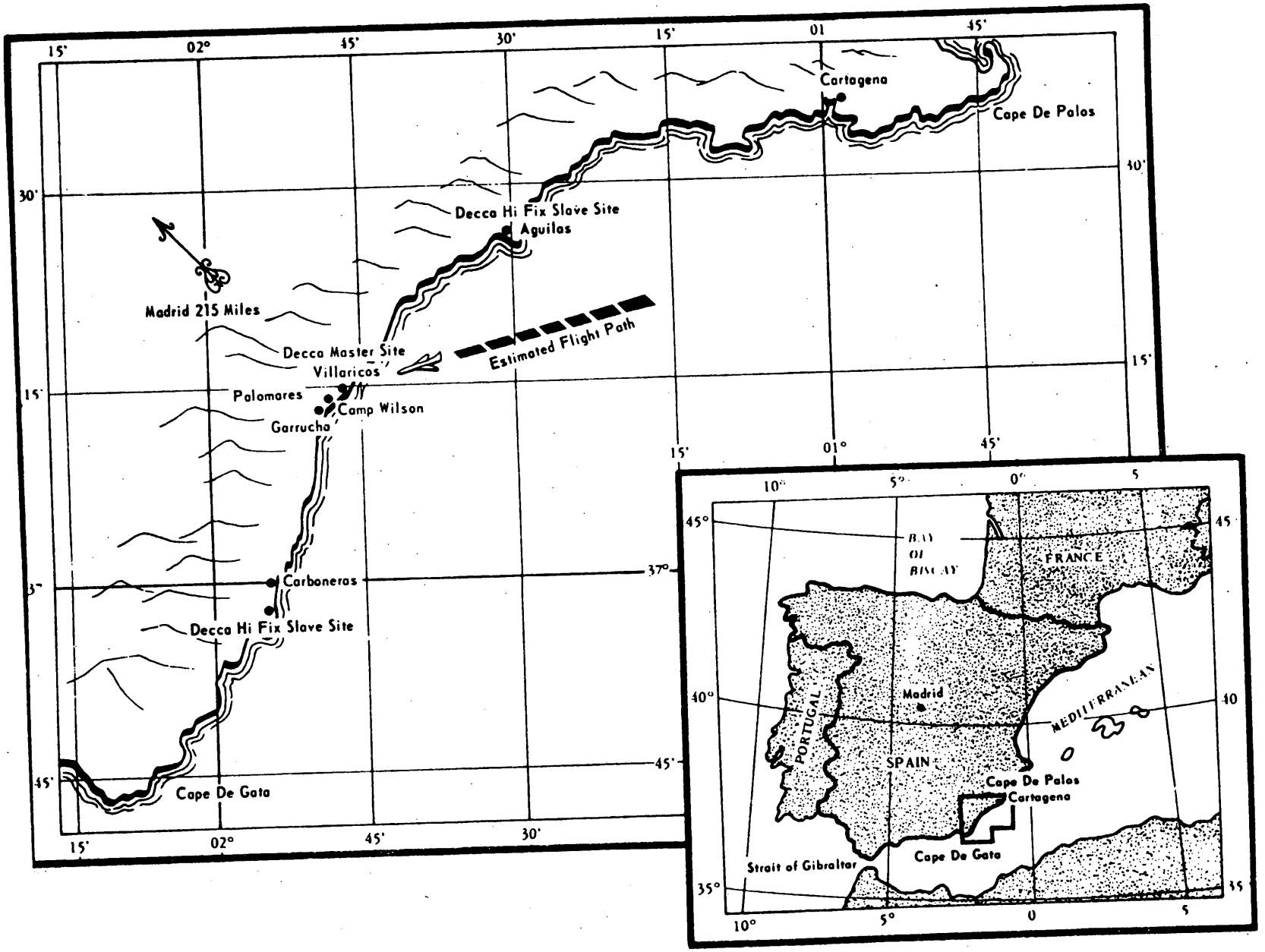


Figure 3-1 Southeast Spanish Coast

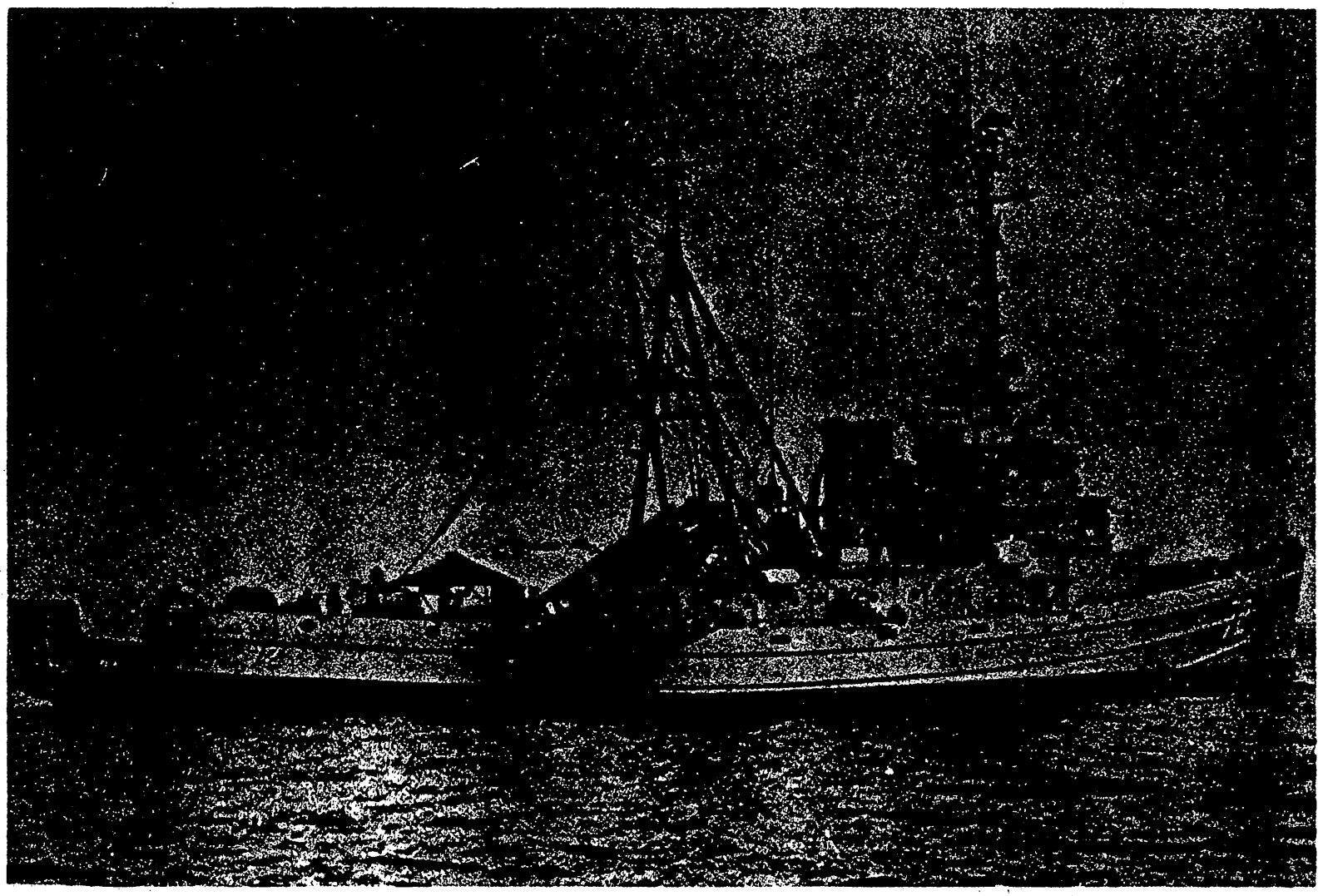


Figure 3-2 Fleet Tug

Forces, Southern Europe, was selected as the Task Force Commander (CTF). At the same time a Technical Advisory Group (TAG) was formed under the chairmanship of Rear Admiral Leroy V. Swanson, USN, Assistant Chief of Naval Operations (Fleet Operations)/Director Fleet Operations Division. The TAG consisted of representatives of those elements within or close to the Naval establishment who were most knowledgeable in the field of deep submergency capabilities and environmental problems. The mission of these established organizations was to support and "... conduct coordinated surface and subsurface operations in the vicinity of Palomares, Spain, in order to detect, identify, and recover material associated with the aircraft collision."

This task was to keep both groups at maximum effort for the next 75 days when finally the lost weapon was found, placed in its shipping container, and returned to the United States.

ORGANIZATION:

As with most emergencies or accidents, the military establishment was prepared for such an occurrence with contingency directives to be instituted through the chain-of-command. Before this accident, no weapon had been lost at sea in what could be termed foreign territorial waters. Consequently, the normal chain of command was modified as shown in Figure 3-3 to include representatives of particular interests of both the Secretary of the Navy and the Secretary of State. Once the available information had been passed to CTF-65 by those responsible in the 16AF, the at-sea operations proceeded with little dependence upon the land operation. In fact, from the outset, Naval participation was geared to the assumption that the fourth nuclear weapon was lost at sea, so that the eventual conclusion by the Air Force that the weapon was not on land had little direct effect on the tempo of operations of the sea searchers.

The development of TF-65 was slow and at best piecemeal. Very early in the effort, minimum requirements for the task force were estimated, and ships at least partially equipped for the specialized operations were assigned. Some were involved with maintenance overhaul cycles and so could not get underway immediately for Palomares. As the sea search effort continued with forces immediately available from Sixth Fleet, the TAG laid the highest priority upon procuring the military and civilian expertise in the field of deep sea recovery as well as much of the equipment and instrumentation suggested by these experts. As these personnel and materials filtered in by sea and by air, CTF-65 began to fill the slots of his final staff organization (Fig. 3-4). The initial source of personnel was from the complements of the ships on station. For the most part, the personnel in similar billets aboard the Flag ship were asked to double as the appropriate staff members.

The CNO had directed that full and precise documentation of AIRCRAFT SALVOPS MED would be required should the search be unsuccessful. These records would provide proof of the effort expended and justification for terminating short of success. On the brighter side, such information was considered to be useful for application in future development of procedures, vehicles, and equipment. To accomplish this task, a tactical analysis group, composed of four naval officers and three civilian analysts, was ordered to report to CTF-65

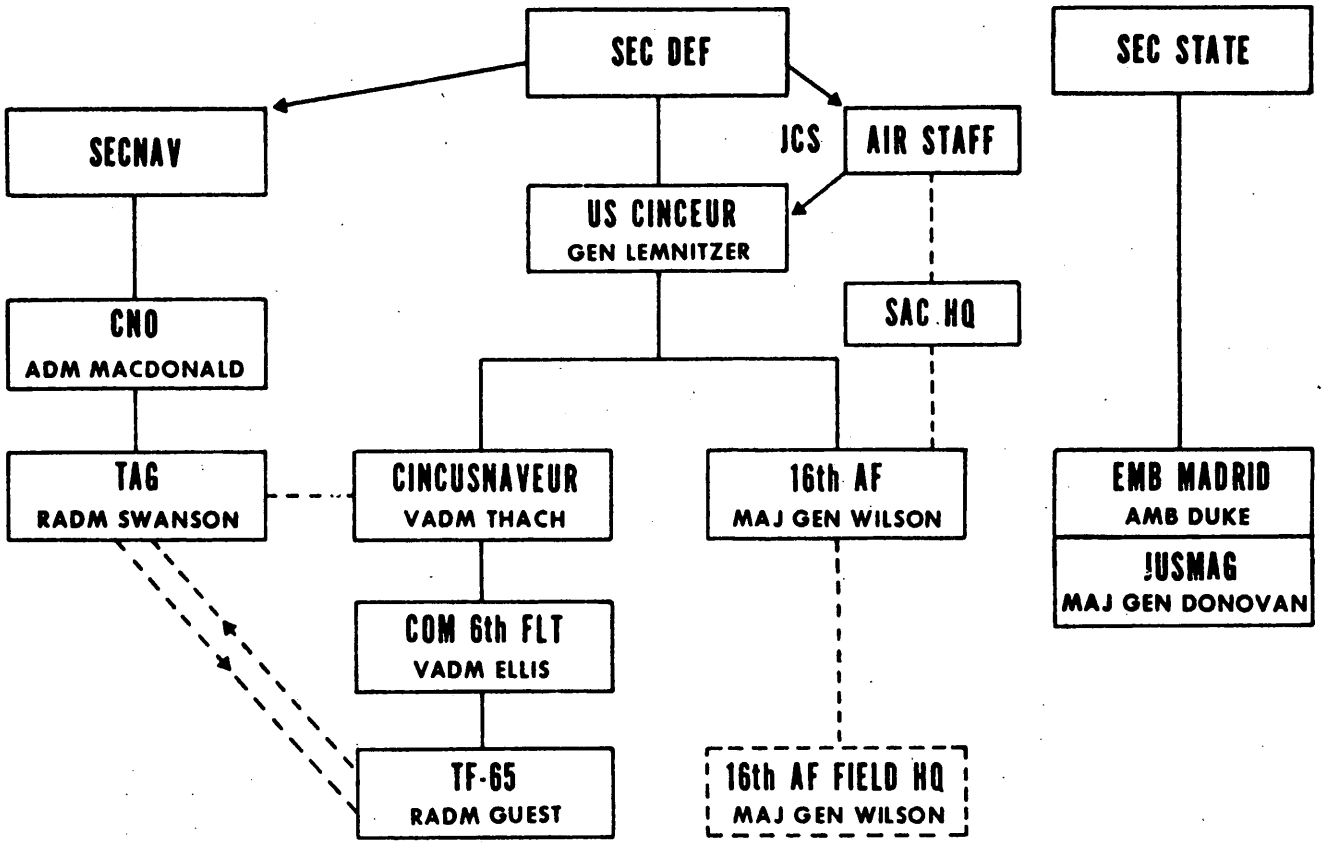
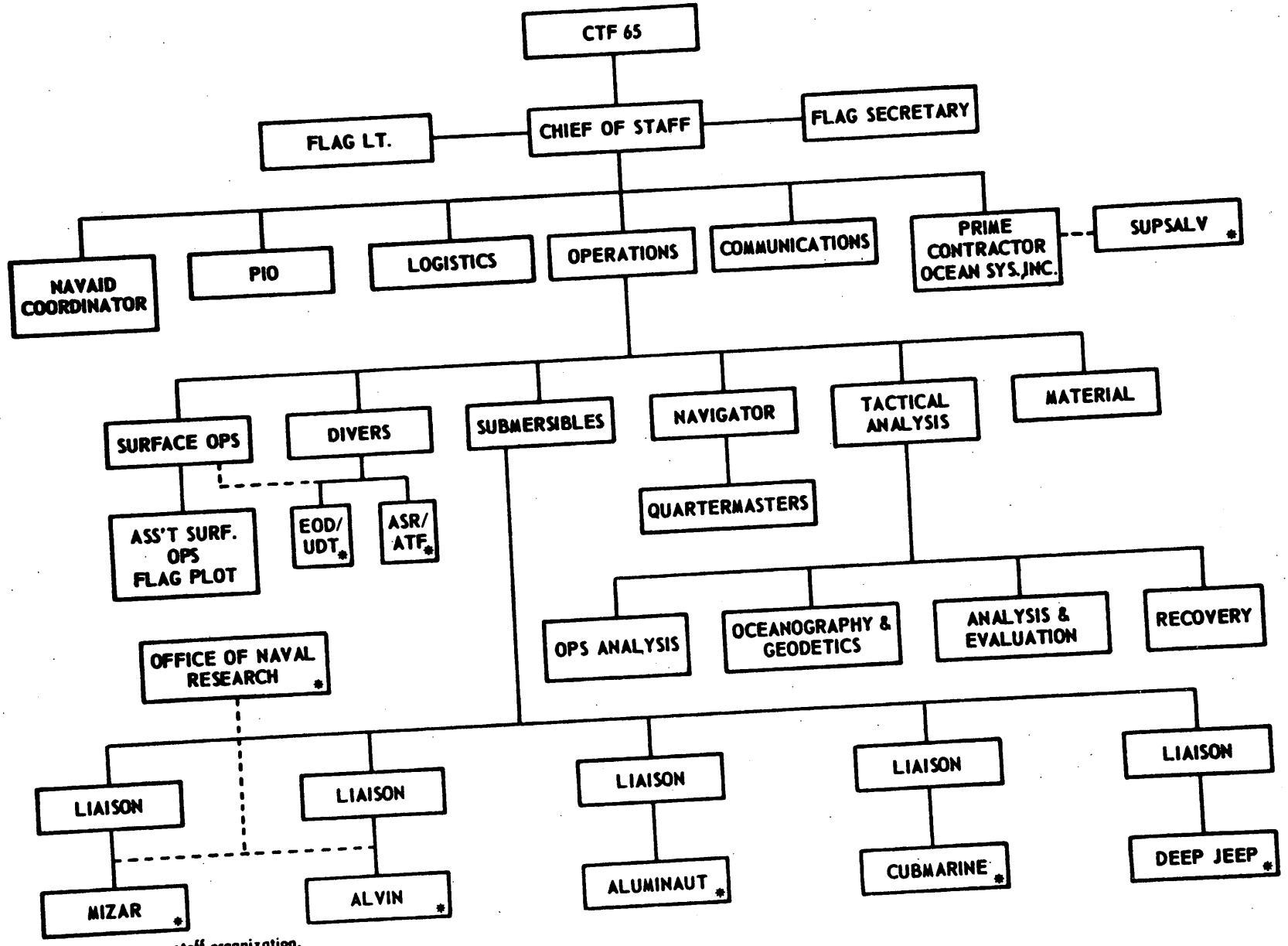


Figure 3-3 Modified Chain of Command



* Indicates a non-staff organization.

Figure 3-4 CTF Staff Organization

by the middle of February. It is of note that all four of the naval officers were qualified submariners, an appropriate selection in light of the fact that CTF-65 was an aviator and not experienced in matters pertaining to search for and recovery of objects on the ocean's floor. With the addition of these seven personnel, CTF-65 at last had an adequate functional staff. The director of the group was assigned as TF-65 operations officer on the staff, thus providing the submarine experience heretofore missing from the task force organization.

To organize the TAG, CNO drew upon men who were not only experts in their own right, but those who also headed the organizations most intimately connected with recovery at sea. These groups from within the Naval establishment were augmented by consultants from various civilian companies having experience in this field. Table 3-1 lists the members of the TAG and their respective positions within the Naval establishment or civilian community.

TABLE 3-1

TECHNICAL ADVISORY GROUP

Established by the Chief of Naval Operations in response to a request of the Secretary of the Navy. Met formally for the first time on 24 January 1966, in Washington, D.C.

Members

Rear Admiral L. V. Swanson	Chairman
Rear Admiral O. D. Waters	Oceanographer of the Navy
Captain E. J. Snyder, Jr.	Special Assistant to the Assistant Secretary of the Navy (R&D)
Captain W. F. Searle, Jr.	Supervisory of Salvage, U.S. Navy
Doctor John P. Craven	Chief Scientist, Deep Submergence Systems Project
Rear Admiral (retired) E. C. Stephan	former chairman Deep Submergence Systems Review Group

Various other Navy, Air Force, and commercial representatives on an as-needed basis

Although not formally depicted on the organization charts, official liaison was established with a small Spanish Naval detachment in Aguilas. It was this group which ordered the available vessels in the area to proceed and assist immediately after the accident. They, too, were tasked with supporting TF-65 in maintaining the integrity of the search area and search operations. On one occasion, when a French salvage ship showed up in the middle of the Task Force, the Spanish authorities were asked to use their influence in removing the unwanted guest from the area of operations. The French ship complied. The Spanish Naval effort was very successful.

COMMAND AND CONTROL:

Although it is apparent from the discussion in this section, one point deserves emphasis. TF-65 was a diverse assemblage of ships, naval personnel, and civilian specialists. As with any special purpose group brought together for a specific purpose, command and control assumes significant importance. The problems of command are also magnified by any situation where political implications of international importance exist, as they did at Palomares.

Published accounts of TF-65 operations have cited friction between some military and civilian personnel as being detrimental to its mission. This friction is described as resulting mainly from differences of opinion on the conduct of search operations, the importance of various findings and the like. What these accounts fail to portray is the immensity of the problem of locating the bomb, if it could be located at all. This operation met and overcame problems never before encountered. TF-65 operated in a difficult environment and it succeeded in its mission. That should be, and is, the principle item to lead any report of its activities. That is the tribute deserved and shared by the officers, seamen, and attached specialists of the command.

Communications, a vital component of Command and Control, were initially nonexistent in the Palomares area. Even ashore, considerable time and effort were required to reach a telephone and then there was no guarantee that the call could be completed successfully. No rapid means of classified communications were available until adequate radio equipment and the required power source could be shipped in and installed. For the sea operations, there were two primary communications channels required. One was local in nature and served the immediate operational requirements of the Task Force and its support units. This system was unsatisfactory on many occasions. Insufficient frequencies were available to handle both administrative and tactical traffic because many ships were auxiliaries or Military Sea Transportation Service ships who were often limited in communications, personnel, and equipment. Included in the limited category was the ship-to-submersible circuit. While communications to the ALVIN and ALUMINAUT via the UQC-1 systems were reliable, the range capability was limited and some interference was experienced when the two submersibles were operating in contiguous areas. Even greater difficulty was encountered by the CUBMARINE and its control vessel, usually a minesweep (MSO). Desired course information was generated from sonar contact with the target and the submersible. The course to steer was then relayed to the open bridge by sound powered phone, thence to the tending motor whale boat by walkie talkie radio and finally to CUBMARINE by the Aqua Sonics underwater telephone. Is it any wonder then, that the resulting orders and information were often lacking in clarity and completeness.

The second communications channel of import was the one providing a reliable link between the CTF-65 and his immediate senior in the chain of command. This channel was not effectively established until the arrival of the cruiser, USS BOSTON (CAG-1) (Fig. 3-5), on January 1966. It was through this ship's capabilities that CTF-65 was able to request assistance and report progress to the CNO and the TAG in Washington, D.C.

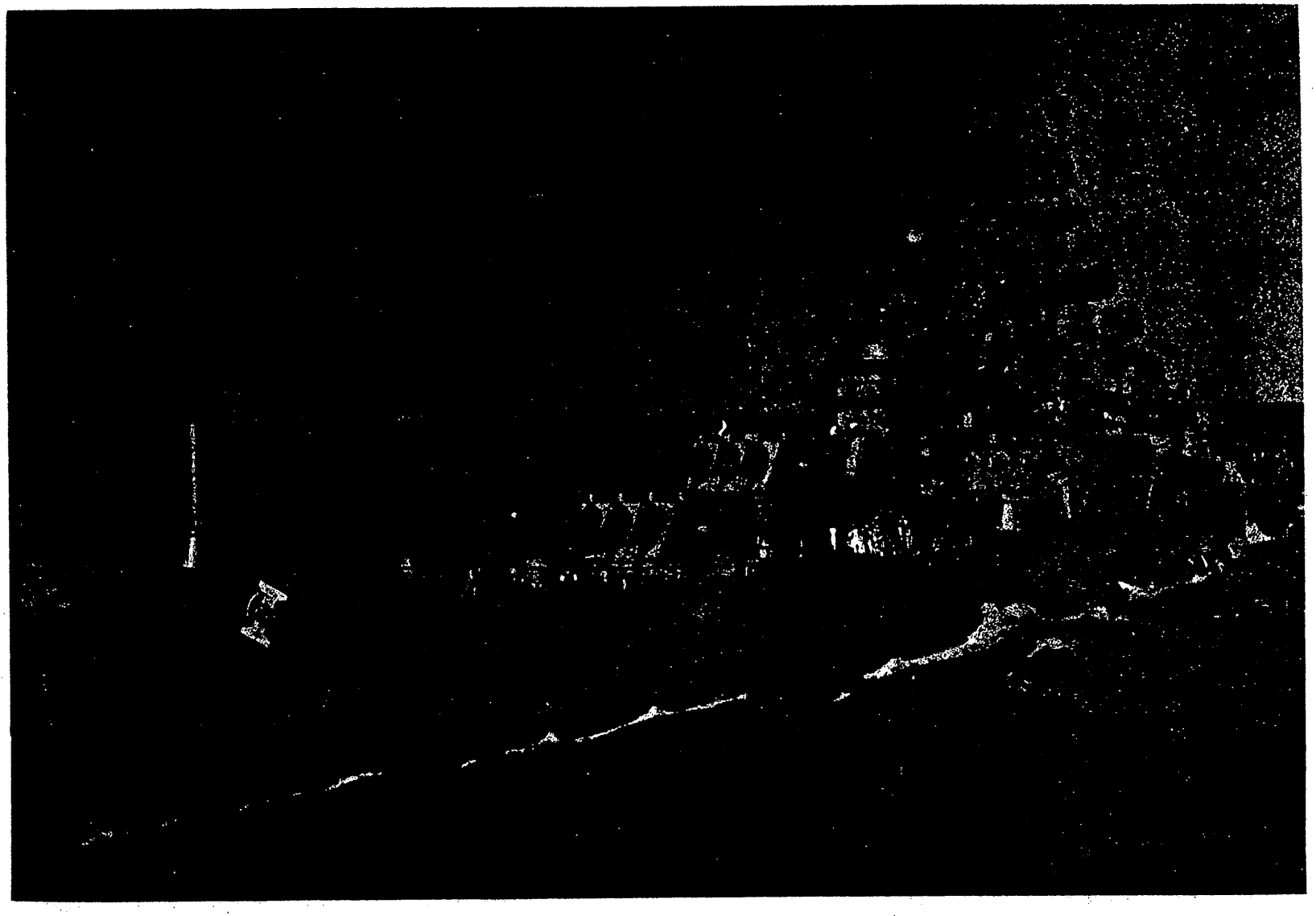


Figure 3-5 USS BOSTON

OPERATIONAL REQUIREMENTS:

Shipping assets required by operations generated in AIRCRAFT SALVOPS MED grew from one fleet tug to a virtual armada of Naval and commercial vessels. The urgency of the situation dictated that the initial contingent of TF-65 initiate immediate action within its capability. Little more than the basic facts concerning the aircraft accident were available to those early participants. The information available to the CTF, upon his arrival at Camp Wilson on 24 January, consisted only of a rough estimate of the actual position of the collision, some guesses concerning the sequence of events following the break-up of the B-52, existing meteorological phenomena, and the location of the surviving crew members and assorted aircraft debris.

The sighting of an object suspended from a large white parachute, its position, and significance to the overall search effort have been matters of uncertainty even to the time of this writing. On 21 January, prior to CTF-65 arrival, several actions had taken place that were to impact on the entire search effort.

The first two ships to arrive with any search capability, the Minesweepers, USS SAGACITY (MSO-469) (Fig. 3-6), and USS PINNACLE (MSO-462) commenced a random search in the area using their hull-mounted search sonar (UQS-1). On the following day, the splash-down point of the large white parachute was confirmed when the Spanish fisherman, Francisco Simo' Orts, who had been closest to the position in question on the day of the accident, was taken aboard the USS PINNACLE. Senor Simo' Orts positioned the ship by seaman's eye. A sonar search of the area resulted in two promising sonar contacts at a depth of 2040 feet. These contacts were reconfirmed by leaving the area and again asking the fisherman to position the ship over the splash-down point. Again the sonar contacts were obtained. Unfortunately, nothing further could be done toward identifying these contacts until a much later date. A confirmation of the splash-down point was received from two other sources: one, a Spanish pharmacist in the vicinity of Garrucha and the other, his assistant located approximately 1 to 1 1/2 miles north. Both men observed the splash-down of the white parachute and provided bearings to the position. These bearings all passed through the search area finally designated as Alpha I. It is rather ironic, if true, that Simo' Orts attempted to pull on board his boat a very heavy object attached to a parachute. Unable to raise the weight and after having dented his boat in the attempt, he released the parachute and its hidden weight and watched it sink into the depths. How different the next 81 days might have been, had he towed the object into shallow water. (This incident was not confirmed in official testimony.)

Armed with a meager amount of information of questionable accuracy, CTF-65 set about establishing an operational plan. Certain aspects of the task were determined, followed by action to provide the ships, personnel, and equipment needed to meet the known requirements.*

* Note - The following functions are not in themselves unique, but categorize the primary purpose of the units as assigned. At various times some of the ships served in secondary and sometimes dual capacities as the need arose.

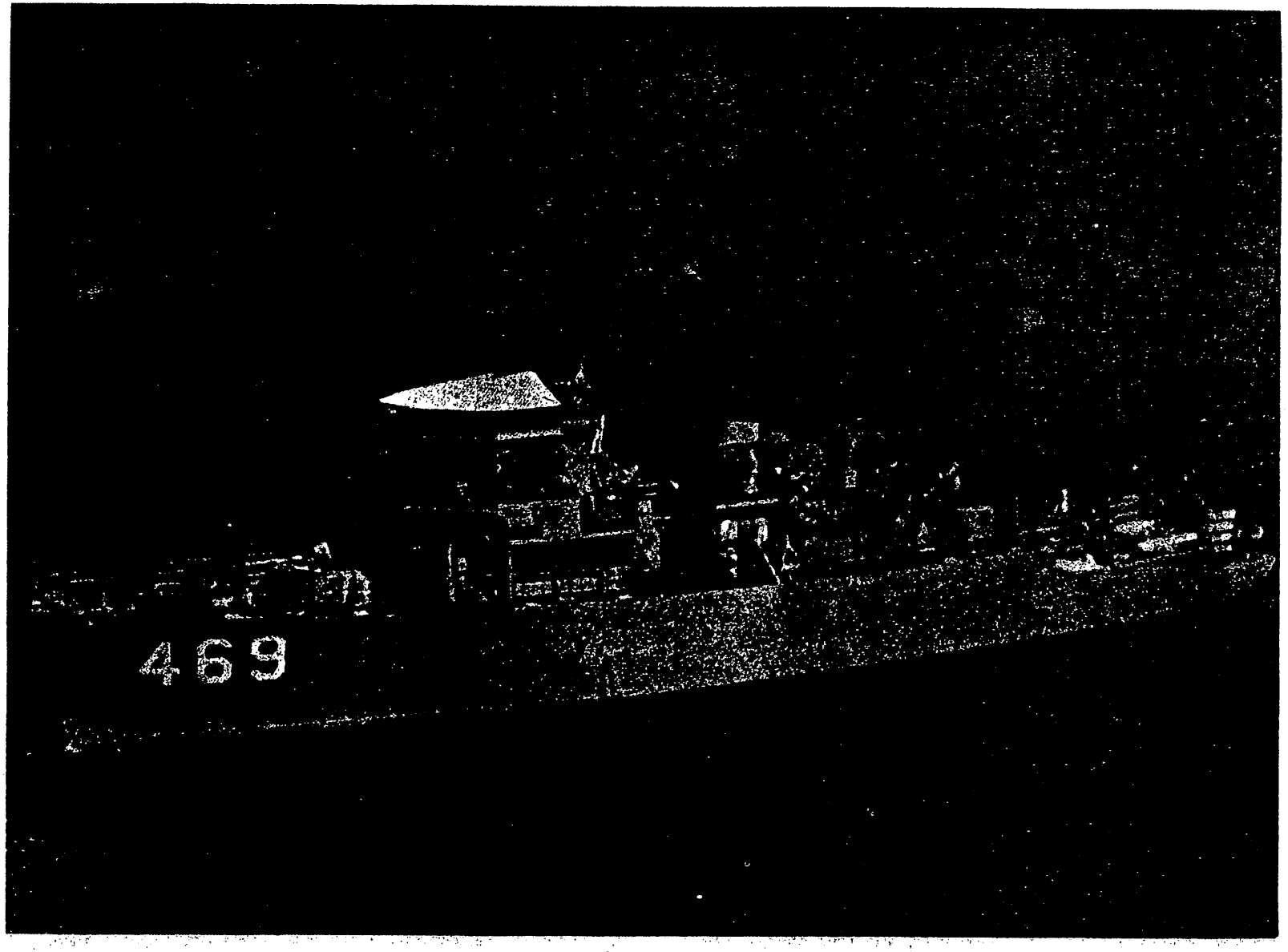


Figure 3-6 USS SAGACITY

Security:

To a world in the throes of a cold war under the threat of nuclear conflict, security measures were high on the list of tasks assigned to TF-65. Several areas were considered important. Area surveillance was conducted by various sea and air units, according to their availability. Their mission was to insure the integrity of the operational area and to maintain continuous surface and subsurface surveillance of the seaward approaches. Surface units were selected from the ships which were assigned to TF-65 and in the area. Air surveillance was provided by aircraft from nearby land bases. Perhaps the most significant surveillance/security operation was that of tracking the Soviet Elint Trawler "LOTSMAN" which observed AIRCRAFT SALVOPS MED for a period of 12 days. Area security was further enhanced by Spanish patrol craft who assisted in keeping the local fishing fleet from interfering with the search and recovery operations.

In addition to the physical security, these units provided command facilities for CTF-65 and his staff, serving as flagship and insuring secure communications to assigned units as well as up through the chain of command. In general, a cruiser, or destroyer was assigned these duties.

Search:

A random search effort began upon the arrival of a search capability. However, to continue such operations would have been a waste of time, men, machines, and money. Random search over such a large area, approximately 130 square miles, would have been inefficient and provided no measure of search effectiveness. CTF-65 immediately designated specific search areas and assigned a priority to each, commensurate with the degree of reliability of the known facts and sightings. The methods and evidence used to finally pinpoint the positions of the search areas varied widely. Of greatest concern, was the selection of the center of area Alpha I. This, in fact, played an important roll in the litigation of the Simo' Orts claim against the U.S. Government for services rendered. A number of factors were considered in determining the search areas, some having greater impact than others on any specific area. In the main, these factors were:

Track of the B-52

Wind direction and velocity from aircraft altitude to the surface

Debris pattern ashore and near the beach

Survivor splash-down points

Air Force computer studies based on the above

Sonar contacts

Visual sightings from personnel on shore

The observations of the fisherman Sino Orts

Area Charlie coordinates were selected by reference to the Air Force computer studies and survivor splash points. Area Bravo was based on the Air Force computer studies. Area Alpha II was selected mainly as an extension of the debris pattern on shore. Finally, and the most auspicious was the selection of Alpha I by CTF-65. This selection was primarily based on the mean of eleven Ocean Bottom Scanning Sonar (OBSS) and UQS-1 contacts which were accorded high credibility because of the statements and plotted evidence from the Spanish fisherman Simo' Orts and the pharmacist and his assistant in Garrucha. These area selections were not finalized until 17 February at which time some 150 contacts had been logged and many processed. Figure 3-7 illustrates these areas with their underlying bathymetric contours. Priorities finally assigned followed in alphanumerical order. These areas were designated by latitude and longitude in reference to the then available navigational charts of the area. These charts were not very accurate.

The navigational aids consisted of radar for range and bearing fixes, consolan, radio beacons, visual landmarks and Loran-C. Radar, consolan and radio beacons are not accurate enough for high order positioning. Visual aids were not on a common datum and in proper relationship to the search area; therefore, they were not useful in the search. Loran-C would not have been suitable due to the distance to the transmitting stations, resulting in weak signals being available in the search area. The only medium or large-scale chart covering the Palomares area in the chart allowance for ships in the Mediterranean Sea is H.O. 3930, scale 1:233640. This chart was compiled in October 1935 from old Spanish charts and was revised in October 1966. The chart carries the note: "Some features on this chart may be displaced as much as one-half mile from their true position." It was found that this was the rule rather than the exception. One more chart (identified as SPN. 108) existed covering the search area and it was reprinted by the Navy Oceanographic Office (NAVOCEANO) in January 1966 from a Spanish chart compiled in June 1960, from latest Spanish surveys. Insets on this chart are a chartlet of Palomares and Villaricos and a chartlet of Garrucha. Both of these chartlets are to a 1:25,000 scale, but neither the main chart nor the chartlets contain sufficient sounding data or landmarks to be of value to AIRCRAFT SALVOPS MED.

In order to fulfill the requirement for a high accuracy, medium range, electronic positioning system, a DECCA Hi-Fix navigation net was installed by 6 February. The DECCA Hi-Fix net, as installed, could only be used for relative positioning. This was remedied by employing a NAVOCEANO geodetic survey team to fix the system transmitter locations on a common datum. A LORAC support team from SERVRON 8 was ordered into the area to operate the shore stations since a considerable amount of equipment and personnel were required to maintain a DECCA Net on a 24-hour basis. Figure 3-8 illustrates the net of the DECCA Hi-Fix System as installed.

In addition to a high accuracy electronic positioning system, more accurate bathymetric information was required. This was accomplished concurrently with the establishment of the operational DECCA system. The initial bathymetric chart was delivered to CTF-65 on 29 January 1966, and the final bathymetric survey was completed 26 February by the USNS DUTTON. The resulting bathymetric information is depicted in Figure 3-7.

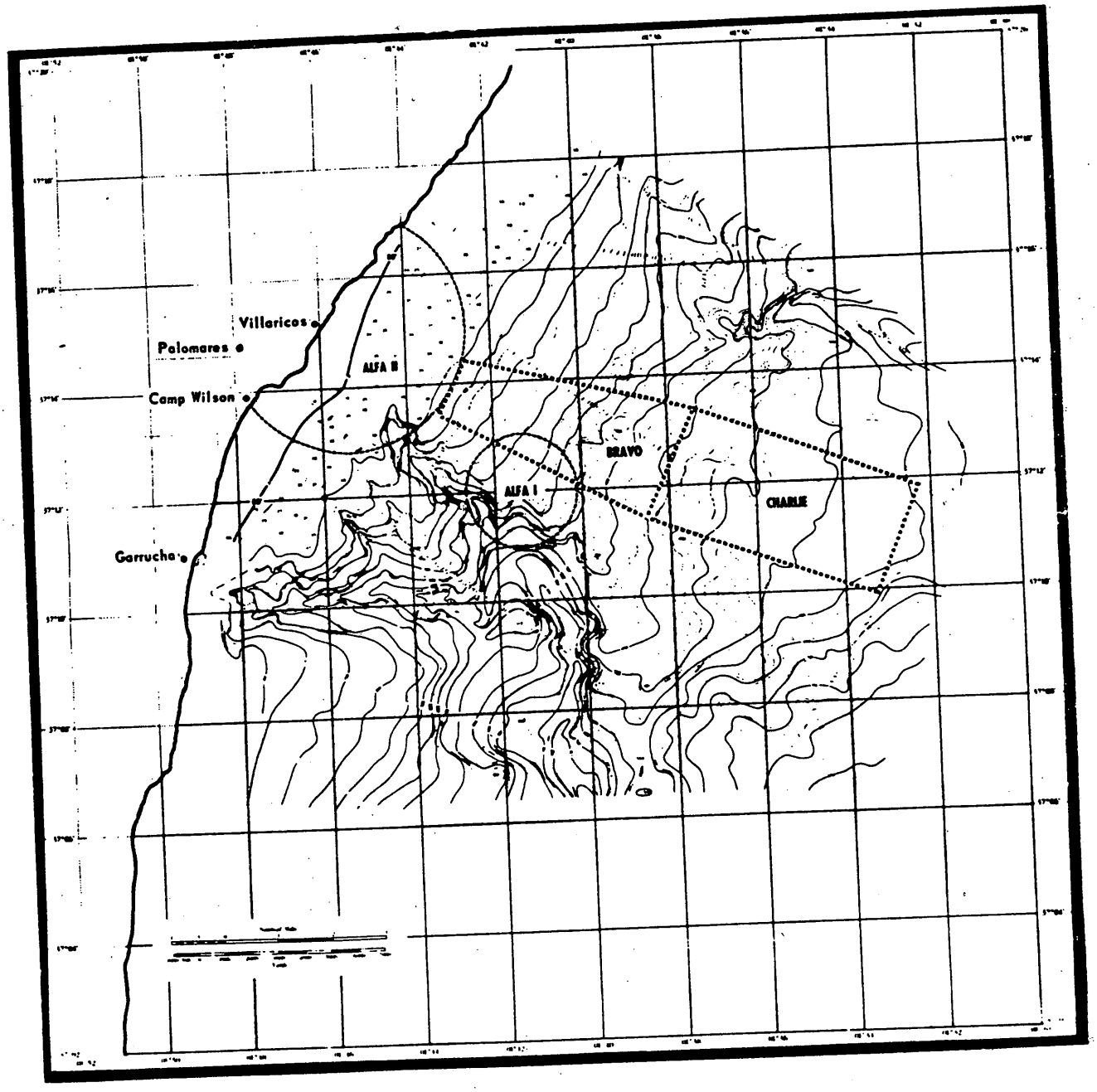


Figure 3-7 Underwater Contours

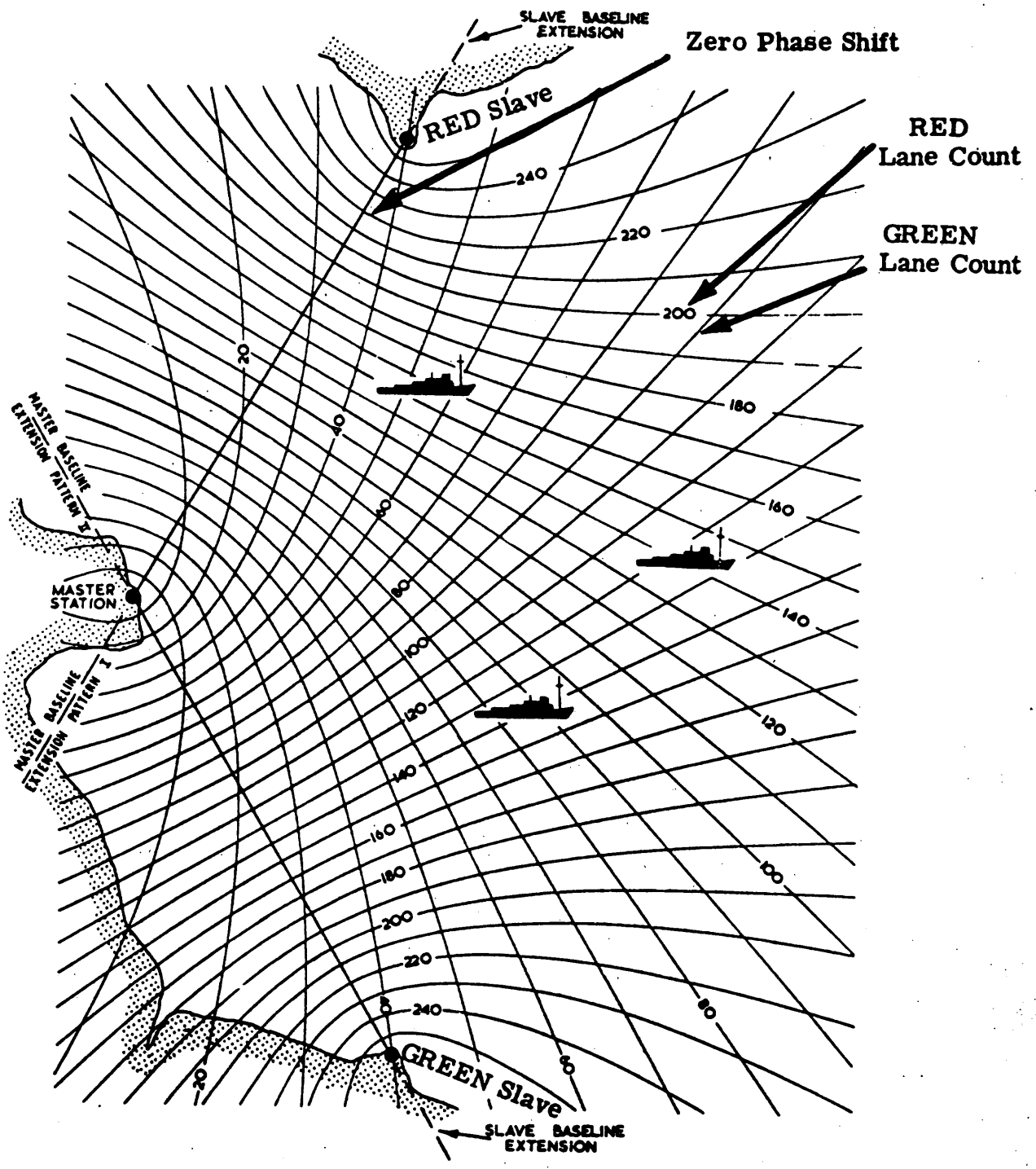


Figure 3-8 DECCA Hi-Fix System

Having determined the areas to be searched, it was then necessary to assign the available search assets so that their capabilities and limitations matched the requirements of the areas to be covered. It was soon recognized that the basic search forces required augmentation for adequate inshore coverage, resulting in a request for additional swimmers and divers. Figure 3-9 demonstrates how the various equipments were utilized to cover the depth requirements.

Basic to the search philosophy in areas searched by electronic sound systems, was the necessity to somehow verify each contact. A team concept was developed whereby units were organized into teams so that their individual capabilities complemented each other. However, staff requirements, weather restrictions and normal scheduling problems made it necessary that team assignments remain flexible.

The search plan which evolved was split into two components. One component was the inshore search area from the water's edge out to the 80-foot depth contour line. This area was separated into block areas of a size that could be covered each day with a complete visual search, for 100 percent coverage, by the divers available. The second component, the area outside the 80-foot depth required more sophisticated methods. Since it was not practical to utilize divers for full coverage at the deeper depths, such acoustic equipments as the Sea Scanner, UQS-1, or the Ocean Bottom Scanning Sonar (OBSS) were put into service. In the case of the Sea Scanner, divers were an integral part of the search team, but not with the other systems and so identification and recovery teams were needed to follow-up the contacts.

There were drawbacks to the follow-up method. For instance:

The lack of positive identification during the time the sonar operator held the contact on his scope, deprived the operator of valuable signal interpretation which would be available if operators had data from known objects on which to base their evaluations of the nature of contacts obtained.

Methods of marking the contact, usually a float and anchor, were not only inaccurate at the time buoys were planted, but the buoys were subject to displacement during inclement sea conditions. This marking system was also limited by depth and bottom contour.

Acoustic systems were hampered in three ways:

1. Rough bottom configuration as existed in Alpha I (Fig. 3-7) causes unwanted reflections and reverberations of sound signals.

2. Absence of a baseline target signature and precise knowledge of the bomb dimensions influenced the sonar operators' contact descriptions.

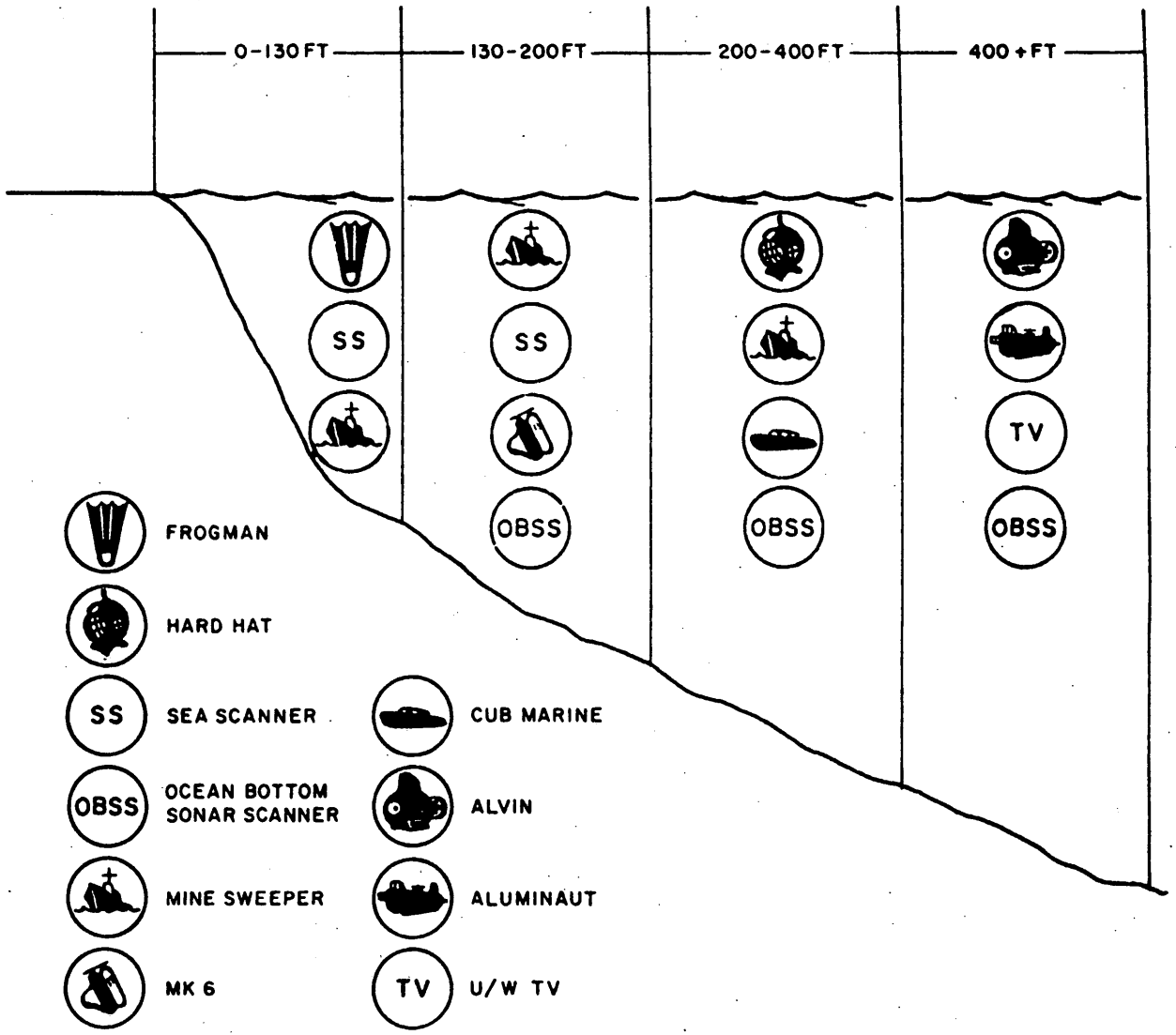


Figure 3-9 Search Methods at Various Depths

3. Inaccuracies in navigation, which prevented return to the same precise positions, led to duplicate contacts and frequent inability to relocate targets previously detected.

Since failure to locate the missing nuclear weapon was a definite possibility, CNO had directed that sufficient records be generated to provide proof of the effort applied and the search effectiveness of that effort. The method devised utilized a grid overlay of the search area (Fig. 3-10). This grid consisted of lettered 2 x 4 mile rectangles oriented with the long dimension parallel to the general contour of the coastline. Each rectangle was subdivided into numbered 1000 x 1000 yard squares which were the units used in making search assignments. The degree of coverage of each of these squares was used to determine search effectiveness.

Two aspects of equipment effectiveness were weighed and caused a variation in the general search plans. The relative mobility of the team using the CUBMARINE dictated that it be assigned to areas of high contact density in order to identify contacts at a higher rate. Because the rate of contact acquisition by acoustic systems far exceeded other methods, the CUBMARINE spent most of its operational time identifying these contacts in depths beyond the capability of the divers.

The deep water region in and about Alpha I was treated as a separate case. Here the ALVIN and ALUMINAUT were assigned visual searches in additon to contact investigation. This was due to navigational limitations which prevented the submersibles from relocating sonar contacts obtained by other means, and the generally unreliable nature of acoustic search in this more rugged bottom terrain. The USNS MIZAR possessed a deep photosearch capability and, therefore, was assigned to search operations in the deep area when not being utilized as a control ship for submersibles.

SEARCH SUMMARY:

The selection of equipment for use in the various search areas was based on equipment characteristics, overall search results and the time required to cover a given area, and the ability of the available equipments to cope with the environments, in the defined search areas. The prime source of contact data was sonar equipment. It detected items of all sizes and composition, from rocks and pebbles to large sections of the aircraft wings. All contacts had to be identified either visually or photographically since even the sonars with the highest-definition (about 6 inches for the OBSS) were unable to provide sufficient data for acoustic identification. This dictated that all contacts be revisited and either sighted or photographed. This requirement placed a major burden on the navigation systems available. In shallow water, over smooth terrain, results were satisfactory because ranges were short and inherent equipment errors negligible. However, in water over 200 feet in depth, artificial light was required and range and bearing errors became significant regardless of the terrain. The rough terrain in the southern half of Alpha I made acoustic systems totally ineffective. Towed search vehicles experienced the same difficulties. Inaccuracies in position increased with depth. Inability to detect the irregularity of the bottom in time to adjust the depth of the tow causes several collisions with the bottom which damaged sensors. The towing duties were mainly assigned to the minesweepers,

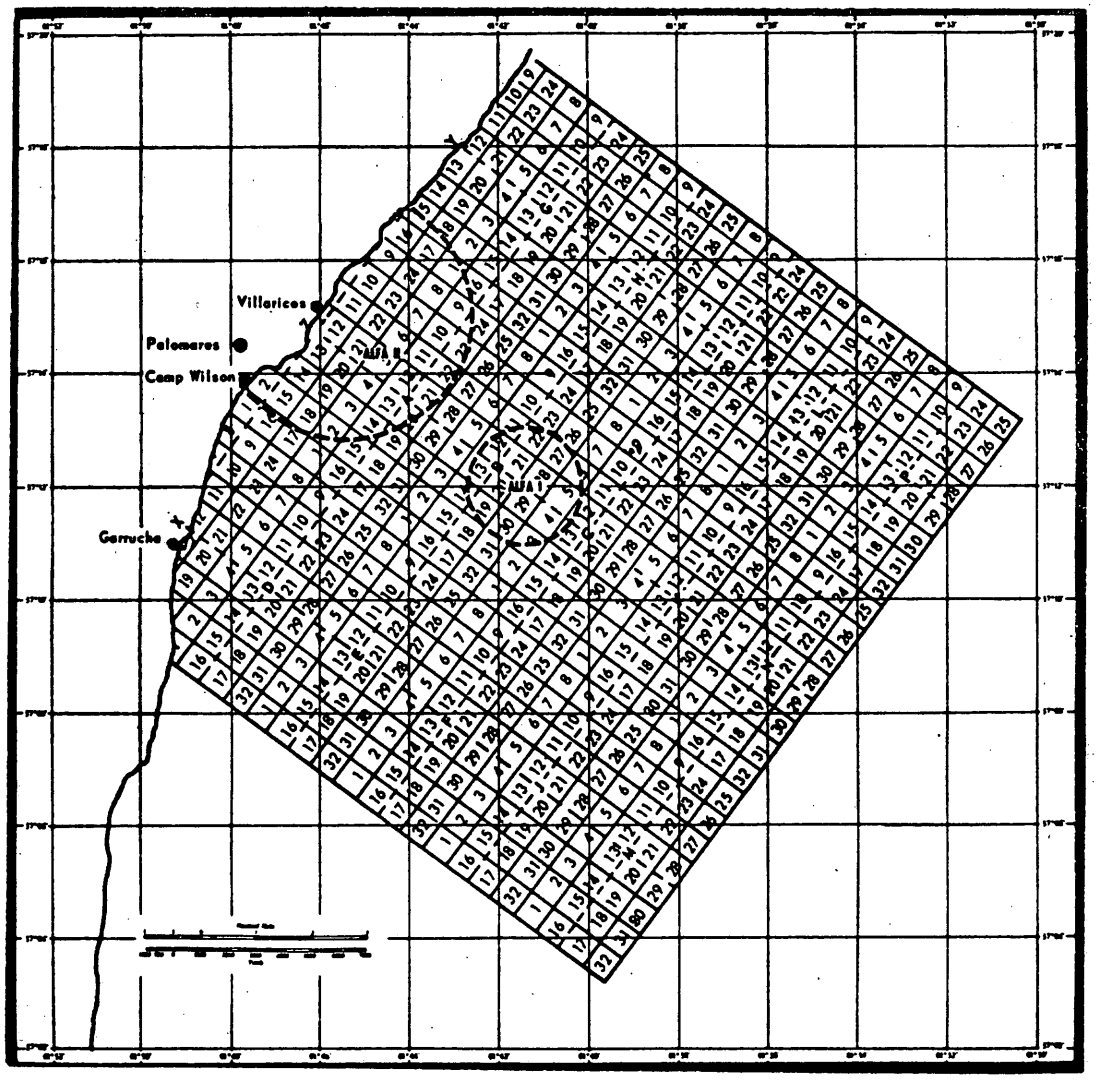


Figure 3-10 Search Grid Overlay

which in spite of the resemblance of towed search equipment to minesweeping gear, experienced two additional limitations and the loss of three towed vehicles. A difficult ship handling problem existed at the 1-2 knot tow speed of the OBSS making the maintenance of a search track impossible in any increased wind or sea conditions, and the physical requirements of recovery dictated diver assistance to shift the tow rig from astern to a midships boom for hoisting aboard, a relatively difficult and dangerous task in high sea states (Fig. 3-11).

Use of the underwater TV system (Fig. 3-12) required even more stringent operating parameters. It could not be towed, and so necessitated extremely accurate ship positioning for either search or contact identification. When a multipoint moor was feasible, search or identification could be conducted by a trial and error dipping procedure until the area accessible from that moor was covered. When a moor was not feasible, the operation was practically impossible.

Forty-two days after the accident over Palomares, and on the tenth dive by ALVIN, a target was discovered in the vicinity of the place where Simo' Orts reported seeing a weapon descend. It was approximately 400 feet long rather than the expected 10 feet and is explained in the following ways.

After water entry, the nuclear weapon, still suspended from its parachute, descended to a depth of 355 fathoms riding the prevailing currents. It touched down on the rim of an underwater ridge and was apparently dragged over the edge by the current forces on the chute, subsequently slid into the deep submarine canyon depicted in Figure 3-13. From here it continued its descent to a depth of 425 fathoms, leaving a smooth furrow. It was this furrow, shown in Figure 3-14, that was first discovered by ALVIN on 1 March while conducting contour searches at constant depth levels. Close to the end of her submerged endurance, ALVIN attempted to follow the furrow down the steep slope but was unable to keep it in sight. Nearing the end of her battery life, she was forced to surface. Eight search missions in the same area and 12 days later, ALVIN relocated the furrow, but again did not reach the end of the track prior to being forced to surface due to battery exhaustion. The next day was spent in maintenance and finally on 15 March ALVIN successfully backed down the furrow to discover a parachute enshrouded object (Fig. 3-15) at a depth of 2550 feet lying on a 70 degree slope. The object was designated contact #261. The first phase of the search was complete.

Phase II was to commence on 26 March following an abortive attempt to raise contact #261 on one line that was severed in the attempt, dropping the object. The second search effort presented many of the same problems and much anxiety for a period of 8 days, when on 2 April the object, still chute enshrouded, was located on a bearing of 210° T., a distance of 120 yards from its position on 15 March and now at a depth of 2800 feet, position 4 on Figure 3-13. The illusive weapon did not again evade the searchers of TF-65.

Figure 3-11 Waist Boom Hoisting Operation

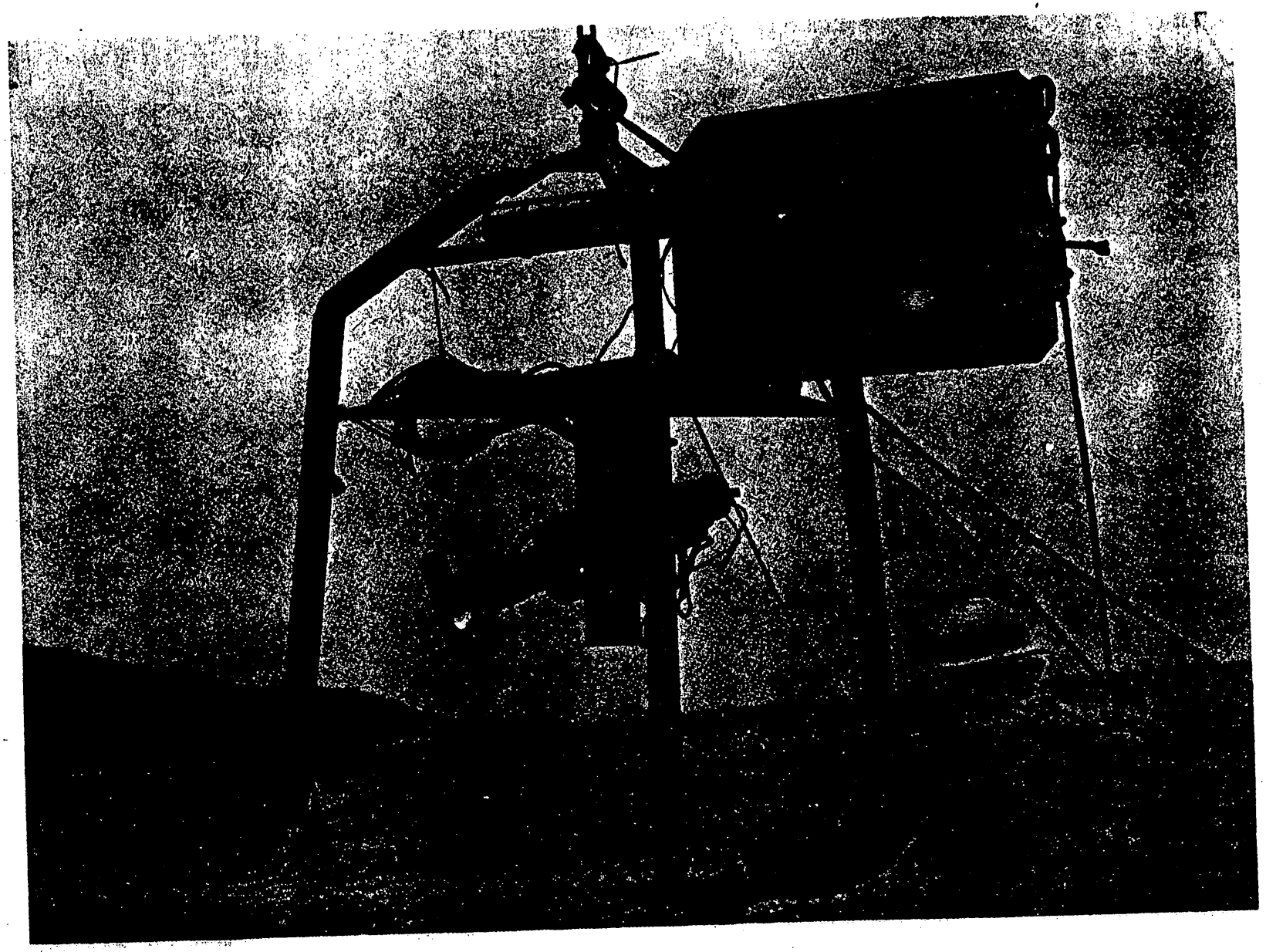


Figure 3-12 Underwater TV System

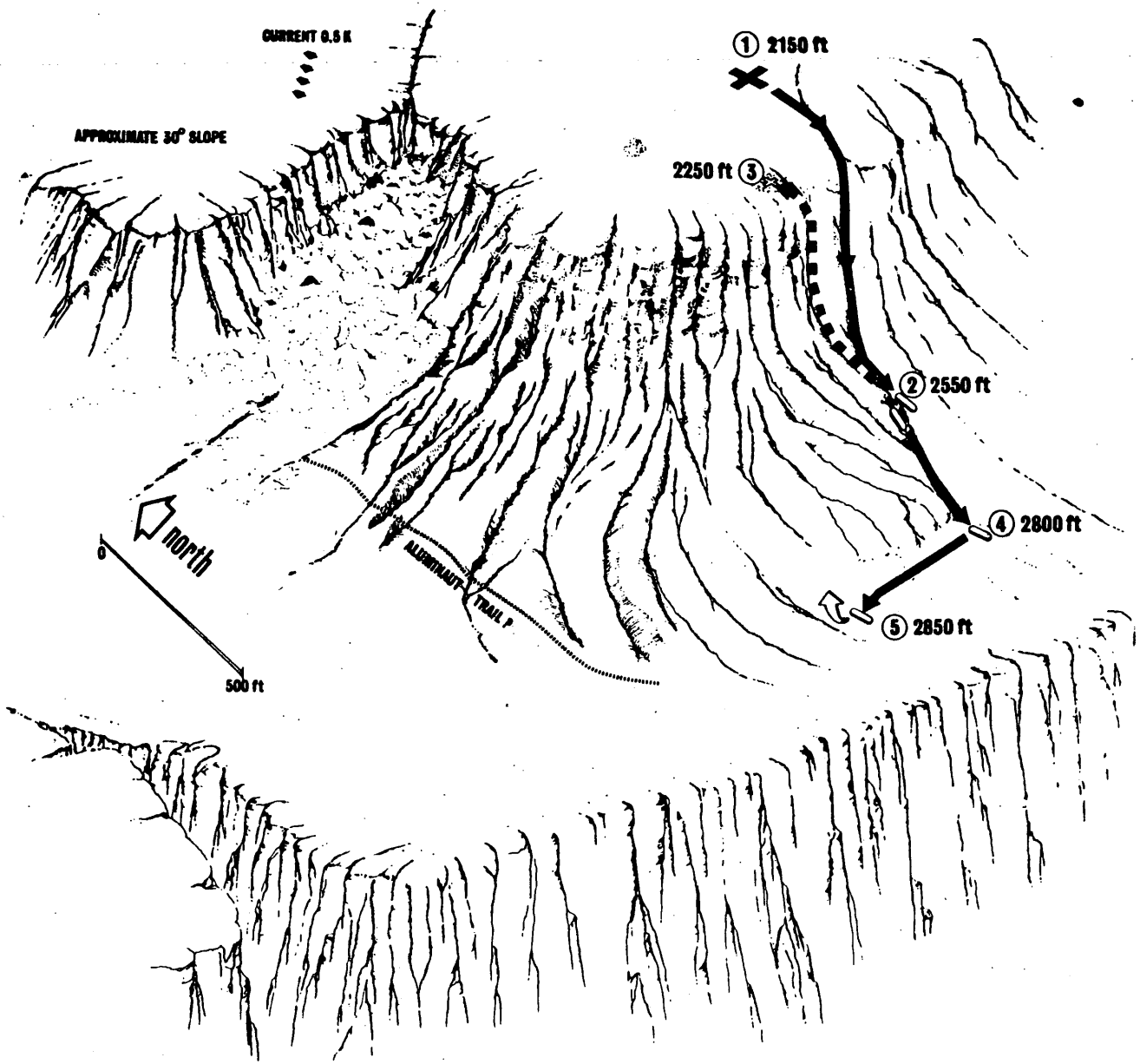


Figure 3-13 Underwater Canyon

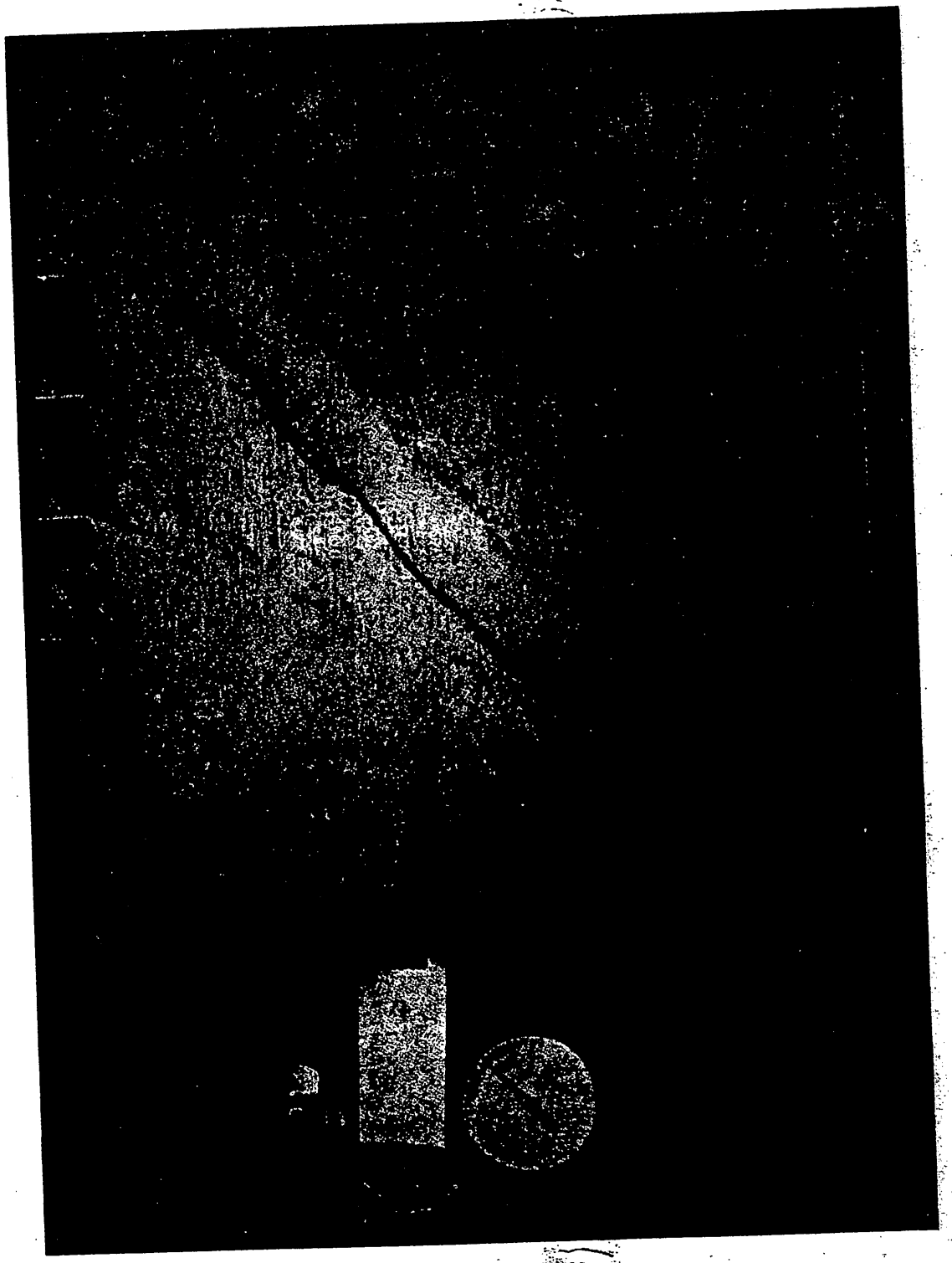


Figure 3-14 Underwater Furrow

Figure 3-15 Parachute Enshrouded Weapon at 2550 feet

Identification:

While not entirely separable from search capabilities, certain systems possessed a more effective means of identification than others. And though there was overlap of these system capabilities, they can best be considered under three categories: divers, surface, and submersible.

Divers - During peak diver operations, approximately 125 Navy divers were assigned to the task force. Between 22 January and 7 March, they searched out, completely identified, and when size permitted, recovered 143 aircraft debris contacts in an area covering 3 square miles. It is obvious that from the standpoint of effectiveness and versatility, depth limitations considered, the swimmers and scuba divers were at the top of the list (Fig. 3-16).

Surface - Although providing mission versatility and an improvement in depth capability over free divers, the hard hat diver was less mobile, handicapped as he was by a tether to the attending surface vessel (Fig. 3-17). Additionally, his having to operate on the bottom caused silt clouds which restricted his visibility and usefulness. Also surface dependent were three other systems employed by TF-65. The underwater TV platform was limited in depth and extremely limited in mobility and search rate requiring a moored vessel for control.

Effectiveness was significantly enhanced by the Cable controlled Underwater Recovery Vehicle (CURV II) (Fig. 3-18). Although tethered to the mother ship, it combined sonar, closed circuit television, cameras and lighting with the ability to maneuver and recover relatively heavy objects from the ocean's floor to a depth of approximately 2900 feet. (Cable lengthened for AIRCRAFT SALVOPS MED (Fig. 3-19).

The third system, used by the USNS MIZAR was a towed sled on which a transponder, a battery, one to four cameras, a pinger and two strobe lights was mounted (Fig. 3-20). An underwater TV camera was available but not used on the sled. This system was primarily used for contact identification but was hampered by the 10-24 hour time lag required to process the film. This, time lag, inherent navigational error, and difficulty in maintaining a minimum fixed height above the bottom (as was the case with the OBSS), caused contact correlation errors not always reconcilable and sometimes resulted in damage through collision with the bottom.

Inherent in all of these unmanned systems was practically unlimited bottom time.

Submersible - This category of vehicle was by far the most expensive, the most versatile, the most dangerous, and certainly the most glamorous. Included within the category of Research and Development vehicles, they all were without proven operating procedures. AIRCRAFT SALVOPS MED, therefore, presented a fine opportunity to prove or disprove the system designs and to convince the world in general that future recovery operations would most certainly require comparable equipments. Excluding swimmers/divers (for depth limitations), the submersible pilots, backed up by external cameras, represented the most

Figure 3-16 Scuba Diver

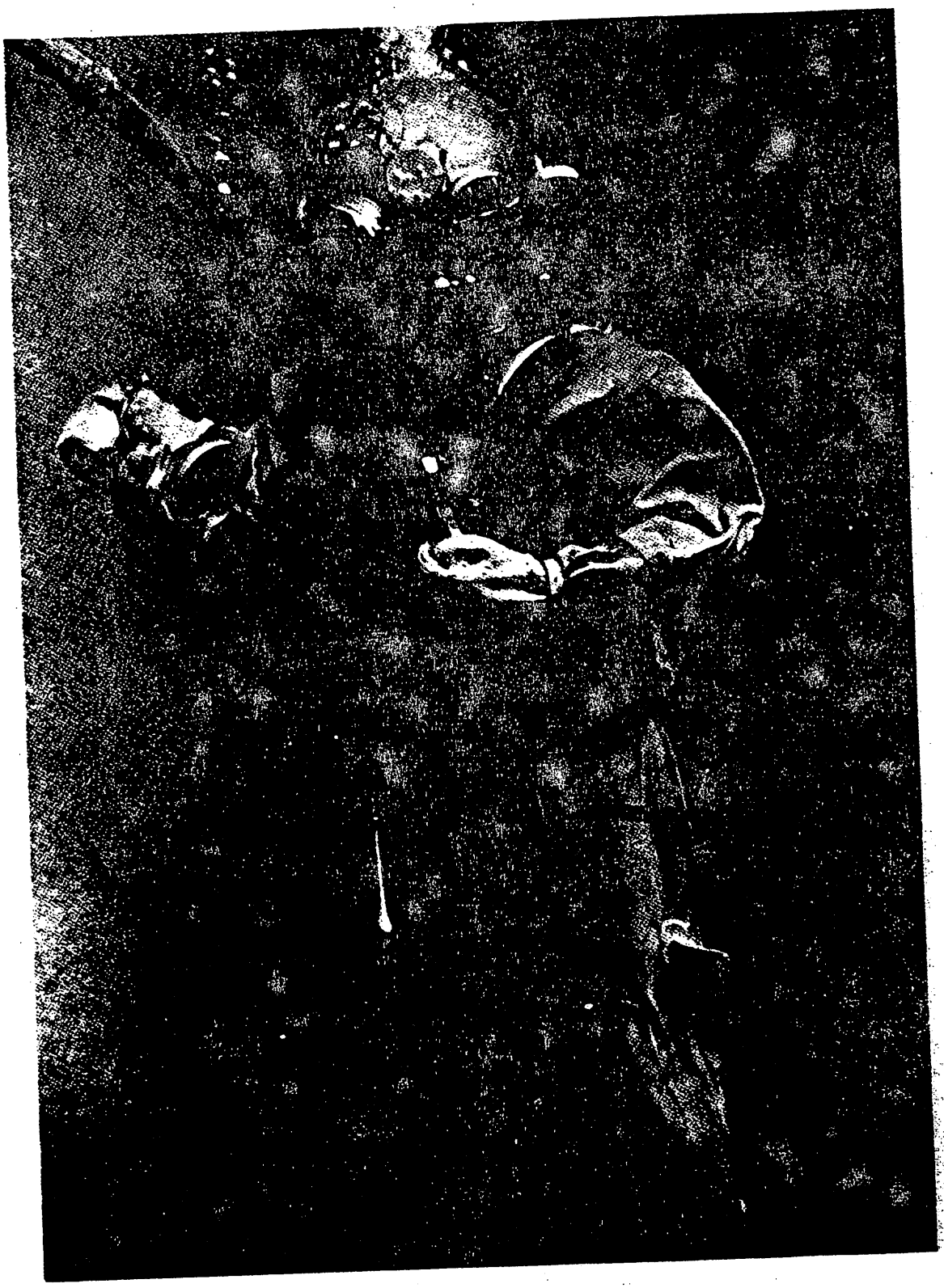


Figure 3-17 Hard-hat Diver

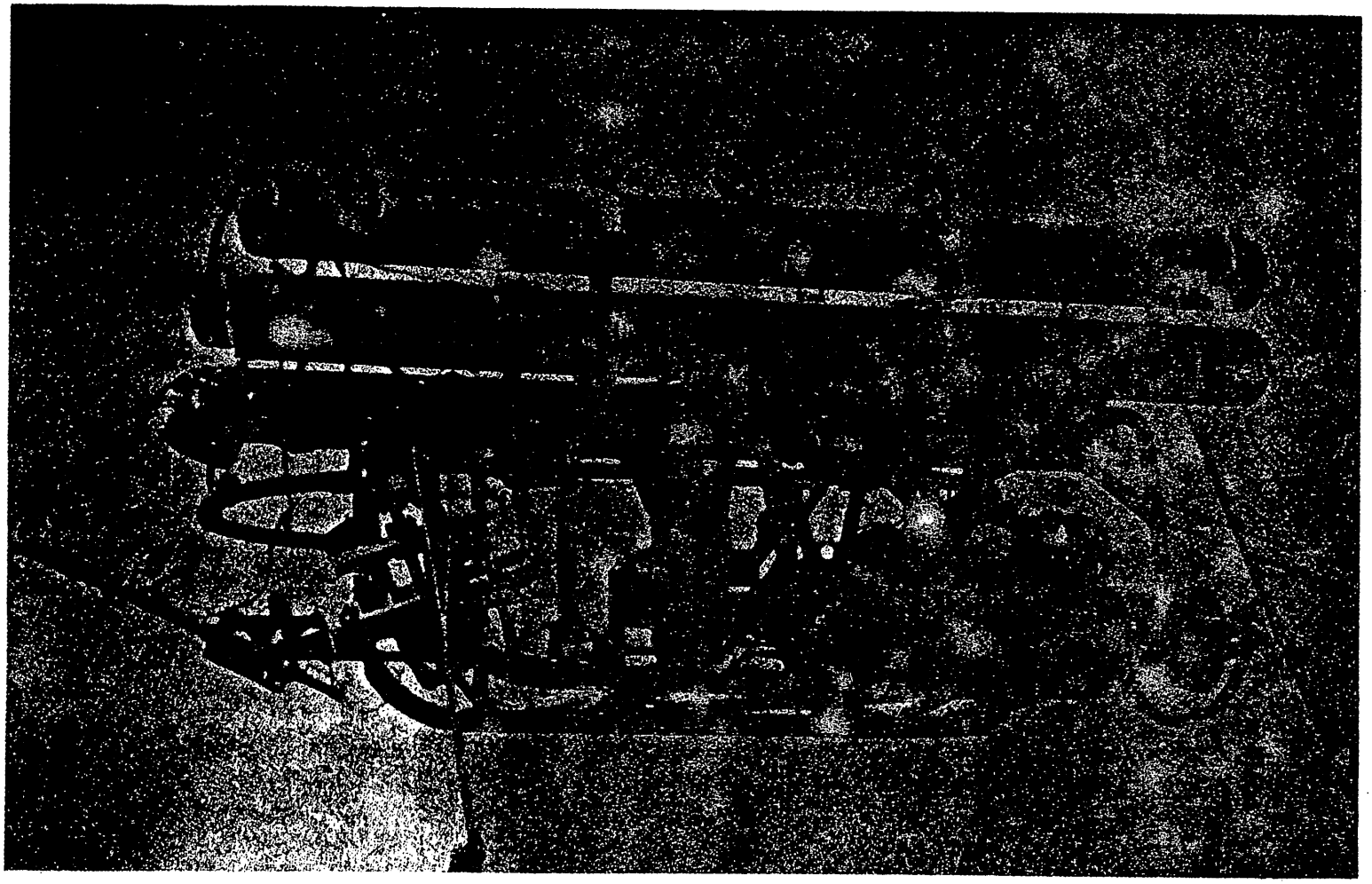


Figure 3-18 Underwater Recovery Vehicle (CURV II)

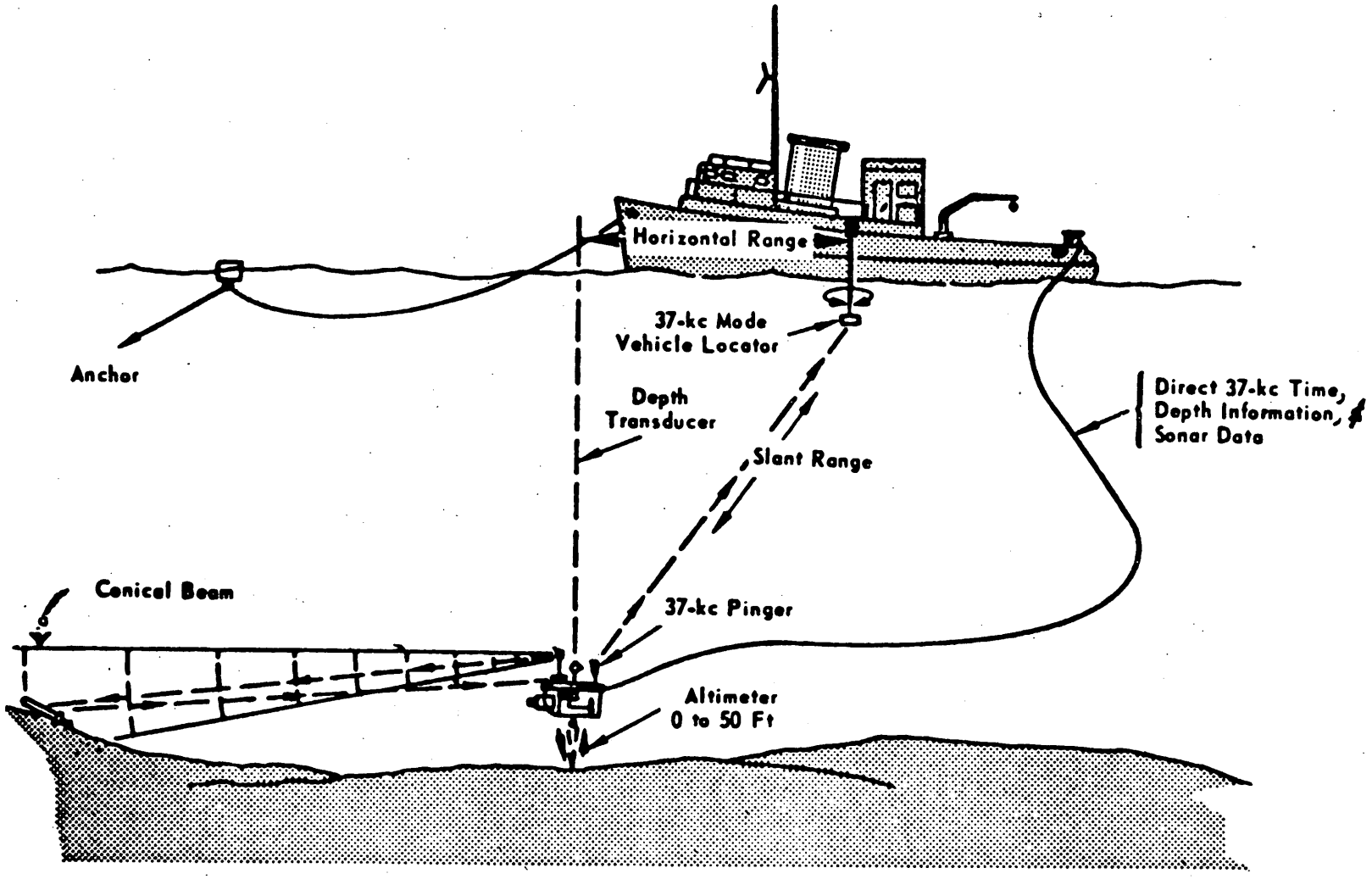


Figure 3-19 CURV II Recovery System

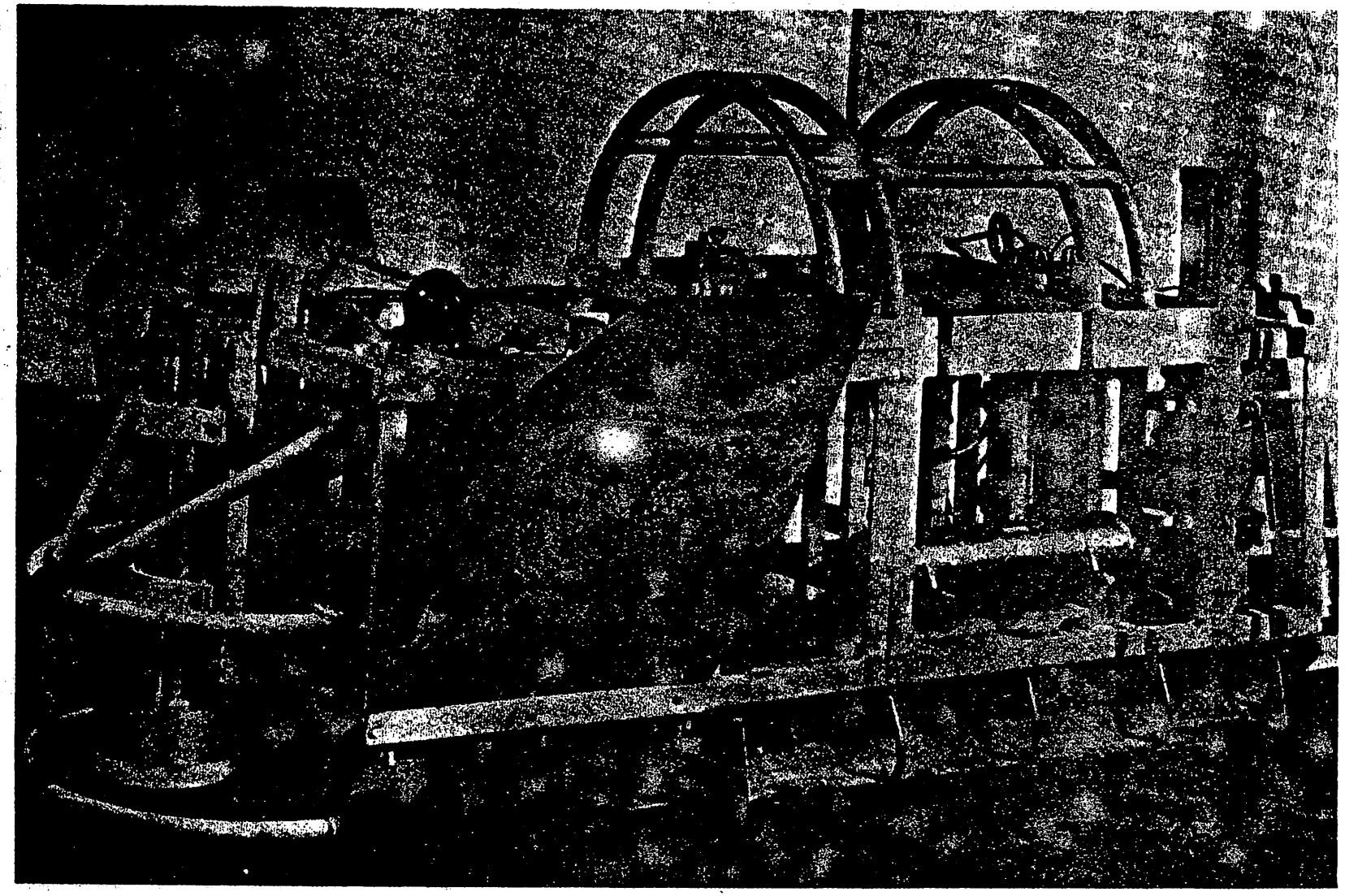


Figure 3-20 Sled Towed by USNS MIZAR

reliable method of contact identification. In spite of this reliability, other factors posed problems. Time on the bottom was limited by crew fatigue, endurance of the life support system and source of power for propulsion and illumination. These manned systems required many more hours maintenance time than their unmanned counterparts, and replacement parts were either nonexistent or difficult to obtain. A support organization or mothership was required, thus increasing the personnel requirement several fold. The vehicles were limited to relatively good weather operations by launch and recovery parameters and required a communications and navigation guide while submerged, since they were not equipped with a self-contained navigation system. Once submerged, they had to depend on the sonar derived steering instructions from the control ship to reach the general vicinity of the area in question. Then, unless previously visited terrain features were recognized, each dive was an adventure into a new world with only general guidance by underwater telephone. The working ability of each was limited by lack of leverage capability, making recovery of heavy objects difficult if not impossible. Additionally, the danger of entrapment was always a possibility with rescue prospects doubtful.

There were four such vehicles used during AIRCRAFT SALVOPS MED.

DEEP JEEP - Although first on the scene, DEEP JEEP was the first to be sent home. On station for only 8 days, it was able to come up with only one contact which was non-aircraft in nature. Disabled by a casualty to one of its electric propulsion motors that was beyond the capability of the Task Force to repair, it was flown back to its point of origin (Fig. 3-21). In summary, the DEEP JEEP was characterized as an inadequate search vehicle with poor mobility, inadequate power, narrow field of view, difficult handling characteristics on the surface, poor maintainability, poor external lighting, no sonar, and a depth limitation of 2000 feet.

CUBMARINE (PC-3B) - CUBMARINE by comparison, was extremely valuable. It spent 73 days on station and evaluated 44 contacts, 18 of which were aircraft debris. Although somewhat limited in endurance and depth capability, which reduced its search effectiveness, CUBMARINE exhibited high mobility, good maintenance, and good coverage. Because of its limited utility, the manipulator was not used. CUBMARINE was limited to 600-foot depth of operations (Fig. 3-22).

ALVIN - Next in size and best in maneuverability and adaptability to rugged terrain, ALVIN (Fig. 3-23) spent 72 days on station and evaluated six contacts, three of which originated from the B-52/KC-135 collision. When compared to the box score of CUBMARINE, ALVIN's contact results are misleading. Employed almost exclusively in deep water at the extreme limit of the predicted debris pattern, ALVINS's opportunity for contact in either the search or identification mode was several orders of magnitudes less than that of CUBMARINE. It is probable that ALVIN would have performed as well as CUBMARINE, given the same area assignment. In spite of the fact that ALVIN found the illusive nuclear weapon, both times, and received its share of the glory, it was not without its shortcomings. To counteract its effectiveness in rugged submarine canyons, the limited endurance, about 8 1/2 hours, made searching large flat areas inefficient. Construction and crew habitually accentuated crew

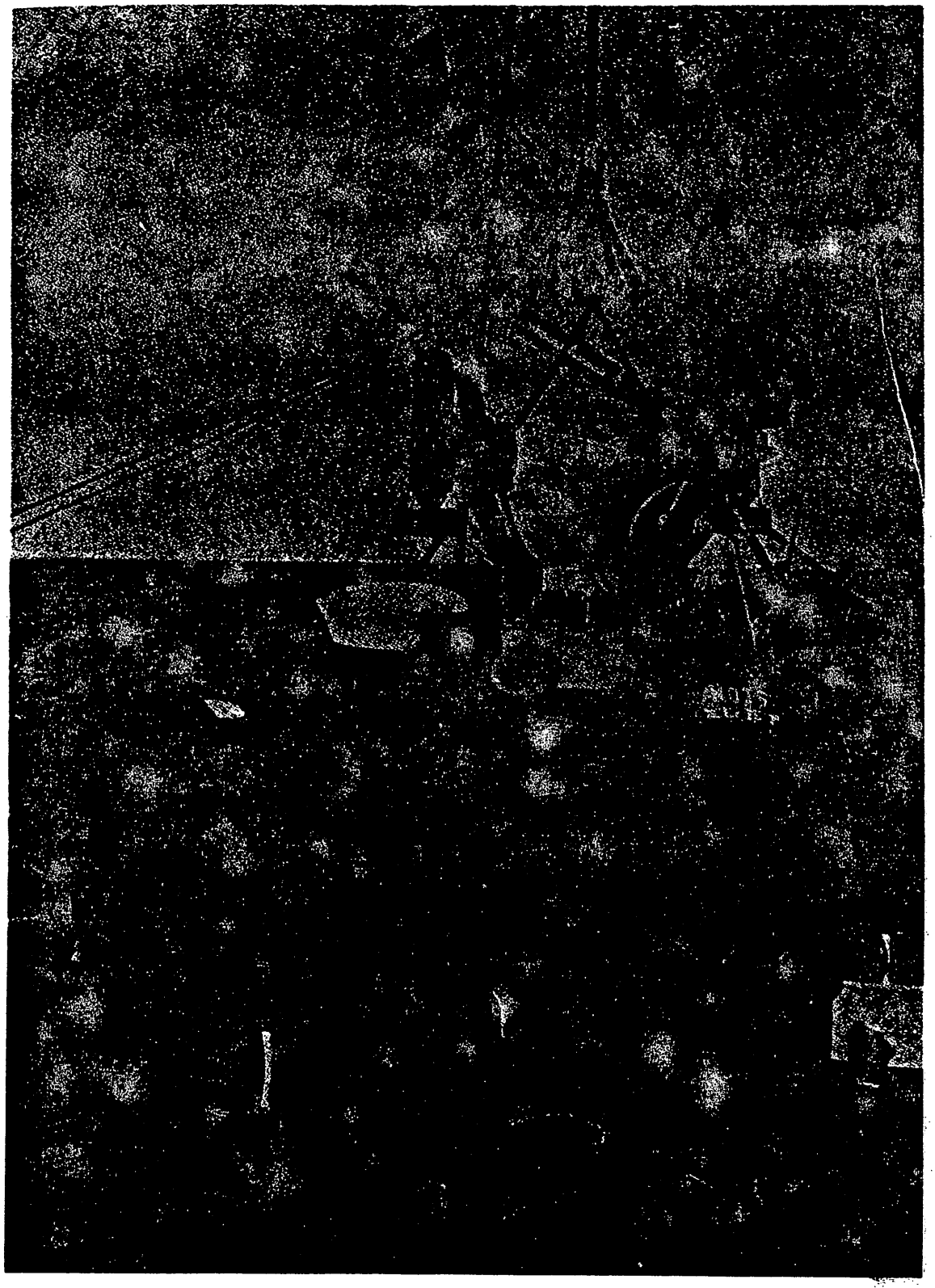


Figure 3-21 DEEP JEEP Vehicle

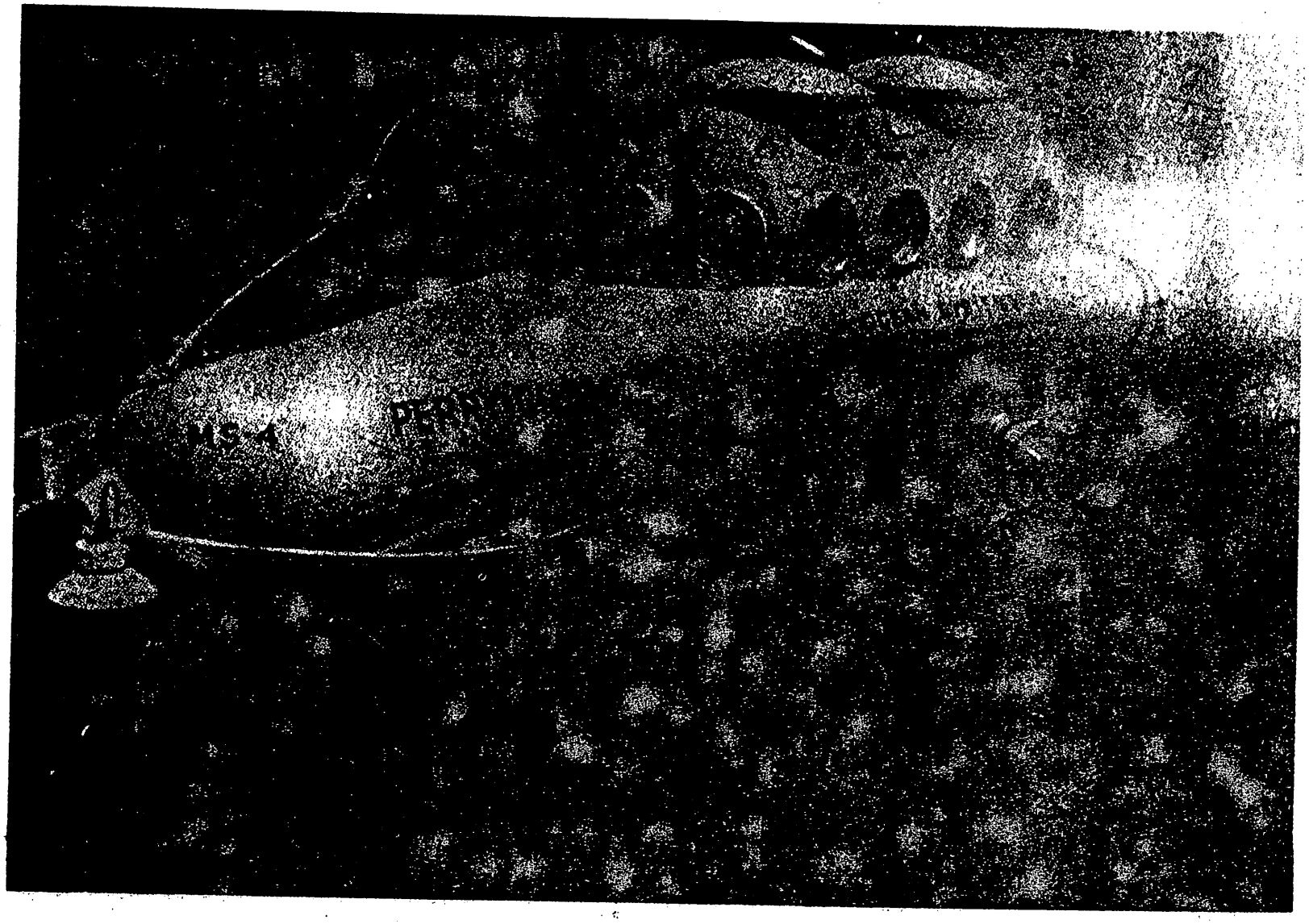


Figure 3-22 CUBMARINE Vehicle

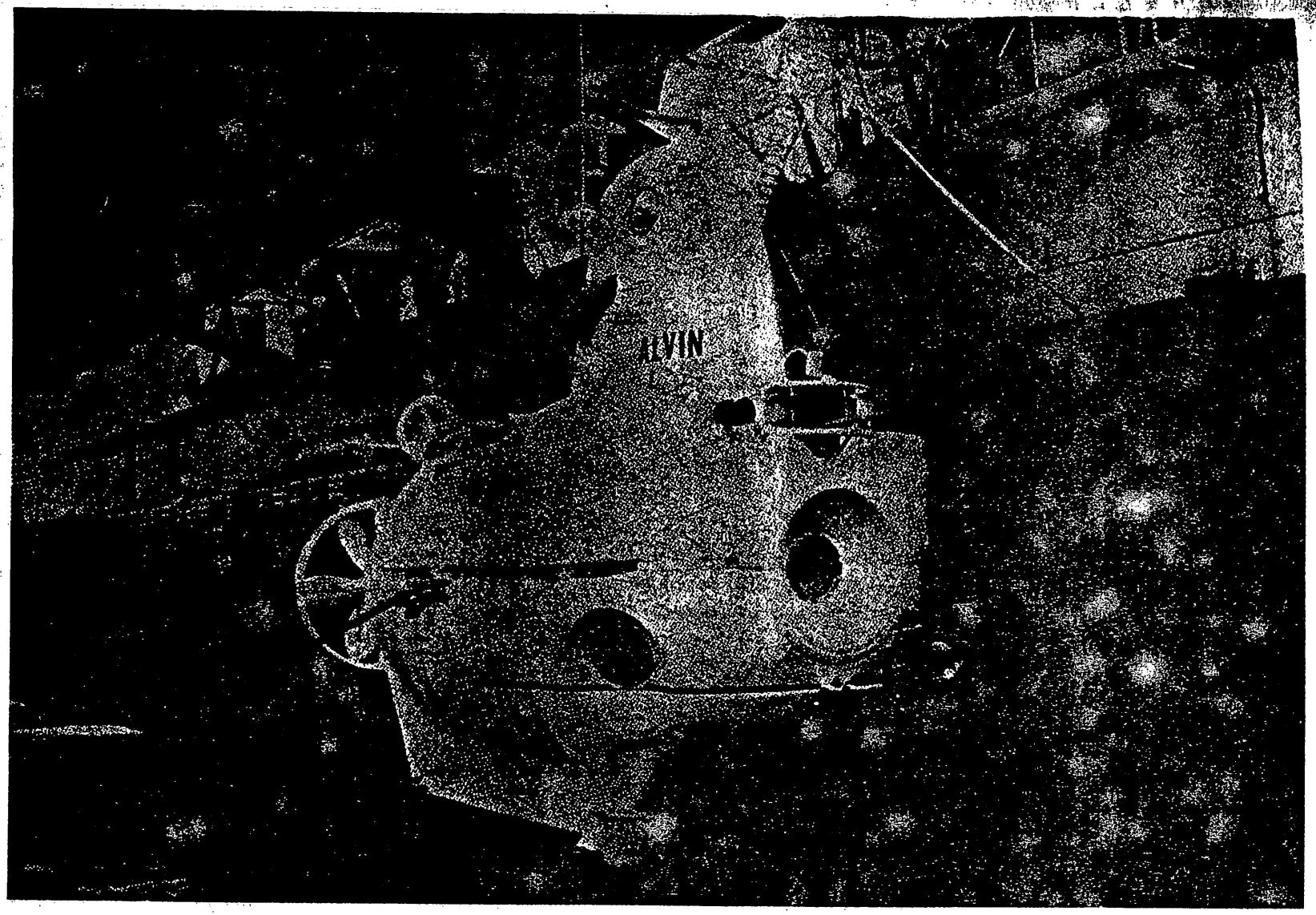


Figure 3-23 ALVIN Vehicle

fatigue. Normally 8 hours of maintenance time between dives was required for battery charging and normal maintenance; this required dry docking in the well of the supporting Landing Ship Dock (LSD) (Fig. 3-24). The viewing ports were insufficient in both size and location, accentuating the need for an improved external lighting system. ALVIN's installed manipulator arm had a working capacity of only 50 pounds, limiting the tasks that could be undertaken as well as the submersible's capacity to carry an observer. The limited reserve buoyancy in the system provided practically no lift capability. The maximum operating depth was 6000 feet.

ALUMINAUT - Largest of the submersibles, and designed for four times the endurance of ALVIN, ALUMINAUT (Fig. 3-25) generally was not as effective for the tasks of search, identification and recovery. ALUMINAUT amassed a record of 15 evaluated contacts, 7 of which were aircraft debris. Although duplicating ALVIN's 60 days of availability, and spending a comparable number of hours submerged, ALUMINAUT amassed nearly twice the number of days lost to maintenance failures and in a standby status. The standby time tends to weight these statistics against ALUMINAUT since she was placed in a standby status on several occasions after the weapon had been located and recovery operations employing ALVIN were in progress. However, several characteristics of ALUMINAUT left room for improvement. Hull inspection and routine maintenance required the docking services of the LSD every 4 or 5 days. ALUMINAUT was normally restricted from operating in rugged canyons and ravines because of its inability to readily avoid the terrain features and still operate within the short distances required by the prevailing visibilities. Lack of an external photographic capability and a proven manipulator limited her identification and recovery usefulness. It should be noted that ALUMINAUT did possess sufficient lifting capacity to recover the weapon but the operation was considered too great a risk to the vehicle and its crew. Although possessing several types of equipment intended to provide a navigation capability, ALUMINAUT was not able to determine its geographic position except by dead reckoning from the dive point. In an environment where visibilities of 40 feet were the maximum, this navigation system was totally inadequate.

IDENTIFICATION SUMMARY:

Identification of contacts by acoustic means was impossible. Thus, all contacts not initially acquired either visually or by photograph, required a revisit. The possibilities for revisit were by diver, underwater TV, towed cameras, camera equipped unmanned vehicles and manned submersibles. All were useful and all contributed to the successful conclusion of AIRCRAFT SLAVOPS MED.

One aspect of the operation affecting search or identification capability was that of subsurface navigation. Given that the DECCA Hi-Fix system accurately positioned the surface control ship, how accurately could the relative position of the submersibles be determined. Only the USNS MIZAR (Fig. 3-26) possessed an accurate tracking system, called Underwater Tracking Equipment (UTE). All other tracking systems were either grossly inaccurate or range limited in determining where the search vehicle had been or where it was to go.

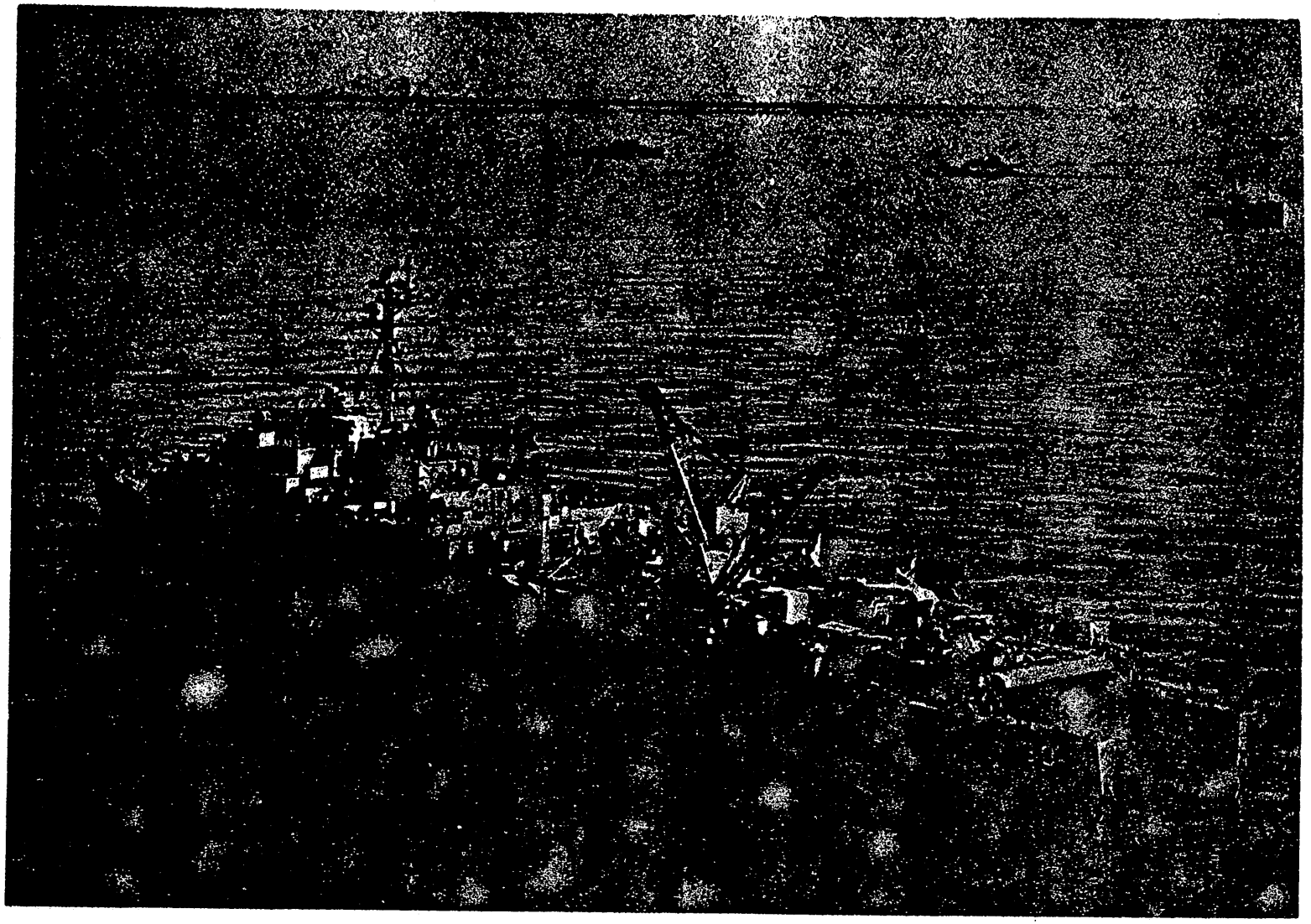
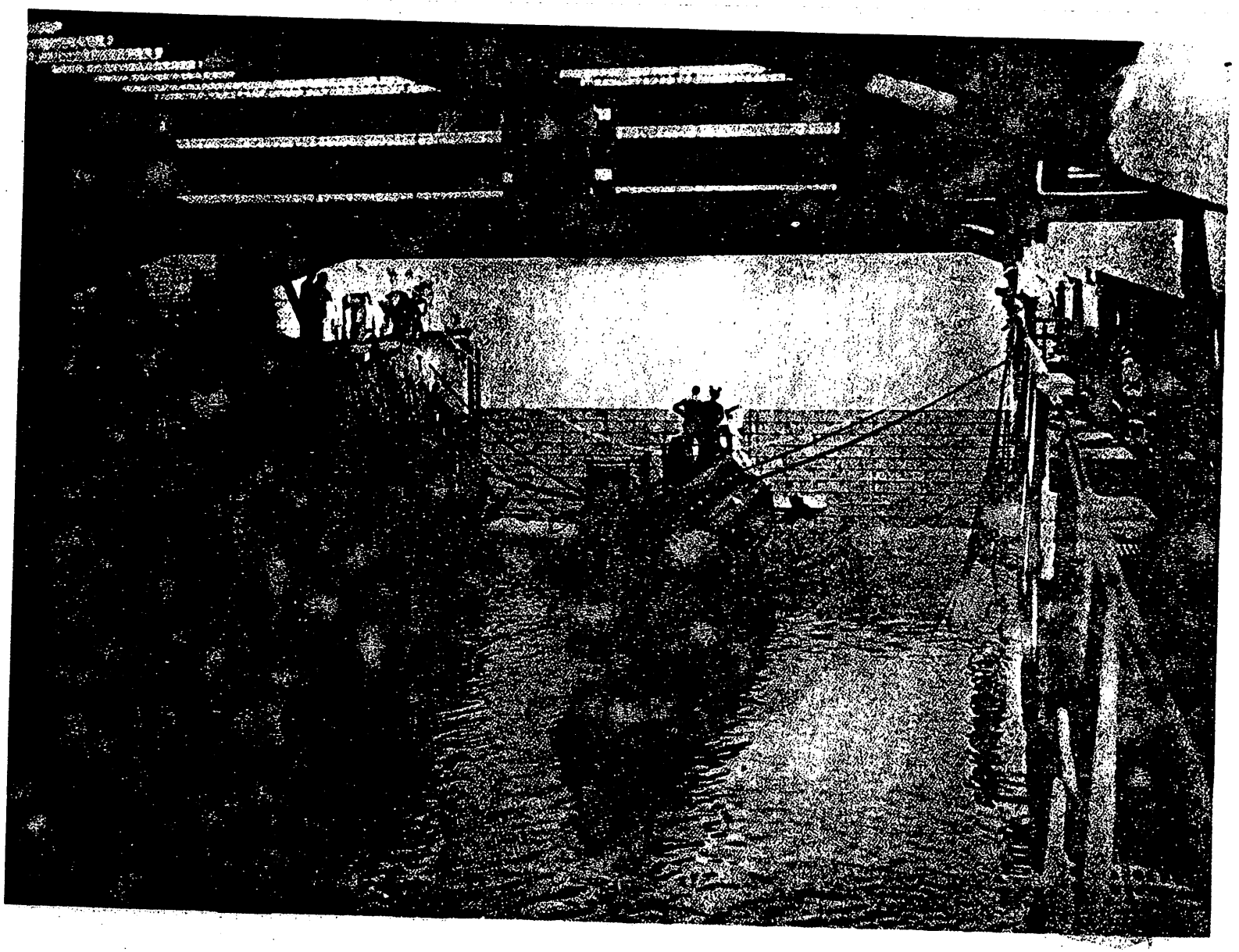


Figure 3-24 Landing Ship Dock (LSD)



Figue 3-25 ALUMINAUT Vehicle

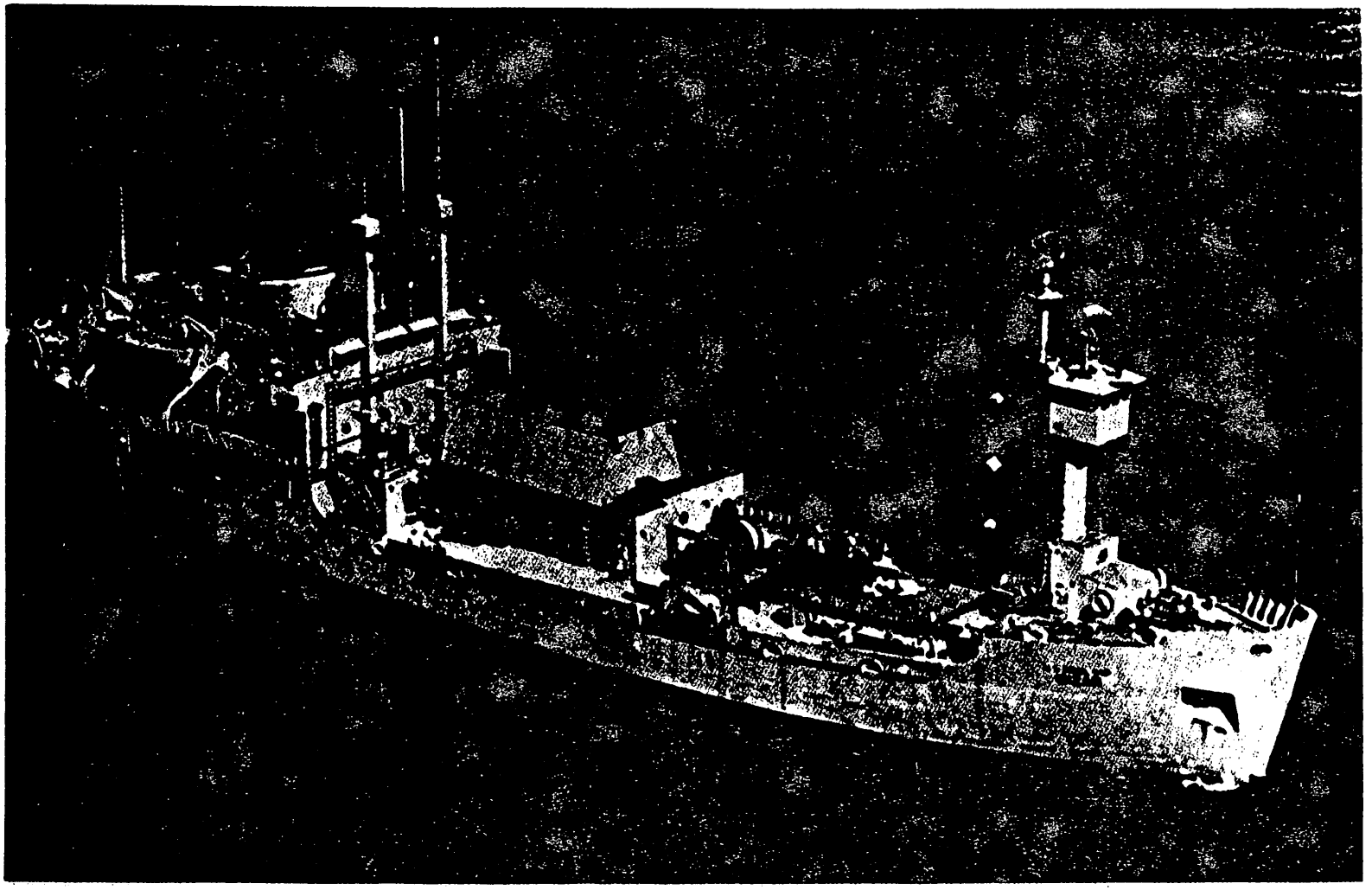


Figure 3-26 USNS MIZAR

Search under any of the other systems was essentially random. Some navigation capability was provided by bottom planted transponders or pingers for use in conjunction with the vehicles sonar. However, the profusion of frequencies and the loss of line-of-signal in rough terrain severely handicapped these systems. The more sophisticated navigation systems installed in the ALUMINAUT were troubled with material deficiencies and were never operated satisfactorily.

Recovery:

Not the least of the problems facing CTF-65 was the recovery of the weapon once it had been located. Three separate plans ALPHA, BRAVO, and CHARLIE, were formulated for the recovery of Contact #261. While all indications were favorable that this contact was in fact the missing weapon, it continued to remain hidden until the CURV cameras and TV caught a glimpse of the weapon shape enroute to the surface (Fig. 3-27), but positive identification could not be effected until the bomb was on the deck of USS PETREL.

Plans ALPHA and BRAVO both involved the use of ALVIN to place pendants to the unit, but neither method proved successful.

Plan CHARLIE called upon the USNS MIZAR to play a primary role. It was to lower a Danforth anchor, with a frame-like assembly called "POODL" (Fig. 3-28), attached to the anchor line, to a point near the weapon. The use of a 16 KC transponder on the "POODL" in conjunction with the UTE, enabled MIZAR to place the assembly within 80 feet of the target. The two lifting pendants on the "POODL" and the one on the anchor were to be attached by ALVIN. Only the lift line on the anchor could be attached to six shroud lines, the two lifting pendants from the POODL were fouled and could not be used. The decision was made to lift. In the process, the lifting pendant parted between the anchor and the weapon allowing the weapon to settle to a depth of 2800 feet. The failure was apparently caused by the nylon lift line fouling on the anchor or perhaps by contact with a jagged stone out-cropping upslope from the weapon.

The fourth plan (unnamed) was to use CURV to attach three locally fabricated grapnels to the chute and its shroud lines. Each grapnel was to have its own 5/8-inch braided nylon lift line. One of the three was to be used as a "lazy tether" line, long enough to reach to the bottom of the deepest canyon in the area. Before this plan could be put into action, several tasks had to be accomplished. When the parachute enshrouded object was sighted on 15 March, CURV was ordered readied for use in depths to 2800 feet. Since its design depth was 2000 feet, some 900 feet of control cabling had to be spliced into position, a sea test conducted off the coast of California and then the vehicle shipped to Palomares and installed on board the USS PETREL (Fig. 3-29). Having demonstrated its ability to recover an object from 1050 feet in the Palomares area, CURV was ready to perform when the target was relocated on 2 April. On 4 April, CURV successfully attached the first grapnel to the apex of the chute (Fig. 3-30). To this grapnel was attached 3200 feet of 5/8-inch braided nylon and an additional 1500 feet of 3/4-inch braided nylon line on a buoy. A second grapnel was entangled in the chute shroud lines and connected to a second buoy by 5000 feet of 5/8-inch

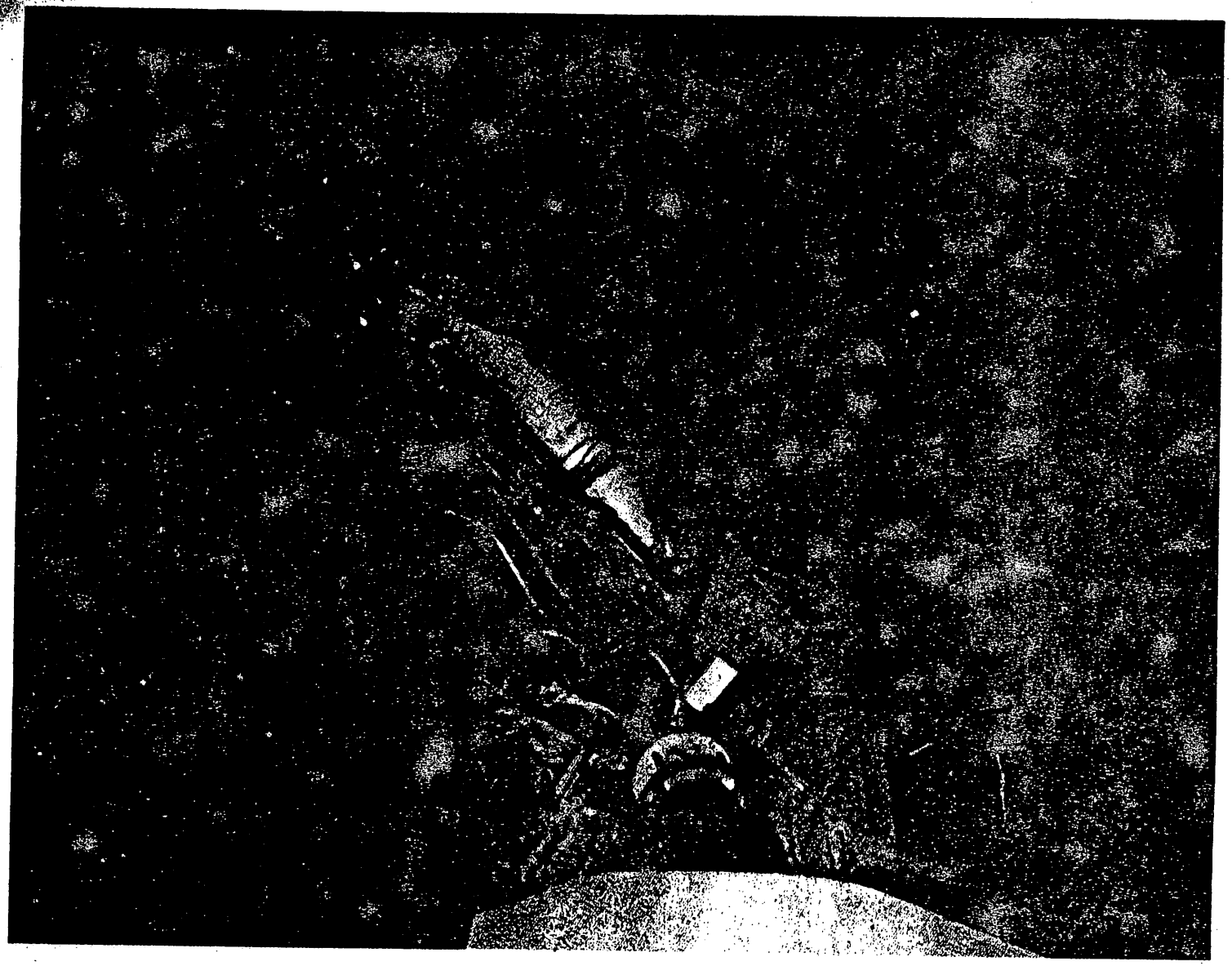


Figure 3-27 Underwater CURV Camera Shot During Lift

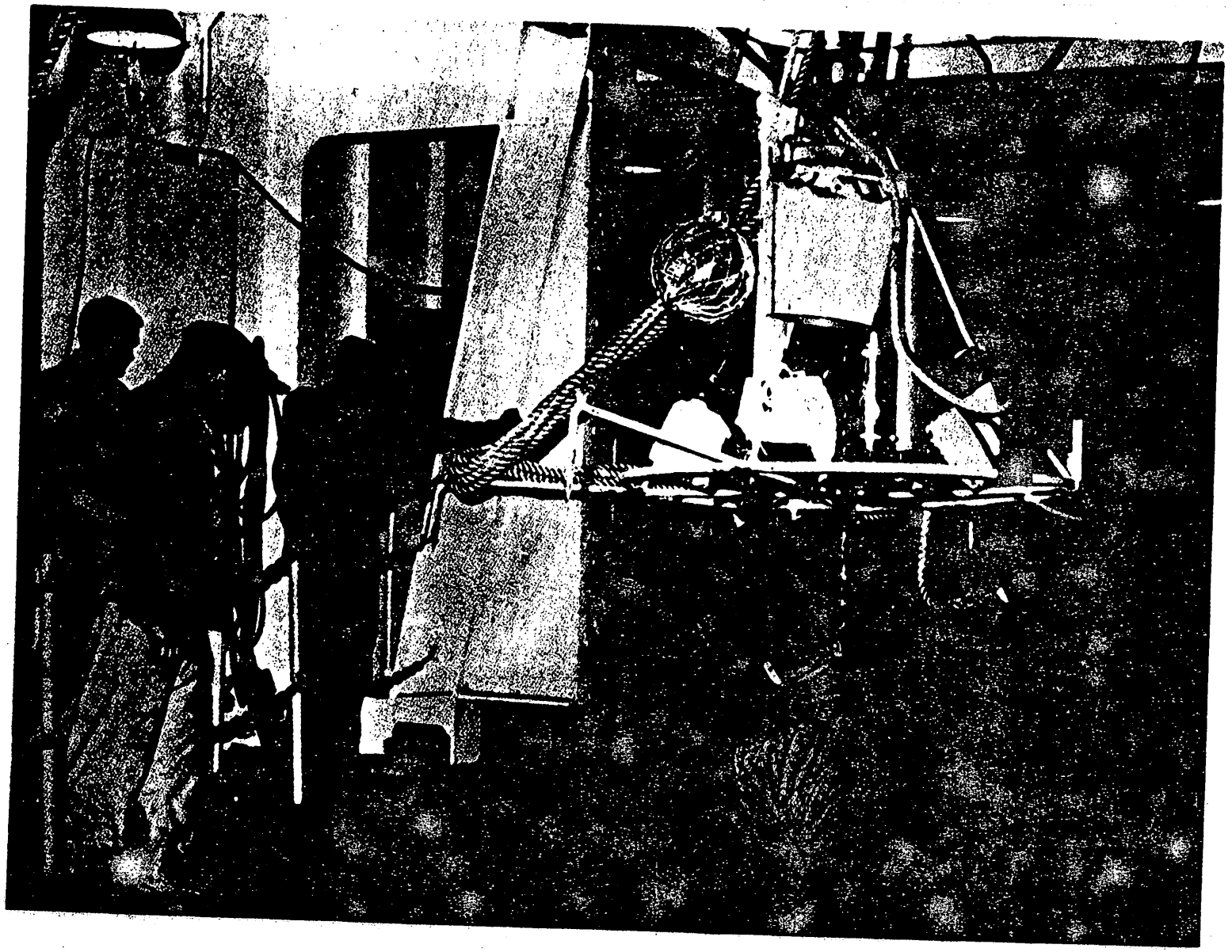


Figure 3-28 "POODL" Assembly

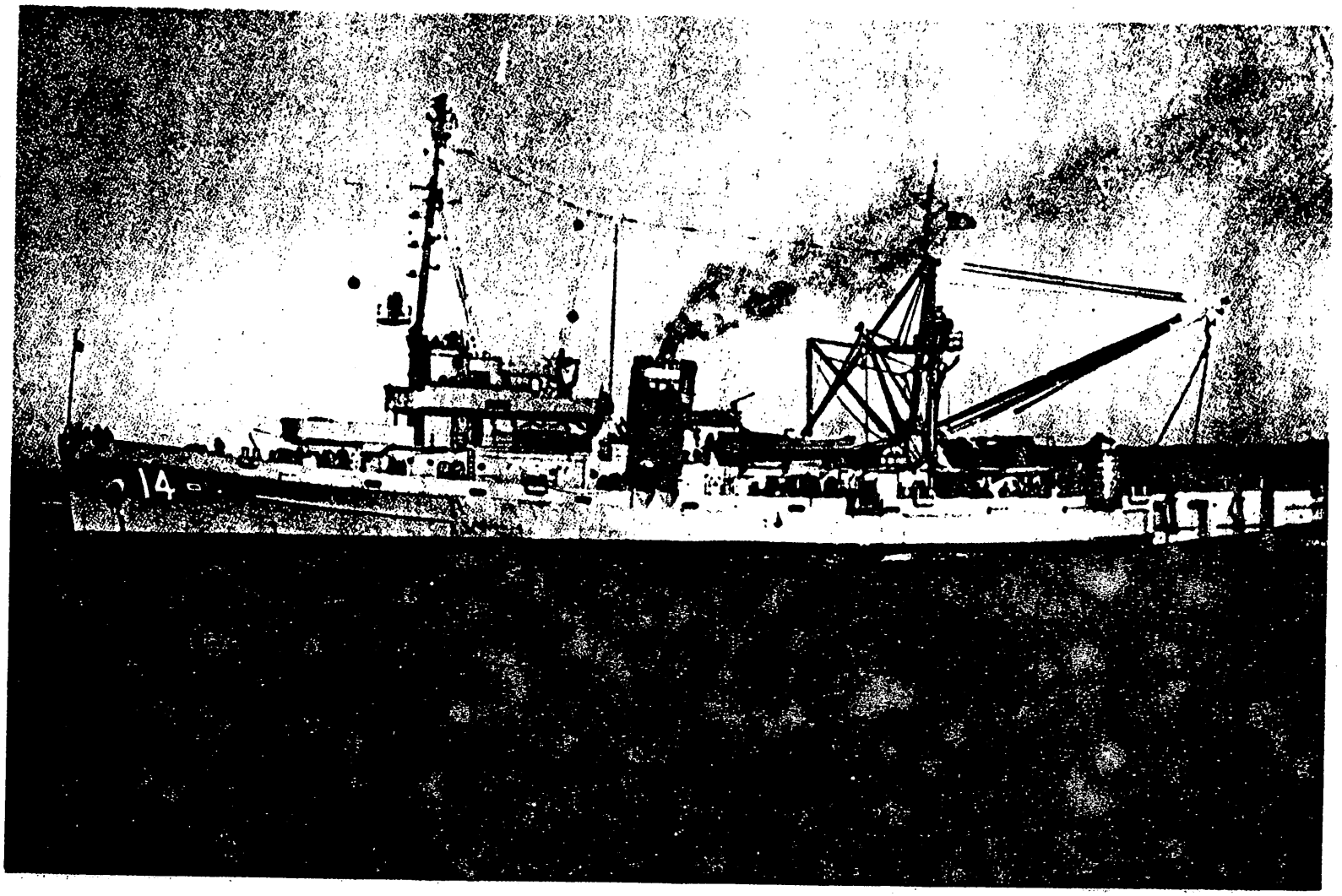


Figure 3-29 USS PETREL

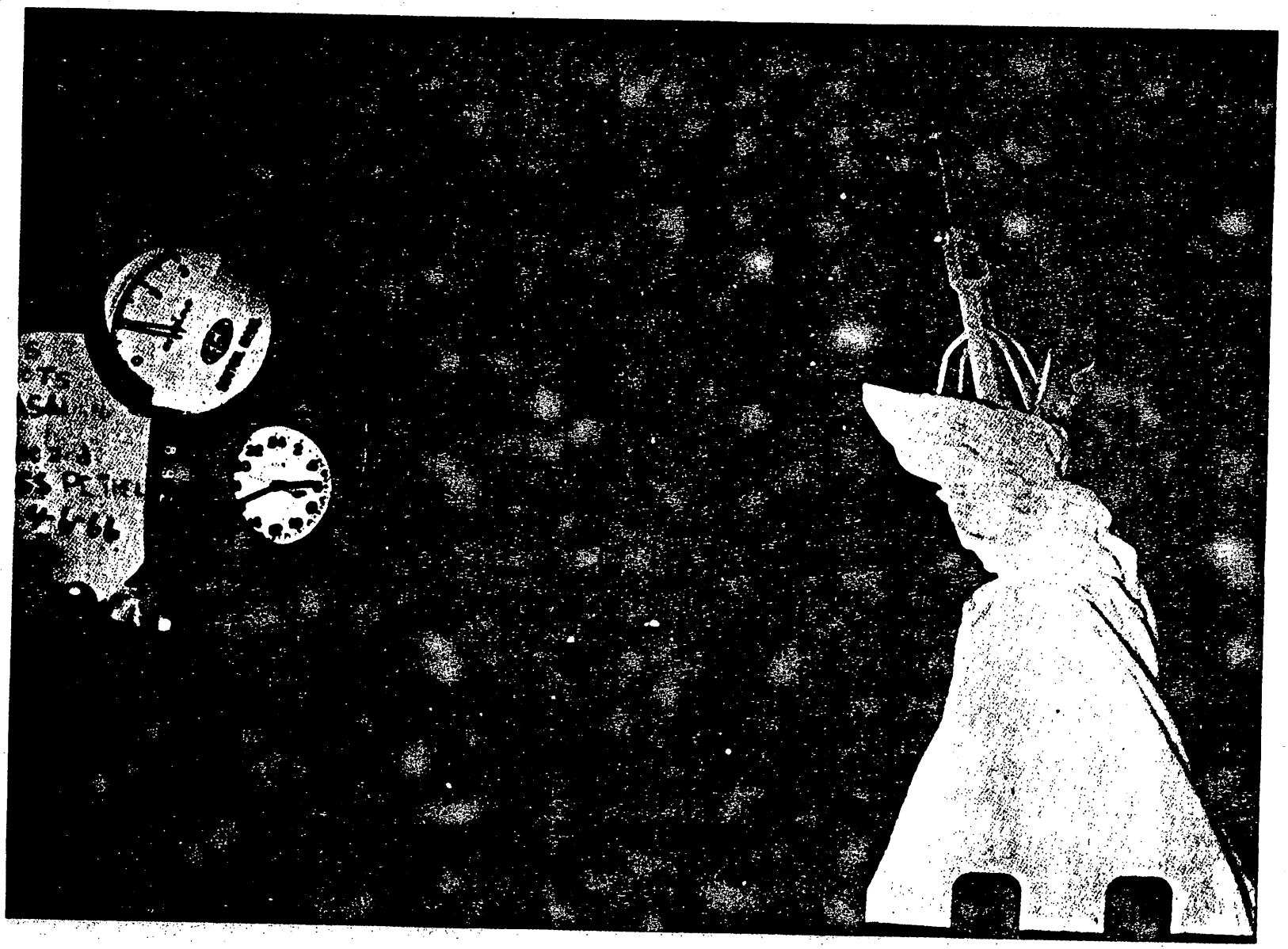


Figure 3-30 First Grapnel Attachment

braided nylon line on 6 April. Subsequently, ALVIN reported that the weapon had moved some 300 feet down slope and so the third grapnel was sent down on CURV lest the weapon move below the depth capability of the CURV. While attempting to engage the third grapnel, CURV became entangled in the parachute and the decision was made to commence the second lift attempt. The two-lift lines were engaged to PETREL's starboard amidships capstan through the starboard diving and boat booms so that both lines were hauled in simultaneously while the CURV's lines were tended over the stern. Taking up the slack on the apex line first, the two lines made the lift, and while the CURV lines were hauled in at the same time, care was taken not to put a strain on the parachute by that means. It is interesting to note that the action during lift was recorded by the TV and cameras aboard CURV (Fig. 3-27).

When the weapon reached a depth of 50 feet and the top of the parachute was at the surface, divers transferred the load to a bridle extended from the ship's main boom and the long lost nuclear weapon was swung aboard (Fig. 3-31), and gently lowered to a wooden cradle to await the rendering safe procedures of the EOD team. A message of "Mission Accomplished" was transmitted to the Chief of Naval Operations.

RECOVERY SUMMARY:

After the weapon was located on 15 March and its condition determined, TF-65 concentrated on the problem of devising a method of recovery that was within the capability of the material and equipment in hand or readily available. Because of the precarious perch of the weapon and the interaction of the currents on the parachute, time was of the essence, for any significant delay might mean another loss of the weapon and a possible recovery from a depth as great as 3900 feet. Not only would this conditon have put the bomb beyond the reach of CURV, but it would have multiplied the difficulties of recovery several fold. There was always the chance that the weapon might slip into a hole or sink into the silt and ooze of the bottom making search and recovery impossible.

Faced with these discouraging possibilities, CTF-65 approved the three proposed recovery plans utilizing the best available equipment and expertise. Each plan failed in turn, and in fact, plan CHARLIE resulted in the loss of the weapon to greater depths. Because of the ability of CURV to descend with a grapnel attached to a line of sufficient strength to lift the weapon and place the grapnel securely in the folds of the chute, the CURV was called to task. CURV accomplished its mission and the missing nuclear weapon was recovered 81 days after the bombs fell on Palomares (Fig. 3-32).

OPERATIONAL SUMMARY:

Review of all aspects of the at sea portion of AIRCRAFT SALVOPS MED presents a rather impressive set of problem accomplishments, lessons learned, and a genuine admiration for the men and machine teams that deserve gratitude and praise from the people and governments of both Spain and the United States. In summary, 454 contacts were made. Of these contacts, 201 were identified as aircraft debris and recovered, while 103 were identified as

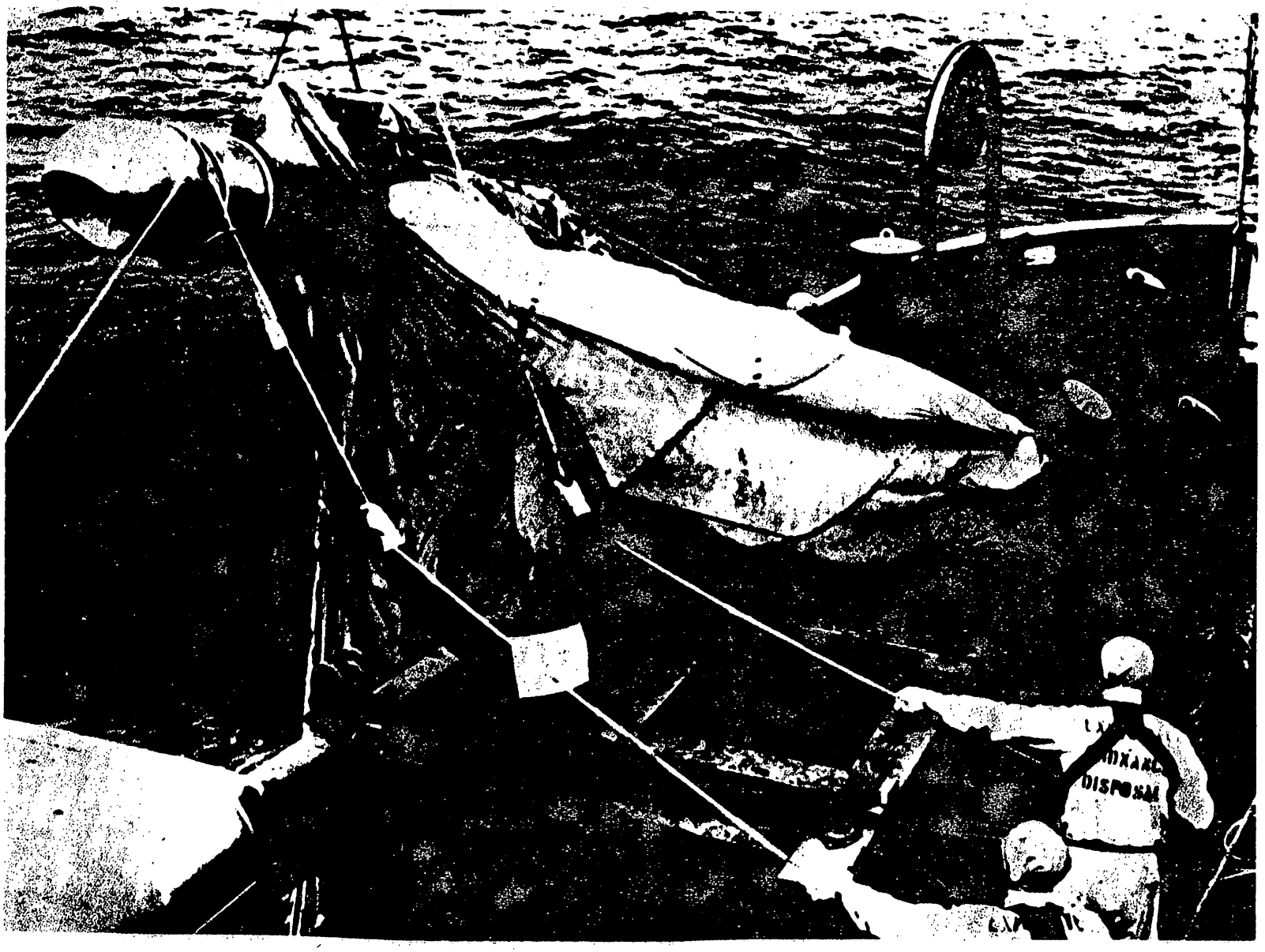


Figure 3-31 Swinging the Weapon Aboard

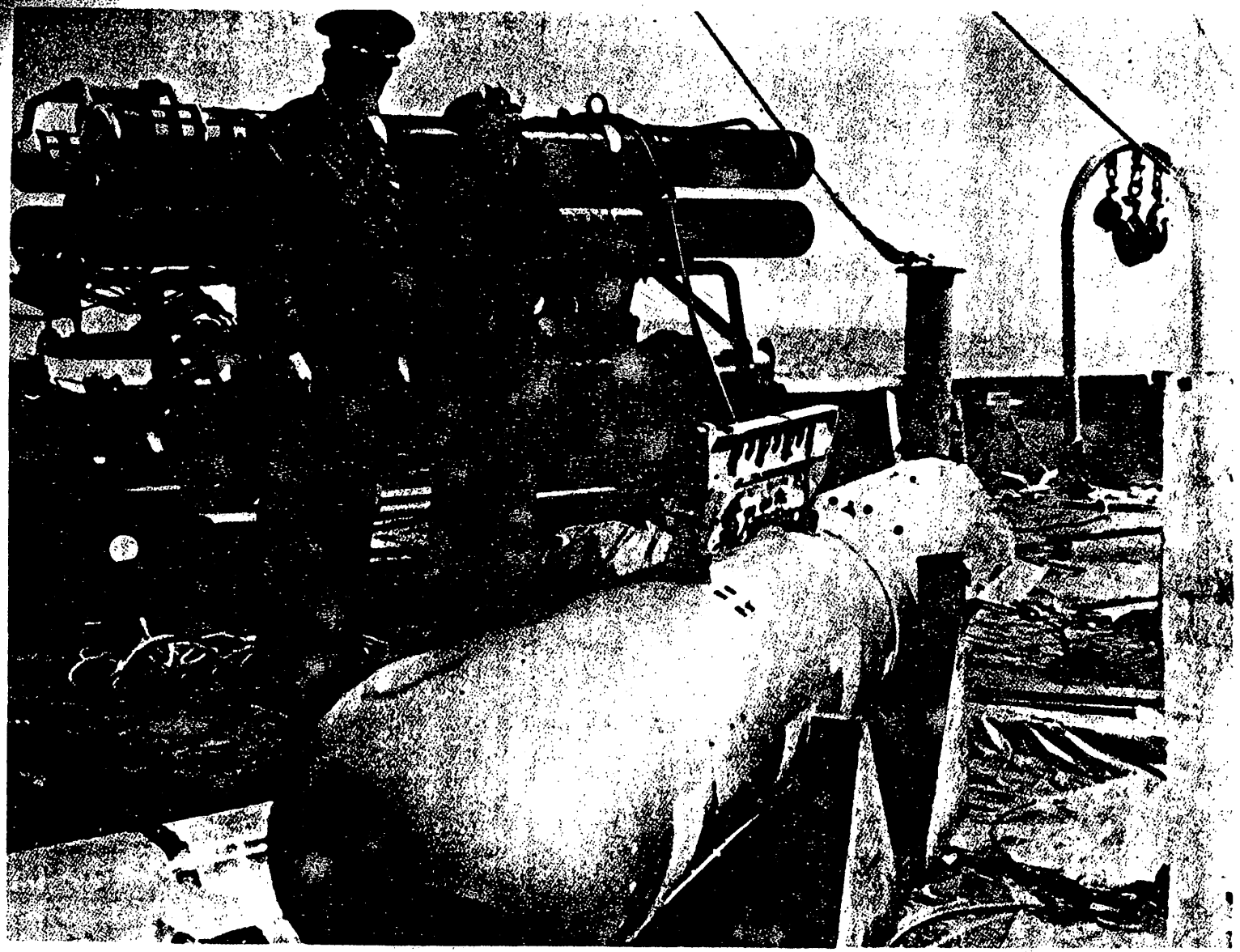


Figure 3-32 Gen Wilson and ADM Guest with Recovered Bomb

non-aircraft debris. Most of these contacts are plotted in Figure 3-33. The remaining contacts were not identified or were abandoned once the weapon was found.

LOGISTICS AND SUPPORT:

The success story of TF-65 was made possible through the combined efforts of supporting personnel in the United States. Coordinating and guiding this rather unusual endeavor was the TAG. In addition, the combined assets of the Naval establishment as well as the country's industrial complex were on call and responded with all possible haste when a need was identified.

Logistics:

The magnitude of effort required to support the large contingent of men and equipment over 3000 miles away from the source of supply, was significant, particularly because many requirements bore a top priority label. It was obvious that normal supply channels through chain of command could not provide the special materials within the time element required, and in some cases, never. As a result, direct channels were opened to the TAG where each request was discussed and the appropriate action taken. Most of the special materials were flown to the site by one of the routes shown in Figure 3-34.

During the period from 17 January to 13 April, a total of 34 surface ships played a part in supporting TF-65. Added to this armada were at least six utility boats, not to mention the smaller craft from the usual complement of the ships assigned. The support of these ships and their crews was not a large task for the Navy, hence all normal logistic requirements were satisfied through regular Navy supply channels. For many of the ships and their crews, it meant days of little visible progress and practically no shore leave. While not a particularly critical problem, the situation did little to boost the average sailor's morale.

At the outset of the support effort, a survey of methods and equipments both foreign and domestic was conducted by the TAG. From this survey, the items that showed the most promise were proposed to CTF-65 and if feasible were ordered to Palomares. Some items not in being, were manufactured, often resulting in the receipt of untried and untested systems for which little expertise in operation or maintenance was available. Certain of the assets could not be shipped or moved immediately. For instance, ALUMINAUT was too large to be airshipped so it was transported on board the USS PLYMOUTH ROCK, a trip which required 10 days. ALVIN required partial disassembly for air lift, with subsequent reassembly upon arrival and so arrived at Palomares on the same day as ALUMINAUT. People, an easy to ship asset, were delayed because of the necessity for security clearances. Some were citizens of foreign countries which compounded the clearance problem.

Major technical and logistics support for AIRCRAFT SALVOPS MED was supplied by the Supervisor of Salvage in the then Bureau of Ships, by the Director of the Deep Submergence Systems Project, by the Chief of Naval Research, and by the Oceanographer of the Navy, all of whom were represented on the TAG. The main effort of the Supervisor of Salvage

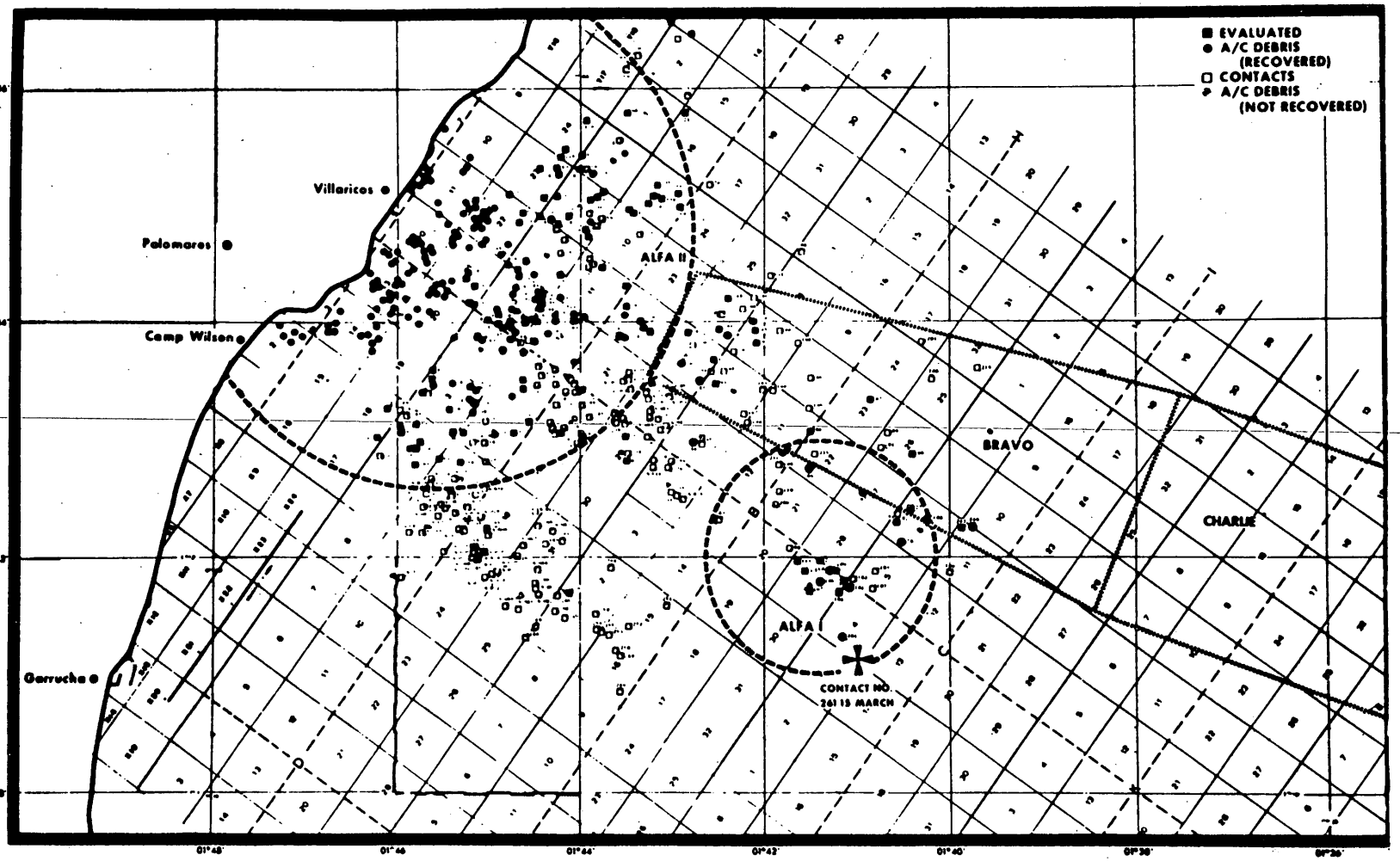
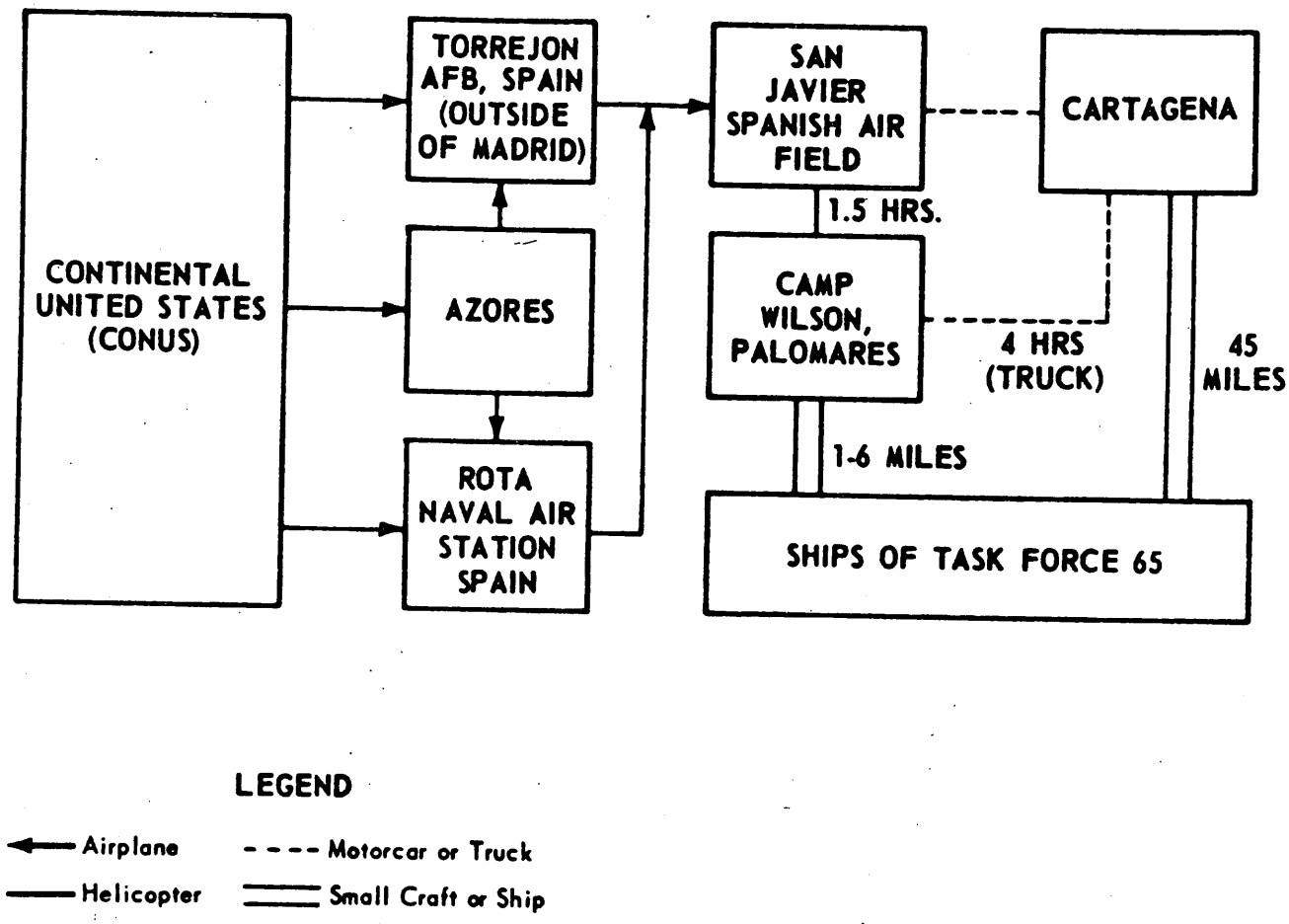


Figure 3-33 Contact and Debris Pattern



NOTES:

1. Total/one way intercontinental airlift of Navy cargo: 250,000 lbs.
2. Total flight time, Andrews AFB (CONUS) to Torrejon AFB: 10.5 hrs. (2875 miles)

Figure 3-34 Transportation Flow from CONUS to Task Force 65

involved contracting, procurement, and modification of commercial equipment and the procurement of all civilian personnel services. Ocean Systems, Inc. was contracted to manage civilian participation and to provide consulting and technical assistance. The Director of Deep Submergence was tasked to provide the services of ALUMINAUT and the MV PRIVATEER, its mother ship (Fig. 3-35). ALVIN and USNS MIZAR were provided by the Office of Naval Research. The Oceanographer of the Navy provided the scientific assistance required to set up the DECCA Hi-Fix navigation system, a product of Great Britain. To the foregoing tasks was added the identification and evaluation of the environmental parameters indigenous to the Palomares off shore area. From the Mine Defense Laboratory came the SEALAB divers, while the Naval Ordnance Test Station furnished DEEP JEEP, underwater TV and CURV plus the technical expertise for operation and maintenance of these systems. And finally, the Commander Military Sea Transportation Service ordered the USNS MIZAR, DUTTON, BOYCE, and the SS ALMA VICTORY into service in support of TF-65.

As a supplement to the TF-65 staff, a Tactical Analysis Group was formed to collect and analyze data, assist in the formulation of the daily search plans and assignments, and the calculation of the Search Effectiveness Probability (SEP*). This group consisted of three naval officers, a civilian oceanographer, and a civilian mathematician. By midnight on 14 March, the day before the missing nuclear weapon was sighted, the search effort in area Alpha I had resulted in an overall SEP of between .30 and .35, while Alpha II had an SEP of from .82 to .86. By comparison, had the weapon not been found on 15 March, much further search in Alpha I was indicated. Figure 3-36 illustrates the SEP for each portion of Alpha I, the summation of which resulted in the overall SEP noted.

Transportation:

As were all support facilities, transportation was woefully lacking during the first few days of AIRCRAFT SALVOPS MED. Vehicles, such as they were, had to be borrowed from commercial vendors of Palomares and the nearby villages, from the Guardia Civil, or the Spanish military authorities. The problem was solved through the use of civilian and military aircraft, Navy ships, and Air Force trucks. The U.S. Air Force provided 47 special logistic flights from the United States to Spain in support of TF-65 in addition to many CONUS and European intra-continental flights. Over 250,000 pounds of cargo were airlifted to the Task Force. In addition, many of the ships that were to take part in the operation arrived with cargo, these in addition to the regular supply ships who serviced the Task Force as part of the Sixth Fleet. Daily flights were flown from Torrejon to San Javier and there the cargo transferred to helicopter for movement to Camp Wilson and the waiting landing craft (Fig. 3-37).

[illegible] can be seen from Figure 3-38, there were no ship landing facilities at Palomares, making [illegible] landing craft indispensable during the logistic phase of the operation. However, inclem[illegible] weather and high winds and seas made the operation of small craft oftentimes treacherous

(*) SEP was defined as "the probability that if the target were in a specified area, then it [illegible] have been detected and identified with a specified amount of search effort. The param[illegible] used in determining the SEP included the sweep width of the individual sensor, naviga[illegible] accuracy, contact identification, and search procedure.

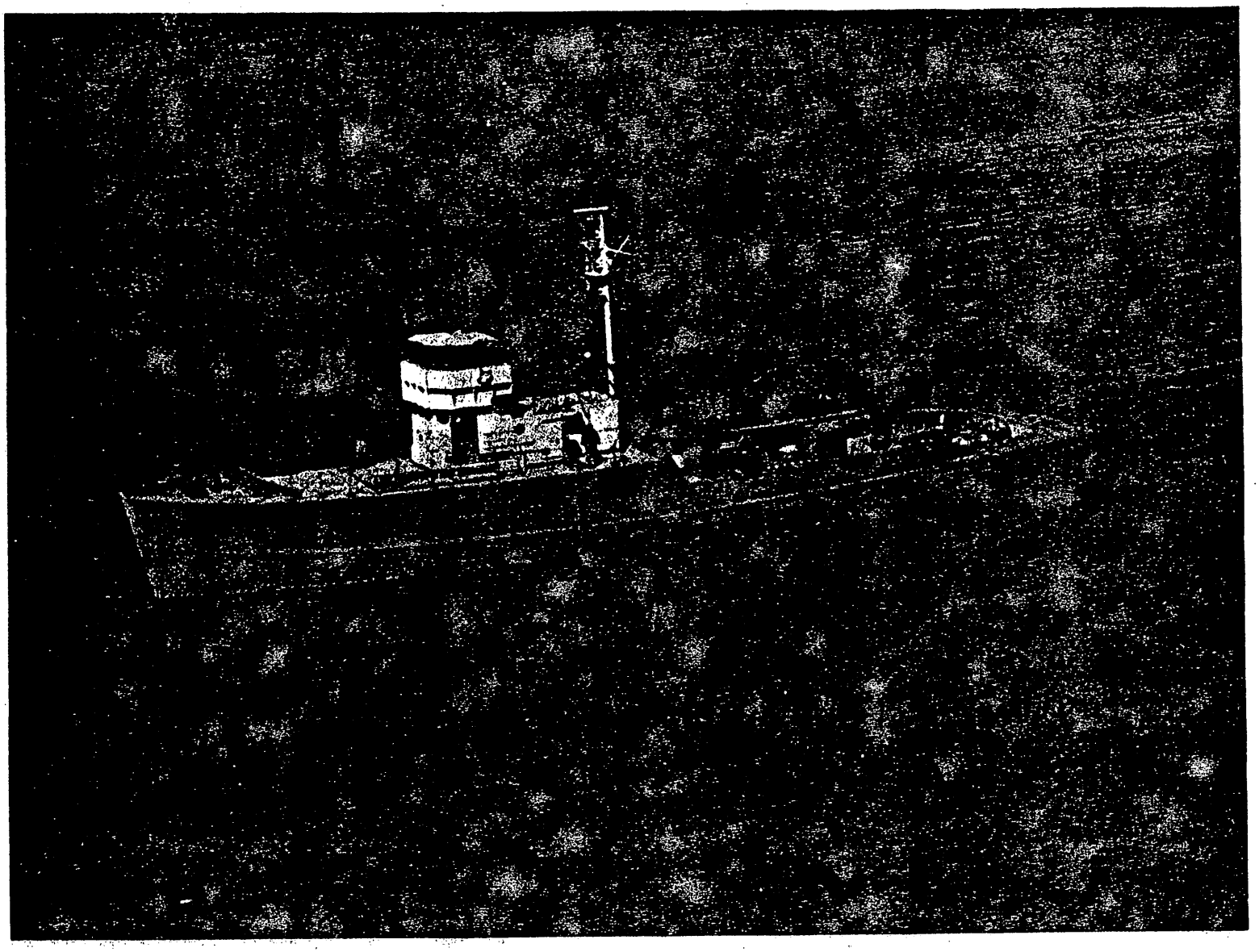
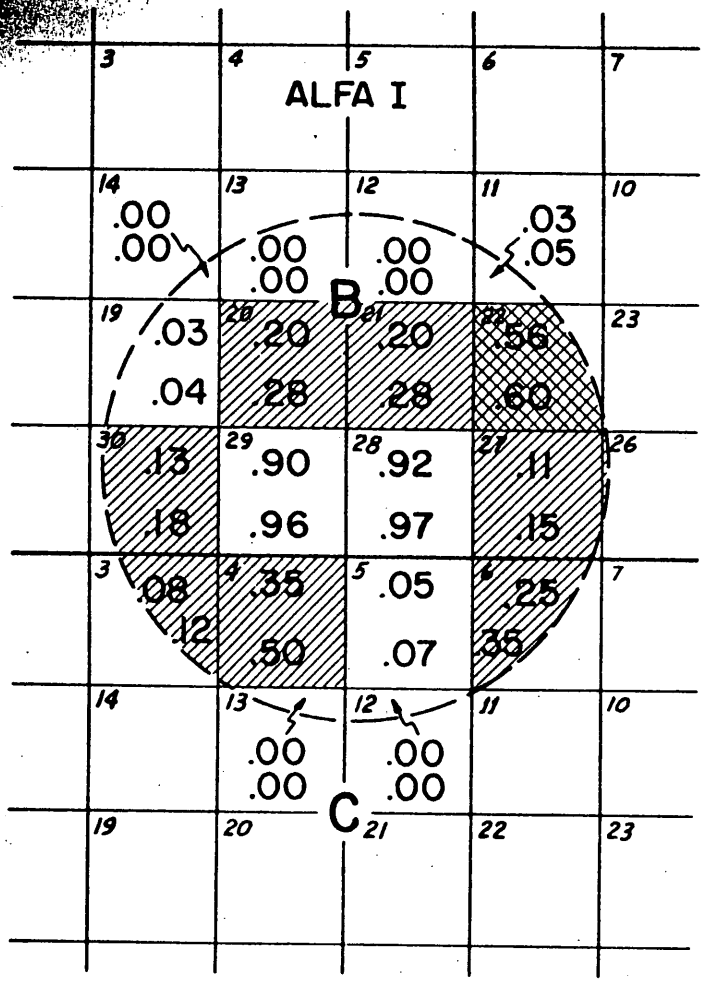


Figure 3-35 MV PRIVATEER



Notes: (1) SEP is given by the large bold faced numbers. The small light faced numbers give the square designation.
(2) The two values of SEP in each square result from two different assumptions about visual detection (optimistic and pessimistic).
(3) Shading is based upon the larger of the two values for SEP.

LEGEND

- $.95 \leq SEP \leq 1.00$
- $.50 \leq SEP < .95$
- $.10 \leq SEP < .50$
- $.00 \leq SEP < .10$

Figure 3-36 Search Effectiveness Probability in Alfa I

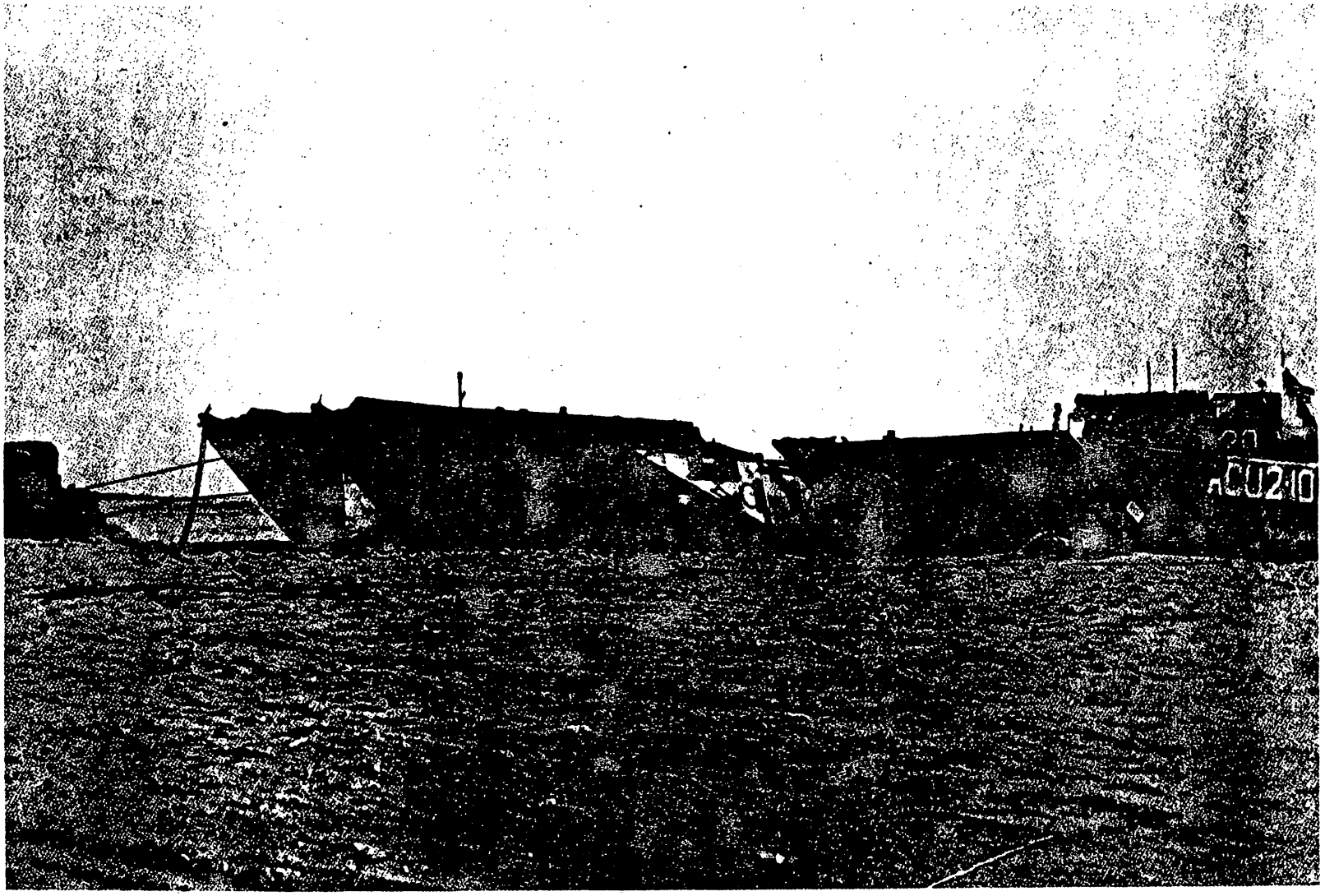


Figure 3-37 Landing Craft at Camp Wilson

Figure 3-38 Beach at Palomares

or impossible. When the need arose to service various smaller ships, they were taken to either Cartagena or Garrucha where reasonable protection and pier facilities were available.

Along with the absence of any pier facilities (Fig. 3-39), Camp Wilson lacked warehouses or other buildings in which to receive and process the bulk of the material and equipment flown in. As a result, the material began to pile up on the beach and lost its identity. In fact, many items were never used or even unpacked and as such represented an over supply, manifesting the desire of TAG to insure that CTF-65 had all the material he could possibly use.

Operational Support:

As part of the support provided to the Task Force by its own supply and repair ships, three particular tasks were noteworthy:

The task of supporting ALVIN and ALUMINAUT fell upon the LSD assigned to TF-65. While not specifically suited to this role, the LSD did provide a dry dock facility for both as well as machine shops and other repair facilities (Fig. 3-40).

The Navy had the task of removing the aircraft debris from Spanish soil and dumping it at sea after it had been collected and stacked on the beach (Fig. 3-41). The Navy modified two barges and towed them from Cartegena to Palomares where the debris was loaded on board. The barges were then towed out into the Atlantic Ocean and there off loaded.

A program for the sanitization of the land in and around Palomares, produced some 4800 barrels of contaminated top soil (Fig. 42). Once land troops had loaded the barrels, delivered from Italy by the Navy, they had to be placed aboard the USNS LT. BOYCE (Fig. 3-43) for shipment to Charleston, South Carolina and thence to Aiken, South Carolina for burial in the Atomic Energy Commission waste depository.

Logistic Summary:

The success of rapid and effective logistics support of AIRCRAFT SALVOPS MED was made possible by the establishment of a highly qualified Technical Staff (TAG) located at the nerve center of the nation and empowered to make the decisions and expend the funds required. Both the urgency of the mission and the serious lack of operational equipment to accomplish the mission generated many specialized logistic problems not normally encountered. The priority assigned were appropriate to a national emergency, which in some respects, this was.

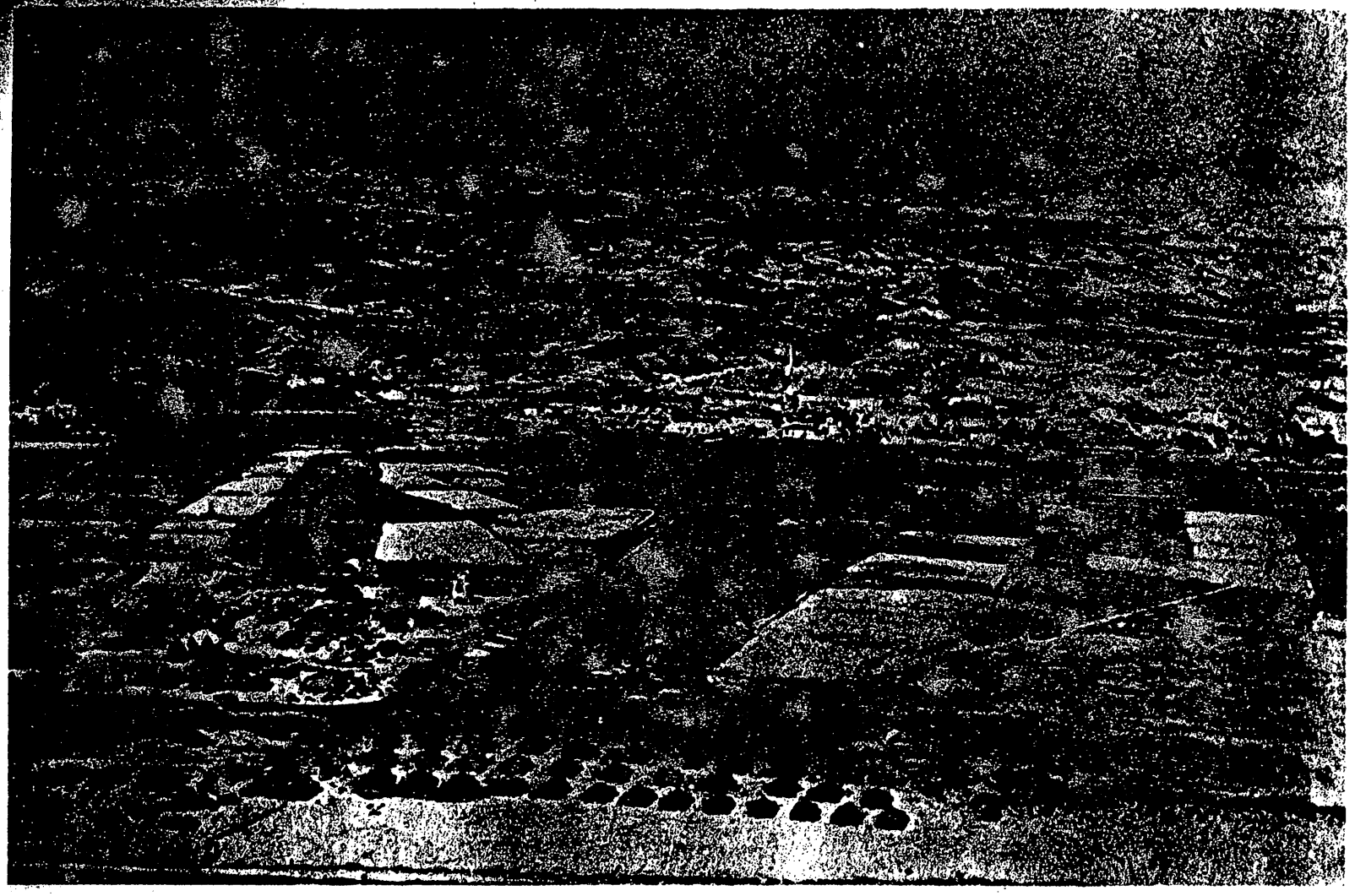


Figure 3-39 Aerial View of Camp Wilson Area

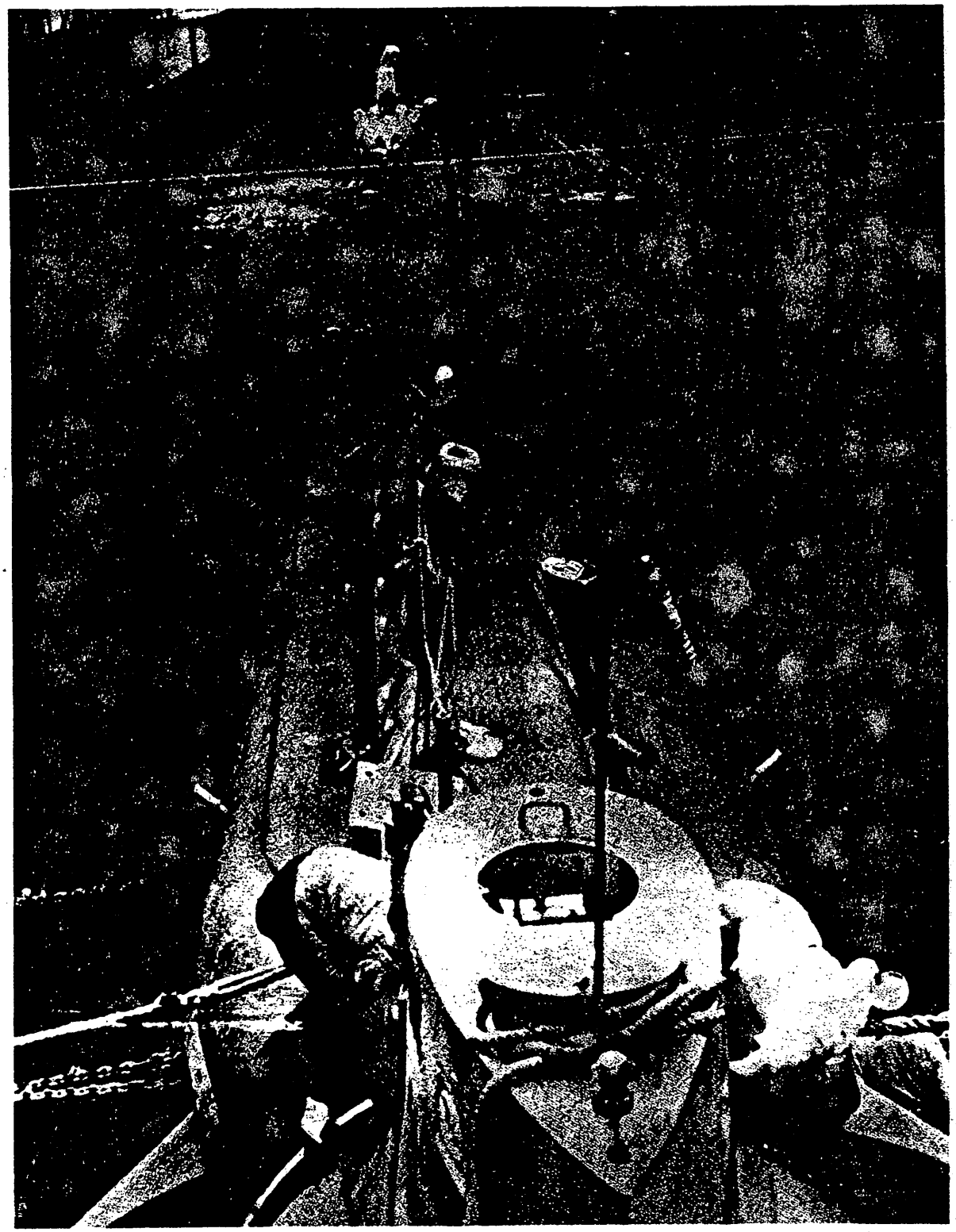


Figure 3-40 LSD as a Dry Dock Facility

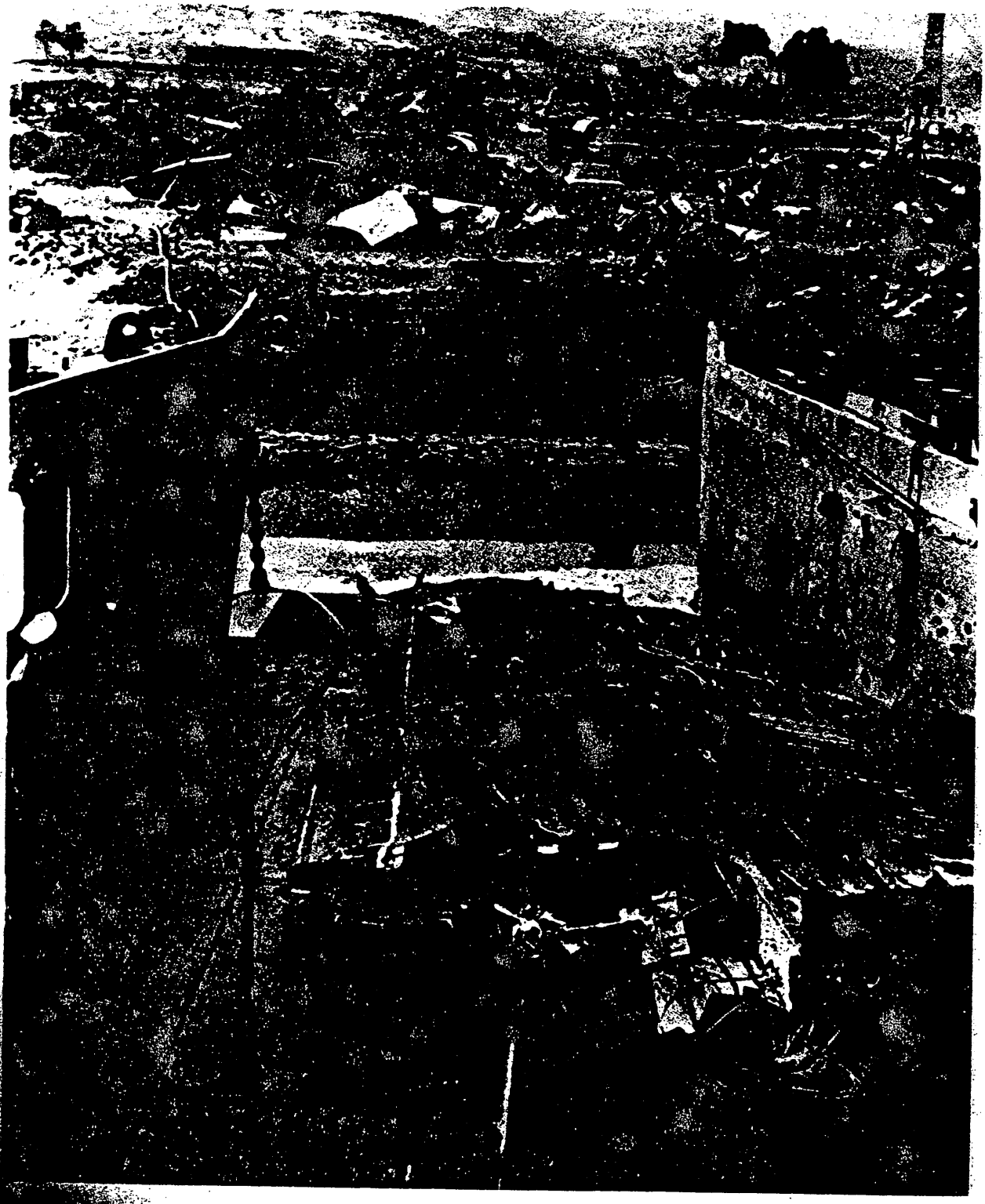


Figure 3-41 Debris on the Beach

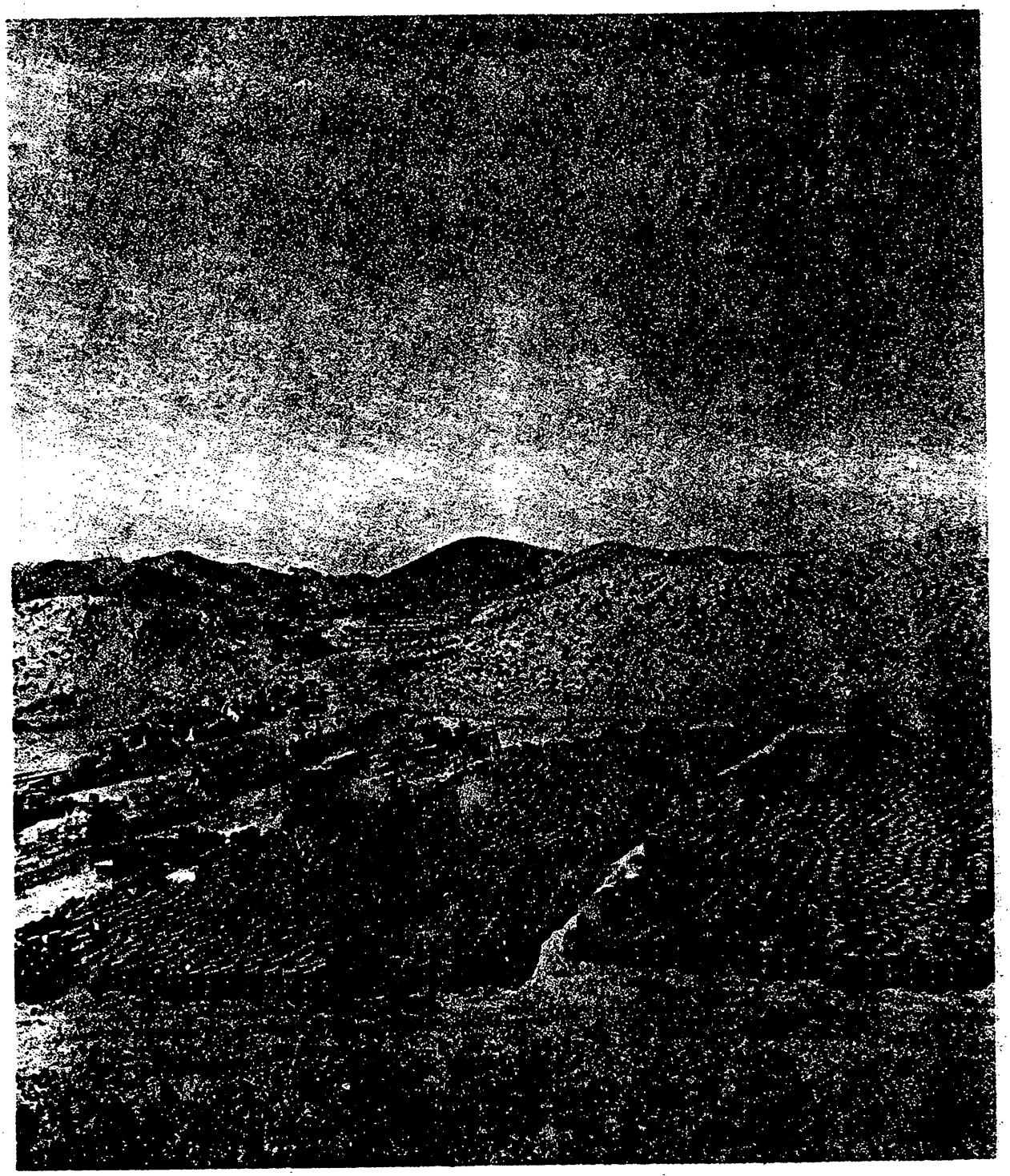


Figure 3-42 Barrel Storage Area

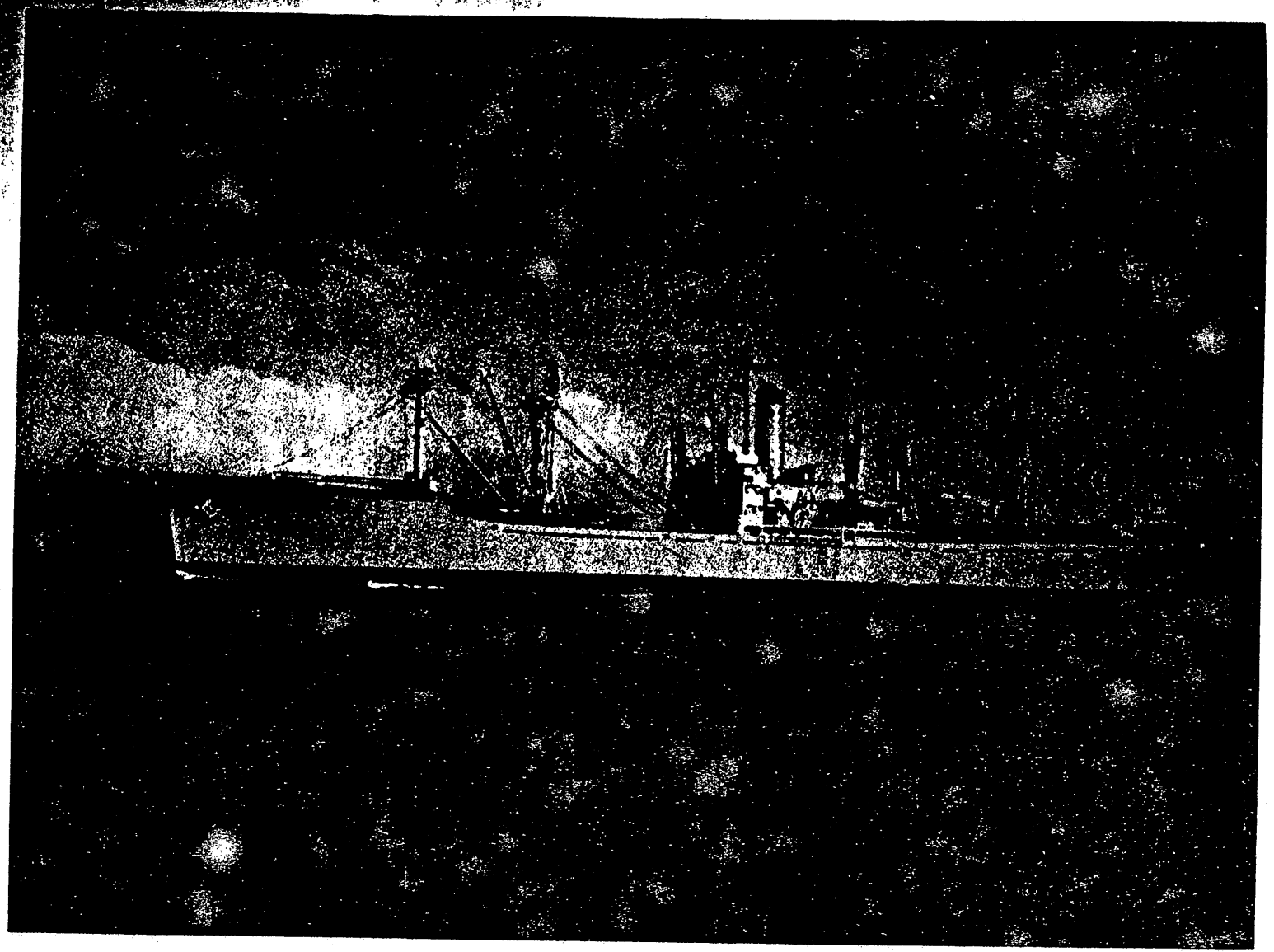


Figure 3-43 USNS LT BOYCE

LESSONS LEARNED:

This section presents the conclusions and recommendations, based on the then current state-of-the-art, and political environment, as described 1 year after the accident in the final AIRCRAFT SALVOPS MED report. Some of the recommendations have been followed, at least as to intent, while others have not, for various reasons, primarily financial. Some of the recommendations were very general in nature and as such appear to have been satisfied in present day organizations and equipments. The current status of Deep Recovery Programs is presented in the Final Analysis portion of this report.

Organization:

In January 1966, the DOD did not have a trained unit or force capable of effective search for and recovery of objects from the ocean floor. TF-65 evolved as a result of decisions made to fill immediate requirements rather than from planned operational requirements.

The Task Force operational concepts were improvised as needs arose.

The establishment of the TAG in Washington, D.C., provided an effective interface between the Task Force and DOD/Civilian scientific and technical resources.

Direct access from the Task Force Commander to the office of the Chief of Naval Operations proved most effective in insuring immediate response.

The diversity and complexity of Task Force components, at times, caused additional problems in both administrative and operational areas.

Upon completion of the recovery operations, all organized expertise accumulated by TF-65 was lost to the Navy when the task force was dissolved.

The need to substitute civilian for military constituents or to provide a nonmilitary appearance in a given search and recovery operation is of real concern in future plans.

Command and Control:

The direction of the search and recovery operations must rest with the on-scene commander, with the guidance and advice of the CNO through the Supervisor of Salvage, who would provide: information on available equipment, procedures for their use, qualified personnel for assignment as operators and to technical advisory or analysis teams; and logistic support from both military and civilian sources. The facilities provided by the assignment of many varied surface ships will not normally produce the multi-channel secure circuits needed by the Commander for inter- or intra-force communications.

The technical advisories sent to CTF by the TAG were invaluable for operational planning.

The detailed SITREPS issued by CTF-65 provided the basis for much of the technical guidance offered by the TAG.

The on-scene commander found it necessary to verify and, where expedient, to modify operational procedures and tactics as experience dictated.

Operational Considerations:

Security:

The integrity of all aspects of search and recovery operations cannot be assured without assignment of a security force of naval warships.

The proximity of the Spanish coastline and the cooperative attitude of the government and its people greatly simplified the security requirement.

Search Preparations:

Weather data and its accurate prediction is an important factor in both the operational and safety aspects of search and recovery operations unless a completely submerged system is available.

Detailed oceanographic data is required for effective search planning.

Bottom sampling and charting must reflect accurate conditions in the search area of concern.

Precise measurement of the characteristics and capabilities of all the equipments under existing conditons must be in hand prior to planning the search. This information must be verified on-scene.

An independent (sea based) navigation system with maximum accuracy is required for surface ship control.

An accurate means of fixing the controlled underwater search or recovery vehicles in relation to the controlling vessel or to the bottom is required. (Accuracy to within 1 foot is desired.)

Search and Identification:

[illegible]rial search effort provides useful debris pattern information when properly planned and [illegible] results recorded.

[illegible] search both actual and by remote means proved to be most beneficial except when visi[illegible] severely limited by silt clouds.

[illegible] was the only means of contact verification whether by eye, television, or [illegible].

Search efficiency is at a maximum using swimmer tactics (0-80 feet depths).

Search effectiveness of hard-hat divers is seriously reduced when the bottom consists of silt or similar composition materials that readily restrict visibility when disturbed (80-600 feet).

Acoustic methods of search lead to maximum contact rate, but provide no positive identification capability. (Maximum depth limited by the particular pulse-repetition rate). Delayed visual follow-up was very difficult and of little value since relocation of a given contact could not be assured. Contact reliability over rough terrain is a minimum.

Tethered vehicles provide maximum endurance, safety, and area coverage. (DEEP JEEP and underwater TV excepted because of control ship moor requirements.)

Manned submersibles provide maximum maneuverability and flexibility, but are endurance limited by life support systems, crew fatigue and power limitations.

Debriefing of system operators immediately after completion of dive is essential to effective planning for the next day's operations.

Debris pattern assessment is essential to search effectiveness probability determination. (Some debris locations were not predictable when based on known environmental parameters.)

Large, less maneuverable submersibles are most useful over level subterrain during the search phase.

Recovery:

Swimmer/diver search procedures provided nearly 100 percent recovery of debris in shallow areas utilizing the lifting capability of the various support ships.

Recovery of debris over 50 pounds was limited to tethered vehicles. (ALUMINAUT had the capability but was not used to recover debris.)

The small manned submersibles were not useful for lifting or line delivery during recovery operations.

A system to decouple surface action is required for recovery by surface ships.

Submersible manipulators, although limited in capacity, are required for light work in the target area.

Design and construction of untried recovery systems by support forces were generally unsuccessful.

Development of a line carrying capability for manned submersibles is essential.

The tethered vehicle equipped with manipulator, sonar, and TV monitor system proved to be most effective in securing the lifting lines to the target.

The danger of vehicle entrapment is always present, but is most likely during recovery operations.

The unlimited endurance of the unmanned tethered vehicle is its greatest asset in recovery requirements.

All recovery vehicles were limited by the current intensity in the area of the target.

LOGISTICS AND SUPPORT:

Sea Transportation:

In spite of the myriad of small craft available, means of moving between ships and between ships and shore were inadequate.

High winds and seas severely restricted small craft operations especially in the vicinity of the beach.

The maintenance facilities provided by the assigned Destroyer Tender (AD) were inadequate in the area of preventive maintenance, resulting in boats which had broken down being out of service for long periods of time.

The landing craft were invaluable in moving supplies to the force and between ships of the force.

Helicopter support is essential to all future salvage operations.

Support facilities required aboard mother ships for submersibles are as follows:

- Crew messing and berthing in air conditioned spaces.
- Center-well for photographic search.
- Bow thruster (laterally thrusting bow mounted auxiliary propellors) for accuracy in station keeping and directional control.
- High speed winches and winch control.
- Photo processing for black and white and color film.
- Adequate fresh water distilling capability.
- Wet and dry laboratories for oceanographer work.
- Cranes for hoisting vehicles aboard when required.
- Docking well wing walls that extend to include a free water area capable of being enclosed in addition to a dry docking area.

Stowage for a supply of ballasting shot, gasoline, oil, batteries, and spare parts, etc.
Air and battery charging facilities.
Shipfitter, electrical, electronic, machine shops, diving locker, diving table, etc.
Accurate underwater tracking capability for towed, tethered, and manned vehicles.
Excellent maneuverability - speed capability of at least 15 knots.
Ability to monitor and control several vehicles simultaneously.
Foul weather recovery capability.
Sufficient communications equipment for all required traffic, local surface and subsurface and long range.
Helicopter flight deck.
Facilities for hydrographic surveys and chart making and printing.

Operational Support:

The Landing Ship Dock (LSD) well deck worked the best of the available launching and recovery facilities for the manned submersibles. (ALVIN's catamaran support ship was not available.)

Flexibility of the LSD was reduced when both ALVIN and ALUMINAUT were on the well deck.

Launching and recovery of the submersibles were extremely hazardous to both equipment and personnel, especially in high sea states.

Facilities aboard the LSD for maintenance of submersibles were marginal and could only be sustained with spare parts shipped direct from the CONUS.

Manned vehicle crew fatigue reduced efficiency.

Vehicle maintenance must be a separate function from the operating crew, particularly in prolonged search and recovery efforts.

While external cameras with strobe lights proved most effective, less than optimum positioning of the lighting reduced visibility, by causing excessive back scatter and "hot spots."

Manned submersibles require improvements in the following areas:

Visibility in all directions.
Maneuverability.
Habitability.
Maximum speed (current limited).
Replenishment (reduced turn-around time).
Sea state capability.
Material reliability.
Underwater navigation capability.
Manipulator flexibility (two arm function).

Lifting capability.
Sonar range and definition.
Endurance.
Anti-entrapment capability.

Tethered unmanned vehicles require improvements in the following areas:

Increased depth capability.
Maximum speed (current limited).
Reduced dependence on mother ship position.
Sonar range and definition.

Better reliability and increased life is required for transponders and pingers. Frequencies must be compatible.

The integration of acoustic detection and immediate visual identification provided the optimum in search effectivness.

A mobile tool kit is required for deployable vehicles, to include a line cutter, penetrating attachments, detachable claws with adjustable grab, latching grapnels, and a double-handed manipulator.

COST OF OPERATIONS:

The cost to conduct the sea search and recovery portion of Aircraft Salvage Operations Mediterranean is outlined in some detail in the following paragraph. However, in retrospect, it is clear that the total bill to the taxpayer was higher than if a specifically designed plan of operations, trained personnel, and the appropriate equipment had been immediately available on 17 January 1966. This statement is no less true today.

COST SUMMARY:

Cost information for that portion of AIRCRAFT SALVOPS MED concerning the search, identification and recovery of the nuclear weapon lost at sea are presented here for historical purposes. It is recognized that inflationary pressures over the intervening 9 years make these figures less than useful, however, the cost listing does provide an indication of relative costs for the selected breakdown.

[illegible] cost for AIRCRAFT SALVOPS MED was $10,230,744 ($126,305 per day).

[illegible] divided into three categories:

[illegible] Category A (U.S. Navy ship's operating costs) incorporates only those U.S. Navy [illegible] assigned to TF-65. Not included in this category are the various replenishment ships [illegible] the scene for 1 or 2 days duration.

Ships were considered to be assigned to one of these units as soon as they were underway for the Palomares or Rota operating area.

The total cost figure for each ship is based on its daily operating cost times the number of days assigned to the salvage operation. The operating cost for each ship encompassed seven major direct cost areas. Support personnel and training were considered indirect costs.

Not included in the above costs are the numerous non-ship oriented units and supernumerary personnel who were dispatched to Palomares. These included part of EOD Unit Two; UDT-22; SEALAB divers; divers and other personnel from NAVSTA Rota and elsewhere in the Mediterranean area, ServLants LORAC Support Team and extra divers from Servron 8; boats of ACU-TWO; and very many officers and Navy civilians dispatched to assist CTF-65 as staff members and consultants.

Category A costs (U.S. Navy ships' statistical operating costs) have been tabulated and summarized. However, only the summary figures are presented herein because of the classified nature of the information. The cost figures supplied do not include Navy administrative costs in Washington and in laboratories or various staffs in CONUS. Also, costs are not included for communication services, or for Navy, or Military associated with the removal of the first three weapons, debris, and the contaminated soil.

2. Category B incorporates those costs incurred by Navy Commands and Activities which are directly chargeable to the salvage operation. The total costs for Category B totaled $3,026,666. Five of the thirteen Navy Command/Activities furnishing assistance, are listed below with cost breakdowns, followed by a summary of all Category B costs (Table 3-2).

a. NAVOCEANO. NAVOCEANO's participation in AIRCRAFT SALVOPS MED fell into the following four categories:

(1) Producing of an interim chart by hydrographic survey using the USNS DUTTON as a survey ship.

(2) Furnishing an analysis and report of currents and bottom bearing characteristics.

(3) The deployment of one Naval Coordinator and four Geodetic Engineers to insure proper set-up of Decca-Hi-Fix system and the formation of plotting charts for the purpose of relocating contacts.

(4) The fourth category concerned the efforts made by NAVOCEANO in the Washington area and included the configuration of special displays, charts and models. The total costs were $108,007.

TABLE 3-2

SPECIAL NAVY COMMANDS

Navy Command or Activity	Cost
CINCUSNAVEUR	$ 25,725
CINCLANTFLT	170,197
Deep Submergence	1,085,000
Office of Naval Research	1,106,200
NAVOCEANO	108,007*
NOTS Pasadena	426,388*
MDL Panama City	7,600
NAVSCHOOL Deep Sea Divers	6,552
SUB. MED. CENTER, New London	1,893
COMSERVLANT	51,000
BUWEPS	351
OPNAV	375*
INDMAN 12	37,380*
Total	$3,026,666

* Not final costs.

Attempts to determine the true final cost were only partially successful. The final costs NOTS Pasadena were furnished by NWC China Lake and are included. Records from the activities were not readily available. Since the percentage change is believed to have minor, the issue was not pursued further.

NOTS (Naval Ordnance Test Station, Pasadena, California). The following is a summary of ment and personnel furnished by NOTS of Pasadena, California for use in SALVOPS MED.

(1) Two underwater TV systems, consisting of cameras, lighting equipment, and TV monitors to detect and identify contacts.

(2) CURV - A cable controlled underwater research vehicle; procured by NOTS and redesigned by their Missile Branch.

(3) DEEP JEEP - A tethered vehicle developed by NOTS for undersea research and exploration with a personnel capacity of two. The total costs were $426,388.

c. SPECIAL PROJECTS OFFICE. The following equipment and services are directly chargeable to the Special Projects Office and figures were obtained directly from same:

USNS DUTTON	$348,600.00
ALUMINAUT and PRIVATEER	450,420.00
Straza Industry (Sonar equipment)	1,213.00
Sperry (Navigation equipment)	13,309.00
Westinghouse (Sonar for USNS MIZAR)	177,589.00
Travel	5,000.00
Total	$996,131.00

d. OFFICE OF NAVAL RESEARCH. The office of Naval Research provided the following:

ALVIN	$525,475.00
USNS MIZAR	550,725.00
Navigational Bottom Markers	30,000.00
Total	$1,106,200.00

The total for the above was obtained from the office of SUPSALV.

e. NAVSCHOOL Deep Sea Divers provided:

Swimmers equipment	$3,289.00
Heli/oxy Gas	2,910.00
Baralyme	353.00
Total	$6,552.00

3. Category C incorporates those civilian contractor and sub-contractor costs directly chargeable to AIRCRAFT SALVOPS MED. The total civilian contractual price of $2,120,000 was for procurement or lease of services and/or equipment.

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SECTION 4

PALOMARES AND INTERNATIONAL RELATIONS

GENERAL:

It is inconceivable that an incident such as that at Palomares would be ignored or later forgotten by governments or their people. In times of war, acceptable risks are expected. In times of peace, however, otherwise negligible risks become potential disasters. As a risk is transformed into reality, as occurred at Palomares and later at Thule, governments and peoples take a new look at the risk and ask themselves if a previously acceptable risk is now less acceptable, or unacceptable. These reevaluations do impact on military operations and defense preparedness.

There were few precedents to follow in the handling of relations for this accident. It was the first time that an incident involving aircraft had resulted in nuclear contamination of the soil of a nation friendly to the United States. Unlike more commonplace happenings, a State Department-to-Foreign Office note of apology for the contamination was considered inadequate. In addition, loss or damage to weapons, particularly nuclear weapons, provides an abundance of material for propaganda campaigns which are motivated by innumerable and often conflicting causes.

Stationing of foreign troops in one's country in peacetime inevitably provides fuel for the fire kindled by anti-government elements. It is distasteful to political groups, irrespective of their political persuasions. The situation in Spain in January of 1966 was a perfect example of this reaction. Anti-government groups seized upon the accident, and its aftermath, as examples of the Spanish government's failure to safeguard its citizens, and as a glimpse of future problems should the government's policies with respect to U.S. bases remain unchanged. Much of the reaction represented reasonable nationalism. Most of it represented the work of irrational zealots who would not hesitate to use propaganda in its most insidious form.

The reaction of the Government of Spain was certainly reasonable under the circumstances and generally took two forms. The first was a fairly rapid move to restrict similar U.S. flights in the future. The second was to attempt to provide as much information as possible to the general public. Aside from its desire to placate its own citizenry, Spain also had to consider the reaction of international tourists to the contamination. Some of the international tourists to the contamination. Some of the international information media characterized the Spanish Mediterranean as a dangerous wasteland as a result of the acci-

RELATIONS WITH THE SPANISH:

U.S./Spanish relations concerning on-site operations at Palomares, public information policy, and claims activities are covered in other sections of this report. It is sufficient here to indicate that the long term impact of the accident on U.S./Spanish relations is probably small. The later renegotiations held in 1968 for our use of bases in Spain were somewhat more difficult. There is little doubt that Palomares was used as a lever by the Spanish. The resulting agreements, however, probably represented normal growth and could probably have been forecast had the accident not occurred.

RELATIONS WITH THE SOVIET UNION:

At the time of the accident, a disarmament conference was in progress in Geneva. The Soviet representative took advantage of the accident stating that, "only a fortunate stroke of luck saved the Spanish population of the area from catastrophe." An Aide Memoire was passed to the U.S. Ambassador in Moscow on 16 February. It charged that the accident constituted a violation of the Limited Test Ban Treaty of 1963, and extended the implications of the accident to the world in general. The basis of the charge was that the purpose of the treaty was "to put an end to contamination of man's environment by radioactive substances." The United States was also charged with violations of international law pertaining to the open sea and with operations in opposition to the 1958 Open Sea Convention. The note finally called for the United States to cease all nuclear armed flights outside the limits of its own national borders. The charges were rejected.

The same line was the subject of a call in March for the United Nations to act against U.S. nuclear flights. Later, when the fourth bomb was located, the Soviet Union called for an international commission to verify the recovery of the weapon. The United States, of course, was not amenable to such a proposal for security reasons.

RELATIONS WITH GREAT BRITIAN:

On 9 February, the British Minister of State for Foreign Affairs answered a query concerning radiation dangers in Spain for British tourists. The Minister answered:

> "I am advised that there is no indication whatever that the recent aircraft accident over the coast of Spain involving an unarmed nuclear device has resulted in any present or prospective risk to holiday makers on the neighboring coast or sailing in nearby water. British citizens who seek information will therefore be advised in these terms."

SECTION 5

CLAIMS ACTIVITIES

INTRODUCTION:

When an accident occurs, the parties involved have several methods of settling responsibility and pecuniary liability. A first course would be by gentlemen's agreement. This system provides satisfaction and involves the least administrative burden on the participants. At the other end of the scale of peaceful settlement is the court suit, involved and lengthy procedure. The claims system employed at Palomares falls somewhere in between. The procedure involved a relatively informal statement of circumstances by the claimant and a non-judicial investigation by an administrative agent of the U.S. Government. On a finding by the U.S. agent that the claim was justified, a settlement could be made on the spot.

Although the accident at Palomares did not involve the injury or death of any foreign national, there was never any question that claims would arise in its aftermath. Lives were disrupted and free access to property was denied. The fact that the participants in claims activities were the government of one nation and the citizens of another did not lessen the responsibility of the offending party. It did, however, make settlement more difficult.

LEGAL BACKGROUND FOR PAYMENT OF CLAIMS:

The first foreign claims legislation was enacted in April 1918 to provide for damages suffered by inhabitants of friendly European nations from American troop activities.* This act remained in effect through the beginning of World War II when provision was made - for duration of the national emergency** - for payments to $1000 for such damages. In April 1943*** the Act of 1918 was repealed and replaced by new rules with the monetary limit for claims which could be handled locally being raised to $5000, with amounts over that going to Congress for approval. At the same time the restrictive "national emergency" term was removed providing for payment of damages resulting from "non-combat activities." These were considered as "authorized activities having little parallel in civilian pursuits, and which historically have been considered as furnishing a proper basis for the payment of claims." This included the operation of aircraft.**** A claim was "cognizable under the Foreign Claims Act if the damage, loss, personal injury or death was proximately caused by act or omission of Air Force military or civilian personnel or is otherwise incident to

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* April 1918, 5 U.S.C. 210; 1940 ed.

** Declared by President Roosevelt on 27 May 1941.

*** April 1943, 31 U.S.C. 224d, 1946 ed.

**** Included were "... maneuvers and special field exercises; practice firing of heavy artillery; practice bombing; operation of aircraft, including the generation of sonic booms; use of animals, or instrumentalities having latent mechanical defects; and movement of vehicles or other equipment designed especially for military use."

Air Force non-combat activities." The claims had to arise outside the United States, its territories, Commonwealth, and possessions. Payable claims were authorized in the cases of:

> (1) Damage to or loss of real property of any foreign country or of any political subdivision or inhabitant of a foreign country, including damage or loss incident to use and occupancy...
>
> (2) Damage to or loss of personal property of any foreign country or of any political subdivision or inhabitant of a foreign country...

Consideration of claims and payment was by a Foreign Claims Commission (FCC) which could be activated if needed. In Spain such a Commission was in existence, Foreign Claims Commission 21 (FCC-21), in connection with the occupancy by American forces of installations under the Spanish-American agreement of 1953, as amended in 1963. This three-man FCC-21 was permitted to settle claims up to $15,000 as long as the settlement did not exceed $5,000. Awards in excess of that $5,000 up to $15,000 had to be approved by the Staff Judge Advocate of USAFE. Claims in excess of $15,000 could be settled in an amount up to $15,000 by the Secretary of the Air Force or his designee, and claims for payment in excess of $15,000 could be certified to the Congress. In the cases of potential claimants, when an aircraft accident such as this occurred, U.S. Air Force, i.e., the Judge Advocate General (JAG), could authorize emergency payments up to $1,000. Payment of claims was to be in the currency of the country where the accident occurred, or where the claimant resided.

In 1963, the DOD outlined the principle of "Single Service Assignment of Responsibility for Processing of Claims," and divided the work into areas to be handled by the three services.* Most of the European and mid-eastern countries were assigned to U.S. Air Force, and included Spain.** Cross-servicing for claims was provided for by the interested service investigating and then filing the claim with the responsible service for settlement.

Spanish Laws on Claims:

Spanish law provided for payment of damages based on whether the damaged items were considered as movables or immovables. The latter were classed as anything either attached to the land - such as buildings, plants, trees*** - while the movables were those items being

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* DOD Directive 5515.8, "Single Service Assignment of Responsibility for Processing of Claims," 4 Dec 63.

** Air Force had responsibility for Canada, Denmark, Greece, India, Japan, Libya, Luxembourg, Nepal, Netherlands, Norway, Pakistan, Saudi Arabia, Spain, Turkey, United Kingdom. Navy: Australia, Iceland, Italy, Portugal, and certain foreign ports. Army: Belgium, Democratic Republic of Congo, Dominican Republic, Ethiopia, France, The Federal Republic of Germany, Iran, Korea, Liberia, Mali, Senegal, Republic of Vietnam.

*** A brief resume of the immovable items was in Article 334, Civil Code, which names lands, trees, plants, pending fruits, livestock stables, pigeon houses, beehives, fishpools, if maintained with the idea of being permanent. This same applied to the tools for the farm and fertilizers placed already on the land where they were going to be used.

capable of being moved from one place to another without detriment to the immovable object. While damages could be paid in both cases the criteria was slightly different. For movables a fair price was to be paid as determined by both parties; however, if such an agreement could not be reached then an evaluation tribunal was to determine the actual price. For immovables the owner was entitled to payment for damages and loss of rents, with payment not to exceed the price of the property. Here a 5 percent factor came into being, which was mentioned several times in dealings with the Spanish. This was contained in what was known as "Article 47," where "in all cases of expropriation, the private person will be paid, besides the fair price as determined ... a price of attachment of 5%." Since expropriation was not a part of the claims procedure in the Palomares affair, this 5 percent addition did not apply, and was not allowed.

Provision for claiming damages in the event of involvement with some type of nuclear energy was contained in an article of the Law of Nuclear Energy, of 29 April 1964. This provided for claims being made up to 20 years after the incident, in some cases, and if the damages increased after that time limit, another claim could be made providing no limitation had been placed by competent authorities.

To establish the legal background of the accident in the eyes of the Spanish, and to provide a basis on which claims could be filed for damages, a Causa was issued by the Air Ministry from the Escuela Elemental de Pilotes de Granada (Pilots' Elementary School of Granada). In the Causa, the occurrence of the accident was outlined, the crew listed, both survivors and deceased, and it was stated that:

> "... From the facts, it does not appear that the action of the members of the crew was negligent or was due to lack of experience. It does not appear either that they failed to observe rules that they were supposed to comply with in order to prevent the accident. In consequence, it does not seem that there is evidence that they have committed any offense, and, in accordance with Article 723 of the Code of Military Justice, it is proper to declare the provisional suspension of the proceedings."

The issuing of this Causa was normal in any accident, whether it be automobile or aircraft. It provided for the appointment of a military investigating officer, named Major Sebastian Delgado Palomares as the investigating judge for the military, and stated that the estimate of damages totalled 28,417,484 pesetas ($473,624.73 at 60 pesetas per $1.00). It also stated that:

> "... It has been proved that important damages have been caused because of the said accident ... (and) the private parties affected should be informed of the legal actions to which they are entitled ..."

This document was signed on 21 April. Known as Case #2-66, this constituted the legal for citizens to claim damages and was approved by the Judge Advocate of the Air Force on 30 April, and signed on 13 May, with transmittal to the American Embassy, Madrid.

Spanish-American Agreements:

Article XVIII of the Technical Agreement, signed 26 September 1953, provided that claims of "inhabitants of Spanish territory for acts of omissions by members of the United States may be settled under the applicable laws of the United States," as may be seen in paragraph 4 of the Article which is quoted in full on the following page. Supplementing this was recognition of the Spanish 1964 law on claims for injury or accidents due to nuclear incidents. This was referred to in a DOD/State message which discussed, among other things, claims which could not be handled through the Foreign Claims Act. In event any future meritorious claims should arise as a result of this accident which cannot be legally paid under the Foreign Claims Act, they will be handled through diplomatic channels in accordance with paragraph 3 of Note No. 82 of 17 July 1964. This exchange of notes contemplates "recognition" of the Spanish Nuclear Energy Law 25/64 of Limitations of 10 and 20 years in the case of immediate and deferred damage respectively.

Exceptions for Palomares:

In the claims area, as in just about every other situation in this KC-135/B-52 accident, the word "unusual" applied. The circumstances dictated exceptions to normal procedures, particularly since relations with the host country were somewhat disturbed, and since the usual approving office was several thousand miles away which could limit prompt action on larger claims.

Since the aircraft debris scattered along a 2-mile line, along with two low-order explosions of the HE of nuclear weapons, it was realized that a large number of claims might be submitted, and that some immediate help to the local residents could be required. The 16AF Judge Advocate, Col. James L. Kilgore, phoned the Claims Division, Washington, on this matter. Verbal authority was given to make emergency payments up to $1,000.00 on potential claims for damage or injury. While making these emergency payments the FCC was told to assure claimants that such compensation would not bar them from making claims for larger amounts when actual damage costs would become known.

This delegation of authority was followed by a second, a week later, after another conversation and confirming wire. At that time FCC-21 was "authorized to settle claims arising from this incident up to statutory limit of $15,000.00." Amounts above that were still reserved for U.S. Air Force action to Congress. At the same time, the U.S. Air Force said that they desired the Claims Commission in Spain to work closely with the Spanish authorities and to "use claims settlement authority to fullest extent possible to settle claims expeditiously."

In general, payment was authorized to "any local national who can establish property damage or personal injury of any nature which can be attributed to activities of USAF or its agents." Excluded from such payments were the pay of civilian workers employed in the search activities; however, if radiation exposure became a problem in their work, then a claim could be considered as cognizable. No cases of this type arose at Palomares.

EXTRACT, TECHNICAL AGREEMENT

ARTICLE XVIII

1. Member of the United States Forces shall not be subject to the civil jurisdiction of Spanish courts or authorities for acts or omissions arising out of the performance of their official duties. A certificate from the United States military authorities attesting the status in this regard of a member of the United States Forces shall be considered conclusive by Spanish authority.

2. Each Government waives all its claims against the other for damage to any property in Spanish territory owned or utilized by it if such damage (a) was caused by a member of the armed forces or civilian components thereof of the other Government while engaged in the performance of his official duties, or (b) arise from the use of any vehicles, vessel or aircraft owned or utilized by the other Government by its armed forces or any employee of such Government. Each Government waives claims for maritime or aircraft salvage against the other provided that the vessel or aircraft or cargo salvaged was owned by the other Government or being used by its armed forces at the time the incident occurred.

3. Each Government waives all its claims against the other for injury or death suffered by any member of its armed forces or civilian components thereof, while such member was engaged in the performance of his official duties.

4. Claims of inhabitants of Spanish territory for acts or omissions by member of the United States Forces may be settled under the applicable laws of the United States. Any settlement effected thereunder shall operate as a complete release as to both the United States and the individual concerned from ulterior responsibility for damages arising out of such acts or omission.

5. The undertaking of a suit in a Spanish civil court against members of the United States Forces on the occasion of damages chargeable to any act or omission of said personnel, shall operate as a waiver of any right that may exist in the Government of Spain or persons resident therein to administrative relief from the Government of the United States for claims arising out of such act or omission, including the procedure referred to in paragraph 4 above.

CLAIMS OFFICE:

A member of the staff of the 16AF, Office of the Judge Advocate, went with the Disaster Control Team to Palomares on 17 January. Three days later a member of the Foreign Claims Commission went to Palomares, followed by a second member on 26 January. These three were augmented by another officer, a Spanish civilian attorney and five airmen, so that until about mid-March the strength of the claims office numbered ten. These personnel came from the 16AF, with the exception of one officer from JUSMG who reported on 1 February, and one NCO from Vandenburg who was sent to assist. Locally, the son of the mayor of Palomares was hired and proved to be a valuable addition. He knew all the local residents, the location of property and its owners, and had good contacts with all the local officials. By the end of April the work force had been reduced to one officer and two airmen, and on 28 May the office officially closed at Palomares, although the mayor's son continued on the job about one day a week to handle letters to and from the office at Torrejon.

At the beginning, two tents at Camp Wilson were used for the claims function. These were, of course, far from ideal, particularly with regard to conducting interviews with claimants, as some claimants were both voluble and noisy at times. Since it was really more desirable to have the claims office closer to the people it was to serve, an inquiry was made as to the possibility of renting a building or office space in Palomares. The local banker had a house that was not in use and the U.S. Air Force used it, without payment of rent, on the provision of turning it back to the owner in the same condition in which it was received. The office occupied this space from 4 March until 28 May 1966.

EMERGENCY PAYMENTS:

The message was received on 19 January authorizing emergency payments up to $1,000.00 with the Washington Claims Division stating that such payments were authorized to those who could "establish property damage or personal injury of any nature which can be attributed to activities of USAF or its agents."* However, it was not until 24 January that the first actual payment was made. This one was for $66.73, and was made to the local milkman who had not been able to sell milk due to the fear of contamination, and without that income he could not buy cattle feed. By a week later, on 31 January, 74 payments had been made for a total of $3,257.48. The last emergency payments were made on 1 April to 38 Villaricos fishermen in the amount of $951.14. This brought the total number to 222. Of these, 213 were recovered when regular claims were filed ($13,990.14). Seven were not recovered since no further claim was made ($275.64), and two were included in claims the settlement of which was not yet accepted by the calimants in September 1966 ($421.25).

* The Claims Division stated that pay of civilian workers engaged in search operations could not be paid from claims funds, unless they filed claims for radiation exposure in which case special approval authority would have to be obtained.

In considering the need for emergency assistance, one item was the requirement to buy animal feed since entry to the normal feeding areas was not possible in cases where clean-up activities were in progress. Lost wages for field hands and fishermen were compensated for by this method until actual lost time could be established and the rate of payment calculated. About 10 days after the accident when weekly wages were not forthcoming due to the ban on entry to the fields, clean-up activities, or inability to market fish, there was particular requirement for such payments. Money required to pay bank loans, or to provide for new plantings were also considered as meriting this assistance since people had little in savings as their margin of profit was very small. The peseta value distribution of emergency payments is indicated in Table 5-1.

OFFICE OPERATION:

While the actual adjudication and payment of the claims was primarily an American responsibility, Major Palomares, as Judge of the Court of Instruction for this area, was at his request the focal point to which the Spanish first reported. When appearing before him they were advised of the penalties for perjury, and were placed under oath. He then determined the validity of the claims, and discouraged those he considered as unreasonable or as unconnected with this disaster. Upon completion of the interview the claimants were given a slip of paper showing that they had visited him; without that the claims personnel would not consider a claim.

Proceeding then to the claims office, the claimants* were given the required forms to fill out. When these forms had been completed, an interview was conducted to determine (1) any additional facts that would help in the claim preparation, and (2) the claimant's possible need for an emergency payment.

Within the office the documents and claims generated from the interviews were picked up several times a day and taken to translators in the administrative section. At that time they were logged in and the claims file started. That file was reviewed by one of the claims officers for determination if further investigation was required. If additional investigation was required, it was then done and the file later returned to the officer. Upon completion of that, a breakdown of the items claimed was made, the recommendations for each listed, and the file went to one of the three commission members. After their review, a brief discussion was held with another member of the commission, then the final figures were determined and

* The JAG's summary of the Palomares incident explained the system of names used in Spain - which complicated identifying family relationships: A Spaniard's proper name consists of his given name(s), followed by his father's family name, followed in turn by his mother's family name. Often the given name is itself a family name. Thus there were "Blas Alarcon Navarro, "Alarcon Navarro Blas, and "Navarro Blas Alarcon". Fathers and sons (grandfathers too) could have the same names, and these sometimes distinguished themselves by adding "Mayor" or "Menor" to their signature. Sometimes they didn't. Among our claimants were twelve named "Navarro Flores" and four called "Francisco Sabiote Flores". There was also one "Antonio Alias Alias."

TABLE 5-1

DISTRIBUTION OF PESETA PAYMENTS
Palomares, Spain
24 January - 1 April 1966

Amount	Number
0 - 4,000	188
4,001 - 8,000	16
8,001 - 12,000	5
12,001 - 16,000	1
16,001 - 20,000	2
20,001 - 24,000	0
24,001 - 28,000	1
28,001 - 32,000	0
32,001 - 36,000	0
36,001 - 40,000	0
40,001 - 44,000	0
44,001 - 48,000	1
48,001 - 52,000	1
42,001 - 56,000	2
56,001 - 60,000	3

the file then went to the administrative section for preparation of the necessary forms. Then, the claimant could be informed that all was complete and payment was made either by check or cash at the same time that the acceptance agreement was signed. Notification was made either personally, or through a list posted in the local barbershop. When payment was made by check the local bank cashed it, which required payment of a 1 percent charge, and

that amount was included in the computations of the payment due. To simplify preparations of letters to claimants, 16 standard paragraphs, in both English and Spanish, were prepared. Some of these were:

> The Foreign Claims Commission has determined that the above amount includes adequate compensation for loss of earnings in this case.
>
> The most recent information received from the official appraisers of the Ministry of Agriculture which have been used in the determination of damages indicates that the fair amount of total damages is not higher than the amount approved by the claims commission.

While the above description simplifies the claims procedures, and does not appear to be a difficult or time consuming task, some data on the activities may give a different idea of the work load. One claims officer at the scene stated that:

> ... From the date of the accident to the middle of February, the average rate of interviews was 10 per day. By the end of that month the rate had more than doubled; and during the first few days of March the rate decreased to a level of about 16 interviews per day. The actual number of daily interviews, during this period varied considerably from a low, on Sundays and Spanish holidays, of 0 to less than 10, to a high of 66 on one day in February. By the time the office closed in May, the more than 500 claimants had visited the claims office on more than 2000 occasions.

AIMS PROCEEDINGS:

k after the accident, claims personnel estimated that in one area of 35 acres the cost crops being destroyed would be about $14,500.00. In addition, it was anticipated that im of about $3,000.00 would be presented by the fishermen who rescued the survivors who had damaged their boat when docking. But by the time five more days had passed, 1 January, the estimate had spiralled to a possible 600 claims for about $100,000.00. that date some idea of the problem was developing since 70 emergency payments had been totalling $35,000.00.

llowing day a summary of some of the problems involved was made. It was believed claims would be those normal in any multiple aircraft accident, but in addition, this complicated by psychological factors that stemmed from the contamination prob- RN had told the people to stay out of the fields, the town of Palomares was "off or entry and departure, and all was confusion. The people were not told the ls, but the press and radio - denied authentic information - had many words to ject. Thus, on Saturday after the accident, 22 January, buyers - including of town - refused to buy the local products, considering that all product of sea were poisoned and inedible. During the days from 22 to 31 January the d somewhat, but when one of the claims officers checked the markets of

the village of Vera he found that there was about a 50 percent drop in both volume and price in the area; however, some out of town buyers were returning. Also, some confidence was being built up in the local populace as the JEN had fairly well designated the fields to be opened for working and forage, although in many cases the people were not told, or ordered, directly to return to their fields and time was lost by this fact.

Before January ended some complaints were heard that claims were not being paid, and Maj Gen Wilson discussed this with the mayor who said that people had been advised by the Spanish agriculture representative not to file claims at that time, although the Spanish were satisfied with established American claims procedures. It may be that this advice stemmed from the fact that an official survey was underway which would provide firm costs on which to base claims. On the evening of 31 January, a meeting of the people was held in the local theatre with Maj Gen Wilson and Brig Gen Montel addressing the citizens. They explained the situation as far as possible, and how the claims process would work. These talks eased the tension somewhat. By that time it was also known that surveys were underway to establish a basis for payment for damages incurred both by crop destruction and through the search activities.

The next problem arose from the wording of the release that claimants would sign upon accepting money from the United States when the claims were completed. They disagreed with the "finality" clause as they felt that the word final in "liquidacion final de mi reclamacion contra el Gobierno de los Estados Unidos," would prevent collection of full damages since at that time, the early days of February, the extent of the claims could not be known. The Spanish and English versions of this form may be seen on the following page.

As a result of this feeling that anyone accepting such "final" settlement at that time would be the object of some degree of discrimination, about 3 February the Spanish authorities told potential claimants not to sign the acceptance forms. This matter was then discussed at higher levels, in both Spain and the United States. Maj Gen Donovan, Chief of JUSMG/MAAG, met with General Eduardo Prado Castro, Vice Chief of the High General Staff, on 12 February concerning the wording of the form. On 18 February he sent General Castro a letter telling him that:

> The claims forms now in use meet the requirements prescribed by the Foreign Claims Act ...
>
> ... payment of a claim is considered by the United States Government as settlement only for claimed damages or injuries known at the time of filing.
>
> Damages or injuries, even though arising from the same incident, which subsequently accrue and were unknown at the time of filing of the first claim may be made on the basis of a new claim, which, if found meritorious and otherwise meets the requirements of the Foreign Claims Act, will be paid...

(Translation)

ACCEPTANCE AGREEMENT

By these presents, I, _____, Spanish National Identification Card # _____, residing in Palomares, Cuevas de Almanzora (Almeria), Spain, accept the sum of _____(Pesetas) ($) in full satisfaction and final settlement of my claim against the United States, for all damages, resulting from an aircraft accident occurring on 17 January 1966 in Palomares, Cuevas de Almanzora (Almeria), Spain, to my share of the crops in

Poligon No_____, Plot No _____, Palomares, Spain, and I renounce all extent or future causes or rights of action that I have accrued or may accrue to me in relation to the above mentioned crops.

Signed in Palomares, Cuevas de Almanzora (Almeria), Spain, this _____ day of _____, 1966.

Signed:

ACUERDO DE LIQUIDACION

Por el presente documento, yo, _____, documento nacional de identidad num. _____, icilio en Palomares, Cuevas de Almanzora (Almeria), Espana acepto la cantidad de _____ Pesetas) ($) en concepto de indemnizacion y liquidacion final de mi amacion contra el Govierno de los Estados Unidos y empleados o miembros de dicho ierno, por la totalidad de los danos y prejuicios, a consecuencia del accidente aereo rrido el 17 de Enero de 1966 on Palomares, Cuevas de Almanzora (Almeria), Espana, a parte de las cosechas en Poligono Num. _____, Parcela Num. _____, mares, Espana, renunciando al ejercicio de cualesquiera acciones que me puedan sponder contra dicho Gobierno en relacion a las cosechas indicadas.

omares, Cuevas de Almanzora (Almeria), Espana, a _____ de _____ 1966.

Firmado: _____

/FS

... the two year statute of limitations under the Foreign Claims Act would not begin to run until the date the damages or injuries became known...

... (other claims) will be handled through diplomatic channels...

This letter evidently convinced the Spanish that the "finality" clause was not really final, as long as the claims were legitimate, and on 24 February the ban against signing the acceptance document was lifted. Brig Gen Montel used this letter also to get the message to the claimants, and it was translated into Spanish and handed out to them. Maj Gen Wilson told U.S. Air Force that he had heard of criticism in delaying of payments. He said he could not understand this since it had been the GOS (Government of Spain) that had imposed the ban and thus set up a three weeks delay period in payment of final claims, although 140 emergency payments had been processed for $11,814.52 by that time. It became a proven fact that it was possible to reopen claims cases since there were 120 amendments to original claims, with 92 having 1, 25 having 2, and 3 having 3 amendments.

Establishing Values:

The Americans coordinated closely with the Spanish authorities to determine the amounts that could be paid for wages, market losses, animals, and crop damages.

For crops, which were involved in 94 percent of the total claims paid, there were four estimates of loss computed. Two of these were not considered by the Spanish as official, while the remaining two were prepared at their direction. The Claims Office estimated that crops from 625 acres of farmland were involved, with 340 acres of that being within the contamination zone. Distribution of the four principal crops was:* grain, 10%, alfalfa, 20%, beans, 30%, and tomatoes, 40%. Harvesting was underway for two of the three annual crops, the beans and tomatoes; the grain planted in the preceding fall was not due for harvesting until April or May; the majority of the alfalfa fields were 1 to 2 years old, and were harvested monthly under normal circumstances.

One of the first things that became apparent as a problem area in estimating damages was in obtaining maps sufficiently accurate to plot ownership and show the crops. In Spain the provinces are divided into polygonas, and then into parcelas, and for this area of the country only free-hand drawings of the polygons and parcels were available. When the registry of owners at Cuevas de Almanzora was consulted it was found that entries were as much as 6 years behind, that boundaries of parcels had been changed without being recorded, tenants and sharecroppers were not always listed properly, with many of the working agreements being purely verbal. Digressions from normal recording procedures were particularly true in the cases of transfers from one member of a family to another, and those intra-family shifts were often not readily apparent because of the complete difference in names from one

* Other crops in the area included cucumbers, olives, peas, peppers, potatoes, prickly pears, lettuce, and cabbages.

generation to another. In the event a change of ownership was not registered, the owner was asked to show his notarized title transfer, Escritura, but this did not help much since it did not show either polygon or parcel, but rather listed the surrounding land owners, and those had changed in many cases. Thus, the claims personnel decided that:

> ... the problem was not one of non-owner claimants, but rather of an inability to establish with any certainty that the claimant was the owner-in-fact. Therefore, it was decided to take the calculated risk of paying a nonowner and rely on the presentation of an Escritura or a certificate from the mayor or other person familiar with the area as the ownership, and thereby avoid the probably impossible and time-consuming tasks of tracing ownership from the registered owner. Time proved this to be the right decision, since not one allegation of payment to a non-owner has been raised as of (September).

Utilizing the aerial survey photographs and with much assistance from the mayor's son, it was possible to prepare outline maps with sufficient delineation to permit identifying the parcels, establishing the crops, and to determine to whom the payments should be made. This process involved determining whether the owner worked the land himself, rented it out, or if a share-cropper was involved with either the owner or tenant.

The estimate considered as unofficial by the Spanish was that of the independent appraiser, known as a perito, who was hired by the FCC to appraise damages. Sr. Francisco Gonzalez Navarro started working on Saturday, 22 January, and by 30 January had made estimates for 25 to 30 acres of the crops within the contaminated zone. However, the Spanish experts arrived on the scene and would not permit him to work at the same time they were in the fields, and thus his usefulness in that area was limited. However, he was utilized to provide estimates on crops not appraised otherwise, and to assist in estimates of property damage claims.

Another unofficial estimate, and the one on which many of the claimants based their claims, was prepared by two persons appointed by the mayor of Palomares, Sr. Jose Manuel Fernandez Gonzalez, and was presented to the Americans by a local lawyer on 5 February. It was known as the Board of Neighbors Report, and placed crop damage at $653,906.67. While the list was fairly complete and contained the names of the owners, share-croppers, tenant farmers, and the general areas where the crops were located, there were various errors in the report that made it extremely difficult to work with. In general, the value figures used for the various crops were not listed, the exact locations of the parcels were given and 111 contained more than one name. In addition, although it had been prepared at the request of the Palomares mayor, the Spanish governmental authorities did not recognize it as an authentic source document on which to pay claims. Advice was then given to the members of the Board of Neighbors Report that individual claims would have to be submitted and that it was thought to be premature to say that all crops would be totally de-

Six days after the accident, on 23 January, Sr. Manuel Mendizabal Billalba, Chief Engineer of the Department of Agriculture, visited the site at the request of the Minister of Agriculture. The purpose was to personally report the extent of the damages, the kinds of crops and their condition. Then, following the instructions of the military judge, Major Palomares, two appraisers were appointed: Sr. Francisco Alados Vielma and Sr. Isidoro Vertiz Espinar, from the Technical Division, Department of Agriculture, Almeria area, to prepare the estimates from which payments were to made.

The first of two estimates was completed about 5 February and submitted to the FCC-21 on 15 February. The basis for their estimates were contained in an annex to the report:*

Alfalfa: Grown for feed, 12 cuttings per year, when not available must buy feed.

Beans: In first cycle of production, 2 to 12 pesetas a kilo.

Corn: If operations finished by 1 April this can be still planted in time for a good crop.

Grain: Basic feed for livestock; cut green, followed by use of grain and straw; up to 1.80 pesetas a kilo.

Soil: Where removed, to return land to original state for cultivation, requires either refilling or use of manure and mineral fertilizers; about 30,000 pesetas per hectare.

The second agricultural report was given to the FCC on 21 February, and consisted of a general upward revision (Table 5-2). To these two reports were added four annexes. Two concerned payments to certain individuals in which their claims were adjusted due to newly discovered facts, while the other two were general changes.

The first of the two general adjustments was dated 3 March and concerned the price of beans in Spain, and particularly in Palomares. The losses in this area were primarily in two categories, with the first being the inability to harvest the first crop of beans while they were

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* The metric system was used for measure, with equivalents being:

Hectaria	=	10,000 square metres - 2.47 acres
Cuerda	=	87 square metres
Area	=	100 square metres
Centiarea	=	1 square metre
Acre	=	4,049 square metres

In addition other measures were used. One was the "fanega" which was a measure of either size or weight. It varied with location. In measurement of size: 3200m^2 in Palomares; 2,096m^2 in Casa Marques Canal; and 1,746m^2 in Nati and La Hoya, was 1 fanega. In the same order, 1 hectaris = 2.86 fanega, 4.91 and 5.71. It was also used as a measure with 1 F = 1.60 bushels. Another measure was mata, which was a weight, with 1 mata = 3 kilogrammes.

TABLE 5-2

AGRONOMIST REPORT, CULTIVATION, PALOMARES, SPAIN

5 - 21 February 1966

Product	Area (Hectarias)	Peseta Price Per Hectaria	Peseta Value of Cultivation
Out of Zone - 21 February			
Alfalfa	16.8850	25,534	431,150
Beans*	49.5100	23,186	1,147,950
Grain	148.8500	1,946	289,810
Tomatoes**	94.3100	90,420	8,527,600
Vegetable Greens	40.6100	81,720	49,850
In Zone - 5 February			
Alfalfa	11.3000	151,800	1,716,000
[illegible]ans	33.7600	85,031	2,870,650
[illegible]bage	0.0100	350,000	3,500
[illegible]cumbers & Peppers	0.0100	400,000	4,000
[illegible]ttuce	0.1000	120,000	1,200
[illegible]rain	53.8400	14,750	794,179
[illegible]	1.200	80,000	96,000
[illegible]toes	68.750	109,960	7,560,371

[illegible] - 2.32 pts/sq m.
[illegible]oes - 9.04 pts/sq m.

still at the proper stage for picking, and the second due to the loss of growth resulting from the inability to irrigate and care for the plants. The first value placed on this type of damage, for each 10,000 square metres of plantings, was 23,186 pesetas; but a "new consideration" gave a value based on the fact that a kilogram of beans in Palomares was 3.50 pesetas as against a 6.75 average for some other areas. Thus, the figure of 23,186 pesetas was lowered to 21,250 pesetas. Since 495,000 square metres were concerned, this gave a value of 10,518,750 pesetas for the bean crop, or $175,312.50 in the second zone.

The first of the two specific annexes was issued on 19 February and increased the amount due Juan Navarro Serrano from 89,027 pesetas to 237,027 pesetas. This was due to recalculation of the area of sanded tomatoes and peppers in which the ground has been plowed thus destroying this special preparation for early crops. This was part of Serrano's payment which finally totalled 583,354 pesetas.* The second adjustment was on 31 March for Juan Soler Flores, and changed the payment due him from 82,800 pesetas to 144,900 pesetas. Sr. Flores' case is fully discussed in this chapter as a representative case.

While this was going on, it was considered desirable to determine how the agronomists arrived at their figures, and on 2 March members of the claims office met with them. In brief, their decisions were based on the following:

In-Zone estimates made on basis of total destruction of the crops.

Out-Zone estimates on basis of actual losses except for:

1. Tomatoes: based on total destruction as tomato season was almost over; if tomatoes were sold after the estimate was made, the amount of the sale should be deducted.

2. Beans: inability to irrigate and pick, and future sales effected, and any sales made after the estimate should not be deducted. The estimate should be increased, figure to be furnished, since original estimate was based on 6 pesetas sale price, but are selling for 3-1/2 pesetas, and increase required to compensate.

3. Alfalfa crops showed disparity between estimates, and the Neighbors' estimate was based on total destruction both in- and out-zone, where the agronomist was based on total (in-zone), and actual (out-zone) as applicable.

4. Animal feed requirements: recommended payment for alfalfa increased by one-half since feed had to be purchased, which is high in price.

5. Potatoes: seed potatoes expensive; if not planted in February cannot be planted now.

6. Corn: can still be planted this time of year.

* Serrano was paid one emergency claim on 28 January, 1,800 pesetas; a second on 31 January for 12,000 pesetas. The final claim paid on 22 April was 569,354 pesetas, bringing the total of 583,354 pesetas.

7. Watermelons: plantable until 15 March, claims on inability to plant before that date invalid.

On 12 March the labor union, Sindical del Movimiento, Hermandad Sindical Comarcal de Labradores y Ganaderos, of Almeria, submitted to the agronomists, a letter on the costs of growing things in this area, and they were somewhat above the agricultural department estimate:

1. Alfalfa: value of one hectare of land planted, 250,000 pesetas;

2. Beans: value of one hectare of land planted and irrigated, 100,000 pesetas;

3. Tomatoes: normally 25,000 plants, with production of 2 to 4 kilos per plant, price in this area from 10 to 15 pesetas per kilo; late production due to electrical transformer outage; not possible to estimate cost per hectare.

This was followed 4 days later by a group of land owners calling on Ambassador Duke to protest the claims payments. Maj Gen Wilson reported to General Ryan at SAC that some allegations were made about the claims activities. A possibility existed that either individuals or an organization may ask for resolution by the International Court at the Hague. In view of this, Maj Gen Donovan and Brig Gen Montel met on the scene on 17 March to gain first hand knowledge. At this meeting Brig Gen Montel was convinced that to expedite claims GOS appraisals must be established and remain fixed and that GOS officials should assure land owners and their lawyers that adjudication of damages was fair. Both generals met [illegible] land owners on 18 March. An agreement was reached wherein official in-zone estimates were increased 26.5% for tomatoes, 15% for alfalfa and beans. Outside the zone crops were increased 26.5%. This appeared to be more satisfactory, although it required considerable recomputation of previously processed claims.

[illegible]nnex was issued to cover these changes. Included was the statement that there was the possibility of error in both in- and out-zone estimates due to the fact that the urgency of the appraisals did not always permit exact measurement or determination of the condition [illegible] crops, particularly since some were cut prior to observation. The possibility of [illegible] the out-zone was given at 15 percent.

[illegible]bject of farm animals was also important, since they were a part of the economy, [illegible]ly for local consumption, and for farm work. On 24 February, the JEN surveyed [illegible] for radiation contamination with all results being negative; included were 74 pigs, [illegible] sheep, and 4 calves. Six weeks later, the JEN issued a statement that the death [illegible]ould not be attributed to the effects of the radiation due to the accident.

[illegible] this was done the deaths of animals within this area was generally attributed to [illegible] and/or the accident. For example, there was a hive of bees that had been [illegible] Site #3, and the bees died; however, no connection between the two events could [illegible] Las Rozas, cats, rabbits and pigeons had died after eating forage, and pigs

were ill, and since this was within the area of aerial burst they were checked. In that case, it was considered that the death of the rats on the farm could have some cause other than the accident. Claims were submitted for some of these, but no awards were made.

Payments for loss of wages was another claim item. Insofar as farm workers were concerned it was estimated that by 30 days after the accident the normal harvest time would have been ended, and the Commission (FCC) decided that no more than 30 days lost wages would be paid, and that feed payments would cover the same time span since most of the area had been opened to the owners by the end of that time.

On 17 March, the FCC decided to establish a factor on loss of profits for tomatos, beans, and similar produce warehoused in Palomares at 1000 pesetas a day for a maximum of 30 days. There were six warehouses in Palomares.

FISHING CLAIMS:

Fishing was the primary livelihood of persons living in the port towns of Aguilas, Garrucha and Villaricos. With the presence of the U.S. Navy, the rumors on contamination, and the presence of wreckage on the sea bottom, the fishing industry of Villaricos was almost forced out of business during the recovery activity. Thus, special attention had to be given to furnishing emergency payments to these people, as well as to trying to assist in using what fish were caught, or in trying to provide markets for them, and then to return the fishermen and their boats to the sea as quickly as possible.

Fishing areas were not delineated by law or local rules, but primarily by the size of the boat. The particular area where the search was conducted was, in general, a fairly level plain, with few outcroppings that would damage fishing nets. In general, there were three areas used, based on the size of the boats, the weather conditions, and location of the home port:

1. From Carboneras to Mesa de Roldan, large capacity boats.

2. From Mohacar River to level of Palomares, small boats, also used when weather conditions were such that the larger boats could not go to the other side of Carboneras.

3. From Palomares to northeast of Villaricos, both large and small boats; boats from Villaricos use this area.

Three methods of fishing were used in this area, with the most common being arrastre, which required the net to be dragged along the ocean bottom. The other two methods did not require dragging, with one being encirclement (cerca) where the net was pulled through the water without touching the ocean bottom, and the third, artes menores, where a smaller net was used, without dragging. These three types were adapted to the relatively shallow waters of this coast, and the boats utilized were designed and powered to operate by these methods within the fishing area as discussed above. Navigational methods used were more or less

locally devised, and consisted of using landmarks rather than formal navigation methods. Denying entry of the fishermen to their normal areas was of particular importance since they could not just simply go some place else and fish. They were limited by the size and power of their boats. They knew the tides, the ocean floor, and could find their way around without getting lost. Move them to another area and they would be literally "at sea."

There were about 60 boats working in the Garrucha area, employing approximately 300 people in this early part of 1966, and Sr. Antonio Jerez, the harbor master, Garrucha, stated that the number of boats had increased yearly. Weight of fish taken in at the Garrucha port, and the sales price, were given as follows:

SALES PRICES, FISH CATCH, GARRUCHA

Year	17 December - 16 January	17 January - 16 February
1964	1,273,516.10 pesetas	1,335,008.10 pesetas
1965	1,161,993.85 pesetas	1,179,970.45 pesetas
1966	3,635,826.90 pesetas	1,940,932.40 pesetas

Year	Month	Kilograms	Pesetas Sales
1965	January	21,974	1,029,843.40
	February	37,373	1,228,863.10
	October	75,507	1,306,618.15
	November	103,885	2,812,873.30
	December	82,396	3,881,429.15
1966	January	27,878	2,583,487.80
	February	29,163	1,647,658.55

The gross sale of the catch of each boat was called the monte mayor. From this was deducted the expenses of the voyage and a contribution to the fishing syndicate organization. From this latter fund fishermen were entitled to assistance in case of injuries suffered and illness contracted during fishing operations, or for damages to the boats. The rest of the money was divided into two equal parts, with one part going to the owner, while the other,

called the monte menor, was divided among the crew. Each member of the crew received a certain number of shares (partes) according to the importance of his job.*

As elements of the U.S. Navy arrived in these waters the fishing activities were somewhat lessened. At first no ban was placed on fishing boats operating in the search area but on 9 February a large area was placed off-limits to the fishing fleet. This was just about the center of the normal zone of operation for the boats, and particularly affected the smaller vessels. This restriction remained in effect until 1 April when the restricted area was reduced, and then upon recovery of the weapon it was withdrawn. This restriction created problems, and in a letter from Sr. Antonio Jerez, the harbor master of Garrucha, on 14 February, a desire was expressed that an "immediate solution be given to this grave crisis, since as you know the economic life of this town depends exclusively on the fishery business." However, no action could be taken at that time to lift the boundary since frogmen, hard-hat divers, and submersibles were working to recover debris and to search for the bomb. Compounding the problem was the fact that as word spread of the possibility of radioactivity contamination the buyers of fish declined to have anything to do with what fish and crustaceans were brought to the docks. Then came the problem of what to do with a highly perishable product when one had more than one could eat, and no buyers for the remainder. The problem was never entirely solved.

By the end of March the rumble of discontent was beginning to be heard. General Wilson sent a note to General Montel outlining the problem and stating that something had to be done for these people. From Villaricos, about 50 fishermen were claiming damages and from Aguilas, representatives claimed that 800 families had suffered loss of income; however, General Montel said that this was not so as only about three-fourths of the Aguilas boats were unable to work and this many families were not involved. From Garrucha came word of 300 crew members from 60 boats that needed help. General Wilson recommended to JUSMG that the Spanish survey these claims and that either the United States pay directly to the Spanish Government the amount of the assessed damages, or that a list of claimants and the estimated payments due be furnished to the Claims Commission so payment action could be taken. Three days later a member of Brig Gen Montel's staff reported to the claims office that the fishermen of Villaricos were planning a demonstration "because they were in real need and we were taking no action to help them."

* This system was described as "... a net handler might receive one parte, the engineer two partes, and the captain 3 partes. The monte menor is divided by the total number of partes to find the value of each and each man receives the value of his total number of partes. The method which determines the number of partes a man is entitled to is a loose one and may be adjusted upward or downward in accordance with local custom and although the engineer might ordinarily be entitled to 2 partes, the engine of his boat may be in such bad repair requiring more work that he would receive 2 1/2 partes. The matter is determined by the captain since if one man receives more money the others will receive proportionally less."

The JAG, 16AF, discussed the fishing situation in their summary report, prepared late in 1966. Their comments were:

> The fishermen from Aguilas and Garrucha claimed that they had suffered damages because of the reduced market value of their catches and because of the limitations imposed on their fishing grounds. However, the Commission could not readily ascertain any such losses from the official port records, and it requested that the Spanish Government furnish an official survey, comparable to the Agronomists Reports, to authenticate all losses incurred by fishermen and associated activities. A token effort was made in this direction but no report has ever been furnished and no claims from Garrucha or Aguilas have been processed.
>
> Almost all of the able-bodied men from Villaricos worked at Camp Wilson for much of the time we were there, and the wages paid them exceeded what they probably would have realized from fishing for a similar period. Further, most of them had received an emergency payment either during January or February. However, late in March there was much discussion about their claims. The Commission sought to deter this matter but the clamor mounted. Finally, we were advised that the women of Villaricos were organizing an en masse march on our establishment. These ladies were truly fishwives and even the fearless Guardia blanched at the prospect of dealing with their concerted ire. We quickly made another emergency payment to the head of each family in the village. Within the following month, after much discussion, but no marches, all Villaricos claims were finally paid. In this regard, wages earned at Camp Wilson and emergency payments were deducted from awards.
>
> attempts had been made to assist in the sale of the fish. For example, Maj Gen Wilson arrangements for some to be delivered to the Air Academy at San Javier; some was ed at the camp. But, even though the fishing areas were reduced to less than normal, tch was of sufficient size that it could not all be used locally. To forestall demonstra- decision was made to provide emergency payments to the heads of families in need, payments were made on 31 March for the equivalent of 10 days work at 150 pesetas 0) per day. This temporary assistance calmed the air around Villaricos. Later on 22 two weeks after the bomb had been recovered, a formula for payment was worked master-owner and the fish seller could both be paid 150 pesetas per day for a maxi- 60 days to compensate for lost fishing time and the inability to sell what was avail-

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wner Payment: a maximum of 150 pesetas per day for 60 days is authorized for wner share. If in applying this formula the computation exceeds the total the amount claimed will be awarded. If the master and the owner are not on and the master is claiming on behalf of the owner or any member of the a general release from all. If the master is claiming only for his share as only entitled to 1/2 the above maximum rate." "Certified fish sellers: a maxi- etas per day for 60 days."

The fishing area was restricted on 9 February. This had quite effectively eliminated most of the Villaricos fishermen's area, and with the planned demonstrations of late March, Maj Gen Wilson asked RADM Guest if some of the area could be opened. This was done on 1 April and Brig Gen Montel's office agreed that the new area would satisfy the requirement.

DISAPPROVED CLAIMS:

Ninety-eight claims were disapproved based on factors discussed in the preceding paragraphs. Most of these were for lost wages and loss of profits, and refusal to pay these was based on investigations revealing that they were too remotely connected with the accident to be considered as valid, or that the persons were not listed as local employees. Of the remaining disapproved claims the major portion was concerned with a land devaluation claim at a site 20 miles from Palomares.*

It was apparent that some were filed simply because someone else put in a claim and received some money, particularly in the lost wages or profits categories. Claims for dead animals were turned down, other than for the pig that was killed by an American vehicle since, as stated earlier, no connection between the deaths of animals and the accident could be established by the Spanish authorities.

MARKETING RESTRICTIONS:

The exact date, and by whom, that restrictions were placed on marketing was open to conjecture. Maj Gen Wilson stated in one Memo for the Record that it was on 20 January by the JEN, and included the general Palomares area. Such a ban might have been possible since radiation contamination was known at that time, but the "0" line of contamination was not established until the last two days of January, and reconfirmed about 10 days later. It was also believed by Col Dills, of the SAC Surgeon's office, that this was the probable source of the ban. As to the length of the ban, it was believed to have been until 19 February, as that was the observed date of the start of tomato harvesting.

While the above concerned the in-zone area, Brig Gen Montel stated that insofar as the out-zone restrictions were concerned, they were lifted on 1 February, but how appropriate instructions were issued is not known. Maj Gen Wilson stated that in contacts with some of the farmers in the out-zone it was indicated "that the situation was not clarified several days or weeks after the February order was published."

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* JAG, 16AF, reported that there was one claim for nearly a million dollars from a land developer who had shoreline property upcoast from the scene. A British combine had taken an option to purchase, but after the accident dropped the option. This claim was later withdrawn.

General Wilson, in considering the marketing situation, said that:

> ... coordinated and well conceived plans to re-establish the market for produce was totally absent. The JEN told USAF personnel that their role was one of advisory insofar as relating pertinent information outside the zone ... Limited observations and hearsay lead me to believe that the Governor, Minister of Agriculture representatives, JEN, etc., were not on the same frequency, consequently an utter state of confusion continued to prevail for several weeks after the 1 February order.
>
> ... the need to start harvesting and re-establish the market was again brought to Gen Montel's attention. After one of his many trips to Madrid, he finally informed me that CAT (Government Supply Agency) had been instructed to come into the area on 16 February and re-establish the market. Apparently buyers arrived about this time but some one had failed to notify local authorities and/or the growers. Consequently produce was not available for the buyers because harvesting had not been re-energized. Finally, on 21 February some harvesting and buying was observed. This however, seemed to be on a hit and miss proposition. Practically all harvesting and buying ceased on or about 25-26 February since it became evident that tomatoes had become too ripe for shipping. Although some fields were harvested for marketable tomatoes and beans after about 21 February, many farmers refused to take any action and obviously were going to depend upon the claims procedure to recoup any losses.

Thus, it can be seen that there was considerable confusion concerning the marketing, and at the same time the psychological situation must be considered. The fields had been barred to the farmers, there was an air of mystery - the subject of radiation was little understood by the local people, and the supposed dangers and results were undoubtedly intensified in their minds. This would spread to the buyers, and without firm, direct information to the contrary, fear would offset commonsense, upsetting the Palomares area economy.

ALLEGED INJURIES:

While there were no direct injuries resulting from this accident, there were claims made for indirect injuries suffered on 17 January. In three cases ex gratia payments were made, which, in effect, denied the claim but did pay some compensation as a matter of "favor."

[illegible] Molina Alarcon.* The mother-in-law of Diego Flores Martinez, a lady of about 75 [illegible] allegedly fell

[illegible] when she tried to leave the house in the moment of the accident under the impression that parts of the airplanes were falling on her house, she broke both [illegible] in the fall and also some trouble to her leg, and after being attended by the [illegible] she is now unable to use her arms and she needs a person with her at all [illegible] to care for her. And on top of all this trouble she has been left in very bad

[illegible]B/66-22136/FS; 52548

physical condition and liable to have an embolism which could cause her death. And for this reason I am requesting the amount of 100,000 pesetas as payment for all the consequences caused by the accident or that could arise in the future to the above mentioned person as a result of this accident....

Four months after the accident, on 23 May, Josefa Molina Alarcon died, allegedly of the injuries suffered on 17 January. The daughter and son-in-law presented a claim, for the deceased elderly lady, asking the $1,666.67 on 1 March. This was included along with a property damage claim of 940,640 pesetas ($15,677.33). As this was over the approving authority of the Commission, the claimant indicated a willingness to amend his claim to $15,000 to allow it to be handled locally. The payment made to these people totalled 364,377 pesetas ($6,079.03), of which 36,000 ($600) was ex gratia for the claimed personal injury to the mother. As one emergency payment of $2,400 pesetas had been made to Flores Martinez on 9 February, the last check was for 361,977 pesetas which thus recovered the emergency payment. The total amount was accepted by Diego Flores Martinez, and his wife, Gabriela Navarro Molina, on 20 June, and the acuerdo was signed that day.

On 8 August, the daughter presented another claim in her mother's death for 250,000 pesetas, and the next day her husband claimed additional money (616,219 pesetas) in connection with crops. The Commission did not consider that there was merit in this new claim since payment had been made on recognized factors and no new evidence of loss was presented. On 17 August they were told that since they had signed the acceptance agreement on 20 June as "full and final settlement of all damages," a new claim could not be considered. No further word was heard from this family.

Antonio Fernandez Parra.* A claim for medical expenses to treat a case of eczema on the left hand of Antonio Fernandez Parra was made on 18 April. Allegedly this was contracted when assisting in recovery of the bodies from the aircraft wreckage. The claim totalled 13,553.85 pesetas ($226.12), which included 600 for the doctor's fees, 5,403.85 for medicine, 5,550 for 37 days of lost work,** and 2,000 for clothes. The claim was accompanied by a statement from the parish priest that this man had helped in the recovery of the bodies.

Since the medical claim in connection with this was not supported by sufficient evidence that the cause of the eczema was the handling of the accident victims, legitimate payment could not be made on that basis. Also, this Fernandez Parra was not on the workers list and the claim for lost wages could not be granted. As for the clothes allegedly damaged as the result of the recovery work, there was some hedging on that when asked to bring the suit in. At first he said he had paid 5,000 pesetas for it in France a year past, and that it was at home; however, when told to bring it to the office he changed his story and said that it was burned, and in the garbage, and could not be seen. Based on this evidence, the entire claim was disapproved on 22 April.

* AFE 66/22610/FS; 52433

** 18 January - 23 February 1966 @ 150 psts/day

Sr. Parra was not satisfied with this decision and he wrote a letter to Mr. Duke, the U.S. Ambassador to Spain. He said that he had helped in the rescue work and had then found medical treatment necessary for 27 days, and he felt that the Commission had put aside his claim without justification, particularly since another certificate from the priest substantiated his statements of assistance although not of the medical treatment. He also said in the letter that he had been offered 5,000 pesetas by the Commission which he had refused since his costs had been higher than that,* but that later, on 23 April, they had told him they would give him nothing. His letter ended by saying that he was "capable of directing myself to the President of the United States."

A form letter was used by the Embassy to forward this piece of paper to the Judge Advocate for a reply to be made directly to Mr. Parra. The case was reconsidered and the Commission decided to award him 3,000 pesetas ($50.00). This was not done on the bases of the medical claim, but rather on the "unselfish acts during the initial recovery operations ... ex gratia." The release forms were enclosed, Sr. Parra signed them and returned them to the Commission, and he then received his check for 3,000 pesetas. The case was then considered as closed.

Isabel Jordan Paredes. The third ex gratia case was that of Isabel Jordan Paredes who allegedly injured her back in running from the area where aircraft wreckage was falling. Sra. Paredes was a widow with six children, and during the summer months of the previous year she had been employed as a charwoman at a restaurant in Palma de Malorca, and had promised to return there in 1966. She filed her claim for injury on 26 April, and four days later submitted a statement from the doctor that she was under treatment. The amount requested was 4,455.25 pesetas ($74.33). The Commission settled upon a payment of 2,500 pesetas, and that was accepted by her on 29 April.

[illegible]eek later, on 5 May, a letter was received from her stating that she had been unable to [illegible]urn to work because of her injuries, and this loss of pay plus her medical expenses "ob[illegible]es me to present this claim." She was asked to send further substantiating paper, and [illegible] submitted the x-rays that had been made, as well as two prescriptions that she had been [illegible]able to have filled due to lack of money. Based on this new evidence the decision was made [illegible]ward her an additional 15,000 pesetas, bringing the total payment to 17,500 ($295.00). [illegible] amount was sent, along with the x-rays, to Sra. Paredes, and on 3 August she signed [illegible]cuerdo.

[illegible]ENTATIVE CLAIM:

[illegible] claim for damage and destroyed crops was that of Juan Diego Soler Flores, Case [illegible]B66/22147/FS, who claimed $13,683.58, and received payments totalling [illegible]. This total included one emergency payment followed by a claim with two amend-

[illegible]

[illegible] no evidence to support such a statement in the file of Sr. Parra.

Juan Flores lived with his wife, three sons, and two daughters at Palomares,* where he had farmed for many years. As a land owner he raised tomatoes, beans, cabbages, grain, and alfalfa, and maintained 24 animals (pigs and cows, and two donkeys). In addition to farming his own land he rented land from Nicolas Saez Vicente where he grew alfalfa. He had also entered into share-cropping with two men, with the crop in these cases being grain; one area was shared with Vicente; while another was shared with Sebastian Navarro Flores. Surplus crops and milk were sold on the local market, and the fields of alfalfa were used for animal food. The land concerned was both in and out of the contaminated areas at Site #3.

Estimates of the damages had been included in both the Board of Neighbors and the agronomists reports. Thus, when Sr. Flores appeared at the claims office on 11 February, consideration was given for an emergency payment. At that time he required money for payment of a loan that he had obtained from the bank and which he had not been able to pay due to the loss of income from the crops and milk sales. The following day he was paid 50,000 pesetas ($833.33). At the same time he was given the forms to prepare the claim.

His claim was presented on 3 March for 627,363 pesetas ($10,456). Based on the agronomists report, and adding 20 percent of the feed cost claimed (24,000 claimed, 4,800 permitted), part of the milk loss of sale (4,500 claimed, 1000 permitted), and the cost of the dead pig which had been killed by an American vehicle, and the "furniture" lost (farm equipment), an award of 390,260 pesetas was arrived at. From this there had to be deducted the 50,000 pesetas emergency payment. Before this claim could be paid it was found that the investigators for the agronomists had omitted 4,000 square metres of tomatoes that had been destroyed by the crop cutters, with a value of 56,530 pesetas. Then, as discussed in the preceding pages, negotiations were not yet completed. The revised agronomist report of 25 March changed values, and for Sr. Flores there was a special annex prepared on 31 March. The first of these changed prices by raising them in general; the second specifically changed Sr. Flores' claim by adjusting the areas planted in beans and increased the amount by 78,100 pesetas.

With those adjustments, all of them upward, the final award of 1 April was placed at 521,360 pesetas, from which had to be subtracted the 50,000 pesetas emergency payment. Mr. Flores was not, however, to receive all of this new total since he was to divide it with the two share-croppers, Vicente and Sebastian Flores. Juan Flores received 97 percent of the total, or 504,060 pesetas, Vicente 10,925, and Sebastian 6,375. On 2 April, the Acuerdo de Liquidacion papers were signed for those amounts.

The Air Force heard again from Juan Diego Soler Flores. On 20 April he filed an additional claim for 194,000 pesetas ($4,857.29). This claim included tomatoes and grain that was allegedly not included in the first claim, additional pay for feed that was necessary to buy since the fields could not be used for pasture, and a new claim for repair of a threshing area

* Family of Juan Diego Soler Flores: wife, Manuela Gonzalez Sabiote; sons, Pascual Soler Gonzales and Sebastian Soler Gonzales, and Juan Soler Gonzales; daughters; Maria Soler Gonzalez and Antonia Soler Gonzalez.

that was destroyed during decontamination activities. Lost wages for the family was placed at 21,750 pesetas, and for potato and corn crops, which he had been unable to plant, he estimated a 78,000 peseta loss.

A week later this claim was investigated by the U.S. Air Force and it was found that the primary question in regard to the crops was that he questioned the difference between claim and payment. For example, he had claimed 7,996 pesetas in one instance and received only 3,600 in payment. In such cases as this, the agronomists' estimates had been used and the amount paid was all that was allowable. In the case of tomatoes, however, a 10 percent increase (5635 pesetas) was given since the tomatoes had been "in zone" and thus had been completely destroyed and merited this additional sum. Inspections of the threshing area was done by a member of the civil engineering staff, and it was found that it had been badly damaged. An attempt was made to level it, but the Spanish tractor operator only succeeded in making it worse. Since this type of area had to be firm and very even, it was concluded that this was indeed a just complaint, and 6,000 pesetas was given to provide payment for the labor to repair it. Wage losses were denied since this work was within the family and provision for payment of the claim would cover this. The potato crop claim was denied since the ground that Sr. Flores had said he was going to plant in this crop had already been claimed in tomatoes, and the tomatoes would not have been completely harvested prior to March; potatoes had to be planted by the end of January to produce a satisfactory crop. The comment of the adjudicator was that "two objects cannot occupy same place at same time," and this claim was denied. As far as the corn was concerned, it was still possible to plant and harvest a satisfactory crop within this season and so that claim was also denied. Also included had been an item of "loss of wages on farm equipment" that he had on "3rd partnership" for a value of 8,250 pesetas. This equipment was found to be the two donkeys that Sr. Flores owned. Since these were used only to work on his farm, and were not rented out so that he received no income from their work (other than that from his own use of them), that claim was also denied.

As a result of this investigation an amount of 11,647 pesetas additional was approved, which included the 6,000 for the threshing area, 5,635 for the tomatoes, plus 12 pesetas that the bank would charge for cashing the check. This brought the total payment on this re-opened claim to 532,527 pesetas. This was not satisfactory to Sr. Flores, and he so stated this fact in a letter on 26 May. In it he reiterated that he had not received adequate compensation for animal feed and loss of milk sales. These items were not increased, nor was the amount of 6,000 pesetas for repair of the threshing area. However, he "emphatically stated" that he had canes on hand for future plantings which were destroyed: a total of 300 packages valued at 25 pesetas per package, for a value of 7,500 pesetas. When estimating damages to the tomato crops, the loss of cane poles had been considered as part of the crop loss; but, in this case, Sr. Flores said that these had not been in use, and since he reiterated this several times, he was taken at his word and payment included in the computation. Thus, the 11,647 peseta increase estimated on 29 April rose by 7,500 [illegible] to bring the entire claim to a total of 540,000 pesetas, for a total dollar payment of [illegible]74. The last acceptance document was signed by Juan Diego Soler Flores on 28 June [illegible] that amount.

This representative case, while comparatively simple when written out in this form, was only one of the 595 claims presented, but some idea of the work involved can be understood. As may be seen, there was an increasing awareness of what might be claimed, probably developed partly from what other people received, as well as new ideas on what to claim. The claimant was always quite convinced of his honesty and purported rights in these situations. As can be understood, the U.S. Air Force was indeed fortunate to have the support of the Spanish Government in estimating crop damages, and it was primarily on the Spanish that the blame for any inadequate crop payments must fall. For other matters, such as the case of the donkeys and their work in the fields, it became a matter of determining the real facts in the case.

THE ORTS CLAIM:

If the total volume of file space is an indication of the historical importance of a claim, that of Francisco Simo Orts certainly deserves to be included here. Senor Orts played a significant role in the initial recovery of fliers downed in the water and in locating the spot where Weapon #4 entered the water (Section 3). Senor Orts and his vessels were utilized on several occasions by the search forces. He was reimbursed for these activities and for damage to his boat and equipment in the amount of 373,900 pesetas ($4,565.56). In addition, in Madrid on 15 April 1966, Ambassador Duke presented Sr. Orts with a medallion and scroll worded as follows:

> "As testimony and admiration of the exceptional talents
> and profound knowledge of the sea of
>
> DON FRANCISCO SIMO ORTS'
>
> which led to the finding of the nuclear bomb which fell
> into the sea on the coast of Palomares, and as a symbol
> of gratitude on behalf of my country, I make this
> document in Madrid, Today, April 15, 1966.
>
> (signed) Duke
> United States Ambassador"

On 24 June 1966, Orts' attorney presented a claim on his behalf in the amount of 5 million dollars "tax free" at Torrejon. The basis of the claim was that Sr. Orts had rendered "salvage service" to the U.S. Air Force, both in the recovery of the bomb and in the location of the "black box".

The claim, because of the amount involved, was beyond the jurisdiction of the Foreign Claims Commission at Torrejon and was forwarded through Headquarters USAFE to Headquarters USAF in Washington, D.C. for consideration. Conflicting legal opinions by government attorneys are on file as to the worthiness at law of the claim. Most of the legal questions arose concerning Sr. Orts' activities during the search. The legal brief accompanying

aim contends that Sr. Orts was only compensated for "lost time" in his fishing enter- and not for his part in the success of the salvage operation. The United States' ion was that Sr. Orts was thoroughly compensated for his activities and was acting contract to our government rather than in a voluntary capacity.

from the purely legal aspects of the case, political implications are apparent from the By the time a decision was reached in Washington, the first anniversary of the acci- was approaching. Thus, Sr. Varona, Orts' attorney at the time, was advised on 18 ry 1967, the day after the anniversary, that the claim had been rejected.

interval, several statements by Sr. Orts in the press (Europa Press, Pueblo, El ar) indicated his dissatisfaction with his treatment by the Americans. The newspaper ibe actually conducted a subscription campaign toward the purchase of a new fishing boat Sr. Orts. The response, however, indicated that "his cause had not caught the public ination."

May 1967, Sr. Orts had submitted through his American council, Lord, Day and Lord New York City, Memoranda of Facts and Law to the U.S. Department of State. Coordina- between the Departments of State, Defense and Justice and the Atomic Energy mission followed.

his time, Mr. Herbert Brownell, a past Attorney General of the United States, and then mber of Lord, Day and Lord, continued to press for administrative settlement of the m. Then followed a period during which there was some question on the part of the law as to their authority to proceed on Sr. Orts behalf. This difficulty was cleared up by n 1968 when the firm, because the 2-year statute of limitations, filed a protective suit Southern District of New York. This filing placed the case in the hands of the U.S. rtment of Justice. As a last attempt at administrative settlement, a figure of ,000.00 was proposed by Sr. Orts' attorney as "a fair and equitable sum."

this time, general agreement had been reached by the interested departments of our gov- ment that the case should go to court rather than be settled administratively (out of court). reasoning employed in this decision proceeded as follows: If Sr. Orts' claim was justi- other Spaniards who were of similar aid during the salvage operations would have lar recourse. The procedure at court would provide direct and regulated access to ement, if desired, for all. Although many Spaniards had been of considerable help in on recovery on land, no procedure for salvage on land exists at law. Thus, action in would apply only to sea salvage and not create untoward reaction among the Spanish rs. Reaction on our renegotiation of the Defense Agreement (bases, etc.) with the nment of Spain was also considered. Any action on our part which indicated an arbi- decision on the claim might raise concern with all claimants and place undue pressure Government of Spain during the negotiations. Anti-government groups within Spain ready been using the claims situation as a spark to ignite anti-American feeling in see "Red Duchess" discussion following).

The case was settled in Admiralty Court in New York in the Fall of 1971. Senor Orts was awarded a consent judgment of $10,000.00.

ANALYSIS OF MINING SLAG:

Mr. Kingery, a representative of the Bureau of Mines, U.S. Department of the Interior, was in the area for a study of wells, craters, and mine shafts, during the search for the missing weapon. As there had at one time been considerable mining activity in this district, including smelting and reduction of ore, there were piles of slag and residue of the mining activity. Some of this material was utilized by the Americans in road construction, in preparation of the camp site, and in building of the jetty used for boats. Some comments were made as to the value of the slag, by the owners, with metallic content stressed, particularly of precious metals. To protect the interests of the United States against possible future claims for the material thus used, the claims personnel asked that Mr. Kingery take samples of the slag and have it analyzed to determine content.

He chose samples, and three semi-quantitative spectrographic analyses were performed. The first consisted of samples from widely separated areas which were combined into one for analysis. The second was not considered as representative, but was one that "indicated special silver element content," while the third was from a residue metal pot from a reduction oven. Mr. Kingery reported that:

> Comparison between these three samples show good correlation between silver (Ag), lead (Pb), and iron (Fe); consequently, they may be considered representative of the slag, although scientific sampling was not conducted.
>
> The spectrographic analysis shown is by weight; probably percentage minimum to maximum ranges are shown. The maximum silver content indicated would not exceed 0.15 percent; overall, all averages will be considerably less.

With this record on file, the U.S. Air Force would be fairly well protected against claims, and is one more example of the steps that had to be taken in this accident case.

THE RED DUCHESS:

The Duchess of Medina Sidonia, known as "The Red Duchess" in the Spanish press, could be described as an agitator. Her activities were generally aimed at discrediting the Spanish government. Because of the presence of United States forces in Spanish soil and the support that the United States government provided to the Spanish regime, she was active in anti-American circles. During the recovery effort, she organized demonstrations against U.S. presence using the dangers associated with nuclear weapons and alleged faults with claims payments as a rallying call.

The Duchess took up the claims cause in earnest as the first anniversary of the accident approached. On 17 January 1967, she organized a "bus march" to Madrid to discuss the

laims of "her people" with the Ambassador. The gathering was dispersed by police and the Duchess was jailed until 20 January.

On 23 January, the Duchess and a party of five, including three dissatisfied Palomares claimants were received at the U.S. Embassy, claiming to represent all Palomares region inhabitants. The group indicated that amicable attempts at settlement would end if "just compensation for moral" damages were not forthcoming at once. The group was after an overall compensation for the area. An appointment with the Foreign Claims Commission was offered but declined when the group learned that settlement must be reached with individuals. A meeting between the Claims Commission and lawyers representing 241 claimants did occur on 8 February 1967. The Duchess used the press to advantage by releasing pointedly worded items concerning the meeting (Section 6). The lawyers requested access to commission files to attempt to find some base for additional claims. The commission replied in summary:

(1) Settled claims are closed and commission will not permit them to be opened for review.

(2) Files of open claims in which claimant has not accepted quantity offered will be returned to claimants who request withdrawal. If withdrawal is not desirable, the individual claimants have documents covering amounts claimed and awarded.

(3) Commission would consider claims for new damages or those unknown at time of original filings.

The response led to a threat by the lawyers to the U.S. Embassy that further attempts would be made through Spanish courts. Embassy officials pointed out this recourse was open to them, but expressed the desire that the claimants continue discussions with the FCC. The Duchess read this as a statement of sovereign immunity by the United States. The President of the FCC was replaced as a result of the interchange.

Later in 1967, officials of the Spanish Ministry of Foreign Affairs (MFA) made a statement that implied that Spanish courts had jurisdiction over the U.S. government in regard to the Palomares claims. The U.S. government could not agree to this implication and initiated diplomatic discussions to clear the matter. The MFA indicated that the intention of the statement was that Spanish courts could be employed by Spanish citizens against the Spanish government, not the U.S. government. Settlement within the U.S. government would then through diplomatic channels. The MFA officials did suggest that the FCC take new initiatives with the lawyers of the claimants, thus keeping the matter out of the Spanish courts. This route was pursued by the FCC with a letter of 22 December 1967. The lawyers responded favorably, recognizing that their clients would fare better following the procedure than Spanish courts.

We last see the work of the Duchess in a 2 January 1968 petition to the Spanish Chief of State, Franco, asking for "fair compensation for material losses suffered" and certificates of health for land, animals and people. It is interesting to note that the press for "moral damages" was not included.

SUMMARY:

Essentially, the claims function was charged with the responsibility of seeing that "the claimant shall receive compensation for the actual damage sustained as substantiated by the evidence." Table 5-3 provides a summary of claims situation through January 1973.

In reviewing the entire claims program, the first President of the FCC expressed the opinion that a Foreign Claims Commission is not an appropriate agency for disasters of the magnitude of that at Palomares. He suggests rather than an international agreement, in the sense of 10 USC 2734b, should be employed in the future. Another mode of operation would be through SOFA (Status of Forces Agreement) agreements which allow for foreign nationals to process claims against their own government for damages resulting from U.S. operations. The United States then reimburses that government with a certain percentage (generally 75%) of the settlement. These agreements are common between the United States and NATO nations. An agreement of this type was reached with Spain in 1968.

There is at least one possible claim that, as of this writing, has not been filed. The potential, however, is present. The claim would probably come under the previously mentioned Spanish Law of Nuclear Energy of 1964. The statute of limitations can reach for 20 or more years. Louis Castro Lopez was 12 years old and living in Palomares at the time of the accident. At the age of 18 he entered the hospital in Barcelona where he later died of "cancer of the blood." It is not known at this time if the boy was among those tested in the JEN's whole body counting program. It is additionally understood that an attempt may have been made, to run samples of his blood for a plutonium determination. This death may have had considerable impact on the Palomares population. Many minds may question the worth of the official assurances concerning "no danger from radioactivity."

The Palomares claims program was lengthy and caused considerable personal and political friction, both in Spain and in the United States. If there are lessons to be learned, they can probably be summarized as follows:

1. Close and continual coordination between the foreign government, U.S. diplomatic officials, and the claims operation is required.

2. A strong public information program initiated by the foreign government to explain, in full, the procedures and basis of settlement should be pursued.

TABLE 5-3

CLAIMS SUMMARY

	September 1966	June 1970	October 1970	January 1971	February 1972	January 1973
Total Claims Received	595	644	644	644	644	644
Total Dollars Claimed*	6,533,383.13	7,839,519.63	7,839,519.63	7,839,519.63	7,839,519.63	7,839,519.63
Total Claims Paid	492	529	530	533	535*	536
Total Dollars Paid	555,456.45	696,299.45	697,663.73	699,917.12	710,462.12*	710,913.93*
Total Claims Denied	91	98	98	98	98	98
Total Claims Abandoned	00	7	7	7	12	10
Total Claims Open	12	10	9	6	0**	0
Total Dollars Open**	5,924,957.58	5,099,749.13	5,096,362.41	5,067,372.75	0	0

* Includes F. Simo Orts claim of 5 million. The claim was denied but is included to indicate the total dollar cost. Sr. Orts' sued at admiralty and received a settlement of $10,000.00.

** Several claimants accepted partial payments but refused total settlement. Several attempts were made to conclude the negotiation. The cases have lapsed and are considered closed. It is possible that these claimants are anticipating later claim (10-20 years) for radiation associated damage claims.

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SECTION 6

PUBLIC AFFAIRS

FIRST NEWS:

At 170945Z January 1966, the 16AF Director of Information was informed of the mid-air collision and within five minutes the news had been relayed to his SAC counterpart. Before JUSMG and U.S. Information Service (USIS) could be notified the Associated Press correspondent from Madrid called. He had already received information on the crash from a correspondent in Vera, and wanted more details. By 1130Z seven more queries had been received: UPI, Westinghouse Broadcasting Corporation, Europa Press, Reuters, ABC, and Stars and Stripes, and the public relations office of EUCOM, Camp de loges, France. Very little information was available at Torrejon, as a result only the home bases of the aircraft and the fact that they were flying a refueling mission on a routine training flight were given after permission had been obtained from SAC. The names of the known survivors were released as they became available. In conformance with policy of not giving out names of casualties, those names could not be given until the next of kin had been notified.

The news agencies did not wait for official releases and the first dispatch on the teletype receiver at Torrejon was from UPI at the Hague at 1130Z. The Dutch vessel Willem Koerts had radioed that two jet fighters collided in the Cartegena area, with one ditching in the Mediterranean, and the other continuing its flight. The Associated Press (AP) released a dispatch at 1230A, followed by additional ones at 1240A, 1328A, 1407Z, 1506A, and 1805Z, as well as special bulletin at 1255Z. Considerable detail was given, such as four parachutes seen descending, the name of the survivor on the beach who had been interviewed (Buchanan), a statement by the Spanish police that four charred bodies had been recovered, and it was not stated whether or not the B-52 carried nuclear arms. The 1805Z release listed the names of the four known survivors as supplied to both AP and UPI by the 16AF.

[illegible] Buchanan had been interviewed by UPI, SAC stated that valid questions could be answered so as not to embarrass the United States and the Government of Spain. That evening it was established that no press interviews would be permitted at Torrejon even though reporters were aware that three of the four crew members had been returned to the hospital [illegible]

[illegible] while SAC was busy preparing a release. The draft was read over the telephone to the [illegible] 1530Z; however, until clearance with USIS, JUSMG, and the Embassy and the Spanish Government could be obtained, it could not be made public. At 2030Z, eleven hours [illegible] accident, the official release was received by 16AF, relayed from USIS at Madrid, [illegible] DOD-State story approved by the Spanish. Within 15 minutes it had been sent to [illegible] Being brief, only the basic facts were stated:

Rec'd Fr Mr. Bell, USIS, 2130/17 Jan 66 -

For immediate release by 16 AF

Joint DOD-State Msg - GOS approval

> A B-52 bomber from the 68th BW at Seymour Johnson AFB, N.C., and a KC-135 Tanker from the 910th ARS at Bergstron AFB, Tex. crashed today southwest of Cartegena, Spain during scheduled air operations. There are reports of some survivors from the crews of the acft. An AF Accident Investigation team has been dispatched to the scene. Additional details will be available as the investigation progresses.

Released - 2145

Although information concerning nuclear weapons could not be released it is noteworthy that the Associated Press had asked about them on 17 January. At that time the only answer was a truthful one, information concerning the weapons was not available. It was no longer possible to adhere to the usual policy of not discussing nuclear weapons, and by the afternoon of 19 January, radiation hazards and lost bombs were definitely the subject of the day. The Reuters representative in Madrid called concerning a reported "450 airmen with Geiger counters looking for nuclear material." The American Broadcasting Company reported, also from Madrid, that "several hundred U.S. airmen combed the Spanish countryside today looking for - to quote - ' the nuclear weapon or weapons that were aboard the crashed B-52.'" At 2105Z SAC advised 16AF that two UPI dispatches, both datelined 20 January, had been received. The lead paragraph of the first read:

> Residents of this tiny village (Palomares) waited nervously while the U.S. Air Force searched for an atomic bomb carried by a nuclear bomber which crashed after colliding in the air with a KC-135 jet tanker.

The second article, written in a personal vein, started:

> Searching for a missing atom bomb is not exactly my idea of the best way to spend a holiday on the sunny coast of southern Spain.

The first story included the "no comment" statement of personnel at the site and at Torrejon, following with the fact that hundreds of airmen were hunting for a nuclear device. The reporter went on to say that the immediate crash site had been evacuated, but the general area was not, and that about 50 Guardia Civil were preventing civilian entrance to the crash zone while the Americans hunted for some object.* Then, as if to answer the question of how

* He also reported two interviews to reflect local reaction, one against, the other for the situation that existed. The first, after describing how he had walked up and touched the bomb, said that he considered "it intolerable that the Spanish Government allows these planes to fly over Spanish territory." The other considered that it was much more dangerous to give Russia "the edge in the cold war."

he surmised that it was a bomb missing, and not some other type of equipment less [illegible] the personal article explained his sources of information:

> I saw American airmen, some of them carrying Geiger counters and many of them wearing radiation detection badges, scouring the area in the search for the missing bomb.
>
> I was stopped by a guard in the area. He asked me if I could speak Spanish and I told him I did. Then he asked me if I could go with him to a nearby bean field where a Spanish farmer was cutting his crop.
>
> The guard explained that the Guardia Civil had been instructed to clear the area of all people because it was contaminated.
>
> After further questioning, the guard said one nuclear device was missing from the crashed B-52 ....
>
> The guard said that two bombs were found during this first day's search in the arid, sparsely-vegetated hills ... and said that the last bomb was found there, right on the beach.

With the extensive coverage of the UPI throughout the world the implications of that release could not be ignored. At 1230Z, 20 January, the second official release was received at Madrid and distributed. In this it was admitted that the bomber had been carrying nuclear weapons, but the fact that a bomb had not yet been found was omitted:

> The Strategic Air Command bomber which was engaged in a refueling operation off the coast of Spain, and suffered an accident with a KC-135 tanker was carrying unarmed nuclear armament. Radiological surveys have established that there is no danger to public health or safety as a result of this accident.

[illegible] these news releases, press stories, and directives were being issued, the Embassy, [illegible] direction of DOD and State, was preparing a statement for release. It was coordinated [illegible] USMG and then went to the Spanish Foreign Office. It stated, in brief, that Ambassa[illegible]ke expressed appreciation for the assistance given by the Spanish in the rescue work. [illegible] announced that there had been a small explosion of conventional materials, and that [illegible] monitoring teams were working in the area to "confirm the safety of the spot."

[illegible]h, according to a USIS representative, "obviously do not desire that such a state[illegible]eleased although they appreciate the ambassador's desire to express his thanks." [illegible] also said that they desired to reconsider the release after it was approved by [illegible] which effectively would delay its publication. However, the next afternoon, [illegible] January, the Air Ministry issued a release which was carried in ABC, Arriba, [illegible]ciones the next morning, It really said little, but did explain something of the [illegible] security precautions being taken in the accident area since it mentioned the [illegible]re of the aircraft:

> With reference to the air accident that occurred off the Spanish coast in the province of Almeria, it has been determined that it was a collision between a tanker aircraft and a long range American jet plane while a refueling operation was underway.
>
> The authorities and civilian personnel of that area went to help the crews and they managed to save four flyers and they helped put out the fires of what remained of the aircraft that collided and which had fallen in the neighborhood of the village of Vera and Palomares.
>
> The last area, five kilometers in diameter, over which the debris was scattered and the recovery of elements of a secret military nature have made necessary the search and safety measures taken by this ministry in order to obtain full information and analyze the conclusions of flight safety procedures.
>
> The Air Ministry appreciates the cooperation given by the local authorities and civilian personnel and their spontaneous and courageous help which made possible the assistance given and the work that is underway to complete the investigation with added safety.

Friday, 21 January, was quiet, with no new releases, but with a bit of advice from SAC: there was no special guidance for handling of newsmen, and no objection to photographing unclassified wreckage, but personal safety was paramount. The only comment to be made was "investigation continuing." While silence was being maintained by the military, the following day the Associated Press told of an interview in which "an official Spanish Government source" told that they had medical specialists in the area, but stressed that even though the reports on contamination were not yet complete, there was very slight radioactivity. However, there was no danger even to those working directly in the area, and the amount of radiation present was much the same as encountered in many laboratories.

In response to a request by U.S. Air Force a rationale of the release policy was sent from Palomares the next week. It was felt that a new policy was needed since it was quite apparent that something more than a normal accident recovery operation was going on:

> Newsmen in the area see large numbers of men, many carrying radiation detectors, searching the countryside. Also, decontamination personnel wearing distinctive clothing, using surgical masks and gloves are seen throughout the area ... We believe we should be allowed to confirm that there were unarmed nuclear devices on board, and use a statement to the effect that the search is for the purpose of absolutely insuring that there is no danger to the health of the population.

As there were U.S. Navy ships in the area there were further requests for information. The Navy proposed a release with which they would answer those queries. In it they said that they had at the site a special search and recovery task force with 10 to 12 ships as well as underwater search equipment which was being brought in. This proposed release was sent

to USCINCEUR despite the fact that on the previous day the Commander, Sixth Fleet, had passed along specific guidance from "higher authority" that no news releases were to be initiated. Additionally, the 16AF was to receive all news queries, and Navy relations with the press were not to include taking aboard of any newsmen or accepting press traffic for them.

USCINCEUR approved the release, and Torrejon told Maj Gen Wilson of this on the morning of 25 January, but said that since DOD had not yet concurred it could not be released. JUSMG did not approve the story and also pointed out that JUSMG had named the 16AF Information Directorate as the one point of contact, and they would coordinate with the Embassy, and stressed that the Spanish had asked that all releases be coordinated with them "to allow their official releases to be in consonance with U.S. releases."

In an apparent attempt to satisfy reporters, a third official release was made:

> Elements of the U.S. Navy and the U.S. Army are assisting Spanish authorities and the U.S. Air Force in the search for wreckage of the B-52 and KC-135 aircraft which suffered an accident during a refueling operation January 17.
>
> Air Force officials reconfirmed that radiological surveys have found no indication of danger to public health or safety as a result of the accident.

A restatement of the "no comment policy came from DOD on 25 January, which named also the releasing agency in Spain:

> ... there should be no news releases or public statements of any kind on this subject without prior approval from ASD(PA). Before granting approval, ASD(PA) is coordinating with other military and defense agencies, State Department and U.S. Ambassador in Spain. In virtually all cases, releases will emanate from Embassy, Madrid after proper coordination with Government of Spain (GOS).

As explicit as these policies seemed to be for the personnel who sat in Spain, apparently those on the home front were not briefed. There were two articles within a few days that violated these lines. The first appeared in the Spanish ABC, datelined 29 January, in which DOD confirmed that two submarines were being sent to assist in the bomb search. That story was from an exclusive of the New York Times correspondent in the Pentagon. A UPI story on 1 February attributed "informed sources" for their item on submarines making contact with " a missing nuclear bomb lying in 1,200 feet of water off the southeast coast of Spain." Both DOD and JUSMG said that such unilateral releases could only embarrass the United States, and that on-the-scene press relationships became a little strained when reporters in the States scooped their own people at Palomares.

The Armed Forces Communications Service (AFCS) unit at the scene - the 2nd Mobile Communications Group - sent a proposed release to 16AF for approval. Their story told what equipment was at the scene, and included a list of the members of the detachment. Even though it was written as primarily of interest to local Service papers, the Group was told

that the Embassy had been designated as the single point release agency and that the particular story could not be given to newsmen. Then, when more pressure was exerted by newsmen for information on the Navy, DOD continued their policy and denied all requests, and again said that no tours could be given since the Navy's work was concerned primarily with search for wreckage and classified materials. It was not a matter of being selective on who would have publicity, it was merely a matter of saying nothing about anything.

On 3 February, the very first briefing for media personnel was held in Madrid; however, from records of the recovery story, it was apparent that the 16AF public relations personnel were not there to hear the comments. Ambassador Duke told newsmen that 67 objects had been recovered from the sea, none of which had definitely been identified as the missing nuclear device, and that the purpose of the recovery operation, to leave Spain as it was before, would continue until the job was done. He announced the arrival of Jon Lindbergh, of Ocean Systems, who would work with the deep sea recovery portion of the project; that Alvin would start work about 8 February, and that the Aluminaut would arrive about 17 February. He also told reporters that it was hoped that unclassified photographs of the operations could be released and that authority for that action had been requested.

EVALUATION OF POLICIES:

It was then two and a half weeks after the accident, and there came a lull in both releases and directives. Three official statements had been given out: (1) the occurrence of the accident; (2) the bomber was carrying unarmed nuclear weapons, and (3) elements of the Navy and Army were assisting, and there was no danger from radiation. JUSMG's original directive naming the 16AF to handle releases had been changed by the DOD directive naming the Embassy as releasing agent.

DOD took this time to request a report on current and future public affairs activities as seen from the angle of the people in Spain. As mentioned before, one brief report had been filed from Torrejon, at DOD's request, but now more comprehensive information was desired, such as reactions of the press to the "no comment" policy, the degree of relationship with the Spanish, and problem areas.

In reviewing the situation, 16AF replied that interest of the press in the accident was shown by the fact that at Palomares there had been 54 newsmen, representing 7 countries, who had made 101 visits to the press center in this period. Also there were others in the area who had not officially contacted the press center. At Torrejon, representatives of 23 media of 6 countries had made queries. The reaction to the news ban was generally hostile, with "indignation, turning later to frustration." Due to pressures on reporters, the lack of factual information resulted in their turning to local Spanish and/or Americans at the scene, and that only led to "speculation and outright fabrication." Generally there had been little difficulty with the Spanish press since their reporting was usually factual. Rather, they had decried the sensationalism of some items that had appeared in the French and Italian papers, as they were to do a week later with an English release. For the future, the problems outlined reflected the experience of the past 17 days:

We believe there will be increasing pressure for information on naval activities, particularly on the undersea research vehicle operation. It is anticipated that the press will strive to keep the story alive and in the absence of official comment, may begin to speculate on such areas as water contamination, etc. Decontamination of crops continues to be an area of concern; however the GOS coordinator is making every effort to dispel any false fears on this. We believe that Navy furnished photography on their operations could reduce considerable pressure on the advanced camp and dispel many rumors.

In the area of relationship with the Embassy it was felt that the climate was satisfactory. Ambassador Duke had visited Palomares on 3 February and while he made no direct comment on media handling, he appeared to consider the situation favorable. Relationships with the Spanish were satisfactory, and information was exchanged so far as security permitted. For discussion of the Spanish reactions to the accident, DOD was referred to a report prepared by the AFSSO (Air Force Special Security Office). In that it was stated that the "population has not been overly affected by the incident." The first reactions were those of concern over the crash and the deaths. This was replaced by curiosity as recovery teams moved in, and with newsmen flocking to the scene a certain air of the importance of Palomares began to appear. However, when radiation checks were started and fields were closed off there was some alarm, but some of this was dissipated when the United States paid for the crops it destroyed, and when it was seen that some of the foodstuffs were being eaten by the Americans.

This summary of relations was sent to DOD on 5 February; however, two days prior the Public Affairs Division, Assistant Secretary of Defense, directed evaluation of the situation in Spain. As a result, Col. Donald C. Foster was sent from Washington to Torrejon and then to Palomares. He discussed the situation with JUSMG, Embassy, 16AF and Navy personnel, and reviewed the newspaper stories. The consensus of opinion, diplomatic and military, was that:

... immediate positive action is required to reverse the damaging news stories which have been, and are continuing to be, published worldwide ...

That a joint press briefing be held no later than 16 February at either Torrejon Air Base or preferably, if communications difficulties can be overcome, Palomares. On that occasion we should release a Defense Atomic Support Agency prepared paper on radiation hazards and should confirm the fact that we are searching for a nuclear weapon ...

That Commanders, 16AF and TF-65 be authorized to release, on a continuing basis, unclassified photography of their operation.

That Commanders, 16AF and TF-65 be authorized to provide, routinely, briefings and land and sea press "tours" of their decontamination and search areas, the sea tour to be confined to light LCVP or similar vessels.

That U.S. Embassy, Madrid, 16AF and TF-65 establish an on-site ad hoc public affairs working group to make appropriate recommendations as dictated by subsequent events.

That Commander, 16AF control all on-site press activities. Col. Foster pointed out that there were other factors contributing to adverse and speculative press stories. Living conditions were not of the best, transportation was difficult to obtain, and reporters were usually not equipped to work under Spanish winter-time conditions. These personal inconveniences, while not exactly the concern of military authorities, "militate against favorable press coverage," particularly when the "vacuum of official news" was added. With regard to the official Spanish attitude on news releases, he stated that it was his "conjecture that present Government of Spain (GOS) news blackout is based on its awareness of U.S. news policy." He also met with the ambassador just prior to returning to Washington and found that Ambassador Duke was in accord with trying for a more liberal public affairs policy and had so informed the State Department. Unofficially, it was also felt that the Spanish would go along with such a change.

Ambassador Duke agreed to the idea of a press conference which would be held on Wednesday, 16 February, at Palomares, with the local Spanish governor of the region, General Montel (or his representative), General Wilson, and Admiral Guest attending. Topics of discussion, which would be furnished by DOD/AEC authorities, would include a detailed statement concerning radiation hazard. Colonel Foster had included in his report a suggested introductory briefing that outlined the two problems being encountered. One was the search which would mention that one of the nuclear devices had not yet been uncovered, and the second was the return of the area to its original condition. The two speakers, one to cover land search, the other sea activities would be introduced at this time. The conference never materialized.

JUSMG also had some ideas on the existing policies and sent them along to their next higher headquarters, USCINCEUR. They agreed that the coverage in Spain had been factual, but that the paucity of information at the beginning had created an unwholesome situation. Their recommendations, in brief, were that:

The first release should be made as soon as possible after the accident and should include a direct admission that nuclear weapons were involved, but that no danger to public health existed.

A more liberal attitude toward news releases should be maintained to prevent a feeling of censorship.

PRESS POLICY REVISIONS:

It was hoped by those at Palomares and Torrejon that all of these recommendations might bear quick results and a loosening of the strings on releases would occur. The first step in that direction occurred on 12 February when a coordinated DOD and Department of State

release admitted that a nuclear weapon had been lost, and that contamination had occurred but that there was no sign of health hazards. It was sent to the Spanish for coordination; however, no reply had been received by the end of the month although it had been reported by USIS about 24 February that General Munoz disagreed with two items and would not clear it; what those were was not stated. So it appeared that another obstacle had been placed in the way of a more open policy.

Initiation of a revised press policy occurred when Jose Maria Navascues, President of the Junta de Energia Nuclear (JEN), discussed the radiation situation and recovery operations with newsmen. A lengthy article was published in Informciones and Pueblo on 1 March. The reporter stated that the accident "had produced no little speculation and resulted in confused information," and that to clarify the situation he had visited Navascues who had openly answered some questions. He said that there had not been one case of radioactive contamination found in Palomares, and that 17 scientists and technicians were working in the area on the radiation problem. He discussed the shipping of 6,000 tons of contaminated soil to the United States. While this was being published, including use of a complete paragraph of the previously proposed release, and paraphrasing of other information, the decision was made to proceed with the drafted statement as the fourth release in Spain. This was accomplished at 1245EST, 2 March. The statement made by Navascues may be seen in its entirety on the following page, with the fifth paragraph concerning radiological surveys. The same day the AEC in Washington issued a release on the radioactive soil:

> Following the January 17 collision of a B-52 carrying unarmed nuclear weapons with a KC-135 refueling plane, approximately 1500 cubic yards of earth and vegetation were collected in southeastern Spain to preclude any possibility, however remote, of public health of safety hazard. There was no nuclear detonation.
>
> The earth and vegetation contained only small quantities of radioactive material scattered when the nuclear weapons impacted. The material will be shipped to the AEC, Savannah River Plant, near Aiken, South Carolina, where it will be buried in the same manner as other low-level radioactive waste material is routinely disposed of.
>
> The material is being packed in 55-gallon drums. The levels of radioactivity are being carefully monitored to be sure they are well within the standard limits of such shipments.

Since it was public knowledge that the bomb had been lost, DOD provided more information through a question-and-answer form distributed on 2 March in Washington. Items of interest included how many bombs were involved, the characteristics of the plutonium and the alpha rays it emitted, as well as safety measures built into the bomb. Concurrently, the State Department was including information in their daily briefing which used the DOD release, including a question and answer period. Some of the same questions were answered in the DOD release, answers to the unexpected questions were wired by DOD to Spain, while the State Department's USIS issued a talking paper.

APPROVED DOD NEWS RELEASE, 2 MARCH 1966

Search is being pressed off the Spanish Coast for the recovery of material carrried by the two planes involved in the recent air collision and for fragments of wreckage which might furnish clues to the cause of the accident. Included aboard the B-52 which collided with the KC-135 tanker were several unarmed nuclear weapons, one of which has not yet been recovered.

When this search and investigation have been concluded further announcement will be made of the results.

The impact of the weapons on land resulted in a scattering of some plutonium (Pu 239 and uranium (U235) in the immediate vicinity of the point of impact. There was no nuclear explosion.

Built-in safeguards perfected through years of extensive safety testing, have allowed the United States to handle, store and transport nuclear weapons for more than two decades without a nuclear detonation. Thorough safety rules and practices also have been developed for dealing with any weapon accident which might result in the spilling of nuclear materials.

Radiological surveys of the Palomares area and its human and animal population have included detailed laboratory studies by leading Spanish and U.S. scientists throughout the 44 days since the accident. They have obtained no evidence of a health hazard. These experts say there is no hazard from eating vegetables marketed from this area, from eating the meat or fish or drinking the milk of animals.

Steps have been taken to insure that the affected areas are thoroughly cleaned up, and some soil and vegetation are being removed.

These measures are part of a comprehensive program to eliminate the chance of hazard, to set at rest unfounded fears, and thus to restore normal life and livelihood to the people of Palomares.

Release Time, 1735Z (1245EST)

DOD issued a new policy on publicity. Coordination was to be accomplished with the Embassy, but 16AF and CTF-65 were to handle questions concerning search and decontamination operations as routine public affair items. Dr. Langham, or his Spanish counterparts in the nuclear energy field, were to answer questions on technical matters but no statements were to be made on the quantities of materials being removed or its disposition. In Madrid the ambassador directed that an "information policy coordinating committee" was to be established, chaired by USIS, as the Embassy's Counselor for Public Affairs, and that JUSMG, 16AF, and possibly CTF-65 should be represented. He stated that:

In the future I would like any new press statements, after coordination, to emanate from an Embassy spokesman. Such statements, as well as those statements contained in the State/DOD message, can be routinely given newsmen by military information officers, both on the scene and at Torrejon Air Base.

Consideration of the AEC statement of 2 March could also be handled in the same manner, but that technical questions should be referred to the Embassy. In organizing such a committee Col. Foster's recommendations were closely adhered to with the exception of meeting in Madrid rather than the site of operations.

Ambassador Duke and Information Minister Fraga swam in the 59° water of the Mediterranean to prove that no danger existed from radiation. Sixty-three newsmen assembled on 8 March. A fiesta atmosphere prevailed, and several banners were displayed reading "Viva la Wilson," "Viva la Americano" and "Las Tropas de Wilson's Han Sido Correctas con Palomares." The following day, 28 reporters were taken on an LCU to tour the Navy area. They were permitted to photograph the pocket submarines, and were given a briefing by Admiral Guest on the sea search. Upon returning to shore they were given a detailed and comprehensive briefing by Gen Wilson followed by a visit to Site #3. Admiral Guest discussed the search area, depths of water, types of equipment and their capabilities. Reaction to this unfamiliar treatment was favorable.

RECOVERY ACTIVITIES:

On 15 March, at 1100Z, Alvin spotted what was considered to be the missing bomb. Efforts were made to keep the matter somewhat quiet until positive identification could be made. Ambassador Duke instructed that the matter be handled with the "utmost secrecy," and that any announcements would be made by a publicity committee of Spanish and Embassy representatives. However, such secrecy was not possible. Two days later the UPI filed a story from Frankfurt, Germany stating that "officials were virtually certain that the missing bomb had been located in the water, and that a parachute for the weapon had been recovered." The story seemed to have been written at the scene, but that was not the case. There had been a leak, someone had talked out of turn, or there was some very accurate guesses on the part of an observant reporter. Thus, the Embassy decided to hold a press conference and announce the big event, and the State Department was notified. The press corps members were told to be at the Embassy at 0100 hours 18 March but, 15 minutes before the time, word was received from the State Department that the meeting should be cancelled and no statement given out. Instead of the planned briefing a telegram from Secretary of State Dean Rusk was read to the reporters:

> There have been hopeful developments but I cannot give you further information at this time. If we have a positive identification and recovery, we will so inform you.

It took another day for an approved release to be received in Spain, and on the morning of 19 March, DOD/State Department directed that the "appropriate military spokesman" could make this statement:

With regard to the unidentified object and a parachute at a depth of some 2500 feet about 4 miles off the shore from Palomares, Rear Admiral William S. Guest, and Task Force Commander, has advised that because of the extremely steep slope of the sea bottom on which the object and parachute are resting, he proposed to attempt first to move them to a more favorable recovery area.

If successful, this course of action will lessen the risk of having the object fall from its present precarious position into much deeper water. When the object is positively identified, an appropriate announcement will be made.

JUSMG did not agree with sole military release, feeling that Embassy and military sources should be authorized joint release. Also, they felt that nothing more should be said until something actually was accomplished. The State Department and DOD agreed that periodic releases would be acceptable, but that full coordination between the Embassy and on-site commanders must be maintained. Both General Wilson and Admiral Guest agreed with this by recommending that the "next release be made when successful identification and recovery were fully completed. Release of the story on the object in the sea was made at 1200Z, 19 March, both at Palomares and at Madrid.

The sixth release did not concern the bomb itself, but was issued jointly on 24 March by Generals Wilson and Montel at the accident site to announce that the last barrels of contaminated soil had been removed from the beach:

The loading of these last barrels marks the completion of the soil removal portion of our search and recovery operation. Approximately 4900 barrels or around 110 tons of soil have been transported to the USNS Boyce for shipment to the United States. The Boyce will sail for the U.S. later today. I think we have achieved our goal of leaving the Palomares area in the same condition it was in prior to the accident. We will now gradually commence phasing down our camp. However, considerable support will be required for continuing operations by the Navy.

Now that the field of releases to the public seemed to be open, another, the seventh made in Spain, was issued on 25 March, but this time it was made only at Madrid, by the Embassy:

Admiral William S. Guest, Commander of Task Force 65, advises that operations for recovery of the object with attached parachute (previously located off the coast from Palomares, Spain), are proceeding satisfactorily. These operations must necessarily be accomplished slowly and cautiously due to the precarious position of the object on a steep submarine slope, and the great depth involved. At first weather conditions with high winds and choppy seas continued to periodically hamper current efforts. The limited endurance of the submersibles being employed and the necessity to recharge their batteries after each dive are primary factors which, with weather, control the tempo of our activities. Everything possible is being done to expedite recovery and identification of the object under these circumstances.

This release from Madrid caused considerable unhappiness in Palomares since agreed that all such items would be put out simultaneously in Madrid and Palomares. Wilson pointed out to General Donovan that fortunately, the release had been a minor one; the press at the scene would have been "highly indignant." He said for a reporter at the scene to utilize such a release it was necessary to drive about one-half hour to a phone and then gle with the long-distance communications system of Spain. He considered that the situation was "rough enough without antagonizing them further with advance releases in Madrid."

As noted earlier, there had been one serious leak to the press, and unfortunately there were more with the stability of the Wilson-Montel relations at the site becoming somewhat strained. It was considered that the curiosity of the reporters was only heightened by the policy of "no comment," as evidenced by the amount of coverage in the press of this accident/recovery operation. All during this time enterprising reporters had queried Spanish citizens and American airmen whenever possible, and frequently used them as their "informed sources," but the news leaks that began occurring became embarrassing particularly since they were fairly accurate. General Wilson told SAC and U.S. Air Force of the strained relationships and wrote that General Montel had:

> ... been embarrassed on several occasions when queried by Air Minister La Calle and Captain General Munoz-Grandes concerning articles appearing in the press. These officials are apparently learning more from press releases than from Montel and Donovan. Montel's recourse is to query me. I'm in a quandary as to information that should be passed to my GOS counterpart within security limitations and outguessing what might appear in the press within hours after dispatch of SITREPS (Situation Reports, Navy). Recent Stars and Stripes have carried articles containing practically all pertinent information concerning salvops (salvage operations) of the unidentified object .... In my opinion this situation could jeopardize the future military position in Spain.

Reference to Stars and Stripes, the unofficial military publication in Europe, was to comments made by General Wilson on 25 March to SAC and DOD concerning a story that appeared in both Stripes and the New York Herald Tribune, Paris edition, that had given such information as was known at 16AF. Not only did it distress him with regard to his relations with General Montel, it also gave an unwarranted sense of imminent recovery, which was completely false. In reply to this allegation, USCINCEUR said that Stripes had commercial wire services, either AP or UPI. As the executive agent for Stars and Stripes they had directed the editor, early in the recovery operations" ... to select the service reporting each new development with the most authoritative source and to quote source early in the story. The Embassy also told the State Department of this and said that they were sending an information officer to Palomares as a representative of the Ambassador and as coordinator for public affairs. At the scene, CTF-65 advised his task force personnel that they were to guard against open discussion over circuits where monitoring or listening might be taking place.

RECOVERY RELEASE PLANS:

Now that the bomb had been identified, and before it was lost again, and then found for the second time, several plans were devised on how to release the news. There were several factors to consider. Recovery might be a simple operation, with the bomb coming up gracefully from the sea bottom, intact, ready to be returned to its homeland. On the other hand there was the possibility that it was not intact, that pressures had damaged it, that low-order detonation had occurred, or something might happen that could endanger the whole recovery action. Also, this was a highly classified item - very few people had actually seen a nuclear bomb. But since recovery was not to be a simple operation there was adequate time to write and rewrite contingency plans and statements.

The first meeting of the "Public Information and Coordinating Committee" was held on 17 March, the day before the midnight press conference was held. Discussion was on release policy and drafting a statement prior to actual recovery. When the Embassy was notified that the bomb had been recovered, the Spanish would be informed and an announcement would be made to the American press. They would also be invited to a press conference in which technical details of the recovery activities would be given.

DOD and the State Department approved a release outlining facts of the rescue; that the bomb was intact, there was no radioactivity, and that the contaminated soil was on its way to the United States, and Camp Wilson was being phased down. Then, in another message they added some information concerning activities at the time the bomb would be raised. They felt that General Wilson and AEC representatives should be there when it was raised from the water. If it were intact, General Montel, or another Spanish official, would be invited to view it as well as, possibly, a member of the JEN. The press would be permitted to photograph it which would be a milestone in the history of nuclear bombs. General Wilson did not believe this action would be in the best interest of the recovery project since it would be necessary first, to monitor for radiation, and second, to perform necessary safety measures. Then, the Spanish could be invited to the viewing, and photographs suitable for the press could be taken.

The Embassy became involved in the planning and when Ambassador Duke's representative, William Bell, arrived at the scene the afternoon of 26 March, he brought an elaborate plan. The raising of the weapon was to be witnessed by General Munoz-Grandes and other Spanish officials who would accompany the ambassador to the scene. USIS had alerted the press that they should stay close to Madrid and apparently gave them the impression that photography of the recovery would be permitted. This was done without coordination with the on-site commander. In this apparent attempt to placate the press for past actions, safety factors were ignored along with the possibility that something might go wrong in the recovery activity.

This plan was discussed with General Wilson as to its weaknesses. Primarily there was no way of accurately predicting when the bomb would be lifted, also a dignitary such as Munoz-Grandes was not a person that could be kept waiting. The reason for the exhibition of the

recovery was to establish credibility, hence the on-scene commanders both felt [illegible] graphs of Spanish Government officials viewing the bomb was necessary, and would [illegible] cient, although for countering propaganda from Communist elements, press coverage [illegible] be desirable. They felt that "beyond doubt credibility" must be established particular[illegible] since the Soviets had expressed an interest in international verification of the recover[illegible] weapon, as had U.N. Secretary General U Thant. Participation by outside agencies was [illegible] desired. However, Ambassador Duke did ask that consideration be given to press view[illegible] and photography, perhaps by a "pool", which would then furnish coverage to all newsmen [illegible]

For a time it appeared as though no plan, regardless of acceptability, would be put into effect. The Navy sent a proposed release for coordination in the afternoon of 26 March;

> .... in a first attempt to recover the object with a parachute attached in the waters off Palomares, Spain, the lift line parted as a result of having been caught in, and cut by, the fluke of an anchor which was part of the recovery rig. The object and parachute are still in the same area but have moved from the position at which they were originally located, making the next recovery attempt even more difficult and lengthy.

Prior to this release the Sunday morning papers (ABC, Arriba, Ya), headlined this attempt [illegible] recovery. This rather outdated the Navy story but it was released anyway, after coordin[illegible]ation with the Ministry of Information, as the eighth release in Spain. When the Navy was [illegible]formed of this release, they were also informed that Mr. Bell could coordinate - in the [illegible]ame of the Embassy. The text could be released to Madrid at the same time it was given [illegible] General Montel. In Madrid, the Embassy and Torrejon would handle the release. [illegible]eral Wilson did not agree with all of this proposed policy change, and stated that rather [illegible] Mr. Bell giving the releases to Montel, he would do it himself, which was logical in [illegible] of the close Wilson-Montel cooperation that had been achieved. Also, it was believed [illegible] it was not necessary for the GOS to clear releases. They should be furnished the text [illegible] the release time prior to actual release.

[illegible] fact that the bomb was lost again as the result of this recovery attempt, and not found [illegible] 2 April for the second time, did not stop the planning process. General Wilson told [illegible] General Ryan of the unrealistic, theatre-like plan of the Embassy, and said that the [illegible] representatives were definitely restless as they had been alerted for imminent recov[illegible] the weapon and nothing was happening. He said that the alternative of the Embassy [illegible] the small photo pool, with one American, Spanish, and international photographer [illegible] coverage. Mr. Bell then conceived an idea known as Plan Able. In this plan the [illegible]ere to be alerted when recovery was imminent and told to be at Camp Wilson within [illegible]um of 10 hours.* They would then be taken by landing craft to the recovery ship [illegible]y) which would be placed into a position so that photographs could be taken.**

[illegible]mate driving time to the scene from Madrid.
[illegible]ntel and JEN representative were to be present with the weapon.

After the press returned to shore, either CTF-65 or Mr. Bell would issue the final announcement in both English and Spanish. Within 24-hours another trip would be made to the flagship for a chronological briefing by Admiral Guest on the entire recovery operation. General Wilson did not approve of this plan either and felt that Admiral Guest would agree with him. He realized that things could move much too swiftly to permit arrival of the newsmen and any other personnel considered vital to the Embassy plan. Mr. Bell said he stood their reasoning, but recommended adoption of the plan or a modification acceptable to the State Department and DOD, but General Wilson was still very much concerned with safety and security, having just gone through an arduous and tedious decontamination process.

The State Department and DOD agreed with General Wilson, but added that "the credibility of the whole operation and the closing off of further speculation by the press" was also required. They had given latitude to the Embassy and the on-site commanders in evolving and executing a plan to cope with the situation, such as the use of the photography pool, with the final briefing by Admiral Guest to be done as soon as possible to prevent further delays. However, if coverage by all media could be accomplished rather than the "pool" coverage, that would be preferable. From this the Embassy representative arrived at Plan Baker. It was different than Plan Able in that a pool would be utilized with members agreeing in advance to make the material available "uniformly and simultaneously to all other news organizations without payment of any kind." All pool members would be pictorial media, with one still, one TV, and one newsreel cameraman. The exposed film would be taken by aircraft to Torrejon, and there released. Non-pictorial reporters could not participate in this portion of the operation but would be free to report on the recovery at the same time the contingency statement was released at Palomares and Madrid.

Thus, Plan Able would let all the concerned media view the remains, while Plan Baker would permit only the designated three to photograph the object. The latter plan was considered as being unsuitable because of the possibility of antagonism so it was discarded. Therefore, the execution of Plan Able must be well coordinated in order to assure success. After the meeting in Madrid, General Wilson and Admiral Guest met in Palomares to agree upon a suitable plan to fulfill the needs of the press, and at the same time to provide credibility to satisfy the requirements for the DOD and State Department.

As a result of the Palomares meeting, it was decided that press members would be taken from the shore to the USS Albany, and from that vantage point the recovery ship would come alongside. This would permit photographing of the weapon and at the same time it could be inspected by General Montel and a JEN representative. While safing actions would be completed and identification marks covered prior to exhibiting the bomb, any disassembly for shipping would not be done until after the Spanish officials and press corps personnel had seen it. The Embassy concurred with this, asking only that sufficient time be given to permit the ambassador to arrive at the scene to be with the newsmen.

CONTINGENCY STATEMENTS:

The first contingency release relating that the lost bomb had been found and that the salvage operation was essentially complete, was prepared on 3 February in order that it could be released at the proper time. The draft was prepared under the assumption that the weapon would be recovered before decontamination accident investigation could be completed ashore.

Since that statement was not acceptable to the situation that later existed, i.e., the wreckage had been cleaned up, the contamination controlled, and the accident investigation completed, a new release was prepared in late March, after the weapon had been found, but before it was recovered. The Embassy sent the following to Washington for coordination:

> The fourth and final weapon from the January 17 crash near Palomares, Spain has been recovered today and will be transported directly to the United States. The casing was intact. The weapon was located on March 16 in 2,500 feet of water, approximately five miles off shore by the submersible Alvin. Photographs taken at that time tentatively identified the object as the missing weapon. The recovery of this weapon brings to a close the search phase of the operation. No release of radioactivity into the coastal waters has occurred. All wreckage fragments and associated aircraft material of interest to the accident investigation have now been located and recovered.

The Navy agreed but pointed out two corrections to be made. First, the weapon was located on 15 March, not 16 March; second it was located by units of Task Force 65 rather than by Alvin alone. The Embassy changed the one sentence to read:

> ... The weapon was located on March 15 in 2,500 feet of water, approximately five miles off shore by units of Task Force 65 ....

The statement was then approved as the final release on the bomb episode and given to the press at a conference the day after the bomb recovery as the ninth, and last, release.

THE FINAL ACT:

Both the contingency statement and the plan were utilized for publicity of the bomb recovery operation. The weapon was recovered at 0740Z, 7 April. According to one newspaper, they were told:

> The United States Embassy, Task Force 65 and the 16th Air Force are delighted to announce that the long-missing bomb was recovered safely this morning.

They were then informed that additional information would be available and that the bomb could be seen the following day.

The next day, 8 April, about 100 newsmen and photographers were ferried to the flagship (USS Albany), and were allowed to photograph the bomb. The submarine rescue ship, Petrel, slowly passed down the starboard side of the USS Albany, and then reversed course, coming within 35 yards of the flagship. The weapon was visible on decks where it lay on wooden chocks. After that Admiral Guest met with the press in a lounge of the USS Albany and gave a briefing on the recovery events. This was followed by a question-answer period, and the newsmen were then returned to shore. On the dock at Garrucha, Ambassador Duke gave a brief impromptu talk on the events.

This officially ended the bomb story from Palomares. A few days later a joint communique prepared by the State Department, DOD, and AEC was issued on guidance for publicity of nuclear weapons. Essentially, return to the former policy on these bombs was directed; nothing could be said about them, and no more pictures could be taken by the public. As far as the Palomares bomb was concerned, all that could be said was that "the weapon upon return to the United States will be delivered to a facility of the Atomic Energy Commission."

PHOTOGRAPHY:

Photography at the site by reporters was not permitted unless the person was accompanied by a military escort, and then only if they had Spanish press credentials. Some newsmen did utilize long focal length lens but generally photographs taken in this manner were not of good quality due to the high winds and dust in the area. Both the Guardia Civil and the Air Police enforced these rules.

By the end of January permission was requested for blanket approval to release unclassified photographs of the clean-up and Navy operations, following coordination with the Embassy, JUSMG, and the Spanish. It was also suggested that unclassified motion picture footage, being accomplished by U.S. Air Force photographers, be cleared for television use in the United States and copies of that material then released for submission to Spanish television through the GOS. At the same time the Navy was asked to furnish unclassified photographs for clearance, and a week later Admiral Guest told General Wilson that approval had been given for him to furnish them. On 12 February, DOD approved release of unclassifed pictures with the same policies as set down for news items; clearance with JUSMG, Embassy, and the GOS. This policy, in general, was that sound judgment was to be used to eliminate possible controversial subjects. Such things as protective clothing, radiation detectors, or anything that suggested a potential hazard could not be used.

On 12 February, photographs were given to JUSMG and the Embassy for clearance, and the Embassy passed them along to the Spanish. On 16 February, the GOS released the 14 pictures to two news agencies, EFE and CIFRA, without giving them to American or other agencies. USIS and JUSMG asked that copies be made available for others, and the 16AF provided them. The Embassy then discussed the situation of what appeared to be preferential treatment of the Spanish press and the decision was made at GOS-Embassy level that in the future all photo releases would be made by the Embassy, after approval by the Spanish. The 14 pictures given out at that time were:

1. General Wilson addressing the people of Palomares;
2. Submersible Alvin close-up with cables attached;
3. Alvin in well of LSD, cables attached;
4. Alvin in open end of LSD, man sitting on conning tower;
5. Aluminaut in open well of LSD;
6. Aluminaut under tow, ship in background;
7. Deep Jeep on ship, clear of deck, several sailors surrounding vehicle;
8. Deep Jeep on deck, several sailors in picture.
9. Deep Jeep being hoisted from water;
10. Frog man jumping into water from rail of vessel;
11. Frog man with air cylinders in rubber boat with other sailors;
12. Deep Jeep in water, frog man attaching line;
13. Tug hoisting large wing section from water;
14. Wing section in landing craft, salvage yard in background.

Pictures were released from Madrid since the major wire services all had bureaus in Madrid, and there were no facilities for transmission of photographs from the accident scene.* The photographs were reproduced at the base photo laboratory at Torrejon; for those chosen at the site (and then sent to Madrid for coordination) the Navy usually reproduced the cut-lines.

The next set of photographs was sent to USIS for transmittal to the Spanish on 21 February. Of the ten submitted, six were cleared, both by GOS and the Embassy, and were given out on 23 February:

1. Staff at the site: Maj Gen Wilson, Gen Montel, Rear Admiral Guest, and Colonel Alfaro (Commander, San Javier Base);
2. Mr. Jon M. Lindbergh leaving the Perry Submarine (PC-3B) after a dive;
3. Hoisting the PC-3B after a dive;
4. Hooking the PC-3B in preparation to hoisting;
5. Spanish and Americans working together to sort wreckage;
6. U.S. Navy landing craft pushing a lighter filled with aircraft wreckage.

The uncoordinated photographs showed military pay day with a pay-line in a tent, and shots of personnel at a party given by the airmen for local children.

In addition, the U.S. Navy issued photos of their operations, including pictures of various vessels on the scene, the submersibles being used, and activities of the divers. These

* When DOD gave permission to release photos, they said: "16th AF is authorized to release to the press unclassified photography which depicts Navy and Air Force operations at Palomares." This sentence can be interpreted two ways: (1) "to release ... at Palomares," or "depicts ... operations at Palomares." The 16AF interpreted it in the first manner and thus queried DOD asking permission to release at both Madrid and the site. SAC said that the manner of release could be determined locally providing all clearances were effected.

were cleared through the same channels as the U.S. Air Force photographs. On 24 February, thirteen were given clearance and all were released except one. Then, when the shift in release policy occurred in early March, DOD said that photograph release was authorized if the Embassy was kept informed and had no objections. In line with that, the Embassy told the site that the barrel operation could be photographed except for the filling of the barrels at Site #2, where exposure to radiation might occur. Thus, the arrival and departure of the drums could be photographed.

Permission to photograph the bomb after recovery, a completely unprecedented action, was given on 26 March. As described earlier, press representatives photographed it freely, and one underwater picture was released as well as one taken shortly after its recovery which showed the parachute still attached, with Spanish and American officials inspecting it.

HANDLING OF NEWS PERSONNEL

As may be realized from the discussion of the release problem, the main thing that information officers had to do was to be able to repeatedly say "no comment" without showing irritation. Then it was not a matter of just keeping reporters away from the hot spots, it was also necessary to just simply keep them away from where most of the activity was occurring, the decontamination sites and the naval operation. As mentioned earlier, it was not until nearly 2 months after the accident that they were really taken into the camp and Navy area, and not until 29 March was a group taken in a helicopter to view the scene. External security of the area was essentially the responsibility of the Guardia Civil, and at times tempers of the newsmen grew short. On 9 February, immediately after the British stories, written in a most flagrant scare theme, appeared in the press releases, the Guardia increased their area in which an escort was required, and the information officer at the site reported that:

> Guardia has also widened the area in which escort is required. Newsmen must now have a military escort anywhere in the crash area, decontamination area, town of Palomares, and the military encampment. This will probably reduce the information newsmen can gather, and may result in more fabrications.

He also said that British reporters had been "particularly abusive" in response to the "no comment" answer to questions, and had made comments on "information released by high officials in the British Ministry of Defense" when refused permission to talk to General Wilson. On the following day seven English newsmen were denied entry because they did not have permits from the Ministry of Information, and were told that it would take up to two weeks to obtain them. The Commander, Guardia Civil, said that their instructions were not to admit people who did not have permits, and while such a paper had been required for more than a week it had only been within the last few days that it had been asked for by the Guardia. All of the restrictions did not always apply to all newsmen, and thus appeared to be retaliation actions against sensational stories. This ban continued for several days, being reported through 16 February.

An indication of the media treatment of the accident and subsequent search activities can be gathered from some of the headlines which introduced news articles. Examples are:

20 Jan 66	U.S. ADMITS DOWNED B-52 HAD A-DEVICE
21 Jan 66	"SAFE" A-BOMB MISSING IN SPAIN PLANE CRASH
22 Jan 66	CONTAMINATION REPORTED AT AIR CRASH IN SPAIN
24 Jan 66	SONAR FIND SPURS HUNT FOR A-BOMB IN SEA OFF SPAIN
24 Jan 66	SILENCE VEILS A-CRASH FINDS
24 Jan 66	BOMBER CRASH STIRS RADIOACTIVITY SCARE
25 Jan 66	SPANISH FEAR A-BOMBER CRASH MAY HAVE DAMAGED CROPS
25 Jan 66	SPANISH FARMERS SUFFER
28 Jan 66	SUBS REPORTED GOING TO A-HUNT SITE
29 Jan 66	SPAIN BARS ATOM FLIGHTS AS U.S. HUNTS BOMB
30 Jan 66	A-BOMB LOSS WILL PERIL RIGHT TO OTHER BASES
31 Jan 66	SECRECY SHROUDS URGENT HUNT FOR MISSING A-WEAPON
5 Feb 66	MADRID POLICE DISPERSE MOB AT U.S. EMBASSY
7 Feb 66	STILL LOOKING
8 Feb 66	U.S. DENIES "THUNDERBALL" REPORT (RANSOM FOR STOLEN BOMB?) 007 IN BOMB HUNT? U.S. REPLY: O, O, NO!
9 Feb 66	CHARGES NEAR CATASTROPHE FROM U.S. BOMB SOVIETS SAY "NUCLEAR VOLCANO" IN SEA OFF SPAIN
19 Feb 66	SOVIET ASKS WORLD CHECK ON U.S. H-BOMB OFF SPAIN
20 Feb 66	PALOMARES LEARNS TO LOVE THE BOMB
25 Feb 66	U.S. FACES UNENDING CLEANUP TASK
27 Feb 66	FORTY DAYS AND STILL NO BOMB; U.S. LEADERS SILENT
27 Feb 66	U.S. MAY NEVER FIND LOST BOMB
27 Feb 66	U.S. REPLY TO MOSCOW CHARGES PROPAGANDA
3 Mar 66	SPAIN KEPT LOST BOMB SECRET
3 Mar 66	AIR CRASH SCATTERED RADIOACTIVE FUEL
3 Mar 66	ENVOY TO SPAIN WILL SWIM NEAR SITE
3 Mar 66	DEADLY CLEAN-UP TASK IN 2 AREAS
3 Mar 66	U.S. ADMITS LOSS OF NUCLEAR BOMB
Unknown	SUN OF DEATH NEARLY SETS COAST ABLAZE
13 Mar 66	A-GOOF EVIDENCE FACES BURIAL IN S.C.
18 Mar 66	MISSING BOMB IS LOCATED
27 Mar 66	H-BOMB RECOVERY IS SNAGGED AGAIN
7 Apr 66	H-BOMB IS RECOVERED
13 Apr 66	PALOMARES SNAG: SETTLING CLAIMS

ANNIVERSARY ACTIVITY

As the first anniversary of the accident approached, there was recognition that press interest would be revived. Contingency guidance for press interviews was prepared and issued to interested U.S. agencies. The format was generally one of question and answer. Subjects which were recognized as being of continuing interest were covered. Among these were: claims, radiation exposure tests, crop conditions and tourist activities.

During the second anniversary, the BBC television became interested. The coverage included the role of the U.S. Embassy, claims, radiation exposure and United States and Spanish relations.

Near the fifth anniversary, Helsinki's ILTA SANOMAT published a very damaging article, the gist of which was that the rich United States had left poor Palomares in a continuing tragedy. The article described Palomares as the third victim of the atomic age, after Hiroshima and Nagasaki.

The Embassy in Madrid requested that a CBS correspondent then in Madrid and who had also been in Palomares in 1966 covering the accident, make a then-now comparison of conditions. His survey denied in every case the inferences and allegations of the ILTA SANOMAT story.

SECTION 7

SUBSEQUENT BIOMEDICAL AND ENVIRONMENTAL FACTORS

The fact that Junta de Energia Nuclear (JEN) personnel were present and worked with U.S. personnel during the clean-up operation was covered in Section II. The first bio-assay samples of Palomares residents were taken a few days after the accident. No unreasonable levels were encountered.

It is reasonable here to include portions of Dr. Wright Langham's progress report on the JEN's activities written on the occasion of his last visit to Spain in November 1971. It contains the most up-to-date summary of the follow-up program:

> An agreement between the U.S. and Spanish Atomic Energy Commission set up a four-point follow-up program to the Palomares incident. The program was to be strictly under the direction of the Junta de Energia Nuclear's Division de Medicine y Proteccion (Dr. Eduardo Ramos) with equipment, technical help, and operational support from the U.S. Atomic Energy Commission. The four-point program was as follows:
>
> (1) Collection of information on uptake and retention of plutonium and uranium by representative numbers of a population group potentially exposed to inhalation of a plutonium oxide aerosol.
>
> (2) Measurement of temporal and seasonal fluctuations in plutonium air concentrations above a plutonium oxide-contaminated agricultural area that has been subjected to the agreed upon decontamination procedures.
>
> (3) Serial measurements of contamination levels (both by plant uptake from the soil and wind dispersal) of agricultural products produced in a contaminated area subsequent to decontamination.
>
> (4) Studies of the temporal migration and redistribution of plutonium oxide in soil, decontaminated by deep plowing, as a result of continued cultivation and weathering.
>
> Technical assistance, approximately $250,000 in equipment (including whole-body and lung counter), and annual operating funds to the extent of about $25,000 per year, have been provided by the U.S. Atomic Energy Commission to support the effort.
>
> Six or so unclassified papers have been prepared addressing the Palomares incident. These are largely general in scope and difficult to find. Records show the following articles:

(1) William D. Moss: Report on Bio-assay Laboratory in Madrid, Spain, Los Alamos Scientific Laboratory Report H5MR66-1 (September 1966).

(2) Eduardo Ramos Rodriguez: Palomares Two Years After, presentation at some European conference, publication not known.

(3) Emelio Iranzo: First Results from the Programme of Action following the Palomares Accident, Symposium on Radiological Protection of the Public in a Nuclear Disaster (IRPA), Interlaken, Switzerland (June 1968).

(4) E. Iranzo and E. Ramos: Measures to Determine the Risk to which a Population can be Subjected as a Result of a Nuclear Accident Generating Radioactive Aerosols: Environmental Contamination by Radioactive Materials, International Atomic Energy Agency, Vienna, Austria (1969).

(5) C. Alvarez-Ramis and Gregorides de los Santos: Contamination de Gasteropodes Terresteres Habitat un Biotope a bas Niveau de Contamination Alpha Due Plutonium et a l'Uranium, Actes du Symposium International de Radio-ecologie, Centre d'Etudes Nucleaires de Cadarache du 8 au 12 (September 1969).

(6) Emelio Iranzo and Sinesio Salvador: Inhalation Risks to People Living near a Contaminated Area, Second International Congress of the International Radiation Protection Association, Brighton, England (May 1970); not published.

All primary data collected to date relevant to the four-point program was available in Madrid. Under point one, 100 of the most likely exposed residents of Palomares were taken to Madrid and counted in the lung counter. The lower limit of detection of the counter was approximately 40 nCi. No positive counts were observed in any of the 100 individuals. The counter was modified by the Spanish to give a minimum detectable limit of about 16 nCi, and a few of the most likely exposed individuals were recounted. Even with the improved sensitivity, no positive counts were observed. Urine samples (24-hour) were collected from the same 100 individuals. Seventy-one percent of the subjects showed no indication of plutonium in the urine. The others showed urine values of less than 0.1 to 0.2 disintegrations per minute per 24-hour sample -- not statistically significant. It is my understanding that no further measurements have been made on the Palomares residents.

Point two of the agreement (measurement of air concentrations) was initiated with installation of four continuous air-monitoring stations and two meteorological stations strategically located with respect to the contaminated area. One of the air-monitoring and meteorological stations was located in the center of the village. Continuous air monitoring at all four stations were continued for approximately 2 years. Daily samples were counted for gross alpha activity, and 10-day samples were pooled and analyzed for plutonium using chemical separation and alpha

spectrometry. Uranium-234 and uranium-235 were detected in the air samples taken in 1967. These results were reported in the paper by Iranzo and Salvador (paper No. 6 in the previous listing) at the Brighton International Congress.

Positive air samples were obtained occasionally at all stations, with the highest values coinciding with periods of high wind velocity (above 35 km/hour). Mean plutonium values in the village for 1966 and 1967 were 0.38×10^{-15} and 0.09×10^{-15} $\mu Ci/cm^3$, respectively. Only the air sampling station in the center of the village (station P) and the one in the irrigated fields to the east (station 3-2) are currently in operation. The others have been discontinued and salvaged to obtain parts to keep the other two in operation. Judging from sound, they are about ready to go also. In my opinion, it is unfortunate that station 2-2, strategically located to sample wind pickup from the untreated hillsides, has been discontinued.

With regard to point three of the agreement (plutonium in vegetation), periodic sampling has been conducted. Reported measurements to date are in terms of gross alpha activity. They now have alpha spectrometry data on most of the vegetation samples. The Palomares area is perhaps one of the highest natural alpha background areas in Spain. The number of samples to be processed is large, and the Spanish were given only one alpha spectrometer which has given poor service. Counting times for spectral measurements are long, and air samples alone have been taking most of the available instrument time. Alpha spectrometry analysis of all samples (air, vegetation, ans soil) will be required before the actual plutonium contamination can be established. The gross alpha and plutonium measurements of vegetation are characterized by great variability from area-to-area and from sample-to-sample within the same area. Undoubtedly, this variability is a manifestation of the difficulty of representative sampling and the nonuniform particulate nature of the environmental contamination. Contamination of vegetation appears to be almost entirely surface-deposited. Leaves and stalks run higher than the plant fruit. This is especially true for tomatoes. In general, natural vegetation runs much higher than cropped vegetation. Natural vegetation is usually confined to the hillsides, where plowing under of the plutonium was not practical and many of the plants are perennials. In 1969 and 1970, esparto grass (near impact point No. 2, area 2-1) ran 9063 and 10,314 pCi of plutonium/kg wet weight, respectively. Esparto is a tough perennial that grows from a crown of dead growth from past seasons. The crown appears to be an excellent filter for trapping moving particles. Artemisa from the same area ran 3861 pCi/kg. In 1969 alfalfa from area 5-2 ran 41 $\mu Ci/kg$. Vegetation from the western side of the village usually runs higher than the same vegetation from areas in and east of the village. When alpha spectrometry data are complete, a summary of the vegetation analyses may show some interesting correlations with the levels and methods of cleanup. The article by Alvarez-Ramos and Santos (No. 5 of the previous list) gives considerable data on gross alpha activity of vegetation in the Palomares area during 1967 and 1968. Work has been done on gross alpha activity of snails, etc.

(gasteropodes) from the area. Activities were very low. Fish samples from Garrucha, a fishing village near Palomares, showed no measurable activity.

The soil studies program (point four of the agreement) is a slow, arduous task fraught with many difficulties, the greatest being the representative sampling problems. Analytical variations among samples are quite high. Six sampling plots, strategically located through the contaminated area, were laid out by Dr. Eric Fowler of Los Alamos. These are sampled annually in depth increments of 0-5, 5-15, 15-25, 25-35, and 35-45 cm. Surface samples are taken at several points in each plot. The vegetation samples are taken also from or near these plots. So far, the soil analyses are as gross alpha activity per gram. Alpha spectrometry analysis of the samples is just beginning.

In general, the relative depth distribution of activity is about as one would expect from the plowing operation. It is doubtful that one will see any significant redistribution with time because of inherent large statistical variations and low rainfall. One time variation that concerns the investigators has been noticed. The surface layer of the plowed areas near the hillsides that could not be plowed is increasing in activity with time. This is interpreted as resulting from movement and redeposition of plutonium from the hillsides and shows that plutonium deposited on the surface is indeed moving with the winds.

Manuscript material and tabulated data are in various stages of preparation for publication as a special issue of the Junta de Energia Nucleaire's Journal, Energia Nuclear, an impressive, slick-paper bimonthly publication. The articles will cover the following subject matter: (a) bomb physics and phenomenology (Pasqual); (b) general description of the accident (Ramos); (c) physiology and toxicology of plutonium (Ramos); (d) plutonium in soils (Iranzo); (e) plutonium in vegetation (Iranzo); (f) plutonium in air (Iranzo); and (g) summary. They are hoping for publication of the special issue by mid-1972. However, they do not work fast, and their very limited staff seems overcommitted because of pressures of other problems. Dr. Iranzo particularly seemed disturbed about rushing publication when much of the desired alpha spectrometry data are incomplete but believes they should go ahead as fast as possible with publication.

Some of their equipment is now obsolete and their facilities still poor by U.S. standards. The equipment we gave them is now 6 years old. It has not been updated, improved, or added to.

Enthusiasm for the work did not seem as high as it once was. This could be a result of their having to turn their attention during the last year to a fission-product release into a major river used for irrigation of vegetable crops for the Madrid market. It could be also that we have not maintained the interest and attention in the Palomares program manifested originally. Limited foreign travel funds prevented return for 6 years.

They are understaffed technically and depend a lot on use of graduate students supported by the $25,000 per year operational support from the U.S. Atomic Energy Commission.

Current concern in this country over plutonium environmental contamination from the breeder reactor developmental program and from projected uses of plutonium-238 might justify considering revitalization of the Palomares program. One might consider the following actions:

(1) Encourage them to get on with publication of their observations to date.

(2) Increase operational support to provide more technical staff.

(3) Update their equipment and certainly provide at least one additional alpha spectrometer.

(4) Reevaluate their approaches to the four points of the agreement and modify them as indicated by the past 6 years of experience and the accumulated data.

(5) Consider the advisability of providing them with a new lung counter to recount a number of the 100 Palomares residents examined the first year after the accident. Counters are now possible with a minimum detectable limit of 4±4 nCi of plutonium; their sensitivity to americium-241 is 100 times greater. Results on people who have lived in a contaminated area for 6 years after an accident might be of value even if all negative -- as I am relatively certain they would be.

(6) Manifest more interest in their work through more review of their efforts.

In a recent visit (April 1973), Dr. Emelio Iranzo of the JEN indicated an interest in revitalizing the Palomares studies. In general, he is in agreement with the recommendations made by Dr. Langham in his trip report. One exception might be the inadvisability of a new lung counter. It is doubtful that such an installation would represent an efficient investment over their present equipment.

Unless the political implications of a continuing radiation monitoring program at Palomares are overriding, a program such as Dr. Langham and Dr. Iranzo propose should probably be supported. Palomares is one of the few locations in the world that offers an on-going environmental laboratory, probably the only one offering a look at an agricultural area.

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SECTION 8

EPILOGUE

THE DESALINATION PLANT:

In the latter stages of 1966 consideration was given to some means of recognizing the people of Palomares for "the help given ...., in some cases at considerable personal risk, in the initial rescue of survivors from aircraft crews, of their cooperation in subsequent clean-up operations and in prolonged and anguished search for the missing bomb, and finally, of the traumatic disturbance to their daily existence represented by the accident." By December 1966, a suggestion that the United States offer the people of the Palomares area a desalination plant to treat the area's plentiful but saline ground water had received some support in Washington. An effort was made to obtain approval for the project prior to the first anniversary of the accident. Such an action would have blunted the "bad press" which U.S. and Spanish authorities were expecting.

By June 1967 some opposition to the plant was apparent within U.S. agencies. This opposition was verbalized by suggesting that desalination plant would be the subject of adverse propaganda, implying that the accident contamination had affected the local water supply and that the water now required some treatment. A counter-proposal of a school/community center was suggested.

Preliminary to an October 1967 meeting with the U.S. Secretary of State in New York City, the Spanish Foreign Minister, Fernando Maria Castrella, made it known that the Spanish knew of the gift project and that they would prefer the desalination plant. At the same time he scoffed at the adverse propaganda issue.

Several analyses to define parameters of a desalination plant were undertaken. However, by January 1968, we find that another negative aspect appeared. The argument was that the Palomares ground water had been getting more saline (seepage from the sea) each year, and was already beyond being satisfactory for agriculture. As the area depended upon agriculture for its existence, and as a desalination plant of the capacity being suggested could not support agriculture, there was a feeling that we would be building a "monument to our own lack of foresight."

In March 1968, the U.S. Embassy officially advised the Spanish Government that the United States would support a desalination plant in the Palomares area to the extent of $150,000. Spanish review of the proposal concluded that the unit cost of the water thus provided would be too high. At the same time the Spanish recognized their responsibility to the area and countered with a proposal to enter into a larger scale, joint desalination project which would provide lower unit costs and supply more villages in the area. By this time a decision had been reached to use sea rather than well water as a source for the plant.

In June 1968, a formal note was presented to the Spanish Minister of Foreign Affairs by the U.S. Charge d' Affaires of the Madrid Embassy. It recognized the project as a joint U.S./ Spanish effort with the previously mentioned U.S. support of $150,000. The U.S. funds would be applied toward the plant itself, while the Spanish would be responsible for land acquisition, storage, conduction and distribution systems. The plant contract was let to a U.S. firm (Aqua-Chem, Inc.) and amounted to $427,272. In addition to the Spanish share of this plant cost ($277,272), the GOS also supported the distribution system (one estimate is $500,000, or slightly lower).

The completion date was originally slated for late 1971. A number of problems were encountered (low water volume from beach wells, higher than normal alkalinity of well water, etc.). These problems caused delays. The 30-day acceptance test was completed in February 1973. Discrepancies resulting from the test had been corrected and a short test of 5-10 days is scheduled. At this time, Palomares is the only village to which the distribution system (a Spanish project) has been completed.

CONCLUSION:

What is Palomares? To the Spanish people who live there, it is their home and it provides their livelihood. To them, it is no different than Atlanta or Portland or Washington, D.C. - it is home. It is a home that many thought they had lost on a clear winter day when it rained fire, and metal and Radioactividad. To the Government of Spain, it is now a familiar village in a part of Spain with a considerable potential for attraction of tourists, a growing industry in Spain. To the U.S. government, it remains as the site of a tragic and embarrassing accident which held the attention of the world for a few long months in 1966. To hundreds of men of the U.S. Armed Forces civilian members of the atomic community, and contractors and consultants, Palomares is a remembered portion of their lives. To some, it is long hours spent stooping over fields and rocky hills with an alpha counter. To others, it represents that catch of time that the city boy-aircraft technician spent as a farm worker, a reaper of wheat, a tomato picker. To still others, it is long hours at the wheel, holding a ship in an exact location in howling winds that fought against their efforts. It is working at the limits of human and machine endurance 2,500 feet below the surface of the sea in precipitous underwater canyons, eyes ever-straining for the sight of that needle in the haystack.

But what was Palomares? What did we learn there? We learned something of the scope of decontamination operations after a nuclear weapon accident - the man hours, the materials and their deficiencies, the knowns and the unknowns. We learned a great deal about deep water salvage, about finding that needle in the haystack. We learned some more about people - about their needs and their capabilities. We discovered some of the difficulties of a large scale claims operation. We saw the smiles and undeserved gratitude of people who had been treated fairly, and we saw the diplomatic and propaganda impact of those who felt that they were treated unfairly. We learned that a common need of all men; the atomic scientist from Los Alamos, the General from SAC, or the farmer from Palomares - yes, even a news reporter; is to understand the unknown, and exactly what that unknown means to him as an individual.

This document begins with a dedication to Dr. Wright Langham. It seems fitting that it should end in his own words. They are taken from a trip report of his last trip to Palomares.

I cannot resist one more casual comment. Tourism has become Spain's largest industry. Last year they had 25 million tourists, while the total population of Spain is only about 35 million. During the 1966 negotiations with high Spanish officials, their great concern was that the nuclear weapon accident and residual plutonium would interfere with promotion of tourism in this region of the Costa Blanca -- as was occurring throughout the Costa Brava and Costa del Sol. The latter regions of the Spanish Mediterranean coast now look like Miami Beach crowded with high-rise apartments and luxury tourist hotels. The idea that the bleak, isolated region around Palomares and Mojacar would ever be developed for tourism seemed so incongruous at the time that it was my opinion they were using the issue only for bargaining purposes.

During the return visit to Palomares, I stayed in the government-owned Parador Motor Hotel (only 12 miles from where the bombs fell) with dining room, bar, and rooms with a balcony and picture windows overlooking the Mediterranean. Only 5 miles from the Parador in Mojacar (a glistening white Moorish village on a mountain top, steeped in history back to 2000 B.C. and the birth place of Walt Disney) is a fabulous luxury hotel designed by a Madrid architect. The architect, Roberto Puig, saw from the window of his apartment in Mojacar the explosion that released the bombs over Palomares. He claimed to have rushed to Palomares and sustained a radiation burn to his knee while inspecting one of the bombs in its crater. He became very concerned that he had been contaminated by plutonium and injured by radiation. The JEN Division de Medicine y Proteccion, after much counciling and examination, was able to allay his fears, and he completed his designs of the Hotel Mojacar. Perhaps someday Roberto Puig, his fabulous hotel, and the nuclear weapons accident over Palomares will become just another of the many legends to tell visitors to the ancient and spectacular village of Mojacar on the Costa Blanca.

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