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TECHNICAL REPORT

Cleanup of Johnston Atoll missile launch facility

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Johnston Atoll, a remote test site in the Pacific Ocean, was used in 1958 and 1962 to launch missiles to test high-altitude nuclear detonations. In July 1962, when a missile failed to lift off from the launch pad, a nuclear test device was intentionally detonated to prevent any nuclear yield. Although the launch facility suffered only minor damage, it was contaminated with plutonium from the test device. A cleanup operation was immediately conducted, but much of the contamination could not be removed. Instead it was fixed in place by paint, asphalt, concrete, and clean soil. Within 3 months of the launch failure, the facility was again in operation under strict radiological control. No nuclear tests were conducted from the site after 1962, but Launch Emplacement Site 1 was used for missile launches until it was decommissioned in 1977.

In 1980, a long-range program was developed to remove the contaminated material from the test site. In 1984, funds became available to transport the contaminated material to a Federal radioactive-waste

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disposal site. The waste disposal project involved the dismantling of structures remaining on the site, decontaminating several concrete pads, determining the level of contamination on the debris, preparing and packaging the debris for shipment, and transporting the contaminated material to an authorized waste disposal site. Because the operation involved sea and land transport of a large volume of plutonium-contaminated material, it had the potential of becoming controversial. However, in-depth planning and extensive coordination with appropriate agencies enabled the operation to proceed without incident. This report addresses the planning process, cleanup options considered, instrumentation and measurement techniques, and personnel radiation safety practices. Included are a brief background of the situation, a summary of the planning phase and regulatory guidelines, detailed description of the operation, and discussion of some of the unique circumstances and relevant problems encountered during this project.

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BACKGROUND

Johnston Atoll is a small group of four islands about 800 miles southwest of Hawaii (Figure 1). The main island, Johnston Island (Figure 2), is about 2 miles long and 0.75 miles wide. The other three islands are smaller and are used mainly as wildlife refuge areas. The atoll has been under United States military control since the early 1930's and is currently administered by the Defense Nuclear Agency (DNA) of the Department of Defense. In 1962, during the testing of high-altitude nuclear detonations, a missile failed at lift-off. To prevent any nuclear yield, the test device was command-detonated, resulting in plutonium contamination of the launch site. Although no nuclear tests were conducted after 1962, the facility was operated under strict radiological controls until decommissioned in 1977.

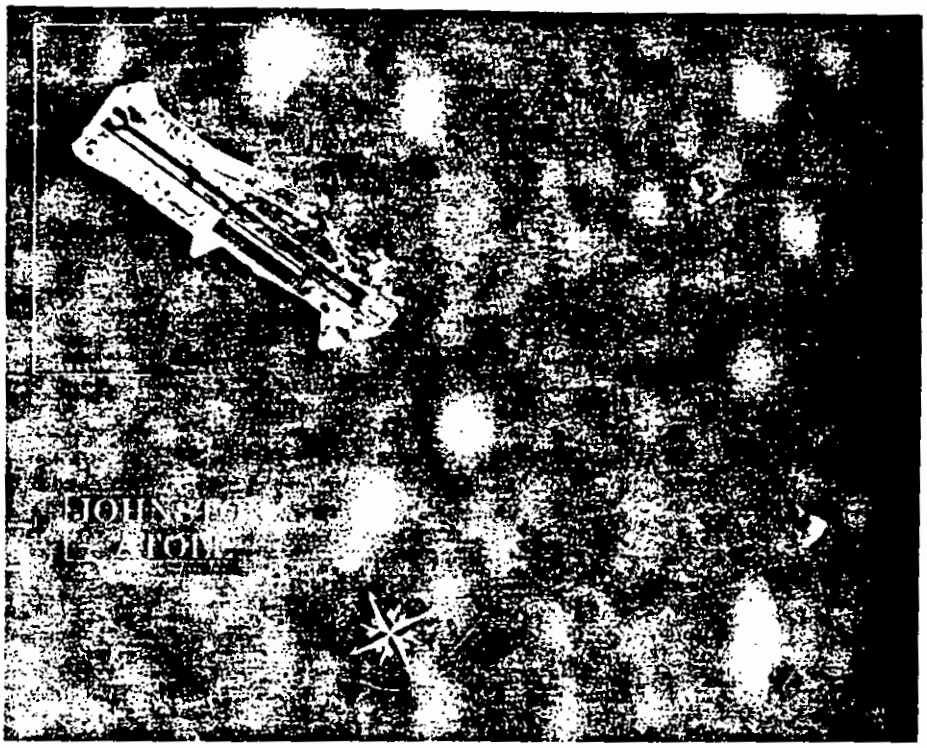

Figure 1. Islands of Johnston Atoll

When the launch facility was deactivated, almost all the missile components were decontaminated and removed from the site. However, the remaining structures could not be decontaminated economically. Included in these structures were the launch erector base, missile shelter building, two large steel revetments, fuel tank, liquid oxygen tank, and the launch pad itself (Figure 3). The launch pad was approximately 138 feet long by 25 feet wide and up to 1 foot thick in some sections. Partially covering the launch pad was the missile shelter building, which was a barnlike structure resting on steel wheels guided by typical railroad tracks. The building consisted of a steel frame covered by honeycomb panels of metal sheet and cardboard spacers. Before a missile was launched, the shelter was driven back about 100 yards; the missile was then raised to the vertical position and fired.

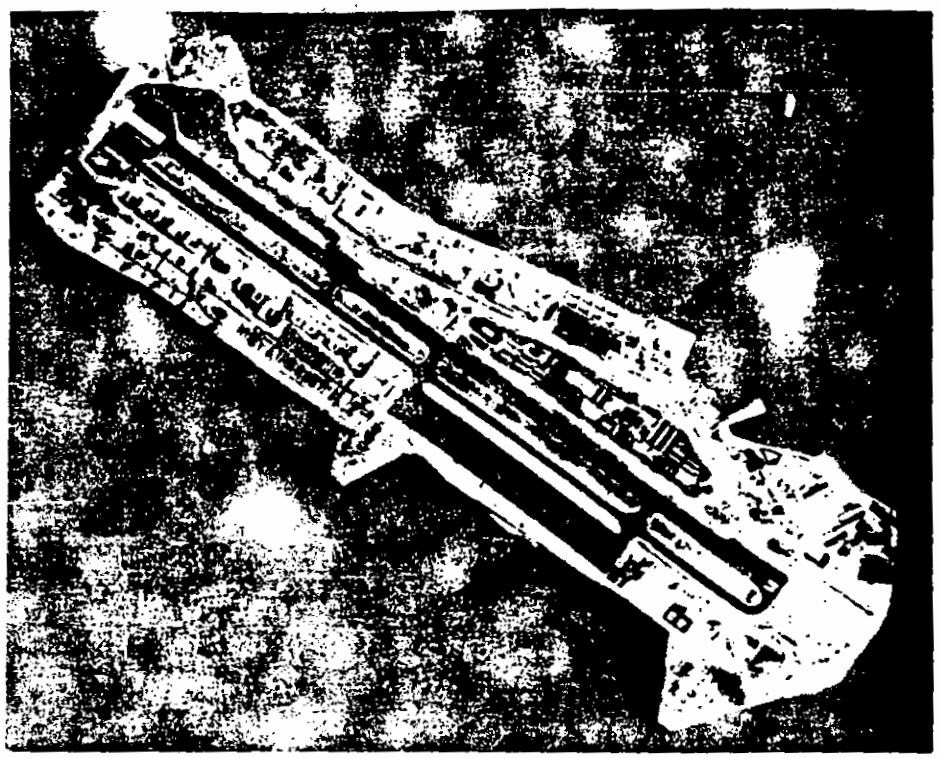

Figure 2. Johnston Island, main island of Johnston Atoll

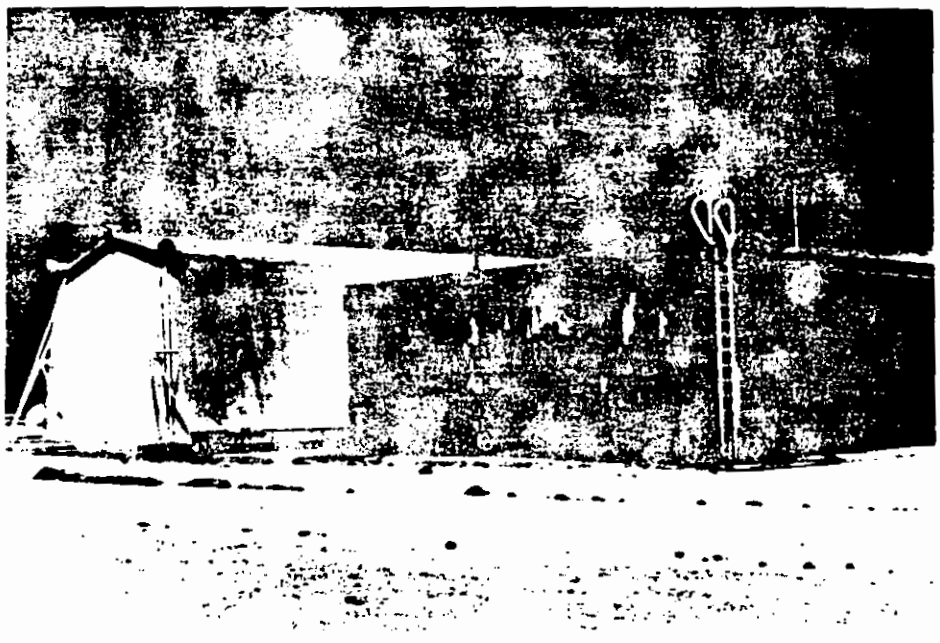

Figure 3. Missile shelter building (background) and steel blast revetments (foreground)

On either side of the moveable missile shelter were revetments constructed of steel piling and thick steel roof plate covered with asphaltic material. The interior and exterior walls were about 4 feet apart, and the space between was filled with aggregate coral. These revetments stored control and diagnostic missile equipment and protected vehicular trailers (which also stored missile equipment) from the blast and heat of the missile launches. Situated near the revetments about 5 feet below grade were the large fuel tank and liquid oxygen tank (Figure 4). The tanks were mounted on concrete pads surrounded by embankments constructed of loose gunite concrete. Also on the site were four 28,000-gallon water tanks (installed after the launch failure); several small concrete pads; and arrays of cable trenches, conduits, metal piping, and electrical cables.

Figure 4. Below-grade liquid oxygen tanks and 28,000-gallon water tanks

During the years the facility remained in use, missile launches and the harsh ocean atmosphere chipped and degraded the paint used to fix the contamination in place. In addition to routine maintenance of the facility, radiological safety procedures required frequent collection of the paint chips and repainting of the surfaces to ensure that the contamination remained fixed. When the site was decommissioned and the majority of missile components were removed, general maintenance at the site was discontinued, necessitating an increase in the radiological maintenance of the facility.

By 1980, there had been significant deterioration of the metal structures at the launch site. Concerns were raised that a strong typhoon might destroy the facility and redistribute the contamination to uncontrolled areas. To protect against further damage from severe weather conditions, the two large steel revetments were dismantled and placed inside the moveable missile shelter (Figure 5). At that time, a comprehensive radiologic survey was completed to determine the extent of contamination. Most of the contamination was fixed to the steel revetments, the doors of the moveable shelter building, and the launch pad. It consisted mainly of plutonium isotopes and an americium impurity (americium-241) typically present with plutonium. The americium-241 impurity is a daughter product of plutonium-241, which decays with a 13.2-year half-life. The primary radiations from these contaminants were alpha particles, characteristic X rays from the most abundant plutonium isotope (plutonium-239), and 60-keV gammas from the americium-241. Because the photon radiation was low and did not have much penetration ability, the major health hazard was from the intake of alpha-emitting plutonium and americium isotopes.

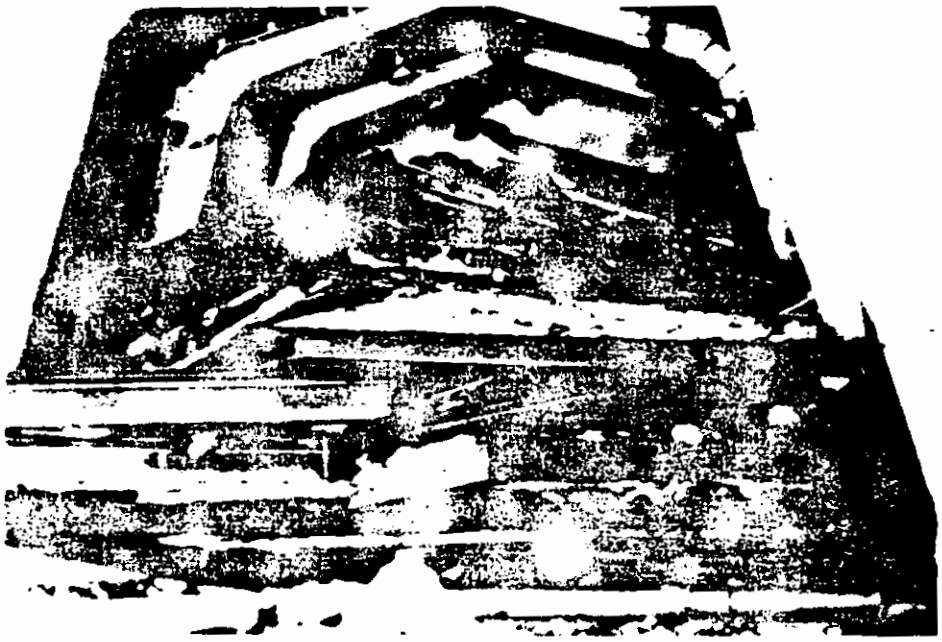

Figure 5. Remains of steel revetments stored in missile shelter building

PLANNING

With the completion of the survey, several options for decontamination were considered. Among these were entombing the entire launch facility in concrete, dismantling the facility and storing the debris locally on Johnston Atoll, and dismantling the facility and transporting the waste to a disposal site in the

continental United States. The final option was favored because it would reduce the need for further maintenance and radiologic controls at the site. Also, this option would enable the soil cleanup to proceed, allowing more efficient use of the very limited land space on Johnston Island. A disposal permit was requested and granted from the Department of Energy, and an environmental assessment was performed. It was concluded that packaging the debris and transporting it from Johnston Atoll to the continental United States storage site would have no significant impact on the environment.

A comprehensive operations plan was then developed, which exactly outlined how the cleanup operation would be accomplished and indicated the time allotted for each segment of the project. Responsibilities for logistical, radiation safety, financial, and transportation aspects of the project were designated in the operations plan. Overall management of the project was the responsibility of the DNA Health Physicist, who also served as the Radiation Safety Officer for the operation. Funding was obtained from the Department of Defense Environmental Restoration Fund, which is comparable to the Environmental Protection Agency's "super fund." Personnel to perform the dismantling, packaging, and transport were provided from several sources. DNA provided military health physicists to assist the Project Officer by serving as Assistant Radiation Safety Officer, and enlisted members of the U.S. Air Force Military Airlift Command provided radiation safety technician support. The Air Force personnel were trained as explosive ordnance disposal specialists, with radiation safety as a collateral duty. The actual disassembly of the facilities and the packaging of debris were performed by the Johnston Atoll operating contractor with assistance from a subcontractor, who removed the contaminated concrete surfaces. The Military Sealift Command, which is controlled by the Military Traffic Management Command, transported the debris from Johnston Atoll to the continental United States. Finally, a commercial trucking company provided the overland transportation to the storage site.

There was continuous coordination with the agencies mentioned above (Department of Energy, Military Sealift Command, Military Traffic Management Command, USAF, etc.) before and during the operation. In addition, coordination was effected with appropriate elements of the Environmental Protection Agency and state radiological safety offices. A public affairs plan also was developed to provide prompt and accurate response to questions from the public. This painstaking planning and coordination were necessary to ensure that all state and federal laws and regulations were followed in all phases of the operation.

REGULATIONS OF DEPARTMENT OF TRANSPORTATION AND NEVADA TEST SITE

Based on the measurements of the 1980 radiologic survey, it was presumed that most of the contaminated material would fall under the Department of Transportation (DoT) category of low specific activity (LSA) material. According to DoT, plutonium-contaminated material may qualify as LSA in one of two ways. First, LSA material may be nonradioactive material externally contaminated with an activity of less than 100 nCi/cm^2 when averaged over a square meter. Second, plutonium may be uniformly distributed throughout a volume of nonradioactive material if the average activity is less than 100 nCi/g. Because LSA materials are

considered inherently safe to transport, they are excepted from the DoT requirements of specification packaging, marking, and labeling if transported as an exclusive-use shipment in strong, tight containers so that there are no leakage of radioactive materials and no shifting of lading under normal conditions of transportation. A shipment is for exclusive use if the transport conveyance is used solely by a single consignor. The conveyance can be a freight container for highway transport, or a hold or defined deck area for ship transport. In addition, there must be no significant surface contamination on the packages and no loose radioactive material in the conveyance. Finally, the transport vehicle must bear the yellow-black-and-white RADIOACTIVE placard, and each package must be labeled "Radioactive - LSA." Any material that did not meet the LSA criterion was expected to be packaged in DoT Type A shipping containers (specified type 7A 55-gallon drums). The DoT criterion for use of a Type A container is that the activity in each package must be less than 2 mCi. If a material was so "hot" that it exceeded the criterion for the Type A container, then it would be packaged in drums and stored in a secure place on Johnston Island, pending ultimate disposal at a DOE waste isolation pilot plant. In addition to the DoT regulations, the contaminated material had to meet the Nevada Test Site (NTS) criterion for low level waste. That is, activity in each container had to be less than 100 nCi/g, where the mass includes all materials buried.

EXECUTION

CONCEPT OF OPERATION

The basic assumption of this operation was that all material on the site was contaminated, until measurements proved otherwise. Before the disassembly began, the structures and equipment left on the site were evaluated to determine if they could be salvaged. Several items (such as the fuel tank, liquid oxygen tank and water tanks, and copper cabling) were still serviceable, and their decontamination would be relatively easy. However, most of the structures were severely rusted and corroded, and it was considered more economical to dispose of them than to attempt their decontamination.

To ensure that the nonsalvageable contaminated materials met the DoT and storage-site requirements, the structures on the Launch Emplacement Site 1 (excluding the concrete pads) were first disassembled and cut into workable sizes (Figures 6 and 7). When possible, the debris was cut into pieces about 6 feet by 8 feet to conserve space in the freight containers. Because there were so many different types of debris (pipes, cabling, ladders, railroad ties, etc.), the sizes of the cut pieces varied greatly. Each piece was then cleaned and painted. The debris was painted to effectively fix any remaining contamination in place, meeting the DoT requirement that there be no loose contaminants. The loose Gunite concrete could be broken up into workable pieces and processed in the same manner as the structural debris. However, it was not practical to remove the massive concrete pads. Instead, only the contaminated surfaces were removed through a process called scabbling, in which the top layers were chipped away. That material was then stored in 55-gallon drums. The scabbling process, described below, resulted in rubble whose contamination was uniformly distributed. Before

Figure 6. Missile shelter building before disassembly

Figure 7. Missile shelter building with panels removed

packaging, all debris was monitored by counting the 60-keV photons from americium-241, using either an intrinsic germanium detector or a sodium iodide detector with a well-defined source-detector geometry.

Structural debris meeting the LSA criteria was loaded onto large (20 feet long by 8 feet wide by 9 feet high) dry-cargo freight containers (Figure 8), and the concrete rubble and any Type A material were loaded into 55-gallon drums. The freight containers were lined with plywood on each of the six surfaces to prevent puncturing of the walls, and were braced to prevent settling or rearrangement of the contents during shipment. These containers served as both package and transport vehicles for the bulk LSA material. One freight container was dedicated to the material packaged in the 55-gallon drums, and for these materials, the freight containers served only as the transport vehicle. Detailed records were kept of the material and the total amount of activity loaded into each container so as not to exceed the DoT or the Nevada Test Site criterion. The freight containers were shipped from Johnston Island to the Naval Construction Battalion Center in Port Hueneme, California, and then were transported by truck to the disposal site at the Nevada Test Site.

Figure 8. Debris being weighed before loaded into freight container at rear

FLOW PATTERN OF DEBRIS

The missile launch facility was located on the northern shore of Johnston Island, the main island of the atoll. Prevailing winds blew from east to west; residential and most work areas on the island were upwind from the launch site (Figure 9). The layout of the site was organized to establish an efficient flow pattern for the removal of the contaminated materials. The different processing stations were arranged so that they were crosswind of each other. The break area, storage shed, and laundry trailer were all upwind of the contaminated area; a road barrier and open water were downwind of the site.

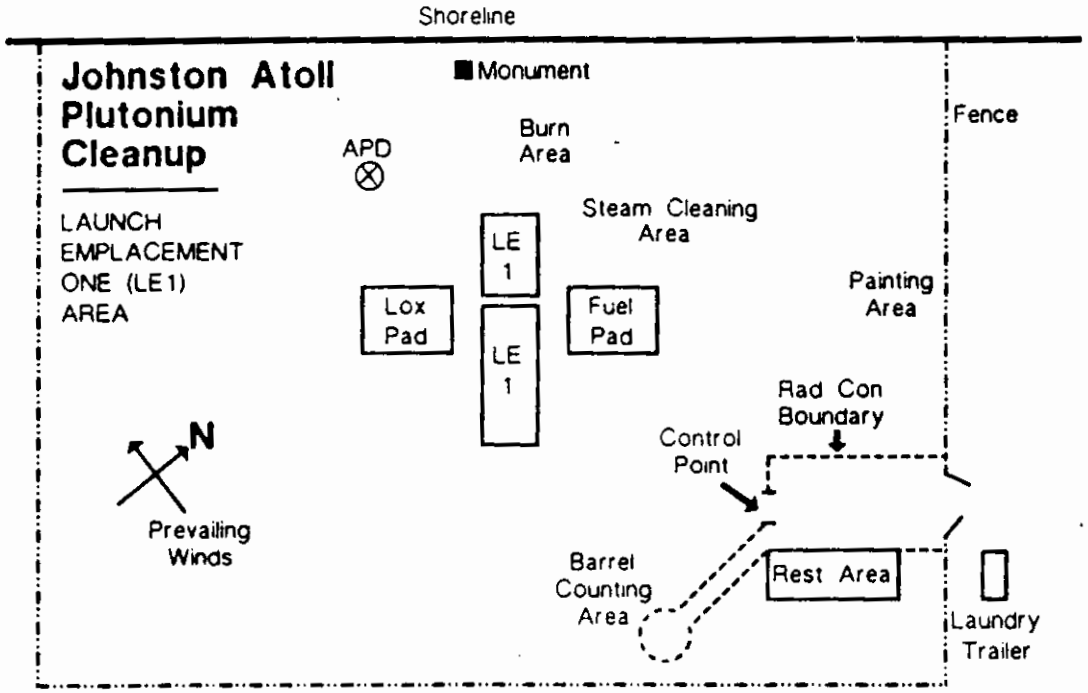

Figure 9. Layout of cleanup site

The first step in the removal process was to reduce the materials to workable sizes. The debris was cut into smaller pieces using acetylene torches, saws, and chipping hammers. After the materials were cut, they were either steam cleaned or rinsed with a high-pressure water hose to remove any loosely bound contaminant, paint, or dirt. The material was then loaded onto a clean pallet and moved to the painting area. At this station, any remaining contamination was fixed in place with a thick coating of black piling paint or white or yellow road-striping paint (which was outdated and not suitable for road use) (Figure 10). After all the exposed surfaces were painted, the materials were sent to the exit hot line for delivery by forklift to the counting site (Figure 11). Before leaving the contaminated area, the debris was smear-monitored to check for loose contamination.

Figure 10. Debris paint area to fix contamination before monitoring

Figure 11. Transporting painted debris from paint area to counting pad

The counting area was about 800 feet east of the launch site and was chosen for its relatively low background radiation. When the pallets reached the counting area, they were laid out in rows (Figure 12). and each piece of debris was numbered (Figure 13). To locate areas with high levels of contamination, a preliminary

Figure 12. Debris laid out in rows at counting area

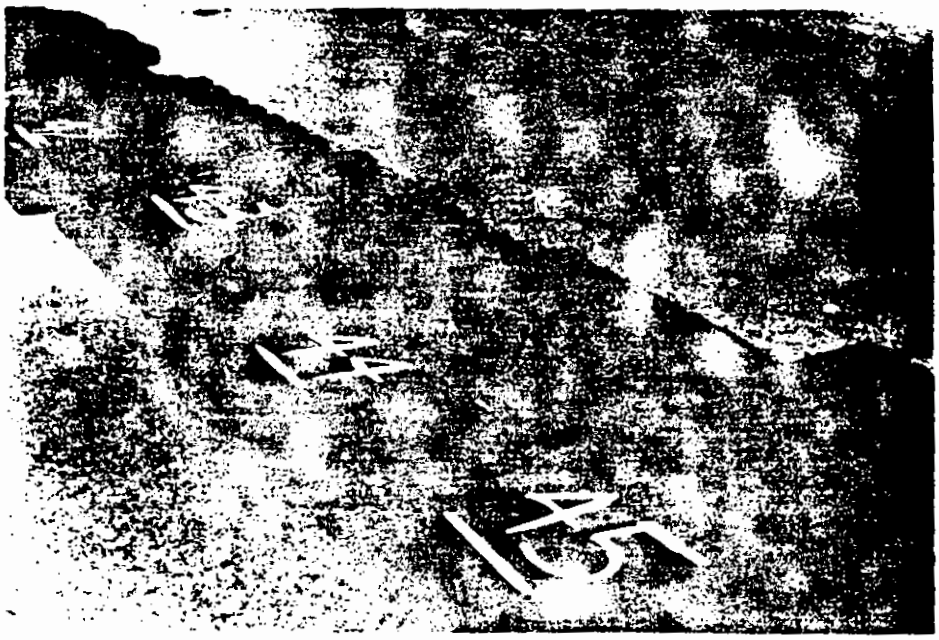

Figure 13. Numbers painted on each pallet of debris for identification

survey was performed over the surface of each piece with a modified FIDLER (field instrument for detection of low-energy radiation). The FIDLER used for screening had a 2-inch-diameter sodium iodide crystal connected to an analog ratemeter and earphones, and the window was set to detect the 60-keV photons from the americium-241. When "hot spots" were located, they were marked with spray paint and counted separately. The activity on each piece (and hot spot) was measured using the germanium detector (Figure 14) or the backup sodium iodide detector. The counting system is discussed in detail below.

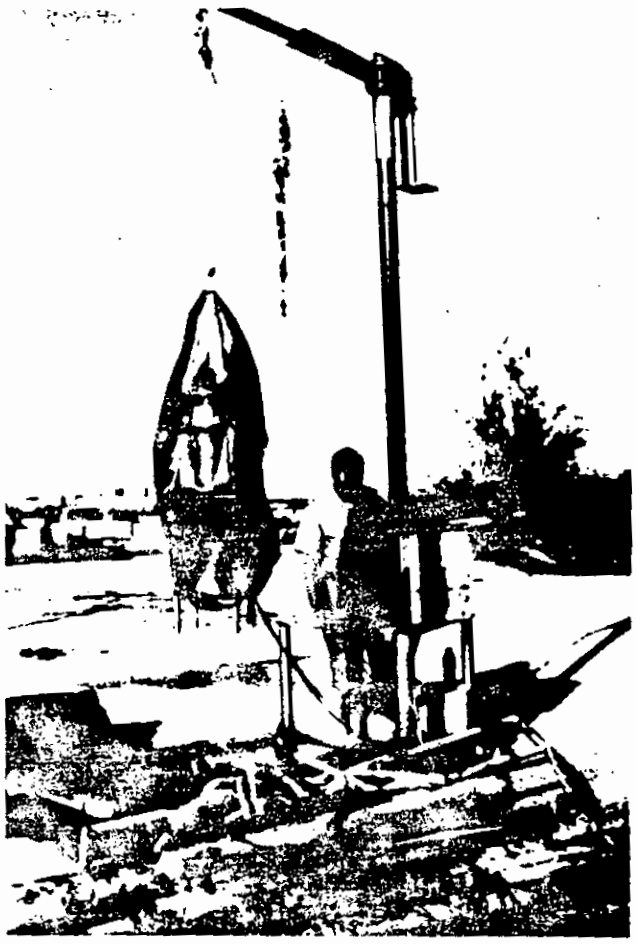

Figure 14. Monitoring pallet of debris with germanium detector system

After counting, the materials that met the LSA criterion were loaded into the freight containers, and the physical dimensions (weight, length, and width) and a brief description of the material were recorded in the packaging logbook.

DECONTAMINATION OF CONCRETE PADS

As mentioned above, the large concrete pads were decontaminated instead of removed from the site, because the launch pad and the pads beneath the fuel tank and liquid oxygen tank were far too massive. To significantly reduce the waste volume, it was decided to remove only the contaminated surfaces. This was accomplished through the scabbling process, in which the proximate concrete surface was hammered away. The scabbling device had five heads with carbide-tipped nipples that were used to finely chip the concrete surface to about a 7-mm depth. A wooden box enclosed the chipping head to prevent dispersal of contaminated concrete chips and dust. The box was continuously evacuated to a cyclone separator, which deposited the heavier particles into a 55-gallon drum through an HEPA (high-efficiency particulate air) vacuum system. While most of the concrete rubble was removed by the cyclone separator, a small amount (about 5%) remained in the HEPA filter system. The filters were later disposed of in the 55-gallon drums. A Vacublaster was used to decontaminate the cracks and expansion joints in the concrete pads. Before using the Vacublaster on the expansion joints, the joint filler material was removed and disposed of in a 55-gallon drum. The Vacublaster used a narrow nozzle to propel steel shot onto the concrete to wear away a few millimeters at a time. The concrete debris and used steel shot were then vacuumed up by the Vacublaster through the HEPA system. Most of the shot was then recycled by the Vacublaster for continued use. A quantitative assessment of the amount of contamination removed from the pad was obtained through the use of the intrinsic germanium counting system (discussed below in Radiation Measurements section). The pads were monitored after the scabbling and use of the Vacublaster, and these processes continued until the contamination was below the minimum detection limit of the counting system (about 10 nCi/cm^3). After the concrete pads were successfully decontaminated, they were covered with a layer of "clean" dirt to prevent recontamination.

MEASUREMENTS OF RADIATION

The quantitative measurements were performed using a high-resolution germanium detector coupled to a portable multichannel analyzer. As a backup, a FIDLER with a 13-cm sodium iodide crystal connected to a scaler was used with the multichannel analyzer. (Note that similar systems have been used in other cleanup operations.) The backup FIDLER was needed toward the end of the operation when the preamplifier failed on the germanium detector. Both detectors were used with an 11-inch-long cylindrical collimator so that the field of view was circular and limited to about 35 degrees. The detector in use was suspended from a rope attached to a mobile rig. This was done to reduce the interference from microphonic noise caused by the heavy equipment and aircraft on the nearby runway. To accommodate the wide range of sizes of the contaminated material, the detectors could be adjusted from 1 to 6 feet above the ground. Calibration of the detectors was checked once a day with an americium point source, and background readings were taken at least twice a day (before and after counting). The counting system measured the americium-241 activity per area, and this had to be converted to total transuranic alpha activity from all the plutonium and americium isotopes. The transuranic activity of the Johnston Island plutonium contamination was 8.7 ± 2.9 times the americium-241 activity.

The detector was placed above the center of a piece of debris so that the field of view covered the longest dimension. If this was not possible, either the piece was cut into smaller sections or more than one count was made. When a hot spot was indicated on the debris, the detector was placed above the hot spot so that the field of view encompassed one square meter with the hot spot in the middle. Each piece was counted for 2 minutes, and the material identification number, peak display, and net area counts were recorded on multichannel analyzer minicassette tapes. The taped data were later input and stored along with the packaging data in a Compaq Plus (Houston, TX) computer.

Assessment of the contamination present on the concrete pads was more complicated. The pads were first cleaned with the HEPA vacuum to remove loose contamination, and then a uniform grid survey was performed. This was accomplished by dividing the pads into square blocks, 6 feet by 6 feet, and sequentially numbering each block. Also, hot spots and hot lines (mainly found in the joints) were identified with the FIDLER and numbered separately. The germanium multichannel analyzer counting rig was rolled over the center of each box, and counting was performed as described above. To count the hot spots and hot lines, a steel plate about 1/4-inch thick was placed over the rest of the block so that only the area of interest was counted. Similarly, when the entire block was counted, steel was placed over the hot sections so that they were not included in the counting. The data from each block, hot spot, and hot line were stored in the computer. During the scabbling and Vacublaster operation, a careful talley was kept so that it was known in which drum each section of concrete pad was stored. The total weight in each drum then could be divided by the total activity to determine the activity per gram.

Several 55-gallon drums had been filled with radioactive waste from the many cleanup operations over the years at the site. Included in this waste were hot pieces of coral, americium smoke detectors, and other miscellaneous items. Although this material was already packaged, the amount of activity needed to be assessed. This was done by cutting the bottom 6 inches off a 55-gallon drum and filling it with the contaminated material. The detector was then placed over the drum, and the calculations were performed, considering the material in the drum as a disc source. The material was repackaged in 55-gallon drums, but the amount of transuranic activity contained in each was now known.

SCREENING FOR LSA

The amount of activity contained on the different types of debris was carefully measured so that compliance with the DoT regulations could be demonstrated. As discussed earlier, two criteria apply for plutonium-contaminated material to be considered LSA: (a) nonradioactive material that is externally contaminated, with an activity of less than 100 nCi/cm^2 averaged over a 1-square-meter area, and (b) contamination uniformly distributed throughout a volume of nonradioactive material with an average activity of less than 100 nCi/g. Note that the first criterion was applied to the painted structural debris, and the second to the concrete rubble. A screening level of 50% of the DoT standards was chosen to be conservative, that is, 50 nCi/cm^2 for the structural components and 50 nCi/g for the concrete debris. As expected, almost all material met this conservative

screening level. Only one 55-gallon drum had to be shipped as a Type A container, and no waste exceeded the criteria for a Type A container (less than 2 mCi per package).

PACKAGING AND SHIPPING

All the bulk LSA debris was loaded directly into the reinforced freight containers, and one container was dedicated for the 55-gallon drums. The debris counting data, which had been stored in the computer, were sorted by container number, enabling printout of the contents and weight of each container, as well as the total activity and mass of plutonium contained in each. This was a convenient method of ensuring that each freight container met the Nevada Test Site criterion for low-level waste (this screening level was also set at 50 nCi/g). Before a filled container was moved to the holding area, the door was welded shut and the outside of the container was smear-monitored to check for contamination.

All of the freight containers were placarded, and all but the container with the 55-gallon drums were labeled as radioactive LSA. However, each drum containing LSA material in this freight container was labeled "Radioactive - LSA." A commercial freighter under contract by the Military Sealift Command was used to transport the containers to the Naval Construction Battalion Center. A Radiation Safety Officer accompanied the shipment to monitor the containers in the event of container damage. Radiation measurements of the ship container storage areas were made before loading the containers aboard ship and after the containers were off-loaded. Radiation surveys were also conducted at the Naval Contruction Battalion Center port handling facility after the containers were moved to the waste site. The final leg of the journey was made by a trucking company, which was fully certified to transport radioactive materials.

DISCUSSION

The cleanup described above was an extensive operation requiring resources from many government and civilian organizations. Throughout the project, several logistical and technical challenges were met, and some lessons were learned that may be of interest to others beginning similar operations.

RADIATION SAFETY

The major radiological danger throughout the operation was the possibility of inhaling alpha-emitting actinide particles. For this reason, strict radiological control procedures were maintained. Full anticontamination clothing and respirators (Figure 15) and full-body monitoring with alpha detectors at the hot line contributed to a successful program. The airborne contamination hazard normally associated with winds was mitigated because of the heaviness of the plutonium contaminant. Air monitors were run continuously at 30, 50, and 100 meters downwind of the site. These read as high as 50 fCi/m^3 averaged over a 24-hour period. As expected, they gave high readings when there was activity that involved mixing up the debris (such as torching, cutting, and scabbling) and low readings (tens of fCi/cm^3) when there was not much activity. The air monitors upwind of the site typically read 10-50 fCi/cm^3.

Figure 15. Removing respirators at contamination hot line: Note use of full anticontamination clothing

All personnel were monitored with LiF dosimetry to document the external exposure received during the project. A 24-hour urine specimen for each person was taken for radioanalysis before working at the site and after conclusion of the job. The thermal luminescent dosimeters and the urine samples were processed by the Air Force at the Occupational Environmental Health Laboratory. The results indicated that no external or internal doses were received as a result of the operation.

The laundry trailer was used to return uncontaminated and contaminated anticontamination suits to use. After laundering, each piece was monitored with alpha detectors to determine if it was radiologically clean. The washing machine was then smear-monitored before another load was started, and the water from the washer was piped back into the controlled area.

HEAT PREVENTION PROGRAM

Most of the heavy labor was done in full anticontamination suits, including full-face respirators, which caused serious concern for heat-related injuries. Therefore, a heat prevention program was implemented and followed conscientiously. A bottsball thermometer was used to indicate the heat conditions. All personnel wearing the protective clothing were briefed on the nature of heat illness, means of notifying personnel when the temperature is critical, proper response to be taken for various temperature conditions, and appropriate first aid for a heat-related casualty. Intake of water and the work-rest cycles were based on the bottsball temperature (Figure 16). These measures proved to be effective, as there were no heat-related injuries during the operation.

Figure 16. Workers resting at rest area outside contamination hot line before and after working inside site

DECONTAMINATION OF EQUIPMENT

Several pieces of equipment were salvaged from the site, including fuel tanks, liquid oxygen tanks, water tanks, and some copper cabling. The equipment was decontaminated by steam cleaning the outer surface and then surveying and smear-monitoring it to ensure that all contamination was removed. If the contamination had not been removed, the procedure was repeated. Equipment used in the operation (such as forklifts), which had to be removed from the controlled area, were treated similarly. They were surveyed, smear-monitored, and released after negative results. If contamination was indicated, the equipment was steam cleaned and checked again.

PACKAGING AND COUNTING

A unique aspect of this operation was the use of freight containers as both package and transport vehicle. This dual use of the containers was considered the most efficient method of transporting the large pieces of steel debris, which made up most of the contaminated material. An added advantage of these freight containers was that because of their low cost, they were disposed of with their contents at the waste-disposal site.

Novel techniques were also used to measure the activity of all the debris packaged and transported from Johnston Atoll. This was done through several modifications of a typical counting system. Debris with essentially uniform surface contamination, volume contaminated debris, and debris considered as a disc source were all effectively monitored to determine the total transuranic activity.

COMPUTER

A Compaq Plus computer was used with Symphony software (Lotus, Cambridge, MA) to store, reduce, and analyze the data collected. After an initial period of familiarization with the computer and software, the computer became an invaluable tool and time-saving device. Data for each shipping container were readily available, and total amounts of volume and activity could be easily retrieved from the data base. In fact, the computer was used to produce the manifests for the shipping documents.

SOPR 25 September 1980

MEMORANDUM TO DDOA

SUBJECT: Initial Summary - TITAN Missile Incident

1. This paper was prepared by gathering data through observation and conversations with those individuals who had personal, first hand knowledge of what transpired at their respective locations. It is not a "fully coordinated" paper, but has been read by those who contributed, and it has been agreed that the paper is accurate as we presently know and understand the facts. There are literally a thousand unanswered questions in the paper. Some of these will unfold after review of actual duty logs and a more complete set of reports being prepared at DoE, SAC, FCDNA, DNA, FEMA and HQAF.

In short, it is a quick-look attempt to document, largely from memory, the events of the incident and our general impression of the effectiveness of the response.

2. Command: Due to the time between first indication of a potential accident situation and its actual occurrence, HQ SAC was able to establish a pre-designated disaster response force command. Gen Light was briefed on the current status of the missile prior to the explosion. During the period between the fuel leak 18/1830L and the subsequent fire/explosion 19/0300L (approximately 8 1/2 hrs), SAC notified Arkansas State Emergency Officials (18/1850L) of a possible fire in silo 47. Some disparity exists regarding who suggested evacuation, but at approximately 18/2000L AF officials notified state emergency services suggesting a 2000' evacuation of residents. The VanBuren county sheriff also was involved, and suggested a 1 mile radius evacuation. Reports to the NMCC from SAC HQ (at 0340) indicated a 4 mile evacuation had occurred. Who made these decisions, how far the radius extended and the reasons for the decisions are all unclear. It does not appear, from what we know now, that other than local (AF or county) officials were involved in the decision.

Details of command at the site, prior to the explosion, are sparse. At that point, it was a SAC problem, and there is both evidence and an assumption that HQ SAC played in the command process to determine the course of action regarding the fuel leak problem. Following the explosion, there is ample evidence that not only HQ SAC, but the HQ USAF, JCS and SECDEF exercised command authority. The transition was rather clear to those present. Once the NMCC was notified of the fuel explosion, they and the JCS activated their notifications.

Activity centered in the NMCC, under the CJCS personal direction (getting facts, assessing situation) of the assessment phase. The SECDEF and ATSD(AE) arrived and were briefed by the CJCS and LGEN Leavitt (SAC VC). SECDEF made specific decisions on the spot and directed that the HQ USAF (CSAF) assume command responsibility at approximately 19/0730L. This action was carried out by CJCS in the NMCC. It effectively removed the JCS and NMCC from their prior role as the center of command authority, and placed CSAF and the AFEOC in the command role.

Initially, the AFEOC had been monitoring activity with a forming staff element. This is, as people arrived, they took up responsibility for gathering and assessment of data. Activity at the AFEOC became, for a brief period after 19/0730L, intense but without common direction. It was not until approximately 19/0900L, that the entire AFEOC staff was briefed on the accident status. Once this was done, and the team chief issued his guidance, activity took a more deliberate pattern. Prior to this, no one had all the available facts; afterward, everyone did.

One point of clarity, or perhaps confusion; when SECDEF came to the NMCC, it was evident that he was then in command of the incident. SECDEF told HQ SAC that he (SECDEF) was now backing out of that role and asking CJCS to have CSAF assume command responsibility. It's not clear that HQ SAC was ever aware they had lost responsibility. SAC was certainly better prepared than HQ USAF to reassume it once SECDEF relinquished it.

To the credit of USAF HQ, they did not immediately start issuing instructions to HQ SAC or the OSC. Some deliberate policy (not operational) discussions were held with SECAF, CSAF, JCSAF and others to determine policy guidance. Some of these policy decisions were later questioned, but that should not detract from the fact that they were made early. Operationally, HQ SAC retained the reins. AFEOC worked their actions through SAC/MAC to the DoD/DoE JNACC, as is appropriate, and did not unilaterally task or direct activity in support of the incident. The AFEOC was surprisingly "aware" of the role of JNACC, and the importance of coordinating all actions through JNACC channels. The airlift representative in particular kept this on track during the earlier periods when facts were few and the "Big Picture" had not been unveiled to the entire staff.

2. Coordination: Previously, we indicated that the coordination of actions between the AFEOC and DoD/DoE JNACC was very good. There is some evidence that coordination was slightly less between the State and Federal Response Forces.

First, the state apparently requested DoE assistance to obtain the services of Oak Ridge radiation monitor capability. Soon after, the DoE JNACC was aware of the request, and it was DoE JNACC that informed DoD JNACC of the availability

of airlift to move from Oak Ridge to Little Rock. It's known that DoE ALOO determines who on the Federal side would be alerted. HQ/DoE held the approval authority for any actual movement of DoE assets to LRAFB. We do know that DoE ALOO made most of the decisions regarding the support that would be required to the DoD and Oak Ridge was a potential element of the response. Related was a decision to alert the EG&G Airborne Radiation Detection and Photographic Capability. A lot of activity occurred regarding pick-up of equipment from Las Vegas and AF held capability at LRAFB. We determined that the single event that initiated the activity was ALOO action. Another complex action is a bit clearer. The SAC OSC, Gen Light, initially requested that DoE be asked to provide assistance on-scene. He specifically requested National Laboratory Representatives, and specified LLNL, LANSL and Sandia. We assume his reason for specificity related to a desire to get all the help we could get as soon as possible (a basic tenet of thought on NWA response.) What followed was insistance by a HQ SAC duty officer that DoE dispatch a LLNL representative. The issue was later sorted out when DoE JNACC and HQ SAC resolved the issue. Gen Light was told of the issue and readily agreed that LLNL was not needed. DoE ALOO had notified the LLNL HOT SPOT TEAM to standby for possible deployment earlier in the day, however, and was ready if needed.

Coordination on site was reported by DoE ALOO to be excellent. They felt the DoD OSC was well informed about what he was doing, and why DoE was there and their mission. There was excellent cooperation and meshing of the DoD/DoE personnel. DoE/ALOO felt the major problem on-site involved DoD dealings with state and local officials and the press. The confirm nor deny policy caused credibility problems and left the state officials frustrated and angry. Another related problem was with the press attempts to get information. There were several overflights by civil fixed wing and helo aircraft observed with cameras on board. This activity was a violation of FAA Regs over restricted airspace and was reported to FAA. The press also was active in the area attempting to get photos by use of a 50' "Cherry Picker" with a camera on top. DoD/DoE was forced to use vehicles, tents and whatever they could find to shield their activity. This was both an irritant and an imposition to the DoD/DoE Teams' work. DoE expressed strong displeasure with the confirm nor deny policy enforced during this particular incident.

3. Communications: From what can be determined now, it appears that the initial notification of the occurrence of the (19/0300L) missile fuel explosion was good. Cursory review of comm logs and conversations with those involved in this process in the Washington area exposed no problems. The DoE/DoD JNACC notification sequence was as follows (Albuquerque, NM time): 0225 - FCDNA (NCOD) received initial communication of the accident from the SAC Command Post (?); immediately notified FCDNA (SDO) who in turn notified both DoD and DoE/JNACCs. Both DoD and DoE JNACCs were in their respective operation centers prior to 0310. Throughout the course of events the JNACC activities were well coordinated in the view of the DoD JNACC. The DoE JNACC personnel concurred with the assessment, and added that the events that occurred 3 days

before had been a big help in making this incident run more smoothly. Specific comments regarding coordination of FEMA activities is in a separate part of this paper. There was evidence at the NMCC and the AF EOC that FEMA was working the problem. There were several calls between these centers in the first 5-7 hours of observation. FEMA had a representative at the state EOC, but there is no knowledge at this point that he had any contact with the DoD or DoE on site.

4. Public Affairs (time in this paragraph is EDT)

When word of the explosion was received at the NMCC, the ASD(PA) duty officer was notified. He in turn notified the ASD(PA), Mr. Tom Ross, and went to the Pentagon to man the telephones at ASD(PA). Other senior officers came to the News Branch desk to assist in responding to media queries and assist SAC PAO as needed.

Mr. Ross called from his home the VC SAC and provided PA guidance. He evidently specifically stated that the "confirm nor deny" position was in effect. HQ SAC PAO was designated media focal point and early morning, about 0600 EDT, a short statement was issued by SAC. A copy was furnished to ASD(PA). Media queries to ASD(PA) were referred to SAC PAO.

At 0730 the Air Force desk at ASD(PA) was designated action officer for media queries. He coordinated with SAC PAO on a continuous basis for the remainder of the day.

A detailed statement was developed late morning by ASD(PA) based upon suggestions from SAC and approved by SECDEF and Mr. Ross. This news release was made by SAC and ASD(PA).

DNA PAO was notified at 0530 and arrived at NMCC by 0615. After consulting with the DDOA it became clear that the best place for DNA PAO was at the News Branch office. At ASD(PA) from 0700 until 1000, DNA (PAO) remained at News Branch and provided advice and assistance. Suggestions made and accepted were need to contact FEMA and DoE PAO's.

Lessons learned:

- Initial statements and PA guidance will be coordinated and issued from the highest level, i.e. personally by the ASD(PA).

- PA responsibility will be held at DoD until situation is under control.

- Services/Command will be designated PA executive agent as soon as possible.

- Direct communication between on-scene PAO and ASD(PA) will be required, at least initially.

- DNA PAO can best be utilized at ASD(PA).

It is considered appropriate for SAC, specifically OSC, to address the impact of the "neither confirm nor deny" policy on media and state relations. It appears that this policy had significant adverse impact which should be weighed against the national security considerations that dictate this long standing policy.

5. Federal Emergency Management Agency Activities: The FEMA Watch Center received the fuel explosion accident notification message at approximately 0430 EDT 19 Sept. The FEMA Watch Center notified FEMA staff members at their homes. The Watch Center also notified the FEMA Region VI watch officer in Dallas. (The FEMA Region VI office had originally been notified of the situation by the state on the previous evening when the fuel leak first occurred.) Upon receiving notification of the explosion, FEMA National called DNA Headquarters to receive more details of the situation. (Time in the remainder of this paragraph is EDT.)

At approximately 0830, FEMA called the NMCC and the AF EOC to obtain more information on the situation. Arrangements were made at this time to provide FEMA liaison to the AF EOC.

Beginning at approximately 0830, the FEMA Operations Center contacted the FEMA Regional Office to obtain information on the situation and to recommend that a FEMA regional staff member be dispatched to the Arkansas State EOC in Conway. At this time, FEMA National Office first learned that an evacuation had been ordered. Few other details were available at that time.

The FEMA liaison reported for duty at the AF EOC at approximately 1200. Processing of security clearances resulted in a two hour delay in getting a FEMA staff member into the AF EOC.

The FEMA Operations Center was notified at approximately 1100 by the Office of ATSD(AE) that a major missing missile component had been located and was intact. This was the first information of any kind received from DoD regarding the seriousness of the situation or the potential for off site consequences. Until this time, FEMA had assumed that all major missile components had remained in the immediate vicinity of the missile silo.

Reports were received from the state EOC, via the FEMA Regional Office that no radiation had been detected by State Health officials. (One report of low levels of Alpha readings were reported at one time, but these readings were later determined to be incorrect.) The FEMA Regional Office reported at 1500 that the evacuated area was being reduced in size and some residents were being permitted to return to their homes.

6. Other Federal Agency Involvement: During the morning of September 19, FEMA received calls from HHS and USDA requesting information and guidance regarding their possible response to the situation. At the time of their inquiry, FEMA was not able to provide any useful guidance due to a lack of firm information. As the situation developed, these agencies were notified that there were apparently no off site consequences and that no response would be required of them.

7. The above information will be expanded or augmented as additional information is developed by the agencies involved.

for [signature] LTC, USA
LEE A. SNOWBERGER
Lt Col, USAF
Chief, Plans & Requirements

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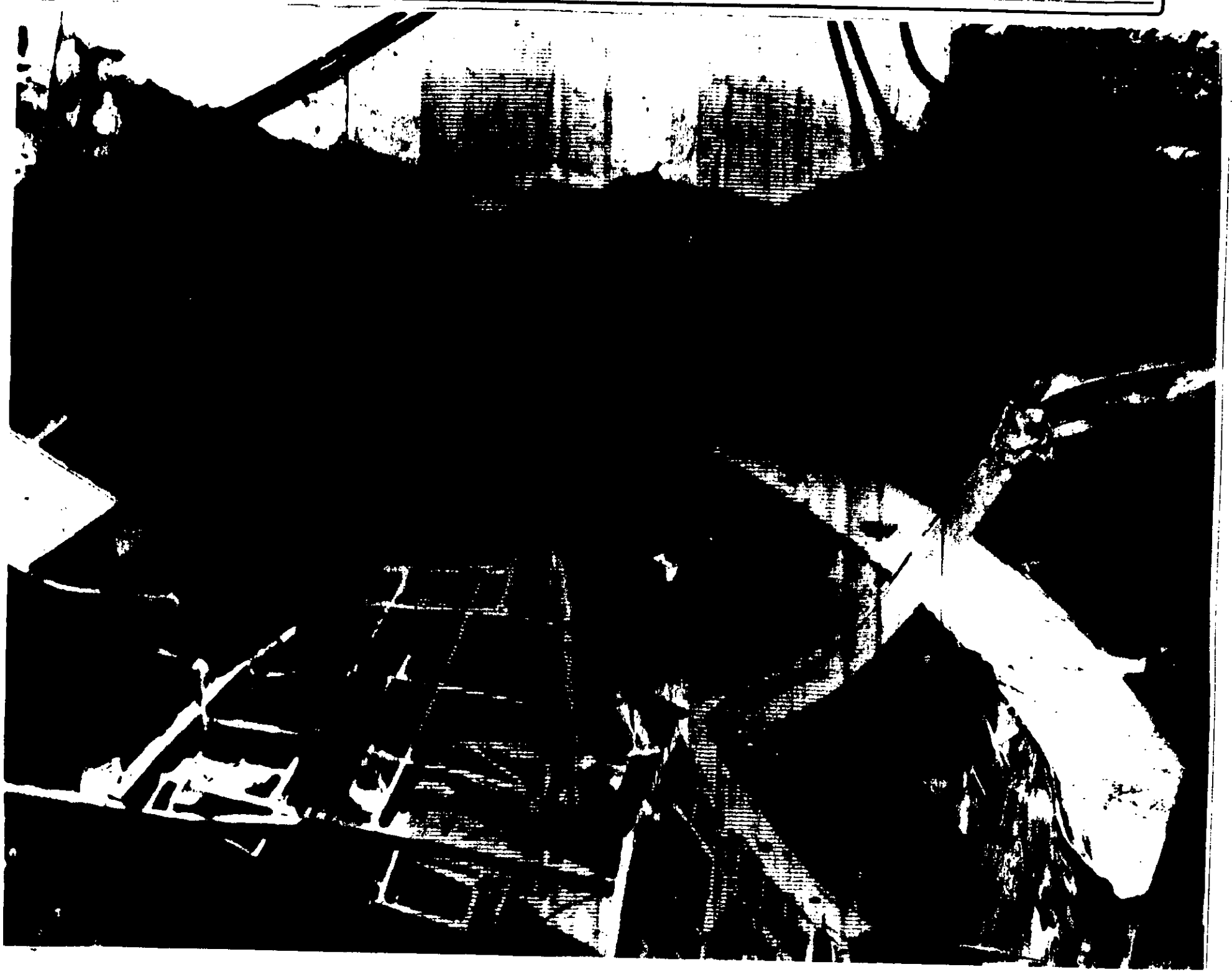

PHOTO PLASTIC PRODUCTS, INC., P. O. BOX 17000, ORLANDO, FLORIDA 32860

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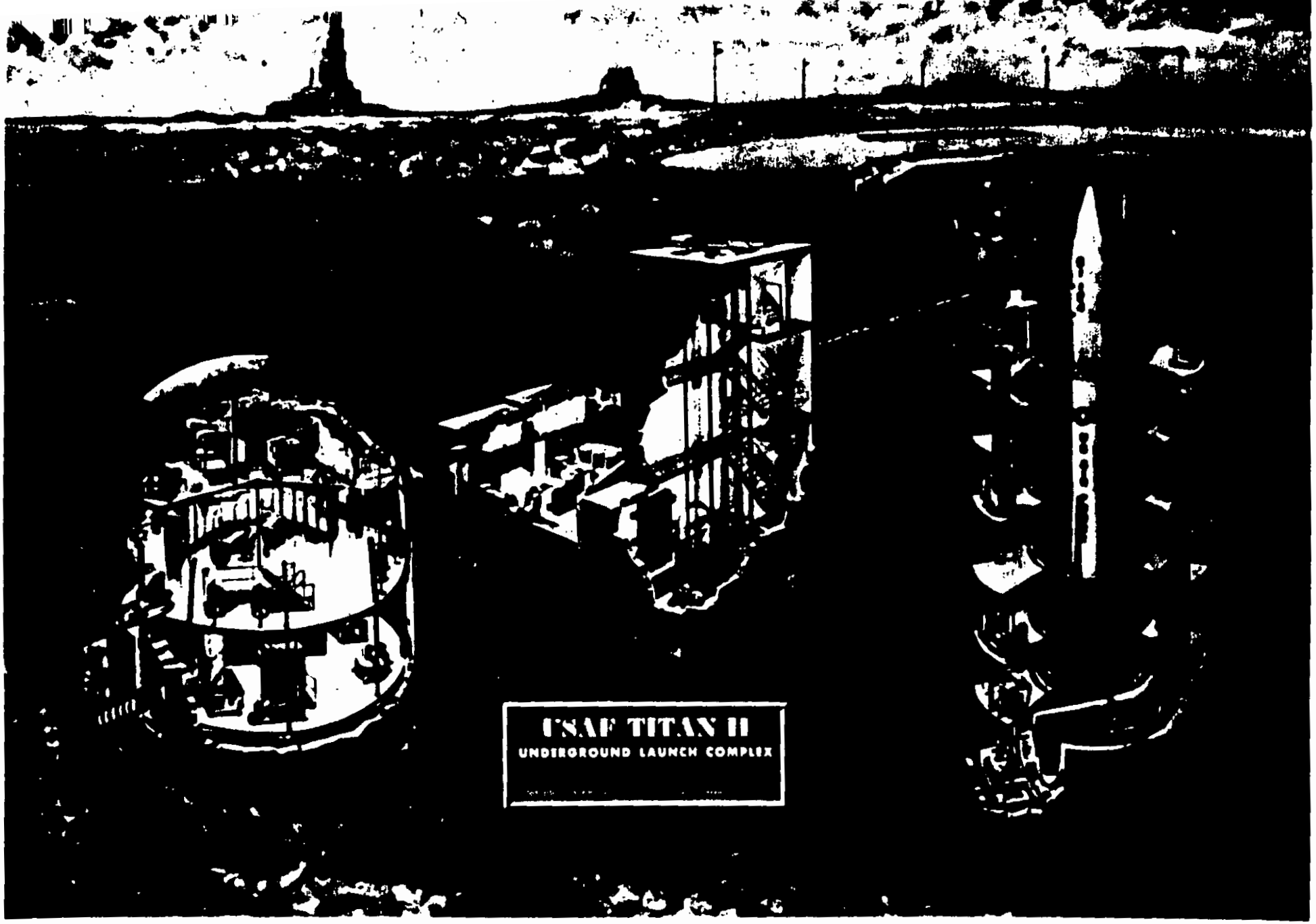
USAF TITAN II
UNDERGROUND LAUNCH COMPLEX

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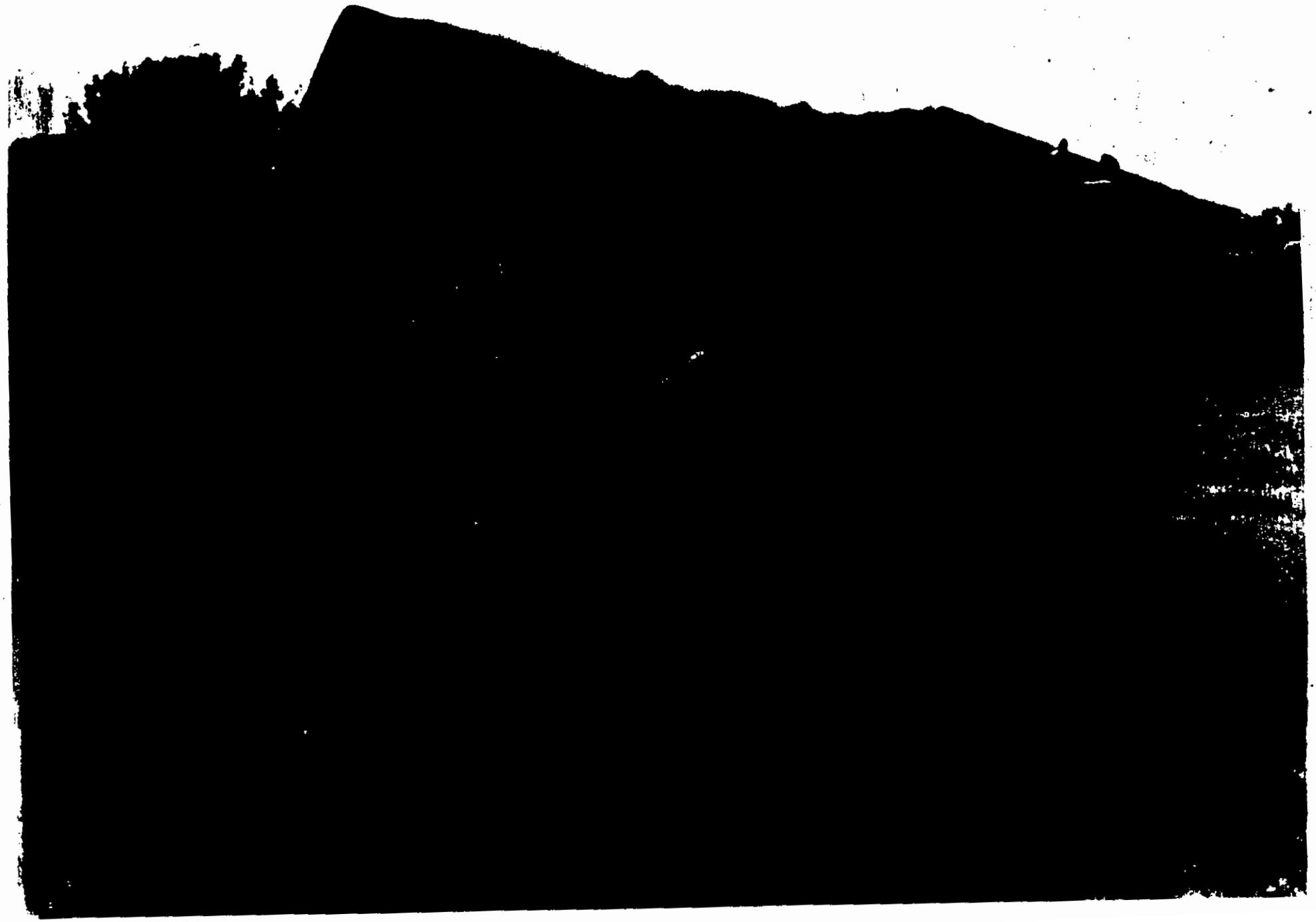

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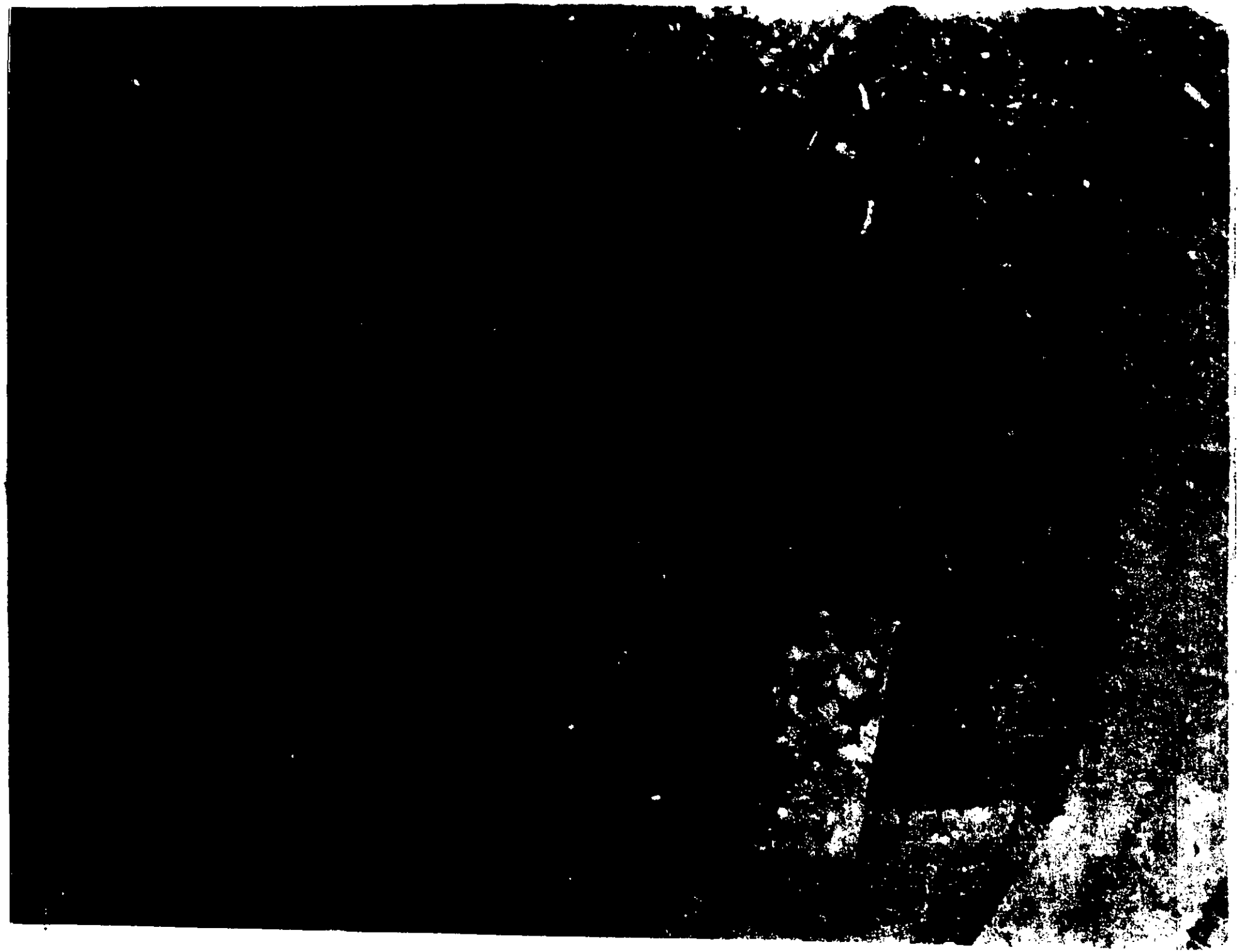

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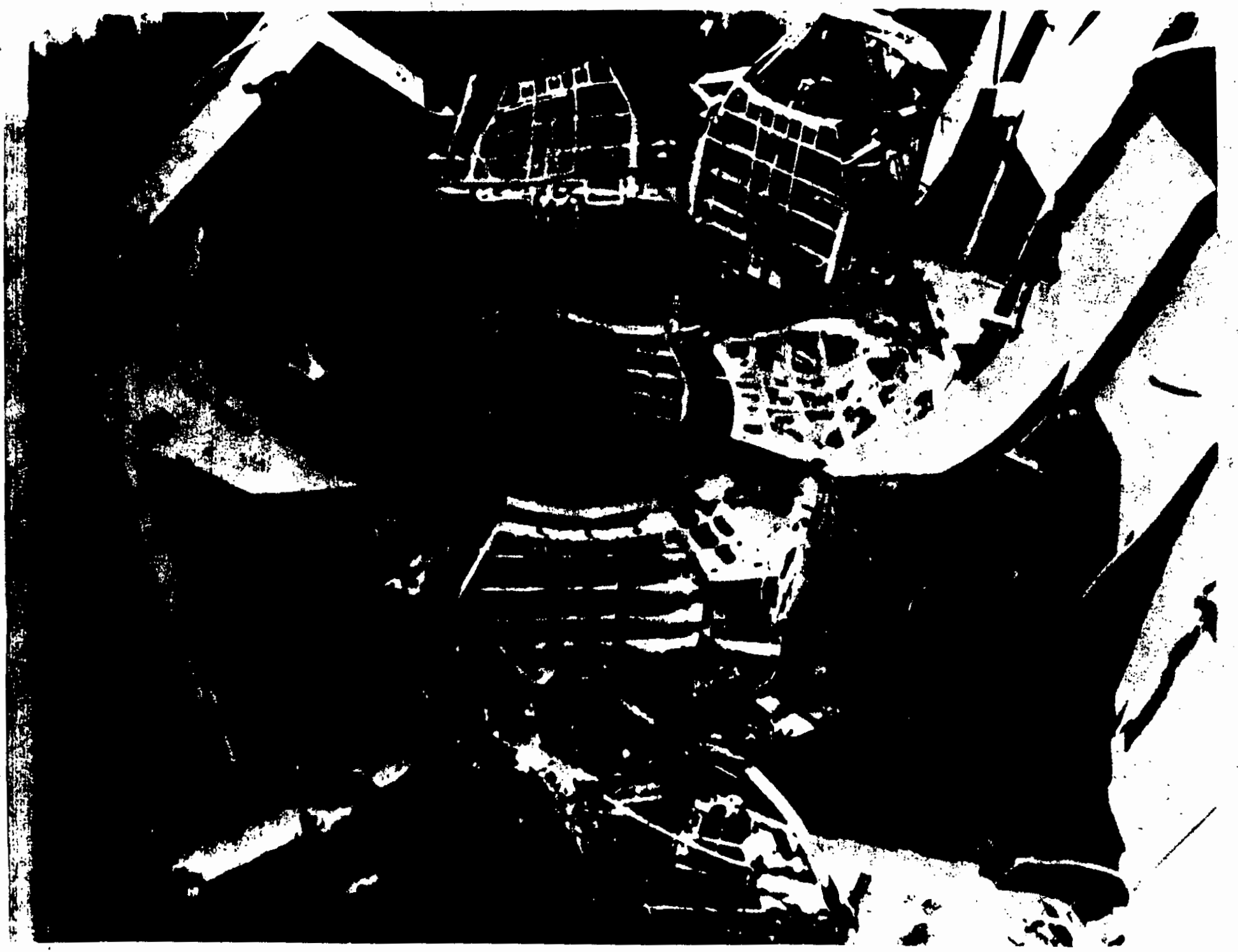

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STYLE NO. 810-1 PHOTO PLASTIC PRODUCTS, INC., P BOX 17838, ORLANDO, FLORIDA 32860
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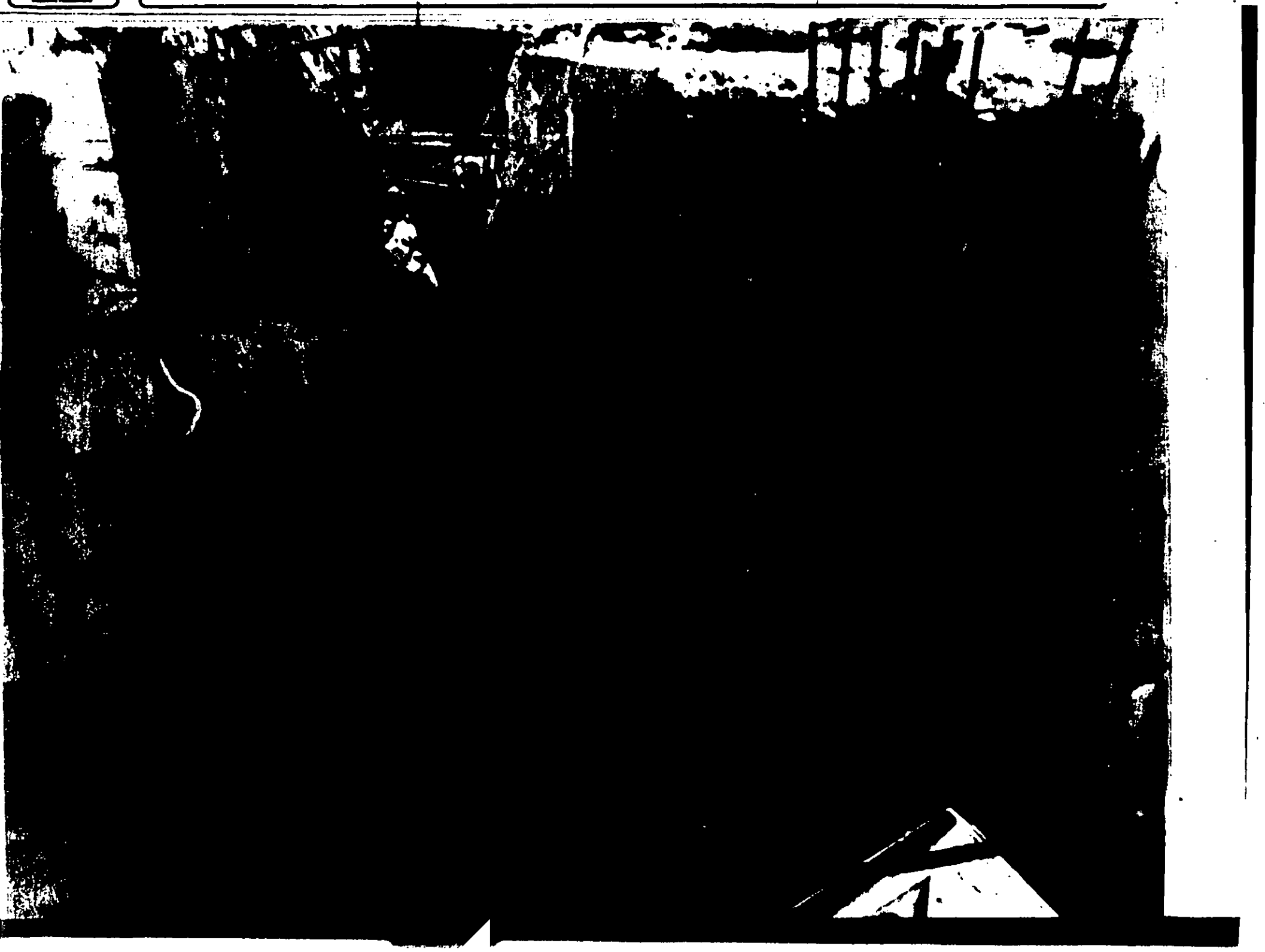

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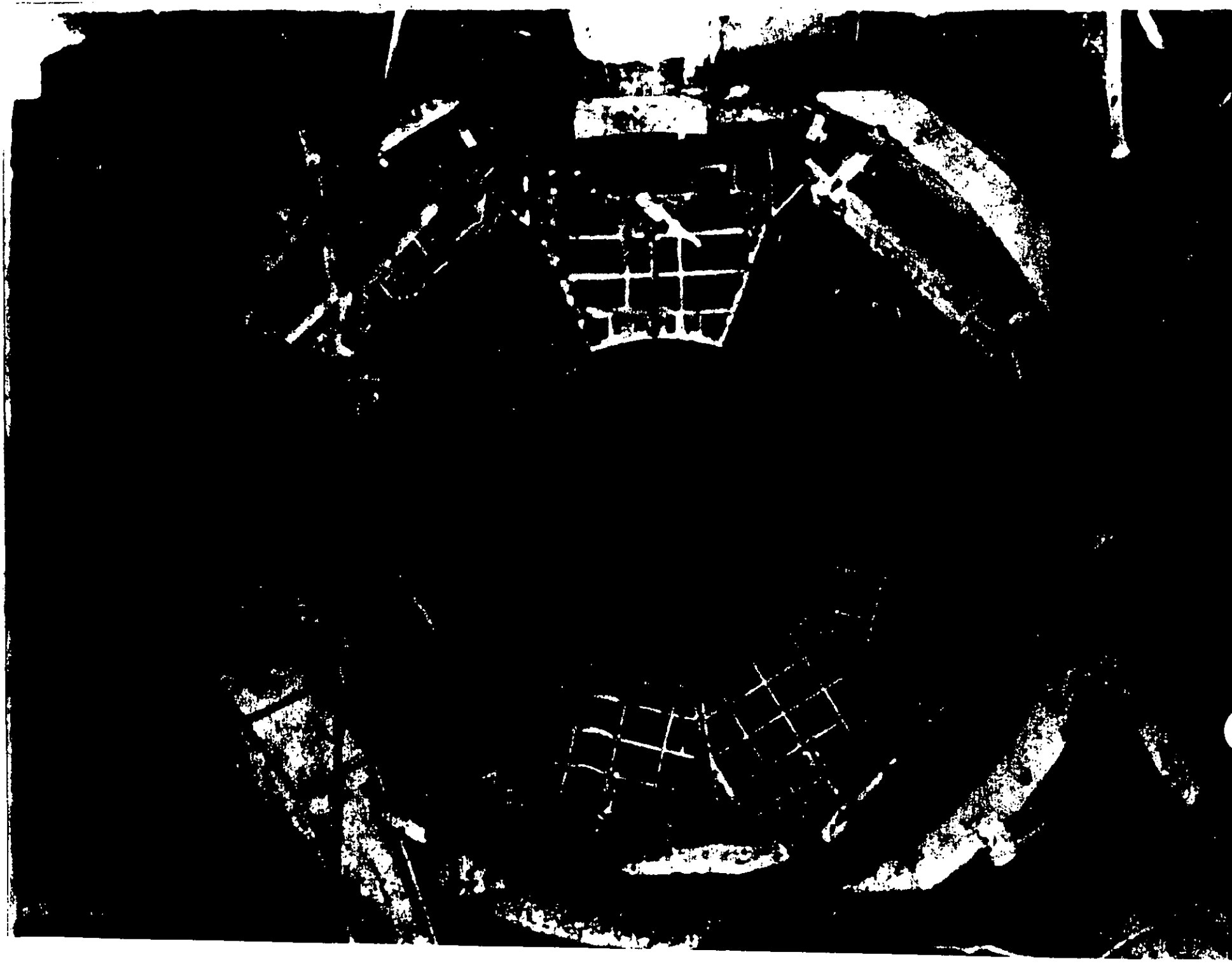

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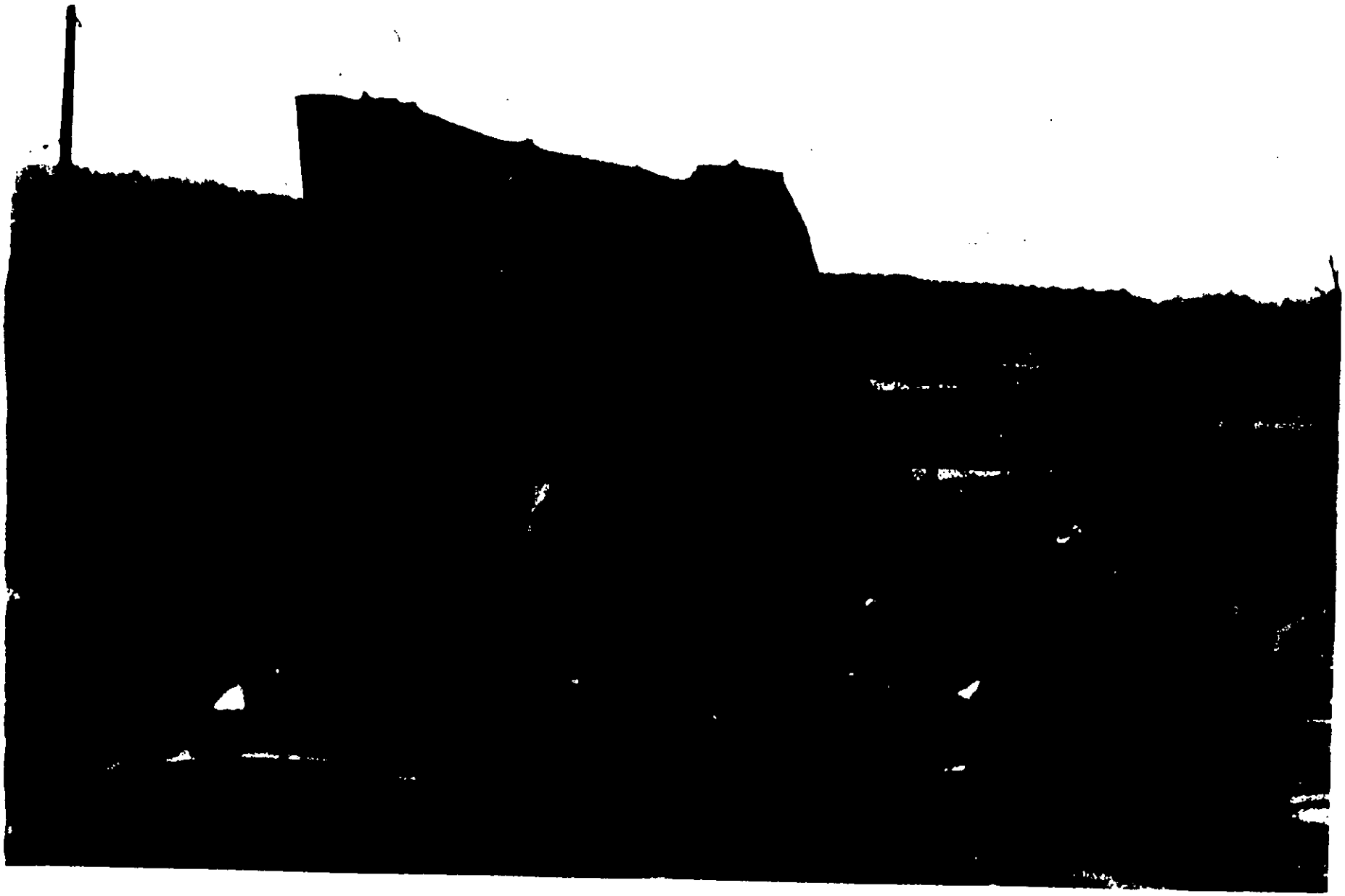

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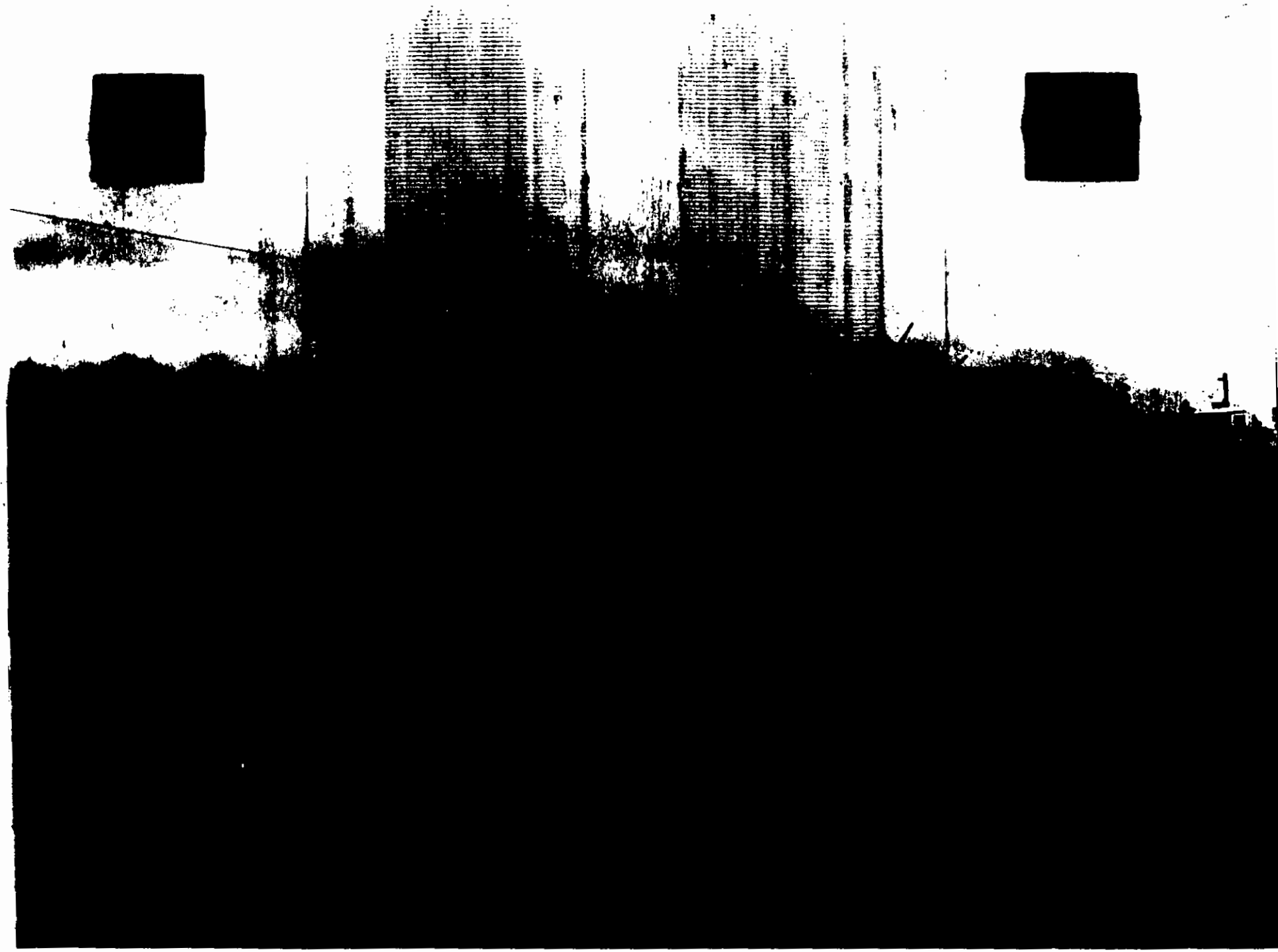

THE DAMASCUS MISSILE MISHAP

(1) INTRODUCTION, MR O'BRIEN, LADIES AND GENTLEMEN. I AM LT COL LARS V. VEDVICK, THE HQ SAC SECURITY POLICE OPERATIONS DIVISION CHIEF AND MEMBER OF THE HQ SAC DISASTER RESPONSE FORCE.

(2) I WILL BE BRIEFING THE SECURITY ASPECTS OF THE TITAN MISSILE MISHAP THAT OCCURRED AT DAMASCUS ARK ON 19 SEP 80.

FIRST I WILL REVIEW THE SEQUENCE OF EVENTS FROM THE ACCIDENT THROUGH THE CURRENT POSTURE, CONCENTRATING ON SECURITY POLICE INVOLVEMENT. THEN I'LL PRESENT THE LESSONS THAT WE HAVE LEARNED.

(3) TO PINPOINT THE LOCATION, THE SITE, COLORED ORANGE, IS LOCATED 66 MILES NORTH OF LITTLE ROCK, ARK. AT THE TIME OF THE MISHAP, THE MISSILE FIELD SECURITY FORCE POSTURE WAS NORMAL. FIVE TWO-MAN SECURITY TEAMS WERE DEPLOYED IN THE FIELD, ONE TEAM

(4) FOR EACH OF THE FIVE SECTORS SHOWN HERE. THE SITE COMPLEXES, COLORED YELLOW, IDENTIFY THE SECURITY TEAMS HOME SITE IN THAT SECTOR. THE TEAM SUPPORTING THE MISHAP SITE WAS LOCATED HERE (374-6) HOME SITE. THREE 4-MAN ALERT FIRE TEAMS WERE ON DUTY AT THE BASE TO PROVIDE SECURITY RESPONSE TO THE WEAPONS STORAGE AREA AND THE MISSILE FIELD. ONE MISSILE FIELD SECURITY SUPERVISOR TO OVERSEE THE RESPONSE FORCES AND AN OFFICER SHIFT COMMANDER WERE ALSO ON DUTY.

AT 1830 THE CREW AT THE COMPLEX RECEIVED PROPELLANT LEAK HAZARD INDICATIONS AND IMPLEMENTED APPROPRIATE CHECKLISTS. THE BASE COMMAND POST IN TURN NOTIFIED THE ARKANSAS OFFICE OF EMERGENCY SERVICES AT 1900 HOURS, WHICH THEN NOTIFIED THE STATE POLICE

Encl 4

AND COUNTY SHERIFF. SECURITY CONTROL AT THE BASE WAS NOTI-
1905 FIED AT APPROXIMATELY 1905 OF A LEAK. THE RESPONSIBLE 2-MAN
SECURITY ALARM RESPONSE TEAM WAS DISPATCHED FOR POSTING AT
THE ENTRANCE TO THE COMPLEX ACCESS ROAD TO CONTROL ENTRY.
THE MISSILE FIELD SECURITY SUPERVISOR WAS IN SECTOR 2, AND
DIRECTED THE RESPONSE OF THE TEAM FROM SECTOR 3. NOW THERE
WERE 5 SECURITY FORCE PERSONNEL ENROUTE TO THE SCENE. AT
1922 1922 CIVILIAN POLICE ARRIVED AT THE COMPLEX. WHEN THE FIRST
1937 SECURITY RESPONSE TEAM ARRIVED AT 1937, THEY ENCOUNTERED
ABOUT TEN CIVIL POLICE GATHERED TO ASSIST. IN THIS DRAWING
(5) OF AREA AROUND THE MISHAP SITE:

SITE - SQUARE

ECP - INTERSECTION W/, STATE 65

SCALE - 1 1/2 MILE SEGMENT

HOMES - BLACK SQUARES

THE VANBUREN COUNTY SHERIFF HAD JUST DIRECTED THE NOTIFICATION
OF RESIDENTS IN THE IMMEDIATE AREA THAT THERE WAS A HAZARD.
1951 THE SECOND SECURITY RESPONSE TEAM ARRIVED AT 1951. THE
2005 MISSILE FIELD SUPERVISOR ARRIVED AT 2005, ASSESSED PROBLEM,
(6) AND DIRECTED AN 1800 FT CORDON SHOWN IN RED CIRCLE. IN HIS
DISCUSSIONS W/SENIOR CIVIL OFFICIAL, HE DISCOVERED THE COUNTY
SHERIFF HAD ALREADY DIRECTED HIS FORCES TO EVACUATE PERSONNEL
OUT TO A DISTANCE OF APPROXIMATELY ONE-HALF MILE. AS THE
SEVERITY OF THE PROBLEM ON SITE INCREASED, AN ON BASE SECURITY
RECALL WAS INITIATED, AND THE SHIFT COMMANDER AND TWO FOUR-MAN
FIRE TEAMS WERE DISPATCHED TO THE SCENE TO ASSIST THE EVACUA-
2150 TION EFFORT AND POSTING OF THE CORDON. AT 2150, THE FOUR TEAMS
(7) AT THE SCENE WERE POSTED IN FOUR LOCATIONS, (IDENTIFIED IN THIS
DRAWING BY THE 2), IN A TRAPEZOIDAL AREA AROUND THE COMPLEX.

ALL HOMES IN THIS AREA WERE EVACUATED. THE 4 SECURITY TEAMS WERE EVENTUALLY RELIEVED BY RECALLED SECURITY PERSONNEL AT 2230 SO THEY COULD RETURN TO THEIR AREAS OF SECURITY RESPONSIBILITY IN THE MISSILE FIELD. ALSO BY THIS TIME, APPROXIMATELY 200 AREA RESIDENTS HAD BEEN EVACUATED.

2230

EXCEPT FOR THE OBVIOUS DARKNESS DURING THE EARLY MORNING HOURS, THE COMPLEX LOOKED LIKE THIS.

(9)

0300

AT APPROXIMATELY 0300, AN EXPLOSION OCCURRED.

THE COMPLEX NOW LOOKED LIKE THIS.

(9)

IN TRYING TO ACCOUNT FOR ALL WHO WERE TOPSIDE AT THE TIME OF THE EXPLOSION, IT WAS DISCOVERED THAT TWO PERSONNEL COULD NOT BE LOCATED. THEY WERE SUBSEQUENTLY FOUND AND ALL PERSONNEL WERE NOW ACCOUNTED FOR. (PAUSE)

WE NOW NEEDED TO ASSIST THE CIVIL POLICE TO INSURE CIVILIANS HAD BEEN NOTIFIED TO EVACUATE. SECURITY TEAMS STARTED OUTWARD - IN ALL DIRECTIONS FROM THE SITE - TO MAKE NOTIFICATIONS. IN MOST AREAS, CIVIL POLICE HAD ALREADY EXERCISED THEIR PREROGATIVE TO EVACUATE PERSONNEL AND THERE WERE REPORTS OF EVACUATION NOTIFICATIONS IN EXCESS OF 10 MILES FROM THE COMPLEX. SECURITY PERSONNEL WERE REPOSITIONED APPROXIMATELY 2 1/2 MILES OUT FROM THE SITE, AND, TOGETHER WITH THE STATE POLICE, ESTABLISHED ROAD BLOCKS AND CORDON CONTROL FOR THE AREA INSIDE THE LARGE CIRCLE ON THIS MAP, SPECIFIC POSTS ARE IDENTIFIED BY 3 IN RED.

(10)

- OTHER THAN REMOVAL OF THE INJURED, THE PRIMARY AREA OF CONCERN WAS DETERMINING THE LOCATION OF THE NUCLEAR WEAPON AND PROTECTING IT. THE WEAPON WAS LOCATED IN THE DITCH ALONGSIDE THE ACCESS ROAD. [illegible] OF RADIATION LEVELS AND THE LOCATION OF HIGH EXPLOSIVES IN THE AREA, SECURITY POLICE WERE NOT POSTED AT THE WEAPON. MAINTENANCE PERSONNEL WERE POSITIONED AT THE INTERSECTION OF THE COMPLEX ACCESS ROAD AND HWY 65, [illegible] THE AREA HAD BEEN EVACUATED, AND SECURITY FORCES WERE POSTED ON THE CORDON; THE SCENE WAS SECURE. ADDITIONAL SECURITY FIRE TEAMS HAD BEEN DISPATCHED TO PROVIDE THE REQUIRED NUCLEAR SECURITY ARMED RESPONSE. SECURITY PERSONNEL WERE SUBSEQUENTLY POSTED PRIOR TO DAYBREAK AT AN ENTRY CONTROL POINT ON THE ACCESS ROAD (AT BOTTOM OF SCREEN) WHERE THEY COULD OBSERVE THE NUCLEAR WEAPON. THEY WERE [illegible] POSTED CLOSE-IN AROUND THE NUCLEAR WEAPON LATER THAT MORNING WHEN THE AREA WAS DECLARED SAFE. RADIOLOGICAL AND TOXIC VAPOR READINGS TAKEN IN THE VICINITY OF THE NUCLEAR WEAPON AND IN THE DISASTER AREA WERE NEGATIVE EXCEPT VAPOR ON SITE. UPON THIS DETERMINATION, EVACUEES WERE ALLOWED TO RETURN TO THEIR HOMES THAT AFTERNOON. THE 1800 FOOT CORDON WAS REESTABLISHED. CONTROL OF ENTRY TO THE SITE WAS INITIALLY AWKWARD AND DIDN'T GET COMPLETELY SMOOTHED OUT UNTIL MIDDAY ON 20 SEPTEMBER WHEN A SPECIAL INNER AND OUTER ZONE BADGE SYSTEM WAS IMPLEMENTED. UNTIL THAT TIME, PERSONAL RECOGNITION AND AF RESTRICTED AREA BADGES WERE USED WITH VOUCHING AND ESCORT PROCEDURES.

- A MULTITUDE OF ASSISTANCE WAS MADE AVAILABLE. THE HQ SAC DISASTER RESPONSE FORCE ARRIVED EARLY ON THE MORNING OF 19 SEPTEMBER. THEY WERE FOLLOWED BY DEPT OF ENERGY FROM

ALBUQUERQUE, EOD TEAM FROM BARKSDALE, BIOENVIRONMENTAL TEAM FROM BROOKS, AIR TRANSPORTABLE RADIOLOGICAL PACKAGE FROM KELLY, NUCLEAR SURETY (AFISC) AND SP REPRESENTATIVES FROM KIRTLAND, PUBLIC AFFAIRS FROM BARKSDALE AND PHOTO FROM CHARLESTON. AN ENTRY AUTHORITY LIST HAD TO BE PREPARED TO RESOLVE THE COMPLICATIONS ARISING FROM HAVING REPRESENTATIVES FROM THIS MANY ORGANIZATIONS.

- CONTROLLING THE NEWS MEDIA AROUND THE SITE WAS A MAJOR PROBLEM. ALL LOCAL, NATIONAL, AND SOME CABLE CREWS WITH ELABORATE VANS, WERE SET UP AT THE COMPLEX ROAD ACCESS POINT. LIGHT PLANES AND HELICOPTERS OCCUPIED BY NEWS PERSONNEL OVERFLEW THE SCENE IN VIOLATION OF THE FAA ESTABLISHED SAFETY AREA ABOVE THE SITE. WHILE THE AF ASSISTANCE TEAMS PHOTOGRAPHED, THOROUGHLY EXAMINED, AND ENCASED THE NUCLEAR WEAPON IN A CONTAINER FOR MOVEMENT, NEWS CREWS TRIED TO TAKE PICTURES OF OUR ACTIONS. WE HAD TO DEVELOP OBSCURATION DEVICES TO PROTECT AGAINST THIS ACTIVITY.

TO PREPARE FOR THE CONVOY, THE STATE POLICE WERE CONTACTED THE NIGHT BEFORE, AS IS NORMALLY REQUIRED. AT 0730 THE CONVOY LEFT THE SITE - ONE STATE POLICE VEHICLE IN FRONT AND AN EXTRA ONE IN THE REAR, ALONG WITH A 21-MAN AF SECURITY COMPLEMENT. AS THE CONVOY PROCEEDED DOWN THE TWO-LANE HIGHWAY, NEWS VEHICLES - TWO AND THREE VEHICLES ABREAST OFTEN TRIED TO PASS THE STATE POLICE CAR.

A REQUEST FOR ADDITIONAL STATE POLICE ASSISTANCE WAS RADIOED IN. IT ARRIVED SHORTLY AND ASSISTED FROM THE REAR. AS THE CONVOY ENTERED THE INTERSTATE, THE DECISION WAS MADE NOT TO ALLOW TRAFFIC TO PASS, MAINLY DUE TO THE ERRATIC WAY THE NEWS MEDIA WAS DRIVING.

CIVIL POLICE COORDINATION WAS EXCELLENT UNDER THE CIRCUMSTANCES GIVEN THE FACT THERE WERE NO WRITTEN AGREEMENTS OR PROCEDURES ESTABLISHED BETWEEN THE AIR FORCE AND LAW ENFORCEMENT AGENCIES AT THAT TIME. OUR INABILITY TO DISCUSS THE EXACT NATURE OF THE SITUATION, SPECIFICALLY THE LOCATION OF THE NUCLEAR WEAPON, FOSTERED AN AIR OF MISTRUST. IN SPITE OF THIS DEFICIT, THEY ACTED IN EXCESS OF REQUIREMENTS AND WITHOUT REQUEST; THE EVACUATION, SITE SECURITY, AND CONVOY SUPPORT WERE OUTSTANDING.

(15) - AFTER THE NUCLEAR WEAPON WAS REMOVED AND SECURITY RESPONSE FORCE (15 AND 5) REQUIREMENTS WERE DELETED FOR THE COMPLEX, IT WAS PROTECTED BY 6 PERSONNEL, ONE FOR EACH CORNER OF THE COMPLEX, A SUPERVISOR AND ENTRY CONTROLLER. CIVIL POLICE ALSO WITHDREW THE MAJORITY OF THEIR FORCES AT THIS TIME. THE SECURITY FORCE WAS THEN REDUCED TO THE PRESENT REQUIREMENT OF TWO PERSONNEL.

(11) - THIS MISHAP HAS TAUGHT US SEVERAL LESSONS. FIRST, WE WOULD RECOMMEND WHENEVER THERE IS AN ACCIDENT IN WHICH A NUCLEAR WEAPON IS INVOLVED AND THERE IS WIDESPREAD PUBLIC SPECULATION THAT A NUCLEAR WEAPON IS PRESENT, THE PRESENCE OF THE WEAPON AND ITS CONDITION SHOULD BE DISCLOSED. THIS SHOULD BE DONE AS SOON AS PRACTICAL AFTER THE WEAPON'S CONDITION HAS BEEN VERIFIED BY QUALIFIED PERSONNEL.

THIS LIMITED DISCLOSURE WOULD SIGNIFICANTLY IMPROVE ESSENTIAL COORDINATION AND WORKING RELATIONS WITH STATE AND LOCAL OFFICIALS AND HELP MINIMIZE ADVERSE PUBLICITY.

- SECONDLY, WE HAVE PREPARED WRITTEN AGREEMENTS BETWEEN OUR TITAN BASES AND THE RESPONSIBLE CIVILIAN OFFICIALS, TO IDENTIFY A SINGLE POINT OF CONTACT TO RECEIVE, CONFIRM, AND PASS OUR

REQUESTS TO EVACUATE CIVILIANS FROM HAZARDOUS AREAS. THE WRITTEN AGREEMENTS ALSO IDENTIFY AN ON-SCENE CIVIL OFFICIAL WHO WILL COORDINATE THE CIVIL ASSISTANCE TO THE MILITARY AND INVOLVEMENT OF OTHER CIVIL AGENCIES THAT RESPOND TO THE INCIDENT.

--THIRD, SECURE COMMUNICATIONS MUST BE ESTABLISHED AS SOON AS POSSIBLE.

SINCE THE MISSILE SECURITY RADIO NET WAS INITIALLY THE ONLY FUNCTIONAL MEANS OF COMMUNICATIONS AVAILABLE TO CONDUCT DISASTER RECOVERY OPERATIONS, THE MONITORING VULNERABILITY WAS EXPLOITED BY THE MEDIA AND OTHERS USING COMMERCIAL SCANNERS. WE HAVE PROPOSED A $1.2 MILLION RADIO PACKAGE WHICH WILL INCLUDE 2 CHANNEL PRIVACY CAPABILITY TO OVERCOME THIS VULNERABILITY.

--FOURTH, SINCE MANY ACCIDENT SITE PHOTOGRAPHS ARE NECESSARY DURING THE FIRST FEW DAYS, IT IS APPROPRIATE TO PROVIDE FOR DAILY CLASSIFICATION MANAGEMENT.

--FIFTH, THE PUBLIC AND ESPECIALLY THE NEWS MEDIA, CONTINUALLY ATTEMPTED TO ENCROACH UPON THE ACCIDENT SCENE MAKING IT NECESSARY TO IMPROVISE METHODS TO DENY VISUAL OBSERVATION OF CLASSIFIED COMPONENTS AND PROCEDURES. WE HAVE ADVISED OUR UNITS TO EQUIP THEIR DISASTER RESPONSE FORCE WITH OBSCURATION DEVICES AND/OR TECHNIQUES TO BE USED UNDER SIMILAR CIRCUMSTANCES. POSSIBLY ADOPTION OF THE PUBLIC DISCLOSURE RECOMMENDATION WOULD ALSO REDUCE THE MEDIA'S ATTEMPT TO OBTAIN INFORMATION.

--LAST UPDATED MAPS OF EACH SAC TITAN MISSILE COMPLEX HAVE BEEN PREPARED FOR EMERGENCY RESPONSE PURPOSES.

(PAUSE)

SIR, THAT CONCLUDES MY BRIEFING. ARE THERE ANY QUESTIONS?

CLASS A MISSILE MISHAP

WHEN 0300 CDT 19 SEP 80

WHERE 308 SMW LITTLE ROCK AFB, COMPLEX 374-7

SITUATION REPRESSURIZATION OF STAGE II OXIDIZER TANK DUE TO PRESSURES BELOW ALLOWABLE LIMITS.

MISHAP STAGE I FUEL LEAK DUE TO A DROPPED SOCKET --- A SUBSEQUENT EXPLOSION OCCURRED.

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390 SMW/SE

COST

1 LIFE----INTANGIBLE PRICE

1 MISSILE AND
1 MISSILE COMPLEX----$225,332,670 IN PRESENT COSTS

CIVILIAN CLAIMS----UNKNOWN?

BURGESS
390 SMW/SE

PERSONNEL ON SITE

INSTRUCTOR CREW		PTS TEAM A	LOCATION
MCCC CAPT, 31	UPGRADE DMCCC 2LT,26	CHIEF SRA, 24	C/C LEV 2
DMCCC 1LT, 27		SRA, 21	BLASTLOCK BACKUP
BMAT SSGT, 24		A1C, 19	TOPSIDE SERVICING ECU'S
MFT SSGT, 27		AMN, 19	L/D LEV 2, WITNESSED SOCKET FALLING
		A1C, 21	TOPSIDE IN CAT 1
		A1C, 26	BLASTLOCK BACKUP
		SRA, 22	L/D LEV 2, DROPPED SOCKET
		A1C, 20	TOPSIDE IN CAT 1

ALL OF THE ABOVE EVACUATED THRU THE ESCAPE HATCH AND THE BREAK-AWAY PORTION OF THE FENCE

PTS TEAM B- PENETRATION TEAM AFTER EVACUATION, PRIOR TO THE EXPLOSION

SRA, 22	PTS MEMBER (DIED 19 SEP 80 OF SEVERE PULMONARY EDEMA)
SRA, 21	PTS MEMBER
SRA, 21	PTS MEMBER
A1C, 25	QC&E PTS TECH
SGT, 32	QC&E PTS TECH
SGT, 35	PNEUDRAULICS TECH
SRA, 27	INSTRUCTOR MISSILE MECHANIC

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SEQUENCE OF EVENTS

TIME	EVENT
2-14 SEP	REPLACEMENT OF STG II OXI MANHOLE COVER GASKET
16 SEP	STG II OXI TANK REQ REPRESSURIZATION
2325 17 SEP	SORTIE "NOT READY", STG II OXI BELOW PRESSURE LIMITS (T.O.-1-2)
1015 18 SEP	PTS TEAM ARRIVES AT 4-7
1030	PNEUDRAULICS TEAM ON COMPLEX
1150	PNEUDRAULICS TEAM UNABLE TO COMPLETE INITIAL REPAIR OF HS-2, ADDITIONAL PARTS REQ FROM BASE
164?	HS-2 OPERATIONAL, PTS BEGINS T/S ON STG II OXI LOW PRESSURE
1710	MISSILE LEAK CHECK ACCOMPLISHED
1745	MCC AND PTS PREPARE FOR STG II OXI TANK PRESSURIZATION
1827	ECU'S ACTIVATED. PTS ENTERS L/D LEV 2
1835	SOCKET SEPARATES FROM RATCHET, FELL TO LEV 2 PLATFORM, BOUNCED ON RUBBER BOOT, FELL 66', HIT THRUST MOUNT RING, BOUNCED UPWARD AND PUNTURED STG I MISSILE FUEL TANK
1836	PTS TEAM IN L/D REPORTS FUEL LEAK

PTPMU READINGS

STG I F	STG I OXI	STG II F	STG II OXI
(NORMAL T.O.-1)			
9.5	9.5	33.2	36.2
TO	TO	TO	TO
15.5	13.5	40.9	43.9

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TIME	EVENT	PTPMU READINGS
1837	FUEL VAPOR LAUNCH DUCT LITED; PTS TEAM IN BLAST LOCK REPORTS 40 PPM FUEL SIDE (5-10,000 PPM ON LIRA IS OBSERVED BUT NOT REPORTED TO MCC)	
	FIRE IN ENGINE, FIRE LAUNCH DUCT, SPRAY ON, LAUNCH DUCT TEMP HI, LAUNCH DUCT AIR SHUTDOWN LITED; PTS CLOSES BLAST DAMPER #2	
1838	VAPOR SILO EQUIP AREA, VAPOR FUEL PUMP ROOM, OXI VAPOR LAUNCH DUCT LITED; LIRA READING DROPS TO 0 PPM DUE TO MSA WATER LOCKOUT; BLAST VALVE # 5 CLOSED	
1839	TOPSIDE PERSONNEL EVACUATE 2000'; ALL PTS PERSONNEL EVACUATE TO CONTROL CENTER; MCCC STAYS WITH FIRE AUTO CHECKLIST AND REFERS TO OTHERS AS TIME PERMITS	
1841	MCCC RECORDS PTPMU	9.7 13.8 36.1 33.4
1842	BLAST DAMPER #1 CLOSED	
1844	DEFLECTOR HIGH LEVEL LITED	
1848	MPHT FORMED	
1856	HALR PRESSED, OXI VAPOR LAUNCH DUCT NOT LITED	
1858	PERSONNEL TOPSIDE REPORT SMOKE COMING FROM SILO EXHAUST SHAFT	
1905	MCCC RECORDS PTPMU	5.5 18.6 37.7 36.8
1910	MCCC RECORDS PTPMU	4.9 18.8 37.8 36.9
1915	MCCC RECORDS PTPMU	4.1 19.0 37.9 37.0
1920	MCCC RECORDS PTPMU	3.6 18.9 37.9 37.0

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TIME	EVENT	PTPMU READINGS
1925	MCCC RECORDS PTPMU	3.1 18.8 38.0 37.0
1930	MCCC RECORDS PTPMU	2.6 18.8 38.0 37.0
1935	MCCC RECORDS PTPMU	2.2 18.8 38.1 37.0
1940	MCCC RECORDS PTPMU	1.7 18.8 38.1 37.0
1945	MCCC RECORDS PTPMU	1.3 18.8 38.2 37.0
1949	SPRAYS OFF, LACK OF WATER; MSA OUT OF WATER LOCK-OUT; P-1 WILL NOT PRESS OFF AT FPCB	
1950	MCCC RECORDS PTPMU	0.9 18.8 38.2 37.0
1955	MCCC RECORDS PTPMU	0.7 18.9 38.2 37.1
1956	CREW REMOVES POWER FROM MISSILE (T.O.-2-6) AT DIRECTION OF MPHT	
2000	MCCC RECORDS PTPMU	0.4 19.0 38.2 37.1
2004	LAUNCH DUCT TEMP HI HI LITES	
2005	MCCC RECORDS PTPMU	0.4 19.5 38.2 38.1
2010	MCCC RECORDS PTPMU	0.1 23.1 39.2 38.5
2012	MPHT DIRECTS MCC TO SET LDAC SWITCH OFF	
2015	MCCC RECORDS PTPMU	-0.1 23.3 39.2 38.8
2019	MPHT DIRECTS PTS TO SUIT UP TO VENT STG I FUEL TANK	
2020	PTS TEAM ATTEMPT TO RETRIEVE RFHCO AND ECU'S FROM BLAST LOCK, THEY ENCOUNTER SMOKE AND VAPORS	-0.5 23.4 39.3 39.1

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TIME	EVENT	PTPMU READINGS
2022	MPHT PTS REP ADVISES STG I FUEL TANK COLLAPSE POSSIBLE	
2026	VENTING TANK IS IMPOSSIBLE AT THIS TIME	-0.7 23.4 39.4 39.2
2027	MCC AND PTS TEAM DIRECTED TO EVACUATE LCC BY MPHT	
2030	MCC SETS TRANSFER SELECTOR SWITCH ON FPCB TO HAND	
2040	MCC AND PTS TEAM COME OUT OF ESCAPE HATCH TOPSIDE	
2043	MCC AND PTS TEAM ASSEMBLE WITH SECURITY POLICE AT END OF ACCESS ROAD	
2045	HELICOPTER REPORTS COLUMN OF WHITE SMOKE FROM SILO EXHAUST SHAFT	
2057	HELICOPTER LANDS WITH 308 SMW/CC REP AND PTS QC&E	
2102	MCCC, DMCCC AND TWO PTS PERSONNEL PROCEED TO SURFACE GATE TO OBSERVE AND REPORT CONDITIONS	
2125	PTS QC& E TECH MAKES UNAUTHORIZED ENTRY OF LCC THRU ESCAPE HATCH TO RECORD PTPMU READINGS	-2.0 29.4 41.0 41.4
2331	PTS RECOVERY TEAM ARRIVES ON-SITE	
0152 19 SEP	THREE-MAN PTS RECOVERY TEAM, 308 SMW/CC REP AND SENIOR PTS TEAM CHIEF PROCEED TO SURFACE GATE FOR INITIAL PENETRATION EFFORT	
0155	THREE-MAN PTS RECOVERY TEAM IN RFHCO ENTER COMPLEX AFTER BREAKING THRU FENCE. OTHERS REMAIN AT GATE	
0201	HEAVY VAPORS EMITTING FROM EXHAUST SHAFT	

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TIME	EVENT	PTPMU READINGS
0205	TWO PTS TEAM MEMBERS HEAD TOWARD ACCESS PORTAL; ONE PTS TEAM MEMBER PROCEEDS TO EXHAUST SHAFT WITH PVD	
0208	TWO PTS MEMBERS ARRIVE AT PORTAL. REMAINING MEMBER REPORTS 250 PPM AT EXHAUST SHAFT. PART OF SMOKE MAY BE STEAM. PERIODIC ERUPTIONS	
0211	TWO PTS MEMBERS INSIDE ENTRAPMENT AREA. 0 PPM ON PVD	
0212	PTS MEMBER AT EXHAUST SHAFT RETURNS TO SURFACE GATE. TWO PTS MEMBERS REPORT 10 PPM FUEL VAPOR OUTSIDE BLAST DOOR #6	
0215	TWO PTS MEMBERS ATTEMPT TO OPEN BLAST DOOR #6 WITH PORTABLE HYDRAULIC PUMP	
0228	PTS MEMBERS UNABLE TO OPEN BLAST DOOR #6; DIRECTED TO RETURN TO GATE DUE TO LOW AIR SUPPLY	
0242	SECOND PTS RECOVERY TEAM (TWO MEN IN RFHCO) ACTIVATE AIR AND ENTER COMPLEX	
0244	SECOND TEAM PROCEEDS TO ACCESS PORTAL	
0251	BLAST DOOR #6 REPORTED OPEN	
0253	PVD INDICATES 180 PPM IN BLAST LOCK AREA 202	
0254	SECOND TEAM REPORTS 180 PPM AT AIR HOLE IN BLAST DOOR #7	
0257	BLAST DOOR #7 OPENED VIA HS-3 SYSTEM. PERSONNEL TOP-SIDE REPORT SMOKE/VAPORS SETTLING CLOSE TO GROUND. PVD PEGS OUT AT 250 PPM IN BLAST LOCK AREA 201. SECOND TEAM EVACUATES. BLAST DOORS #6 AND #7 LEFT OPEN	

Burgess
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TIME	EVENT	PTPMU READINGS
0259	TEAM REPORTS VISIBILITY BETWEEN BLAST DOORS #8 AND #9 WAS LIMITED. MSA PEGGED OUT AND ALL INDICATORS ON FUEL SIDE WERE LITED. TEAM TURNS EF105 SWITCH OUTSIDE ENTRAPMENT DOOR TO ON POSITION AND BOTH PTS TROOPS SIT DOWN ON CONCRETE NEAR ENTRY PORTAL	
0300	MPHT REPORTS TELEPHONE CONTACT WITH LCC BROKEN. VIOLENT EXPLOSION	

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LITTLE ROCK CLASS A MISSILE MISHAP

Prepared by: 1Lt Jon R. Burgess, Missile Safety Officer
390SMW/SE, Davis-Monthan AFB Arizona 85707

1. 390 SMW Safety

2. This is looking at the surface gate of Complex 374-7 from the access road.

3. This is another look, 250 feet east of the complex. You are looking at the silo door abutement rail bridge and jack.

4. The fuel hardstand on complex.

5. One of the few things left standing, the IRCS (Intra-base Radio Communication System) soft antenna. Most of the Stage I missile fragments located within 300 feet of the silo.

6. Another view of the IRCS antenna. Most of the Stage II missile fragments located out to 2300 feet from the silo.

7. View of Complex 374-7 at 1030L on 19 Sep 80. Explosion occured at 0300. Note the wet surface area and the arrow pointing to the PTS maintenance truck.

8. Ground view of silo. Note missing deflector vanes in the exhaust duct and the blast effect on the concrete siding.

9. Another ground view of the silo. Note the cooling tower pit in the upper left corner had moved 8 to 10 feet.

10. Silo Launch Duct Levels 1 and 2 with the work platforms.

11. Another view of silo launch duct levels 1 and 2.

12. Silo launch duct level 1 showing launch duct access door frame.

13. Silo launch duct level 2 access door. Note door is "blown" inward toward missile.

14. Overhead view of entire silo launch duct.

15. Silo launch duct level 2 work platforms. Note that the segment "g" platform grating mostly remains. Severe burning effects can be seen from level 3 downward.

16. Looking down at silo launch duct levels 4 to 7. Note thrust mount suspension set still intact; remaining acoustical tiles in upper center; severe burning effects; and stage 1 oxidizer feed line.

17. Looking at the Thrust Mount Ring, Stage 1 Oxidizer Feed Line and lower section of Stage 1 Fuel Tank.

18. Exhaust Duct Deflector showing equipment room to deflector wall blown outward. Note water remaining in the deflector.

19. Launch Control Center after portable generator was brought in for power to lighting. Note drinking glasses in foreground.

20. Another view of the Launch Control Center with drinking glasses intact.

21. Blast Lock Area 201. Blast Door 9 on left. Note corrosive effect of vapor and smoke.

22. This is the truck where the MB and the PTS members monitored the Launch Control Center penetration operation. When the explosion occured, the MB was thrown into the cab, where he grabbed onto the seat. One PTS member was sitting on the tailgate, while another was standing to the right of the truck. Note the tailgate and concrete pieces.

23. PTS Team "A" truck. Note the damage and location of the concrete slab.

24. PTS Team "B" truck. Note the concrete block.

25. HS-1 N_2 storage container. Originally located in Silo Equipment Area Level 1. 6,000 pounds and 465 feet from silo.

26. Broken Arrow.

27. This is where the device landed, about 75 feet from the surface gate. Note the broken N_2 accumulator bottles near where it landed.

28. Portion of silo door. 244,000 pounds and 290 feet from silo.

29. Part of the 740 ton silo door.

30. Best view of the 740 ton silo door which landed at an 80° angle, hit 625 feet from the silo and slid 75 feet.

31. This "piece" was about 2200 feet from the silo, two foot into the soft dirt.

32. Two large pieces of Flame Deflector Vane, each weighing 11 tons and 1700 feet and 1730 feet (respectively) from the silo.

33. Portion of Water Chillers from Silo Equipment Level 2.

34. Water Chiller Control Panel.

35. Fragments spread over the countryside.

36. More fragments. 98% of fragments were contained within 2,000 feet of silo.

37. Flame Deflector Vane contained within complex fence. Four feet into ground.

38. Silo Launch Duct steel liner. 20,700 pounds located 230 feet from silo.

39. Stage I missile fragments located in base warehouse for sorting and classification.

40. Stage II missile fragments in warehouse. Note the "banana-peel" effect.

41. RV ablative shield nose tip and pieces of RV. NO evidence of impact with silo closure door.

42. Lower portion of Stage I Oxi Tank. This may have been the area of rupture.

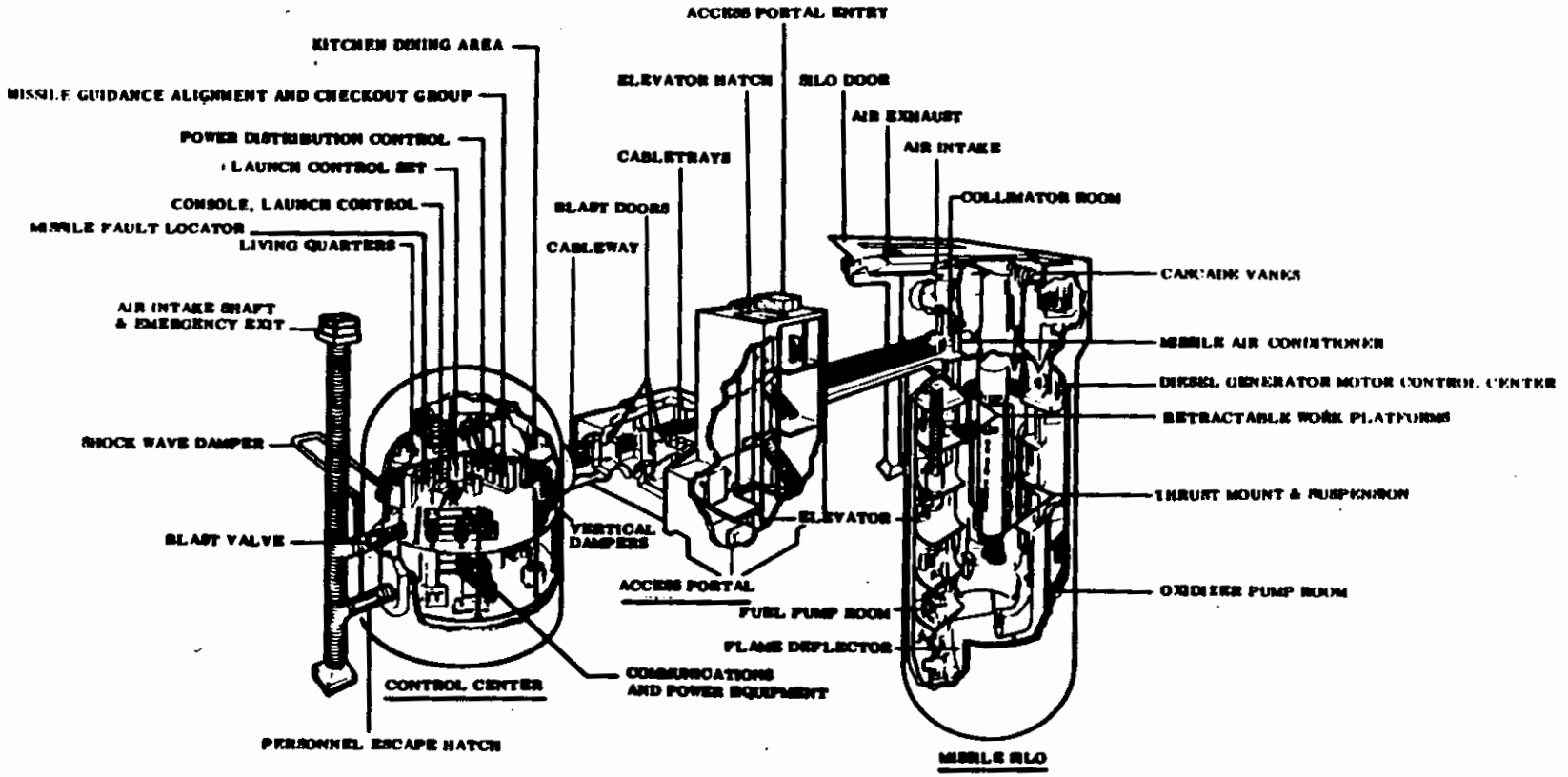
43. Missile internal batteries (APS & VHPS).

44. Parts of the Stage I missile engine components.

45. RFHCO helmet found topside. Worn by surviving PTS member.

46. RFHCO outfit worn by deceased member of PTS team.

47. This was the cause. If the socket retaining pin was properly placed into the engaging hole, this missile mishap might not have occured!



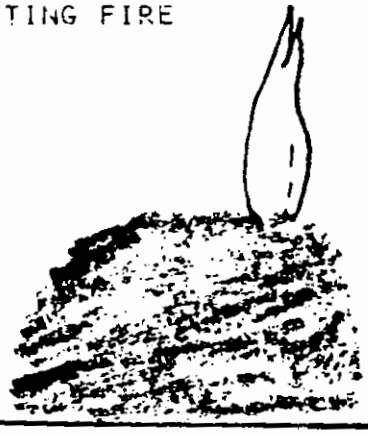
TITAN II LAUNCH COMPLEX

CAMERA GROUND LEVEL VIDEO TAPE SEQUENCE

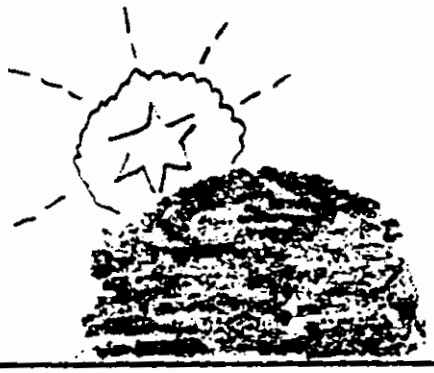
2000' EAST OF SILO
(OBSTRUCTION BY 30' TREE)

T+0 SEC
DIFFUSION FIRE

T+3 SEC
JETTING FIRE



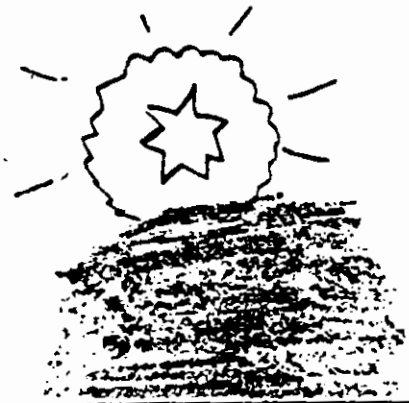
T+4 SEC
SMALL EXPLOSION



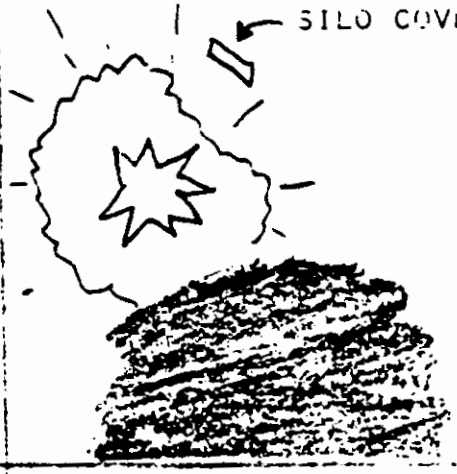
FADE OUT

T+4.5 SEC
SECOND LARGE EXPLOSION

T+4.0 SEC FIREBALL

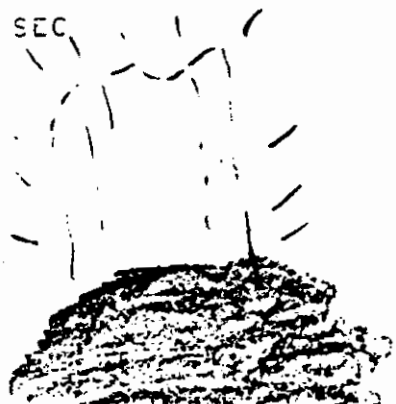


SILO COVER DOOR

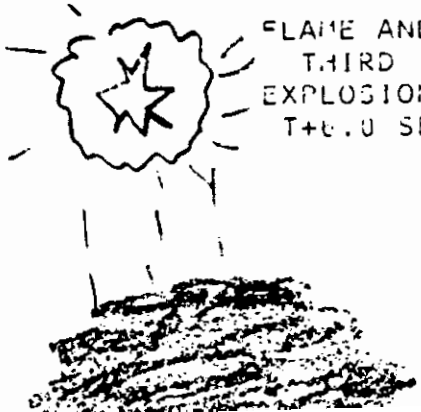


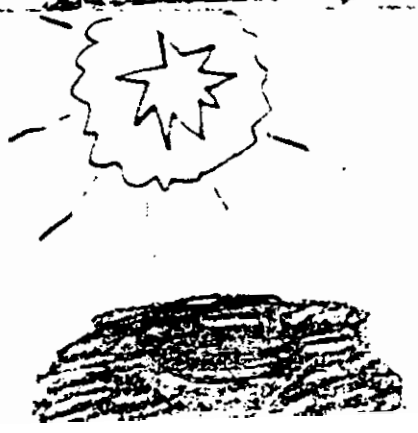
T+4.0 SEC

T+5.0 SEC

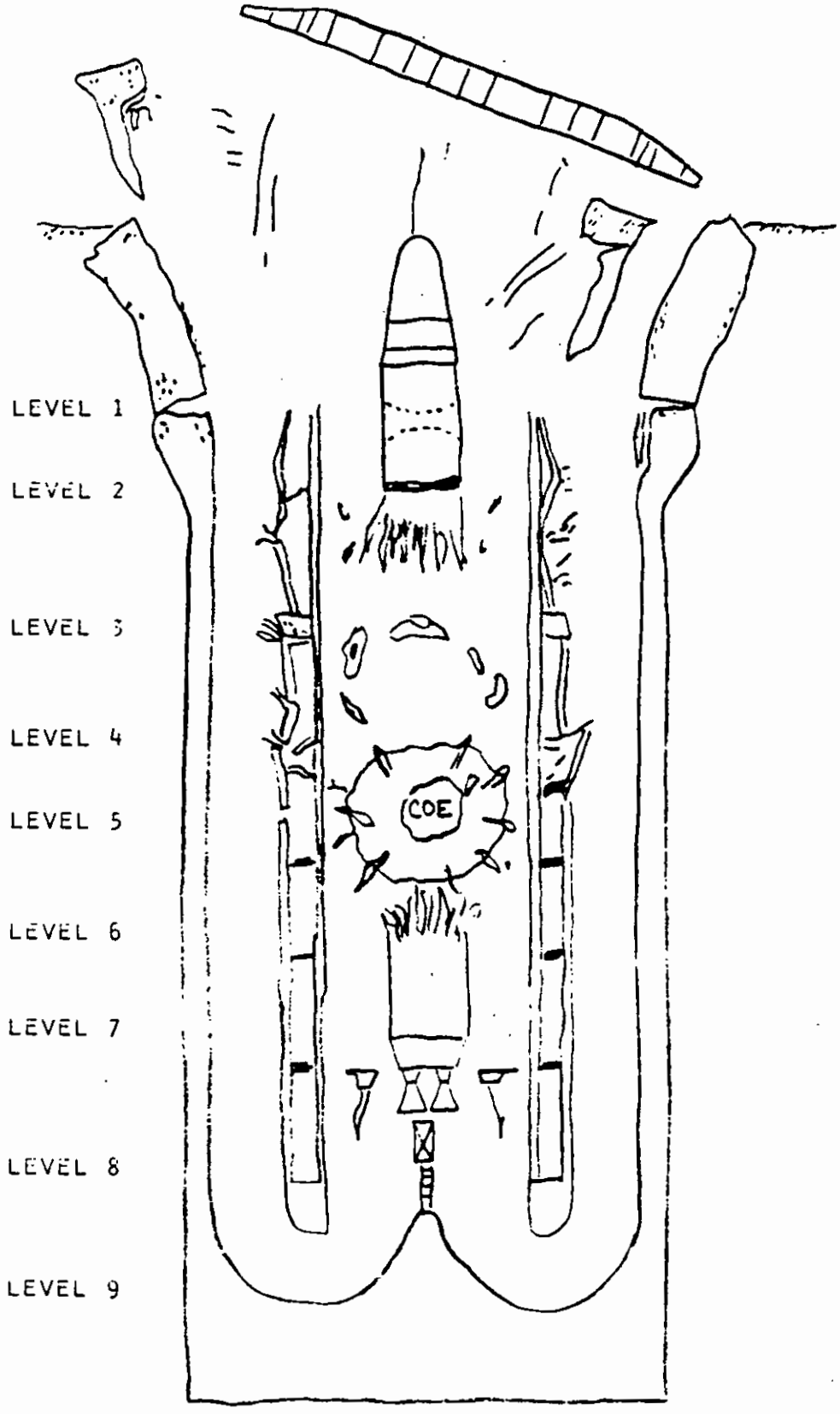


FLAME AND
THIRD
EXPLOSION
T+6.0 SEC





SILO DAMAGE AND CENTER OF EXPLOSION (COE)



RECOMMENDATION SINCE THE MISHAP

1. CHANGES TO TECH DATA

2. CHANGES TO PTS PROCEDURES

3. DEVELOPMENT OF NEW MCL'S

4. IMPROVEMENT OF EXISTING SAFETY EQUIPEMENT AND SYSTEMS

5. IMPROVEMENT OF SAFETY TRAINING PROGRAMS

6. IMPROVEMENT OF MPHT EFFECTIVENESS

7. IMPROVED INTRABASE COMMUNICATIONS

FC

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D.C.

10 JUN 1981

REPLY TO ATTN OF: XOORB

SUBJECT: NUWAX-81 After Action Report (Your Msg, 071949Z May 81, same subject)

TO: FCDNA/FCN

Attached are copies of the following materials generated by HQ USAF in support of NUWAX-81:

a. AF/XOO 6 Apr 81 Ltr, subj: Participation in Nuclear Weapons Accident Exercises (NUWAX-81), which tasked Air Staff agencies to staff the HQ USAF Contingency Support Staff (CSS) during NUWAX-81.

b. Copy of AF/XO briefing on NUWAX-81 presented to CSAF on exercise D-Day.

c. Weather information prepared by the Air Force Operations Center (AFOC) Weather Detachment.

d. Copy of AFOC Contingency Support Staff Executive Officer's log.

e. Copies of HQ USAF/CSS messages 211734Z and 211950Z Apr 81.

f. Transcript of telecon between HQ SAC and AFOC on initiation of NUWAX-81.

FOR THE CHIEF OF STAFF

Richard B. Bugeda

RICHARD B. BUGEDA, COL, USAF
CHIEF, AIR BASE SURVIVABILITY GP
DIRECTORATE OF OPERATIONS

6 Atch
1. AF/XOO Ltr 6 Apr 81
2. AF/XO NUWAX-81 Briefing
3. AFOC WX Brief
4. AFOC CSS Log
5. AFOC CSS NUWAX-81 Msgs
6. Transcript of AFOC/HQ SAC telecon

For 5

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D.C.

6 APR 1981

REPLY TO ATTN OF: XOO

SUBJECT: Participation in Nuclear Weapons Accident Exercise (NUWAX-81)

TO: See Distribution

1. NUWAX-81 is a biennial joint DOD and DOE field exercise based on a nuclear weapons accident in the United States. The exercise will take place at the Nevada Test Site and will include Washington area participation. NUWAX-81 is scheduled to begin on 21 April 1981 and will continue for approximately seven days. The exercise will require consideration of the actions taken to recover from the effects of a serious nuclear weapons accident near a populated area.

2. NUWAX-81 will require the HQ USAF Contingency Support Staff (CSS) to convene on an as required basis. Each organization tasked to provide personnel for CSS duty should review applicable rosters to insure that representatives are available for duty during the 21-28 April time frame.

3. Exercise conduct will be as realistic as possible, all crisis management training will be conducted during the course of the exercise. Activation of the CSS will be as outlined in applicable HQ Operating Instructions on a real time basis.

4. Air Staff points of contact for NUWAX-81 are Maj Latham or Lt Col Buschmann, XOOTA, ext 78456 and Lt Col Cooper or Major Cashman, XOOOF(EX), ext 77580.

Richard A. Burpee

RICHARD A. BURPEE, Brig Gen, USAF
Dep Director of Operations & Readiness
DCS/Operations, Plans and Readiness

Atch
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AF/XOO (Distribution "A" DOI 10-8)

NUWAX 81

(21 - 27 APR)

SLIDE NUWAX 81, A WEEK LONG LIMITED NOTICE NUCLEAR WEAPONS ACCIDENT EXERCISE, BEGAN ~~TUESDAY~~ TODAY AT THE DEPARTMENT OF ENERGY'S NEVADA TEST SITE.

PERSONNEL FROM FEDERAL AND STATE GOVERNMENTS AND ALL MILITARY SERVICE WILL PARTICIPATE.

OBJECTIVES

- INTERFACE OF LOCAL, STATE AND FEDERAL AGENCIES
- COMMAND AND CONTROL OF JOINT DOD/DOE ACCIDENT ORGANIZATIONS
- EVALUATE TECHNICAL AND LOGISTICS SUPPORT
- VALIDATE COMMAND POST EXERCISE

SPLIT THE SCENARIO INVOLVES A MIDAIR COLLISION BETWEEN A LIGHT PLANE AND A US ARMY HELICOPTER CARRYING THREE ARMY NUCLEAR WEAPONS, FROM AN AIR FORCE BASE IN CALIFORNIA TO AN ARMY DEPOT IN CALIFORNIA.

THE HELICOPTER CRASHED ON A BANK OF A SMALL CITY'S WATER RESEVIOR THEN BURSTS INTO FLAMES.

THE CIVILIAN PLANE IS ALSO DESTROYED.

U

REVEAL THESE NUCLEAR WEAPONS WERE AFFECTED.

THE B-48, DNA, FEMA ANI DETONATED IN THE POST CRASH FIRE AND PRODUCED RATIOACTIVE CONTAMINATION OVER A LARGE AREA.

THE W-50 WEAPON BURNED IN THE FIRE AND ITS HIGH EXPLOSIVE WAS COMSUMED.

THE W31 FELL WELL CLEAR OF THE WRECKAGE YET WAS SIGNIFICANTLY DAMAGED.

ALL 20 PERSONNEL FLYING ONBOARD THE TWO AIRCRAFT WERE CASUALITIES. THE BODIES OF THE PILOT AND COPILOT OF THE HELICOPTER WERE CONTAMINATED WITH RADIOACTIVITY.

THE EXERCISE INCLUDES SMALL AMOUNTS OF AIRCRAFT WRECKAGE, WEAPON SHAPES (TRAINING) AND SMALL AMOUNTS OF RADIUM 223 AND MERCURY 197 TO PROVIDE REALISTIC RADIOACTIVITY. THE RADIUM HAS A HALF LIFE OF 11 DAYS AND MERCURY 2.3 DAYS AND NEITHER WILL ENDANGER PERSONNEL, WHO ARE WEARING PROTECTIVE CLOTHING.

SPLIT PARTICIPANTS FROM THE THREE SERVICES, JCS, THE DEPARTMENT OF ENERGY, DNA, FEMA AND CALIFORNIA CIVILIAN AUTHORITIES WILL COMPRISE THE RESPONSE TEAM OF OVER 850 PERSONNEL.

AIR FORCE PERSONNEL WILL BE SUPPORTING THE ARMY, WHICH IS INCHARGE OF THIS YEARS EXERCISE.

SPLIT THESE NUCLEAR ACCIDENTS RESPONSE TEAM ACTIONS WILL BE EXERCISED.

JOINT COMMAND AND CONTROL PROCEDURES WILL BE ESTABLISHED WITH ALL PARTICIPATING AGENCIES.

THEY WILL ALSO ESTABLISH RADIOLOGICAL SAFETY PROCEDURES FOR PERSONNEL WORKING IN THE ACCIDENT AREA AND SET UP COMMUNICATION NETS, HEALTH SERVICES AND SECURITY PROCEDURES.

THE WEAPONS RECOVERY AND PUBLIC AFFAIRS OPERATIONS WILL BE TWO OF THE MAJOR TASKS DURING THE EXERCISE.

LOGISTIC SUPPORT (OF SUPPLIES) WILL BE PROVIDED BY THE AIR FORCE AND ARMY, WHILE LEGAL AFFAIRS WILL BE PROVIDED BY ALL PARTICIPATING AGENCIES.

SITE RESTORATION WILL ALSO BE IMPORTANT. ALL MATERIAL WILL BE REMOVED AFTER THE EXERCISE. AN AERIAL RADIATION AND SOIL SAMPLING PROGRAM WILL BE CONDUCTED FOLLOWING THE EXERCISE TO CONFIRM FINAL SITE RESTORATION.

WEATHER INFORMATION - 60 MILES NORTHWEST INDIAN SPRINGS, NV

CURRENT AS OF 1600Z 21 APRIL 1981:

SKY: 18000 SCATTERED 25000 THIN BROKEN
VISIBILITY: 35 MILES
TEMPERATURE: 65F
DEWPOINT: 37F
WIND: FROM THE SOUTHWEST (230°) AT 2 KNOTS.
ALTIMETER: 29.95 INCHES

24-48 HOUR FORECAST

TUESDAY AFTERNOON - SKY: 8000 SCATTERED 12000 SCATTERED 25000 SCATTERE
VISIBILITY: UNLIMITED
MAX TEMPERATURE: 81F
WIND: FROM THE NORTHEAST (020°) AT 15 KNOTS
REMARKS: ISOLATED RAINSHOWERS OVER MOUNTAINS

TUESDAY NIGHT - MOSTLY CLEAR TO PARTLY CLOUDY
VISIBILITY: UNLIMITED
MIN TEMPERATURE: 55F
WIND: VARIABLE AT 5 KNOTS

WEDNESDAY - PARTLY CLOUDY
VISIBILITY: UNLIMITED
MAX TEMPERATURE: 87F
WIND: FROM THE NORTHWEST AT 5 KNOTS INCREASING TO 10-15 KNOTS BY AFTERNOON.

MAJ LINDQUIST/AFOC
71638

UPPER AIR WINDS - 60 MILES NORTHWEST INDIAN SPRINGS, NV

	21/1200Z	22/1200Z	23/1200Z
SURFACE	030/04 KNOTS	350/05 KNOTS	030/09 KNOTS
5000 FEET	030/12 KNOTS	040/18 KNOTS	130/10 KNOTS
10000 FEET	010/16 KNOTS	020/25 KNOTS	090/04 KNOTS
15000 FEET	360/23 KNOTS	360/39 KNOTS	350/10 KNOTS
20000 FEET	350/38 KNOTS	350/52 KNOTS	320/21 KNOTS

MAJ LINDQUIST/AFOC
71638

DATE/TIME	EVENT
21/1435Z	Notified by NMCC that Army CH-47 with nuclear weapons crashed at 0930E at Wahmonie, CA.
21/1450Z	Notified to form an Initial DRF from March AFB, CA.
21/1555Z	Confirmed that cage had put OEHL and ATRAP on standby.
21/1640Z	Obtained ESP code NA for NUWAX-81.
21/1723Z	Based on SAC request tasked OEHL and ATRAP to respond.
21/1833	Informed SAC that ATRAP and OEHL would respond on 22 Apr by preplanned airlift.
21/1917Z	CHP reports AF team arriving. 4 civilians taken to Riverside, 7 civilians retained. All helicopter personnel and civilian aircraft personnel were fatalities.
21/2040Z	Lt Col Anderson (March CP) called asking if we had talked to HQ SAC. We had! He said they had not talked with on site team yet.
21/2100Z	White Sands pick-up of Army commander. C-130 landed 2035Z. Scheduled to depart for Las Vegas at 2300Z. Told Army Ops Center will expedite ground turn if possible.
21/2150Z	Army AOC report of secondary explosions. Exercise
21/2250Z	Conference call continues to pass classified data over non-secure phone.
22/0023Z	Received call from SAC CP asking CSS to confirm number of people in civilian aircraft. Called FAA representative but they were not given the scenario.
22/0100Z	Exec change over Maj Ted Schwartz off and Maj Barry Ream on duty.
22/0125Z	Lt Col Anderson (March CP) called, we were on a conference call and told him to call back.
22/0125Z	NMCC conference call - Maj Gen Nord the Army ongoing on-scene commander has not arrived.
22/0145Z	Maj Moon (SAC CP AUTOVON 271-2810/11) called with a request from March CP. They wnated to know if they could remove the bodies from the accident. Also the aerial photo will be completed by dusk local time on-scene and radiological survey by dawn.

DATE/TIME	EVENT
22/1055L	Only 1 civilian was on the aircraft from Col Licht, NMCC.
22/1105L	Passed request for Navy underwater EOD support to Navy CSS, Cmdr McGuire. Equipment is available nearby, need to know exact requirement.
22/1125L	Question from NMCC. Did local population object to establishment of NDA? Passed to on scene.
22/1226L	Cmdr McGuire, Navy Ops Center, called to say Navy EOD request being worked with Barbers Point, Hawaii. Should have answer in approximately one hour.
22/1305L	Size of NDA passed to NMCC by Maj Neher. Also passed that there was some local resistance to establishing the NDA but all problems were solved by the on-scene JA. Also no security problems last night.
22/1307L	1739Z SITREP from March AFB, Command Post. - DOE, FEMA, OEMS, NTSB, Army, all local police on-scene - Found second weapon. NDA expanded to compensate. - AF team told to assist as necessary after Army takes over.
22/1314L	Conference call recommended with Maj Gen Nord's deputy, Col Rose. Second weapon discovered south of crash site. Container appears not to be damaged. AOC asked grid coordinate of NDA - information not yet available. On-scene commander estimated that Maj Gen Nord will request change of control in approximately one hour. SECDEF has stated that Gen Nord could assume role of on-scene commander when Gen Nord was ready. Conference call terminated at 1326.
22/1425L	Refined dimensions of NDA passed to NMCC by Maj Neher. 4000' x 7000' plus 2000' radius semicircle to south.
22/1500L	Navy CP called. Underwater EOD departing Seal Beach for site. 5 sets of equipment, boat and trailer, Sonar Area Point Search System all towed by two vehicles. From Capt Maycock at 73072.
22/1630L	Maj Webster Army Ops Cneter called; Maj Gen Nord has taken command as on-scene commander at accident site effective 22/1930Z, Apr 81 - two hours ago!
22/1715L	During a telephone conference call, it was revealed that Maj Gen Nord was not on-scene commander and that he would not take over until directed to by the NMCC.

DATE/TIME	EVENT
22/0845L	Col Ritchie NMCC asked for exact number of AF Security Police at the site. SAC provided the answer - 20. Passed answer to NMCC at 0853L.
22/0930L	Maj Latham talked to Lt Col Jones on the site. According to Lt Col Jones, the Army is in control. Passed this information to Lt Col Braden, NMCC. He says the AF still had control and will until 12-1300 EST.
22/0955L	Col Ritchie NMCC. According to Col Rose (Deputy to Maj Gen Nord on scene), the Army has not assumed control. Lt Col Shea is still in charge on scene. Wants AF to ask two questions. 1. How large is NDA? 2. Were there any security problems last night? Wants to pass two items to Lt Col Shea. 1. Ex Gov due on scene. 2. Anticipate additional press inquires. Only two telephone lines are now established with AF on scene, therefore having problems getting through.
22/1000L	Maj Webster AOC, please inform AF on scene team that they may be asked to stay after the Army takes over.
22/1030L	March AFB questions 1. Names on Army helicopter 2. EOD needs underwater resources 3. FAA number on civilian aircraft Passed two items 1. AF still in charge on scene 2. 1 mile restricted area set up
22/1045L	Passed request for Navy underwater equipment to NMCC, Col Licht. He returned call said go directly to Navy Ops Center.
22/1050L	Passed six names to March AFB. (Fatalities on Army helicopter . Names being withheld pending notification of next of kin.) Roberts, Gordon W. Maj Pilot Williams, James Capt Co Pilot Woodfin, Woodward SSG Crew Chief Garcia, Larkin 1 Lt Zualodeck, Michael D. Spec 4 Johns, W. PFC

DATE/TIME	EVENT
22/0150Z	Capt Taylor, CSS, contacted Maj Moon and informed him that the state medical examiner must be contacted before the bodies can be moved.
22/0200Z	Lt Col Anderson (March CP) wanted to know the ETA of the decontamination team.
22/0230Z	Conference call by NMCC from March CP. Maj Gen Nord is at the scene touring the site. However, Lt Col Shea, Air Force is still the on-scene commander.
22/0400Z	There is still a problem with the Army body count as to how many were on the helicopter. Army says six and the on-scene commander says seven. The Army will not release any names or notify next-of-kin until they get the actual body count correct. This probably won't happen until tomorrow.
22/0445Z	Received a call from March CP requesting the Air Transportable Radiac Package (ATRAP), Contamination Disposal Team (CDT), and Occupational and Environmental Health Laboratory (OEHL).
22/0450Z	Capt Taylor contacted HQ SAC and March CP to confirm that the on-scene commander Lt Col Shea had requested the ATRP, CDT and OEHL. March CP confirmed the on-scene commander's request.
22/0510Z	Capt Taylor contacted HQ AFSC CP and instructed them to contact OEHL with instructions to deploy to Nellis AFB.
22/0515Z	Capt Taylor contacted HQ AFLC CP and instructed them to contact the ATRAP and CDT with instructions to deploy to Nellis AFB.
22/0520Z	See Airlift Report (Maj Conklin) about problems associated with the movement of the ATRAP, CDT, and OEHL.
22/0740Z	The Army Ops Center called and said Maj Gen Nord has taken over as on-scene commander effective 22/0550Z. We received the word only 1 hour and 50 minutes late. The change of on-scene commander was confirmed with the NMCC and we passed the information on to SAC CP Maj Moon.
22/0750Z	AF CSS closing down Maj Barry L. Ream, Exec, XOOTD, 71810.
22/1010Z	NMCC called AFOC and AF/CSS is still in charge. Army Maj Gen Nord will take charge at 0930 Las Vegas time.
22/0630L	CSS exec returned to duty. Army reportedly has not assumed command. AF still in control. Maj Gillett.

UNCLASSIFIED

01 02 211734z APR 81 RR RR UUUU

FROM HQ USAF WASH DC//CSS//

TO HQ MAC SCOTT AFB IL//CSS//

HQ SAC OFFUTT AFB NE//CSS//

HQ AFSC ANDREWS AFB MD//CSS//

HQ AFLC WPAFB OH//CSS//

INFO FCDNA NTS NV//JTG//

CNO WASH DC

CSAF WASH DC

DA WASH DC//DAMO NCS/DAIG/DAMI CIC//

CIA WASH DC

DNA WASH DC

NMCC WASH DC

ANMCC WASH DC

CDRFORSCOM FT MCPHERSON GA//AFOP TAS//

CDRARRCOM ALEXANDRIA VA//DRCNC/DRCSF//

CDRARRCOM ROCK ISLAND IW/DRSAR MAYN/DR SAR SF//

CDRARRCOM DOVER NJ//DRSAR MAY A//

CDRMICOM REDSTONE ARSENAL AL//IAX TA C//

CDRTAC ARLINGTON HALL STATION VA//IAX TA C//

INSIDE PHONE

XOORE, MAJ KEYS, 50909, 21 APR 81,

SPECIAL INSTRUCTIONS

KDB

Col George Harrison
CSS/Team Chief

for T. L. Wint

UNCLASSIFIED

EDITION

UNCLASSIFIED

02 02 UUUU

FROM CDRARRADCOM DOVER NJ//DRDARQAN//

TO: CDRUSANCE FT BELVOIR VA//MONA MS/MONA SU//

DCDRINSCOM FT MEADE MD//IACSP/ABI//

NUWAX-81 JTG

UNCLAS

EXERCISE NUWAX-81 EXERCISE EXERCISE

SUBJECT: NUWAY 81 PRECEDENCE AND EXERCISE CODES

1. USAF ACCOUNTING CODE WILL BE ESP CODE NA.

2. THE JCS HAS DIRECTED THAT FORCE ACTIVITY DESIGNATOR {FAD} I BE APPLIED. USAF PRECEDENCE RATING IS 1-1.

EXERCISE EXERCISE EXERCISE

6 5 4 3 2 1 0

DISTR

DRAFTER TYPED NAME TITLE OFFICE SYMBOL PHONE

XOORE,MAJ KEYS,50909,21APR81,KDB

SPECIAL INSTRUCTIONS

TYPED NAME TITLE OFFICE SYMBOL AND PHONE

SIGNATURE

SLW

SECURITY CLASSIFICATION

UNCLASSIFIED

DATE TIME GROUP

DD 173.3 (OCR)

PREVIOUS EDITION IS OBSOLETE AS OF 1 JAN 1980

~~CONFIDENTIAL~~ downgraded Unclass

X 01 02 211950Z APR 81 00 00 ~~OCC~~ UNCLASSIFIED

HQ USAF WASH DC//CSS/X00RZ//

HQ TAC LANGLEY AFB VA//DOR//

INFO NGB//X00//

HQ SAC OFFUTT AFB NE//D00/D0R/DOC//

15 AF MARCH AFB CA//DOR/INZ//

~~C O N F I D E N T I A L~~ Unclass

EXERCISE NUWAX 81 - EXERCISE

SUBJ: AERIAL PHOTOGRAPHY OF CH-47 CRASH SITE

REF A - TELECON BETWEEN MAJ VOXLAND AF/X00RZ AND LT COL BOEHMER 21 APR 81.

REF B - TELECON BETWEEN LTC SMITH AF/X00RZ AND MAJ REAMER HQ TAC/ DORR 21 APR 81.

1. (U) REF B ALERTED HQ TAC TO AN AERIAL PHOTOGRAPHIC REQUEST FROM HQ SAC (REF A).

2. (C) MIDAIR COLLISION OCCURRED BETWEEN A CH-47 CARRYING THREE NUCLEAR WARHEADS AND A SMALL PRIVATE AIRCRAFT AT 1430Z 21APR81 NEAR WAHMONIE CALIF. REQUEST YOU PROVIDE FOLLOWING COVERAGE:

A. TARGET: 36500N, 116080W.

B. SCALE: BEST POSSIBLE

C. CONTACT SAC POC LT COL BOEHMER, AVN 271-2810, FOR PRODUCT

RECON STATION 9

B G HARRISON, COL, CSS TM CHIEF

George B. Harrison

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UNCLASSIFIED

~~X 82 82~~ APR 81 00 00 ~~CCCC~~

REQUIREMENTS AND DELIVERY INSTRUCTIONS

~~DECL:~~ 21 APR 87

~~EXERCISE~~ NUWAX 81 EXERCISE

~~CONFIDENTIAL~~
UNCLASSIFIED

TRANSCRIPT OF INITIATION OF EXERCISE NUWAX 81

GEN BODIE - Air Force, I need the names of on-scene commander and PA Officer from March AFB, CA? (NAME)

REMAINDER OF TRANSCRIPT OCCURRED BETWEEN 0950E & 1003.

Sgt Tucker - Calls SAC HQ. This is Sgt Tucker from the Air Force Operations Center with question concerning Exercise NUWAX-81. I need the on-scene commander and PA officer at March AFB, CA?

Col Slaman - I'll get back with you with that info. We (SAC) weren't aware that this even happened.

Sgt Tucker - Yes sir; 1430Z sir.

SAC CALLS - This is Col Bowman at SAC. Someone called here asking some questions concerning NUWAX-81.

Sgt Tucker - That was me sir. I need the information per Gen Bodie's request.

Col Bowman - Okay what do you need?

Sgt Tucker - I need the on-scene commander and PA officer at March AFB, CA sir.

Col Bowman - Here at SAC or March?

Sgt Tucker - No Sir; at March AFB, CA.

Col Bowman - You mean at the scene or at March?

Sgt Tucker - At March AFB, CA sir. Sir, do you have the time of the crash.

Col Bowman - No; we have nothing on it.

Sgt Tucker - The time of the crash was 1430Z. NUWAX-81 began at 1447Z.

Col Bowman - Are we going to get something hard copy on this?

Sgt Tucker - They have an OPREP that's out on it right now sir. It will be an broken arrow.

(SAC) Col Bowman-I understand. Okay start of Exercise NUWAX 81 1447Z.

Sgt Tucker - Yes sir.

SAC CALLS - Col Bowman here; the on-scene commander is LtCol Shea and the PA officer is LtCol Heil.

Sgt Tucker - Okay sir; thank you.

SAC CALLS - Col Bowman here again with info concerning how Col Heil can be reached. He's at the site and we are trying to get an on scene number to reach him. March AFB, will get back with us (SAC) as soon as they have a number for LtCol Heil on the scene.

Sgt Tucker - Okay sir.

SAC CALLS - Col Bowman here; I have a question for you.

Sgt Tucker - Yes sir.

Col Bowman - What you told me was when the thing was supposed to have crashed? Do you have any offical notification or can I assume that this is official notification?

Sgt Tucker - That was a verbal notification thru NMCC (Gen Bodie).

Col Bowman - Okay; good enough.

SAC CALLS - Col Bowman here; March has a listing and the only way they know to get hold of Col Heil is to go thru the umpire on the scene. I don't have the same list as March but March says contact Nellis switch Mercury swithc 5151 at Nellis AFB, NV. That's the best we have.

Sgt Tucker - Okay sir I'll pass it along.

FePEO

DEPARTMENT OF THE ARMY
WALTER REED ARMY MEDICAL CENTER
WASHINGTON, D.C. 20012

REPLY TO ATTENTION OF:

HSWP-QHP

JUN 5 1981

SUBJECT: Radiological Advisory Medical Team (RAMT) After Action Report (NUWAX 81, 21 - 29 April 1981)

THRU: Commander
US Army Health Services Command
ATTN: HSOP-S
Fort Sam Houston, TX 78234

HQDA (DASG-PSP)
WASH DC 20310

ROBERT T. WANGEMANN
Colonel, MSC
Radiological Hygiene Consultant

TO: Defense Nuclear Agency
ATTN: FCN
Kirtland Air Force Base, NM 87115

1. References:

a. Department of the Army Regulation, 15 Nov 79, subj: Medical Support - Nuclear/Chemical Accidents and Incidents.

b. DRAFT Nuclear Weapons Accident Response Procedures Manual, 14 Feb 81.

2. General:

a. Pre-NUWAX-81 Exercise, Sierra Army Depot, Nevada, 1 Apr 8:

RAMT participated in a Pre-NUWAX-81 NAIC Exercise at Sierra Army Depot (SIAD) on 1 April 1981. Participants in the exercise included the on-scene Commander and staff from White Sands Missile Range, SIAD NAIC Team, RADCON, and RAMT. RAMT members responding to this exercise were CPT Dennis A. Stevenson (RAMT OIC), SFC Michael W. Pearson (RAMT NCOIC), and SP6 James I. Lewis, Jr. (Health Physics Technician). RAMT responded to a scenario related to contaminated patients taken to a local hospital and in need of various types of medical treatment. This scenario required coordination with a local physician, medical facility and morgue, preparations for monitoring, decontamination and medical treatment at SIAD health clinic, and preparations for evacuation of patients to a definitive care medical facility. These requirements underlined the necessity for RAMT to be highly mobile in order to accomplish mission requirements, and for

adequate communications between the Command Post and RAMT in order to effectively deploy resources. RAMT participated in the critique scheduled at 1400 hours during which CPT Stevenson was given the opportunity to brief MG Nord, on-scene Commander, on RAMT specialized capabilities and equipment.

b. Radiological Advisory Medical Team (RAMT) Personnel Designated to Participate in NUWAX-81:

Position	Name	Special Qualifications
OIC	STEVENSON, Dennis A., CPT, MSC	SSI-68B9B Certified Health Physicist
Physician	DORN, Ronald V., III, MAJ, MC	Specialty: 61Q Radiation Oncologist
NCOIC	PEARSON, Michael W, SFC, USA	MOS 52ES5 Health Physics Technician
HP Tech	WENDER, Samuel A., IV, SFC, USA	MOS 52ES5 Health Physics Technician
HP Tech	LEWIS, James I., Jr. SP6, USA	MOS 52ES5 Health Physics Technician
HP Tech	TALKINGTON, Gary F., SP6, USA	MOS 52ES5 Health Physics Technician

c. Deployment: 21 April 1981:

LTC George E. Friel, Army Action Officer and Mr. Thomas, Traffic Manager, WRAMC, acting in the capacity of a "Trusted Agent," made prior arrangements for early purchase of commercial airline tickets to deploy RAMT to NUWAX-81. RAMT was not advised of the time/or date of departure, but CPT Stevenson was advised to review the airline schedule the afternoon of 20 April 1981 to assure NUWAX-81 notification was accomplished and to assure prearranged departure schedule could be met. CPT Stevenson determined on the evening of 20 April 1981 that RAMT could meet prearranged departure of commercial flight (0950 hours EST, 21 April 1981), if notification to deploy was NLT 0700 hours EST 21 April 1981. At 0600 hours EST 21 April 1981 CPT Stevenson called Army Operations Center seeking guidance regarding NUWAX-81 notification and RAMT deployment. No guidance was given. At 0700 hours EST CPT Stevenson alerted Health Physics Office personnel, WRAMC, to respond to Bldg 188 to prepare RAMT for deployment to NUWAX-81. This was an unannounced alert for all RAMT personnel. All RAMT equipment and supplies and responding personnel were prepared to deploy to Dulles International Airport by 0745 hours. RAMT departed WRAMC for Dulles International Airport at 0800 hours.

RAMT received instructions prior to departure time at Dulles that arrival time to Nevada Test Site should be between 0400 and 0600 PST. RAMT elected to proceed on prearranged flight schedule and hold at Nellis AFB, if required. WRAMC was notified to deploy at 1021 hours EST 21 April 1981.

d. Arrival at Nevada Test Site:

RAMT arrived at McCarrin Airport, Las Vegas, Nevada at 1620 hours PST 21 April 1981. Rental vehicles were picked up in order to transport RAMT personnel and 35 pieces of equipment to the site. An initial stop was made at Nellis AFB in order to contact WRAMC for last minute instructions and to get a phone number and POC at accident site. No instructions or POC information was available, either from WRAMC or the AOC. CPT Stevenson contacted March AFB to obtain required site POC and method to contact the site. Instructions from site, upon contact, were to remain at Nellis AFB and proceed to the Nevada Test Site at "first light." RAMT complied with instructions. RAMT arrived at the Lathrop Wells Gate (Gate 510), Nevada Test Site at 0525 hours PST 22 April 1981. The Nevada Test Site requirements necessitated RAMT to return to Mercury for badging (a lengthy process - 95 minutes). RAMT arrived at the Base Camp, NTS at 0722 PST and proceeded to in-process. RAMT received initial briefing at 1055 hours PST from Mr. George Wentz, Radiation Safety Staff Advisor to the OSC.

e. 22 - 27 April 1981: RAMT provided assistance and guidance to the OSC through his staff (primarily Radiation Safety Staff Advisor and Medical Staff Advisor) relative to the radiological health hazards at and in the vicinity of the accident site. RAMT responded to the following specific scenarios/requirements during NUWAX-81:

(1) Out briefing of Air Force Bioenvironmental Officer responsible for radiation safety aspects of initial response force operations. Provisions had not been made for out briefing of Air Force personnel with regard to collecting all data and information relevant to radiological safety/health aspects of the response, and obtaining a current status of operations and actions taken with regard to radiological health matters. RAMT was out briefed by an Air Force Team with regard to radiological health and medical aspects of the response.

(2) Establishment of a Health Physics Control Center, RAMT was instrumental in the establishment and operation of a Health Physics Control Center. Requirements for such a center were necessitated by independence of operations of various agency/service support teams without benefit of review/analysis of independently obtained and analyzed data with regard to radiological health considerations. RAMT coordinated with DOE in the establishment and operational control of this center. The interagency/service cooperation and coordination was a positive approach to coordinating technical and professional resources in this area; however, data allowing immediate site analysis of radiological health aspects of operations was either difficult to obtain or was not collected

properly to be meaningful. This is a deficiency that needs to be corrected by inclusion in the NARP of a section on the functions and responsibility of a Radiation Protection Officer.

(3) Riverside County Hospital -- RAMT responded to Riverside County Hospital to confer with Dr. Brown, hospital physician, regarding the status and treatment of the four contaminated patients from the Wahmonie accident and to survey hospital for radioactive contamination. This was a joint visit which included State of California officials, RAMT, and Lawrence Livermore Laboratory (LLL) personnel. Lawrence Livermore Laboratory utilized instrumentation to determine possible lung burden levels to assist RAMT in determining possible required medical treatment. RAMT confirmed that hospital was free of contamination, RAMT physician recommended appropriate treatment for contaminated patients, and RAMT discussed appropriate personnel and area decontamination procedures with Dr. Brown.

(4) Disposition of Seven Fatalities -- RAMT was involved in determinations involving disposition of contaminated fatalities. RAMT recommended utilization of a form similar to "an acceptable form for Radioactivity Report Accompanying Body," Appendix V, National Council on Radiation Protection and Measurements Report No. 37. This would assure that receiving activity, March AFB in this case, is aware of potential radiation hazards.

(5) Medical Injury at Hot Line -- RAMT responded to an individual with a compound fracture of the leg at the hot line. A determination was made by the RAMT physician that the patient's medical condition necessitated his immediate removal to the base camp medical facility for stabilization, decontamination and medical evaluation. The patient's condition required his evacuation to a definitive care facility at March AFB. Problems encountered by RAMT in this scenario involved reluctance of EMT and base camp personnel to provide medical care due to personal concerns for radioactive contamination.

(6) Accident Site Fire -- RAMT was present at the hot line area when a house in the middle of the contamination area caught fire. RAMT expressed concern regarding possible airborne radiation hazards as a result of this fire. As a result, security forces positioned downwind from the fire were required to mask until an evaluation of the hazard was made. Determinations were made that there were not airborne hazards associated with the fire. Security force personnel were monitored and found clean.

(7) FBI/Classified Item -- A classified item was picked up at the accident site by an area resident. There was a possibility of radioactive contamination of personnel, house and automobile as a result of this incident. RAMT was requested to monitor the individual and his belongings to ascertain if there was any radiation hazard. RAMT immediately coordinated with Lawrence Livermore Laboratory and EOD team personnel to determine status of item, possibility of contamination, and expected isotope involved. Based on these findings, RAMT was able to obtain immediate and detailed information relevant to the radiation survey. RAMT responded to the individual's home with State of California officials. No contamination was found on the individual or his property (car, home).

(8) Briefing of Base Camp Hospital/EMT Personnel -- Immediately upon arrival at NUWAX-81, RAMT members coordinated with base camp hospital personnel, the base camp physician, and hot line EMT personnel with regard to preparations, receipt, and proper medical treatment of contaminated patients. Base camp hospital personnel were reluctant to accept contaminated patients at their facility.

(9) Other Scenarios -- RAMT participated in several other scenario incidents which included location of townspeople and determination of radiological health aspects of their association with the accident, radiation monitoring of townspeople, and Press who were concerned with their possible contamination, and participation in a Press conference with State of California and FEMA officials.

3. Functional Areas: Discussion/Recommendations

a. Command and Control:

Topic: Interagency/Service Coordination
Operating Procedures
Command Post Management

From the viewpoint of a responding specialized team with expertise in radiological health and medical management of radiation accidents, the staff control/coordination of responding teams was weak. Specifically, there was no formalized inbriefing/debriefing of responding/departing teams. Documentation of all aspects of a team's interactions associated with an accident is critical and should be compiled by the Command Post operation element. This was done on an informal basis; however, much information seemed to be lost. As an example, the Air Force responding team's bioenvironmental engineering staff with specific responsibility for radiological health departed the accident site leaving a minimal of information relevant to their part of the accident response and the primary response force did not collect or document much of the information available to them in this area.

Recommend that:

- A separate area be staffed under operations control to provide inbriefings to responding teams and to distribute maps/written data as necessary. This would alleviate unnecessary congestion at the Command Post. More detailed briefings to responding teams by individual staff members could be arranged as required.

- Debriefings of teams be conducted on a regular basis to document important data at the earliest possible time. Possibly, tape recorders could be utilized for initial collection of this information. Transcription of these recordings could be made at a later date.

Based on exercise experience, consideration must be given to Command Post management relative to security clearance (specifically CNWDI). Many responding teams did not have CNWDI clearance although their specific mission requirements may necessitate obtaining some information which might be classified as CNWDI. Also, non-participation in planning aspects of accident/incident response by teams not cleared for CNWDI could adversely impact on overall mission accomplishments. This is especially evident in planning in which CNWDI is an integral part of a discussion as in the radiological safety aspect of the operation. Those health physics, radiological health, or medical personnel would not have access to important CNWDI information relevant to radiological health analysis of operation.

Recommend that: Consideration of types of security clearances responding teams should have to effectively accomplish their mission.

b. Radiological Safety and Control:

(1) Topic: Interagency/Service Coordination

Coordination and effective utilization of separate teams/units/elements with expertise in the area of radiation safety or health physics is essential at the earliest possible moment after the accident/incident. This necessitates assignment of one health physics staff advisor to the on-scene Commander, senior in rank and with the proper training, experience, and professional credentials to address health physics problems related to the accident/incident. This individual must also have developed managerial skills in order to recognize potential radiation safety hazards, to effectively utilize the variety of health physics assets available at the accident site, and to advise the on-scene-Commander of health physics concerns and solutions in a timely manner. Ineffective interagency/service coordination of health physics assets will result in neglect of selected radiological safety aspects of the accident resulting in potential hazards to local civilians and responding team members. For example, it is not clear that the appropriate air samples were taken on a daily basis. Documentation was not available to health physics teams to address the questions relevant to airborne radiation hazards and required respiratory protection. A health physics coordination center was developed and put into operation as a result of coordinated effords of DOD and DOE teams in order to address health physics issues/concerns. Documentation/data was not available from responding teams to adequately address significant health physics issues/concerns which had the potential of being hazardous to health.

Recommend that:

- Individuals be identified by name to serve as Radiological Safety Staff Advisors at the site of a radiation accident/incident. These individuals must have special competence in health physics relevant to radiation accidents, appropriate health physics credentials, and demonstrate managerial skills. One of these individuals would respond to the accident site concurrent with the response of the on-scene-Commander.

- The Radiological Safety Staff Advisor would be responsible for setting up a Health Physics Coordination Center at the site to collect and review data, and to advise on matters relevant to radiation safety/radiation protection, both on and off site. Actions which could result in radiation hazards to personnel should not be taken prior to timely concurrence/approval of a site radiation safety committee representative of the diverse health physics expertise at the site. The on-scene-Commander should have the benefit of this advisory committee on health and safety aspects of accident/incident issues.

- DCSOPS Task TSG to appoint the Radiological Safety Staff Advisor from its assets.

- Subsequent exercises to evaluate creation of Health Physics Control Center. Development of procedures to collect and analyze data, with appropriate documentation and display of collected data could then be incorporated into the NARP. At this point procedural directives for this operation could be prepared for further testing.

(2) Topic: Interagency/Service Support

There appeared to be excellent interagency/service support of the radiological safety aspects of the accident scenario. Highly specialized teams representing a broad spectrum of expertise (e.g., DOE teams - expertise in weapons related health physics, RAMT - expertise in medical related health physics, RADCON - expertise in survey procedures). These specialized teams were adequately prepared to support the accident scenario and fulfill their mission requirements. Coordination of this broad spectrum of expertise in radiological safety was lacking, resulting in ineffective utilization of expertise and inadequate consideration of health physics aspects of work site operations.

Recommend that: A staff advisor with special competence in health physics aspects of radiation accident management be predesignated and respond to the accident site to serve as Radiation Protection Officer/Health Physicist. This individual must have definite authority to take action over all aspects of the site operations involving radiological safety and control. He should have the added responsibility to develop a Health Physics Control Center and actively involve the interagency/service support teams in radiological safety and control issues.

(3) Topic: Radiological Emergency Medical Procedures

Radiological emergency medical procedures at the site of a nuclear accident are divided into three phases, as follows: Initial Notification/Response Phase, Operational Phase, and Follow-Up Phase.

(a) Initial Notification/Response Phase: The initial notification/response phase is that portion of the response where responding teams are assembling at the accident site (up to approximately D + 24 hours). Specialized teams with expertise in medical management of radiation accidents (e.g., RAMT) have not arrived at the scene. There are likely to be a large number of medical casualties and certainly a large number of potentially contaminated civilians. Correct radiation accident management of the situation with regard to the medical and radiological health aspects early in this phase would greatly alleviate problems and concerns to be addressed by the on-scene-Commander at later phases of the response. As an example, there was inadequate monitoring of personnel involved in the accident by the initial response force, or if such monitoring was accomplished, there were no records/documentation to that effect. This caused undue delays in addressing the medical concerns as to contaminated civilians and providing those individuals proper monitoring/bioassay analysis to assure hazards to them would be minimal. Such delays in locating and identifying these individuals also led to public affairs problems relating to a possible misconception of the concerns of the military response force for the health and well-being of the citizens of the community.

Recommend that: In the initial phase of the accident, a physician and a health physicist with special competence in radiation accident management be designated to communicate/coordinate with elements of the initial response force to assure appropriate health and safety aspects of the initial response have been addressed. These individuals would not respond to the accident site, but would serve as a distant resource pending arrival of the specialized teams. This would require adequate communications to a fixed facility from the accident site. Coordination of the medical and radiological health response with local medical facilities, and the on-site response force utilizing experts in these areas is vital to the success of this aspect of the response.

(b) Operational Phase: In this phase the primary response force is in place with all its medical and health physics assets. During NUWAX-81 there was reluctance on the part of the base camp medical facility to address/respond to a medical emergency involving a contaminated patient despite efforts on the part of RAMT to prepare the base camp facility for this possibility. This is not an unusual reaction of medical personnel untrained in radioactive contaminated patient treatment.

Recommend that:

- At the accident site ALL medical personnel (EMT, physicians, medical techs) be trained/instructed at the earliest possible time as to the hazards and proper procedures associated with radiation accident patients.

- A medical "clearing" tent be placed near the hot line area with equipment for monitoring, medical evaluation, and care of medical problems at the hot line. This could be staffed by EMT personnel with a physician and health physicist (medically trained) on call to make the necessary medical decisions.

- Medical resources, both on and off site, be identified, equipped, and prepared to assure timely medical treatment of contaminated patients. This should include the base camp medical facility and personnel as well as hot line EMT personnel. Medical resources at NUWAX-81 were adequate; however, base camp support medical personnel insisted they were not in the "play" with regard to contaminated patients. This misconception could result in a minor medical problem turning into a life threatening situation.

(c) Follow-Up Phase: In this phase, continued analysis and review of personnel exposures/dose commitments and medical treatment of radiation accident patients must be coordinated by the Radiation Safety and Medical Staff Advisors to the on-scene-Commander. This may result in long term analysis and periodic medical examinations for persons involved in the accident.

Recommend that: Definitive responsibility be given to assure that this phase is actively pursued and anticipated. Neglect in obtaining required documentation in other phases of response could negate effective follow-up phase.

(4) Topic: Radiation Contamination Survey Techniques

Radiation contamination surveys involving collecting, processing and evaluating environmental (soil and air) samples by various interagency/service support teams revealed a widespread lack of understanding of the collection procedures and quantities required to perform meaningful laboratory analysis of samples. Problems noted in this area included the following:

(a) Soil and Water Samples:

1. Some teams would collect soil and water samples without prior coordination with the laboratory designated to do the analysis. This resulted in incorrect collection of samples (e.g., depth of soil samples collected was too great, surface area unknown). Thus, the result reported

by the laboratory is meaningless in terms of health physics analysis.

2. Documentation of location of sample collection and other necessary data was normally lacking.

(b) Air Sampling:

1. Documentation of location of sampling and other necessary data was normally lacking.

2. Several organizations calculated airborne activity independently utilizing a variety of methods peculiar to their instruments and procedures. Results were reported in a variety of units and there was no correlation of data. This type of data must be correlated and reviewed with respect to airborne hazards to personnel.

Recommend that:

- Inclusion of specific collection and analysis procedures in NARP for environmental sampling. This should include units that results should be reported in.

- All contamination survey results should be collected at and reviewed by the Health Physics Control Center to assure adequate radiological safety at site.

(5) Topic: Contamination Control Station Procedures

In any operation the size of NUWAX-81, the traffic flow of personnel in and out of the hot line is a problem from the standpoint of time required for processing, safety aspects, and insuring collection and review of appropriate data. In addition, the data collection should be accomplished in such a way that all data for a given individual can be reviewed immediately to assure that all personnel monitoring requirements have been accomplished and to determine any potential problem areas. On D + 2 days, RAMT recommended a card procedure be utilized (Inclosure 1) similar to that utilized in nuclear power plants throughout the United States. The cards and all materials needed to implement such a system were brought to NUWAX-81 by RAMT. The time necessary to implement such a system was estimated to be negligible. Each person entering the hot line would have a card, the personal data being filled out only once. Each successive entry would only require identification by the individual and a notation on the card of entry date, time, and dosimeter reading. The advantage of this system is the possibility for immediate review of individual data relevant to exposure, contamination history, etc. The team in charge of hot line operations chose not to implement this system at NUWAX-81. Utilization of this system in a subsequent exercise at Seneca Army Depot (27 May 81) successfully demonstrated the advantages of such a system.

Recommend that: This card system for in/out processing procedures be adopted and included in the NARP.

(6) Topic: Equipment Decontamination

Recommend:

- Making use of a separate contamination control station for vehicles and equipment and designating responsibility for this function separate from those responsible for the personnel contamination control station.

- If vehicle is required to enter contaminated area and there is no need for that vehicle outside the contaminated area, it should be left inside. Designation of such vehicles for use in contaminated area should be made prior to actual need.

(7) Topic: Documentation

Documentation of the radiological safety aspects of a radiation accident/incident is critical, both to assess potential hazards in order to make crucial decisions during the operations and to alert support organizations to potential hazards in their operations. Documentation must be in a format so that it can be utilized readily and easily during all phases of operations. This requires that all documentation be available in one location and that all sources utilize the same format to report data. RAMT recommended use of three forms which have general usage in an accident situation.

Recommend that: Forms similar to the attached be utilized during a radiation accident/incident by response forces.

(a) Personnel Dosimetry Control Card (Inclosure 1) -- To be utilized for in/out processing through the hot line. Advantages:

1. Reduces time necessary to in/out process personnel through the hot line. Individual needs only fill out data on card once. Card is filed in either of two boxes (IN-box/OUT-box) pending individual's status.

2. All information (e.g., exposures, nasal smears, personnel contamination) relevant to a single individual can be readily reviewed. Utilizing the current system, this data is not easily compiled although it should be available. RAMT recommended that this system be utilized early in NUWAX-81 exercise; however, players controlling hot line operations elected not to institute the system. All materials required to institute this system were available on site.

(b) Radiation Accident Registry (Inclosure 2) -- To be utilized where personnel involved in the accident might come (e.g., claims office, PAO, legal, medical). Advantage: This form gives information for dose assessment and medical review. The form, utilized by RAMT during NUWAX-81, was satisfactory for RAMT purposes and appeared to be of more general use.

(c) Form for Radioactivity Report Accompanying Body (Inclosure 3) -- To be utilized when shipping bodies from a radiation accident site to a morgue. Advantage: This form alerts the personnel receiving a body that the body is or is not contaminated. The receiving personnel can then take appropriate precautions.

c. Communications

(1) Topic: Interagency/Service Coordination

Communication between staff elements and responding elements is a necessity. This is of especially critical importance in areas where specialized teams are required to be mobile as in the radiological health and medical area. In NUWAX-81 communications support and coordination between RAMT, DOE, and FEMA (with existing equipment) was excellent due to the interagency/service cooperation. Teams provided communications equipment to the Health Physics Control Center so that personnel staffing that center could get in immediate contact with any or all teams. All responding teams do not have communications equipment to provide to such a control center.

Recommend that: Communications equipment be made available to the Staff Advisor to provide one-each unit to a specialized/support team. This will allow immediate access to all resources in the area. Each team would have the responsibility for providing for communications within its team.

(2) Topic: Equipment

RAMT responded with a VRC 46, RT 292 antenna, and 3 PRC 77's as well as Lafayette CB radios modified to military frequency restrictions in order to meet internal RAMT communications requirements. This equipment was not adequate to meet RAMT communications requirements and be consistent with mission requirements involving distance and mobility of RAMT operations.

Recommend Communications Equipment Meeting the Following Criteria:

- Equipment must be small and lightweight. RAMT noted problems involving both size and weight during NUWAX-81.
- Distance of Transmission -- Approximately 20 miles to meet potential needs of RAMT.
- Secure transmission capability.

HSWP-QHP
SUBJECT: Radiological Advisory Medical Team (RAMT) After Action Report (NUWAX 81, 21 - 29 April 1981)

(3) Topic: Reporting

WRAMC was addressee for all messages in NUWAX-81. Classified and unclassified messages were not received by WRAMC in a timely manner (Inclosure 4).

d. Logistics and Service Support

Logistics and service support operations for NUWAX-81 to include administrative, transportation, and base camp were outstanding. Problems normally encountered in procuring support for supplies, transportation, and needed equipment were minimal from the perspective of the needs of a specialized team like RAMT. Base camp inprocessing was well planned and efficient. This is in contrast to the major problems encountered upon arrival in getting badged by the Nevada Test Site operations personnel. Delays encountered in security/personnel dosimetry badging of responding forces (e.g., security and RAMT on D +1) could have serious effects on timely response to accident problems.

Recommend that: Next exercise include requirements on the initial/primary response force for badging and providing personnel dosimetry to responding teams. This has never been exercised and will be a major impact on response force operations. Similarly, requirements for obtaining protective clothing and the laundering of that clothing should be addressed by initial/primary response force.

4. Summary: NUWAX-81 was an extremely valuable exercise which enabled RAMT to participate in as realistic a field situation as possible short of an actual accident/incident. Valuable lessons were learned as a result of participation in NUWAX-81. Only through such exercises can the capabilities of response teams such as RAMT be periodically tested.

FOR THE COMMANDER:

Patrick J. Mumma

PATRICK J. MUMMA
MAJ, MSC
Adjutant General

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wd 1 cy (HSOP-SO)

APPENDIX V

An Acceptable Form for Radioactivity Report Accompanying Body

_____ HOSPITAL

Report on Radioactivity to Funeral Director from Radiation Protection Supervisor or Delegate

[ ] This body does not contain significant amounts of radioactive materials. No special precautions are required if standard embalming procedures are employed.

[ ] This body contains a significant amount of radioactive material. The following precautions are to be observed.

_____

_____

_____

Signed _____
Radiation Protection
Supervisor or Delegate

Date _____

RADIATION ACCIDENT REGISTRY

FULL NAME:_____ SSAN_____

BIRTH DATE_____ AGE_____ SEX_____ RACE_____

CURRENT LOCAL ADDRESS_____

CURRENT PERMANENT ADDRESS_____

NAME&ADDRESS OF EMPLOYER_____

FATHER'S NAME_____ MOTHER'S NAME_____

WOMEN ONLY: DATE OF LAST MENSTRAL PERIOD_____ # PREGNACIES OR MISCARRIGES_____

COULD YOU BE PREGNANT NOW? DEFINITELY YES_____ DEFINITELY NO_____

NOT SURE_____

PAST HISTORY:

ANY KNOWN TREATMENT WITH X_RAYS OR ISOTOPES? _____

IF SO, REASON FOR TREATMENT:_____

MONTH/YEAR OF TREATMENT_____

PLACE WHERE TREATMENT WAS GIVEN:_____

HAVE YOU EVER HAD ANY CANCER OR OTHER MALIGNACY?_____

IF YES, TYPE:_____

DATE OF DIAGNOSIS:_____

FAMILY HISTORY:

HOW MANY CHILDREN DO YOU HAVE?_____ ARE THEY ALL HEALTHY?_____

IF NOT, NATURE OF DISEASE OR DEFECT:_____

INDICATE WHICH, IF ANY OF THE FOLLOWING MALIGNANCIES ARE PRESENT IN ONE OR MORE MEMBERS OF YOUR FAMILY: LEUKEMIA BREAST THYROID LUNG

STOMACH INTESTINES BONE

CURRENT MEDICATIONS:_____

ALLERGIES:_____

DETAILS OF RADIATION ACCIDENT:

LOCATION WHERE ACCIDENT OCCURRED:_____

TIME & DATE OF EXPOSURE:_____

TYPE OF RADIATION SOURCE:_____

LOCATION OF ACCIDENT VICTIM:_____

DISTANCE FROM SOURCE:_____

DURATION OF EXPOSURE:_____

SHIELDING(BUILDINGS,CLOTHING,ETC):_____

_____

DOSIMETRY: ESTIMATED RADIATION DOSE(WHOLE BODY & ORGAN SPECIFIC):_____

_____

NAME, TITLE, AND ADDRESS OF INDIVIDUALS WHO ESTIMATED DOSES:

_____

_____

METHOD OF DOSE ESTIMATE: HISTORICAL DOSIMETERS OTHERS_____

IMMEDIATE POST ACCIDENT MEDICAL ASSESSMENT: TIME_____ DATE_____

LOCATION_____

SYMPTOMS_____

PHYSICAL FINDINGS:_____

LABORATORY DATA, INCLUDING PREGNANCY TEST IN ALL WOMEN WHO MIGHT BE PREGNANT:_____

_____

DISPOSITION OF PATIENT:_____

NAME/ADDRESS OF FAMILY PHYSICIAN:_____

_____

NAME/TITLE OF PERSON COMPLETING THE FORM:_____

DATE/TIME OF COMPLETION:_____

RETURN TO: RADIOLOGICAL ADVISORY MEDICAL TEAM, WALTER REED ARMY MEDICAL CENTER
WASHINGTON DC 20012

APPENDIX V

An Acceptable Form for Radioactivity Report Accompanying Body

_____ HOSPITAL

Report on Radioactivity to Be Removed from Radiation Protection Supervisor or Delegate

[ ] This body does not contain significant amounts of radioactive materials. No special precautions are required if standard embalming procedures are employed.

[ ] This body contains a quantity of radioactive material. The following precautions are to be observed:

_____

_____

_____

Signed _____
Radiation Protection Supervisor or Delegate

Date _____

MESSAGES FOR NUWAX 81 EXERCISE

DATE/TIME GROUP	SUBJECT	DATE/TIME Received WRAMC HPC
212125Z Apr 81	Broken Arrow Sitrep (Alert/Tasking)	23 Apr 81/1115
212245Z Apr 81	Broken Arrow Sitrep	23 Apr 81/1115
221210Z Apr 81	NUWAX 81 Sitrep 1	23 Apr 81/1115
230047Z Apr 81	Transfer of Command and Control to Army	23 Apr 81/1620
230254Z Apr 81	Transfer of Command and Control to Army	23 Apr 81/1620
230700Z Apr 81 *231150Z	Situation Report No. 2 (Period 222100Z to 230400Z Apr 81)	23 Apr 81/1620
231429Z Apr 81	Sitrep 2 (from DAMO-OPS-AOC)	23 Apr 81/1620
231659Z Apr 81	Dr. Wade's Visit to Accident Site	23 Apr 81/1620
240700Z Apr 81	Situation Report No. 3 (Period 230400Z to 240400Z Apr 81)	24 Apr 81/1920
241214Z Apr 81	NUWAX 81 Update 62	
241724Z Apr 81	NUWAX 81 Site Security After NDA Termination	
250716Z Apr 81	Situation Report No. 5 (Period 250400Z to 2600400Z Apr 81)	
250750Z Apr 81	Situation Report No. 4 (Period 240400Z to 250400Z)	
251817Z Apr 81	MP Reaction Force	
252145Z Apr 81	Authorization to Exclude the Public from Radiologically Contaminated Area	
260315Z Apr 81	Reduction in Size of NDA	
261350Z Apr 81	NUWAX 81 Situation Update No. 4	
261727Z Apr 81	Site Restoration Annex	
261930Z Apr 81	Situation Report No. 6 (Period 260400Z to 270400Z Apr 81)	
262346Z Apr 81	NUWAX 81 (Termination)	
270230Z Apr 81	NUWAX 81 Final Sitrep 260400Z Apr 81 to 262400Z Apr 81	
270355Z Apr 81	NUWAX 81 Communications	

* Original number given to Situation Report No. 2, was later changed to present number.

Received After Exercise Termination (1100 hrs Mar 27-Apr 81