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DRAFT

Chemical Weapons Movement History Compilation

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Office of the Program Manager for Chemical
Munitions (Demilitarization and Binary) (Provisional)
Aberdeen Proving Ground, Maryland 21010-5401

DRAFT

Chemical Weapons
Movement History Compilation

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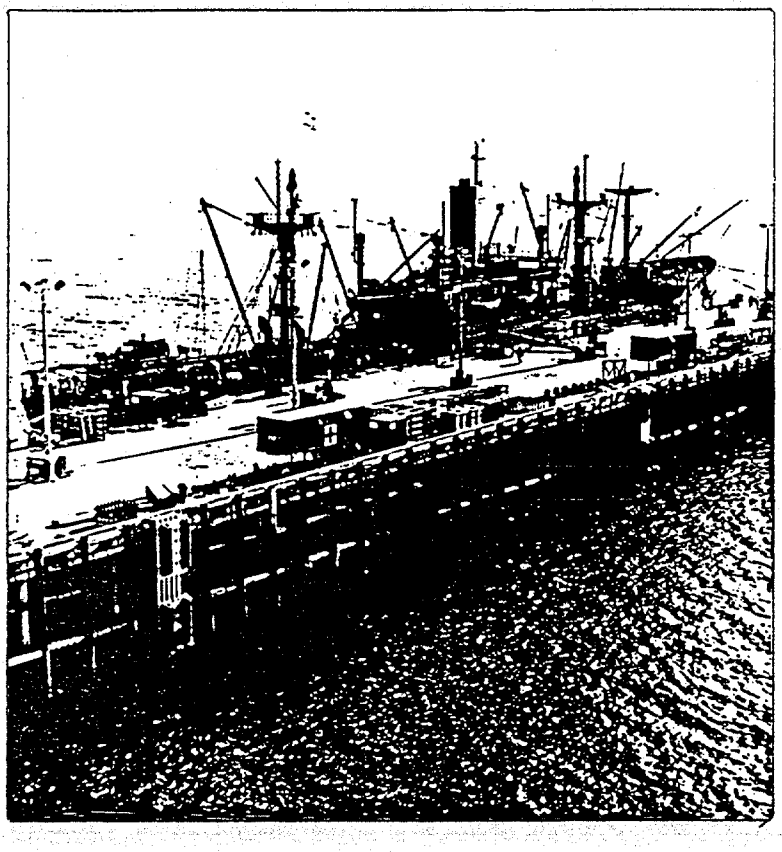
Executive Summary

The production of a compilation of movement operations provides a base of data which can be used or interpreted in many ways. Some are favorable to the Army, and some are not. However, the Army wishes to show that (1) it has moved large quantities of chemical weapons over many years with relatively few problems and that (2) the Army has learned lessons from the problems which is has encountered. The Army also shows in this study that although there have been some problems associated with the movement of chemical weapons, there has never been a chemical agent fatality associated with such a move. Most of the incidents catalogued in the study are minor.

That the Army records on chemical movement operations are incomplete is a theme frequently returned to in the study. It is of note that some of the earlier records are actually more complete than were recent records. There are many reasons for this, but one which overshadows all others. The fact is that by the 1950's these movement operations had become so common, that an attitude had become prevalent that these moves were no longer anything "special." They were regarded as a matter of routine, and as a result, few photographs were taken, and many records were disposed of as excess files according to then existing regulations. It was not until 1969 and 1970 that close control of movements under the new public laws (91-121 and 91-441) made these moves once again into something special or different which required better tracking of operations and preservation of records.

Lastly, it should be noted that the U.S. Army throughout all of these years has operated one unit to escort these munitions and to respond to emergencies. This unit, the U.S. Army Technical Escort Unit has existed since 1943 and has the responsibility for the moving of all chemical munitions. The vast majority of the information contained in this study comes either directly, or indirectly from their records. These records have been kept under the following organizational titles:

January 1943 - February 1944	Guard and Security Section, Camp Siebert, Alabama
February 1944 - January 1946	Guard and Security Section, Edgewood Arsenal, Maryland
January 1946 - March 1947	9710 Technical Service Unit, Guard and Security, Edgewood Arsenal, Maryland
March 1947 - September 1957	9710 Technical Service Unit, Technical Escort Detachment, Edgewood Arsenal, Maryland
September 1957 - Present	U.S. Army Technical Escort Unit, Edgewood Arsenal/Aberdeen Proving Ground, Maryland



OPERATION RED HAT - THE USNS FRANCIS X. McGRAW AT TENGAN PIER, OKINAWA - OKC TO JA, 1970-1977, PAGE 1.

OPERATION RED HAT - PREPARING TO LOAD M55 ROCKETS - OKC TO JA, 1970-1977, PAGE 1.

How to Use the Compilation

Excluding the Executive Summary, the movement history compilation consists of five principal sections: (1) an introduction, (2) a location key, (3) a summarization of the known incidents associated with moves, (4) a compilation of the actual moves, and (5) recommendations and conclusions.

Introduction:

The Introduction is provided to explain the resources used to produce this report.

Location Key:

The Location Key provides a list of codes, usually three or four letters, which conveniently represent locations where chemical weapons were shipped to or from. The Location Key directly refers to the To and From columns in the section covering the compilation of moves.

Incident Summarization Sheets:

The section titled Incident Summarization Sheets contains, by reference number, a listing of incidents which occurred on movement operations. These were developed from existing trip reports, special project reports, depot records and, in some cases, personal interviews with former escort officers. This section is probably incomplete, owing to the condition of Army records, however it is felt that it documents all major incidents and shows most of the minor incidents. It is important to note that there has never been a chemical agent fatality on a chemical weapon movement operation.

The definition of an incident, for purposes of this report, is anything out of the ordinary which either resulted in, or might have resulted in, a spill or an injury. The term incident, as rigidly defined by AR 50-6 or AR 335-40, is not applicable in this report. For purposes of this report, a major incident is presumed to involve injuries from chemical warfare agent, or a large spill. A minor incident is defined as having no injuries, or a small/no spill.

Compilation of Moves:

The section covering the compilation of actual moves is the heart of the report. The section is divided into years from 1946 to 1986. During each year the pages are numbered, so that a move can be referred to by referring an entry on "1946, page 5," as an example. The section shows the following information:

1. From: The location from which the shipment originated. This is also sometimes an intermediate point where modes of transportation were changed such as From EA To ENJ, then From ENJ to Sea.

2. To: The location to which the shipment was sent. The destination of "sea" indicates a sea dumping of chemical weapons.

3. Date: Where two dates are given, the dates represent the date the shipment left, and the date that it arrived. Where one date is given, the date

represents only an arrival date or an approximate date of the move, due to poorer quality of historical records.

4. Type: Moves were categorized into movement types as follows:

S = sea shipment (either for transport or disposal)
R = rail shipment
M = tractor trailer truck shipment
A = air shipment

5. Cargo: The type of cargo requires some discussion of what was then, and is now, in the inventory, as well as the common abbreviations for chemicals used by the Army.

Rockets - includes the current M55 Rocket, as well as the no longer extant Honest John Rocket, 4.5" aircraft rocket and German rockets.

Drums - refers to the practice of storing chemicals in 55 gallon drums, generally discontinued in 1946.

Bulk or Cylinder - refers to one-ton containers or commercial gas cylinders.

Projectiles - refers to steel shelled artillery and mortar rounds, both U.S. and German, some of which are now obsolete (such as the 75mm), and some of which are currently stored (105mm, 155mm, 8 inch artillery and 4.2 inch mortar rounds).

Mines - refers to liquid filled land mines such as the current M23 VX filled land mine or the former British H or HT filled land mine.

Bombs - refers to both current and obsolete liquid filled aircraft bombs of several nations. All mustard filled bombs have long been disposed of other than periodic infrequent recoveries.

CAIS - an acronym referring to chemical agent identification sets. These items actually consisted of seven different configurations of training sets made over a period of almost 50 years by the Army and the Navy. They were sets intended for use by troops during training so that chemical agents could be properly identified and decontaminated in combat. Some sets contain little agent, while others contain as much as a large projectile.

CL - the abbreviation for chlorine gas, a World War I choking gas, identical to what is used for water purification today.

CG - the abbreviation for phosgene, another choking gas used in World War I and stockpiled extensively as a deterrent during World War II. Phosgene is used extensively by the chemical industry as a raw material for items such as plastics and fertilizers. The Army has periodically sold excess stocks of phosgene to private industry.

CK - the abbreviation for cyanogen chloride, a cyanide gas stockpiled extensively as a deterrent during World War II.

H - the abbreviation for mustard, manufactured by either the Levinstein or Thiodiglycol processes, a blister agent used in World War I, stockpiled during World War II and which remains stockpiled today. It is found filled in many different weapons, by many different nations. All of the belligerents during World War II stockpiled extensive quantities of mustard.

HD - the abbreviation for distilled mustard, chemically identical to H, but purified further so that it can be stored longer before polymerizing.

HT - the abbreviation for mustard mixed with T, which is Bis |2 (2-chloroethylthio) ethyl| ether, a compound used to depress the normal freezing point of mustard which is about 58°F.

L - the abbreviation for lewisite, an arsenical blister agent stockpiled extensively during World War II of which very little exists today.

GA - the abbreviation for Tabun, the first nerve agent developed secretely by Germany in 1936 (GA or German A-type). Stockpiled extensively by Germany during World War II.

GB - the abbreviation for Sarin, the standard non-persistent nerve agent stockpiled by the U.S. today.

VX - the abbreviation for the standard persistent nerve agent stockpiled by the U.S. today.

AC - the abbreviation for Hydrogen Cyanide, a cyanide gas stockpiled during World War II.

CN - the abbreviation for an early form of tear gas (such as today's riot control gas CS). CN, and its derivatives, CNS, CNB, etc., were relatively non-toxic.

PS - the abbreviation for chloropicrin a World War I tear gas which was relatively toxic when compared to CN or CS.

DM - the abbreviation for an arsenical riot control vomiting gas, no longer stockpiled.

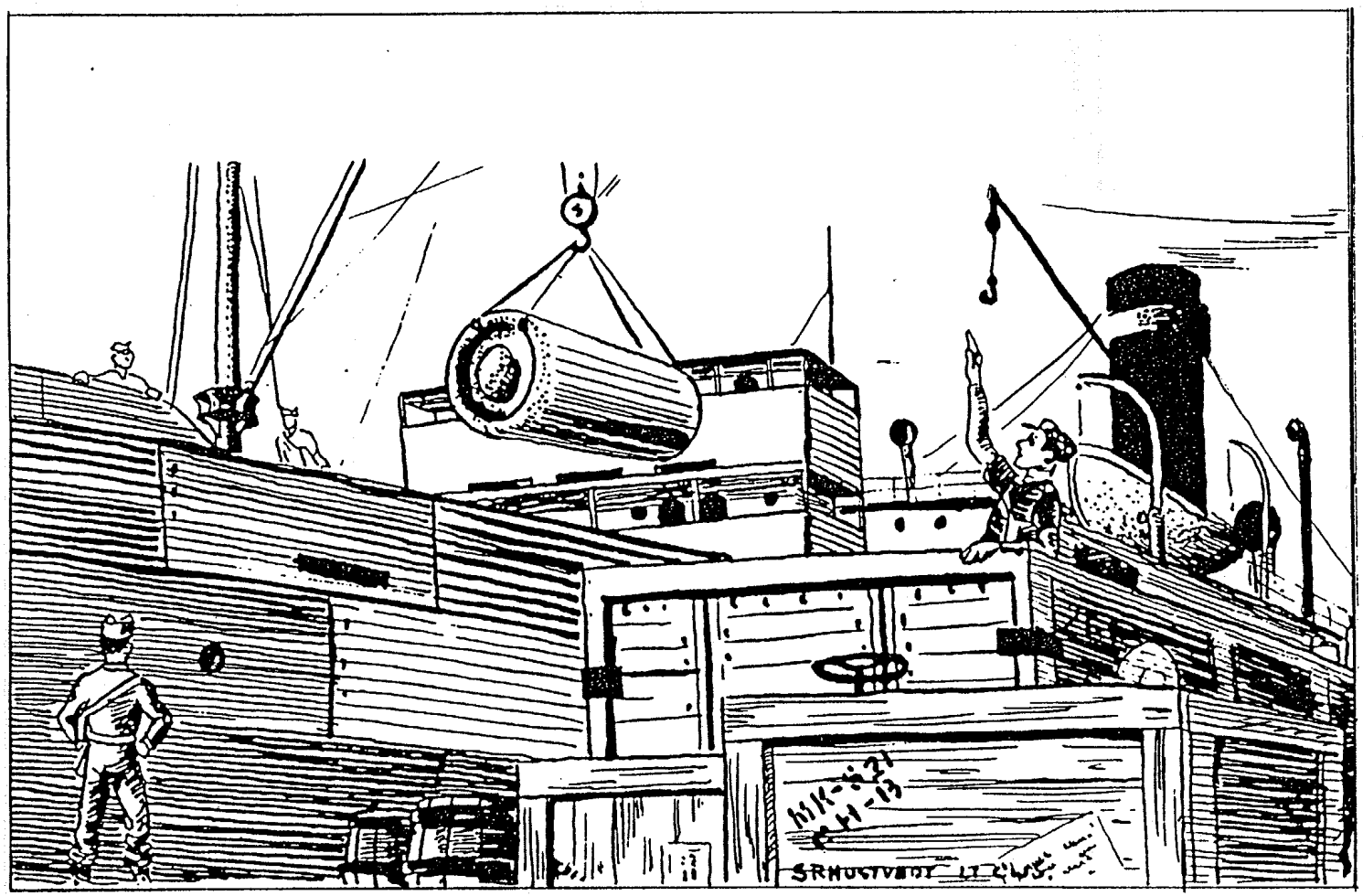
6. Quantity: Where it could be determined, this item shows the number of railcars, the number of aircraft, the number of trucks, and the name of the cargo ship. Where this information was unavailable, whatever information that was provided was used. It is emphasized that, due to the variety of records sources used, the description of quantity varies from the standards; for instance, instead of railcars of projectiles, the quantity may be found shown as pounds, tons or numbers each. Wherever possible, the quantity of railcars, aircraft, or trucks was used. Where railcars, aircraft or trucks are specified, the number reflects cargo carrying vehicles, without escort or security.

7. Incidents: Where an incident was identified, a number appears. This refers the reader to the section titled Incident Summarization Sheets. By looking at the corresponding number, the reader will find a summary describing the incident. Where "None" is stated, there is some documentation which

supports that no incident occurred. Where the column is left blank no information could be found. This almost certainly means that no incident occurred, however, no confirming documentation could be found to substantiate this conclusively.

Recommendations and Conclusions:

The section covering recommendations and conclusions deals with the problems discovered by researching past movement operations and what might be done to prevent them from being repeated. It is presented in the context of lessons learned.



PERIOD DRAWING OF DOCKSIDE OPERATIONS - 1946.

Introduction

The material that follows in this report is a compilation of Army Chemical Warfare Service Records which were located in November 1986 to April 1987 by the Office of the Program Manager for Chemical Munitions. The compilation documents, as far as the existing records allow, the major chemical warfare moves which were made from 1946 to 1986, and shows what problems were encountered during these moves when problems did arise.

Scope of the Compilation:

In the process of doing this, it is also necessary to state what is not covered by these records and how the compilation was arrived at. At times, due to the lack of completeness of the records, some judgement was called for on the part of the researcher. If this has resulted in any inaccuracy, corrections can be made by contacting the researcher, Mr. William Brankowitz, at (301) 671-4505/2056. Corrections or the contribution of missing material is encouraged by the Army.

First, the period of World War II was not covered even though these records do exist. As can be easily imagined, there were movements during the war to counteract the very real threat that either Germany, Italy or Japan would use chemical weapons. These moves were conducted under wartime conditions, and were extremely numerous. They were not included in this compilation due to the fact that they do not address any of the agent or weapons currently in the stockpile today except for a small quantity of the bulk mustard. Records predating the war were not researched, although some are known to exist.

Second, throughout the years since World War II, and continuing to the present, there have been a multitude of movements of small quantities of chemical agent. These small quantity moves are currently restricted to less than one liter by public law, and typically go to U.S. Army contractors for use in defense contracts, such as developing new filters for gas masks. Moves of small amounts of very pure agent for quality control of U.S. Army laboratories that perform air monitoring on the various depots are also in this category. These moves do not resemble, either in size or risk, the movement of munitions, and were therefore excluded from this compilation.

Also, throughout the years since World War I, a class of operations has been conducted by the Army which can be called recovery operations. Prior to 1969, when strict accountability of chemical weapons was put into effect by public law, conditions existed in which some chemical items or munitions were used in training or fired. At these locations, chemical items or munitions are sometimes still discovered. There have also been documented cases of chemical weapons being recovered from civilian residences where they were kept after being obtained as "war souvenirs" during World War I or II. The Army provides for the recovery of these items so that they can be returned to the nearest safe storage location. This is done on a no-questions-asked basis to encourage such items to be turned in. Once again, some discretion has been used in the documenting of these items such that recoveries from private citizens are shown as transportation from the recovering military installation.

Lastly, during the period covered by this report, a small number of classified chemical moves have been made. These movement operations remain classified for national security reasons. On one of these moves there were two truck accidents in an area of mountainous terrain. Although neither accident resulted in a chemical release, a guard riding in one of the trucks was fatally injured when the truck struck a ditch and overturned. There were no injuries associated with the other accident. There have been no spills or injuries during other classified moves.

Purpose of the Compilation:

The purposes for constructing the compilation were to document, insofar as existing records allowed, the movements of chemical weapons:

(1) To show how often chemical munitions were moved by the Army without problems,

(2) To describe what kinds of problems were encountered when chemical weapons were moved and things did go wrong, and

(3) To benefit from the lessons learned based on past movement problems by providing this information to other Army and contractor personnel working on studies for the Chemical Stockpile Disposal Program.

Although current movement concepts involve packaging, air monitoring and security measures far more stringent than those used previously, some lessons can still be learned from the earlier successes and particularly the earlier mistakes. These are summarized in the section entitled "Recommendations and Conclusions."

In addition, a section of this introduction is devoted to a description of monitoring for chemical agents and how this has changed through the years. This may assist the reader in putting into context the fact that the air monitoring devices available to the Army today are far more sophisticated than those of the previous periods, and that leaking weapons can be detected and dealt with today far more rapidly than in the past.

Construction of the Compilation:

The compilation was constructed principally by researching the records of chemical depots (past and present) and records retained by the Army which deal with the U.S. Army Technical Escort Unit. The Technical Escort Unit (located at the Edgewood Area of Aberdeen Proving Ground, Maryland) has been the responsible unit for the movement of chemical weapons since World War II, and is specifically trained for this purpose. Under previous names it was known as the Guard and Security Section, the 9710th Technical Service Unit, and the U.S. Army Technical Escort Unit, Edgewood Arsenal.

After each move, officers of this unit were required to write a trip report. These trip reports were detailed and included point of origin, point of destination, makeup of the team, makeup of the cargo, and specific details of the operation. They were frequently classified Confidential or Secret at

the time. In addition, at the end of each year, until the late 1950's, a historical summary of the unit was constructed. Unfortunately, since this was required to be an unclassified document, it usually lacked details other than origin and destination of a move, and typically listed the cargo as "classified toxic gases" or some similar phrase. Details of the operation itself, unless considered extraordinary, were not included.

Lastly, for large operations involving high public visibility such as some of the sea dumps, specific historical documents were assembled, complete with reports, messages, and photographs. These volumes were extremely useful for operations such as CHASE VIII and the 1958 sea dumps.

The above, had all of it been preserved, would have made for a complete record of all operations. Unfortunately, this was apparently not the case.

The proper course for documents to be turned in from the U.S. Army Technical Escort Unit is, and was, twofold. Documents, if believed to be of sufficient historical value, could be turned in to the Edgewood Arsenal Historical Office. If not so judged, these records could be turned in to the post Records Retention Center. Records would be held here for about a year. They would then be sent to the Modern Military Records Retention Center at Suitland, Maryland, where the National Archives and Records Administration (NARA) maintains them for the Army for a number of years. The records are periodically reviewed by the Army and are then turned over to the complete custody of the Archives.

From 1942 to 1950, this system was observed well, and all of the records from this period have survived intact. From 1951 to 1954, only the Historical Summaries appear to have survived. These documents are in the custody of NARA and may be viewed in the research room in Suitland, Maryland.

From 1955 and 1956 no Technical Escort Unit records at all have been found. Fortunately, this could be supplemented with some records from other depots which survived as part of their depot surveillance records.

In searching the files at the U.S. Technical Escort Unit, the complete trip reports for 1957 and half of 1958 were discovered. These were preserved by the unit historian.

For 1959, a summary document was discovered, at the same location, which described air movements; however, little information on other moves has been found.

From 1960 to the first half of 1964, only limited information has been discovered. This information came from a variety of sources including the special Historical volumes mentioned above, the AMCCOM Transportation Office, chemical depot records, and the personal remembrances of some former escort officers.

From the last half of 1964 through 1969, a summary of movement operations was fortunately preserved by the unit historian at the U.S. Army Technical Escort Unit. This summary was apparently constructed during the early 1970's by COL Phillip Blackwell who used the original trip reports. It includes all

information except a description of any unusual incident which occurred on the move. Information on incidents, where possible, was obtained from personal remembrances and depot records. The trip reports from which the summary was constructed, with a few minor exceptions, have been misplaced in the Army records system or have been disposed of. The few that survived did, apparently, because they were unclassified and were kept separate from the rest.

In addition to the "Blackwell summary", depot records have been found which significantly supplement the data for 1968 and 1969. This is significant in that the "Blackwell summary" appears to be very complete for 1964 to 1967, but is missing many moves from 1968 and 1969.

For the reasons above, the information provided in the compilation is not complete. Wherever possible, the Army will continue to seek missing records, and will update the compilation as any new information becomes available.

Additional Historical Background:

Over the years, the Army has adopted some names or expressions for specific moves, or groups of moves, which are not completely clear to someone reading the movement tables. This section is provided to add more background as an aid to the reader.

Most early moves of chemical weapons were simply isolated events. Those that were big enough not to be, such as the return of the stocks from Europe, took on no specific name, but might sometimes be referred to by the name of the ship they came "home" on. However, incidents which were noteworthy to the technical escort personnel frequently were given names either by those personnel or by the news media. Early incidents which typify this were as follows:

(1) The Francis L. Lee incident - frequently used to describe all of the problems involved with handling the leaking cargo of captured German war stocks aboard the ship, the Francis L. Lee from 1 May 1946 when it left Antwerp until December of 1946 when "mothballing" of the vessel was finally completed. See incident 19.

(2) The Leaking Nazi War Gas Train - refers to the series of events at Panola, Alabama, Amory, Mississippi, and Memphis, Tennessee caused by a trainload of munitions being moved from the Francis L. Lee to Pine Bluff Arsenal, Arkansas in July 1946. See incident 18.

In late 1948, the Army made the decision to sea dump the majority of its remaining stock of Lewisite. Sea dumping had been accomplished previously, but before this time munitions were generally loose dumped from barges. In this case the Army decided to fill a World War II merchant hulk, the S.S. Joshua Alexander, with the bulk Lewisite to be sea dumped. The hulk was then towed to sea and scuttled (see 1948, page 2). This work was assigned a code name, Operation Geranium (Lewisite has an odor like Geraniums). This was a method of operations and a naming convention not used again for some time; but eventually the Army returned to it.

During the 1950's, the only major operation referred to by name was the Ralston sea dump. This operation was carried out in the spring of 1958, and consisted of the sea dumping of the remaining stocks of M70 bombs and some remaining Lewisite. The operation took its name from the name of the merchant hulk to be filled with the bombs, the S.S. William Ralston. The operation consisted of rail moves from Deseret Chemical Warfare Depot (now the south area of Tooele Army Depot) and Navajo Army Depot to the naval weapons station at Concord, California. From there, the Ralston and, later, a barge of one ton containers, were moved to sea for scuttling/dumping.

In the early 1960's, the system of using code names came back into use. This system has continued to the present day. Some notable examples which are sometimes referred to in the text of this report are as follows:

(1) Operation YBA - The first movement of chemical weapons to Okinawa from the Continental United States (see 1963, page 1). This includes the accompanying rail moves to Concord Naval Weapons Station, the port of departure.

(2) Operation YBB - The second movement of chemical weapons to Okinawa (see 1963, page 1).

(3) Operation YBF - The third and final movement of chemical weapons to Okinawa in April 1965 (see 1965, page 2).

(4) Operation CHASE 8 - The first of the four CHASE sea dumps of chemical weapons. CHASE was a U.S. Navy acronym for "Cut Holes and Sink Em." The Navy had been sea dumping conventional high explosive ammunition at sea using former merchant hulks which were scuttled for years. One series of these dumps were the CHASE dumps. Many people, even within the Army, erroneously assume that all CHASE dumps were chemical weapon dumps. In fact, the vast majority were not. CHASE 8, the first chemical weapons CHASE dump, was made in May-June 1967 (see 1967, pages 1 and 2). The material dumped was bulk mustard ton containers and GB filled M55 rockets. The rockets were placed into steel vaults which were then filled with concrete. All of the cargo was placed aboard a merchant hulk (the S.S. Corporal Eric Gibson) and was then sunk in deep water off the continental shelf.

(5) Operation YZU - The movement of the current chemical weapons stocks to Europe in June 1967. Most aspects of this movement remain classified.

(6) Operation CHASE XI - The second CHASE operation (see 1968, page 1) held in May-June 1968. This operation was conducted similarly to the previous CHASE operation.

(7) Operation CHASE XII - The third CHASE operation (see 1968, page 1) held in June 1968. The cargo in this case was mustard contaminated one ton containers filled with water.

(8) Operation CHASE X - The fourth and final CHASE operation (see 1970-1977, page 1) conducted in August 1970. Why CHASE X followed XI and XII is unclear, although it was probably planned earlier and executed later. The cargo consisted of solid concrete vaults of GB filled M55 rockets.

(9) Operation Red Hat - The movement of all chemical munitions on Okinawa to Johnston Atoll in January - September 1971 (see 1970-1977, page 1). This operation involved the last major movement of M55 rockets.

(10) Operation TNS - The movement of mustard filled mortar projectiles from the north area of Tooele Army Depot to the south area of Tooele Army Depot by train in August 1977 (see 1970-1977, page 1).

(11) Operation DTS - The movement of various chemical munitions from Dugway Proving Ground to the south area of Tooele Army Depot in August 1977 by truck convoy (see 1970-1977, page 1).

(12) Operation SETCON I - The movement (see consolidation, or SETCON) of small stocks of Chemical Agent Identification Sets (CAIS) to Rocky Mountain Arsenal from worldwide sites for incineration during the pilot test of a facility at Rocky Mountain Arsenal in January and February 1978.

(13) Operation SETCON II - Following the successful pilot incineration program, the movement of all remaining stocks of CAIS to Rocky Mountain Arsenal in May-June 1980 (with an earlier Navy move in 1978 to facilitate the airlift).

(14) Operation RMT - The airlift of the GB filled Weteye bombs at Rocky Mountain Arsenal to Dugway Proving Ground, and the associated truck convoys from Dugway Proving Ground to Tooele Army Depot in August 1981 (see 1981-1986, page 1).

Description of Monitoring:

The monitoring of the air and of suspect liquids for chemical agent has developed tremendously over the last 40 years. It is important to keep in context while reading this report exactly what monitoring was available during transportation to the U.S. Army over the years.

a. Mustard and Lewisite: Detection of a mustard or lewisite leak during the late 1940's and early 1950's consisted of visual inspections and odor. Using sense of smell to detect a mustard or lewisite leak is less hazardous than might be normally suspected, as both compounds have very characteristic odors which can be detected by smell at very low concentrations. Mustard has an odor described as that of garlic, while lewisite has an odor similar to geraniums.

During the same period, the Army had a detector crayon for localizing mustard or lewisite leaks. This crayon would turn color in the presence of the chemical agents and was useful for verifying, for instance, if a wet spot under a one-ton container plug might be chemical agent seepage or merely water condensation.

Later, in the mid-1950's, the Army developed detector tubes. These tubes were thin glass tubes with a chemical substance inside. The substance was wetted with a second reactive chemical, then an aspiration bulb was connected to the glass tube. The tube was aimed at the desired sample area and the aspiration bulb was used to pump air through the glass tube. If mustard or lewisite was present, the primary substance in the tube would turn color. This

system is still in use today for spot checks, and is similar to the industrially used Draeger-style tubes available for many compounds.

At the same time as the detector tubes were developed, an impregnated paper was also developed to replace the detector crayon. This detector paper, referred to as M8 paper, is still in use today.

Recently the Army has begun limited use of the British manufactured Chemical Agent Monitor, or CAM, which can perform similar spot checks for mustard by using an ionization principal similar to home smoke alarms. However, this new device has not been previously used in monitoring a move.

Other very sensitive devices the U.S. Army uses to monitor for mustard, principally the use of bubblers and the gas chromatographic based Automatic Chemical Agent Monitoring System (ACAMS), are also available. However, neither of these systems is easily portable and they have never been used in a move. Their principal application has been at fixed storage or disposal sites. Monitoring for lewisite has become relatively unimportant as most remaining stocks were destroyed at Rocky Mountain Arsenal in 1981 and 1982. Only small quantities remain at Tooele Army Depot.

b. Nerve Agents (GA, GB, and VX): Detection of nerve agents was a matter of great concern thrust upon the U.S. Army upon discovery of Germany's secret stocks of Tabun (GA) in 1945. As all of the nerve agents are essentially odorless and are deadly at low concentrations, a quick and accurate method was required.

The method selected was biological monitoring. Rabbits, which were found to be very susceptible to the nerve agents, were placed in the vicinity of the weapons. Usually four rabbits in small cages would be placed in a railcar. This method continued in use during transportation until 1969, and at some storage installations into the early 1980's.

In the mid-1950's, as with mustard, a detector tube was developed for nerve agent. The detector tube has continued into use today, but is supplemented by a newer wafer like paper held in a plastic matrix that can be similarly aspirated and changes color in the presence of nerve agent.

In the late 1960's, a chemical reaction based alarm, the M8, was developed which detected nerve agent at the level immediately dangerous to life and health. This alarm was used extensively in later moves, such as Operation RMT in 1981, although it was not as rugged as was desirable and would false alarm with reasonable frequency.

Since that time, the Army has fielded the M8A1 alarm, which is an ionization alarm for GB and VX. This alarm is considerably more rugged and false alarms with less frequency. It is highly suitable for movement operations, as is a similar alarm, the British CAM, and either of these alarms would replace older methods.

As with mustard, the Army has other techniques for the monitoring of nerve agent (bubblers and ACAMS) which are excellent, but are designed for fixed storage or disposal facilities. These methods are not easily portable and have not been used during transportation.

Description of Packaging.

Past packaging and shipment of chemical munitions was not considered with the scrutiny currently being given this issue. This particularly relates to the issue of overpacking munitions in a vapor tight container. Packaging, prior to Operation RMT in 1981 (the movement of Weteye bombs from Rocky Mountain Arsenal to Tooele Army Depot - see the next section and 1981-1986, page 1), concentrated on adequate blocking and bracing of the munitions. Some excellent photographs of this, taking during Operation Red Hat, are provided in the section for moves from 1970-1977. Other than blocking and bracing, the munitions were shipped in their storage configuration. This configuration generally had the munitions stored on sturdy wooden pallets, which were not overpacked in any fashion. The number of munitions per pallet varied with the size of the munition.

The only exception to the palletized configuration were the Navy bombs (MK94 and Weteye), the spray tanks and the one ton containers. The Navy bombs have their own specially designed overpack to protect them from salt spray and other contaminated effects, as well as to protect the crew from a leaking bomb. The spray tanks used by the Air Force also come in a specially designed overpack. One ton containers have previously been shipped "as is".

Typically, on early moves, weapons were shipped in closed box cars and were stacked as efficiently as possible. During the incidents mentioned in this report, several disadvantages of doing this became apparent:

(1) If an item on the top leaked, it contaminated everything underneath it,

(2) If an item on the bottom leaked, everything above it had to be moved to reach it, and

(3) Such cramped conditions made emergency response more hazardous to the technical escort team coping with the problem.

In the 1950's, a modified approach using less dense packing was adopted. This was later formalized in rail and air packaging drawings published in the 1960's. Generally speaking, rockets, mines, and projectiles were still moved in boxcars, although they were not stacked as high or packaged as densely as before. One ton containers and bombs were moved in gondola cars (there are some excellent photographs of this in the section for 1958 on the Ralston sea dump). Spray tanks were moved on flat cars.

During Operation RMT in 1981, packaging was given some additional attention for the first time. Several Weteye bombs had been discovered leaking throughout the years prior to the move, and their contents had been drained into one ton containers. These one ton containers were overpacked for the air

move in a special steel container. The Weteye bombs, as previously mentioned, are already overpacked and were shipped as stored. Prior to Operation RMT, overpacking was accomplished only for munitions found to be leaking just prior to or during a move.

Reconciling the Records:

For anyone reading the history compilation pages, there is a tendency to want to reconcile all movements. That is, if VX projectiles went into Dugway, and are no longer stored there, the reader might wish to search for an outgoing shipment to show what happened to these items.

In some instances this can be done. In many instances, however, this attempt would be doomed to failure. Failure to reconcile the records could occur for several reasons as follows:

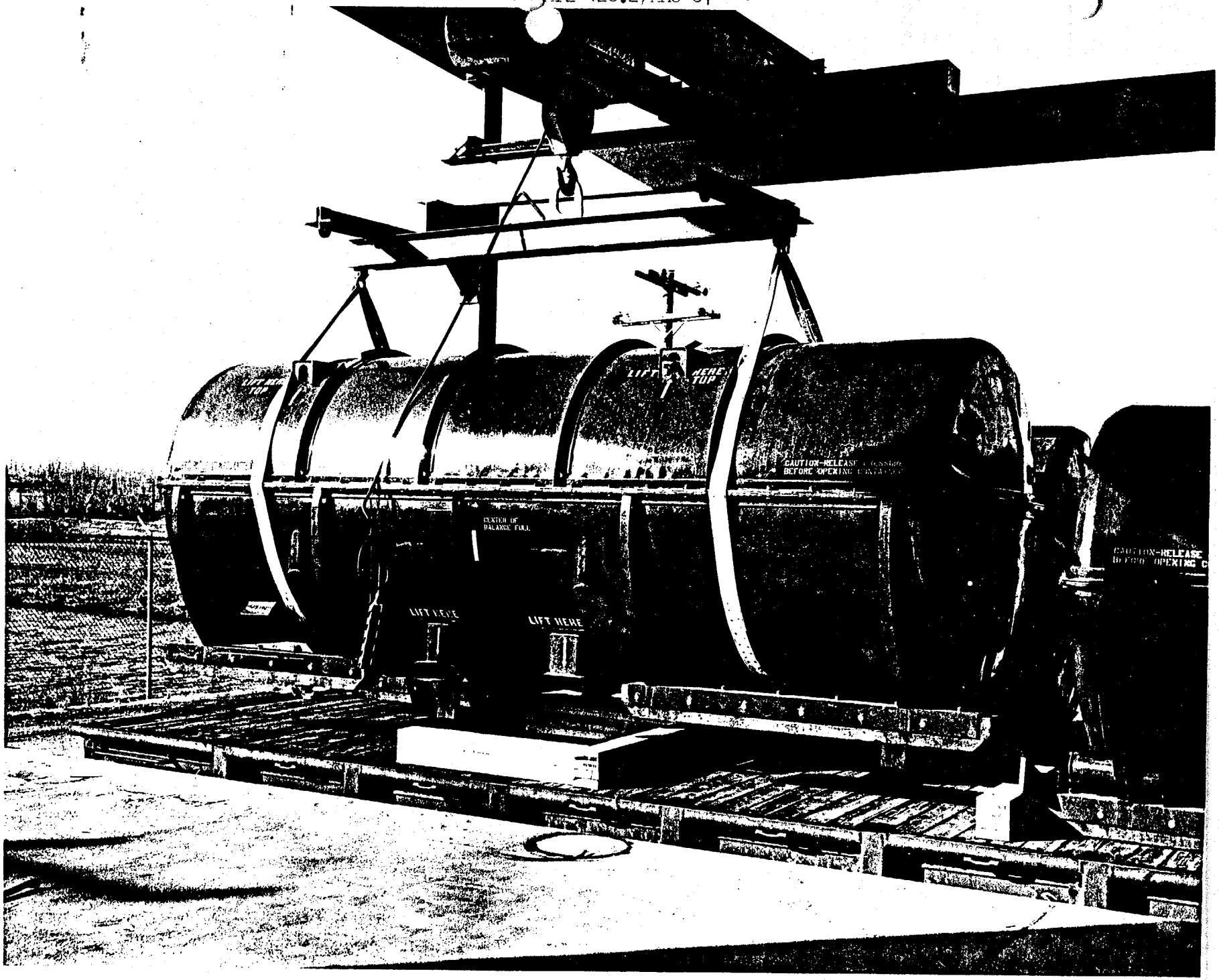
(1) For many years, the Army fired chemical weapons during tests at many of the locations shown. Some locations which extensively fired chemical weapons were Pine Bluff Arsenal, Edgewood Arsenal, and Dugway Proving Ground.

(2) The Army has transferred agent from certain munitions into other containers or munitions. For instance, at Pine Bluff Arsenal, captured German stocks and British stocks were transferred from bombs and land mines into one ton containers. At Rocky Mountain Arsenal, phosgene from bombs and projectiles was transferred into one ton containers. The containers were later sold by the government to private industry. The phosgene was then used as a raw material for fertilizers, plastics, etc.

(3) The Army has run many major disposal programs. For instance, all GB and HD stocks remaining at Rocky Mountain Arsenal in 1970 were incinerated or neutralized in controlled industrial facilities. At earlier dates, many installations destroyed chemical munitions by open pit burning.

(4) Finally, as referred to earlier, the records are not complete for all years. There are some moves, for instance the specific date of movement of GB rockets from Rocky Mountain Arsenal to east coast depots (accomplished some time in 1961-1963), which are simply missing.

For whatever admitted flaws in records completeness that exist, the records do give a picture of the magnitude of moves made over the years, and the success, and sometimes the problems, which the Army has encountered during this time. For further discussion of this issue, the reader is referred to the section on "Recommendations and Conclusions."



Spray Tank [illegible] Plant

Location Key

ACY	American Cyanamid Chemical Company - Azusa, California
ANAD	Anniston Army Depot - Anniston, Alabama
BAAB	Brooksville Army Air Base - Brooksville, Florida
BARB	Barbers Point Naval Air Station, Hawaii
BHOD	Black Hills Ordnance Depot - Igloo, South Dakota
BRAG	Ft. Bragg - North Carolina
CAAA	Crane Army Ammunition Activity - Indiana
CAAF	Campbell Army Air Field - Kentucky
CHAS	Charleston Naval Weapons Station - South Carolina
CNAD	Crane Naval Ammunition Depot - Crane, Indiana
CON	Naval Weapons Station - Concord, California
CZ	Canal Zone Tropical Test Areas
Deseret	Deseret Chemical Warfare Depot - Utah
DOW	Dow Chemical Company - Pittsburg, California
DPG	Dugway Proving Ground - Utah
EA	Edgewood Arsenal - Maryland
ELM	Elmendorf Air Force Base - Alaska
ENJ	Colts Neck Naval Pier - Earle, New Jersey
FALL	Fallon Naval Air Station - Nevada
FCA	Fort Churchill - Rivers, Manitoba, Canada
FMC	Fort McClellan - Alabama
FTR	Ft. Richardson - Alaska
FTST	Ft. Stewart - Georgia
GAAF	Godman Army Air Field - Ft. Knox, Kentucky
GAK	Ft. Greely - Alaska

Location Key (Continued)

GCWD	Gulf Chemical Warfare Depot - Huntsville, Alabama
GUAM	Anderson Air Force Base - Guam
HAAP	Hawthorne Army Ammunition Plant - Nevada
JA	Johnston Atoll
KEY	Keyport Naval Torpedo Station - Washington
LALM	Los Alamitos Naval Air Station - California
LBDA	Lexington-Blue Grass Depot Activity
LEJ	Camp Lejeune - North Carolina
LLL	Lualualei Naval Magazine - Hawaii
LOD	Letterkenny Ordnance Depot - Pennsylvania
LRAFB	Little Rock Air Force Base - Arkansas
MAAB	MacDill Army Air Base - Tampa, Florida
MAAP	McAlester Army Ammunition Plant - Oklahoma
MAFB	Maquire Air Force Base - New Jersey
MAP	Mukilteo Ammunition Pier - Mukilteo, Washington
MCMA	Mineral County Municipal Airport - Nevada
MMA	McAlester Municipal Airport - Oklahoma
NAAP	Newport Army Ammunition Plant - Newport, Indiana
NAVG	Naval Magazine - Guam
NAZ	Navajo Army Depot - Arizona
NMD	Naval Mine Depot - Yorktown, Virginia
NOPE	New Orleans Port of Entry - Braithwaite, Louisiana
NRAF	New River Marine Corps Air Field - North Carolina
OKC	Chibana Army Depot - Chibana, Okinawa

Location Key (Continued)

PAAF	Phillips Army Air Field - Aberdeen Proving Ground, Maryland
PAFB	Pope Air Force Base - North Carolina
PBA	Pine Bluff Arsenal - Arkansas
PNMA	Pendleton Municipal Airport - Washington
PUDA	Pueblo Depot Activity - Pueblo, Colorado
QUAN	Quantico Marine Corps Air Field - Virginia
RAH	Rahway Arsenal - Rahway, NJ
RMA	Rocky Mountain Arsenal - Colorado
SBSB	Small Boat Wet Storage Basin - Charleston, South Carolina
SBCA	Seal Beach Naval Weapons Station - California
SJOD	San Jacinto Ordnance Depot - Houston, Texas
SUF	Suffield Test Center - Ralston, Alberta, Canada
SUN	Sunny Point Naval Pier - Sunny Point, North Carolina
SVOD	Savanna Ordnance Depot - Savanna, Illinois
TAFB	Travis Air Force Base - California
TEAD	Tooele Army Depot - Tooele, Utah
TNM	Theodore Naval Magazine - Mobile, Alabama
TORO	El Toro Marine Corps Air Station - California
TUL	Tulalip Backup Storage Depot - Tulalip, Washington
UKMR	Upper Kipapa Military Reservation - Hawaii
UMDA	Umatilla Depot Activity - Hermiston, Oregon
WAAF	Wainwright Army Air Field - Ft. Wainwright, Alaska
WHID	Whidbey Island Naval Air Station - Washington
WRAF	Wright Army Air Field - Georgia
YTS	Yuma Test Station - Yuma, Arizona

Incident Summarization Sheets

1. (Date: Jul/Aug 47, Ref: 1947, page 1) One 4.2 inch phosgene (CG) filled mortar cartridge was discovered leaking while unloading on the dock. Item was destroyed. There were no injuries.

2. (Date: Mar 48, Ref: 1948, page 2) Minor valve leaks were discovered during the movement on two bulk containers of mustard (H). The leaks were sealed and decontaminated. There were no injuries.

3. (Date: Feb 48, Ref: 1948, page 2) A switching accident at Pine Bluff Arsenal resulted in two railcars filled with HT ton containers derailing and overturning. No leakers occurred and there were no injuries.

4. (Date: Jul 47/Jan 48, Ref: 1947, page 1) One minor road accident. No injuries and no leakers.

5. (Date: Aug/Sep 49, Ref: 1949, page 1) Truck 3 of the convoy was involved in a slow-speed collision with a civilian automobile near Jefferson City, Missouri. No leaks, spills or injuries were involved.

6. (Date: Nov 49, Ref: 1949, page 1) Truck 9 of the convoy was involved in a serious (20 mph) accident with a civilian truck when the police escort in St. Josephs City, Missouri failed to block off an intersection. There were no spills or leaks. Personnel on the truck were injured by the collision (injured neck and back, bruised knee, bruised side, etc.).

7. (Date: Oct 49, Ref: 1949, page 1) During unloading of the trucks, the fact that one 75mm projectile had rolled out of its pallet went unnoticed. The projectile was found later in the day still in the truck at the Ringsby Transportation Company Garage, Denver, Colorado. The projectile was reported to the Army and removed to Rocky Mountain Arsenal without further incident.

8. (Date: Oct 49, Ref: 1949, page 1) The air brakes on truck 8 of the convoy failed causing it to rear-end truck 7 near Bennett, Colorado. A vehicle fire started as the collision was serious, but was quickly extinguished by the escort personnel. There was no leak or spill, but there were some collision oriented injuries.

9 (A). (Date: Nov/Dec 48, Ref: 1948, page 2) During placement of the ton containers in the hold of the vessel prior to sea dump, a valve was accidentally sheared off. A vapor leak occurred but was sealed and decontaminated. There were no injuries.

9 (B). (Date: Nov/Dec 48, Ref: 1948, page 2) During the sea dump, the scuttling crew reported donning masks due to vapor in the hold of the vessel. It is probable that a ton container leaked during movement to the dump site. There were no injuries.

10. (Date: Jun 50, Ref: 1950, page 2) Truck 303 of the convoy was involved in a collision in Red Bird, Wyoming on 8 June 1950. No further details regarding this accident exist in the historical files.

11. (Date: Jun/Jul 50, Ref: 1950, page 2) Upon starting from a dead stop, a tractor and trailer uncoupled causing the trailer to fall forward onto the ground. There was no damage to the load. There were no spills, leaks or injuries.

12. (Date: Sep 46, Ref: 1946, page 8) Three leaking lewisite bombs were discovered during movement from the train to the barge. These were sealed and decontaminated, and then overpacked. There were no injuries.

13. (Date: Aug 46, Ref: 1946, page 10) Mustard bombs were discovered leaking during the unloading of the barge. One Non-Commissioned Officer was injured. Hospitalization was not required.

14. (Date: Aug 46, Ref: 1946, page 9) Leaking chemical munitions were found during the unloading of the S.S. Richardson. They were segregated onto special barges after being sealed and decontaminated. The leakers included 2 German GA bombs, 2 British H land mines, 46 CG bombs and 154 German H bombs. During the handling of these items "three civilian employees of this station received mustard gas injuries in handling contaminated lines to barges containing leaking munitions. None were hospitalized. Eight enlisted personnel received injuries from mustard gas in miscellaneous operations handling leakers. None were hospitalized." The barges were being used to remove unserviceable munitions found on the S.S. Richardson to a sea dumping area.

15. (Date: May/Jun 46, Ref: 1946, page 9) "Hold Number 2 had a considerable concentration of CG from leaking bombs." The hold was ventilated using large fans. The leakers were sealed. The cargo was unloaded by 18 June 1946. There were no injuries.

16. (Date: May/Jun 46, Ref: 1946, page 9) When unloading of the vessel began, personnel were not in protective clothing and leakers were soon encountered resulting in injuries. Both civilian stevedores and military personnel were then put into full rubber protective clothing. Eventually a total of 2 leaking GA bombs and 154 leaking mustard munitions were discovered. The leakers were sealed, decontaminated and overpacked. They were then segregated on the dock for sea dump. "Fifty-two civilians of the Charleston Stevedoring Company were treated for gas injuries, and 10 of them were hospitalized. Nine civilian employees of the Basin were treated for gas injuries and 3 were hospitalized. Eight Army personnel were injured, and 3 of them were hospitalized." All injuries were mustard burns.

17. (Date: Jul 46, Ref: 1946, page 9) Leaking mustard bombs from the cargo hold of the S.S. Francis Lee were taken by barge to Horn Island, Mississippi, and were open air burned. "All working personnel received vapor burns in the wrist area...some men also had slight burns on the neck." These injuries were incurred by the military group which off-loaded and burned the bombs.

18. (Date: Jul 46, Ref: 1946, page 9) The famous "Leaking Nazi War Gas Train." Soon after leaving Theodore Naval Magazine (12 July 1946) leaking German H bombs were discovered in one railcar. This car was detached from the train at Panola, Alabama, the leaks sealed and the car was returned to TNM for inspection and later shipment.

At Amory, Mississippi, a second car was discovered to be leaking seriously (13 July 1946). It was detached and moved to a siding in Bigbee, Mississippi and was left under guard. In spite of this, several railroad employees of the Amory yard ventured too close to the car and received vapor burns. A military escort team from Edgewood Arsenal arrived and by 17 July 1946, had isolated the leaker, decontaminated the area and destroyed the munition. The railcar then was forwarded to Pine Bluff Arsenal without further incident on 21 July 1946.

Meanwhile, the train with the remaining 8 cars had continued on toward Pine Bluff Arsenal. Arriving at the yard in Memphis, Tennessee (late on 13 July 1946), it was discovered that 3 more cars had leakers on board, and that one was very serious. The train had, in fact, contaminated 10 miles of track leading to the yard. Another special escort team from Edgewood Arsenal was sent to Memphis. The tracks were decontaminated, the leaking railcars were separated and decontaminated, and the leaking munitions were isolated and destroyed. These 3 railcars eventually reached Pine Bluff Arsenal on 30 July 1946.

During the Amory and Memphis operations, at least 21 civilian railyard workers received vapor burns from mustard and 2 were hospitalized. At least twenty-five military personnel received both vapor and liquid burns and at least 4 were hospitalized. The final medical report on these incidents lists 60 total gas exposures - 28 at Amory and 32 at Memphis. The injuries were mainly due to the high summer temperatures, poor availability of proper protective clothing and a lack of understanding and cooperation by local military authorities. This incident resulted in the virtual rewriting of chemical movement procedures used at that time.

19A. (Date: May-Jul 46, Ref: 1946, page 8) This ship, the S.S. Francis Lee, like others carrying captured German stocks, was found to contain leakers; however, this ship contained far more leakers than any of the others. These were segregated on the pier after decontamination and were placed on a barge for disposal (see Incident 17). During the unloading of the vessel 375 people were injured by exposure to mustard, and at least 22 people were hospitalized, making this the worst chemical incident the Army has ever incurred during transportation (excluding combat action during World War II). All of the injured were military personnel, or civilian contract personnel to the Army, principally stevedores.

19B. (Date: Jul-Aug 46, Ref: 1946, page 9) Upon opening the last hold of the Francis Lee, the situation was determined to be beyond handling with the resources at TNM. Consequently, the hold was sealed and the ship was moved to Edgewood, Maryland. Here, technical teams off-loaded the last 300 bombs, destroyed them and completely decontaminated the ship. There were 52 cases of

minor vapor burns during this operation, and some personnel were briefly hospitalized. The ship was subsequently moved to Baltimore for "moth balling" prior to being placed in long-term storage. During the moth-balling process, three civilians were injured and hospitalized due to contamination which had gone undiscovered in a remote portion of the bilge. This area was decontaminated by teams from Edgewood. The ship was checked periodically at its naval reserve mooring for the next 3 years, and no further contamination was found.

20. (Date: May/Jun 46, Ref: 1946, page 7) This ship, the S.S. Isaac Wise, contained some leakers. These were destroyed at San Jacinto Ordnance Depot. Five men received mustard vapor burns during the unloading operation - one ship's crewman, three stevedores, and one military escort person.

21. (Date: Jun/Jul 46, Ref: 1946, page 6) A serious mustard leaker was discovered as the train approached Chattanooga, Tennessee. The car was isolated at Tinner, Tennessee. The leaking bomb was sealed and decontaminated, and mustard which had spilled onto the siding was also decontaminated.

22. (Date: Jun/Jul 46, Ref: 1946, page 6) A leaking railcar was discovered upon entering the Georgia Railroad Yard at the corner of Delta and DeKalb Streets, Atlanta, Georgia. The car was isolated and a military escort team from Edgewood Arsenal was sent to decontaminate the area. The siding was decontaminated and the bomb was isolated and destroyed. Some military personnel on the escort team received minor vapor burns, and one air force enlisted man was briefly hospitalized with vapor burns.

23. (Date: Jun 46, Ref: 1946, page 5) One railcar was found to contain leaking drums of mustard upon arrival at Gulf Chemical Warfare Depot. There were no injuries.

24. (Date: Apr 46, Ref: 1946, page 4) On 8 April 1946, while at sea, a ton container of chlorine began leaking through a faulty fusible plug. After unsuccessful efforts to plug the leak, the ton container was thrown overboard. There were no injuries.

25. (Date: Mar 46, Ref: 1946, page 4) On 6 March 1946, while at sea, a 150 pound cylinder of chlorine was found to be leaking. After unsuccessful efforts to plug the leak it was thrown overboard. There were no injuries.

26. (Date: Apr/May 46, Ref: 1946, page 7) Eight 1,000 pound phosgene (CG) bombs and six 500 pound phosgene (CG) bombs were discovered leaking during unloading of the S.S. Park Benjamin. Twelve were repaired and two were destroyed (see Incident 39). There were no injuries.

27. (Date: Mar 46, Ref: 1946, page 2) Two mustard bombs were found to be leaking upon arrival. These were placed on a barge and dumped at sea. There were no injuries.

28. (Date: Feb 46, Ref: 1946, page 1) A gasoline line broke causing the truck to catch fire near Little Rock, Arkansas. The crew quickly extinguished the fire. There were no spills, leaks or injuries.

29. (Date: Jun 46, Ref: 1946, page 5) A railcar was discovered leaking mustard near Manchester, Georgia. Military escort teams were sent from Edgewood Arsenal, Maryland, to decontaminate the spill and arrived on 25 June 1946. The teams located a leaking bomb on 26 June 1946 and decontaminated it. The railcar was then forwarded to Gulf Chemical Warfare Depot (GCWD) without further incident. During the decontamination operations at Manchester, approximately 6 civilian employees of GCWD received mustard vapor burns. Approximately 14 members of the military escort teams also received vapor burns, and 7 men were hospitalized for approximately 2 weeks.

30. (Date: May 68, Ref: 1968, page 1) During the movement of this train from ANAD to Earle, New Jersey, the train was required to be repositioned while in the Potomac River Railroad Yard, Alexandria, Virginia. During this time two carloads of rockets were uncoupled from the train, and upon departure, were inadvertently left in the yard. When this was discovered, a military team was sent to secure them, and they were subsequently moved to the sea dump area without incident. The rockets in thecarloads were completely encased in concrete for the sea dump, and at no time leaked or caused injuries.

31. (Date: Mar 58, Ref: 1958, page 1) Leakers developed during the move as follows: 7 discovered in Elko, Nevada, 23 discovered in Portola, California, 34 discovered in Sacramento, California, and 59 discovered upon arrival in Concord. This resulted in 7 of the 15 gondola cars being contaminated. Load was decontaminated enroute and on arrival. No injuries.

32. (Date: Mar/Apr 58, Ref: 1958, page 1) Leakers developed during the move as follows: several minor leaks discovered in Portola, California, major leaks were apparent by the time the train arrived in Sacramento, California. During off-loading in Concord, about 150 leakers were found in 22 of 30 gondolas. Prompt decontamination and temperatures dipping into the 30's at night prevented a major spill. Spills were confined to the gondolas and were decontaminated. There were no injuries.

33. (Date: Apr 58, Ref: 1958, page 1) Leakers developed during the move. During off-loading, leakers were found in 29 of 30 cars. Prompt decontamination prevented a major spill and spills were confined to the gondolas. Leakers were segregated and rapidly overpacked in propellant charge cans during the off-loading at Concord, and all rail cars were decontaminated. There were no injuries.

34. (Date: Sep 65, Ref: 1965, page 4) The VX spray tank being returned was almost, but not quite, empty. During the movement, the spray tank nozzle leaked a small amount of VX. The military escort team used a powdered and spray decontaminant to clean the spill, and the chemical reaction caused a small on-board fire on the aircraft. The fire was quickly extinguished and there were no injuries.

35. (Date: May 65, Ref: 1965, page 2) During Operation YBF as the USNS McGraw was moving out of San Francisco harbor, another ship turned across its bow resulting in a near collision. The ships cleared each other by approximately 600 feet.

36. (Date: Oct 68, Ref: 1968, page 3) Upon preparing to unload one railcar at Umatilla, the rabbits were found dead. Further inspection disclosed a small leak in an MC-1 bomb (GB) at the edge of the center suspension lug. The bomb was immediately taped to stop the leak and was then overpacked. The area was then decontaminated. There were no injuries.

37. (Date: Sep 68, Ref: 1968, page 2) During unloading of one railcar at Umatilla, a leaking MC-1 bomb (GB) was detected. The leaker was taped and overpacked. The area was then decontaminated. There were no injuries.

38. (Date: Aug 64, Ref: 1964, page 1) During the movement to sea, a ton container of mustard leaked at the valve assembly. The lip of the ton container had filled with mustard and the ton container below was contaminated as well. The team evacuated the barge, suited up in protective clothing and returned to the barge. They then dumped both ton containers over the side and decontaminated the spill on the barge deck. There were no injuries and the rest of the material was sea dumped without further incident.

39. (Date: May 46, Ref: 1946, page 7) Three leaking German phosgene bombs were disposed of by taking them offshore and dumping them in deep water. There were no injuries.

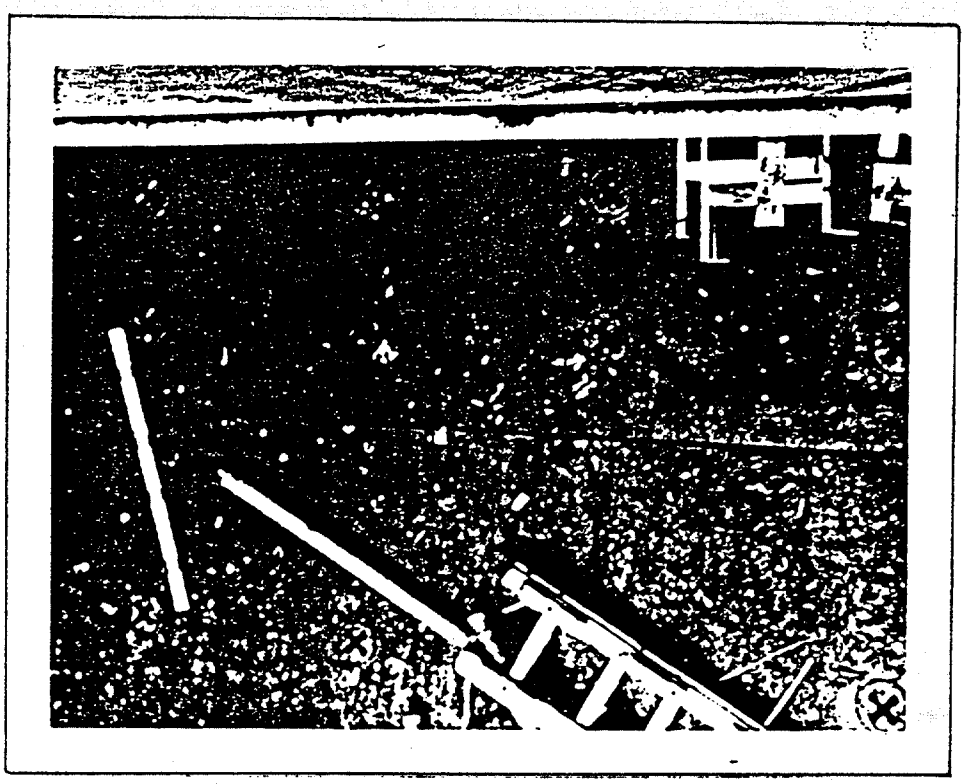
40. (Date: Jul 46, Ref: 1946, page 9) During unloading of the Francis Lee, 33 leaking German bombs were set aside on a barge for sea disposal. These were dumped on 13 Jul 46 20 miles off the coast. While dumping the bombs, a forklift pierced one bomb accidentally, contaminating the barge and allowing the mustard to partially drain. Since the personnel conducting the dump were in protective clothing, there were no serious injuries and the barge was decontaminated. However, the partially drained bomb floated away rather than sinking. It subsequently washed ashore (20 Jul 46) where local residents retrieved it as a war souvenir. The Army recovered the item on 23 Jul 46. Fortunately, the mustard had been flushed from the bomb, broken up by wave action, and had reacted with the seawater. The bomb was completely clean of mustard. There were no injuries to the civilians who retrieved the bomb.

41. (Date: Aug 71, Ref: 1970-1977, page 1) During the loading of the USNS Sealift, one pallet of 15 M55 rockets was accidently dropped approximately 40 feet into the hold of the vessel from a crane. Although subsequent examination showed that some of the rockets had been severely damaged, no spill occurred, and there was no harm to operators or the general public.

42. (Date: Aug 77, Ref: 1970-1977, page 1) Prior to Army inspection, and prior to arrival in the North Area of Tooele Army Depot, one of two engines scheduled to pull the munitions train was involved in a collision when its brakes failed allowing it to roll into another train. Although no weapons were

involved in this crash whatsoever, the event was widely covered by the media, so it is mentioned here for clarification. No chemicals were involved in or spilled during this accident. The engine was replaced, and the actual movement operation proceeded without incident.

43. (Date: May 80, Ref: SETCON II, page 1) A helicopter transferring Chemical Agent Identification Sets (CAIS) from Crane Army Ammunition Activity, Indiana, experienced engine failure immediately after takeoff and crashed. None of the CAIS in the helicopter leaked or spilled. One crew member suffered a broken foot. These CAIS and the remaining CAIS at Crane were removed without further incident.



OPERATION RED HAT - M55 ROCKETS LIE IN THE HOLD OF USNS SEALIFT AFTER ACCIDENTAL DROPPING -OKC TO JA, 1970-1977, PAGE 1.

Moves - 1946

From	To	Date	Type	Cargo	Quantity	Incidents
Deseret	RMA	4-6 Jan 46	R	Drums - H	36 Cars	None
Deseret	RMA	11-14 Jan 46	R	Drums - H	28 Cars	None
Deseret	RMA	18-21 Jan 46	R	Drums - H	50 Cars	None
PBA	RMA	14-18 Jan 46	R	Bulk - H	4 Cars	None
Deseret	RMA	25-27 Jan 46	R	Drums - H	50 Cars	None
Deseret	RMA	2-5 Feb 46	R	Drums - H	50 Cars	None
Deseret	RMA	15-17 Feb 46	R	Drums - H	25 Cars	None
GCWD	BHOD	28 Jan - 2 Feb 46	R	Projectiles - H	10 Cars	None
Deseret	RMA	7-10 Feb 46	R	Drums - H	25 Cars	None
Oakland, CA	Yokohama, Japan	20 Dec 45 - 7 Jan 46	S	Bulk - CL	S.S. Kodiak Victory	None
DOW	TUL/MAP	8-12 Feb 46	R	Bulk - CL	3 Cars	None
ACY	TUL/MAP	30 Jan - 4 Feb 46	R	Bulk - CL	Unspecified	None
EA	Snowden Chemical Company	14-24 Feb 46	R	Bulk - PS	2 Cars	None
DOW	TUL/MAP	1-6 Feb 46	R	Bulk - CL	3 Cars	None
PBA	EA	4 Feb - 7 Mar 46	M	Bombs - Incendiary	1 Truck	28
Oakland, CA	Yokohama, Japan	12-29 Jan 46	S	Bulk - CL	S.S. Warwick Victory	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Oakland, CA	Manila, PI	29 Dec 45 - 25 Jan 46	S	Bulk - CL	S.S. Walter Wellman	None
GCWD	NOPE	17-19 Feb 46	R	Projectiles - H	37 Cars	None
GCWD	NOPE	20-25 Feb 46	R	Projectiles - H	25 Cars	None
NOPE	Sea	1-7 Mar 46	S	Projectiles - H	U.S.S. Akutan	None
BHOD	DPG	13-16 Mar 46	R	Bombs - CK	4 Cars	None
EA	SJOD/NOPE	19 Feb - 10 Mar 46	R	Bombs - H	1 Car	27
NOPE	Panama	10-19 Mar 46	S	Bombs - H	USAT William Gibson	None
Oakland, CA	Yokohama, Japan	22 Jan - 6 Feb 46	S	Bulk - CL	S.S. Twin Falls Victory	None
Oakland, CA	EA	22 Mar - 1 Apr 46	R	Probable captured Japanese munitions	Unspecifed	None
Oakland, CA	Manila, PI	15 Feb - 6 Mar 46	S	Bulk - CL	S.S. Linfield Victory	None
Oakland, CA	Manila, PI	13 Jan - 26 Feb 46	S	Bulk - CL	S.S. John Troy	None
EA	NMD	15-18 Mar 46	R	Projectiles - H	4 Cars	None
NMD	Sea	21-25 Mar 46	S	Projectiles - H	S.S. Diamond Head	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Oakland, CA	Japan/Korea	27 Feb - 1 Apr 46	S	Bulk - CL	S.S. Durham Victory	None
CNAD	Deseret	6-11 Apr 46	R	Bombs - H	15 Cars	None
Deseret	PBA	30 Mar - 4 Apr 46	R	Projectiles - HT	9 Cars	None
EA	NMD	12-14 Mar 46	R	Bulk - H	1 Car	None
NMD	Balboa, CZ	27 Mar - 2 Apr 46	S	Bulk - H	U.S.S. Colonial	None
Balboa, CZ	Panama	2-5 Apr 46	M	Bulk - H	4 Trucks	None
Europe	SBSB	? - 3 Apr 46	S	Projectiles, Bombs - H, GA (German)	S.S. Franck Emerson	None
SBSB	EA	23-25 Apr 46	R	Projectiles, Bombs - H, GA (German)	43 Cars	None
SBSB	GCWD	20-22 Apr 46	R	Projectiles - CG, H	31 Cars	None
MAP	Yokohama, Japan	23 Mar - 6 Apr 46	S	Bulk - CL	S.S. Chelsea Victory	None
DOW	TUL/MAP	23 Jan - 16 Feb 46	R	Bulk - CL	7 Cars	None
CNAD	Deseret	18-23 Apr 46	R	Bombs - H	15 Cars	None
LBDA	GCWD	1-4 May 46	R	Bombs - H	11 Cars	None
LBDA	GCWD	26-29 Apr 46	R	Bombs - H	10 Cars	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
CNAD	Deseret	2-7 May 46	R	Bombs - H	15 Cars	None
MAP	Yokohama, Japan	16 Feb - 15 Mar 46	S	Cylinders, Bulk - CL	S.S. Eugene Skinner	25
DOW	TUL/MAP	25 Jan - 16 Feb 46	R	Bulk - CL	3 Cars	None
DOW	TUL/MAP	15-26 Feb 46	R	Bulk - CL	2 Cars	None
MAP	Yokohama, Japan	23 Mar - 12 Apr 46	S	Bulk - CL	S.S. Cape Friendship	24
DOW	MAP	15-26 Feb 46	R	Bulk - CL	2 Cars	None
BAAB	DPG	8-19 May 46	R	Rockets, Bombs - H	2 Cars	None
BAAB	MAAB	2 May 46	M	Drum - H	1 Truck	None
BAAB	MAAB	1 May 46	M	Drums - H, L	1 Truck	None
CNAD	Deseret	17-22 May 46	R	Bombs - Incindiary	15 Cars	None
SBSB	GCWD	19-21 May 46	R	Mines - H (British)	23 Cars	None
San Francisco	Ginsen, Korea	2 Feb - 13 Mar 46	S	Cylinders - CG	S.S. Edward McDowell	None
BAAB	EA	24-29 May 46	M	Drums - H	1 Truck	None
SBSB	GCWD	30 May - 2 Jun 46	R	Bombs, Projectiles, Mines - H, CG, HT	23 Cars	None
EA	GCWD	23 May - 7 Jun 46	R	Bombs - GA (German)	1 Car	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
SBSB	GCWD	11-14 Jun 46	R	Drums, Bombs, Mines - H, CG (U.S. & British)	26 Cars	None
CNAD	Deseret	1-6 Jun 46	R	Projectiles, Rockets - H, CG	14 Cars	None
CNAD	Deseret	7-13 Jun 46	R	Projectiles - H	12 Cars	None
SBSB	GCWD	19-21 Jun 46	R	Bombs, Drums - CG, H (U.S. & British)	47 Cars	23
EA	RMA	14-21 Jun 46	R	Bulk - HD	35 Cars	None
EA	Washington Natl Airport	14 Mar 46	M	Projectiles - H, HN-1 CG, CK, GA	1 Truck	None
Washington Natl Airport	Schofield Barracks, HI	14-19 Mar 46	A	Projectiles - H, HN-1 CG, CK, GA	1 Airplane	None
SBSB	GCWD	21-23 Jun 46	R	Bombs - H (German)	19 Cars	None
GCWD	RMA	14-18 Jun 46	R	Bulk - H	40 Cars	None
CNAD	Deseret	14-20 Jun 46	R	Munitions - H, CG	13 Cars	None
SBSB	GCWD	29 Jun - 1 Jul 46	R	Bombs - H, GA (German)	20 Cars	None
SBSB	GCWD	25-28 Jun 46	R	Bombs - H, GA (German)	19 Cars	None
SBSB	GCWD	25-27 Jun 46	R	Bombs - H, GA (German)	19 Cars	None
SBSB	GCWD	23-30 Jun 46	R	Bombs - H (German)	Unspecified	29
Auera, Italy	Sea	1-23 Apr 46	S	Bombs - CG	Unspecified	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Auera, Italy	Bagnoli, Italy	6-7 May 46	R	Bombs - CG	13 Cars	None
Bagnoli, Italy	TNM	22 May 46 - 13 Jan 46	S	Bombs - CG	S.S. Francis Newlands	None
TNM	GCWD	24-27 Jun 46	R	Bombs - CG	13 Cars	None
Deseret	RMA	4-5 Jul 46	R	Bulk - H	30 Cars	None
Deseret	RMA	21-23 Jun 46	R	Bulk - H	20 Cars	None
SBSB	GCWD	26 Jun - 3 Jul 46	R	Bombs - GA, H	20 Cars	22
EA	SBSB	18-24 Jun 46	R	Bulk - L	6 Cars	None
SBSB	GCWD	29 Jun - 1 Jul 46	R	Bombs - GA, H (German)	20 Cars	None
GCWD	SBSB	18-27 Jun 46	R	Bulk - L	30 Cars	None
SBSB	GCWD	6-8 Jun 46	R	Bombs, Mines Projectiles - H, CG	38 Cars	None
SBSB	GCWD	22-24 May 46	R	Mines - H (British)	17 Cars	None
PBA	RMA	5-8 Jul 46	R	Bulk - H	35 Cars	None
SBSB	GCWD	27 Jun - 1 Jul 46	R	Bombs - H (German)	20 Cars	21
PBA	SBSB	15-17 Jun 46	R	Bulk - L	24 Cars	None
EA	DPG	26 Jun - 4 Jul 46	R	Bombs, Mines - H, CG, AC, CK	1 Car	None

Moves - 1946 (Continued)

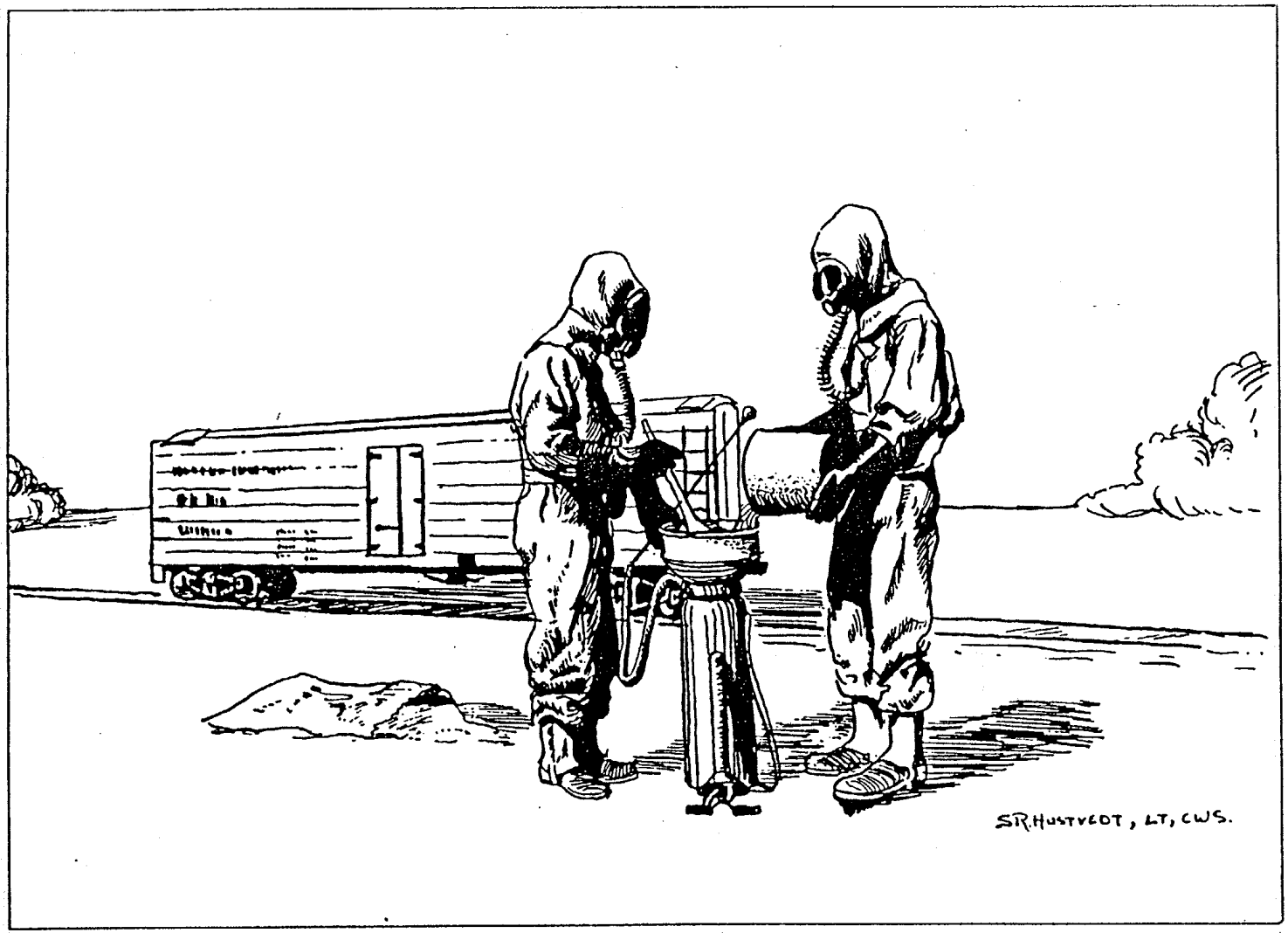
From	To	Date	Type	Cargo	Quantity	Incidents
Antwerp, Belgium	NOPE/SJOD	29 Apr - 6 Jun 46	S	Bombs- CG, H (German)	S.S. Isaac Wise	20
Europe	NOPE/SJOD	? - 15 Apr 46	S	Bombs - CG	S.S. Park Benjamin	26
NOPE/SJOD	Sea	May 46	S	Bombs - CG	3 bombs	39
SJOD	PBA	25-27 Apr 46	R	Bombs - CG	Unspecified	None
SJOD	PBA	28-30 Apr 46	R	Bombs - CG	Unspecified	None
SJOD	PBA	1-4 May 46	R	Bombs - CG	Unspecified	None
SJOD	PBA	6-8 May 46	R	Bombs - CG	Unspecified	None
SJOD	PBA	6-9 Jun 46	R	Bombs - CG, H (German)	30 Cars	None
SJOD	PBA	13-15 Jun 46	R	Bombs - CG, H (German)	19 Cars	None
SJOD	PBA	18-20 Jun 46	R	Bombs - CG, H (German)	24 Cars	None
SJOD	PBA	15-17 Jun 46	R	Bombs - CG, H (German)	47 Cars	None
SJOD	PBA	24-26 Jun 46	R	Rockets, Bombs, Projectiles - H, CG (German)	30 Cars	None
SBSB	GCWD	3-6 Jul 46	R	Bombs, Projectiles - GA, H	10 Cars	None
American Cyanamid Warner, NJ	EA	23 Jul 46	M	Bombs - CK	1 Truck	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Oakland, CA	EA	2-13 Aug 46	R	Bombs - Pyrotechnic (Japanese)	1 Car	None
BHOD	SBSB	17-24 Jul 46	R	Bombs - L	12 Cars	None
GCWD	RMA	10-15 Jul 46	R	Bulk - H	30 Cars	None
GCWD	RMA	28 Jun - 2 Jul 46	R	Bulk - H	45 Cars	None
PBA	RMA	13-18 Jul 46	R	Bulk - H	23 Cars	None
LBDA	SBSB	15-18 Aug 46	R	Bombs - L	13 Cars	None
SBSB	Sea	8-9 Sep 46	S	Bombs - L	Barge	None
SBSB	Sea	8-9 Sep 46	S	Bombs - L	Barge	None
SBSB	Sea	10-11 Sep 46	S	Bombs - L	Barge	None
SBSB	Sea	11-12 Sep 46	S	Bombs - L	Barge	None
SBSB	Sea	19-20 Sep 46	S	Bombs - L	Barge #3151	None
SBSB	Sea	19-20 Sep 46	S	Bombs - L	Barge #3153	None
SBSB	Sea	21-22 Sep 46	S	Bombs - L	Barge #3152	None
SBSB	Sea	24-25 Sep 46	S	Bombs - L	Barge	None
SBSB	Sea	26-27 Sep 46	S	Bombs - L	Barge #3151	12
Antwerp, Belgium	TNM	20 May - 8 Jun 46	S	Bombs - H (German)	S.S. Francis Lee	19A

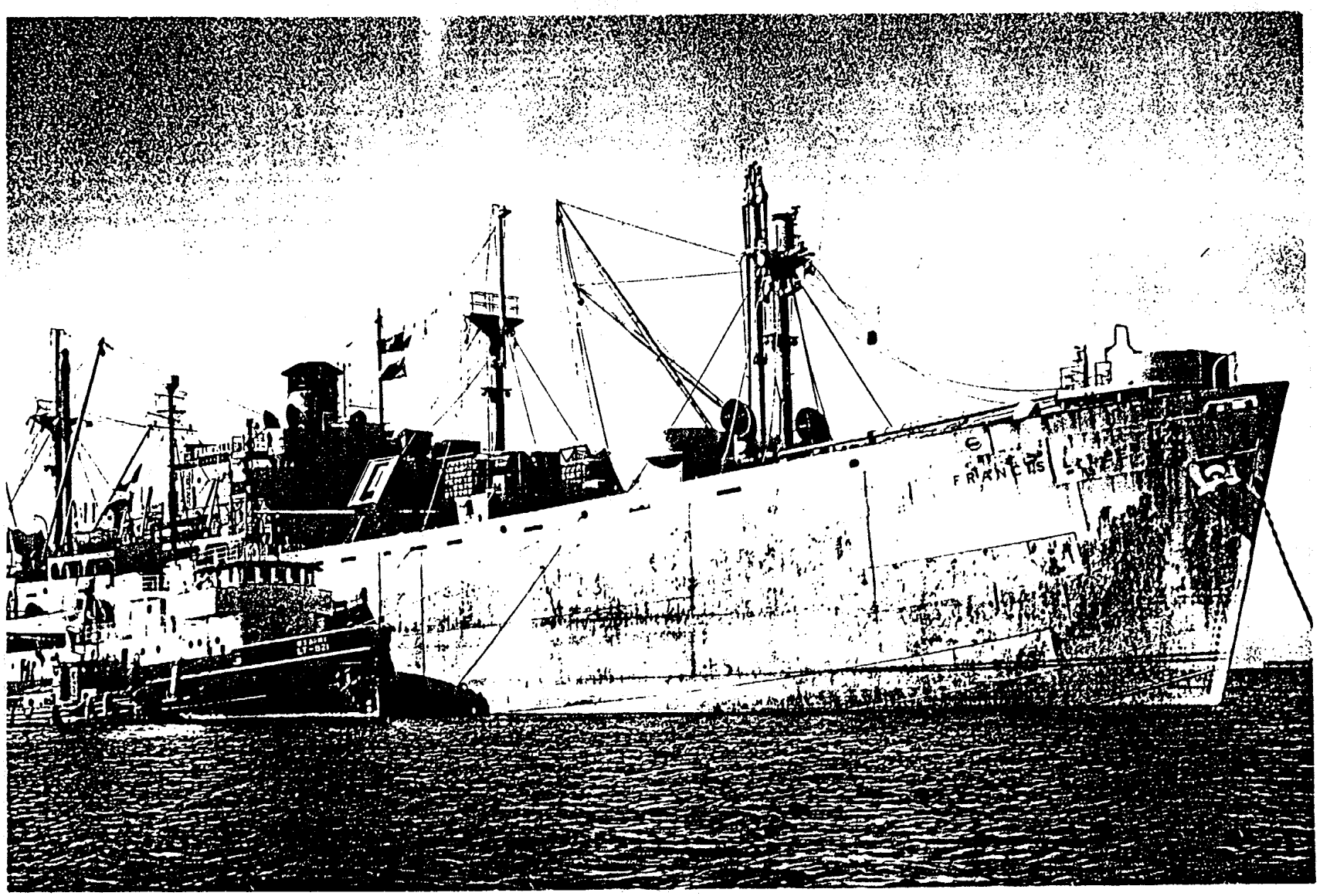
Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TNM	PBA	14-18 Jun 46	R	Bombs - H (German)	42 Cars	None
TNM	PBA	19-22 Jun 46	R	Bombs - H (German)	21 Cars	None
TNM	PBA	26-29 Jun 46	R	Bombs - H (German)	33 Cars	None
TNM	PBA	1-4 Jul 46	R	Bombs - H (German)	26 Cars	None
TNM	PBA	8-11 Jul 46	R	Bombs - H (German)	12 Cars	None
TNM	PBA	11-30 Jul 46	R	Bombs - H (German)	10 Cars	18
TNM	PBA	13-17 Jul 46	R	Bombs - H (German)	10 Cars	None
TNM	Sea	13 Jul 46	S	Bombs - H (German)	Barge	40
TNM	Horn Island, MI	27 Jul 46	S	Leaking German H Bombs (124 each)	Barge	17
TNM	EA	27 Jul - 6 Aug 46	S	Leaking German H Bombs (300 each)	S.S. Francis Lee	19B
Antwerp, Belgium	SBSB	1-28 May 46	S	German Munitions - H, GA, CN, DM	S.S. Edward Richardson	16
Cardiff, Wales	SBSB	? - 16 May 46	S	British & U.S. Munitions - H, CG	S.S. George Walton	15
SBSB	Sea	8-22 Aug 46	S	Bombs, Mines - L, H, CG, GA	2 Barges	14
LBDA	SBSB	30 Aug - 1 Sep 46	R	Bombs - L	13 Cars	None
SBSB	Sea	29-30 Aug 46	S	Bombs - L	Barge	None



"If a serious leaker was discovered, (...) the car was immediately placed on a siding"

PERIOD DRAWING OF A LEAKING RAIL CAR – 1946, PAGES 2, 5, 6 AND 9.



THE S.S. FRANCIS L. LEE AT ANCHOR EAST OF POOLES ISLAND, EDGEWOOD, MARYLAND - 1946, PAGE 9.

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
SBSB	Sea	23-24 Aug 46	S	Bombs, Bulk - L, H, CG	Barge	None
SBSB	Sea	22-23 Aug 46	S	Bombs - L	Barge	None
SBSB	Sea	12-13 Aug 46	S	Bombs - L, H	Barge	13
SBSB	Sea	9-10 Aug 46	S	Bombs - L	Barge	None
SBSB	Sea	7-8 Aug 46	S	Bombs - L	Barge	None
SBSB	Sea	1-2 Aug 46	S	Bombs - L	Barge	None
BHOD	SBSB	27 Aug - 3 Sep 46	R	Bombs - L	12 Cars	None
LBDA	SBSB	12-15 Sep 46	R	Bombs - L	12 Cars	None
BHOD	SBSB	25 Sep - 2 Oct 46	R	Bombs - L	12 Cars	None
LBDA	SBSB	25-28 Sep 46	R	Bombs - L	13 Cars	None
GCWD	SBSB	10-13 Oct 46	R	Projectiles - H	2 Cars	None
LBDA	SBSB	9-23 Oct 46	R	Bombs - L	9 Cars	None
SBSB	Sea	2-3 Oct 46	S	Bombs - L	Barge #3153	None
SBSB	Sea	2-3 Oct 46	S	Bombs - L	Barge #3151	None
SBSB	Sea	10-11 Oct 46	S	Bombs - L	Barge #3152	None
SBSB	Sea	10-11 Oct 46	S	Bombs - L	Barge #3151	None

Moves - 1946 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
SBSB	Sea	14-17 Oct 46	S	Bombs, Projectiles - L, H	Barge #3152	None
DPG	Deseret	14-18 Oct 46	M	Drums - H	Unspecified (see next item)	None
Deseret	EA	18-26 Oct 46	R	Drums - H	2 Cars	None
GCWD	RMA	23-26 Oct 46	R	Drums - H	2 Cars	None
GCWD	Deseret	4-12 Dec 46	R	Bombs - GA	1 Car	None

Moves - 1947

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	4-8 Nov 47	M	Projectiles - H	2 Trucks	None
LBDA	RMA	26-30 Sep 47	R	Projectiles - H	14 Cars	None
LBDA	RMA	13-19 Sep 47	R	Projectiles - H	14 Cars	None
Pacific	Bangor, WA	11 Jul - 5 Aug 47	S	Grenades, Bombs & Projectiles - H, CG, CNS	U.S.S. Tom Treanor	1
Bangor, WA	Deseret	24-28 Jul 47	R	Projectiles - H, CNS	2 Cars	None
Bangor, WA	Deseret	2-7 Aug 47	R	Grenades & Projectiles - H, CG, CNS	20 Cars	None
Bangor, WA	RMA	5- Aug 47	R	Bombs - CG	16 Cars	None
Ft. Monroe, VA	EA	25 Jul 47	M	Bulk - H, CNB	1 Truck	None
BHOD	RMA	2 Apr 47	M	Projectiles - H	3 Trucks	None
CNAD	Deseret	12-18 Feb 47	R	Bombs - CK	11 Cars	None
CNAD	Deseret	21-26 Feb 47	R	Bombs - CK	10 Cars	None
Deseret	RMA	20-23 Jan 47	R	Bulk - L	2 Cars	None
LBDA	RMA	11-16 Oct 47	R	Projectiles - H	12 Cars	None
BHOD	RMA	9 Jul 47 - 27 Jan 48	M	Projectiles - H	758 Trucks/ 102 Trips	4
SVOD	RMA	4 Oct - 12 Dec 47	M	Projectiles - H	155 Trucks/ 14 Trips	None
Attu and Adak, Alaska	Sea	1947	S	Bulk - H, L	Unspecified	Unspecified

Moves - 1948

From	To	Date	Type	Cargo	Quantity	Incidents
Hill AFB, UT	EA	16-20 Dec 48	A	Bombs - CG	1 Aircraft	None
GCWD	SBSB	13-15 Dec 48	R	Bulk, Bombs - L	9 Cars	None
GCWD	SBSB	6-8 Dec 48	R	Bulk - L	38 Cars	None
GCWD	SBSB	29 Nov - 1 Dec 48	R	Bulk - L	36 Cars	None
GCWD	SBSB	22-24 Nov 48	R	Bulk - L	38 Cars	None
GCWD	SBSB	16-18 Nov 48	R	Bulk - L	39 Cars	None
GCWD	SBSB	9-11 Nov 48	R	Bulk - L	39 Cars	None
GCWD	SBSB	1-3 Nov 48	R	Bulk - L	38 Cars	None
EA	DPG	20-29 Oct 48	M	Bulk - CG	4 Trucks	None
DPG	EA	10-11 Sep 48	A	Bombs - GA	1 Aircraft	None
FMC	GCWD	22 Aug 48	M	Projectiles - H	1 Truck	None
GCWD	Deseret	18-25 Aug 48	R	Munitions (German) - Unspecified	5 Cars	None
EA	DPG	3-4 Aug 48	A	Bombs - GA, GB	1 Aircraft	None
EA	DPG	6-7 Jul 48	A	Bombs - GA	1 Aircraft	None
EA	Hill AFB, UT	17-18 Jun 48	A	Bombs - Unspecified	1 Aircraft	None
Pittsburgh, PA	EA	3-5 Jun 48	M	Cylinders - H, L, CG	1 Truck	None

Moves - 1948 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
GCWD	PBA	25-27 May 48	R	Bombs, Bulk - CG	11 Cars	None
GCWD	PBA	6-7 May 48	R	Bombs, Bulk - CG	18 Cars	None
GCWD	DPG	20-25 Mar 48	R	Bombs (German) - GA	16 Cars	None
GCWD	PBA	19-21 Apr 48	R	Bombs - CG	15 Cars	None
GCWD	PBA	30-31 Mar 48	R	Bulk (German), Bombs - H, CG	48 Cars	2
GCWD	PBA	23-24 Mar 48	R	Bulk, Bombs - H, CG	39 Cars	None
GCWD	PBA	16-17 Mar 48	R	Bulk, Bombs - H, CG	28 Cars	None
GCWD	PBA	8-9 Mar 48	R	Bulk, Bombs - H, CG	45 Cars	None
GCWD	PBA	2-3 Mar 48	R	Bulk, Bombs - H, CG	43 Cars	None
GCWD	PBA	25-27 Feb 48	R	Bulk, Bombs - CG	44 Cars	None
GCWD	PBA	23-24 Jan 48	R	Bulk - H	40 Cars	None
GCWD	PBA	31 Jan - 2 Feb 48	R	Bulk, Bombs - H, CG	41 Cars	None
GCWD	PBA	6-8 Feb 48	R	Bulk, Bombs - H, HT, CG	43 Cars	3
GCWD	PBA	17-18 Feb 48	R	Bulk, Bombs - H, CG	42 Cars	None
BHOD	SUF	14-19 Jan 48	R	Bombs - CK, CG	1 Car	None
SBSB	Sea	1 Nov - 20 Dec 48	S	Bulk - L	S.S. Joshua Alexander	9

Moves - 1949

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	26 Sep - 1 Oct 49	M	Projectiles - H	15 Trucks	None
LBDA	RMA	15-19 Aug 49	M	Projectiles - H	10 Trucks	None
LBDA	RMA	13-16 Sep 49	M	Projectiles - H	14 Trucks	None
LBDA	RMA	29 Aug - 2 Sep 49	M	Projectiles - H	10 Trucks	5
BHOD	RMA	5-6 Dec 49	R	Projectiles - H	5 Cars	None
BHOD	RMA	29 Nov - 1 Dec 49	R	Projectiles - H	6 Cars	None
LBDA	RMA	5-9 Dec 49	M	Projectiles - H	17 Trucks	None
LBDA	RMA	21-25 Nov 49	M	Projectiles - H	19 Trucks	None
BHOD	RMA	22-23 Nov 49	M	Projectiles - H	4 Trucks	None
LBDA	RMA	7-11 Nov 49	M	Projectiles - H	15 Trucks	6
BHOD	RMA	17-19 Nov 49	R	Projectiles - H	10 Cars	None
BHOD	RMA	8-10 Nov 49	R	Projectiles - H	7 Cars	None
BHOD	RMA	1-3 Nov 49	R	Projectiles - H	7 Cars	None
LBDA	RMA	24-28 Oct 49	M	Projectiles - H	11 Trucks	None
BHOD	RMA	26-27 Oct 49	M	Projectiles - H	8 Trucks	7
LBDA	RMA	10-14 Oct 49	M	Projectiles - H	8 Trucks	8
BHOD	RMA	20-21 Oct 49	M	Projectiles - H	10 Trucks	None

Moves - 1949 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
BHOD	RMA	14-15 Oct 49	M	Projectiles - H	5 Trucks	None
EA	DPG	13-14 Oct 49	A	Unspecified - Probable G	1 Aircraft	None
BHOD	RMA	6-7 Oct 49	M	Projectiles - H	4 Trucks	None
EA	DPG	30 Sep - 1 Oct 49	A	Unspecified - Probable G	1 Aircraft	None
EA	DPG	21-29 Sep 49	R/M	Munitions - G	1 Car/2 Trucks	None
BHOD	RMA	30 Sep - 1 Oct 49	M	Projectiles - H	5 Trucks	None
EA	DPG	27-29 Sep 49	A	Unspecified - Probable G	1 Aircraft	None
BHOD	RMA	23-24 Sep 49	M	Projectiles - H	2 Trucks	None
EA	St. Thomas, VI	19 Aug - 9 Sep 49	R/S	Unspecified - Probable G	1 Car	None
BHOD	RMA	14-15 Sep 49	M	Projectiles - H	5 Trucks	None
BHOD	RMA	8-9 Sep 49	M	Projectiles - H	4 Trucks	None
BHOD	RMA	1-2 Sep 49	M	Projectiles - H	4 Trucks	None
EA	DPG	1-2 Sep 49	A	Unspecified - Probable G	1 Aircraft	None
EA	DPG	19-24 Aug 49	A	Unspecified - Probable G	1 Aircraft	None
BHOD	RMA	29-30 Aug 49	M	Projectiles - H	2 Trucks	None
BHOD	RMA	25-26 Aug 49	M	Projectiles - H	3 Trucks	None

Moves - 1949 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
BHOD	RMA	22-23 Aug 49	M	Projectiles - H	5 Trucks	None
BHOD	RMA	11-12 Aug 49	M	Projectiles - H	4 Trucks	None
BHOD	RMA	18-19 Aug 49	M	Projectiles - H	3 Trucks	None
EA	DPG	9-10 Aug 49	A	Unspecified - Probable G	1 Aircraft	None
EA	DPG	21-28 Jul 49	A	Unspecified - Probable G	1 Aircaft	None
EA	DPG	26-27 Jul 49	A	Unspecified - Probable G	1 Aircraft	None
SVOD	RMA	21-24 Jun 49	M	Projectiles - H	9 Trucks	None
BHOD	RMA	29-30 Jun 49	M	Projectiles - H	6 Trucks	None
BHOD	RMA	15-16 Jun 49	M	Projectiles - H	6 Trucks	None
BHOD	RMA	2-3 Jun 49	M	Projectiles - H	2 Trucks	None
BHOD	RMA	11-12 Jul 49	M	Projectiles - H	4 Trucks	None
BHOD	RMA	7-8 Jul 49	M	Projectiles - H	3 Trucks	None
BHOD	RMA	27-28 May 49	M	Projectiles - H	1 Truck	None
EA	DPG	9-10 Jul 49	A	Bombs - G	1 Aircraft	None
SVOD	RMA	24 May - 21 Jun 49	M	Projectiles - H	45 Trucks/ 5 Trips	None
BHOD	RMA	22-23 Jun 49	M	Projectiles - H	6 Trucks	None
BHOD	RMA	8-9 Jun 49	M	Projectiles - H	2 Trucks	None
EA	DPG	18-19 Jun 49	A	Unspecified - Probable G	1 Aircraft	None

Moves - 1949 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
BHOD	RMA	19-20 May 49	M	Projectiles - H	1 Truck	None
RMA	Ft. MacArthur, San Pedro, CA	13-15 May 49	M	Bulk - H	1 Truck	None
BHOD	RMA	12-13 May 49	M	Projectiles - CNS	4 Trucks	None
BHOD	RMA	9-10 May 49	M	Projectiles - CNS	3 Trucks	None
GCWD	PBA	2-4 Mar 49	R	Bulk - H, CG	35 Cars	None
EA	St. Thomas, VI	10-25 Mar 49	R/S	Unspecified - Probable G&H	Unspecified Quantity	None
PBA	St. Thomas, VI	10-25 Mar 49	R/S	Unspecified - Probable G&H	Unspecified	None

Moves - 1950

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	11-18 Sep 50	R	Bulk - GA	1 Car	None
BHOD	RMA	17-18 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	21-22 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	24-25 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	23-24 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	29-30 Jun 50	M	Projectiles - H	5 Trucks	None
LBDA	RMA	21-24 Jul 50	M	Projectiles - H	14 Trucks	None
EA	DPG	18-27 Jul 50	R	Bombs, Bulk - GA	3 Cars	None
LBDA	RMA	27-31 Jul 50	M	Projectiles - H	11 Trucks	None
BHOD	RMA	27-28 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	28-30 Jul 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	31 Jul - 1 Aug 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	21-22 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	25-26 Jul 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	17-18 Jul 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	11-12 Jul 50	M	Projectiles - H	5 Trucks	None
GCWD	RMA	21-24 Jul 50	R	Projectiles - H	32 Cars	None

Moves - 1950 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	13-17 Jul 50	M	Projectiles - H	7 Trucks	None
LOD	RMA	12-17 Jul 50	R	Projectiles - H	2 Cars	None
BHOD	RMA	9-10 Jun 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	8-9 Jun 50	M	Projectiles - H	6 Trucks	10
BHOD	RMA	5-6 Jun 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	12-13 Jun 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	20-21 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	16-17 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	1-2 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	7-8 Jun 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	26-27 May 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	14-15 Jun 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	23-24 May 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	31 May - 1 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	2-3 Jun 50	M	Projectiles - H	6 Trucks	None
BHOD	RMA	6-7 Jun 50	M	Projectiles - H	5 Trucks	None
LBDA	RMA	28 Jun - 2 Jul 50	M	Projectiles - H	11 Trucks	11

Moves - 1950 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
BHOD	RMA	6-7 Jul 50	M	Projectiles - H	5 Trucks	None
BHOD	RMA	27-28 Jun 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	23-24 May 50	M	Projectiles - H	3 Trucks	None
BHOD	RMA	29-30 May 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	25-26 May 50	M	Projectiles - H	4 Trucks	None
St. Thomas, VI	EA	6-13 May 50	S	Bombs - GA	U.S.S. William O'Brian	None
EA	DPG	21-22 Jun 50	A	Unspecified - Probable G	1 Aircraft	None
Monsanto Cml Co., Anniston, AL	EA	15-18 Jun 50	M	Unspecified	1 Truck	None
BHOD	RMA	19-20 May 50	M	Projectiles - H	4 Trucks	None
BHOD	RMA	22-23 May 50	M	Projectiles - H	5 Trucks	None
LBDA	EA	2-3 Mar 50	M	Projectiles - H	1 Truck	None

Moves - 1951

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	11-15 Jan 51	M	Projectiles - H	13 trucks	None
LBDA	RMA	5-9 Jan 51	M	Projectiles - H	9 trucks	None
LBDA	RMA	19-23 Jan 51	M	Projectiles - H	15 trucks	None
Hill AFB	EA	28 Feb - 2 Mar 51	A	Bombs - CK	1 aircraft	None
Naval Research Labs, Washington, DC	EA	20 Apr 51	M	Unspecified Chemicals	1 truck	None
EA	FMC	2-9 Jun 51	R	Munitions - Probable GA	Unspecified	None
Monsanto Anniston, AL	EA	4-9 Jun 51	M	Munitions - Unspecified	Unspecified	None
Monsanto Anniston, AL	EA	19-25 Jun 51	M	Munitions - Unspecified	Unspecified	None
EA	GCWD	20-26 Jun 51	R	Munitions - Unspecified	Unspecified	None
Merck Rahway, NJ	EA	19 Jul 51	M	Chemicals - Unspecified	1 truck	None
LOD	EA	19-22 Jul 51	R	Projectiles - Unspecified	Unspecified	None
EA	DPG	9-18 Jul 51	M	Munitions - Unspecified	Unspecified	None
Monsanto Anniston, AL	EA	4-10 Aug 51	M	Chemicals - Unspecified	1 truck	None
LOD	GCWD	7-15 Aug 51	R	Projectiles - CG	Unspecified	None
FMC	EA	13-22 Aug 51	M	Chemicals - Unspecified	Unspecified	None

Moves - 1951 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	27 Aug - 8 Sep 51	M	Munitions - Unspecified	Unspecified	None
DPG	BHOD	8-14 Sep 51	M	Munitions - Unspecified	Unspecified	None
BHOD	EA	14-20 Sep 51	M	Munitions - Unspecified	Unspecified	None
EA	DPG	12-14 Sep 51	A	Munitions - Unspecified	1 aircraft	None
Monsanto Anniston, AL	EA	3-6 Oct 51	M	Chemicals - Unspecified	1 truck	None
EA	DPG	17-25 Oct 51	M	Munitions - Unspecified	Unspecified	None
EA	DPG	5-14 Oct 51	M	Munitions - Unspecified	Unspecified	None
Monsanto Anniston, AL	EA	17-21 Nov 51	M	Munitions - Unspecified	Unspecified	None
EA	FMC	7-10 Dec 51	M	Chemicals - Unspecified	Unspecified	None
PBA	FMC	21-22 Dec 51	M	Bombs - CG	1 truck	None
RMA	Deseret	Dec 51	R	Projectiles - CG	22,238 each	None

Moves - 1952

From	To	Date	Type	Cargo	Quantity	Incidents
EA	FMC	7 Jan 52		Unspecified	Unspecified	
EA	DPG	9 Jan 52		Unspecified	Unspecified	
EA	DPG	29 Feb 52		Unspecified	Unspecified	
GCWD	PBA	Mar 52		Unspecified	Multiple (shuttle) movements	
EA	DPG	7 Apr 52		Unspecified	Unspecified	
EA	DPG	16 Apr 52		Unspecified	Unspecified	
EA	DPG	28 May 52		Unspecified	Unspecified	
LBDA	GCWD	15 Jul 52		Unspecified	Unspecified	
EA	DPG	16-17 Aug 52	A	Unspecified	Unspecified	
EA	FMC	25 Aug 52	M	Unspecified	Unspecified	
EA	DPG	28 Aug 52 - 4 Sep 52	M	Unspecified	Unspecified	
EA	DPG	5-11 Sep 52	M	Unspecified	Unspecified	
EA	YTS	10-16 Sep 52	R	Unspecified	Unspecified	
Deseret	CON	1 Oct 52	M	Unspecified chemicals	Unspecified	
CON		Oct 52	S	Unspecified chemicals	Unspecified	
EA	DPG	3 Oct 52	R	Unspecified chemicals	Unspecified	
EA	DPG	4 Oct 52	M	Unspecified chemicals	Unspecified	
EA	DPG	7 Oct 52	M	Unspecified chemicals	Unspecified	

Moves - 1952 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	FMC	10 Oct 52	M	Unspecified chemicals	Unspecified	
EA	DPG	23 Oct 52	A	Unspecified chemicals	1 aircraft	
Deseret	RMA	4--6 Nov 52	M	Unspecified chemicals	1 truck	
EA	DPG	12 Nov 52	M	Unspecified chemicals	1 truck	

Moves - 1953

From	To	Date	Type	Cargo	Quantity	Incidents
Ft. Detrick, MD	EA	5 Jan 53	M	Unspecified chemicals	3 trucks	
EA	DPG	6 Jan 53	A	Unspecified chemicals	1 aircraft	
EA	FMC	26 Jan 53	A	Unspecified chemicals	1 aircraft	
Great Falls, Montana	EA	26 Jan 53	A	Unspecified chemicals	1 aircraft	
EA	TNM	28 Jan - Feb 53	R	Unspecified chemicals	14,904 pounds	
TNM	CZ	Feb 53	S	Unspecified chemicals	14,904 pounds	
EA	DPG	17 Feb 53	A	Unspecified chemicals	1 aircraft	
EA	DPG	25 Feb 53	A	Unspecified chemicals	1 aircraft	
EA	DPG	4 Mar 53	A	Unspecified chemicals	1 aircraft	
EA	DPG	21 Apr 53	A	Unspecified chemicals	1 aircraft	
EA	DPG	17 Apr 53	R	Unspecified chemicals	1 car	
DPG	RMA	Apr 53	M	Unspecified chemicals	1 truck	
EA	FMC	3 Jun 53	M	Projectiles - GA	2 trucks	
EA	SUF	28 May 53	A	Unspecified cargo	1 aircraft	
EA	England	4 May 53	A	Unspecified cargo	1 aircraft	
EA	England	11 Jun 53	A	Unspecified cargo	1 aircraft	
BHOD	RMA	Jan-Dec 53	M	Bombs - H	Multiple moves - unspecified	

Moves - 1953 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Deseret	FMC	25 Jun 53	M	Bombs -- H	9,000 pounds	
Ft. Detrick, MD	DPG	23 Jul 53	M	Unspecified chemicals	3 trucks	
EA	Bangor, WA	11 Aug 53	R	Unspecified - H	Unspecified	
EA	FCA	2 Sep 53	A	Unspecified cargo	1 aircraft	
Deseret	CON	29 Sep 53	R	Unspecified	9 ton containers	
CON	Japan	Oct 53	S	Unspecified	9 ton containers	
EA	A.P. Hill, VA	16 Nov 53	M	CAIS - H, L, CG, PS	1 truck	
DPG/RMA	EA	16 Dec 53	M	Unspecified chemicals	1 truck	
RMA	PUDA	2 Nov 53	M	Projectiles - HD	1 truck	None
RMA	PUDA	6 Nov 53	M	Projectiles - HD	2 trucks	None
RMA	PUDA	10 Nov 53	M	Projectiles - HD	2 trucks	None
RMA	PUDA	12 Nov 53	M	Projectiles - HD	1 truck	None
RMA	PUDA	17 Nov 53	M	Projectiles - HD	5 trucks	None
RMA	PUDA	18 Nov 53	M	Projectiles - HD	4 trucks	None
RMA	PUDA	23 Nov 53	M	Projectiles - HD	8 trucks	None
RMA	PUDA	2 Dec 53	M	Projectiles - HD	8 trucks	None

Moves - 1953 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	PUDA	7 Dec 53	M	Projectiles - HD	4 trucks	None
RMA	PUDA	8 Dec 53	M	Projectiles - HD	4 trucks	None
RMA	PUDA	9 Dec 53	M	Projectiles - HD	3 trucks	None

Moves - 1954

From	To	Date	Type	Cargo	Quantity	Incidents
EA	CZ	16 Sep - 16 Oct 54	M/S	Unspecified Toxic Agents	Unspecified	
EA	Deseret	29 Oct - 8 Nov 54	R	Unspecified Toxic Agents	Unspecified	
EA	YTS	29 Oct - 13 Nov 54	R	Unspecified Toxic Agents	Unspecified	
Elkton, VA	EA	10-16 Nov 54	M	Unspecified Toxic Cargo	Unspecified	
EA	DPG	5-9 Nov 54	A	Unspecified Toxic Agents	Unspecified	
GCWD	TNM	5 Dec 54 - ? Jan 55	R	Unspecified Toxic Munitions	Unspecified (see next item)	
TNM	Sea	Jan/Feb 55	S	Unspecified Toxic Munitions	Barges (1 or 2)	
EA	DPG	21-28 Jun 54	M	Unspecified Toxic Gas	Unspecified	
Elkton, VA	EA	4-5 Aug 54	M	Unspecified Toxic Gas	Unspecified	
BHOD	RMA	1954	M	Bombs - HD	Multiple moves - unspecified	
EA	DPG	2-3 Apr 54	A	Unspecified - Toxic Gas	Unspecified	
Deseret	DPG	10 Apr 54	M	Unspecified - Toxic Material	Unspecified	
DPG	FMC	11-13 Apr 54	A	Unspecified - Toxic Material	Unspecified	

Moves - 1954 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	RMA	29 Mar - 7 Apr 54	R	Bulk - CK	1 car	
DPG	EA	13-14 May 54	A	Unspecified - Classified Material	1 aircraft	
RAH	EA	20-21 May 54	M	Bulk - Probable H or CG	1 truck	
EA	DPG	28 Dec 53 - 5 Jan 54	R	Bulk - GB	Unspecified	
GCWD	TNM	27 Jan - 20 Feb 54	R	Projectiles - CNS	Unspecified (see next item)	
TNM	Sea	20 Feb 54	S	Projectiles - CNS	LST 694	
EA	DPG	19-27 Feb 54	M	Unspecified - Class A Poison Gas	Unspecified	
RMA	PUDA	4 Jan 54	M	Projectiles - HD	4 trucks	None
RMA	PUDA	5 Jan 54	M	Projectiles - HD	4 trucks	None
RMA	PUDA	6 Jan 54	M	Projectiles - HD	3 trucks	None
RMA	PUDA	7 Jan 54	M	Projectiles - HD	4 trucks	None
RMA	PUDA	11 Jan 54	M	Projectiles - HD	3 trucks	None
RMA	PUDA	18 Jan 54	M	Projectiles - HD	4 trucks	None
RMA	PUDA	19 Jan 54	M	Projectiles - HD	4 trucks	None
RMA	PUDA	20 Jan 54	M	Projectiles - HD	3 trucks	None

Moves - 1954 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	PUDA	15 Feb 54	M	Projectiles - HD	2 trucks	None
RMA	PUDA	22 Jul 54	M	Projectiles - HD	1 truck	None
RMA	PUDA	8 Sep 54	M	Projectiles - HD	1 truck	None

Moves - 1955

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	DPG	29 Aug 55	M	Projectiles - GB	4 trucks	None
RMA	PUDA	Jan-Sep 55	M	Projectiles - HD	76 trucks (multiple moves)	None
RMA	PUDA	9 Sep 55	M	Projectiles - HD	4 trucks	None
RMA	PUDA	28 Sep 55	M	Projectiles - HD	6 trucks	None
RMA	PUDA	18 Oct 55	M	Projectiles - HD	6 trucks	None
RMA	PUDA	25 Oct 55	M	Projectiles - HD	5 trucks	None
RMA	PUDA	8 Nov 55	M	Projectiles - HD	6 trucks	None
RMA	PUDA	15 Nov 55	M	Projectiles - HD	6 trucks	None
RMA	PUDA	30 Nov 55	M	Projectiles - HD	4 trucks	None

Moves - 1956

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	PUDA	31 May - 1 Jun 56	M	Projectiles - HD	1 truck	None
RMA	DPG	7 Feb 56	M	Rockets - GB	1 truck	None
RMA	DPG	17 Feb 56	M	Rockets - GB	1 truck	None
RMA	DPG	23 Feb 56	M	Rockets - GB	1 truck	None
RMA	DPG	27 Feb 56	M	Rockets - GB	1 truck	None
RMA	DPG	7 Mar 56	M	Rockets - GB	3 trucks	None
RMA	DPG	7 May 56	M	Rockets - GB	1 truck	None
DPC	RMA	9 May 56	M	Rockets - GB	1 truck	None
RMA	Deseret	13 Jul 56	R	Rockets - GB	1 car	None
RMA	Deseret	25 Feb 56	R	Projectiles - GB	22 cars	None
RMA	Deseret	27 Apr 56	R	Projectiles - GB	11 cars	None
RMA	Deseret	19 May 56	R	Projectiles - GB	11 cars	None
RMA	Deseret	8 Jun 56	R	Projectiles - GB	20 cars	None
RMA	Deseret	23 Jun 56	R	Projectiles - GB	20 cars	None
RMA	Deseret	13 Jul 56	R	Projectiles - GB	20 cars	None
RMA	Deseret	28 Jul 56	R	Projectiles - GB	20 cars	None
RMA	Deseret	25 Aug 56	R	Projectiles - GB	15 cars	None
RMA	Deseret	15 Sep 56	R	Projectiles - GB	20 cars	None

Moves - 1956 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	Deseret	13 Oct 56	R	Projectiles - GB	20 cars	None
RMA	DPG	11 Oct 56	R	Projectiles - GB	1 car	None
RMA	DPG	11 Oct 56	M	Projectiles - GB	1 truck	None
RMA	Deseret	9 Nov 56	R	Projectiles - GB	20 cars	None
RMA	Deseret	3 Dec 56	R	Projectiles - GB	1 car	None
RMA	Deseret	8 Dec 56	R	Projectiles - GB	19 cars	None

Moves - 1957

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	28 Jan - 4 Feb 57	M	Projectiles - GB	1 truck	None
EA	DPG	17 Mar 57	A	Projectiles - VX	1 aircraft	None
EA	Ohio	15-16 Apr 57	M	Samples - GB, H	1 truck (suspended move)	None
Ohio	EA	16-17 Apr 57	M	Samples - GB, H	1 truck (return to EA)	None
Deseret	SUF	29 Apr - 5 May 57	R	Unspecified	Unspecified	None
RMA	SUN	8-14 May 57	R	Projectiles - GB	1 car	None
SUN	CZ	26 May - 11 Jun 57	S	Projectiles - GB	S.S. Suzanne Bound	None
EA	DPG	19-26 Jun 57	M	Bombs - GB	1 truck	None
Willoughby, OH	EA	25-26 Jul 57	M	Bottles - L (recovered WWI material)	1 truck	None
EA	FMC	5-8 Aug 57	M	Unspecified	1 truck	None
Ft. Bragg, NC	EA	10-11 Aug 57	M	Drums, CAIS - H (recovered WWII material)	1 truck	None
EA	DPG	20 Sep 57	A	Projectiles, Mines, Rockets, Bulk - VX	1 aircraft	None
RMA	Deseret	21-23 Sep 57	R	Bombs - H	22 cars	None
RMA	Deseret	26-28 Sep 57	R	Bombs - H	20 cars	None
EA	ENJ	9-13 Nov 57	R	Bulk - L	3 cars	None

Moves - 1957 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
ENJ	Sea	13-14 Nov 57	S	Bulk - L	U.S.S. Calhoun County	None
RMA	Deseret	7-9 Dec 57	R	Bombs - H	22 cars	None
EA	DPG	12-19 Dec 57	M	Projectiles - VX, GB	1 truck	None
Unspecified	Brooklyn, NY	?-19 Dec 57	S	Unspecified	USNS Callan	None
Brooklyn, NY	EA	19-21 Dec 57	M	Unspecified	1 truck	None
RMA	Deseret	12 Jan 57	R	Projectiles - GB	20 cars	None
RMA	Deseret	9 Feb 57	R	Projectiles - GB	20 cars	None
RMA	Deseret	9 Mar 57	R	Projectiles - GB	20 cars	None
RMA	Deseret	13 Apr 57	R	Projectiles - GB	20 cars	None
RMA	Deseret	8 Jun 57	R	Projectiles - GB	26 cars	None
RMA	Deseret	29 Jun 57	R	Projectiles - GB	24 cars	None
RMA	Deseret	20 Jul 57	R	Projectiles - GB	21 cars	None
RMA	Deseret	13 Aug 57	R	Projectiles - GB	1 car	None
RMA	Deseret	17 Aug 57	R	Projectiles - GB	17 cars	None
RMA	Deseret	21 Sep 57	R	Projectiles - GB	12 cars	None
RMA	Deseret	18 Oct 57	R	Projectiles - GB	1 car	None
RMA	Deseret	26 Oct 57	R	Projectiles - GB	18 cars	None
RMA	Deseret	7 Dec 57	R	Projectiles - GB	11 cars	None

Moves - 1958

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	Deseret	25 Jan 58	R	Projectiles - GB	1 car	None
RMA	Deseret	25-27 Jan 58	R	Bombs - H	28 cars	None
LOD	EA	11 Feb 58	M	Drums - KCN	1 truck	None
PBA	SUN	11-14 Mar 58	R	Bulk - L, HN	41 cars	None
PBA	SUN	15-19 Mar 58	R	Bulk - L	37 cars	None
SUN	Sea	20-27 Mar 58	S	Bulk - L, HN	Probably 4 barges	None
Deseret	CON	18-20 Mar 58	R	Bulk - L	30 cars	None
NAZ	CON	20-21 Mar 58	R	Bombs - H	24 cars	None
Deseret	CON	22-26 Mar 58	R	Bombs - H	18 cars	None
Deseret	CON	28-29 Mar 58	R	Bombs - H	15 cars	31
Deseret	CON	31 Mar - 2 Apr 58	R	Bombs - H	30 cars	32
Deseret	CON	4-6 Apr	R	Bombs - H	30 cars	33
Deseret	CON	8-10 Apr 58	R	Bulk - L	24 cars	None
CON	Sea	18-19 Apr 58	S	Bulk, Bombs - L, H	S.S. William Ralston	None
Deseret	CON	17-18 May 58	R	Bulk - L, HN	18 cars	None
CON	Sea	24-25 May 58	S	Bulk - L, HN	Barge towed by Tug Sea Lion	None

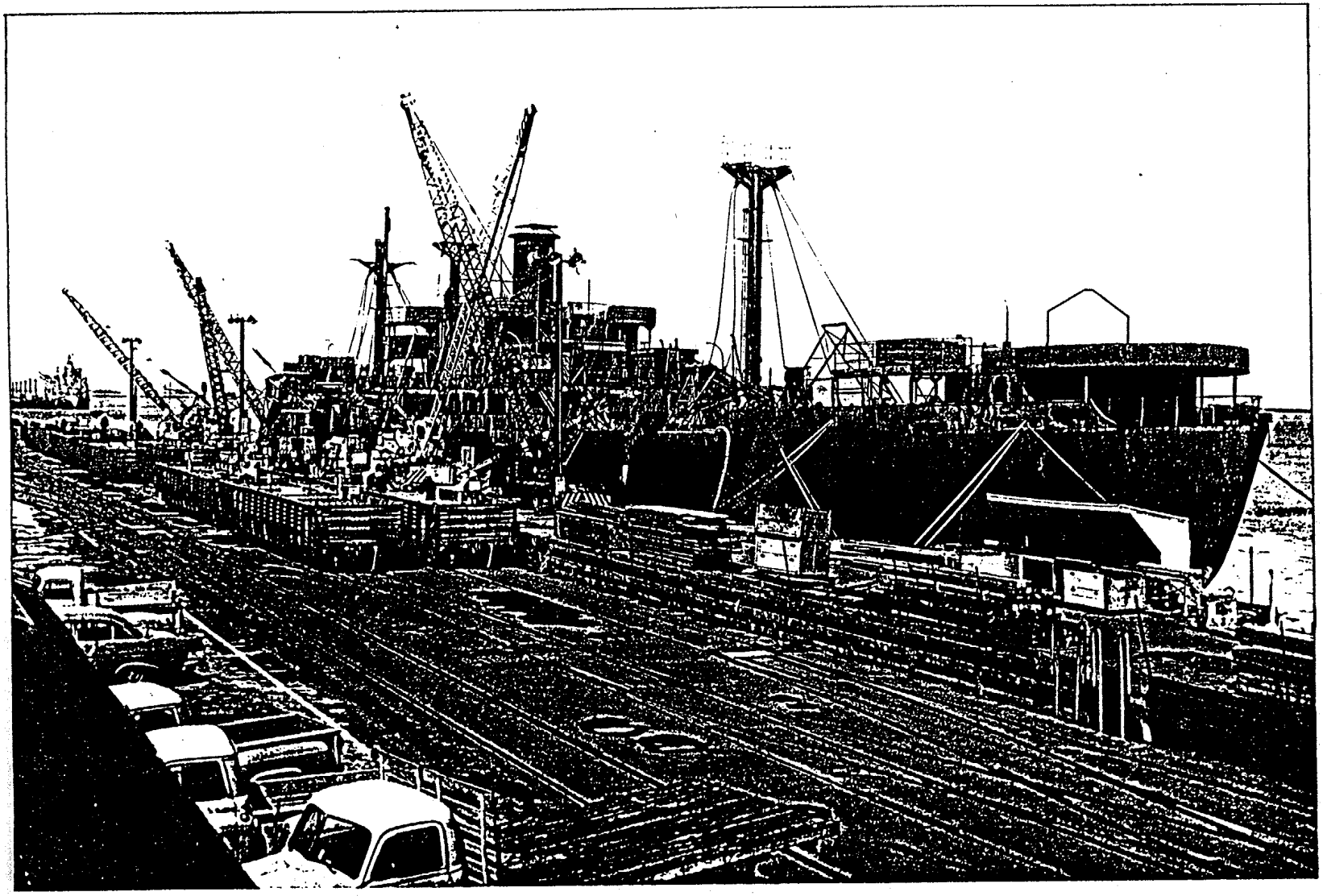
Moves - 1958 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	8-9 Apr 58	A	Projectiles, Rockets - GB, VX	1 airplane	None
DPG	EA	9-11 Apr 58	A	Cylinder - VX	1 aircraft	None
PUDA	RMA	25 Apr 58	M	Projectiles - H	2 trucks	None
PUDA	RMA	16 May 58	M	Projectiles - H	2 trucks	None
RMA	Deseret	17-19 May 58	R	Projectiles, Bombs - GB	20 cars	None
Deseret	DPG	20 May 58	M	Bombs - GB	1 truck	None
PUDA	RMA	29 May 58	M	Projectiles - H	3 trucks	None
PUDA	RMA	23 May 58	M	Projectiles - H	5 trucks	None
RMA	PUDA	4 Jun 58	M	Projectiles - H	3 trucks	None
PUDA	RMA	4 Jun 58	M	Projectiles - H	2 trucks	None
PUDA	RMA	6 Jun 58	M	Projectiles - H	3 trucks	None
RMA	PUDA	10 Jun 58	M	Projectiles - H	2 trucks	None
PUDA	RMA	11 Jun 58	M	Projectiles - H	2 trucks	None
PUDA	RMA	13 Jun 58	M	Projectiles - H	2 trucks	None
RMA	PUDA	18 Jun 58	M	Projectiles - HD	3 trucks	None
PUDA	RMA	20 Jun 58	M	Projectiles - H	4 trucks	None
EA	Friendship Airport, Baltimore, MD	24 Jun 58	A	Cylinder - VX	1 aircraft	None

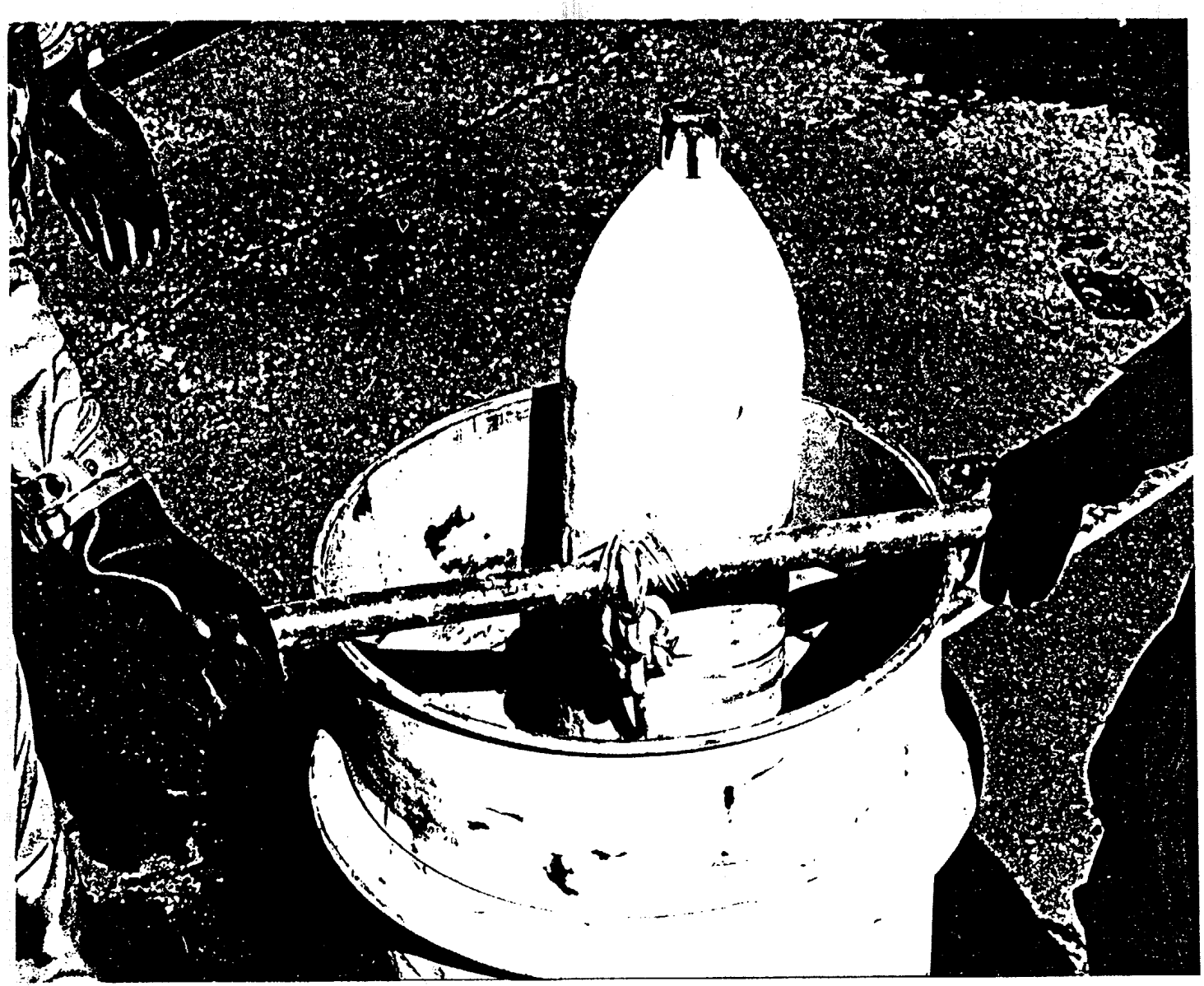
Moves - 1958 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Friendship Airport Baltimore, MD	SUF	24-26 Jun 58	A	Cylinder - VX	1 aircraft	None
RMA	PUDA	25 Jun 58	M	Projectiles - H	2 trucks	None
PUDA	RMA	25 Jun 58	M	Projectiles - H	2 trucks	None
RMA	PUDA	18 Jun 58	M	Projectiles - HD	3 trucks	None
RMA	PUDA	17 Sep 58	M	Projectiles - HD	3 trucks	None
RMA	Unspecified	29 Oct 58	R	Bulk - HD	4 cars	None
RMA	EA	19 Nov 58	M	Bulk - GB	1 truck	None
RMA	EA	1 Dec 58	M	Bulk - GB	1 truck	None
RMA	EA	16 Oct 58	M	Bulk - GB	1 truck	None

GONDOLA RAIL CARS ARRIVE FROM DESERET (NOTE M70 BOMBS IN NEXT TRAIN OVER) – 1958, PAGE 1.

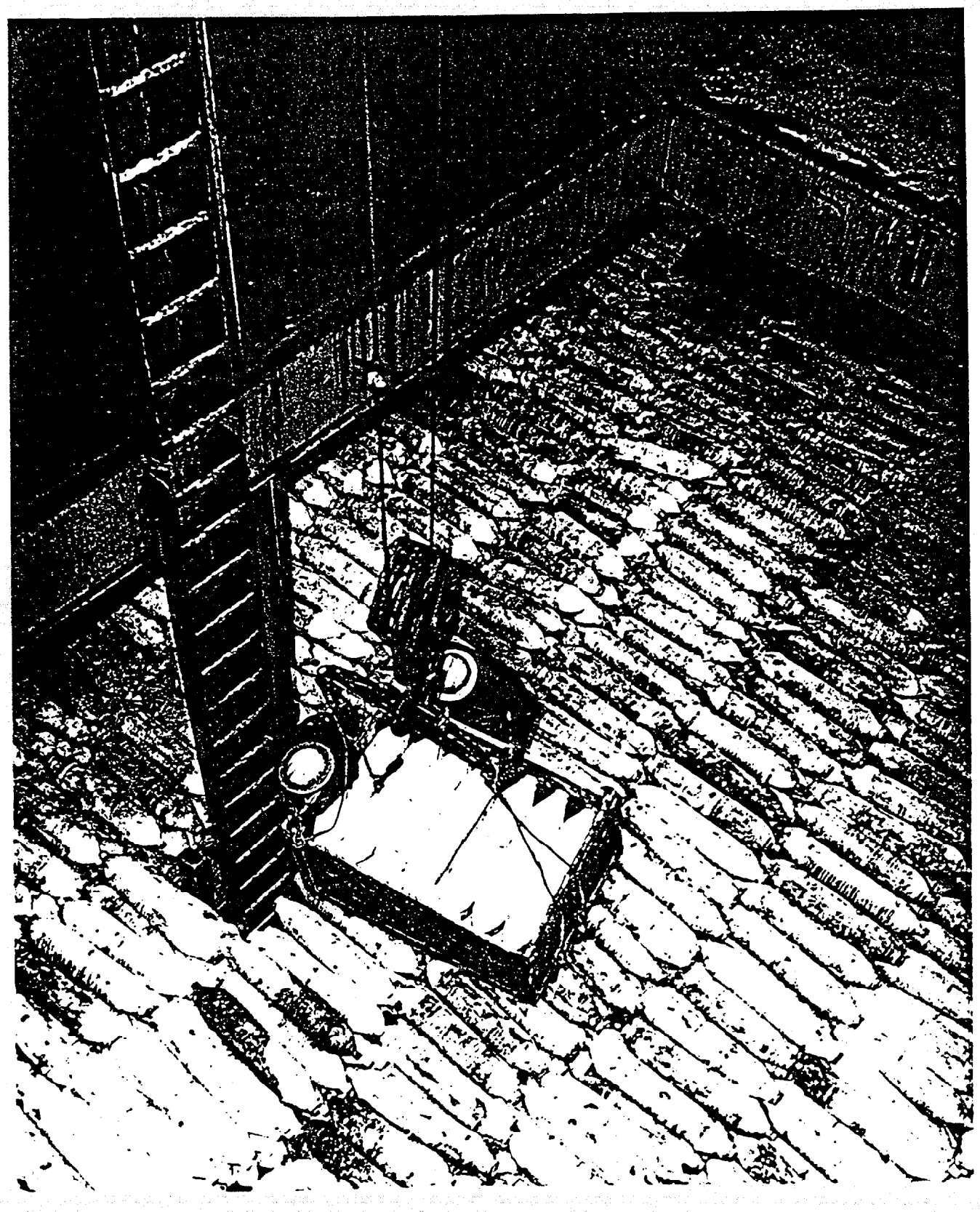


LOADING THE RALSTON – 1958, PAGE 1.

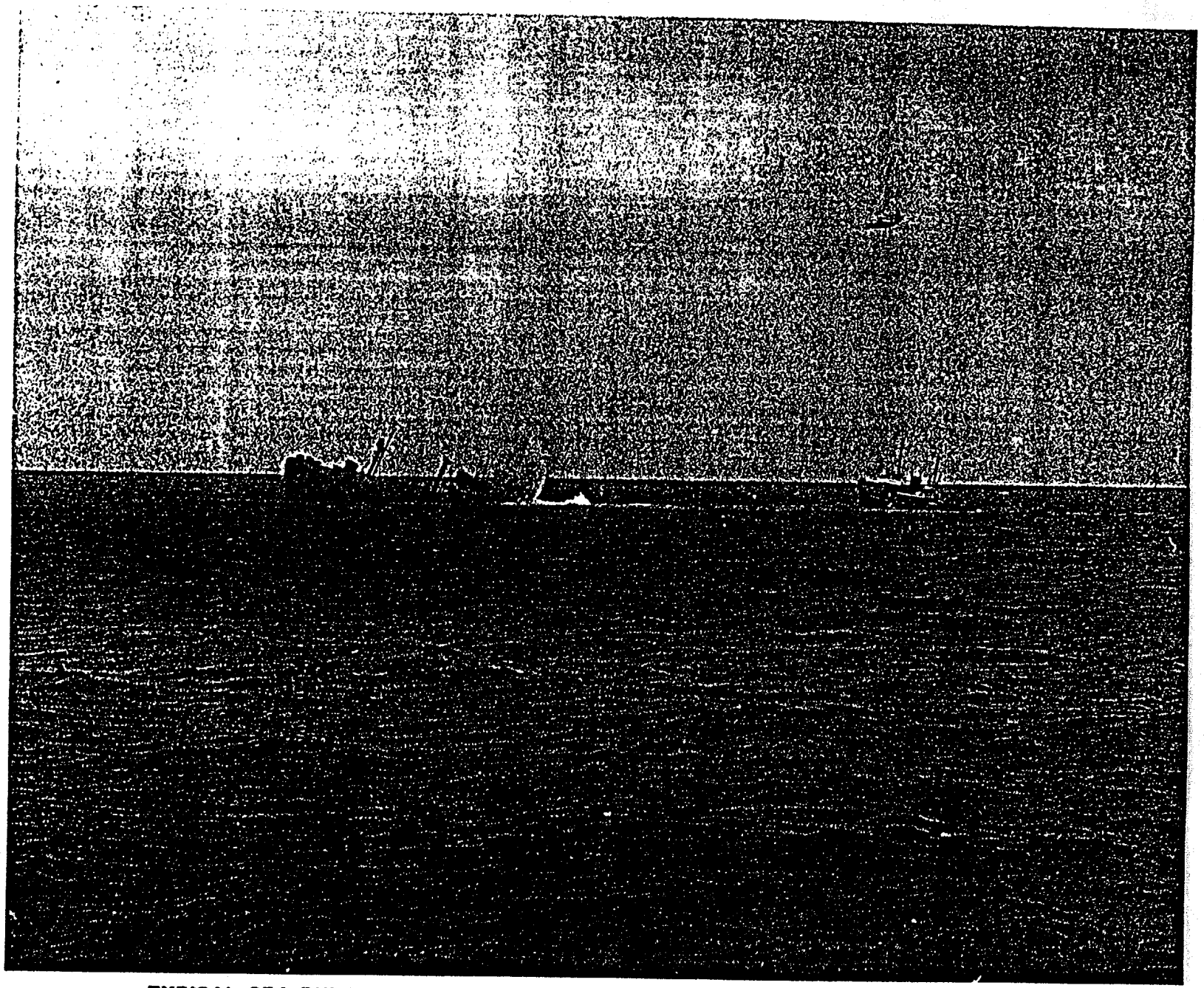


A LEAKING MUSTARD BOMB ARRIVES FROM DESERET- 1958, PAGE 1.

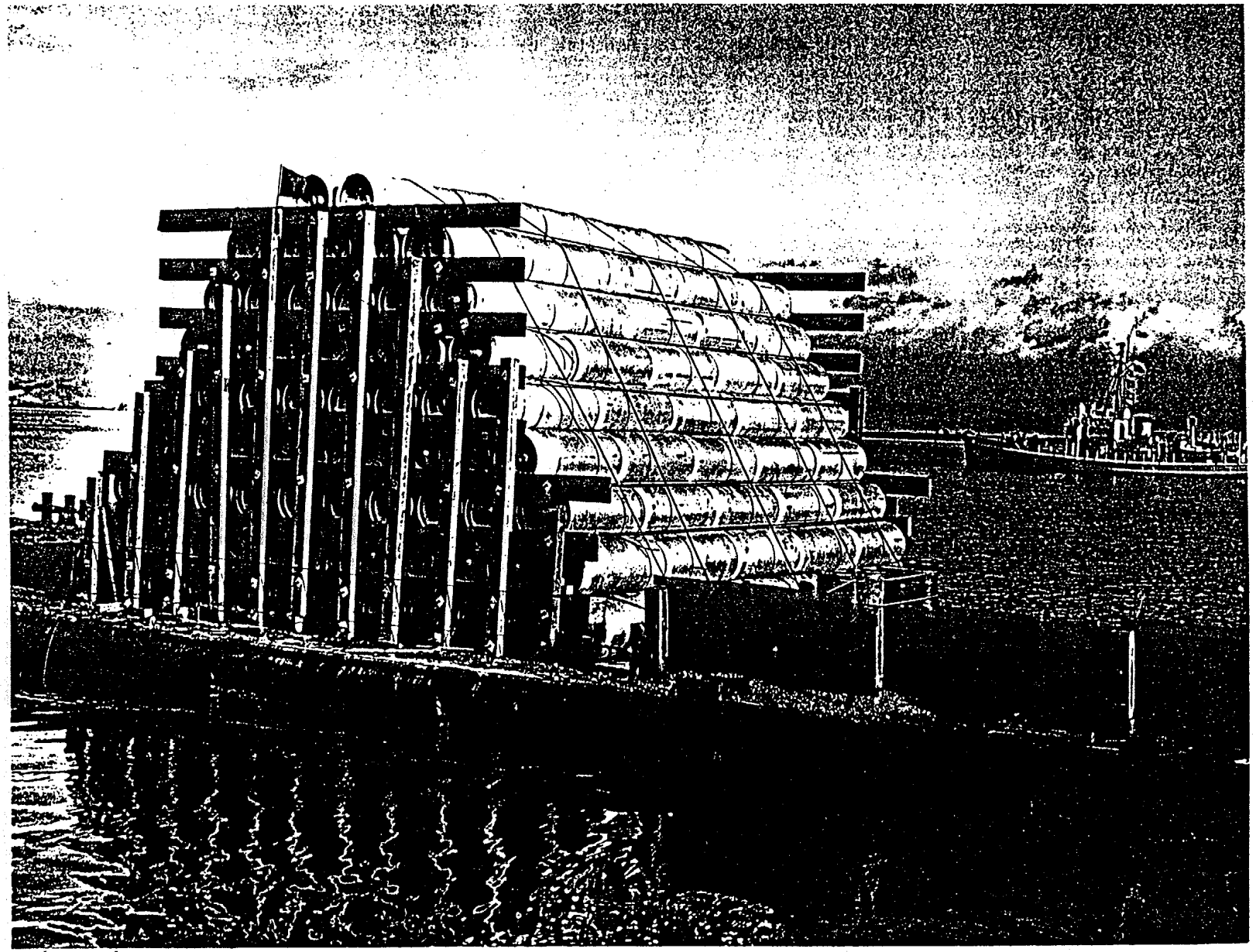
THE LEAKING BOMBS WERE SEALED, DECONTAMINTED AND OVERPACKED ON THE DOCK - CON, 1958, PAGE 1.



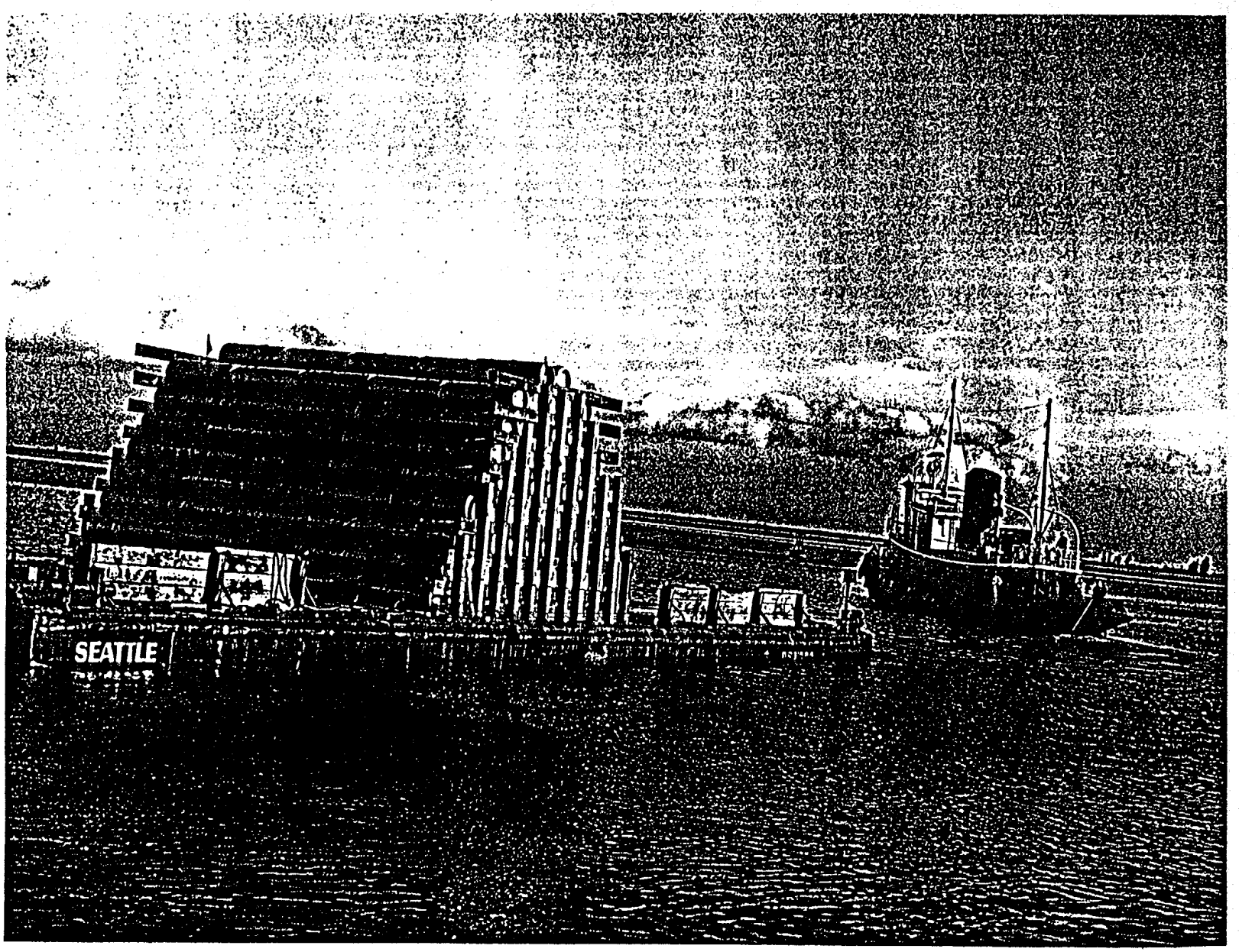
MUSTARD BOMBS (M70) PREPARED FOR SEA DUMPING IN THE RALSTON – 1958, PAGE 1.



TYPICAL SEA DUMP OF A HULK - THE S.S. WILLIAM RALSTON SINKS - 1958, PAGE 1.
(NOTE: PLANE OVERHEAD CONTAINS MEMBERS OF THE PRESS.)



BARGE DUMP OF ONE TON CONTAINERS (BULK) - COAST GUARD ESCORT IN BACKGROUND WAITS TO GET UNDERWAY - 1958, PAGE 1.



TUG SEA LION MOVES THE TON CONTAINERS FROM CON TO SEA –
CONTAINERS WERE LOOSE DUMPED AND THE BARGE RETURNED – 1958, PAGE 1.

Moves - 1959

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	16 Jan 59	A	Rockets - GB	1 aircraft	None
EA	DPG	3 Mar 59	A	Projectiles - GB	1 aircraft	None
DuPont Gibbstown, NJ	EA	22 Apr 59	M	Projectiles - H (Probable) (WWI recovered material)	1 truck	None
EA	DPG	24-25 Aug 59	A	Unspecified Munitions - GB	1 aircraft	None
RMA	EA	28 Sep 59	M	Bulk - GB	1 truck	None

Moves - 1960

From	To	Date	Type	Cargo	Quantity	Incidents
EA	Sea	6-17 Jun 60	S	Bulk - L	Barge - Two ton containers and one cylinder	None
DPG	RMA	21 Nov 60	M	Bulk - GB	72 each	None

Moves - 1961

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	PBA	30 Nov 61	R	Rockets - VX	4 cars	None
RMA	EA	10 Feb 61	M	Bulk - GB	1 truck	None
RMA	EA	13 Jun 61	M	Bulk - GB	1 truck	None
RMA	EA	9 Nov 61	M	Bulk - GB	1 truck	None

Moves - 1962

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	PBA	9 Jan 62	R	Rockets - VX	9 cars	None
NAAP	PBA	26 Jan 62	R	Rockets - VX	5 cars	None
NAAP	PBA	22 Feb 62	R	Rockets - VX	4 cars	None
NAAP	Deseret	3 Apr 62	R	Rockets - VX	6 cars	None
NAAP	Deseret	19 Apr 62	R	Rockets - VX	5 cars	None
NAAP	TEAD	8 May 62	R	Rockets - VX	5 cars	None
NAAP	TEAD	22 May 62	R	Rockets - VX	5 cars	None
NAAP	BHOD	5 Jun 62	R	Rockets - VX	5 cars	None
NAAP	BHOD	19 Jun 62	R	Rockets - VX	5 cars	None
NAAP	BHOD	26 Jun 62	R	Rockets - VX	5 cars	None
EA	Sea	11-18 Jul 62	S	Projectiles, Bulk - H, L	Barge towed by tug USS Sagamore	None
NAAP	TEAD	24 Jul 62	R	Mines - VX	5 cars	None
NAAP	BHOD	31 Jul 62	R	Rockets - VX	5 cars	None
NAAP	TEAD	14 Aug 62	R	Mines - VX	4 cars	None
NAAP	UMDA	21-31 Aug 62	R	Rockets - VX	5 cars	None
NAAP	UMDA	4-12 Sep 62	R	Rockets - VX	5 cars	None
NAAP	UMDA	25 Sep-4 Oct 62	R	Rockets - VX	5 cars	None
NAAP	PBA	11 Oct 62	R	Mines - VX	5 cars	None

Moves - 1962 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	UMDA	25-31 Oct 62	R	Rockets - VX	5 cars	None
NAAP	DPG	5 Nov 62	Unspecified	Mines - VX	6 each	None
NAAP	LBDA	13 Nov 62	R	Rockets - VX	6 cars	None
NAAP	DPG	4 Dec 62	Unspecified	Rockets - VX	45 each	None
NAAP	LBDA	4 Dec 62	R	Rockets - VX	6 cars	None
NAAP	TEAD	11 Dec 62	R	Projectiles - VX	5 cars	None
RMA	TEAD	16 Oct 62	R	Projectiles - GB	6 cars	None
RMA	TEAD	16 Nov 62	R	Projectiles - GB	6 cars	None

Moves - 1963

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	LBDA	8 Jan 63	R	Rockets - VX	6 cars	None
NAAP	TEAD	8 Jan 63	R	Projectiles - VX	4 cars	None
NAAP	DPG	9 Jan 63	Unspecified	Rockets - VX	30 each	None
NAAP	BHOD	17 Jan 63	R	Projectiles - VX	6 cars	None
NAAP	ANAD	24 Jan 63	R	Rocket - VX	6 cars	None
NAAP	DPG	1 Feb 63	Unspecified	Rockets - VX	45 each	None
NAAP	BHOD	5 Feb 63	R	Projectiles - VX	6 cars	None
NAAP	ANAD	12 Feb 63	R	Rockets - VX	6 cars	None
NAAP	BHOD	19 Feb 63	R	Projectiles - VX	6 cars	None
NAAP	ANAD	5 Mar 63	R	Rockets - VX	5 cars	None
NAAP	RMA	12 Mar 63	R	Bulk - VX	3 cars	None
NAAP	BHOD	19 Mar 63	R	Projectiles - VX	5 cars	None
RMA	CON	Apr 63	R	Projectiles, Rockets, Bulk - GB	Unspecified	
TEAD	CON	Apr 63	R	Projectiles, Rockets, Mines, Bulk - GB, VX	Unspecified	
PUDA	CON	Apr 63	R	Projectiles - HD	Unspecified	
CON	OKC	Apr 63	S	Projectiles, Rockets, Mines, Bulk - GB, VX, HD	USNS Brostrum (YBA)	None

Moves - 1963 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	RMA	20 Jun 63	R	Bulk - VX	3 cars	None
NAAP	DPG	20 Jun 63	R	Bulk - VX	1 car	None
NAAP	TEAD	20 Jun 63	R	Projectiles - VX	2 cars	None
NAAP	EA	12 Jul 63	M	Bulk - VX	2 trucks	None
NAAP	RMA	20 Aug 63	R	Bulk - VX	5 cars	None
RMA	CON	Sep 63	R	Projectiles, Rockets, Bombs - GB		
TEAD	CON	Sep 63	R	Projectiles, Rockets - GB, VX	Combined 6 rail moves; number of cars unspecified	
PUDA	CON	Sep 63	R	Projectiles - HD		
NAAP	BHOD	10 Sep 63	R	Projectiles - VX	15 cars	None
NAAP	BHOD	8 Oct 63	R	Projectiles - VX¶	10 cars	None
NAAP	BHOD	29 Oct 63	R	Projectiles - VX	9 cars	None
NAAP	BHOD	14 Nov 63	R	Projectiles - VX	10 cars	None
NAAP	RMA	26 Nov 63	R	Bulk - VX	6 cars	None
NAAP	BHOD	3 Dec 63	R	Projectiles - VX	10 cars	None
NAAP	BHOD	12 Dec 63	R	Projectiles - VX	8 cars	None

Moves - 1963 (Continued)

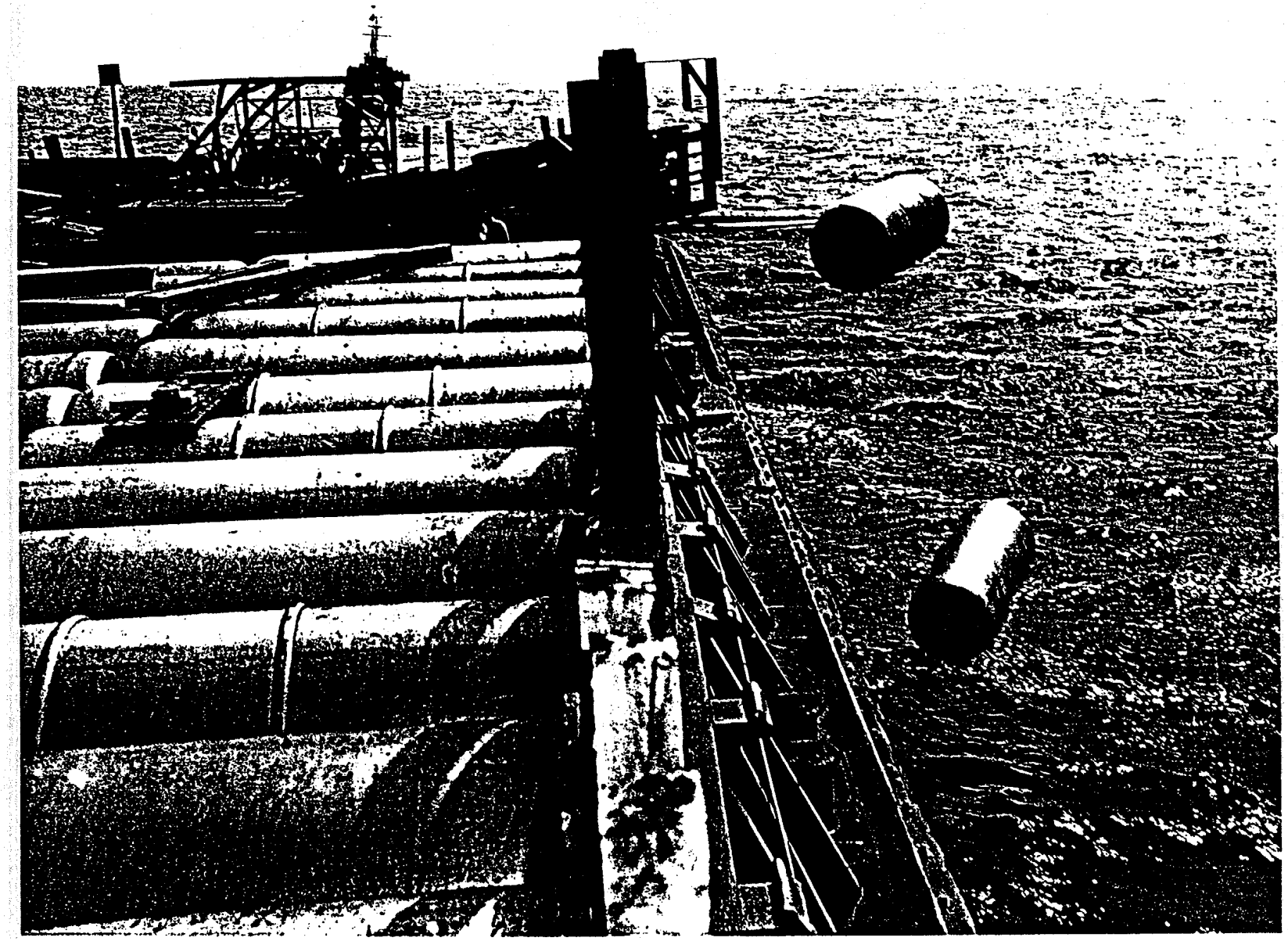
From	To	Date	Type	Cargo	Quantity	Incidents	
CON	OKC	Oct 63	S	Projectiles, Rockets, Bombs - GB, VX, HD	USNS Brostrum (YBB)	None
EA	DPG	Oct 63	R(?)	Rocket - GB	Unspecified	
RMA	CON	13 Apr 63	R	Bulk - HD	1 car	None
RMA	CON	23 Aug 63	R	Bulk - HD	1 car	None
RMA	CON	22 Sep 63	R	Bulk - HD	2 cars	None
RMA	EA	30 Apr 63	A	Projectiles - GB	1 aircraft	None
RMA	TEAD	24 Sep 63	R	Projectiles - GB	5 cars	None
RMA	TEAD	1 Nov 63	R	Projectiles - GB	9 cars	None
RMA	TEAD	22 Nov 63	R	Projectiles - GB	8 cars	None
RMA	UMDA	13-23 Dec 63	R	Projectiles - GB	10 cars	None
RMA	UMDA	16 Oct 63	R	Rockets - GB	Unspecified	None
RMA	UMDA	31 Oct 63	R	Rockets - GB	Unspecified	None
RMA	UMDA	21 Nov 63	R	Rockets - GB	Unspecified	None

Moves - 1964

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	BHOD	2 Jan 64	R	Projectiles - VX	8 cars	None
NAAP	BHOD	14 Jan 64	R	Projectiles - VX	8 cars	None
NAAP	DPG	23 Jan 64	Unspecified	Projectiles, Bulk - VX	116 each projectiles, 1 ton container	None
NAAP	BHOD	23 Jan 64	R	Projectiles - VX	15 cars	None
NAAP	BHOD	4 Feb 64	R	Projectiles - VX	8 cars	None
NAAP	RMA	14 Feb 64	R	Bulk - VX	5 cars	None
NAAP	BHOD	25 Feb 64	R	Projectiles - VX	8 cars	None
EA	Hawaii	Feb - Mar 64	A	Bomblets - GB	1 aircraft	None
NAAP	BHOD	10 Mar 64	R	Projectiles - VX	8 cars	None
NAAP	TEAD	26 Mar 64	R	Projectiles - VX	5 cars	None
NAAP	TEAD	26 Mar 64	R	Projectiles - VX	2 cars	None
NAAP	TEAD	7 Apr 64	R	Projectiles - VX	12 cars	None
NAAP	RMA	16 Apr 64	R	Bulk - VX	6 cars	None
NAAP	ANAD	1 May 64	R	Projectiles - VX¶	8 cars	None
NAAP	ANAD	28 May 64	R	Projectiles - VX	8 cars	None
EA	England	May 64	A	Bomblets - GB	1 aircraft	None
NAAP	ANAD	8 Jun 64	R	Projectiles - VX	11 cars	None
NAAP	RMA	29 Jun 64	M	Bulk - VX	1 truck	None

Moves - 1964 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	DPG	29 Jun 64	M	Bulk - VX	1 truck	None
DPG	GAK	Jun 64	A	Mines - VX	Multiple aircraft	None
RMA	DPG	10 Jul 64		Rockets - GB	45 each	
NAAP	RMA	16 Jul 64	R	Bulk - VX	5 cars	None
RMA	DPG	22 Jul 64		Rockets - GB	301 each	
EA	DPG	16 Jul 64		Projectiles - GB	5 each (175mm)	
DPG	CZ	17 Jul 64		Mines - VX	3 tons	
RMA	TEAD	25 Jul 64		Rockets - GB	4,730 each	
TEAD	Ft. Riley, KS	3 Aug 64		Projectile - H	1 each	
EA	Sea	2-7 Aug 64		Bulk, Projectiles - H, CK, CNB	1 barge	38
RMA	DPG	10 Aug 64		Rockets - GB	45 each	
NAAP	RMA	27 Aug 64	R	Bulk - VX	5 cars	None
RMA	LBDA	5 Aug 64		Rockets - GB	6,480 each	
RMA	LBDA	17 Aug 64		Rockets - GB	7,560 each	
RMA	LBDA	27 Aug 64		Rockets - GB	6,480 each	
RMA	DPG	4 Sep 64		Rockets - GB	45 each	



A TYPICAL LOOSE DUMP OF ONE TON CONTAINERS (BULK) FROM EDGEWOOD IN DEEP WATER OFF THE NEW JERSEY COAST - 1964, PAGE 1.2

Moves - 1964 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	DPG	2 Sep 64		Projectiles, Rockets -- VX	1,400 pounds	
NAAP	ANAD	25 Sep 64	R	Projectiles - VX	3 cars	None
RMA	LBDA	8 Sep 64		Rockets - GB	6,480 each	
NAAP	RMA	5 Oct 64	R	Bulk - VX	5 cars	None
RMA	TEAD	5 Oct 64		Rockets - GB	7,195 each	
BHOD	ANAD	11 Oct 64	R	Projectiles - GB	18 cars	
BHOD	UMDA	9 Oct 64	R	Projectiles - VX	20 cars	
RMA	TEAD	15 Oct 64		Rockets - GB	7,560 each	
SUF	Hawaii	20 Oct 64		Bulk - VX	1 ton container	
BHOD	ANAD	2 Nov 64	R	Rockets - GB	20 cars	
NAAP	RMA	5 Nov 64	R	Bulk - VX	6 cars	None
BHOD	ANAD	12 Nov 64	R	Projectiles - VX	19 cars	
RMA	ANAD	2 Nov 64		Rockets - GB	7,556 each	
RMA	DPG	2 Nov 64		Rockets - GB	45 each	
NAAP	EA	2 Nov 64		Bulk - VX	1 ton container	

Moves - 1964 (Continued)

FROM	TO	Date	Type	Cargo	Quantity	Incidents
BHOD	UMDA	5 Nov 64	R	Munitions - VX	20 cars	
RMA	ANAD	18 Nov 64		Rockets - GB	7,560 each	
BHOD	ANAD	19 Nov 64	R	Projectiles - VX	3 cars	
BHOD	ANAD	20 Nov 64		Projectiles - VX	Unspecified	
Ft. Detrick, MD	EA	24 Nov 64		Rockets - GB	2,800 pounds	
BHOD	SVOD	2 Dec 64	R	Projectiles - H	20 cars	
BHOD	ANAD	3 Dec 64	R	Projectiles - VX	2 cars	
RMA	ANAD	3 Dec 64		Rockets - GB	7,560 each	
RMA	DPG	3 Dec 64		Rockets - GB	45 each	
BHOD	SVOD	14 Dec 64	R	Projectiles - H	18 cars	
RMA	ANAD	11 Dec 64		Rockets - GB	6,480 each	
RMA	UMDA	11 Sep 64	R	Projectiles - GB	15 cars	None
RMA	UMDA	29 Jun 64	R	Projectiles - GB	9 cars	None
RMA	UMDA	1-7 May 64	R	Projectiles - GB	19 cars	None
RMA	UMDA	7-14 Feb 64	R	Projectiles - GB	16 cars	None
RMA	EA	21 May 64	A	Projectiles - GB	1 aircraft	None

Moves - 1965

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	DPG	7 Jan 65		Rockets - GB	45 each	
BHOD	SVOD	12 Jan 65	R	Projectiles - H	19 cars	
RMA	ANAD	15 Jan 65		Rockets - GB	8,604 each	
BHOD	SVOD	16 Jan 65	R	Projectiles - H	16 cars	
BHOD	SVOD	21 Jan 65	R	Projectiles - H	19 cars	
NAAP	UMDA	3-12 Feb 65	R	Projectiles - VX	1 car	None
NAAP	TEAD	3 Feb 65	R	Projectiles - VX	5 cars	None
BHOD	SVOD	28 Jan 65	R	Projectiles - H	20 cars	
NAAP	EA	19 Jan 65		Bulk - VX	3,100 pounds	
NAAP	ANAD	8 Feb 65	R	Projectiles - VX	4 cars	None
BHOD	SVOD	18 Jan 65	R	Projectiles - H	20 cars	
BHOD	SVOD	11 Feb 65		Projectiles - H	Unspecified	
BHOD	SVOD	11 Mar 65	R	Projectiles - H	20 cars	
RMA	DPG	4 Feb 65		Rockets - GB	45 each	
RMA	TEAD	5 Feb 65	R	Projectiles - GB	8 cars	None
BHOD	SVOD	16 Feb 65	R	Projectiles - H	32 cars	
BHOD	SVOD	22 Feb 65	R	Projectiles - H	20 cars	
RMA	ANAD	17 Feb 65		Rockets - GB	7,560 each	

Moves - 1965 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
BHOD	SVOD	10 Mar 65	R	Projectiles - H	20 cars	
TEAD/RMA/PUDA/ UMDA	CON	16 Apr 65	R	Rockets, Projectiles - GB, HD	19 cars (YBF)	
CON	OKC	May 65	S	Rockets, Projectiles - GB, HD	USNS McGraw (YBF)	35
RMA	DPG	3 Mar 65	R	Rockets, - GB	1 car	None
RMA	TEAD	3 Mar 65	R	Projectiles - GB	7 cars	None
BHOD	SVOD	16 Mar 65	R	Projectiles - H	20 cars	
RMA	ANAD	15 Mar 65		Rockets - GB	7,569 each	
BHOD	ANAD	30 Mar 65	R	Rockets - VX	19 cars	
NAAP	ANAD	25 Mar 65	R	Projectiles - VX	5 cars	None
NAAP	UMDA	25 Mar 65	R	Projectiles - VX	4 cars	None
RMA	UMDA	22 Mar 65	R	Projectiles - GB	7 cars	None
BHOD	LBDA	26 Mar 65	R	Rockets - GB	20 cars	
EA	Callery, PA	6 Apr 65		Projectiles - H, GB, VX	129 pounds	
RMA	DPG	13 Apr 65		Rockets - GB	338 tons	
RMA	EA	19 Apr 65		Bulk - GB	Unspecified	
BHOD	UMDA	13 Apr 65		Rockets - GB	520 tons	
RMA	TEAD	10 May 65		Rockets - GB	Unspecified	

Moves - 1965 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	DPG	9 May 65		Projectiles, Mines - GB, VX	814 pounds	
DPG	GAK	18 May 65		Bulk - GB, VX	25,330 pounds	
NAAP	ANAD	21 May 65	R	Projectiles - VX	14 cars	None
NAAP	UMDA	2-11 Jun 65	R	Projectiles - VX	6 cars	None
RMA	UMDA	18 May 65	R	Projectiles - GB	7 cars	None
RMA	DPG	1 Jun 65	R	Rockets, Bomblets - GB	7 cars	
BHOD	RMA	9 Jun 65		Rockets - GB	1 each	
ANAD/PBA	RMA	23 Jun 65		Rockets - GB	2,400 pounds	
RMA	DPG	28 Jun 65		Rockets - GB	675,360 pounds	
PUDA	FMC	2 Jul 65		Projectiles - H	Combined 19,037 pounds	
BHOD	FMC	2 Jul 65		Projectiles - H	Combined 19,037 pounds	
RMA	DPG	7 Jul 65		Rockets - GB	4,020 pounds	
RMA	ANAD	9 Jul 65	R	Projectiles - GB	15 cars	None
PBA	DPC	2 Jul 65		Bulk (?) - GB	3,600 pounds	
LBDA	RMA/DPG	19 Jul 65		Rockets - GB, VX	1,850 each	
TEAD	FMC	19 Jul 65		Bulk - GB	5,040 pounds	

Moves - 1965 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	28 Jul 65		Rockets - GB	7,560 each	
UMDA	DPG/RMA	29 Jul 65		Rockets - GB, VX	25,000 pounds	
NAAP	ANAD	23 Aug 65	R	Mines - VX	5 cars	None
RMA	DPG	10 Aug 65		Rockets - GB	20,340 pounds	
NAAP	EA	23 Aug 65		Bulk- VX	5,400 pounds	
RMA	ANAD	23 Aug 65	R	Projectiles - GB	9 cars	None
Hawaii	DPG	10 Sep 65	A	Bulk - GB, Tank - VX	1 aircraft	34
RMA	DPG	7 Sep 65		Bulk - CG	1 ton container	
NAAP	SUF	1 Oct 65		Bulk - VX	1 ton container	
RMA	ANAD	13 Sep 65	R	Projectiles - GB	6 cars	None
BHOD	RMA	14 Sep 65		Bombs - CG	5,000 pounds	
RMA	UMDA	24 Sep 65	R	Projectiles - GB	7 cars	None
EA	FMC/PBA	29 Sep 65		Bulk - GB, CN	297 pounds	
BHOD	RMA	29 Sep 65		Bulk - Unspecified	Unspecified	
NAZ	RMA	28 Sep 65	R	Bombs - CG, CK	24 cars	
RMA	Cornhusker, NE	3 Oct 65		Bomb - CG	1,488 pounds	
RMA	TEAD	12 Oct 65		Rockets - GB	7,525 each	

Moves - 1965 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	Europe	19 Oct 65		Unspecified	Unspecified	
RMA	DPG	26 Oct 65		Rockets (?) - GB	2,925 each	
RMA	BHOD	2 Nov 65		Bombs - CG	16,745 each	
RMA	LBDA	27 Oct 65	R	Projectiles - GB	9 cars	None
NAZ	RMA	4 Nov 65		Bombs - CG, CK	1,000 pounds	
RMA	Cornhusker,NE	31 Oct 65		Bombs - CG	3,398 pounds	
NAZ	RMA	2 Dec 65		Bombs - CK	3,718,664 pounds	
BHOD	RMA	30 Nov 65		Bombs - CG	2,180,256 pounds	
Ft. Riley, KA	PUDA	1 Dec 65		Projectiles - H	1 each	
EA	DPG	6 Dec 65		Bomblets - GB	4,890 pounds	
EA	NAAP	13 Dec 65	M	Mines - VX	2 trucks	
NAZ	RMA	24 Dec 65		Bombs - CK	16,745 each	

Moves - 1966

From	To	Date	Type	Cargo	Quantity	Incidents
NAAP	ANAD	7 Jan 66	R	Mines - VX	14 cars	None
TEAD	RMA	18 Jan 66		Bombs - CK	100 each	
UMDA	DPG	13 Feb 66		Projectiles - GB, VX	12,800 pounds	
ANAD	DPG	11 Feb 66		Projectiles - VX	2,440 pounds	
NAZ	RMA	15 Feb 66		Bombs - CK	Unspecified	
BHOD	RMA	17 Feb 66	R	Bombs - CK	20 cars	
NAAP	TEAD	23 Mar 66	R	Mines - VX	6 cars	None
ANAD	RMA	19 Mar 66		Rockets - GB	5,000 pounds	
RMA	DPG	21 Mar 66		Unspecified	Unspecified	
EA	PBA	23 Mar 66		Bombs - CG	45 each	
TEAD	RMA	28 Mar 66		Bombs - CK	900 each	
Aliamanu, Hawaii	Hilo, Hawaii	6 Apr 66		Bomblets - GB	1,700 pounds	
TEAD	RMA	11 Apr 66		Bulk, Bombs, CK	1,600,000 pounds	
LBDA/PBA	RMA	13 Apr 66		Rockets - GB	6,200 pounds	
UMDA	RMA	19 Apr 66		Rockets - GB	1,500 pounds	
ANAD	RMA	22 Apr 66		Rockets - GB	7,240 pounds	
UMDA	DPG	2 May 66	R	Projectiles - VX	2 cars	
EA	ANAD	9 May 66		Bombs - GB	12,840 pounds	
TEAD	RMA	9 May 66		Bombs - CK	13,850 pounds	

Moves - 1966 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	RMA	31 May 66		Bombs - CC	543 tons	
UMDA	RMA	1 Jun 66		Rockets - GB	45 each	
RMA	DPG	1 Jun 66		Bulk - GB	6 ton containers	
ANAD/PBA	RMA	3 Jun 66		Rockets - GB, VX	6,000 pounds	
PUDA	ANAD	14 Jun 66	R	Projectiles - H	4 cars	
Marietta AFB, PA	EA	20 Jun 66		Bulk - CL	1,350 pounds	
EA	FMC	27 Jun 66		Bulk - GB, VX	1,254 pounds	
SVOD	RMA	28 Jun 66	M	Projectiles - H	1 truck	None
DPG	GAK	8 Jul 66	A	Projectiles - VX	1 aircraft	
Fisher Cml Co, Great Meadows, NJ	EA	25 Jul 66	M	Bulk - BBC (Recovered WWI material)	1 truck	
LBDA	RMA	29 Jul 66	M	Projectiles - H	1 truck	
TEAD	RMA	15 Jul 66	R	Projectiles - H	1 car	
RMA	LBDA	27 Jul 66	R	Projectiles - GB	Unspecified	
NAAP	ANAD	5 Aug 66	R	Projectiles - VX	5 cars	None
RMA	UMDA	9 Aug 66	R	Projectiles - GB	1 car	
EA	ANAD	14 Aug 66	M	Rockets, Projectiles - GB	Unspecified	
NAAP	ANAD	19 Aug 66	R	Projectiles - VX	5 cars	None

Moves - 1966 (Continued)

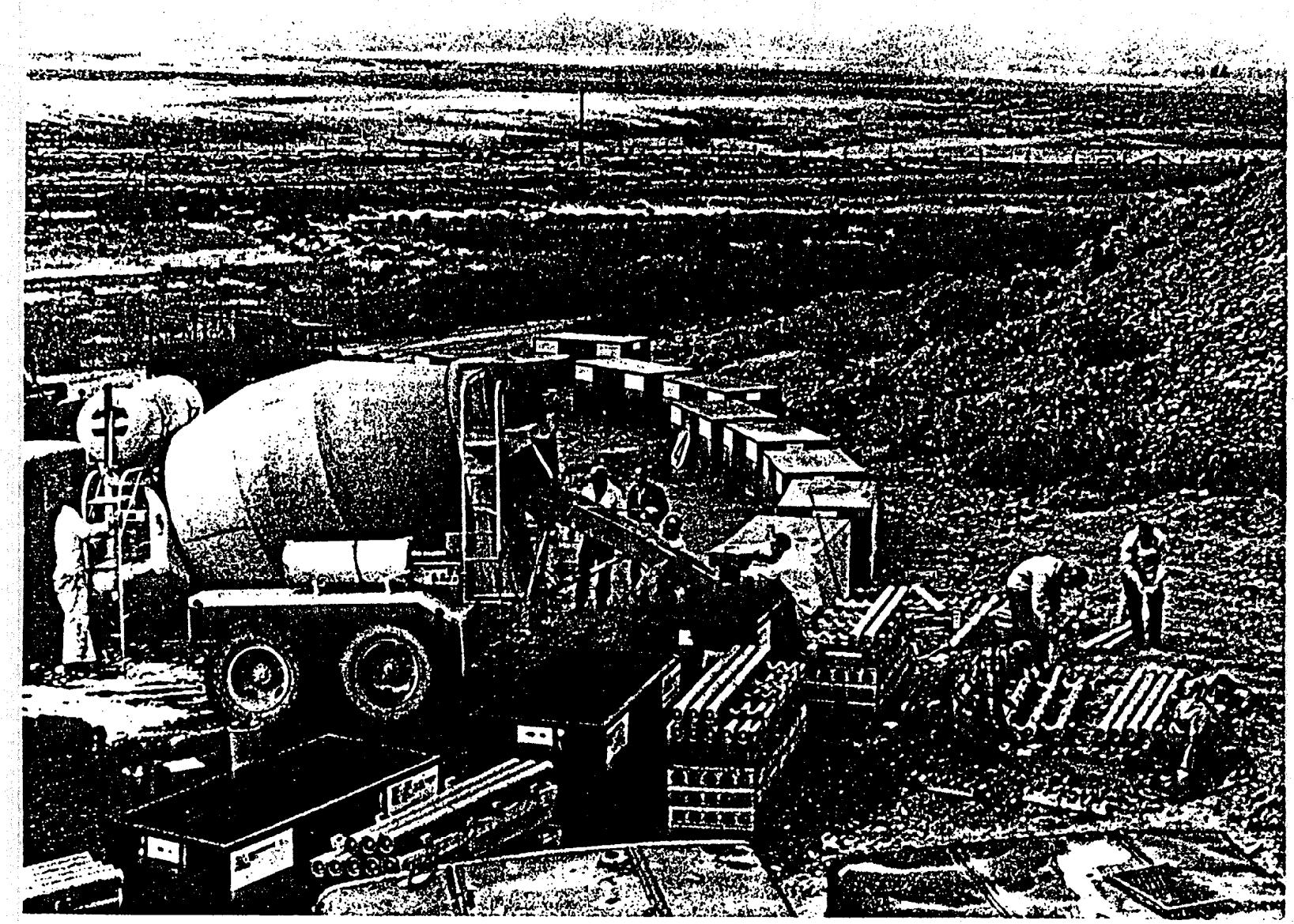
From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	RMA	10 Aug 66	R	Projectiles - CG	Unspecified	
SVOD	RMA	9 Sep 66	R	Projectiles - H	48,600 each	
ANAD/PBA	RMA	9 Sep 66	M	Mines - VX	1 truck	
SVOD	RMA	19 Sep 66	M	Projectiles - H	48,600 each	
TEAD/RMA	DPG	6 Sep 66	M	Bulk - H, VX	2 trucks	
TEAD	RMA	12 Sep 66	R	Projectiles - CG	20 cars	
SVOD	RMA	23 Sep 66	R	Projectiles - H	15 cars	
RMA	Hill AFB, UT	22 Sep 66	M	Bomb - GB	1 each	
Hill AFB, UT	RMA	23 Sep 66	M	Bomb - GB	1 each	
TEAD	RMA	3 Oct 66	R	Projectiles - CG	1,949 each	
NAAP	ANAD	30 Sep 66	R	Projectiles - VX	8 cars	None
NAAP	SUF	10 Oct 66	A	Bulk - VX	1 aircraft	
SVOD	RMA	30 Sep 66	R	Projectiles - H	60,000 each	
EA	RMA	5 Oct 66	M	Bulk - GB	1 truck	
SVOD	RMA	9 Oct 66	M	Projectiles - H	1,579,800 pounds (5 trips)	

Moves - 1966 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	10 Oct 66	M	Mines - VX	1 truck	
TEAD	RMA	18-24 Oct 66	R	Projectiles - H	1 car	None
RMA	TEAD	24 Oct 66 - 17 Nov 66	R	Projectiles - H	1 car	None
PBA	DPG	18 Oct 66	M	Mines - VX	1 truck	
NAAP	LBDA	28 Oct 66	R	Projectiles - VX	5 cars	None
TEAD	ANAD	2 Nov 66	R	Projectiles - GB, VX	6 cars	

Moves - 1967

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	9 Jan 67	M	Rockets, Projectiles - GB	10,337 pounds	
UMDA/TEAD	RMA	6 Jan 67	R	Rockets - GB	1 car	
NAAP	LBDA	17 Jan 67	R	Projectiles - VX	7 cars	None
RMA	EA	1 Feb 67	M	Bulk - GB	1 truck	
NAAP	ANAD	17 Feb 67	R	Projectiles - VX	5 cars	None
TEAD	EA	10 Mar 67	M	Bulk - L	1 truck	
NAAP	RMA	17 Mar 67	R	Tanks - VX	10 cars	None
LBDA	ANAD	10 Apr 67	R	Rockets - GB	1,356 each	
EA	CZ	29 Mar 67	A	Samples - GF, HD, VX	1 aircraft	
EA	GAK	21 Apr 67	A	Samples - GF, HD, VX	1 aircraft	
NAAP	RMA	12 Apr 67	R	Tanks - VX	23 cars	None
ANAD	RMA	14 Apr 67	R	Rockets, Projectiles - GB	1 car	
EA	DPG	19 Apr 67	A	Bomblets - GB	1 aircraft	
RMA	DPG	19 Apr 67	R	Rockets, Projectiles - GB, H	1 car	
NAAP	RMA	5 May 67	R	Tanks - VX	22 cars	None
PBA	ENJ	18-22 May 67	R	Bulk - H, HD, HT	50 cars (CHASE 8)	None
PBA	ENJ	22-25 May 67	R	Bulk - H, HD, HT	50 cars (CHASE 8)	None
PBA	ENJ	26-31 May 67	R	Bulk - H, HD, HT	50 cars (CHASE 8)	None



PREPARING M55 ROCKETS FOR A CHASE DUMP BY POURING IN CONCRETE VAULTS PRIOR TO RAIL SHIPMENT - 1967, PAGE 1.

Moves - 1967 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
PBA	ENJ	31 May - 3 Jun 67	R	Bulk - H, HD, HT	57 cars (CHASE 8)	None
EA	ENJ	8-9 Jun 67	R	Bulk - H, HD	23 cars (CHASE 8)	None
ANAD	ENJ	5-10 Jun 67	R	Rockets - GB	23 cars (CHASE 8)	None
ENJ	Sea	15 Jun 67	S	Rockets, Bulk - GB, H	S.S. Corporal Eric Gibson (CHASE 8)	
RMA/TEAD	DPG	25 May 67	M	Rockets, Bomblets - GB	35,802 pounds	
NAAP	RMA	26 May 67	R	Tanks - VX	19 cars	None
ANAD/UMDA/LBDA	SUN	14 Jun 67	R	Projectiles - GB, VX	Classified (YZU)	
SUN	Europe	14 Jun 67	S	Projectiles - GB, VX	Classified (YZU)	
EA	SUF	31 May 67	A	Projectiles - GA, GD	1 aircraft	
NAAP	TEAD	9 Jun 67	R	Projectiles - VX	6 cars	None
EA	England	14 Jun 67	A	Samples - GA, GB, GD, VX	Unspecified	
NAAP	RMA	24 Jun 67	R	Tanks - VX	24 cars	None
PBA	GAK	27 Jun 67	A	Bomblets - GB	1 aircraft	
NAAP	TEAD	7-17 Jul 67	R	Projectiles - VX	7 cars	None

Moves - 1967 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	DPG	16 Jul 67	R	Projectiles - VX	1 car	
NAAP	RMA	21 Jul 67	R	Tanks - VX	24 cars	None
NAAP	TEAD	11-16 Aug 67	R	Projectiles - VX	9 cars	None
TEAD	DPG	22 Aug 67	M	Rockets - GB	2 trucks	None
NAAP	RMA	30 Aug 67	R	Tanks - VX	24 cars	None
Dover AFB, DE	EA	21 Aug 67	M	CAIS - H, L, CG, PS	1 truck	
LBDA	DPG	18 Sep 67	R	Projectiles - GB	1 car	
NAAP	RMA	22 Sep 67	R	Tanks - VX	24 cars	None
NAAP	DPG	22 Sep 67	R	Tanks - VX	1 car	None
NAAP	TEAD	29 Sep 67 - 17 Oct 67	R	Projectiles - VX	7 cars	None
NAAP	ANAD	6 Oct 67	R	Projectiles - VX	5 cars	None
EA	FMC	26 Sep 67	M	Samples - GB, VX	1 truck	
LBDA/ANAD	PBA/RMA	21 Oct 67	R	Rockets, Bombs, Projectiles and Mines - GB, VX	Unspecified	
RMA	EA	23 Oct 67	A	Samples - GB	1 aircraft	
RMA	TEAD	27 Oct 67	A	Unspecified	Unspecified	

Moves - 1967 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	DPG	4 Sep 67	M	Projectiles - GB	1 truck	None
TEAD	DPG	23 May 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	14 Jun 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	27 Jun 67	M	Rockets - GB	2 trucks	None
Ft. Hayes, OH	TEAD	28-29 Aug 67	M	CAIS - H, L, PS, CG	1 truck	None
Warren AFB, WY	TEAD	7-29 Sep 67	M	CAIS - H, L, PS, CG	1 truck	None
RMA	TEAD	26-30 Sep 67	R	Projectiles - GB	1 car	None
TEAD	DPG	21 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	23 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	25 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	28 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	29 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	30 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	31 Aug 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	1 Sep 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	5 Sep 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	6 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	7 Nov 67	M	Rockets - GB	2 trucks	None

Moves - 1967 (Continued)

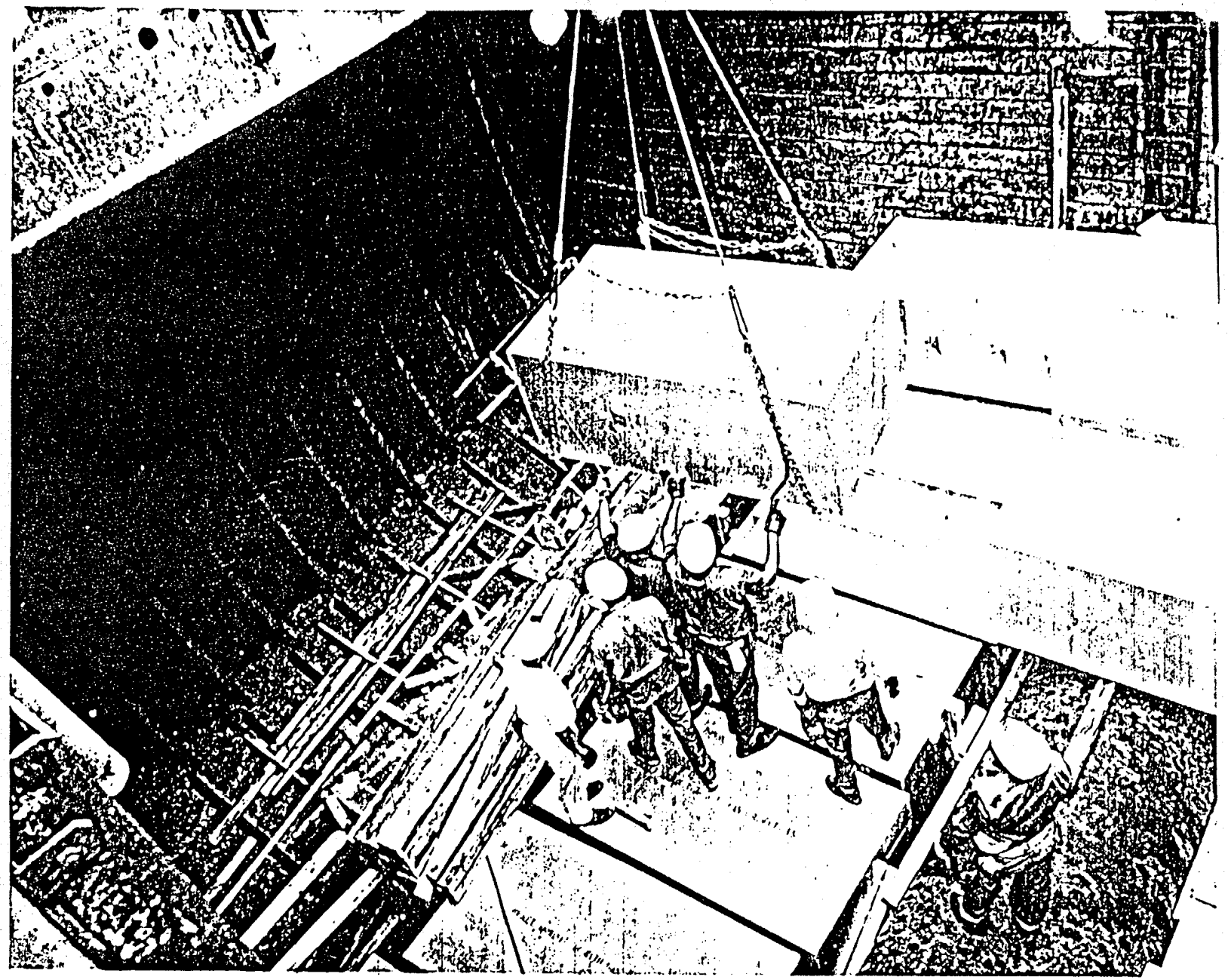
From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	DPG	8 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	9 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	13 Nov 67	M	Rockets - GB	1 truck	None
TEAD	DPG	14 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	15 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	16 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	17 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	20 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	21 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	22 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	27 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	29 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	30 Nov 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	4 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	5 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	6 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	7 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	8 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	11 Dec 67	M	Rockets - GB	2 trucks	None

Moves - 1967 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	DPG	12 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	13 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	14 Dec 67	M	Rockets - GB	2 trucks	None
TEAD	DPG	15 Dec 67	M	Rockets - GB	2 trucks	None

Moves - 1968

From	To	Date	Type	Cargo	Quantity	Incidents
CZ	EA	8 Jan 68	A	Bottles - GA, GB, VX	1 aircraft	None
NAAP	ANAD	15 Jan 68	R	Mines - VX	2 cars	None
NAAP/SVOD	TEAD/ANAD	2 Feb 68	R	Mines, Projectiles, Rockets - VX, GA, GB, H	34 cars	
TEAD	ANAD	19 Feb 68	R	Projectiles - GB	28 cars	
UMDA	TEAD/RMA	23 Feb 68	R	Rockets, Projectiles - GB, VX	Unspecified	
NAAP	UMDA	15 Apr 68	R	Mines - VX	6 cars	None
FMC	ANAD	6 May 68	M	Bulk - GB, HD, CG	7 trucks	
ANAD	ENJ	14 May 68	R	Bulk - GB, VX	Unspecified (CHASE XI)	
ANAD	ENJ	21 May 68	R	Rockets - GB, VX	29 cars (CHASE XI)	30
FA	ENJ	3 Jun 68	R	Bulk - GB, VX, Arsenicals	2 cars (CHASE XI)	
ENJ	Sea	19 Jun 68	S	Bulk, Rockets - GB, VX, Arsenicals	S.S. Mormactern (CHASE XI)	None
EA	ENJ	14 Jun 68	R	Bulk - H (contaminated water)	42 cars (CHASE XII)	
ENJ	Sea	7 Aug 68	S	Bulk - H (contaminated water)	S.S. Richardson (CHASE XII)	None
ANAD	UMDA	12 Jun 68	R	Rockets - GB, VX	Unspecified	



M55 ROCKETS IN CONCRETE VAULTS LOADED INTO A HULK (CHASE VIII, XI AND X) - 1968, PAGE 1.

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	UMDA	25 Jun 68	R	Rockets - GB, VX	20 cars	
LBDA	UMDA	19 Jun 68	R	Rockets - GB	Unspecified	
LBDA	ANAD	8 Jul 68	R	Bulk, Projectiles - H, GB	Unspecified	
ANAD	RMA	8 Jul 68	R	Bulk, Projectiles - H, GB	Unspecified	
RMA	TEAD	8 Jul 68	R	Projectiles - GB	Unspecified	
EA	RMA	12 Jul 68	M	Mines - VX	1 truck	
RMA	ANAD	13 Aug 68	R	Projectiles - GB	Unspecified	
ANAD	RMA	13 Aug 68	R	Projectiles - GB	Unspecified	
RMA	TEAD	7 Sep 68	R	Projectiles - GB	Unspecified	
TEAD-North	TEAD-South	24 Aug 68	M	Projectiles - GB	Unspecified	
RMA	TEAD	30 Aug 68	R	Bulk Bombs, Projectiles-GB	20 cars	
TEAD	DPG	11 Sep 68	M	Rockets - GB	2 trucks	None
LBDA	RMA	17 Sep 68	R	Rockets - GB	Unspecified	
RMA	UMDA	19 Sep 68	R	Bombs - GB	8 cars	37
PBA	McChord AFB, WA	23 Sep 68	R	CAIS - H, L, CG, PS	1 car	
McChord, AFB, WA	Korea	23 Sep 68	A	CAIS - H, L, CG, PS	1 aircraft	
RMA	TEAD	24 Sep 68	R	Bulk - H, VX	20 cars	

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	UMDA	2 Oct 68	R	Bombs, Tanks - GB, VX	15 cars	
LBDA	RMA	29 Sep 68	R	Projectiles - H	19 cars	
RMA	UMDA	18-21 Oct 68	R	Bombs, Projectiles - GB	18 cars	36
RMA	TEAD	19-26 Dec 68	R	Bulk, Bombs - GB, AC	21 cars	
LBDA	RMA	30 Nov 68	R	Bulk, Tank, Projectiles - H, VX	Unspecified	
RMA	TEAD	28 Sep 68 - 2 Oct 68	R	Bulk - HD	16 cars	None
RMA	TEAD	30 Sep 68	R	Bulk - HD	12 cars	None
RMA	UMDA	3 Oct 68	R	Bulk - HD	16 cars	None
RMA	TEAD	10-18 Oct 68	R	Bulk - HD	7 cars	None
RMA	UMDA	28 Oct 68	R	Bulk - HD	20 cars	None
RMA	TEAD	29 Oct 68 - 1 Nov 68	R	Bulk - HD	5 cars	None
RMA	UMDA	4 Nov 68	R	Bulk - HD	16 cars	None
RMA	TEAD	5-7 Nov 68	R	Bulk - HD	8 cars	None
RMA	UMDA	12 Nov 68	R	Bulk - HD	20 cars	None
RMA	TEAD	14-20 Nov 68	R	Bulk - HD	17 cars	None
RMA	UMDA	18 Nov 68	R	Bulk - HD	8 cars	None

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	19-21 Nov 68	R	Bulk - HD	4 cars	None
RMA	UMDA	26 Nov 68	R	Bulk - HD	16 cars	None
RMA	TEAD	26 Nov 68 - 2 Dec 68	R	Bulk - HD	4 cars	None
RMA	TEAD	3-6 Dec 68	R	Bulk - HD	20 cars	None
RMA	TEAD	10-13 Dec 68	R	Bulk - HD	5 cars	None
RMA	TEAD	12-17 Dec 68	R	Bulk - HD	16 cars	None
RMA	TEAD	17-23 Dec 68	R	Bulk - HD	16 cars	None
DPG	RMA	5 Apr 68	A	Tanks - VX	1 aircraft	None
RMA	DPG	6 Apr 68	A	Tanks - VX	1 aircraft	None
RMA	UMDA	23 Sep 68	R	Tanks - VX	7 cars	None
RMA	TEAD	27 Sep 68 - 9 Oct 68	R	Tanks - VX	7 cars	None
RMA	TEAD	4-14 Oct 68	R	Tanks - VX	11 cars	None
RMA	TEAD	11-16 Oct 68	R	Tanks - VX	8 cars	None
RMA	UMDA	18 Oct 68	R	Tanks - VX	4 cars	None
RMA	TEAD	28 Oct 68 - 6 Nov 68	R	Tanks - VX	15 cars	None
RMA	TEAD	4-12 Nov 68	R	Tanks - VX	11 cars	None

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	12-18 Nov 68	R	Tanks - VX	4 cars	None
RMA	TEAD	18-25 Nov 68	R	Tanks - VX	15 cars	None
RMA	TEAD	25 Nov 68 - 5 Dec 68	R	Tanks - VX	15 cars	None
RMA	TEAD	9-17 Dec 68	R	Tanks - VX	15 cars	None
RMA	TEAD	30 Sep 68 - 2 Oct 68	R	Bombs - GB	13 cars	None
ANAD	RMA	27 Aug 68	R	Bulk - GB	1 car	None
RMA	TEAD	4-10 Oct 68	R	Bombs - GB	4 cars	None
RMA	TEAD	11-16 Oct 68	R	Bulk - VX	12 cars	None
RMA	TEAD	16-21 Oct 68	R	Bombs - GB	7 cars	None
RMA	TEAD	16 Oct 68	R	Bulk - VX	20 cars	None
RMA	TEAD	25 Oct 68	R	Bombs- GB	Unspecified	None
RMA	TEAD	24-28 Oct 68	R	Bulk - GB	21 cars	None
RMA	TEAD	31 Oct 68 - 4 Nov 68	R	Bulk - GB	20 cars	None
RMA	TEAD	7-13 Nov 68	R	Bulk - GB	20 cars	None
RMA	TEAD	13-18 Nov 68	R	Bulk - GB	16 cars	None
RMA	TEAD	21-26 Nov 68	R	Bulk - GB	20 cars	None

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	5-10 Dec 68	R	Bulk - GB	20 cars	None
TEAD	RMA	20 Dec 68	R	Bombs - GB	1 car	None
TEAD	DPG	9 Jan 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	10 Jan 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	11 Jan 68	M	Rockets - GB	3 trucks	None
TEAD	DPG	12 Jan 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	15 Jan 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	16 Jan 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	17 Jan 68	M	Rockets - GB	1 truck	None
TEAD	DPG	9 Feb 68	M	Rockets - GB	1 truck	None
TEAD	DPG	12 Feb 68	M	Rockets - GB	1 truck	None
TEAD	RMA	4 Sep 68	R	Rockets - GB	1 car	None
TEAD	RMA	23 Feb 68 - 2 Mar 68	R	Rockets - GB	2 cars	None
TEAD	DPG	19 Nov 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	20 Nov 68	M	Rockets - GB	1 truck	None
TEAD	DPG	18 Nov 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	14 Nov 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	7 Nov 68	M	Rockets - GB	2 trucks	None

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	DPG	29 Oct 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	25 Oct 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	23 Oct 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	21 Oct 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	1 Oct 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	27 Sep 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	25 Sep 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	23 Sep 68	M	Rockets - GB	2 trucks	None
TEAD	DPG	22 Jul 68	M	Projectiles - GB	1 truck	None
TEAD	RMA	23 Feb 68	R	Projectiles - GB	1 car	None
TEAD	DPG	21 Nov 68	M	Projectiles - GB	1 truck	None
TEAD	DPG	7 Oct 68	M	Projectiles - GB	1 truck	None
TEAD	RMA	15 Jul 68	M	Mines - VX	1 truck	None
TEAD	DPG	10 Dec 68	M	Bulk - HD	1 truck	None
DPG	TEAD	20 Nov 68	M	Tanks - VX	1 truck	None
EA	TEAD	6 Dec 68 - 20 Jan 69	R	CAIS - H, L, GB	1 car	None
RMA	TEAD	12 Sep 68	R	Bombs - GB	4 cars	None
RMA	TEAD	3 Oct 68	R	Bombs - GB	1 car	None

Moves - 1968 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	TEAD	9 Oct 68	R	Bombs - GB	2 cars	None
RMA	TEAD	30 Sep 68 - 17 Oct 68	R	Projectiles - GB	5 cars	None
RMA	TEAD	19-26 Feb 68	M	Projectiles - HT	1 truck	None
DPG	TEAD	12 Nov 68	M	Projectiles - GB	1 truck	None

Moves - 1969

From	To	Date	Type	Cargo	Quantity	Incidents
LBDA	RMA	5 Jan 69	R	Projectiles - H	17 cars	
EA/TEAD	UMDA	6 Jan 69	R	CAIS - G, H, L	2,000 sets (about 4 cars)	
TEAD	CZ	29 Jan 69	A	CAIS - G, H, L	1 aircraft	
RMA	TEAD	4-10 Mar 69	R	Bulk - GB	37 cars	None
RMA	TEAD	18-20 Mar 69	R	Bulk - GB	43 cars	None
TEAD	DPG	1 Apr 69	M	CAIS - G, H, L	1 truck	None
RMA	UMDA	30 Jul 69	A	Unspecified	1 aircraft	None
RMA	TEAD	7-27 Jan 69	R	Tanks - VX	15 cars	None
RMA	TEAD	15 Jan 69 - 4 Feb 69	R	Tanks - VX	15 cars	None
RMA	UMDA	12-16 Feb 69	R	Tanks - VX	15 cars	None
RMA	TEAD	4-10 Mar 69	R	Tanks - VX	13 cars	None
RMA	TEAD	18-26 Feb 69	R	Bulk - GB	20 cars	None
RMA	TEAD	17-24 Feb 69	R	Bulk - GB	20 cars	None
RMA	TEAD	8-21 Jan 69	R	Bulk - GB	20 cars	None
RMA	TEAD	18-28 Feb 69	R	Bulk - GB	7 cars	None

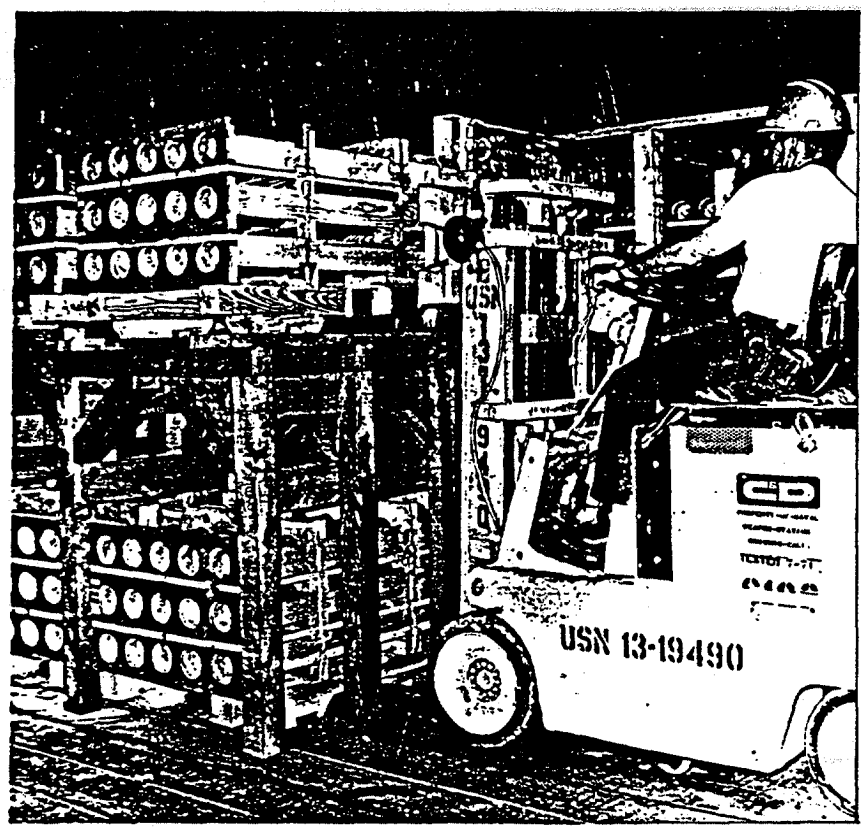
Moves - 1969 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
RMA	UMDA	6 Jan 69	R	Bulk - HD	9 cars	None
RMA	TEAD	8-16 Jan 69	R	Bulk - HD	5 cars	None
RMA	TEAD	16-22 Jan 69	R	Bulk - HD	17 cars	None
RMA	TEAD	16-28 Jan 69	R	Bulk - HD	4 cars	None
RMA	TEAD	21-30 Jan 69	R	Bulk - HD	16 cars	None
RMA	TEAD	23-31 Jan 69	R	Bulk - HD	16 cars	None
RMA	TEAD	28 Jan 69 - 3 Feb 69	R	Bulk - HD	20 cars	None
RMA	TEAD	30 Jan 69 - 6 Feb 69	R	Bulk - HD	16 cars	None
RMA	TEAD	4-10 Feb 69	R	Bulk - HD	16 cars	None
RMA	TEAD	6-11 Feb 69	R	Bulk - HD	16 cars	None
RMA	UMDA	7 Jan 69	R	Projectiles - GB	Unspecified	None
TEAD	DPG	4 Apr 69	M	Bombs, Projectiles - GB, HD	4 trucks	None
TEAD	DPG	10 Jan 69	M	Projectiles - GB, HD	1 truck	None
TEAD	DPG	16 Jan 69	M	Projectiles - GB	1 truck	None
TEAD	DPG	27 Jan 69	M	Projectiles - GB	2 trucks	None

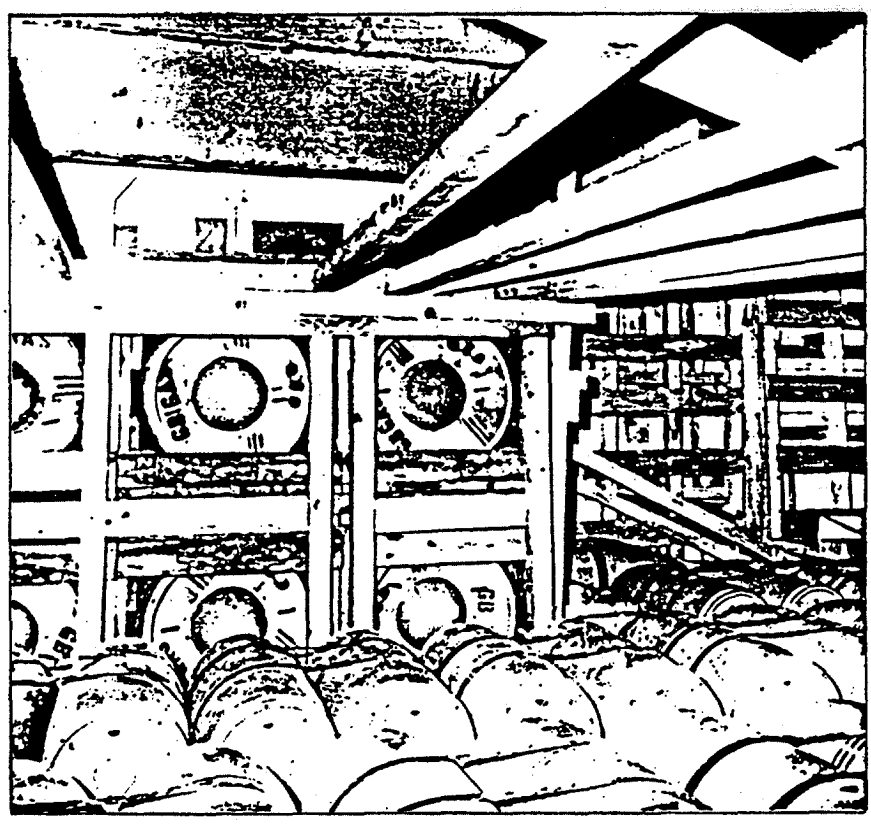
Moves - 1970-1977

From	To	Date	Type	Cargo	Quantity	Incidents
ANAD	SUN	10-12 Aug 70	R	Rockets - GB (vaults)	28 cars	None
LBDA	SUN	10-12 Aug 70	R	Rockets - GB (vaults)	11 cars	None
SUN	Sea	18 Aug 70	S	Rockets - GB (vaults)	S.S. LeBaron Russell Briggs	None
OKC	JA	13 Jan 71*	S	Projectiles - HD	USNS LT Robinson	None
OKC	JA	3 Aug 71*	S	Projectiles, Bulk - HD	USNS Sealift	None
OKC	JA	18 Aug 71*	S	Projectiles, Bombs - GB	USNS Pvt McGraw	None
OKC	JA	29 Aug 71*	S	Projectiles, Rockets, Mines, Bulk - VX	USNS Miller	None
OKC	JA	4 Sep 71*	S	Projectiles, Rockets, Bombs - GB	USNS Sealift	41
OKC	JA	19 Sep 71*	S	Rockets - GB	USNS Pvt McGraw	None
Keflavik, Iceland	EA	13 Nov 74	A	CAIS - H, L, CG, PS, CN, DM	1 aircraft	None
FMC	ANAD	14 Dec 76	M	Bulk, Projectiles - HD, GB	3 trucks	None
TEAD-N	TEAD-S	19 Aug 77	R	Projectiles - HD	16 cars	42
DPG	TEAD-S	25 Aug 77	M	Projectiles, Bulk, Bombs, Tanks, Mines, Rockets - GB, VX, CG, L	13 trucks	None

*Indicates arrival date at JA; departure dates not available.



OPERATION RED HAT - M55 ROCKETS BEING STORED FOR SHIPMENT - OKC TO JA, 1970-1977, PAGE 1.



OPERATION RED HAT - ONE-TON CONTAINERS (BULK) AND MC-1 BOMBS ABOARD SHIP - OKC TO JA, 1970-1977, PAGE 1.

Moves - 1970-1977 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
TEAD	EA	22 Feb 73	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	16 May 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	12 Jun 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	14 Jun 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	18 Jun 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	30 May 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	5 Jun 74	A	CAIS - H, L, PS, CG	1 aircraft	None
TEAD	EA	6 Jun 74	A	CAIS - H, L, PS, CG	1 aircraft	None
TEAD	EA	29 May 74	A	CAIS - H, L, PS, CG	1 aircraft	None
TEAD	EA	23 May 74	A	CAIS - H, L, GB	1 aircraft	None
TEAD	EA	15 May 74	A	CAIS - H, L, GB	1 aircraft	None

SETCON I

From	To	Date	Type	Cargo	Quantity	Incidents
Site 3*	Site 2*	15-16 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#1)	None
Site 2*	GUAM	16 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#1)	None
NAVG	GUAM	16 Jan 78	M	CAIS - H, L, PS, CG	1 truck convoy	None
GUAM	ELM	17 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#1)	None
FTR	ELM	18 Jan 78	M	CAIS - H, L, PS, CG	1 truck convoy	None
ELM	WAAF	19 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#1)	None
WAAF	RMA	19 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#1)	None
Site 4*	Site 4A*	16 Jan 78	M	CAIS - H, L, PS, CG	1 truck convoy	None
Site 4A*	Site 1*	16-17 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#2)	None
Site 1*	RMA	18 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#2)	None
UKMR	BARB	16-17 Jan 78	H	CAIS - H, L, PS, CG	1 helicopter	None
LLL	BARB	16-17 Jan 78	H	CAIS - H, L, PS, CG, CN, DM	3 helicopters	None
BARB	RMA	17 Jan 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#4)	None
BARB	RMA	17 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#5)	None
BARB	TORO	17 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#3)	None
TORO	RMA	18 Jan 78	A	CAIS - H, L, PS, CG, CK	1 aircraft (#3)	None

(*) Classified location

SETCON I (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
LEJ	NRAF	23 Jan 78	M	CAIS - H, L, PS, CG, CK	1 truck convoy	None
NRAF	PAFB	23 Jan 78	A	CAIS - H, L, PS, CG, CK	1 aircraft (#6)	None
BRAG	PAFB	23 Jan 78	M	CAIS - H, L, PS, CG	1 truck convoy	None
PAFB	RMA	24 Jan 78	A	CAIS - H, L, PS, CG, CK	1 aircraft (#6)	None
HAAP	FALL	23 Jan 78	M	CAIS - H, L, PS, CG	1 truck convoy	None
FALL	LAIM	24 Jan 78	A	CAIS - H, L, PS, CG	1 aircraft (#7)	None
SBCA	LAIM	24 Jan 78	M	CAIS - H, L, PS, CG, CN, DM	1 truck convoy	None
TEAD-S	DPG	24 Jan 78	M	CAIS - H, L, CG, CK, GB	1 truck convoy	None
LAIM	WHID	25 Jan 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#7)	None
KEY	WHID	25 Jan 78	H	CAIS - H, L, PS, CG, CN, DM	1 helicopter convoy	None
WHID	DPG	25 Jan 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#7)	None
DPG	RMA	26 Jan 78	A	CAIS - H, L, PS, CG, CN, DM, CK, GB	1 aircraft (#7)	None

SETCON I (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
QUAN	RMA	1 Feb 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#8)	None
QUAN	WRAF	1 Feb 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#9)	None
FTST	WRAF	1 Feb 78	H	CAIS - H, L, PS, CG, CN, DM	1 helicopter convoy	None
WRAF	RMA	2 Feb 78	A	CAIS - H, L, PS, CG, CN, DM	1 aircraft (#9)	None

SETCON II

From	To	Date	Type	Cargo	Quantity	Incidents
CHAS	ENJ	14-21 Aug 78	S	CAIS - H, L, CG, PS	U.S.S. Nitro	None
PBA	LRAFB	19-21 May 80	H	CAIS - H, L, CG, PS	11 helicopter convoys	None
LRAFB	RMA	19-22 May 80	A	CAIS - H, L, CG, PS	6 aircraft	None
JA	TAFB	19-22 May 80	A	CAIS - H, L, CG, PS, CK	4 aircraft	None
TAFB	RMA	20-23 May 80	A	CAIS - H, L, CG, PS, CK	4 aircraft	None
ANAD	LBDA	20 May 80	H	CAIS - H, L, CG, CK	1 helicopter convoy	None
LOD	Hagerstown, MD	27 May 80	M	CAIS - H, L, CG, PS	1 truck convoy	None
Hagerstown, MD	GAAF	27 May 80	A	CAIS - H, L, CG, PS	1 aircraft (#18)	None
LBDA	GAAF	21 May 80	H	CAIS - H, L, CG, PS, CK	1 helicopter convoy	None
GAAF	DPG	27 May 80	A	CAIS - H, L, CG, PS, CK	1 aircraft (#18)	None
TEAD	DPG	22 May 80	M	CAIS - H, L, CG, PS, CK, GB	1 truck convoy	None
DPG	RMA	27-29 May 80	A	CAIS - H, L, CG, PS, CK, GB	2 aircraft (#13, 18)	None
CAAA	CAAF	22-27 May 80	H	CAIS - H, L, CG, PS, CN, DM	10 helicopter convoys	43
CAAF	RMA	27-29 May 80	A	CAIS - H, L, CG, PS, CN, DM	5 aircraft	None
FA	PAAF	27 May 80	H	CAIS - H, L, CG, PS, GB	6 helicopter convoys	None
PAAF	RMA	28 May 80	A	CAIS - H, L, CG, PS, GB	1 aircraft	None

SETCON II (continued)

From	To	Date	Type	Cargo	Quantity	Incidents
MAAP	MMA	1-4 Jun 80	M	CAIS - H, L, CG, PS, CN, DM	4 truck convoys	None
MMA	RMA	2-5 Jun 80	A	CAIS - H, L, CG, PS, CN, DM	11 aircraft	None
HAAP	MCMA	8-11 Jun 80	M	CAIS - H, L, CG, PS	4 truck convoys	None
MCMA	RMA	8-12 Jun 80	A	CAIS - H, L, CG, PS	11 aircraft	None
Ft. McCoy, WI	RMA	10 Jun 80	A	CAIS - H, L, CG, PS	1 aircraft	None
ENJ	MAFB	11 Jun 80	H	CAIS - H, L, CG, PS, CN, DM	6 helicopter convoys	None
MAFB	RMA	12 Jun 80	A	CAIS - H, L, CG, PS, CN, DM	1 aircraft	None
UMDA	PNMA	16 Jun 80	M	CAIS - H, L, GB	1 truck convoy	None
CON	TAFB	16 Jun 80	H	CAIS - H, L, CG, PS	2 helicopter convoys	None
PNMA	TAFB	16 Jun 80	A	CAIS - H, L, GB	1 aircraft	None
SBCA	TAFB	16 Jun 80	A	CAIS - H, L, CG, PS, CK	1 aircraft	None
TAFB	RMA	17 Jun 80	A	CAIS - H, L, CG, PS, CK, GB	1 aircraft	None

Moves - 1981-1986

From	To	Date	Type	Cargo	Quantity	Incidents
Sandy Hook, NJ	EA	1-2 May 81	M	Projectiles - unknown Levins (WWI recovery)	1 truck	None
DPG	PBA	26 Jun 81	A	Bomblet - BZ	1 aircraft	None
RMA	DPG	12 Aug 81	A	Bombs - GB	2 aircraft	None
RMA	DPG	13 Aug 81	A	Bombs - GB	2 aircraft	None
RMA	DPG	14 Aug 81	A	Bombs - GB	1 aircraft	None
DPG	TEAD-S	14 Aug 81	M	Bombs - GB	14 trucks	None
RMA	DPG	17 Aug 81	A	Bombs - GB	2 aircraft	None
RMA	DPG	18 Aug 81	A	Bombs - GB	2 aircraft	None
RMA	DPG	19 Aug 81	A	Bombs - GB	1 aircraft	None
DPG	TEAD-S	20 Aug 81	M	Bombs - GB	14 trucks	None
RMA	DPG	24 Aug 81	A	Bombs - GB	2 aircraft	None
RMA	DPG	25 Aug 81	A	Bombs - GB	1 aircraft	None
RMA	DPG	28 Aug 81	A	Bombs, Bulk - GB	2 aircraft	None
DPG	TEAD-S	29 Aug 81	M	Bombs, Bulk - GB	14 trucks	None
Granite City, IL	PBA	10 Apr 82	M	Projectile - unknown (WWI recovery)	1 truck	None
Newark, OH	RMA	18 Dec 82	A	CAIS - H, L, CG, PS	1 aircraft	None

Moves - 1981-1986 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
EA	RMA	21 Sep 83	M	Drums-DM	1 truck	None
EA	RMA	22 Sep 83	M	Drums-DM	1 truck	None
EA	RMA	29 Sep 83	M	Drums-DM	1 truck	None
EA	RMA	12 Oct 83	M	Drums-DM	1 truck	None
EA	RMA	13 Oct 83	M	Drums-DM	1 truck	None
EA	RMA	8 Nov 83	M	Drums-DM	1 truck	None
EA	RMA	9 Nov 83	M	Drums-DM	1 truck	None
EA	RMA	13 Dec 83	M	Drums-DM	1 truck	None
EA	RMA	14 Dec 83	M	Drums-DM	1 truck	None
EA	RMA	15 Dec 83	M	Drums-DM	1 truck	None
EA	RMA	20 Dec 83	M	Drums-DM	1 truck	None
EA	RMA	21 Dec 83	M	Drums-DM	2 trucks	None
EA	RMA	4 Jan 84	M	Drums-DM	2 trucks	None
Ft. Polk, LA	PBA	20 Jun 85	A	Projectile-unknown (WWII recovery)	1 aircraft	None
Ft. Polk, LA	PBA	20 Aug 85	A	Projectile-unknown (WWII recovery)	1 aircraft	None
Ft. Polk, LA	PBA	13 Nov 85	A	Projectile-unknonw (WWII recovery)	1 aircraft	None

Moves - 1981-1986 (Continued)

From	To	Date	Type	Cargo	Quantity	Incidents
Ft. Sill, OK	PBA	31 Jan 86	A	Projectile-unknown (WWII recovery)	1 aircraft	None
Eagle Bombing Range Hill AFB, UT	TEAD	20 May 86	H	Bomb-GB	1 helicopter	None
Ft. McCoy, WI	PBA	14 Aug 86	A	Projectile-unknown (WWII recovery)	1 aircraft	None
Indiantown Gap, PA	FA	31 Jul 86	M	Projectile - unknown (WWI recovery)	1 truck	None

RECOMMENDATIONS AND CONCLUSIONS

As a result of compiling this history, discussing the various problems that have been encountered on past moves, and analyzing what may be of value to planning for future moves, some basic conclusions have been reached. Some are offered here in the form of lessons learned, and others as recommendations.

Overpacking. The approach that the Army is taking to overpacking is currently very conservative. This approach is substantiated by the history in all but one area - projectiles. It is worthy to note that projectiles, based on past history, have been extremely rugged and reliable containers, even when involved in an accident. All vehicle accidents documented in this history involved projectiles, and no spill occurred in any of these. It is realized that some projectiles have leaked in storage, and that overpacking may be entirely appropriate in spite of past history.

Somewhat unexpectedly, the good movement record for projectiles is not matched by the bulk storage items such as bombs (which are stored without explosives, and as such are essentially bulk containers) and one ton containers. The bombs and one ton containers have shown a small, but repeated history, over a period of many years, of leakage during moves. It is concluded that these items should be overpacked for transport.

As for the rockets and mines, these munitions have not been transported in many years. Their history in storage is well known and overpacking is recommended as an appropriate action.

Refrigeration. In the case of mustard, the movement history has a very clear message. Historically, the Army's worst accident/incidents have occurred as the result of transporting mustard during warm weather. Two principal events seem to have exacerbated this problem: (1) overfilling of munitions beyond the specification point leaving less room for expansion than required and (2) allowing items to sit in ships, trucks or railcars in the hot sun for long periods of time with all doors closed to achieve containment or isolation. The former problem, overfilling, is not a problem to consider with the current munitions in stock, and was a problem principally encountered with captured German stocks after World War II. The second problem, however, is as valid today as it was yesterday. Overheating has resulted in serious mustard leakers which could easily have been prevented by the use of refrigerated ships, railcars or trucks. Some specific examples of the above are provided:

(1) Use of a refrigeration vessel, as opposed to the cargo ship Francis L. Lee, would have eliminated a situation which resulted in many mustard casualties, some of which were serious hospitalization cases. The Lee incident occurred in the Summer of 1946.

(2) Use of refrigerated railcars would have eliminated the famous Nazi Gas Train incident which resulted in 60 mustard gas casualties, with some hospitalization cases. This incident occurred in the Summer of 1946.

(3) Use of refrigerated railcars would have eliminated leakage from M70 bombs during the transportation moves for the Ralston sea dump. The only

thing that prevented a major incident like the Nazi Gas Train incident was that temperatures became unseasonably low at night during the time of the move (March 1958) limiting the extent of the leaks.

Clearly, refrigeration of mustard, which freezes at 58°F, is a prudent and recommended step.

Maintenance. In the past, items earmarked for disposal frequently received little maintenance for prolonged periods prior to disposal. These items then became leakers during moves when relatively minor maintenance could have prevented it. The Ralston sea dump moves were a classic example of this.

The M70 bomb had a nose closure which was a screw thread plug. The bomb would leak around this plug if the plug was not sufficiently tightened. After the first train load containing leaking bombs arrived, the Commander of Deseret was informed of the problem and was asked to eliminate it by performing maintenance on the bomb prior to transport. The Commander of Deseret elected not to do this, stating that a 100 percent inspection for leakers (visual) was all that was required prior to the train leaving Deseret. Although it is not stated, the attitude projected was that there were more important things to do than to be maintaining a bunch of bombs which would be on the bottom of the ocean in another month or so. As a result, the next three train loads contained major mustard leakage upon arrival at Concord, California, even though they were not leaking when they left Deseret. As discussed above, only unseasonably cool weather prevented a major incident. In spite of this, the cleanup costs were significant, and claims were made by the railroads for damaged rail cars.

As a result, it is concluded that the Army should carefully provide funding and manpower for munition inspection and maintenance to continue for all munitions right up to the time of movement, and that all munitions should be carefully inspected immediately prior to movement.

Explosive Disassembly and Downloading. Historically, projectiles moved for disposal were most frequently moved by truck convoy, and sometimes by rail. During the early 1950's, the standard procedure for doing this was to send, about 6 months prior to the move, a technical escort team to the donor location, and to proceed to remove all fuzes and propellant from the projectiles. This was felt to be a reasonably safe operation and, so far as I can tell, never resulted in an incident or casualty. Fuzes and propellant were incinerated locally, and then the projectile bodies were sent to the disposal location, which was usually Rocky Mountain Arsenal. It is not clear from the documents whether bursters were removed, although I tend to doubt they were.

Rockets and land mines right up to the 1970 CHASE X dump, were always moved in a full explosive configuration. There is no historical evidence that this ever resulted in an incident or problem. During the CHASE moves, the rockets were effectively disabled by being embedded in concrete coffins.

Mortar rounds (4.2 inch) were sometimes defuzed, and sometimes not. I suspect this was based on the availability of personnel to defuze them. Due to the configuration of the mortar, this would also result in the burster being

pulled. Although it is not stated, I suspect that when fuzes were pulled, propellant was also.

It is concluded that this area needs further study and discussion within the Army. It appears that ways can be found to safely move items whether they are explosively configured or not, but that if cost effective ways exist to minimize this problem, they should be pursued.

Use of Contract Carrying Services. Throughout the available trip reports, there runs a common thread of complaint about the ability of contract labor (air, rail, ship or truck) to fully understand and comply with the Army's safety procedures. The biggest offender was apparently the railroads, who repeatedly treated chemical cargo roughly.

Another related issue was the inability of Technical Escort personnel to stop such behavior when it was discovered. Crews would occasionally blatantly disregard military personnel, and would counter criticism with the attitude that this was their train (or ship, plane or truck), they would move it according to railroad regulations, and if the Army didn't like it, they could find another carrier.

Another prime offender in this area was stevedoring companies. These companies, in spite of intensive training and oversight, would blatantly ignore Army guidance during stevedoring operations.

Recommendations as a result of this problem are offered as follows:

(1) Senior military personnel (Colonel or above) and senior rail (or air, ship or trucking) company personnel should be required to accompany each move for on-the-spot control. A confrontation between an Army Captain and an engineer for instance will result in the Army losing every time.

(2) The Army should investigate using its own rail engineers and crews if such can be made available for total control of movement conditions. Likewise ships (Navy vessels), aircraft (Military Airlift Command), trucks (Army), and stevedores.

(3) Training for crews, in any event, should be more than the casual gas mask fitting which has been typical of some past moves.

(4) Any contracts written for contract movement or stevedoring should include very restrictive safety language and should maximize Army control of the contractor. Fee should be determined on contractor cooperation with safety directives.

Emergency Response. Emergency response teams for past moves frequently had to travel great distances, and coordination with local Army commands revealed inadequacies. Also, control of civilians was a problem.

During past moves where serious problems with leaking munitions were discovered, it would typically take 24 to 72 hours for technical escort response teams to respond to an emergency in sufficient strength to deal with it. As a result, several undesirable things usually occurred.

(1) The escort with the move generally had inadequate personnel to cordon off the leak. This resulted in civilians being hurt by accidentally entering the vapor cloud.

(2) Civilians, when warned, would frequently disregard warnings. The military, under current law, did not have the power to force an evacuation, and still do not. This also resulted in additional injuries.

(3) The prolonged response time waiting for the team created a tense "stand-off" situation between Army officials and local officials who perceived that "nothing was being done."

(4) The response teams were frequently sent with junior officers who fell under the command of a high ranking local officer. The local officer at times had no real chemical experience, resulting in his giving improper orders to the response team. This resulted in additional, avoidable injuries to the response team.

(5) The response teams were frequently supplied with local protective clothing which proved defective, or local decontaminant, which lacked strength due to prolonged storage. Logistics of emergency response were generally a problem.

Some recommendations based on these conditions encountered during past moves are as follows:

(1) Emergency Response teams should "shadow" the move in another ship, train, aircraft or truck so that they are within minutes of a leak.

(2) Emergency Response teams should carry enough protective clothing and decontaminant to deal with a major problem. Local sources of supply should not be relied upon, even when they claim such materials are available.

(3) The Emergency Response team should be under the command of a senior chemical officer with actual technical escort experience.

(4) Provisions should be made to provide an escort team of sufficient size to cordon off a large scale incident, and to assist, if necessary, in civilian evacuation.

(5) The legal issue of requiring civilians to evacuate an area should be addressed by Army legal personnel, and appropriate procedures should be established, and if necessary personnel retrained, based on this review.

Communications. During past moves, person to person relationships and communications were frequently handled as an afterthought. Problems were caused by this condition fairly routinely, for instance:

(1) Communications between the escort personnel and the train crew on rail moves was frequently poor or even nonexistent. In May 1968, escort personnel determined they were leaving two railcars behind by accident as they were leaving a railyard. Due to lack of communication with the engine crew, the train could not be stopped. The cars were left behind and had to be retrieved hours later.

(2) On more than one occasion, personnel arrived at the destination to deliver the chemical ammunition and found that:

(a) No one was there to receive the material.

(b) The wrong people were there to receive it.

(c) The people receiving it could not produce proper credentials.

(3) On more than one move, members of the emergency response team did not know and had never met, members of the escort team, local commanders, local support personnel, and local officials. This created tensions and "people problems" which could easily have been avoided.

As a result this past experience, the following recommendations are made:

(1) Trains, ships or aircraft should be equipped with a quality telephone system to assure good crew/escort team communications. Trucks should have a quality radio system. All modes of transportation should incorporate quality radio communications for emergencies.

(2) Destination personnel should be well trained, reliable and should carry proper credentials for receiving the weapons.

(3) Premove coordination meetings should be held between the escort team, the emergency response team, local military commanders, local military support teams and local civilian response teams (fire chiefs, sheriffs, etc.). Premove drills with the escort team and emergency response team participating should be part of the movement training.

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