Nike Missile Battery

Environmental Conditions Assessment Guide

Defense Environmental Restoration Program
Formerly Used Defense Sites
(DERP-FUDS)

July 2003

Prepared by:
U.S. Army Corps of Engineers
HTRW-CX

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Executive Summary

The purpose of this report is to provide an overview of the Nike missile program and present detailed information on missile battery operations as described in applicable Army technical manuals and other documents. The operational information is relevant to consider along with site-specific information in developing a preliminary assessment (PA) and/or to evaluate the potential for environmental contamination. Full consideration must also be given to pre-DoD and post-DoD operations to determine whether there are other parties that may have contributed to the environmental contamination.

In 1954, the first Nike Ajax battery became operational. By 1958, there were nearly 200 Nike Ajax batteries. Deactivation and replacement of Ajax batteries with Nike Hercules batteries began the same year. Some Ajax batteries were converted while others were deactivated and declared excess. The phase out of Nike Ajax to Nike Hercules was completed in 1963. The mission of the missile battery was to provide the missile launching and fire control components.

Nike-Ajax and Nike-Hercules missile batteries consisted of two principal operational areas: the battery control area, (or Integrated Fire Control (IFC)) and the launch area and adjacent assembly/service area. An administrative area provided housing and office functions was often collocated with one of the other areas or constructed on a third separate area. Utilities such as water, sewer, and electrical power were required as well as the storage of fuels.

The battery control area buildings, equipment and maintenance operations are discussed in Section 3. The battery control area operations, relative to potential contamination, include underground storage tanks, transformers and associated Diesel generators, sewage disposal, and maintenance activities such as painting and radar maintenance.

Storage tank locations in the battery control area include barracks, mess hall, HIPAR building and the generator building. Typically, installations had their own water treatment and sewage handling facilities. Site-specific sewage treatment facilities could include aeration/settling tanks, sewage lagoons, and/or septic tanks and leach fields.

The battery control area equipment comprised the ground guidance equipment necessary to acquire and designate targets, initiate commands to fire the missiles, control the flight of the missile, and automatically record certain events incident to those operations. Within the battery control area operational and visual inspections were conducted to assure that application of proper preventive maintenance. Periodic cleaning using mineral spirits, a petroleum distillate dry cleaning solvent and soap and water were specified. Other operations required used of organic solvent type paint remover, solutions of butyl alcohol, isopropyl alcohol, water and phosphoric acid, dilute chromic acid, trichloroethane, and toluene.

Radioactive tubes were present in certain radar sets and instructions were provided for shipping, storage, handling and disposal of broken tubes.

Launch area operations consisted of assembly, servicing, maintaining, and preparing the missiles for firing battery. Certain operations utilized solvents, corrosion preventives, and other chemicals in the assembly and service area as well as storage magazines and launcher area. The buildings and equipment associated with the operations are discussed in detail in the report. Fuel storage tanks, generators and transformers were identified in the generator building. Heating of the other buildings required use of fuel tanks. The locations of these tanks are shown in the building drawings.

There are important difference in the missiles that are notable in the assembly process, service and maintenance discussed in detail in the report. The specific cleaning, preserving, and related materials specified in technical manuals may change depending upon whether it was a Nike Ajax or Nike Hercules. These materials include:

- Mineral spirits
- Dry-cleaning solvents, P-D-680 and P-S-661
- Hydraulic fluids MIL-H-5606
- Trichloroethylene
- Trichloroethane
- Ethyl alcohol
- Emulsion cleaner (P-C-576A, type 1)

It is important to understand the difference in the two missiles and certain components. Of particular interest is the propulsion system, warhead and rocket motor igniter. The fueling of the Nike Ajax sustainer motor involved handling of the Inhibited Red Fuming Nitric Acid – IRFNA oxidizer, propellant mixture (M3), and UDMH starting mixture while the solid propellant (a composite propellant containing ammonium perchlorate) sustainer of the Nike Hercules called for wiping of any perchlorate crystals from the small diameter rocket motor adapter threads and handling of ethylene oxide. Specific handling and disposal of these fuels is discussed. The double base propellant booster motors for both contained nitrocellulose and nitroglycerin. The boosters consisted of a single M5 rocket motor for the Nike Ajax and a cluster of four M5 rocket motors for the Nike Hercules.

Certain Nike Hercules missile numbers electron tubes containing radioactive materials. These radioactive materials were shipped, stored, handled and disposed of in accordance with technical manuals.

Deactivation of the Nike system was carried out in an orderly manner requiring the preparation and shipment of:

- Power generation equipment
- Radar vans and launch control trailers
- Missile components
- Installed property
- Launchers, rails, and side tracks
- Small arms and riot control equipment
- Missile handling and test equipment
- Motor vehicles
- Aircraft

The deactivation schedule specifically called for retrieval and turn in of diesel fuel and motor gas. The process for deactivating and preparing this materiel for shipment is contained in the technical manuals.

1. Background

1.1. Purpose:

The purpose of this report is to provide relevant information and general background of the Nike missile program with particular emphasis on the firing battery facilities and operations that required storage, handling, and disposal of solvents, fuels, hydraulic fluids, paints, and other materials to be considered in developing an environmental preliminary assessment and conducting a site investigation, as necessary. This report mentions other maintenance echelons, however the primary focus is on the missile battery operations.

Documents cited are historical period documents when available supplemented by secondary source documents to fill in the information gaps. Due to local conditions and site-specific practices subject to local Nike battery control as well as the differences in Nike Ajax and Nike Hercules missiles, the U.S. Army Corps of Engineers (Corps) districts are encouraged to develop collect site-specific information as necessary:

- Sewage treatment and disposal method.
- Local disposal practices, sites and/or landfills used, if applicable.

Appendix F: *Nike FUDS Sites* and Appendix G: *How do I do research on NIKE Air Defense Missile Sites?* are provided to assist in finding additional information on a site specific basis.

1.2. Nike Surface-to-Air Missile Program Background:

The Nike Ajax and its replacement, the Nike Hercules, were two stage surface-to-air guided missiles. At most sites, the missiles were stored in underground magazines and raised to the surface for launching.

In April 1954, the U.S. Army deployed the first operational Nike Ajax battery at Fort Meade, Maryland. By 1958, nearly 200 Nike Ajax batteries were deployed around strategic urban, military, and industrial complexes. In the same year, the Army began deactivating the Nike Ajax batteries and replacing them with the Nike Hercules. Due to the longer range and nuclear capabilities of the Hercules, only select Nike Ajax sites were converted. For example, only nine (9) of the 16 in the Los Angeles defense area batteries and 10 of 19 in the New York defense area batteries were converted to the Hercules. The phase out of Nike Ajax to Nike Hercules was completed in November1963. Ultimately, 145 Nike Hercules batteries were deployed: thirty-five (35) new batteries and 110 converted from the Ajax installations. Nike Hercules missiles remained deployed in the continental United States until 1974. By 1975, all Nike Hercules sites had been deactivated except in Alaska and Florida. Alaskan sites were deactivated in 1978 and Florida sites in1979. Appendix F identifies the sites by missile type and the radars deployed at each site along with the FUDS site number. Lonnquest, 1996 at 57, 61, 63, 165, 172, 177, 182; Berhow at III.

The Nike Ajax system requirements and operational components remained relatively unchanged throughout the missile systems operational life. The Nike Hercules system was designed to utilize the Nike Ajax supporting components and followed similar operational procedures. The Nike Hercules system was contemplated prior to complete deployment of the Nike Ajax

allowing certain Nike Ajax sites to be constructed with missile magazines and universal launchers capable of handling either missile.[1] The Nike Hercules was deployed as Basic Hercules or Improved Hercules. The increased range of the Nike Hercules did require improvements in the radar and guidance systems. High-powered acquisition radars (HIPARs) or alternate battery radars (ABARs) were installed on Improved Nike Hercules sites to track targets at greater range while an additional target ranging radar (TRR) was emplaced to counter enemy radar jamming attempts. Not all Nike Hercules sites were provided with this new equipment. There were no significant changes to the battery site configuration. Lonnquest, 1996 at 178-179. Air defense against attacking aircraft was coordinated through command posts utilizing the "Missile Master" (AN/FSG-1) or "BIRDIE" command and control system. The Missile Master, a labor-intensive system, eventually became over-capable because the increased range of Nike Hercules reduced the number of batteries that needed to be coordinated. The "Missile Mentor" (AN/TSQ-51), a solid-state system, replaced the Missile Master in the mid-1960s." Lonnquest, 1996 at 178-179.

The Nike Hercules missile itself was advanced with the capability of being armed with single conventional or nuclear warheads. Both the Nike Ajax and Nike Hercules (see figures 4.8 and 4.9) were two stage missiles. The first stage booster dropped off in flight, while the second stage sustainer propelled the warhead to the target. A solid fueled missile sustainer replaced the liquid fueled sustainer used in the Nike Ajax. The use of solid fuel in the Nike Hercules significantly simplified the fueling and maintenance operations of the missile. The booster for the Hercules was a cluster of four Ajax boosters.

Initially, the Nike Ajax were operated by the active Army personnel, but during conversion to the Nike Hercules, Army National Guard units were trained and deployed at Nike Ajax sites as the active Army took over the Nike Hercules sites.

1.3. Air Defense Organization

1.3.1. North American Air Defense Command (NORAD)

NORAD, created in September 1957, was directly responsible to the United States Joint Chiefs of Staff and had jurisdiction over United States and Canadian Forces involved in aerospace defense. NORAD was comprised of a number of "component forces" including United States Army Air Defense Command (ARADCOM)[2], ARADCOM responsibilities for the Nike missile system organized, trained, and equipped the Army air defense units. ARADCOM forces provided combat ready air defense units under operational control of NORAD, while ARADCOM retained command, administration, training, and logistical control. NORAD prepared the operation plans, conducted tactical exercises, and coordinated plans and requirements for new air defense weapons. The Continental Air Defense (CONAD) operated as a unified command under the Joint Chiefs of Staff, and performed all national air defense

1 Although capable of handling either missile, the missiles were not mixed within a single magazine.

[2] The command established to carry out the specific Army defense mission was the United States Army Air Defense Command (ARADCOM). ARADCOM was officially formed on March 21, 1957, as a redesignation of the U.S. Army Antiaircraft Command (ARAACOM) that was formed in 1950. Westec, 1987 at 23.

missions and was involved in broad national planning, separate from NORAD, while more detailed planning was accomplished by individual component commands including ARADCOM. Westec, 1987 at 23.

Under ARADCOM, Army air defense command posts (AADCP) were established for each defense battalion, group, or brigade. From the AADCP the Army air defense commander exercised operational control over all Army fire units within his defense area. For normal operations, the AADCP was under operational control of the NORAD Sector Direction Center; however, for command, the AADCP is directly subordinate to the ARADCOM region commander. Westec, 1987 at 23 & 26.

1.3.2. Air Defense Brigade

The air defense (AD) brigade consisted of a brigade headquarters and headquarters battery, and all the AD groups and battalions assigned or attached to it. The mission of the brigade was to provide tactical control and supervision to all AD units within its jurisdictional area. A brigade usually consisted of two or more Air Defense Groups. Westec, 1987 at 26-27.

1.3.3. Air Defense Battalion

The battalion, as the basic administrative unit of Nike air defense, consisted of a headquarters and headquarters battery, multiple (typically four) firing batteries, and emergency medical service at the battalion aid station. Transportation of re-supply missiles was an additional support requirement. Other transportation support provided for the minimal administrative purposes. The battalion commander was a Lieutenant Colonel.

1.3.4. Battery Mission And Organization

The basic operational unit was the Nike missile battery. The mission of the battery was "to provide the missile launching and fire control components" of the battalion. At full strength, the capabilities of the batteries were to provide:

- Delivery of a sustained and deliberate rate of fire from fixed positions against medium and high altitude hostile aerial targets;
- Assembly, testing and maintenance of missiles;
- Storage of basic load of missiles and warheads; and
- Qualified full time guards, dog handlers and sentry dogs for classified missile components security.[3]

For Improved Hercules sites, the capabilities were augmented by personnel and equipment for:

- Operation and maintenance of Improved Nike-Hercules Kit when authorized.
- Operation and maintenance of HIPAR/Improved Kit when authorized.
- Operation and maintenance of ABAR when authorized.

TOE 44-347, 44-448 and 44-547 at 1 & 3.

[3] The Fire Fighting Unit and the Fire Unit Integration Facility were eliminated due the absence of volatile liquid fuels and the advanced electronic capability. Because the Hercules was capable of being armed with a nuclear warhead, a Security Section was added to Hercules sites in the form of an inner fence and sentry dogs. Cole at 254-255.

See Figure 1-1 for the typical missile battery and its relationship to the battery headquarters and battalion.

The Table of Organization and Equipment (TOE) established the minimum essential quantities and types of equipment to accomplish the mission. Additional equipment, when required, had to be requested for authorization and approval through procedures established by Army Regulation. Allowance could be decreased or omitted by the commanders of major commands. TOE 44-347, 44-448 and 44-547 at 6.

The typical missile battery consisted of a headquarters section, a fire control platoon, a launching platoon headquarters, an assembly and service section, three launching sections, and (security section for Nike Hercules sites).[4] Authorized augmentation sections are shown on the TOE organizational chart. Their duties as described in the January 1956 Field Manual 44-80 "Procedures and Drills for the Nike I System" are:

- Headquarters Section. The organization and responsibility of the headquarters section is essentially the same as in AAA gun batteries.
- Fire Control Platoon. The fire control platoon is responsible for the operation and maintenance of the fire control equipment in the battery control area.
- Launching Platoon Headquarters. The launching platoon headquarters is responsible for the operation and training of the three launching sections. It contains technically trained personnel to assemble, test, and perform organizational maintenance on the Nike I missile and booster and launching section equipment. It is responsible for assembling and testing missiles and boosters, and for the maintenance of the rounds at the launching section.
- Launching Section. The three launching sections are responsible for the preparation of the missile and booster for firing after they have been delivered to the launching section from the assembly and test area and for routine non-technical tests, checks, adjustments, and organizational maintenance.

TOE 44-347 at 7, 44-448 at 7 and 44-547 at 8; Westec, 1987 at 27 & 31.

[4] Contrary to a number of previous reports, there is no motor pool section designated in the TOEs for the missile Batteries. Motor pool maintenance support was designated as a Battalion function. (Expand on this discussion)

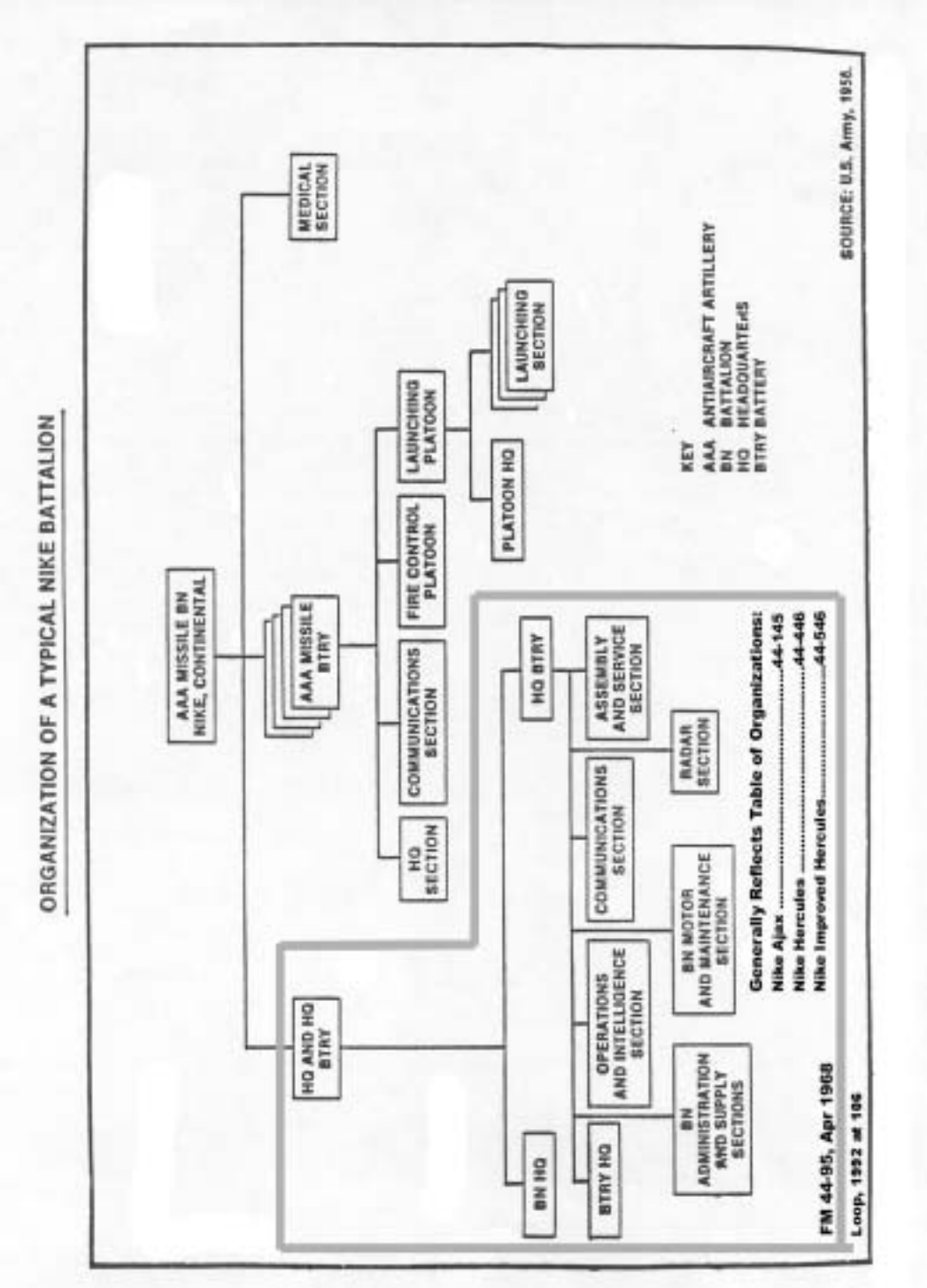


Figure 1-1: Typical Nike Battalion

1.4. Depots, Field, and Battalion Maintenance:

Depot maintenance of ground guidance, handling, launching equipment and the guided missiles were provided by Pueblo Ordnance Depot, Erie Ordnance Depot, Letterkenny Ordnance Depot, and Mount Rainier Ordnance Depot. Benicia Arsenal performed reconditioning, repair and maintenance of missiles. These depots and arsenals stored and issued, less explosive components and fuels. Depot maintenance of explosive components and renovation of explosive components were provided by Anniston Ordnance Depot, Letterkenny Ordnance Depot, Pueblo Ordnance Depot, Savanna Ordnance Depot, Seneca Ordnance Depot and Sierra Ordnance Depot. Ordnance Support Plan General Plan at 6-7 and Annex I at5-6; Cowell at 83-86, 92-94, and 106-107. Field maintenance shops and battalion support performed maintenance on missiles and support equipment that was beyond the capability or equipment of the battery. The field shops were typically located on nearby military installations while battalions were located with the air defense headquarters.

1.5. Annual Service Practice:

Training included annual service practice (ASP) firing competition conducted at McGregor Range at Fort Bliss Texas. " In addition to ASP, firing units were tested on-site through scheduled and no-notice BLAZING SKIES alerts" which could be called as often as once a week. Any aircraft in the area could be designated as a target, and the firing drill completed short of the actual launch. Cole at 254. Practice firing also took place at certain operational sites in Hawaii and Alaska.

1.6. System Operation

Excerpts taken from "To Defend and Deter: The Legacy of the United States Cold War Missile Program" by John C. Lonnquest, 1996 and David F. Winkler provide a description of the Nike Ajax system operations.

"The Nike Ajax command guidance system received guidance information from a computer on the ground." During an imminent attack, a missile launch was preceded by a warning sent to the battery by the Air Defense Command Post. Sirens would alert personnel to take their assigned battle stations. The launch area personnel conducted last-minute pre-firing checks and positioned the missiles on the launchers.

As the missiles were readied, the potential target was picked up by the Nike acquisition radar known as LOPAR for "Low-Power Acquisition Radar." The battery commander used "electronic interrogation" to determine if the target was friend or foe. If the designated target was hostile, the information was transferred to the target-tracking radar (TTR). The TTR determined the target's azimuth, elevation, and range, and provided that information to the computer guiding the Nike Ajax missile. Once energized, the guidance computer received a running account of the target's changing position.

The missile-tracking radar (MTR) locked onto the missile selected to perform the intercept. When the target entered the battery's range, the battery commander would launch the missile.

After the initial thrust, the missile booster dropped away and the missile was tracked by the MTR receiving continuous data on the missile's flight. Using the continuous data from the TTR and MTR, the computer generated course correction information and transmitted it to guide the missile toward the target. At the predicted intercept point, the computer transmitted a burst signal that detonated the three high-explosive warheads. Figures 1-2 through 1-5 illustrate the operations for the Nike Ajax and the later Nike Hercules system.

The Ajax guidance system could engage only one target at a time and once deployed there was no capability for coordinating fire between multiple batteries. This system thus could allow several batteries could engage the same target and allow other targets to pass through. "To alleviate this problem, ARADCOM established command centers where incoming targets were manually plotted and engagement orders were passed to the batteries." The inadequacies of this voice command and control system were addressed in the late 1950s with the introduction of the Interim Battery Data Link (IBDL). IBDL provided a "real-time" target data link between the batteries so that battery commanders could readily see what targets other batteries were actively engaging.

While IBDL was being deployed, the Army tested a successor system called "Missile Master" at Fort Meade, Maryland. After this system was proven within the Baltimore- Washington Defense Area, other major defense areas began receiving the Missile Master (AN/FSG-1) systems. Missile Master was the first truly integrating command and control system featuring automatic data communications, processing, and display equipment. By eliminating voice communications, this Martin-built system allowed an area commander to use all his batteries to engage up to 24 different targets.

Smaller defense areas with fewer batteries received another command and control system called the Battery Integration and Radar Display Equipment "BIRDIE" (AN/GSG-5)." Lonnquest, 1996 at 168-169

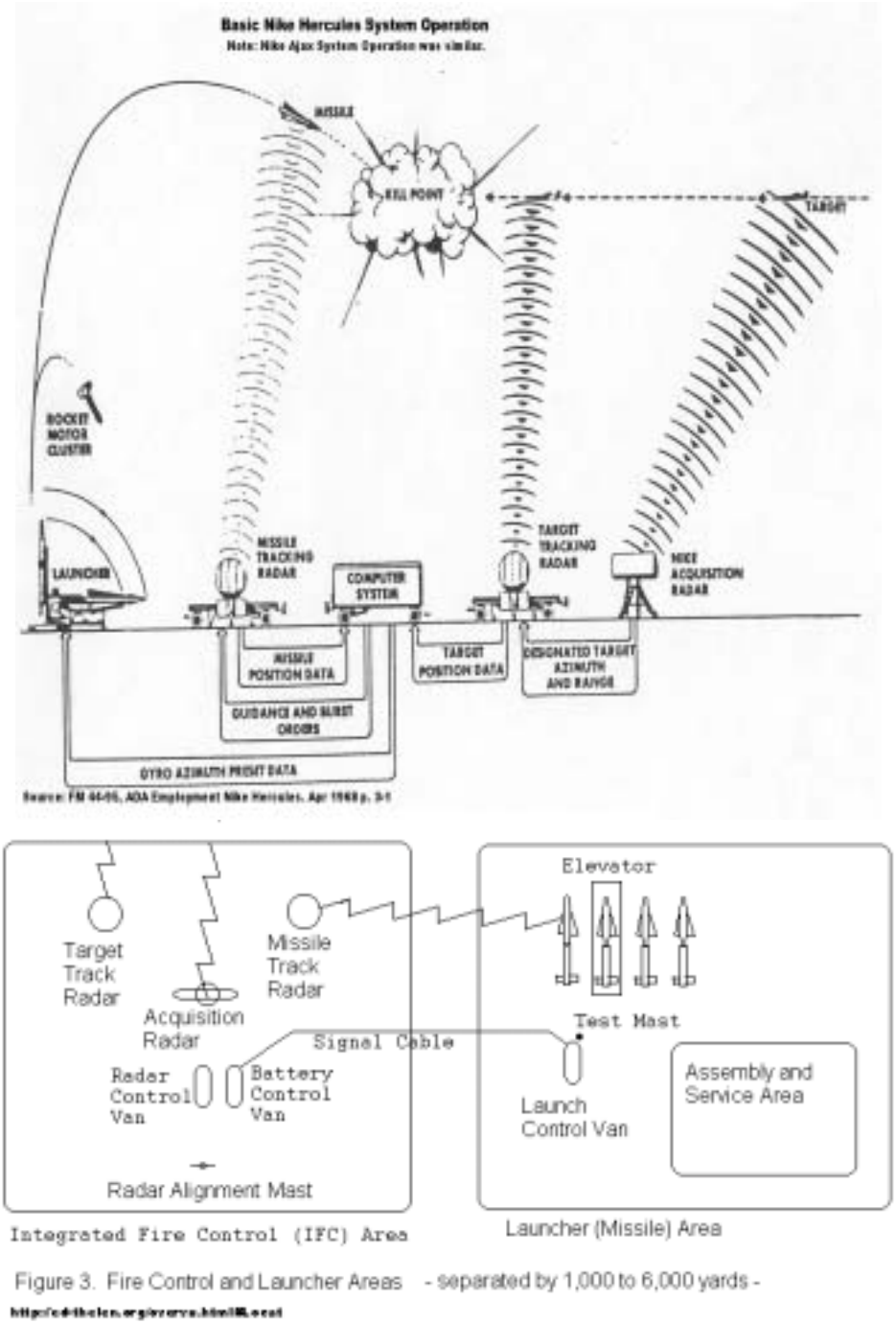
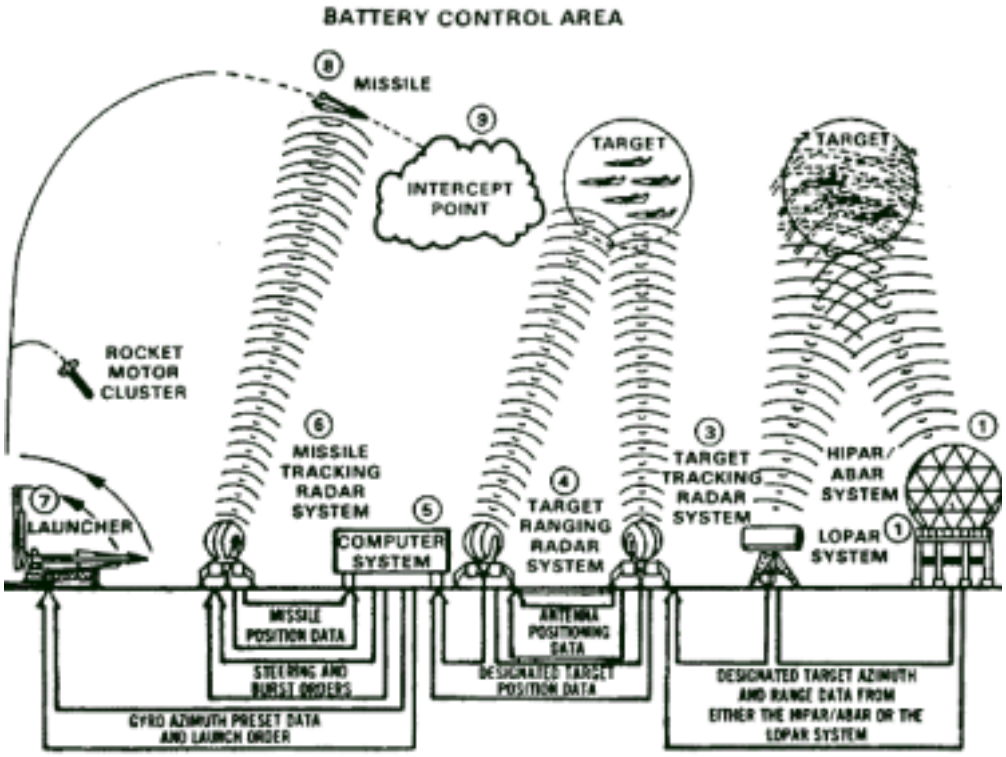


Figure 1-2: Basic Nike Hercules System Operation (Note: Nike Ajax was similar.)



Improved Nike-Hercules missile control and guidance system
From FM 44-1-2 ADA Reference Handbook, 15 June 1984, see page 16 "Rings of Supersonic Steel" 2nd Edition

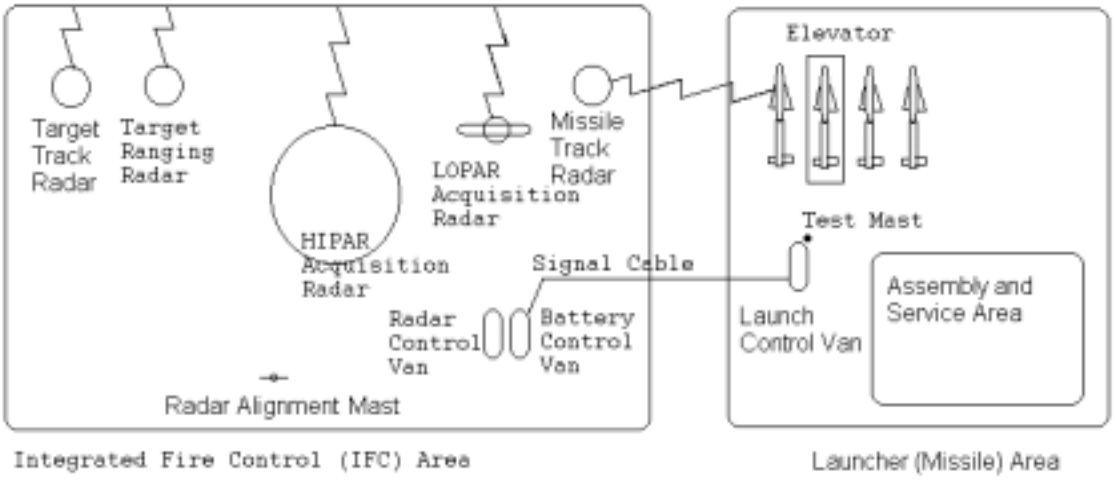


Figure 4. Nike Hercules site Note added HIPAR and Target Ranging Radar
http://ed-thelen.org/overvu.html#Lesat

Figure 1-3: Improved Nike Hercules System Operations

2. Nike Battery Site

2.1. Battery Designation

The Nike-Ajax fixed sites were staggered between out-skirts and close-in locations to provide for greater defense capability. The battery control area for each site was located in an inner ring towards the vital area with the launcher areas located farther out away from the vital area. Battery site designations were based on a 100-segment circle. See Figure 2-1 for an example of battery site designation.

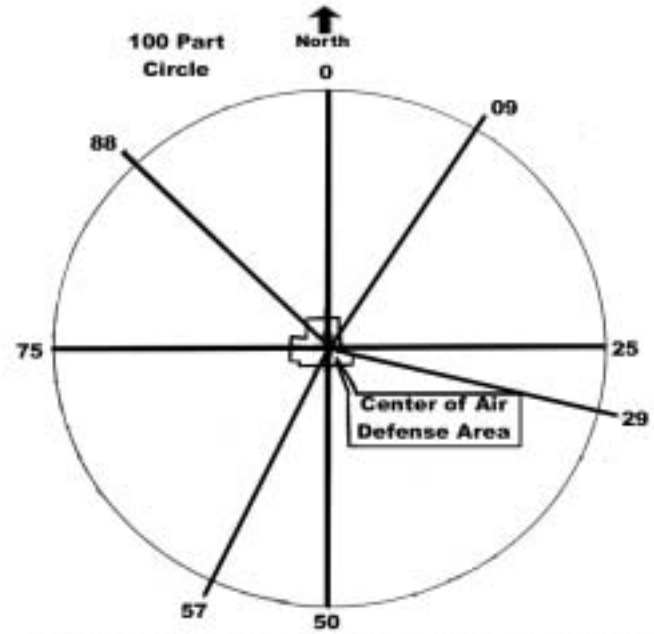


Figure 2-1: Nike Site Designation System

As the Nike Hercules replaced existing Nike Ajax facilities, the greater range of the Nike Hercules allowed for wider area coverage and several Nike Ajax batteries were permanently deactivated. The Nike Hercules sites were located further away from target areas due to the nuclear warheads carried by the missile. Nike Hercules batteries constructed in the late 1950s and early 1960s were placed in locations that optimized the missiles' range and minimized the warhead damage. “Local Corps of Engineer Districts supervised the conversion of Nike Ajax batteries and the construction of new Nike Hercules batteries.” New sites that were located away from populated areas were not confined in acreage and consequently could utilize above ground missile storage and maintenance facilities located behind earthen revetments. Some of these above ground Hercules sites protected Strategic Air Command (SAC) bomber bases. Lonnquest, 1996 at 181-182.

2.2. Battery Layout

Nike-Ajax and Nike-Hercules missile batteries were very similar. Each battery consisted of two principal operational areas: the battery control area, (also called Integrated Fire Control (IFC)) and the launch area with launchers and adjacent assembly/service area. Figure 2-2 shows a typical permanent Nike-Hercules battery. The Nike Ajax batteries also included missile fueling facilities not required by the Nike Hercules. An administrative area provided housing and office functions. These facilities could be collocated with one of the two principle areas or as a separate area. Utilities such as water, sewer, and electrical power were required as well as the storage of fuels. In general, the battery control area was located on relatively level and well-drained terrain and higher than the launch area. This area had to be free of any visual obstructions to allow a direct line of sight between the radar equipment, missiles and targets. The physical layout of the facilities on a site was adapted to site-specific topography, land availability and other site-specific conditions while using standardized "modified emergency" design structures. There were slight variations in these standard designs. An overview of the Nike battery facilities and operations are provided in the Section 3 and 4. While launch sites generally stored missiles in the underground magazines, most of the sites protecting SAC bases stored missiles on the surface with earthen berms around the launchers. Also, some of the early Ajax launch sites were temporarily above ground until underground magazines were constructed.

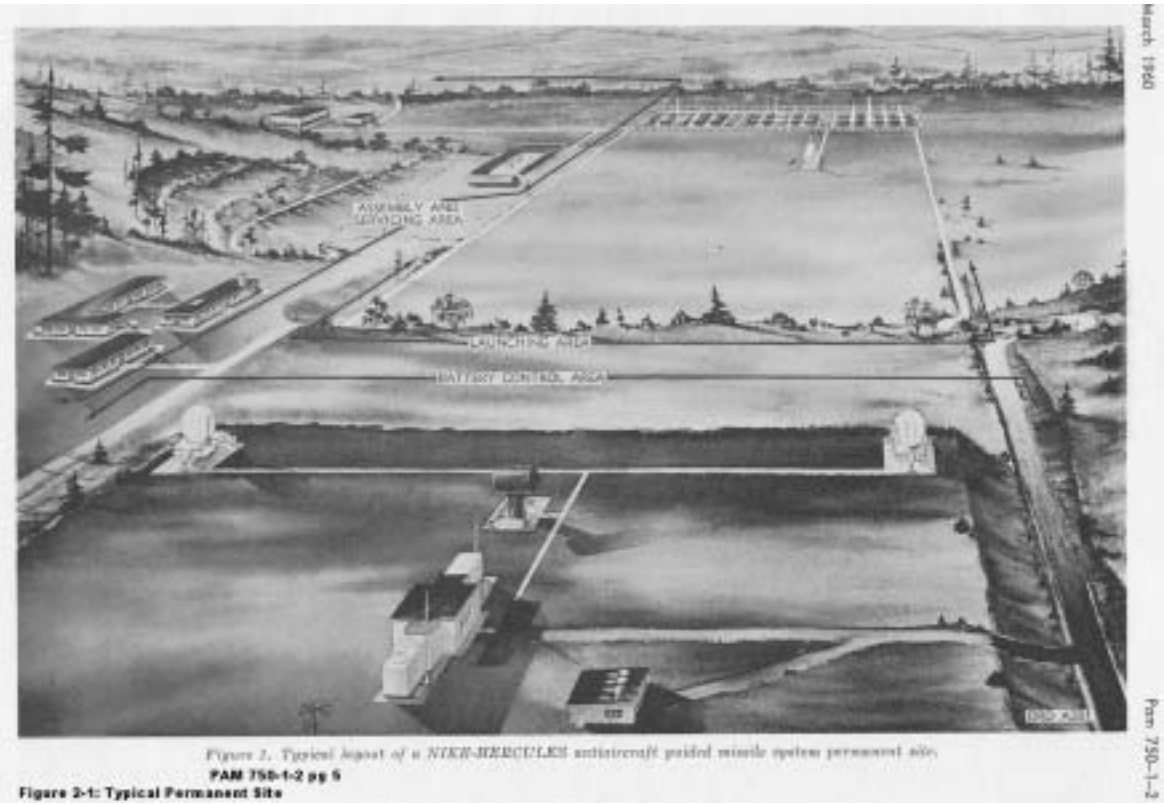


Figure 2-2: Typical Permanent Missile Battery

Site-specific details may be obtained from historical records such as “as-built” drawings, on-site inspections, and interviews with personnel stationed at the site need to be evaluated for individual FUDS sites. Alaska had unique requirements discussed in the Military Engineer, March-April, 1960. Appendix G provides information useful in conducting site-specific research.

3. Battery Control Facilities and Operations

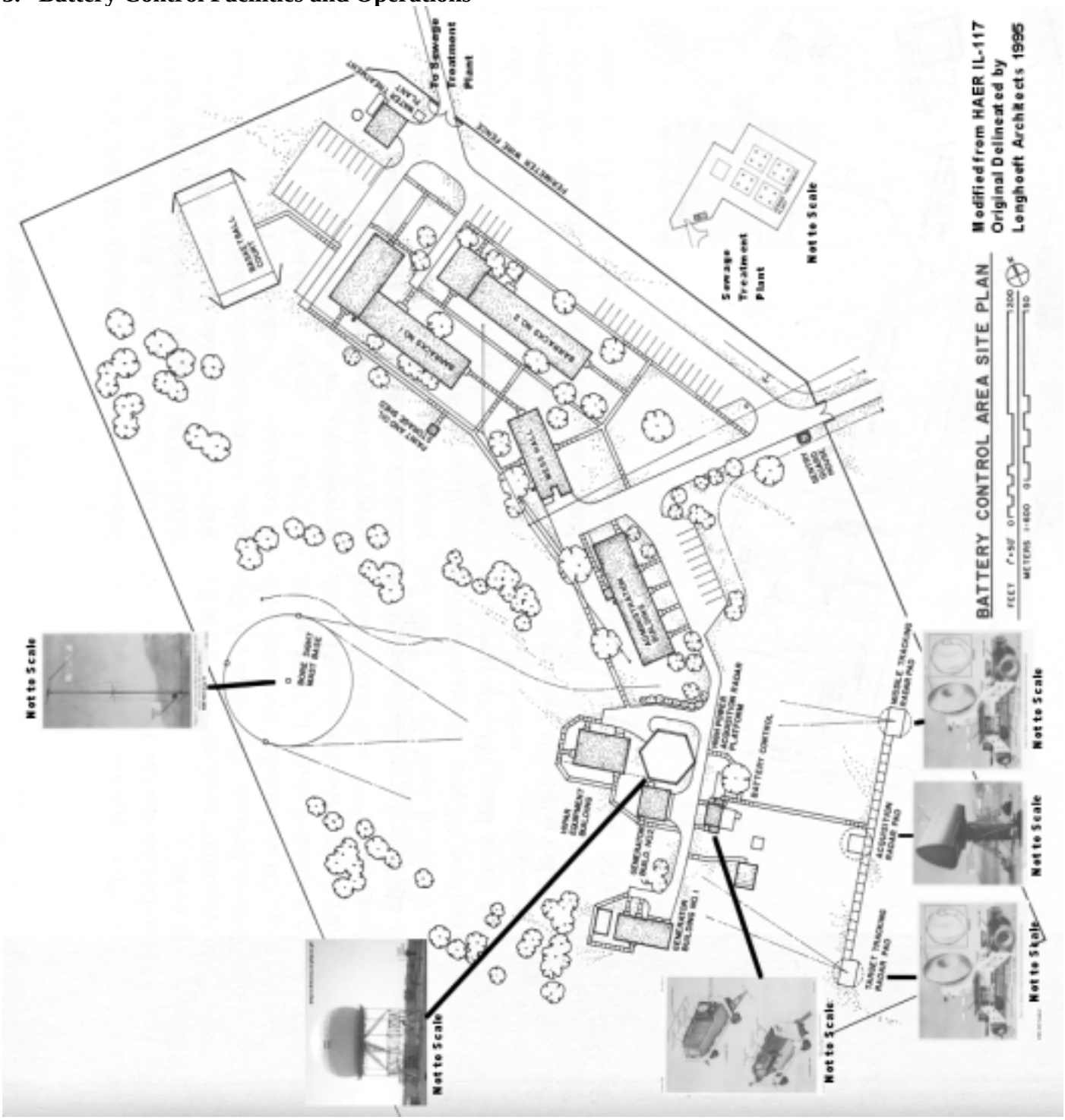


Figure 3-1: Typical Nike Hercules Missile Battery Control Area

This section will present a discussion of the battery control area buildings, equipment and maintenance operations. The administration and barracks areas were often located at the battery control area. They could, however, also be located at the launcher area (LA) or on a separate parcel of land. For the purpose of this report the buildings will be discussed at the beginning of this section under Administrative and General Support Facilities followed by Battery Control Equipment. The battery control area operations, relative to potential contamination, include underground storage tanks, transformers, sewage disposal, and maintenance activities such as painting and radar maintenance. See Figure 3-1 for an example of a typical Hercules battery control area (also known as Integrated Fire Control area).

3.1. Administrative and General Support Facilities and Operations

3.1.1. General Facilities Maintenance

All buildings and structures would be subject to painting and general cleaning as well as heating requirements. No specific information was found on these operations.

3.1.2. Electrical power and Generator Buildings:

The power for the radar course-directing central used 400-hertz (Hz) power. This power was obtained from three sources, 60-Hz commercial power, 60-Hz generators or 400-Hz generators. Power from the 60-Hz sources was converted to 400-Hz by motor generators. A generator building at the battery control area housed the 60-Hz or 400-Hz diesel-driven generators. Commercial power was used for maintenance and non-tactical training while generated power was used for engagement, tactical training, and whenever commercial power was not available. Electrical power brought to and metered at or near the battery area entrance or other convenient location. FM 44-82 at 13; MS-70 “as built” drawing.

Standard drawing ME 26-03-34 for the generator building in the control area show a floor trench to the generators and frequency converters. No detail drawing was available for this trench. Details of the trench for the generator building in the launch area may provide information relevant to this trench. The trenches were sloped to drain. See Figure 3-2. Drawings ME 26-03-34. It should be noted that some buildings may also have been renovated when Nike Ajax sites were upgraded for Nike Hercules.

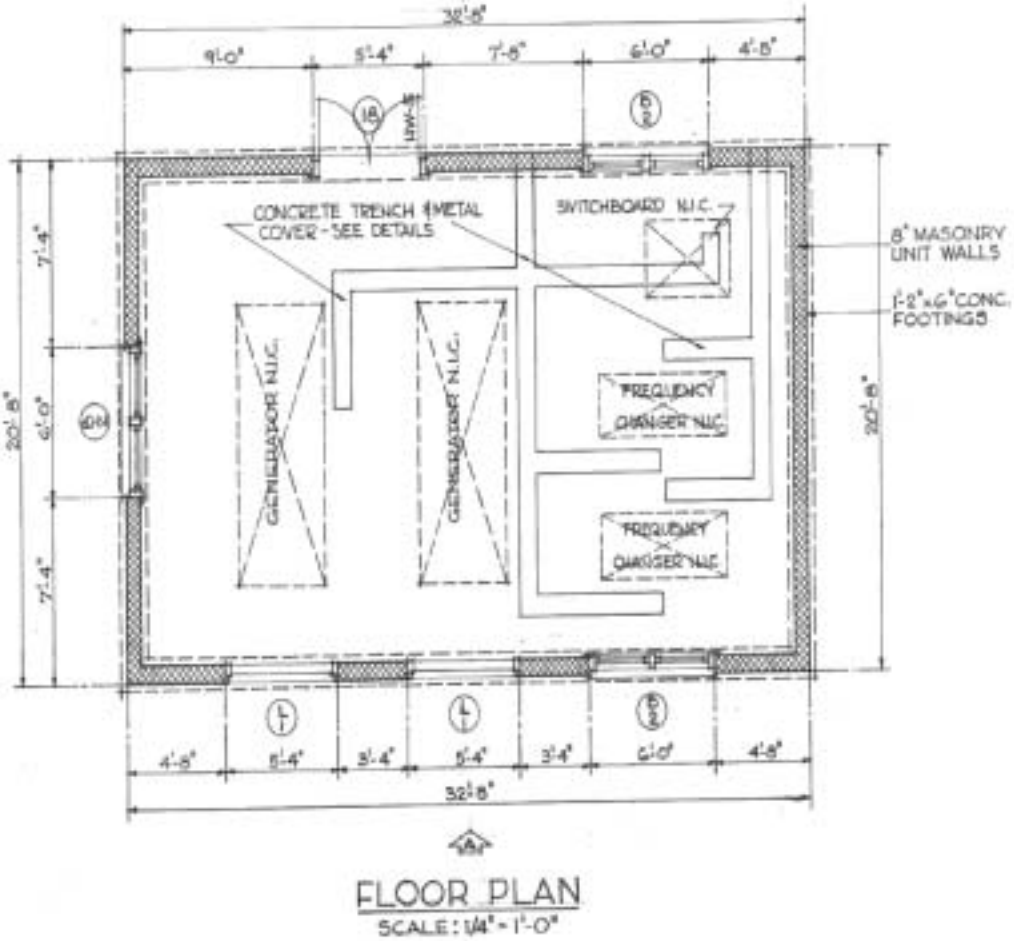


Figure 3-2: Battery Control Generator Building.

3.1.3. Diesel and Fuel Oil storage Tanks

Storage tanks for diesel fuel and fuel oil for heating could be above or belowground. These tanks were located at several locations throughout the battery control and launch areas. Fuel usage and heating units varied some depending upon the temperature zone. Deactivation procedures called for diesel fuel and motor gas to be retrieved and turned in. Site-specific review of the tanks and their usage must be evaluated, buried propane tanks have been found on some locations in place of oil storage tanks at some buildings. Storage tank locations in the battery control area include:

- Barracks,
- Mess hall,
- HIPAR building

- Generator building.

3.1.4. Water Treatment and Sewage Facilities:

Typically, Nike installations had their own water treatment and sewage handling facilities. However, urban and suburban sites may be connected to municipal systems. Depending on location, these facilities could include wells and pump houses for water service while sewage treatment facilities could include aeration/settling tanks, sewage lagoons, and/or septic tanks and leach fields. Certain operational buildings were provided with floor drainage such as the generator building discussed above. Site-specific evaluation of the drainage and sewage handling systems should be considered. Whitacre, 1996 at 56.

3.1.5. Motor Pool

Nike missile battery motor pool maintenance operations were typically provided at the battalion level as illustrated by Figure 1-1 in Section 1. However, if site-specific information indicates the presence of motor pool operations, some minor use of solvents, fuels, and lubricants may have occurred.

3.1.6. Weapons

Military police (MPs) carried rifles and/or pistols requiring storage of small quantities of ammunition. The specific storage area is not designated on the drawings. There are no identified firing ranges on Nike sites.

3.2. Battery Control Equipment

The battery control area, also known as the integrated fire control (IFC) area, equipment was composed of the Radar Course-Directing Central which contained the ground guidance equipment necessary to acquire and designate targets, initiate commands to fire the missiles, control the flight of the missile, and automatically record certain events incident to those operations. The battery control area was the information and communications point for the battery. Communication cables connected the various elements within the control area. An interarea cable connected with the launch area. Whitacre, 1996 at 56-57; PAM 750-1-2 at 8; FM44-82 at 8; Westec, 1987 at 47.

During conversion of Ajax to Hercules, selected sites received the Improved Hercules package of new high power acquisition radars (HIPAR). However, HIPAR radars were not installed at some sites due to geographical constraints and/or to avoid duplication of radars located at adjacent sites. ABAR radars were also used instead of HIPAR at certain locations. Lonnquest, 1996 at 182.

Originally designed as a mobile system for use by a field army, the Nike system was deployed for continental air defense on permanent installations. In order, to maintain it's suitability for mobile use, key pieces of the Nike system's radar, launch, and battery control equipment were deployed as mobile trailers connected through communications cables. An Army training

manual noted, "It appeared more reasonable to adapt the mobile equipment for use in a fixed type of installation rather than to redesign the equipment specifically for fixed installations. The latter would be costly and time-consuming and it offered no promise of operation improvement or substantial ultimate economy." Whitacre, 1996 at 57-58; Westec, 1987 at 49.

Table 3-1 provides the nomenclature list for the major battery control equipment for both the Nike Ajax and Hercules systems. A discussion of this equipment follows.

Table 3-1: Nomenclature for Major Battery Control Equipment (TM 9-500)

Battery Control Area Equipment Description	**Nike-Ajax**	**Nike-Hercules**
a. Low-Power Acquisition Radar (LOPAR), aka as Acquisition Radar	Antenna-Receiver-Transmitter Group, Acquisition: OA-653/MS	Antenna-Receiver-Transmitter Group, Acquisition: OA-1596/T and OA-1601/T, w/e
b. Battery Control Trailer	Director Station, Guided Missile, Trailer Mounted: AN/MSA-7, AN/MSA-7A, AN/MSA-17, AN/MSA-17A,	Director Station, Guided Missile, Trailer Mounted: AN/MSA-19
c. Radar Control Trailer	Tracking Station, Guided Missile, Trailer Mounted: AN/MPA-4 and AN/MPA-4A	Tracking Station, Guided Missile, Trailer Mounted: AN/MPA-5
d. Missile-Tracking Radar	Antenna-Receiver-Transmitter Group, Missile Tracking, Trailer Mounted: OA-654/MPA-4 through 654G/MPA-4	Antenna-Receiver-Transmitter Group, Missile Tracking, Trailer Mounted: OA-1340/MPA
e. Target-Tracking Radar	Antenna-Receiver-Transmitter Group, Target Tracking, Trailer Mounted: OA-655/MPA-4 through 655G/MPA-4	Antenna-Receiver-Transmitter Group, Target Tracking, Trailer Mounted: OA-1487/MSA
f. Radar Collimation Mast Assembly	Antenna Mast Group: OA-739/MSW-1	Antenna Mast Group, Collimation: OA-1600/T
g. High-Power Acquisition Radar (HIPAR)	Not Applicable	Mobile version AN/MPQ-43
h. Alternate Battery Acquisition Radar (ABAR)	Not Applicable	Radar Set AN/FPS-69, AN/FPS-71 or AN/FPS-75

A brief discussion of the function of the basic equipment is presented below:

Acquisition Radar/ LOPAR[1]. The Acquisition Antenna-Receiver-Transmitter Group, also known as LOPAR, contained a receiver-transmitter which generated and radiated into space, a radio frequency energy necessary to detect and acquire a target. In addition, this receiver-transmitter received target echoes and converted them into a usable intermediate frequency. A listing of major components of which this group is comprised is presented below. See Figure 3-3. PAM 750-1-2 at 9.

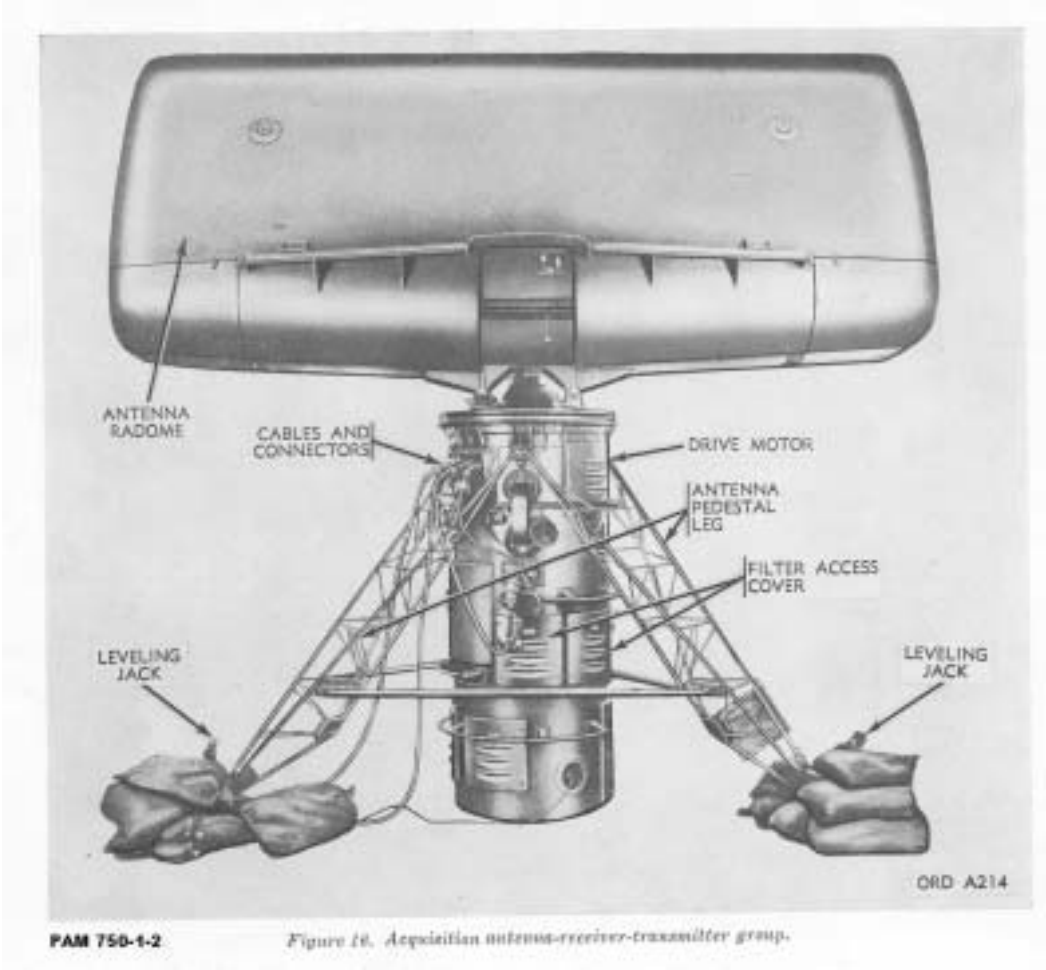


Figure 3-3: Acquisition Radar

Trailer Mounted Director Station. This station consists of a four-wheel, van-type trailer containing electronic equipment necessary for the operation of the computer system, the acquisition radar system, tactical control system, recording equipment, and communication equipment. The major components of this station are:

[1] "The **LOPAR radar** was very much like the original Nike Ajax (and M-33 gun) acquisition radar but with reduced pulses per second to match the longer range HIPAR radar or the ABAR radars mentioned above. It provided another "eye to the sky" and another problem for enemy jammers." http://ed-thelen.org/ifc_acq.html#LOPAR

- The director station group containing the primary power equipment necessary for the trailer's lighting, heating, and ventilating and operation of the acquisition radar system equipment.
- The battery control console containing the controls, presentation indicators, automatic plotting boards, and circuitry associated with the acquisition radar system, computer system, and tactical control system. The console monitors and controls the operation of these systems to direct target engagement.
- The computer group contained subgroups and the assembly associated with the computer system. The computer power supply group contains the power equipment necessary for operation of the computer system. The servo computer assembly contains the equipment associated with the computer ballistic information. The computer-amplifier-relay group contains the majority of the electronic computing equipment necessary for operation of the computer system.
- The early warning plotting board provided early warning position information by recording plots of targets out of range of the battery radar.
- The recorder group contained recording and voice communication equipment. The recording equipment provides a record, on film, of equipment performance during a tactical or test engagement. The communication equipment consisted mainly of a switchboard that provided two-way communication between all system telephone locations.

PAM 750-1-2 at 10.

Trailer Mounted Tracking Station. This station was a four-wheel, van-type trailer that housed the computing equipment necessary for the operation of the target tracking and the missile tracking radar systems. The major components of the station were:

- The target radar control console containing the controls, presentation, indicators, and equipment necessary for the operation of the target tracking radar system.
- The missile radar control console containing the necessary controls, a presentation indicator, and other equipment required for operation of the missile tracking radar system. Proper positioning of switches on this console caused the missile tracking radar to function automatically for acquiring and tracking the missiles.
- The radar power supply group contained the power equipment with associated regulators and timers necessary for the target tracking and missile tracking radar systems.
- The radar set group contained the video detection circuits, the angle and range tracking error circuitry, and data potentiometers necessary to provide the ranging and receiving information necessary for the missile and target tracking radar systems.
- The radar coder set contains the automatic equipment necessary to convert information from the computer system into steering and burst orders which are then transmitted to the missile in flight.

PAM 750-1-2 at 12.

Trailer Mounted Missile-Track Antenna-Receiver-Transmitter Group (MTR). This group outwardly identical in appearance with the target-track antenna-receiver-transmitter group described below, contained the transmitting and receiving equipment necessary to transmit coded pulses which directed the missile in its flight and it receives pulses transmitted by the missile. PAM 750-1-2 at 14.

Trailer Mounted Target-Track Antenna-Receiver-Transmitter Group (TTR). This group contained the transmitting and receiving equipment necessary to supply continuous target position information to the computer. Once locked on target, it automatically tracked the target as long as it was within range. PAM 750-1-2 at 14.

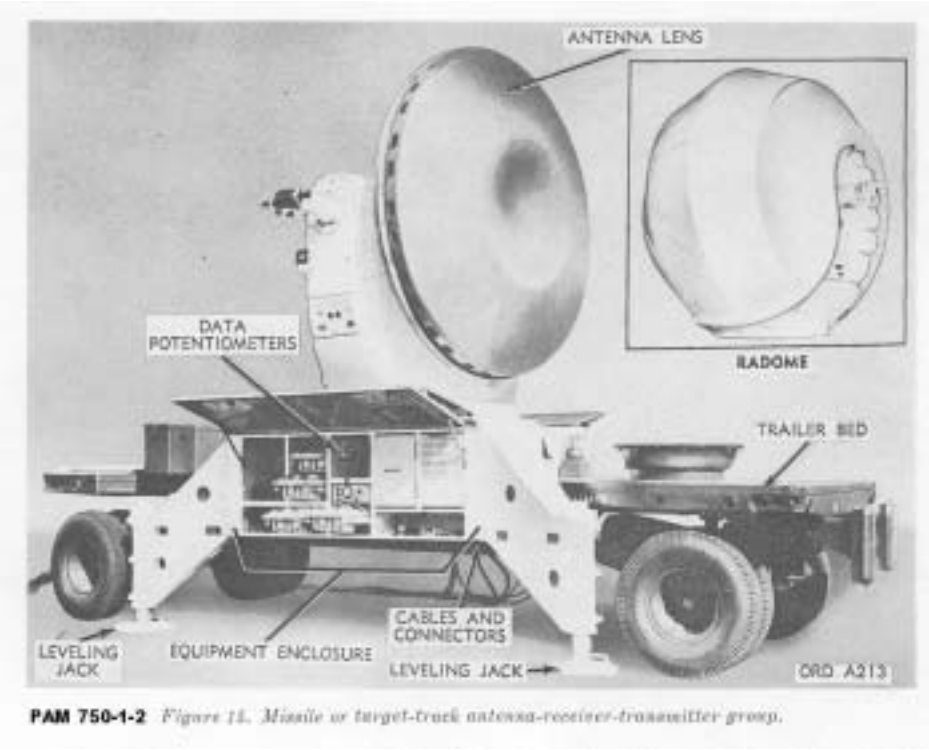


Figure 3-4: Tracking Radar

Antenna and Mast Group OA-1600/T. This group along with the Radar Test Set TS-847A/MSW-1, see next paragraph, was used during aligning and testing of the target and missile tracking radar systems. The alignment assured that the electrical, optical, and mechanical axes of the radar systems were in coincidence. This is done by adjustment of the optical and electrical axes to the mechanical axis. The mast was usually about 60 feet tall and was located approximately 600 feet from the missile-tracking radar and the target-tracking radar and provided a common reference point for adjusting the radars at adjacent sites. Spatially, the mast assembly and the two tracking radars formed a tall triangle. Lonnquest, 1996 at 172-173; Whitacre, 1996 at 59; PAM 750-1-2 at 14.

Radar Test Set TS-847A/MSW-1. The Radar Test Set together with the Antenna and Mast Group OA-1600/T (f1 above) was used during alignment and testing of the target and missile tracking radar systems. For test purposes, the test set is mounted on a frame near the bottom of the
antenna and mast group and it serves as a target substitute during the testing and alignment procedures. PAM 750-1-2 at 14.

High-Power Acquisition Radar (HIPAR). HIPAR increased the detection range, altitude coverage and improved the system's capability to detect small, high-speed targets at long range. The HIPAR was often located on a support and tripod structure, often as high as 50 feet. A radome covered the radar and various antennas. There were usually three types of antennas: the main, omni, and auxiliary antennas. The HIPAR building housed the transmitter and receiver systems and non-tactical operational controls. During conversion selected sites received the Improved Hercules package of new radars. However, HIPAR radars were not installed at some sites due to geographical constraints and/or to avoid duplication of radars located at adjacent sites. ABAR radar was used in place of HIPAR on certain locations. See Figure 3-5. Lonnquest, 1996 at 182; Whitacre, 1996 at 58-59; FM 44-82 at 10-11.

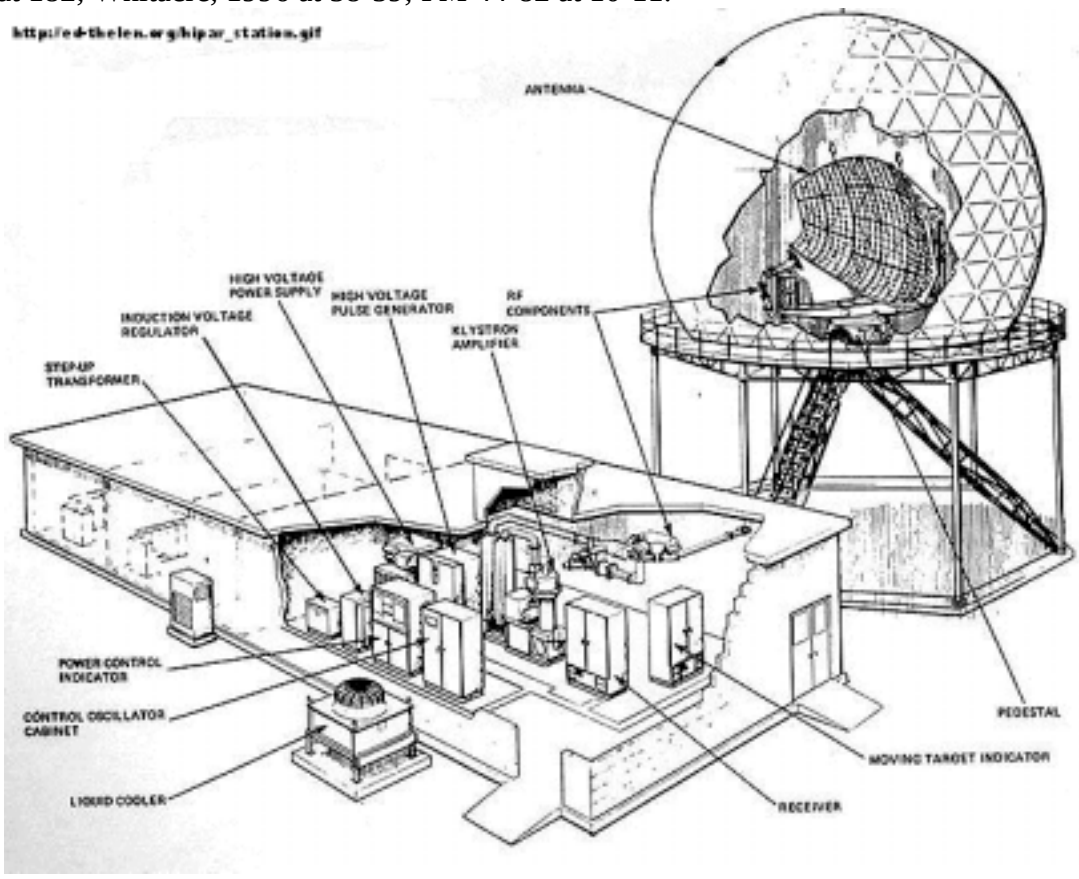


Figure 3-5: HIPAR and Support Building

Fire unit integration facility (FUIF). The FUIF equipment received and decoded data sent by the fire distribution system (FDS) to the fire unit and coded and transmitted data sent by the fire unit to the FDS equipment at an AADCP. The FUIF equipment is housed in a room adjacent to the electronic shop or in the HIPAR building. FM 44-82 at 14.

Alternate Battery Acquisition Radar (ABAR). In lieu of the HIPAR, Some Improved Hercules systems we equipped with ABAR (radar set AN/FPS-69, AN/FPS-71, or AN/FPS-75) to improve target detection range and electronic counter-counter measures. The ABAR equipment less the antenna assembly was sheltered in a building. The antenna assembly was mounted on a concrete tower. See Figure 3-6. FM 44-82 at 11.

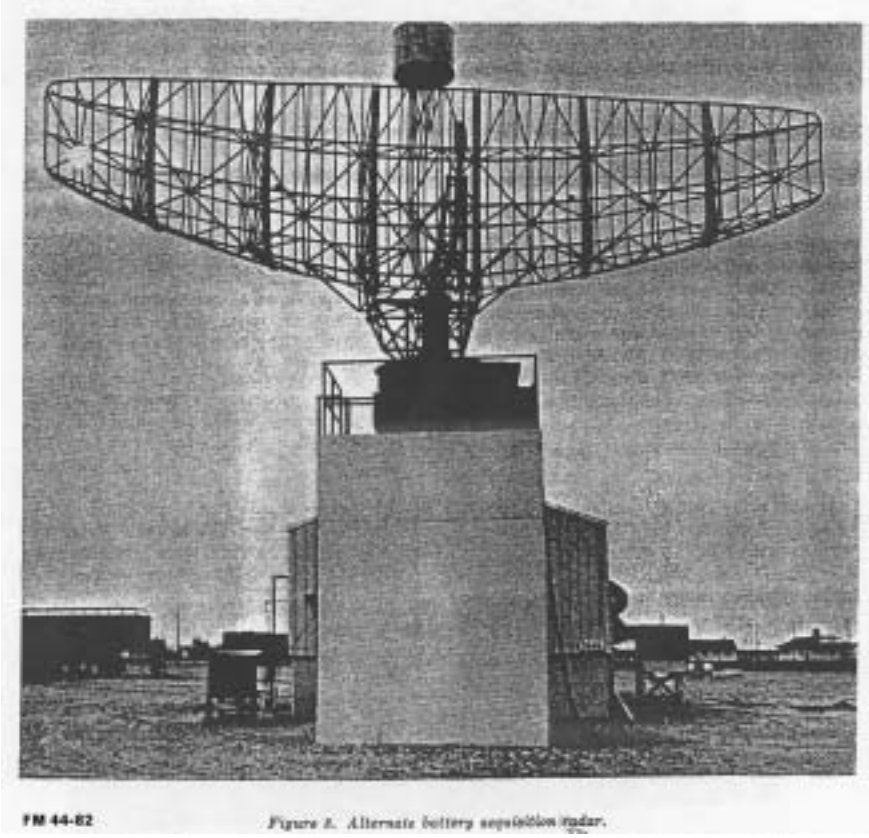


Figure 3-6: ABAR

3.3. Operations

For the purpose of this report, the operations within the battery control area include the inspection and maintenance of radars and guidance equipment. Operational and visual inspections were conducted to assure that application of proper preventive maintenance was being continually performed. The immediate operational status of the Nike antiaircraft guided missile system was dependent upon continuous application of preventive maintenance. Preventive maintenance indicators (PM Indicators) described below were selected key inspection

points that indicated the status of the Nike missile system. The indicators contained were applicable to the inspection of both electronic and mechanical components of the Nike system. These indicators were not sufficient to determine the complete operational status of the system, therefore, detailed inspection by qualified technical personnel were also required[1]. PAM 750-1-2 at 3.

The indicators were divided into two categories, i.e., visual PM Indicators and operational PM Indicators. Visual PM Indicators were checks on the overall physical appearance and outward condition of the equipment found in the battery control area. Operational PM Indicators were checks of an electronic and/or mechanical nature to determine the functional status of individual components or the entire system. The inspection of the Radar Course-Directing Central contained within the Battery Control was performed by two methods, i.e., visual and operational PM Indicators. PAM 750-1-2 at 6-7.

Operational PM Indicators listed included both the battery control and launch area:

- Checks of equipment in operational status with power available,
- Checks for indications of overheating, erratic actions, incorrect response, unusual noises, and pressure surges,
- Checks for correct air and hydraulic pressures; air, oil, and propellant leaks; and correct action of interlocks.

PAM 750-1-2 at 6-7.

Visual PM Indicators included:

- Checks for cleanliness, corrosion, deterioration, unauthorized attachments, freedom from cuts, scratches, warps, pits, burs, dents, ruptures, and holes.
- Check for proper fit and tight closure, missing or damaged gaskets, freedom of movement, lubrication, and absence of moisture, and foreign material.

PAM 750-1-2 at 6-7.

During annual service practice (ASP), the battery radar units were disassembled at the battery location for major maintenance and service checking.
*From LRL Nike History

Technical Bulletin 9-337, Guided Missile Systems Corrosion Control and Treatment, date March 1961 was for organizational and field maintenance personnel based on the facilities and capabilities of these echelons. The bulletin provides general information regarding corrosion control as related to preventive and corrective maintenance operations and was applicable to all components of the missile system. included illustration of missile handling equipment, test sets, launch equipment, missile components, and LOPAR and tracking radars. identifies periodic inspection for corrosion control. Periodic cleaning to remove corrosive agents was conducted using mineral spirits and dry cleaning solvent to clean grease or oil from painted surfaces.

1 No technical manuals have been found for detailed organizational maintenance of this equipment.

Direct contact between these petroleum products and rubber was to be avoided. When unavoidable, the contacted rubber part was washed with soap and water. **Gasoline, benzene, or carbon tetrachloride was not to be used**. TB 9-337 at 4-5.

Preparation to remove corrosion from painted surfaces required paint stripping with organic solvent type paint remover, MIL-R-25134. Methods of corrosion removal included mechanical and chemical. Chemicals used a solution of **butyl alcohol, isopropyl alcohol**, water and **phosphoric acid**. Magnesium parts were not to be cleaned with chemicals but through mechanical means or use of dilute **chromic acid**. Corrosion on brass and copper parts were also mechanically removed and loose particles removed by a cloth moistened with **trichlorethane**. TB 9-337 at 5.

During follow-up painting operations, primer was to be applied before the finish coat. **Toluene** was used to wipe off over-spray of primer. Treatment for specific metals were given as follows:

A. Treatment for aluminum with similar metals.
1. Apply corrosion resistant primer (item 20).[2]
2. Apply resin-acid metal-pretreatment coating compound (item 17)1.
3. Apply one coat of primer. Use vinyl-zinc chromate primer coating (item 45) when top coat is enamel. Use zinc yellow primer (item 46) when top coat is lacquer.
4. Apply two coats of the appropriate lacquer or enamel (table III).

B. Treatment for aluminum with dissimilar metals.
1. Apply corrosion resistant primer (item 20).
2. Apply resin-acid metal-pretreatment coating compound (item 17).
3. Apply two coats of primer. When top coat is enamel, use vinyl-zinc chromate primer coating, (item 45). When top coat is lacquer, use zinc yellow primer (item 46).
4. Apply two coats of the appropriate lacquer or enamel (table III).

C. Treatment for magnesium.
1. Apply chrome-pickle solution (par. 14).
2. Apply resin-acid metal-pretreatment com- pound (item 17).
3. Apply two coats of primer (four coats on castings). When top coat is enamel, use vinyl-zinc chromate primer coating (item 45). When top coat is lacquer, use zinc-yellow primer (item 46).
4. Apply two coats of the appropriate lacquer or enamel (table III).

D. Treatment for cadmium.
1. Apply resin-acid metal-pretreatment compound (item 17).
2. Apply two coats of primer. When top coat is enamel, use vinyl-zinc chromate primer (item 45). When top coat is lacquer, use primer coating (item 44).

[2] Item reference number refers to TM 9-337 list of materials in Appendix D.

3. Apply two coats of the appropriate lacquer or enamel (table III).

E. Treatment for aluminum-clad steel.
1. Spray on aluminum lacquer (item 33).

F. Treatment for noncorrosion-resistant steel.
1. Apply resin-acid metal-pretreatment com- pound. (item 17).
2. Apply three coats of primer. When top coat is enamel, use vinyl-zinc chromate primer atem 45). When top coat is lacquer, use primer coating (item 44).
3. Apply two coats of the appropriate lacquer or enamel (table III).

G. Treatment for corrosion-resistant steel.
1. Apply Pasajel (item 42).
2. Apply resin-acid metal-pretreatment com- pound (item 17).
3. Apply one coat of primer. When top coat is enamel, use vinyl-zinc chromate primer (item 45). When top coat is lacquer, use primer coating (item 44).
4. Apply two coats of the appropriate lacquer or enamel (table III).

H. Treatment for miscellaneous metals.
1. Use procedure as given in treatment F above.
TB 9-337 at 8.

Specific mention was made for maintaining acquisition and tracking radars.

- Air filters were cleaned and recharged regularly. This included cleaning in a bath of several inches of **trichlorethane (1,1,1-TCA).** These filters were recharged with OE10 or OE30 oil.
- Equipment slides coated with light coats of grease or corrosion preventive compound were frequently inspected for dirt and sand and cleaned as needed with 1,1,1-TCA.
- Corrosion products on cables and plugs were removed with 1,1,1-TCA applied by small brush and crocus cloth.
- Dirt and corrosion in transformer terminals, high voltage cables and surrounding areas of the radars high voltage power supply were 1,1,1-TCA. TB 9-337 at 11.

The list of paints and related materials and their uses are included in Appendix D. TB 9-337 at 9-10.

TM 9-1430-254-12/3 includes a radiation hazard warning for radioactive tubes contained in the HIPAR radar set (AN/MPQ-43). These radioactive materials were shipped, stored, handled and disposed of in accordance with TM 38-250, AR 755-380, and AR 55-55. The TM discusses the cleaning of surfaces if the tubes were broken. The surfaces were to be cleaned by a wet method described as one pass wiping. A wet cloth was used for a single pass wipe, folded and a clean side used for the next single pass. Back and forth motion was not to be used as it may rub the radioactive material into the surface. The broken tube and all cleaning materials were to be sealed in a container for disposal. TM 9-1430-254-12/3.

(Reserved for additional information upon receipt of radar TMs.)

4. Launch Area Operations

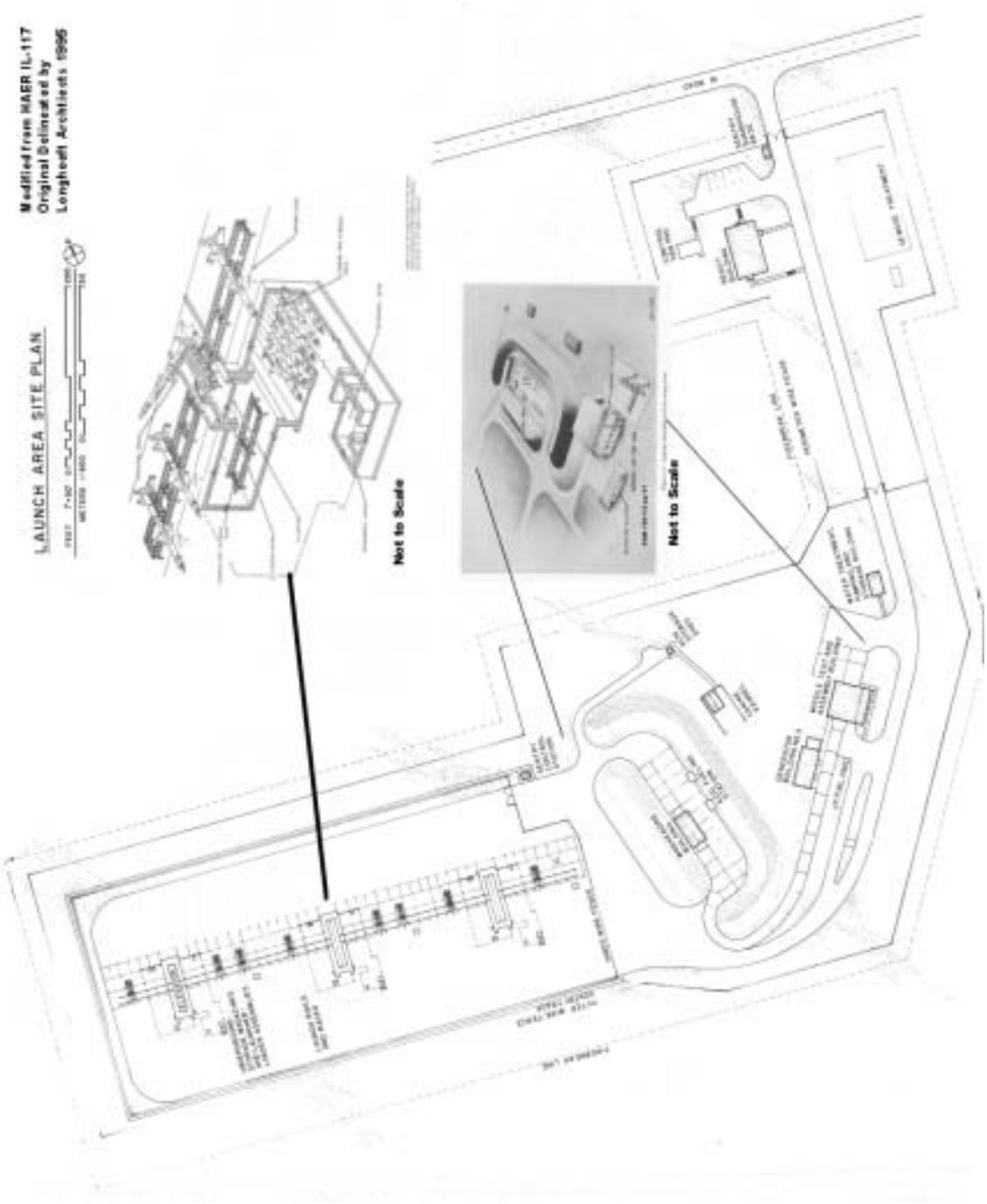


Figure 4-1: Typical Nike Hercules Missile Launch Area

The missiles and warheads were assembled, serviced, maintained, and prepared for firing at the launch area (LA) of a Nike missile battery. All operations necessary to ready the missiles were conducted at specific locations within the launch area. Certain operations utilized solvents, corrosion preventives, and other chemicals that should be considered in environmental investigations. These operations included preventive and organizational maintenance. Missile servicing and handling equipment used at these sites also received organizational maintenance at the launch area.

Figure 4-1 is a representative example of a launch area.

This section describes the areas of a typical permanent site, primarily the assembly and service area and launch area. Each area has associated buildings and equipment. Buildings and equipment features or requirements that may be of interest for environmental purposes are discussed in detail.

4.1. General Buildings

The launch area included a ready building, sentry guardhouse, canine kennels, and an oil storage shed. The ready building for the crewmen included a squad room, a dining and day room, toilet, and heater room. A fuel oil storage tank was typically located outside the heater room.

4.2. Assembly and Service Area

The assembly and service area is divided into two basic sections, the assembly area and the service area, located near the launching area. Its location was limited by the terrain considerations. The separation between buildings was governed by Ordnance quantity-distance tables.

4.2.1. Assembly Area.

The assembly area is used for receiving, assembling, and testing the missiles. The assembly area contains a receiving and storage area, an assembly building, and a generator building. Specific information on the initial assembly and test operations performed in the assembly area for the missiles is described later.

4.2.2. Assembly and Test Building

Initial missile assembly and test operations were conducted in the assembly and test building. Adjacent hardstand received, uncrated, and stored missile components. Missiles arrived in major assembly components unassembled and unarmed. The assembly consisted of the installation of the missile fins, ailerons or elevons, and missile body sections and system tests. Two large overhead doors at either end allowed the missiles to be rolled in and out of the main test and assembly room. Other rooms included a stock room, first aid room, restroom, and boiler room. A concrete walkway was provided for moving the missile from this building to the service area. ME 35-60-04 and 35-60-29. See Figures 4-2a and 4-2c for configuration assembly and test buildings.

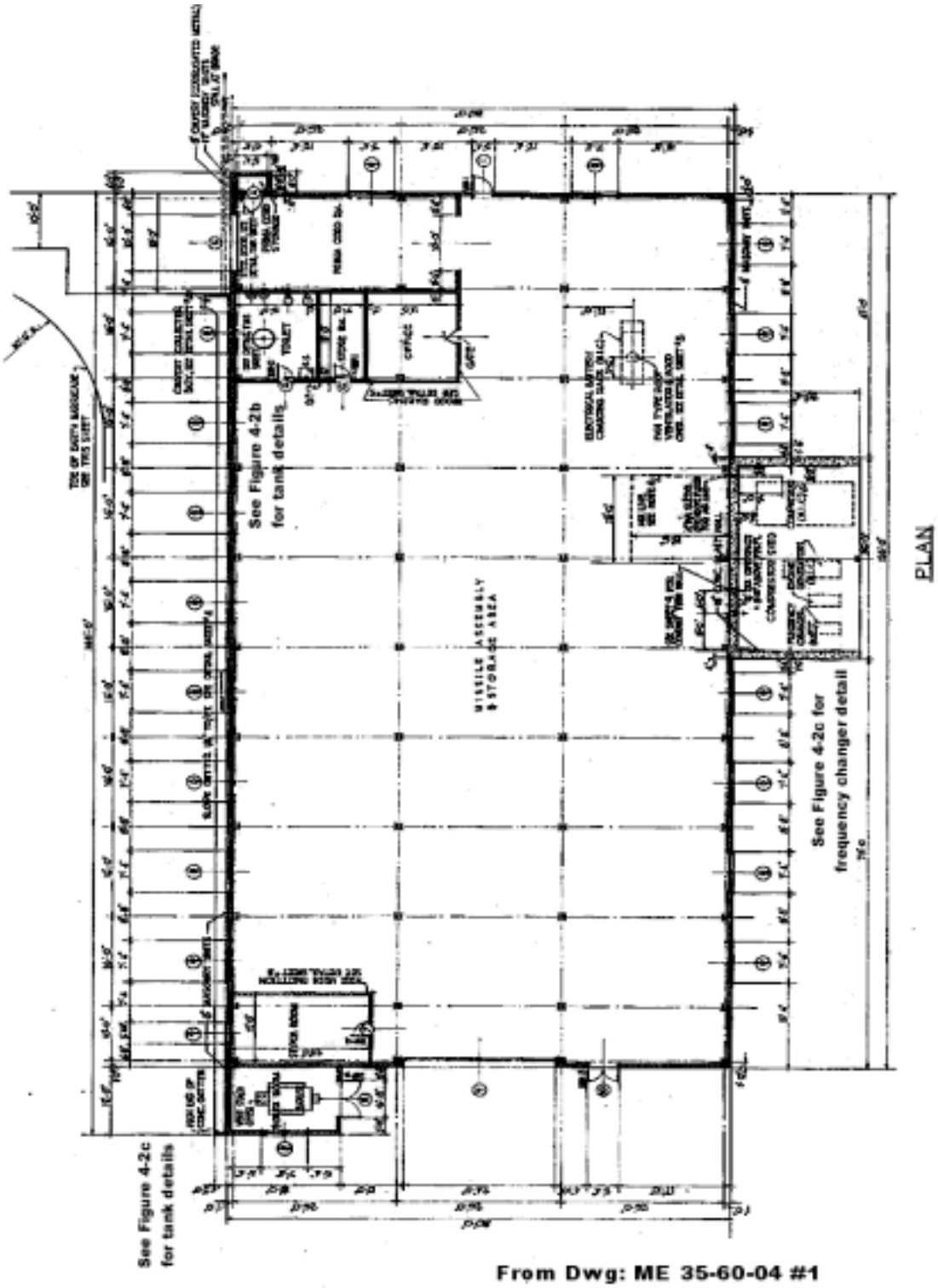


Figure 4-2a: Nike Ajax Assembly and Test Building.

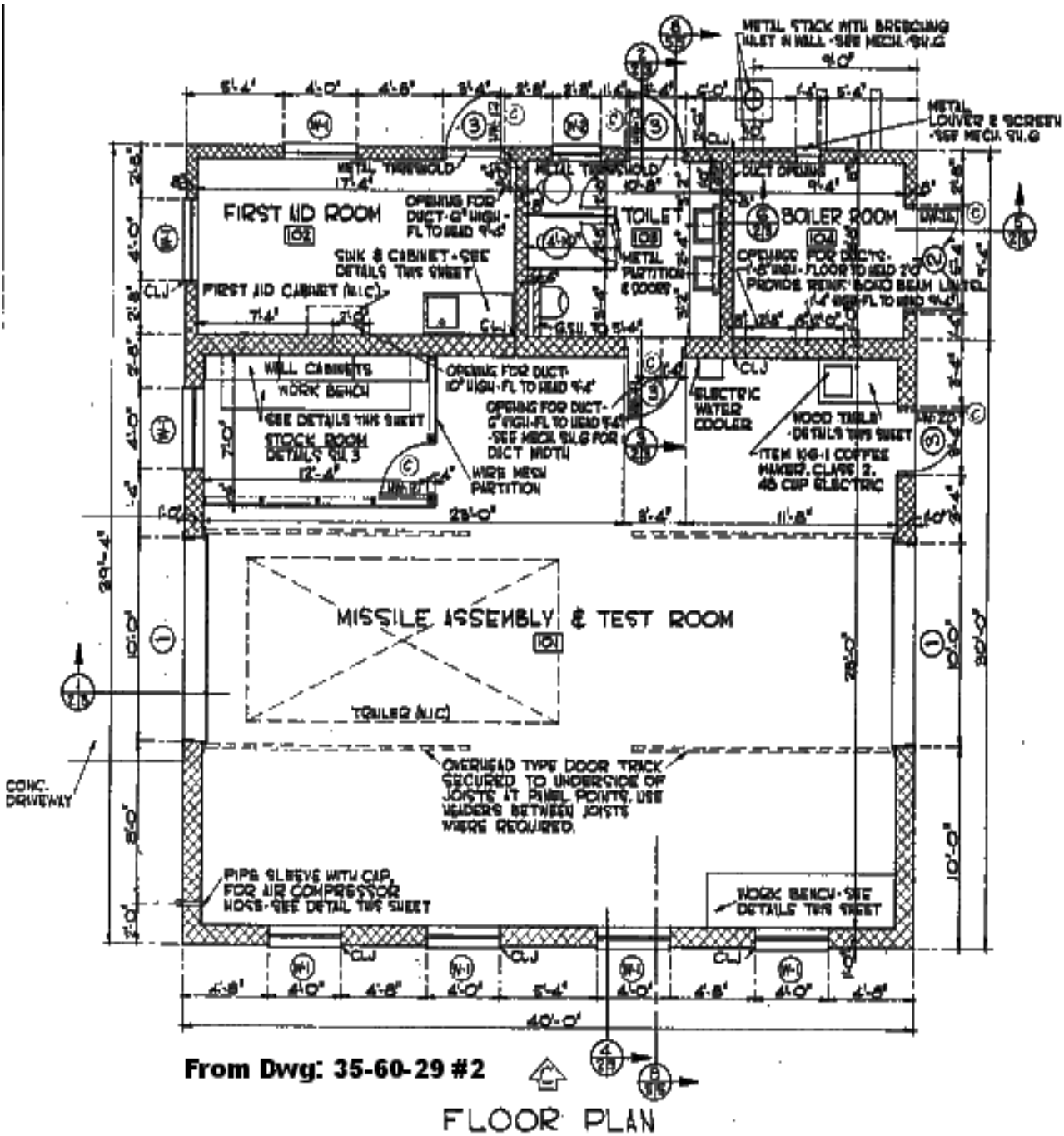
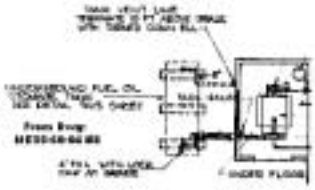
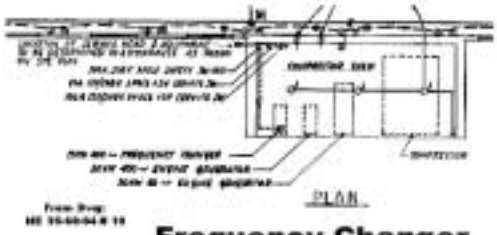


Figure 4-2b: Nike Hercules Assembly and Test Building (Electrical and Heating Plan)
See Fig 4-2c for fuel tank details.

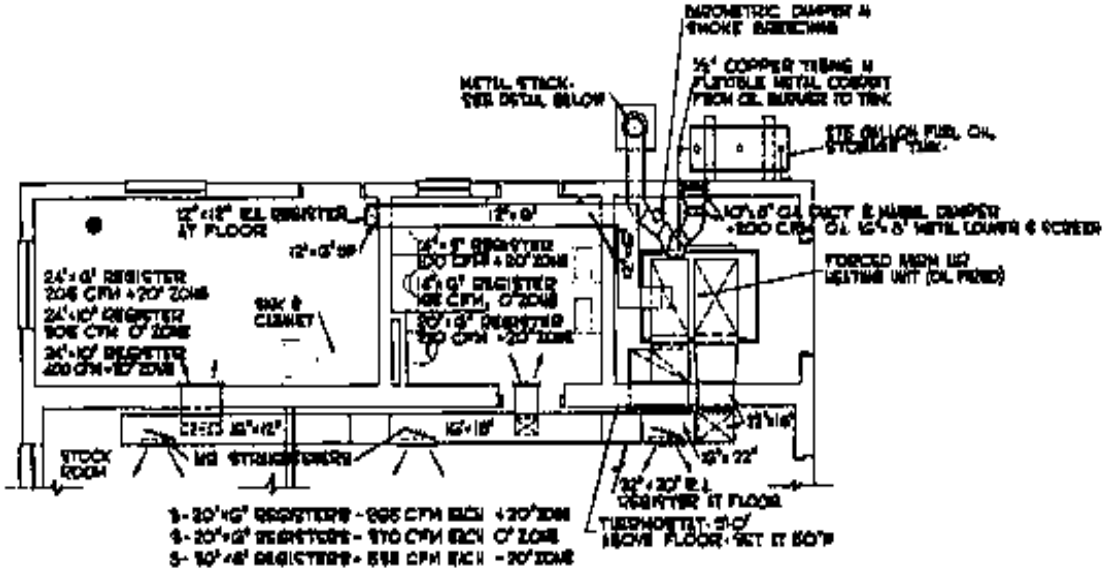


Tank Details



Frequency Changer Identification

Figure 4-2c: Nike Ajax Assembly and Test Building Details



HEATING - PART PLAN

From Dwg: 35-60-29 #6

Figure 4-2c: Nike Hercules Assembly and Test Building Fuel Tank Detail

4.2.3. Generator Building

The generator building housed the generators that provided stand-by electrical power for the assembly and service area in the event that the commercial electrical power should fail. The power for the launching platoon equipment was supplied by a commercial source or by 150-kw, 60-Hz generators. Motor generators (converters) were used to change 60-hertz (Hz) power to 400-Hz required by the launching equipment. The generator building at the launch area housed the 60-Hz or 400-Hz diesel-driven generators. Commercial power was used for maintenance and non-tactical training; power from electric generator sets was used for engagement, tactical training, and whenever commercial power was not available. Electrical power required for operation of the launching area is standard Army frequency converters at permanent (subsurface) installations. PAM 750-1-2 at 28; FM 44-82 at 21; TM 9-1450-250-12 at 6; AR 750-530 at 5.

The generator building provided electrical power to the assembly and test building, service area, and storage magazines. A 1,000-gallon underground fuel storage tank feeds into a 275-gallon day tank located inside the generator building. Fuel was supplied to the generators via ¾ inch supply lines with a flexible connection to the engine fuel pump. The fuel oil lines, fuel return lines and electrical conduits were located in a common floor trench. The trench was sloped to provide drainage. Transformers were mounted outside the generator building for utilization of commercial power. See Figure 4-3: Typical Generator Building Launch Area. ME 26-03-40 Sheets 1-4.

TM 9-5016-2 recommends inspection and preventive maintenance of transformers for secure installation, cracks, charring, discoloration, and leakage of oil or potting compound. TM 9-5016-2 at 142.

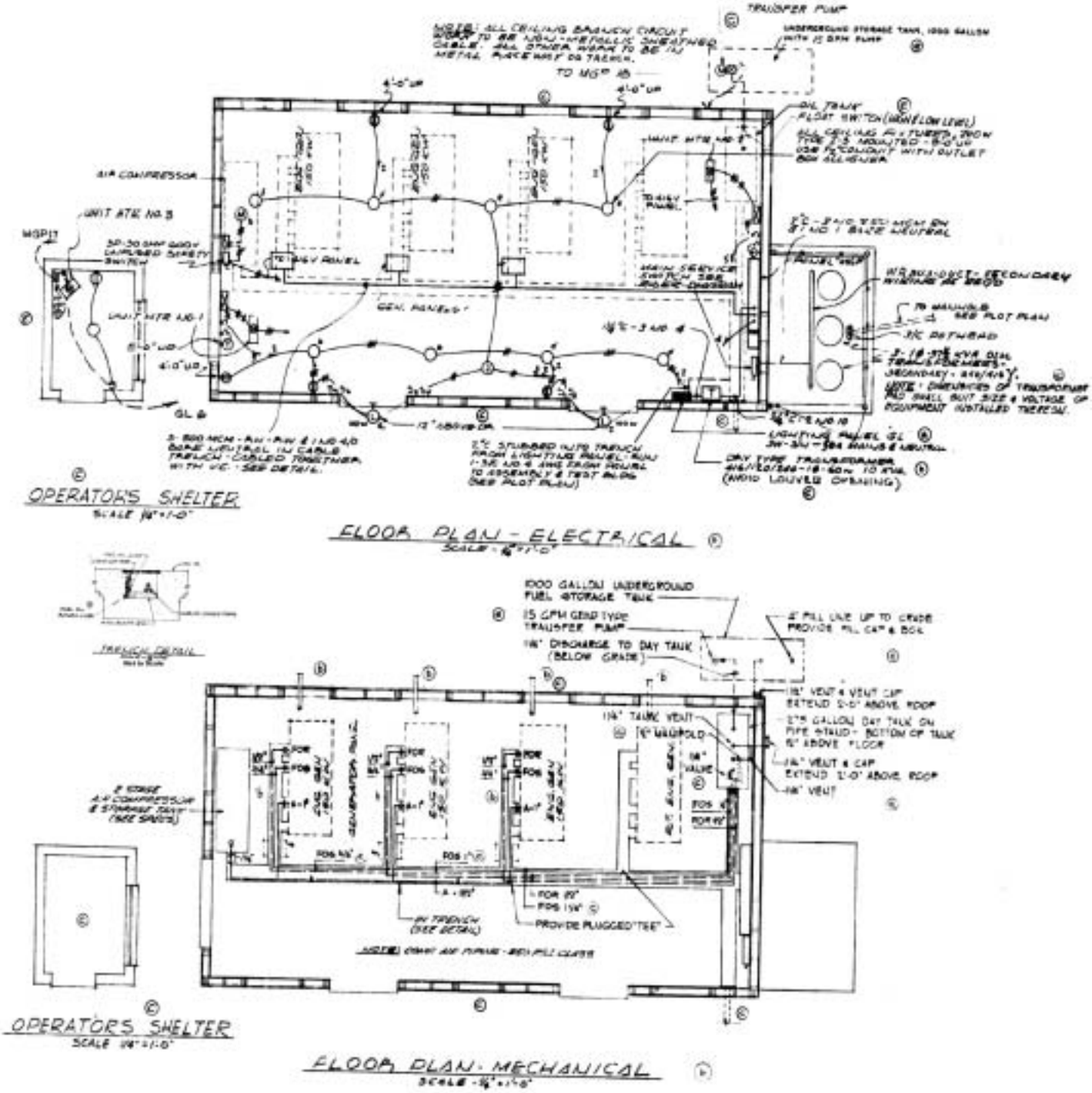


Figure 4-3: Launch Area Generator Building (ME 26-03-40)

4.3. Service Area.

The service area was used to install the rocket motor subassembly, to install the warhead body section, and to assemble the rocket motor cluster. Specific information for assembly and test operations of the missiles performed in the service area is described later in this section. The service area contained the Nike Ajax fueling station, the joining or warheading building where the Nike Ajax booster or Nike Hercules rocket motor cluster was joined to the missile body and the warheads installed, and/or the Nike Hercules rocket motor cluster assembly area. The service area was located between earth revetments approximately eight to ten fee high, at a safe distance from the assembly building, as prescribed in the Ordnance quantity-distance tables. TM 9-1450-250-12 at 6.

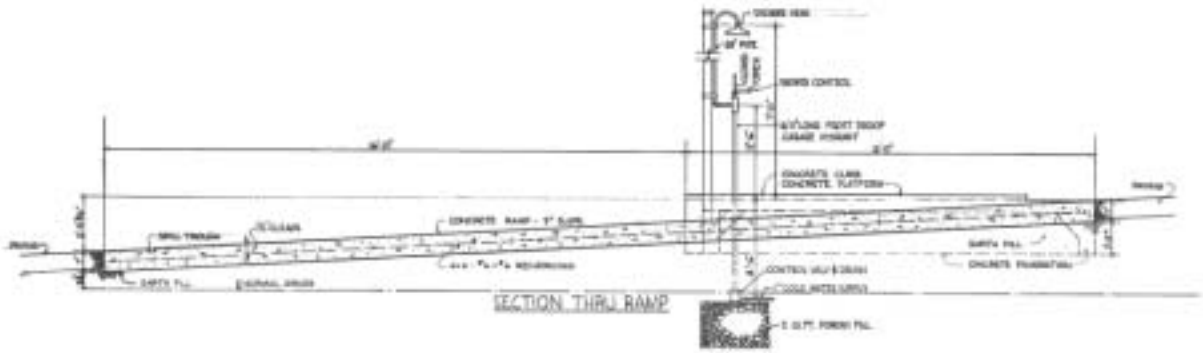
4.3.1. Nike Ajax

4.3.1.1. Acid and Propellant Fueling Station:

Fueling of the Nike Ajax was performed at two fueling station arranged in series. The missile was tilted by a 3° to 5° ramp/bump built into the acid fueling station. The M2 acid platform hoist assembly automatically inverted the barrel as it was raised to provide a 60-inch head between the acid drum and acid port on the missile body. As protection against the caustic acid, crewmen wore disposable protective clothing and breathing apparatus during the fueling process. An emergency shower was provided at the acid platform.[1] See Figures 4-4a and 4-4b. Propellant fueling followed the acid fueling. The M3 fuel hoist was a crank-operated lift approximately 12 feet high. The fuel was hoisted onto this platform, allowing the fuel to flow into the missile by gravity. The propellant fueling ramp and platform were similar but no shower was provided or acid neutralization pit was provided at the propellant station. Both ramps were constructed with a built-in spill trough. TM 9-1450-250-12 at 6; TM 9-5012-1 at 197-199, 202, 208; MS-70 Drwg.

[1] References to an "acid neutralization pit" near the acid fueling station on drawings for Nike Ajax sites, however, no drawings or references to this pit have been located.

Figure 4-4a: Nike Ajax Acid Fueling



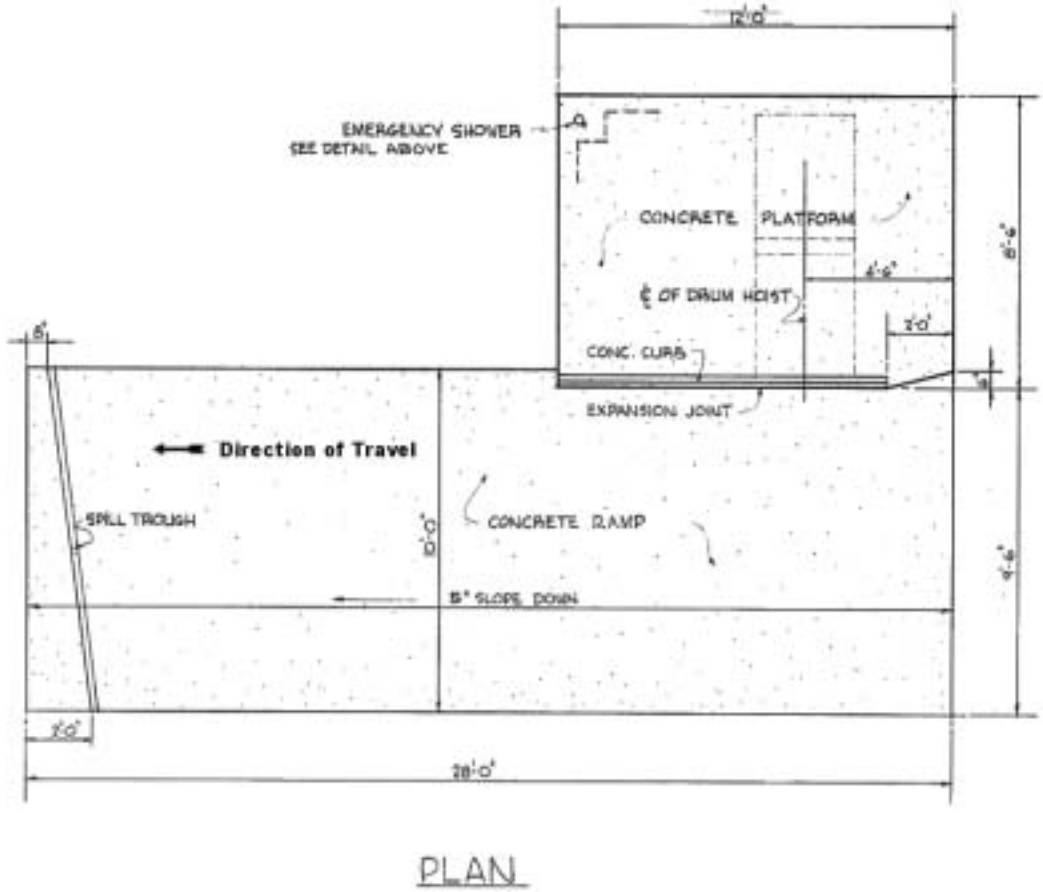


Figure 4-4b: Typical Acid Fueling Ramp and Platform.
(Note: Propellant Ramp and Platform was similar).

4.3.1.2. Acid Storage Shed.

The acid fuel was stored in a shed located at the end of the curved walkway outside the bermed fueling station. Shower facilities were provided near the acid storage shed in the event of

accidental contact with dangerous chemicals and fuels. Whitacre, 1996 at 64; MS-70 drawing.

4.3.2. Warheading Building

Except for the safety and arming devices and rocket motor igniter installed in the launching area, the missiles explosive components were installed in the warheading building. The warheading followed the propellant filling for Nike Ajax missiles. The warheading building may also have been referenced as a joining building at some Nike Ajax sites. The drawings for these two buildings are similar in functional space. The heating drawings show an aboveground fuel oil tank a buildings TM 9-5012-1 at 219; Whitacre, 1996 at 65-66.

The service area was used for unpackaging and assembling the rocket motor, unpackaging, assembling, and installing the warhead and missile rocket motor in the missile, and performing the continuity tests of the rocket-motor initiators, and safety and arming (S&A) devices prior to installation. FM 44-82 at 22.

The joining and/or warheading building provided a protective shelter during the uncrating and installation of the warhead body section and for the installation of the missile rocket motor subassembly. A separate heater room with an exterior above ground fuel oil tank is shown on the standard drawings. TM 9-1450-250-12 at 6; ME 33-38-10 Sheet 1 & 4; ME 35-60-05 Sheet 1.

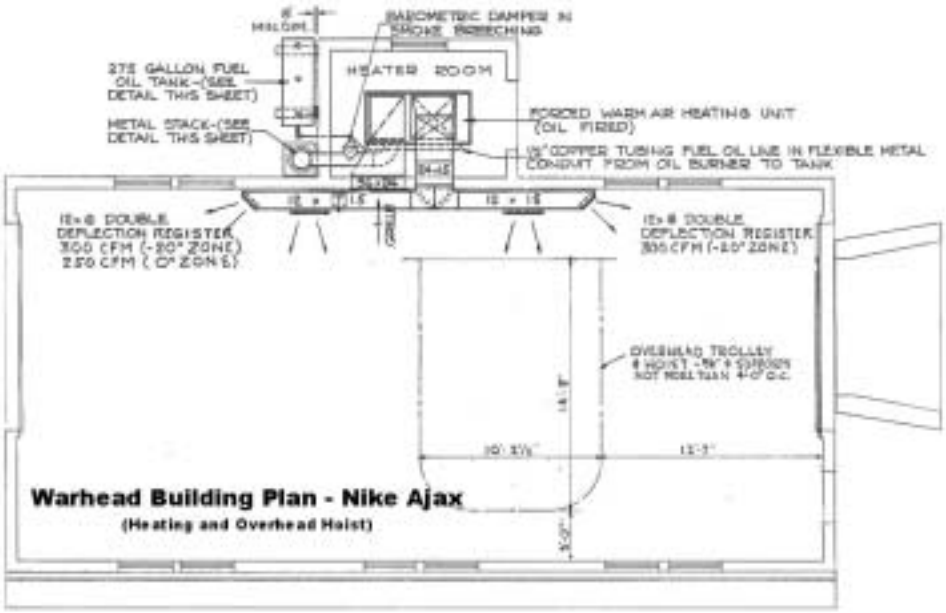


Figure 4-5: Warheading Building

4.3.3. Rocket Motor Cluster Assembly Area

The rocket motor cluster assembly area for the Nike Hercules was located in the service area and

used for uncrating and assembling the rocket motor cluster. TM 9-1450-250-12 at 6.

4.4. Launching Area

The launching area contained equipment necessary to relay command and data signals between the radar course-directing central, missiles, missile launching equipment, a trailer mounted launching control station and three launching sections. Each launching section contained four monorail launchers arranged in various patterns depending upon location and terrain. A brief summary of basic items of equipment is presented below. PAM 750-1-2 at 28.

4.4.1. Trailer-Mounted Launching Control Station (LCS):

Trailer Mounted Launching Control Station was the central control station of the launching area. See Control Van Pad on Figure 4-1. It contained the necessary controls, indicators, and communication equipment for control of the launching sections and it relays tactical launching area information received from the launching sections to the battery control area. The major components within this station are:

- The launching control console.
- The upper and lower manual switch- board SB-22/PT
- The main switchbox
- Five utility storage cabinets
- The personnel heater
- The operational status display board, and
- The flight simulator group

PAM 750-1-2 at 28.

4.4.2. Monorail Launcher.

The monorail launcher, constructed of welded steel beams, consisted of the basic structure, erecting beam, loading and storage racks, four test stations, a launcher control indicator, and electrical and hydraulic power units. The monorail launcher is used in conjunction with the launching and handling rail as a firing platform for the missile and it serves as a test station for missile pre-firing tests and operations.

The erecting beam was raised or lowered by means of hydraulic pressure from the hydraulic power package. The beam was used to support the launching and handling rail and it contained one of the launcher's four test stations. Loading and storage rack sections extended from each side of the monorail launcher. The three sections on the left side of the launcher were used as storage and test stations for the missiles. The two sections on the right side of the launcher are used for storing the launching and handling rails after the missiles have been fired, and they are used to store rejected missiles until they are transported to the assembly and service area. PAM 750-1-2 at 30.

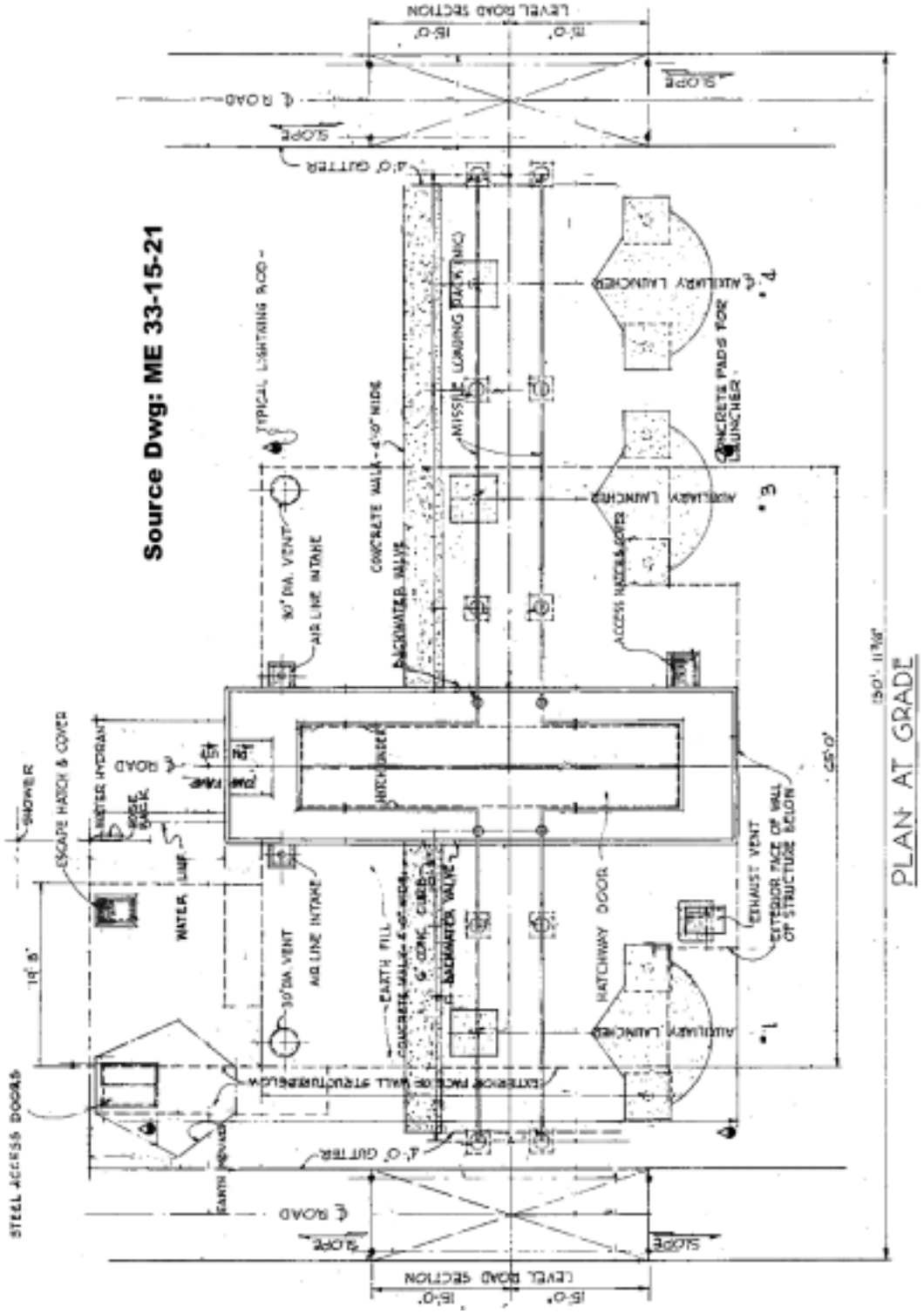


Figure 4-6: Typical Magazine Surface Configuration

4.4.3. Launching and Handling Rail.

The launching and handling rail supports the missile body and booster combination on the loading and storage racks. It transports the body and booster combination on the monorail launcher, holds them in firing position on the erecting beam, and provides a track for the missile body and booster combination on the lift-off.
PAM 750-1-2 at 30.

4.4.4. Underground Storage Magazines and Launcher-Loader Assemblies

The central feature of the launch area was the underground magazine and its associated launcher-loader assembly. Storage racks held the missiles in the underground area using a system of locking pins. The missiles were rolled to the elevator and on to the elevator launcher. The first temporary Nike Ajax sites featured above ground storage and launchers but use of space-saving underground magazines were the norm[2]. The Nike Ajax magazines housed twelve (12) missiles each while eight (8) Nike Hercules could be stored in magazines.[3] The missiles were lifted to the surface in a horizontal position by means of a hydraulic elevator and manually pushed along the launch rails to one of the launchers. The launcher elevated the missiles to an angle of 88 degrees for launching. This angle prevented the booster to from falling back on the launch area. During a launch, the crew took their positions in a small personnel room located behind three blast-proof doors. This room included a console from which the crew could fire the missiles in an emergency. Lonnquest, 1996 at 173; NPS1 at 5; Westec, 1987 at 51

Sub-Surface elements of the magazine included:

- Portable equipment dollies.
- Electrical cable assemblies.
- Hydraulic and air pressure lines.
- Entrance hatches.
- Loading-rack adapters and fin storage racks.
- Elevator assembly with hydraulic power unit.
- Dehumidifiers and exhaust system, and
- Deluge shower.

PAM 750-1-2 at 46.

During conversion from Nike Ajax to Nike Hercules, the sites underwent modifications so the

2 An underground magazine configuration was used to limit the land requirement to approximately 40 acres. Although there were exceptions, such as the outdoor and above ground Hercules configuration used at SAC bases, Hawaii and Alaska, the underground magazines were used in most cases. “New sites, located away from populated areas did not have to be confined in acreage. Consequently, these batteries were all above ground with missile storage and maintenance facilities located behind earthen berms.” Lonnquest, 1996 at 171-172, 181-182.

3 The number of Ajax that could be stored underground was dependent upon the number of missiles that had booster fins removed to allow a "tighter" storage. Typically some were that way but others (in each magazine, or pit) had to be ready. If booster fins were removed, a crew had to demonstrate proficiency in reattaching them during drills so that the battery's rate of fire was not compromised.

new missiles could be serviced and stored. The Ajax magazines and elevators were too small for the larger Hercules so new structures were designed. These became universal magazines capable of holding Ajax or Hercules. The larger size of the Nike Hercules reduced the capacity of the underground magazine's to eight missiles and storage racks, launcher rails, and elevators underwent modification to accept the larger missiles. Table 4-1 compares magazines. Lonnquest, 1996 at 178-179, 182; Cole at 249-250.

Table 4-1: Nike Site Magazines

Type Magazine	Designed for:	Launcher on Elevator	Pit Length	Pit Width
A	Ajax	Yes	42 feet	63 feet
B	Ajax/ Hercules	Yes	49 feet	60 feet
C (A converted to N-H)	Hercules	No	42 feet	63 feet
D	Hercules	Yes	62 feet	68 feet

Source: www.homestead.com/nenike1/files/niketech.htm

Each magazine had an associated launch pad with blast deflector, access areas, and ground electrical units. The magazine pad had a double elevator door, which swung down to open. Stairways led to the double-door main entrances to the magazines. Access to many Nike magazines was via armored hatches, vertical ladders and/or staircases in later additions. Emergency escape hatches, with counter-weights for easy opening, led from the underground personnel rooms to the outside. The magazines were made of reinforced concrete; fresh air was provided via a ventilation unit. Each unit also had several ventilator shafts. Whitacre, 1996 at 66.

The escape hatch covers and miscellaneous controls were operated by 100-150 psi Diesel engine air compressor. AR 750-530 at 6.

Each underground unit contained a room for storing the missiles (the magazine room), an elevator to carry the missiles to the surface for firing, and four launcher-loader assemblies. Three of the launchers were permanently emplaced above the ground. The fourth launcher was mounted on the elevator. The launchers were equipped with electrical and hydraulic equipment needed to conduct prefiring missile tests and to erect a round for firing. Signal circuits, control circuits, and two-way voice communications systems were provided. Nike crewmen could operate the elevator, which could be raised, lowered, or stopped, via a master control station in the magazine room, from the controls on the elevator, or from the launching section control panel in the personnel room. Hydraulic power operated the elevator, and an elevator assembly power unit supplied power to the doors in the magazine room. Whitacre, 1996 at 66; FM 44-82 at 17.

The Section Control Indicator Group consisted of an indicator with the necessary switches, indicator lights, meters, and communication equipment required for preparing the missile fire and launch order circuits for coordinating activities of the launchers with the launching control group. The Section Simulator Group received the 208-volt AC and 24-volt DC power from the launching section generator. It then supplied power to each launcher in the section, to the

launcher control-indicators, and to the launching section control-indicator. PAM 750-1-2 at 30. Pipe drains that could daylight to meet ditch grade or empty to a French drain system drained the magazine sump and access doors.

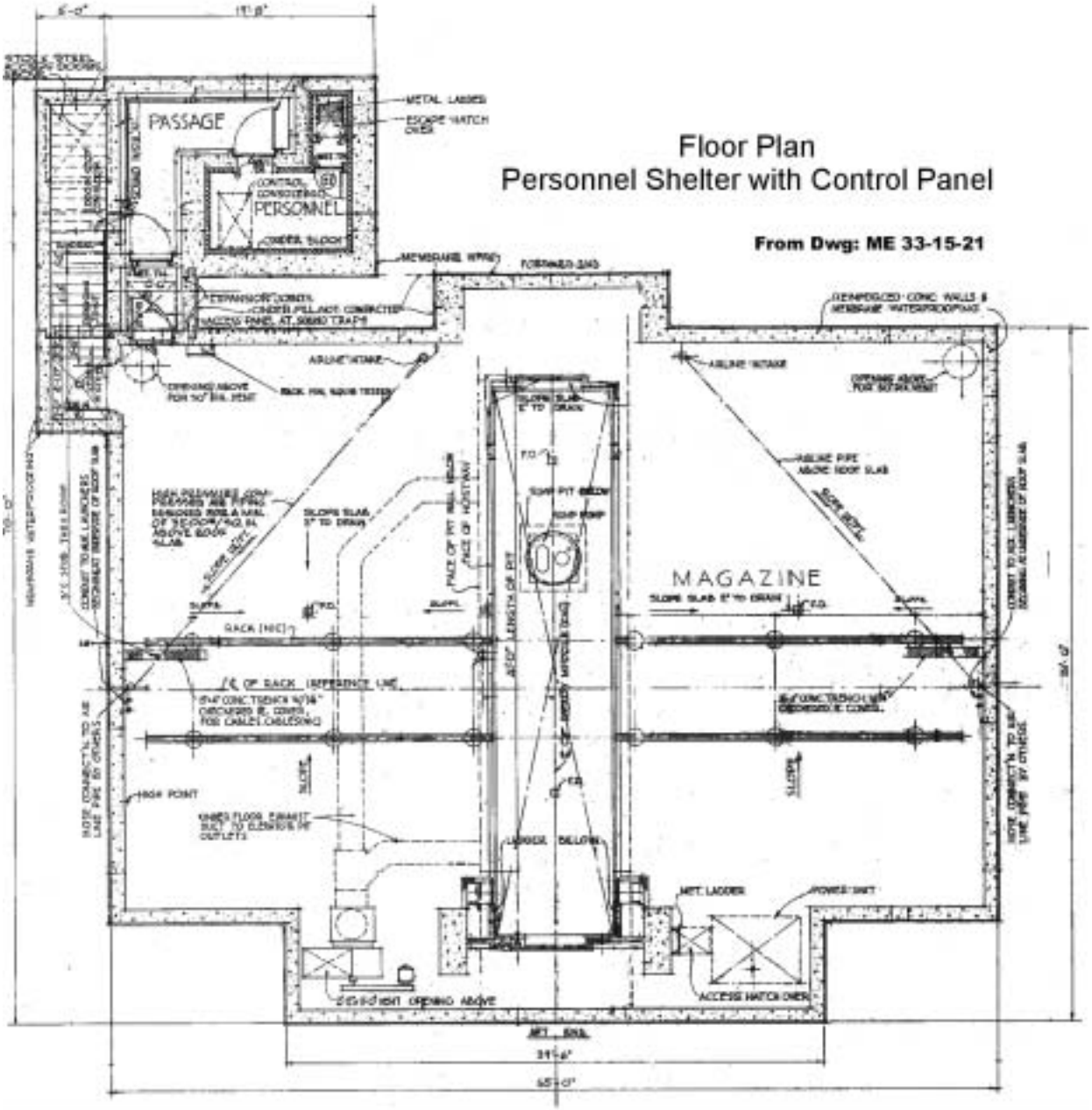


Figure 4-7: Typical Magazine Underground Configuration

4.5. Maintenance Operations

4.5.1. Service and Handling Equipment

When the service and handling equipment was received at the battery site, organizational maintenance personnel inspected all assemblies, subassemblies, repair parts, and tools to determine that the equipment was properly assembled, cleaned, correctly adjusted, and lubricated. The apparent physical and operating condition of the equipment was determined by a visual inspection and review the logbook. A complete physical inspection was performed. Lubrication or maintenance to be performed before assembling and adjusting the parts was accomplished. Once emplaced the equipment was electrically and mechanically checked and aligned, as applicable. Disassembly and assembly instructions enabled the using personnel to clean, inspect, lubricate and replace allocated repair parts when required.
TM 9-1450-250-12 at 13.

Specific abrasive, cleaning, preserving, and related materials for painting were provided in technical manuals. The precautions below were to be observed:

- Before painting in the vicinity of grease fittings, cover the fittings with masking tape.
- Identifying characters or numbers obscured during painting must be re-placed as soon as possible.
- All cleaning, painting, and stenciling procedures were performed in a well-ventilated room or outdoors with a CO2 fire extinguisher nearby.
- Corroded or chipped surfaces were cleaned with a carbon scraper and smoothed with a 1/0-80 grade abrasive cloth.
- Oil and grease were removed by wiping with a clean wiping rag moistened with volatile **mineral spirits paint thinner or dry-cleaning solvent**[4]. The surface was washed with clean water and allowed to dry.
- Paint was issued ready mixed to proper consistency and thinning was not necessary.

TM 9-1450-250-12 at 41.

Each Hercules missile had an internal auxiliary power system (APS) or a hydraulic power unit (HPU). Clean oil for these units was provided by a portable hydraulic oil fill and filter unit and was used for filling and bleeding the system. The hydraulic oil was purged from the unit when changing from one type of oil to another type or prior to performing maintenance procedures on any hydraulic component. The portable unit operated using quick-disconnect fittings. The portable oil fill and filter unit power cable assembly was connected to a 208-volt, 400 cps, 3-phase power source, and operated until the oil flow stopped.
TM 9-1450-250-12 at 12 & 66 .

4.5.2. Preventive and Organizational Maintenance

Preventive and organizational maintenance was a function of the using organization performed by the operator or the organizational maintenance crews. Inspection and preventive maintenance

4 The dry cleaning solvent specified was P-D-680 Type 1, a petroleum distillate.

was performed at specific intervals. Inspection and preventive maintenance of equipment included lubrication, painting, cleaning, missing or damaged parts, signs of leakage and organizational maintenance of the equipment systems. TM 9-5016-2 at 137.

General information for lubrication calls for the use of clean lubricants and hydraulic fluids for proper functioning of the materiel. Lubrication orders prescribed the appropriate cleaning and lubrication.

Launcher-loader lubrication:

- Cleaning of lubricant fittings was accomplished with **mineral spirits**.
- Daily inspection of the launcher-loader hydraulic reservoirs was specified to ensure operational readiness. These reservoirs used **hydraulic fluid MIL-H-5606**. Two types were available depending upon the outside temperature.
- The hydraulic fluid level in the launcher shock strut was checked monthly. The strut also used MIL-H-5606 hydraulic fluid.
- The hydraulic fluid was to be drained every three months or more frequently under dusty conditions or when ever contamination was suspected. The draining of the reservoirs drained into containers.
- Painting of exterior surfaces included removal of oils and greases by wiping with cloths moistened with **trichloroethylene**.

TM 9-5016-2 at 110-111, 114, 117, 132.

Due to concern for malfunctions of launching equipment caused, periodic cleaning of all components were recommended. **Trichloroethylene** was recommended for removal of grease and oil from system components. As with the radar filters discussed in Section 3, the filters for the launching control group, power simulator group, flight simulator and launcher interconnecting box were cleaned in a 2-inch deep bath of **trichloroethylene** and recharged with OE-10 or OE-30 engine oil. These filters were a matter of a few inches to about 12-inches square in dimension. TM 9-5016-2 at 133-135.

Other authorized cleaning materials were listed in ORD 7 Standard Nomenclature Lists (SNL) not located as of this writing. TM 9-5016-2 at 133.

4.6. Nike Missiles

Figures 4-8 and 4-9 illustrate the explosive and fuel components of the Nike Ajax and Nike Hercules.

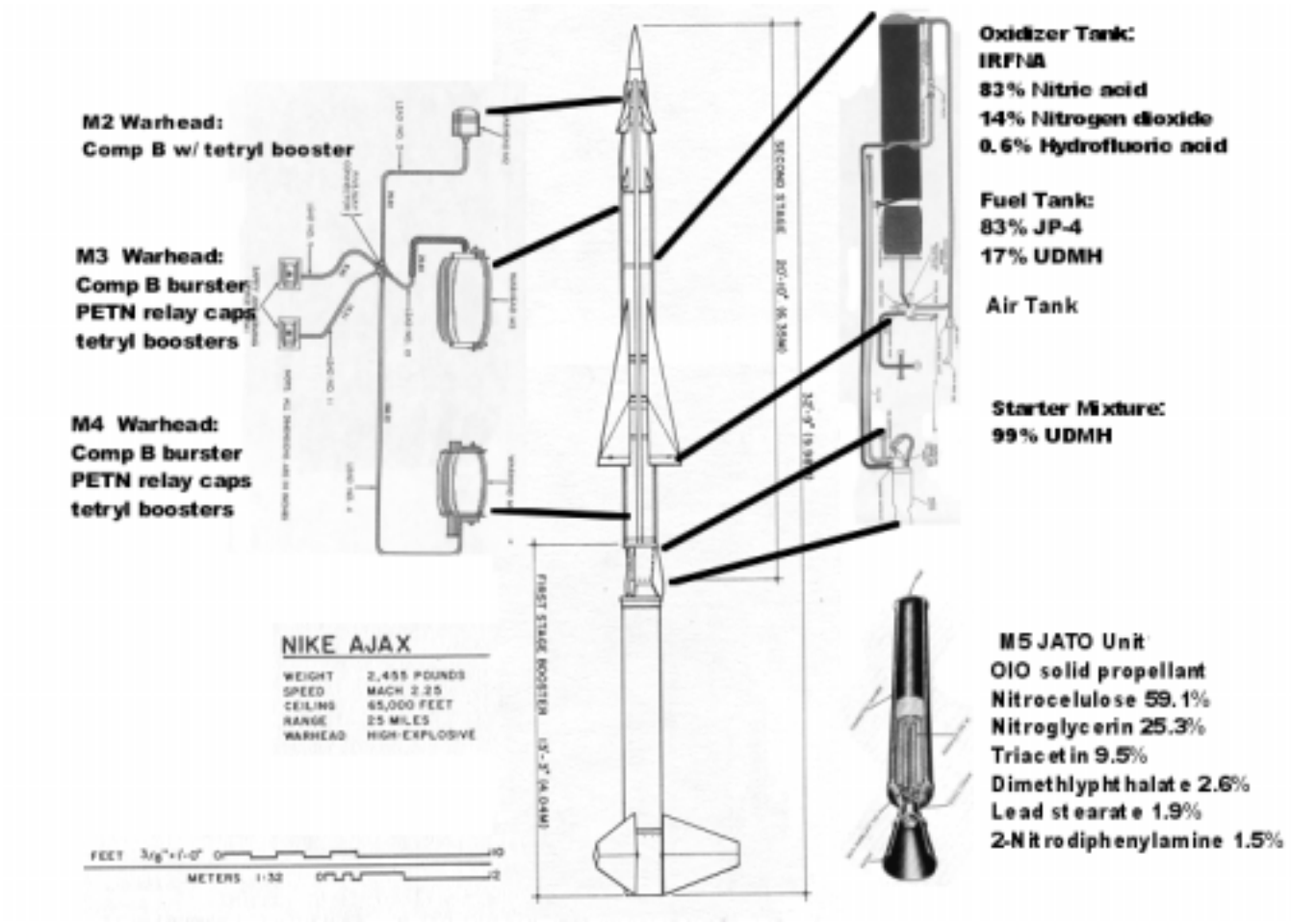


Figure 4-8: Nike Ajax Missile and Booster

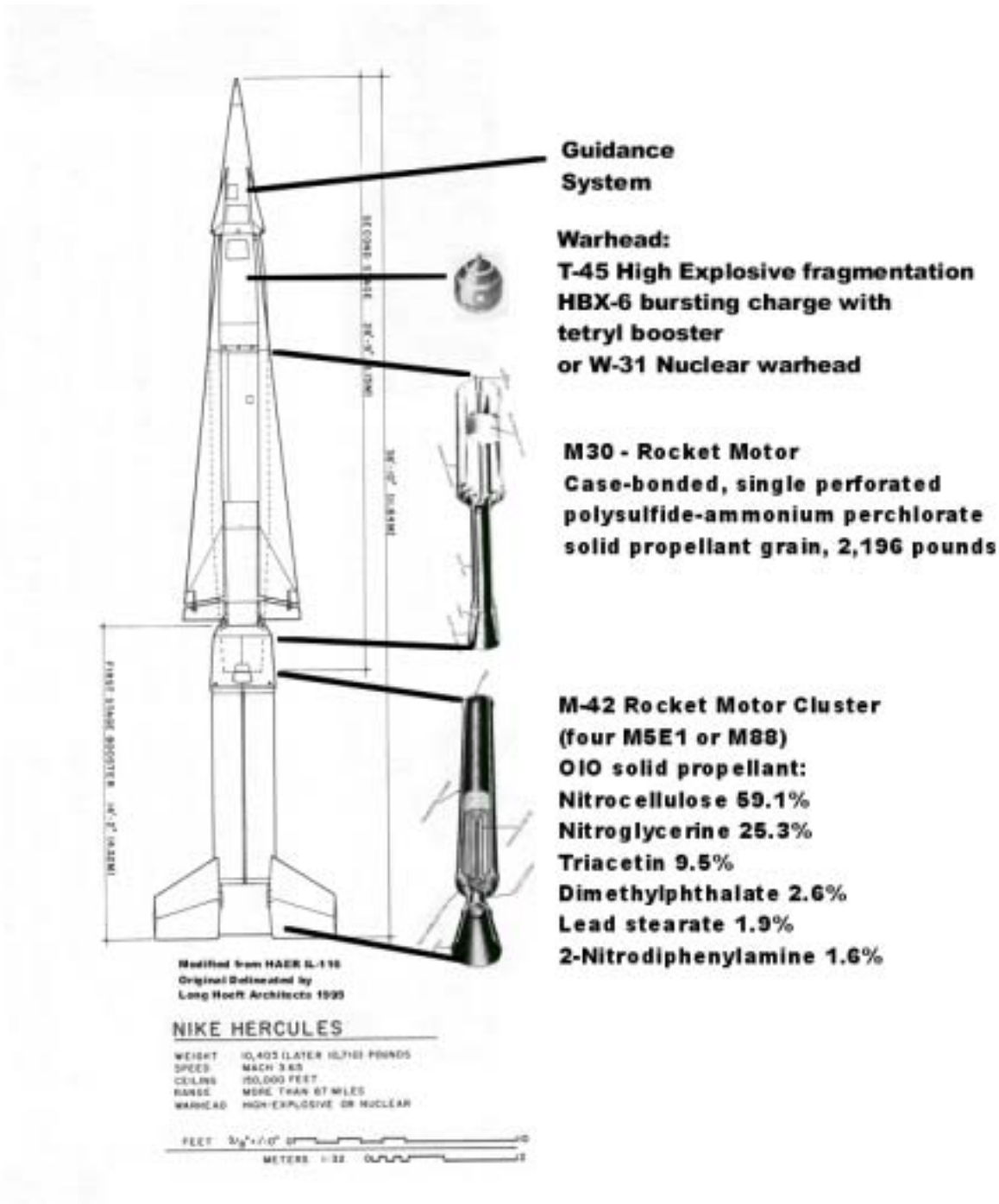


Figure 4-9: Nike Hercules Missile and Booster (TM 9-1385-51)

4.6.1. NIKE AJAX

4.6.1.1. Missile Assembly Process

The missile component parts were received and inspected, assembled, tested or checked and adjusted, sent to the service area for fueling, warheading, and joining, ultimately sent to the underground magazines. The variations between the Nike Ajax and the Nike Hercules missiles and boosters account for certain differences in the assembly procedure, however, the nature of the assembly operations aside from the fueling of the Nike Ajax follow a similar sequence. TM 9-1410-250-12/1 at 3-4.

Periodically, missiles were disassembled and returned to the direct support or general support field maintenance shops and depots for more detailed maintenance, service checking or repair. It is estimated that approximately 30 missiles per year were sent from the battery to the battalion support shop. Approximately 10 missiles per year were sent from a particular battalion to a depot. Any shipping of the missile required disassembly into its 13 component parts, packed in its original crates, and shipped. Disassembly was accomplished at the battery missile assembly building. It was also common practice to randomly select certain missiles to be returned to one of the depot areas for more complete maintenance and service checking operations. The depots were located at Letterkenny, Pennsylvania; Tooele, Utah; and Pueblo, Colorado. [5]

4.6.1.2. Assembly and service operations:

The details of the assembly of the missiles as well as chemicals used are discussed in the technical manuals. See Figure 4-10a & b for the assembly process overview. Pertinent uses of chemicals are presented in the following paragraphs.

The component parts and the rocket motors were shipped to the battery sites in wooden crates and packing boxes. Missile bodies and guidance systems were shipped in metal container pressurized with 5-psi dry air and desiccant to protect against dampness. The Nike Ajax starting mixture, **unsymmetrical dimethylhydrazine (UDMH),** was packaged in aluminum bottles encased in a heat-sealed envelope while the other liquid propellants (oxidizer and propellant mixture M3) are aluminum drums. These shipping containers were inspected for condition and evidence of tampering. TM 9-5012-1 at 66-76.

Pressurized containers required depressurization prior to removal of the missile body. The missile body was handled by the use of handling rings, manual lift trucks and mobile cranes. The shipping container and missile body were inspected for evidence of hydraulic accumulator leaks. All components were inspected for paint condition or bare spots, dents, cracks, bent and broken parts, moisture and corrosion and other damage. TM 9-5012-1 at 83, 87-88.

[5] Included for information purposes only, taken from Louisville District Nike history report but not citations to source document was provided and writer was unable to verify. The “support plan” names additional depots.

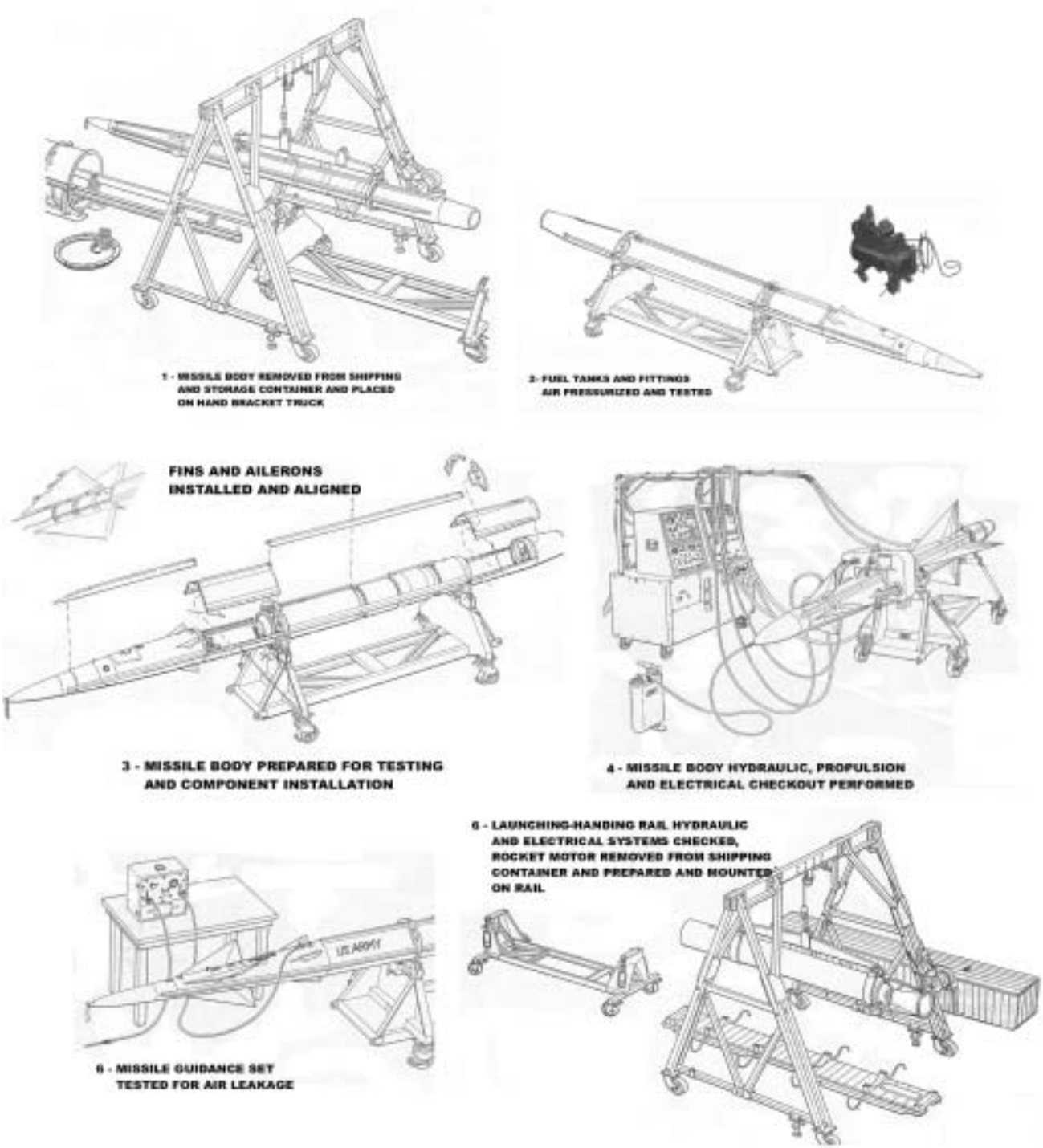


Figure 4-10a: General Nike Ajax Assembly Process Steps 1-6

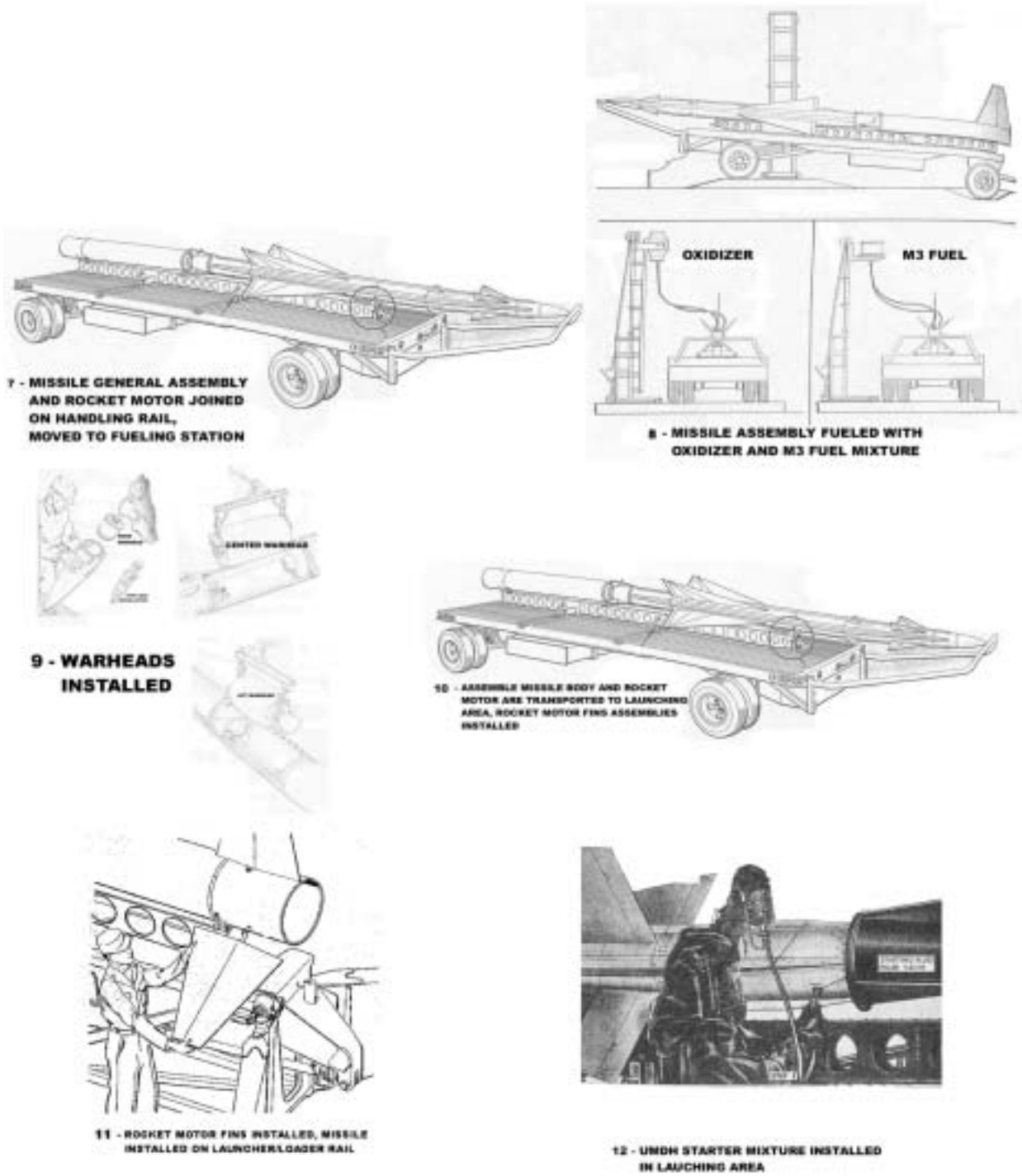


Figure 4-10b: General Nike Ajax Assembly Process Steps 7-12

The corrosion-preventive compound was removed from unpainted surfaces of the Nike Ajax missile stabilizer fins with **trichloroethylene**[6]. A similar requirement for cleaning the booster fins appears later but does not specify what to use. TM 9-5012-1 at 89, 180.

For shipment, the oxidizer, starting fluid, and fuel tanks were filled with pressurized nitrogen. Air pressure readings were taken for the oxidizer, starting fluid, and fuel filler fitting to assure the systems did not leak. If leakage had occurred and the maintenance needed was beyond the scope of the organizational maintenance, the missile body was referred to higher echelon for repair. These tanks and lines were depressurized during assembly. TM 9-5012-1 at 91, 96-97.

High-pressure air and high-pressure hydraulics were integral to the missile body propulsion and steering systems. TM 9-5012-1 at 110-111.

The missile body was prepared for installation of the components. The assembly process was primarily a mechanical process with select moving parts such as aileron pin assemblies receiving lubrication. The missile batteries and other electrical components were tested for proper connection and sensitivity. TM 9-5012-1 at 109-110.

The hydraulic accumulator pressure and hydraulic system is checked and inspected at the assembly stage. The hydraulic accumulator could be drained for replacement or substitution of hydraulic fluid. With the hydraulic pressure line plugged and a drain line attached from missile to fluid receptacle, air pressure is applied to drive the accumulator piston back until the one (1) gallon of hydraulic fluid is forced out. Standard missile **hydraulic fluid MIL-O-5606** was red in color but could be replaced by yellow or amber colored low-temperature **hydraulic fluid GB-104-566** when sustained temperature of –50°F is expected. TM 9-5012-1 at 115, 247.

After completion of the assembly area electrical checkout, the missile guidance set was pressurized and checked for leaks. The missile body was also pressurized and inspected. TM 9-5012-1 at 123, 161.

As with the missile, the launching, handling rails and rocket motor were inspected for damage, dirt, corrosion, excessive paint and grease. Moving parts were checked for proper function and lubricated as needed. The rocket motor was also prepared for joining to the missile. The visible portion of the propellant grain structure was inspected for cracks, evidence of moisture and unusual discoloration. TM 9-5012-1 at 162-164, 175.

The rocket motor was installed onto the launching and handling rail. The missile and rocket motor are then joined. The missile is then ready for fueling. TM 9-5012-1 at 180-182.

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6 August 1961 Change three to TM 9-5012-1 specified **trichloroethane** as the replacement for trichloroethylene for this service.

4.6.1.3. Fueling:

Fueling operations for the Nike Ajax sustainer motor were conducted in the revetted, joining or service area with the missile installed on a launching and handling rail. These operations involved handling of the **Inhibited Red Fuming Nitric Acid – IRFNA oxidizer, propellant mixture (M3), and UDMH starting mixture**. Handling of fuels required use of disposal protective clothing and breathing apparatus that was worn during the fueling operations. Decontamination of propellant mixture and UDMH consisted of neutralization using **5% acetic acid** while IRFNA was neutralized with **5% sodium bicarbonate** solution. Both decontamination solutions were followed by rinses of soap and water. Unserviceable clothing and equipment was decontaminated and turned in through normal supply channels for repair or replacement. TM 9-5012-1 at 194-197, 211.

The IFNRA oxidizer was furnished in drums. During the filling operation, the drum was lifted to provide a 60-inch head between the bung and the top of the missile oxidizer tank. See Figure 4-4a and Figure 4-10b Step 8. The drum was elevated to take all sag out of the tube. The missile was tilted 3 to 5 degrees by a ramp built into the fueling station at permanent battery sites. Sealed connections were made between the drum and missile. To protect the missile from spillage, a splash pan with drain line was attached between the missile body and the oxidizer fill line and the oxidizer vent and drain line. Both lines were connected to the missile by threaded coupling. Any spillage on the missile was wiped off or neutralized with a rag soaked in **10% sodium bicarbonate** solution. Pressure on the oxidizer drum was relieved with any spillage neutralized with a rag or sponge soaked 10% sodium bicarbonate solution followed by a thorough flushing with water. Upon completion of filling[7], the missile and oxidizer drum tubing were disconnected, splash pans removed and any spillage was flushed with water. TM 9-5012-1 at 197-199, 202, 208.

If the missile was overfilled, the excess oxidizer was removed by aspiration through the oxidizer vent. Aspiration was conducted by use of a probe and polyethylene bottle to capture oxidizer. The excess oxidizer was emptied into a suitable oxidizer disposal container and the probe was decontaminated and **disposed in accordance with existing military directives**.[8] TM 9-5012-1 at 209-210.

The fuel filling procedure was performed after the oxidizer filling procedure. The M3 propellant mixture was furnished in pre-metered aluminum drums containing 48.5 to 49 pounds of fuel. The procedures were the same as those for the oxidizer described above utilizing the fuel vent and fuel filler connections. Water and dilute ascetic acid was used for neutralization and decontamination of any drips or leaks from the fuel drum, fueling area and aspirator.

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7 Following the proper filling procedure cleared oxidizer from the vent tube and provided rapid flow of the oxidizer. The oxidizer and propellant mixture filler nozzle were internally stoppered. If the stopper was pushed through the filler into the oxidizer tank, the missile was defueled and repaired at a higher echelon. TM 9-5012-1 at 208, 217.

8 No disposal directives were located.

Decontamination of the missile components was accomplished by wiping with a rag soaked in **ethyl alcohol** and a water rinse. The fuel drums were not returnable. TM 9-5012-1 at 211, 218-219.

To prevent overfilled, the tube between the fuel container and fuel vent was left connected and the drum was lower. Excess fuel drained to the container when the missile was leveled. The propellant weight is then determined and if greater than specified the excess was aspirated. The aspiration process was not needed on previously unfueled missiles. TM 9-5012-1 at 217-218.

4.6.1.4. Warheading:

Except for the safety and arming devices and rocket motor igniter installed in the launching area, the explosive components were installed in the revetted area or joining or service area following the propellant filling. Any defective parts are replaced, not repaired. TM 9-5012-1 at 219.

The explosive harness assembly (M45) contained 5 aluminum-encased PETN relays on the end of each lead. These leads vary in length according to warhead or safety and arming device served. These were installed with finger tight connections whose threads were covered with a thin film of silicone compound. Initiators are installed into the three high explosive warheads and the warheads are installed into the missile. A PETN relay cap is connected to the nose warhead. The disposal of PETN relays caps was done in accordance with TM 9-1903, TM 9-5012-1 at 222, 228-229, 398.

4.6.1.5. Launching Area:

After fueling and warhead installation, the missile was transported to the launching area and transferred to the storage racks in the surface or subsurface magazine. The missile already mounted on the launching and handling rail is aligned with positioned onto storage handling rack. Once on the handling rack, a thin film of general purpose lubricating oil applied to the fin mounting holes on the M5 rocket motors and the fins were installed. The missile is then rolled onto the launcher-loader erecting beam. TM 9-5012-1 at 233-234.

The rocker motor igniter was installed and the booster was in firing condition. Prior to installation, the igniter was inspected for corrosion. If corrosion existed, the igniter was removed to an approved location. The corrosion was removed utilizing **copper wool or aluminum wool** so no static electricity is generated. The effected area is painted with **fungus-proof varnish** where appropriate and **corrosion-preventive compound** was applied. Cleaning of threads was to be accomplished with non-ferrous wire brushes. The use of solvents that might affect the plastic igniter cap or its seals was prohibited. TM 9-5012-1 at 235, 237.

The battery was installed and final connections to the launching and handling rails were made, including inserting the hydraulic quick disconnect connector into the missile body. This connector was lubricated with the same **hydraulic fluid MIL-O-5606** as used in the missile hydraulic system. This fluid change could be done as needed in the launching area. TM 9-5012-

1 at 237, 239-240, 247.

Starting Mixture: The insertion of the starting mixture was performed at the launching area with the missile installed on the launcher-loader[9]. TM 9-5012-1 at 240.

The **starting mixture (UMDH)** was furnished in pre-metered aluminum bottles. Protective clothing was required. Unlike the oxidizer and propellant mixture, the missile was maintained in a horizontal position for the insertion of the UMDH. Starter fluid vent and filler valves were provided and the small bottle was elevated manually. The transfer of the fluid from bottle to missile took about 30 seconds. Any fluid left in the transfer tube was drained back into the bottle. The bottle was to be **disposed of in accordance with local policy**. Flushing, wiping or wetting with alcohol or water decontaminated and neutralized of the filling probe, vent spike, missile components and any spillage. TM 9-5012-1 at 240-242.

The safety and arming device was installed as a complete unit and tightened into place with self-locking nuts. The missile is now ready to be placed on rails for storage in the underground magazine. TM 9-5012-1 at 243.

4.6.2. Depreparation:

Depreparation (deactivation) of the missile was usually required when high pressure air, propellant, or hydraulic fluid leaks developed, or if a malfunction was detected during monthly electrical and hydraulic checks, or in preparation for shipment or storage. TM 9-5012-1 at 251.

Depreparation was a mechanical procedure conducted in the sequence outlined below. Uses of lubricants and/or chemicals are noted: TM 9-5012-1 at 251, 252.

- The rocket motor igniter was removed from rocket motor;
- The safety and arming harness was removed while in the launching area;
- The missile body air storage tanks for the propulsion system and hydraulic system were depressurized. **Hydraulic fluid MIL-L-4343A** was used to lubricate the depressurizing air valve plunger.[10] TM 9-5012-1 at 252.

Removal starter mixture (UDMH)[11] was conducted while the missile was elevated at 15 degrees on the erecting rail. The starter fluid was drained into a bottle by way of a drain adapter and hose. Alcohol and water were used to flush the drain and vent hoses, wipe down any contaminated missiles parts, and neutralize any spillage. Drained started mixture and any contaminated water was **disposed of according to local Standard Operating Procedures**. UDMH could also be

9 Local policy may dictate insertion while the missile was on the handling rack. TM 9-5012-1 at 240.
10 March 1961 Change one to TM 9-5012-1 called out **T-film sealing compound** to replace MIL-L-4343A.
[11] The original fuel of JP-3 and original starting fuel of aniline and furfuryl alcohol were replaced (the date was not given) in the Nike Ajax program with M-3 fuel and UDMH starting mixture. SAE Journal, 1958 at 40.

neutralized for disposal purposes with **dilute sulfuric acid**. TM 9-5012-1 at 255, 257, 397. The missile was removed from the launcher-loader rail after removal of the starting mixture. The storage battery then removed and the missile was transported to the revetted, joining or service area. Removal of the explosive harness assembly and warheads was accomplished in the revetted, joining or service area while the missile was stilled installed on the launching and handling rail. TM 9-5012-1 at 257-259.

The missile body was then disjoined from the rocket motor thrust ring and rocket motor followed by removal from the launching and handling rail and removal of the propellants. This propellant removal procedure began with an inspection for any leaks. Leaking propellant was drained first. A vent hose assembly provided primary venting during the draining process. A warning that oxidizer fumes may be visible as a reddish-brown haze extending 3 to 5 feet from the end of the vent line was included. The IRFNA oxidizer was drained into a clean, dry empty drum through vented drain hose that attached to the threaded oxidizer filler fitting. Personnel worn the protective clothing and followed decontamination procedures previously discussed. The missile was rotated to ensure all oxidizer was removed. **Non-oxidizing lubricant fluorolube**[12] was applied to the missile vent and filler fittings and drainage equipment threads after drainage was completed and before equipment storage. The recorded weight of the oxidizer drained must equal the weight of oxidizer recorded during filling operations. The drum was mark as contaminated. Affected missile components were decontaminated with **95% ethyl alcohol** and a water rinse. The area was decontaminated with dilute ascetic acid followed by a water rinse. TM 9-5012-1 at 261, 263-265, 267.

The propellant mixture M3 drainage and the decontamination process was the same as that described for the oxidizer. TM 9-5012-1 at 268-270.

Starter mixture line was dried using a pressurized air. The area was washed down with water. TM 9-5012-1 at 270.

4.6.2.1. Organizational Maintenance:

Specialized tools, equipment and parts were issued to the using organization for operating, maintenance and assembly of the missiles and components and associated equipment. The parts consist of those replacement parts within the scope of the organizational maintenance functions likely to be come broken, worn or otherwise unserviceable. Tools were hand held pullers, screwdrivers, wrenches, electrical and pressure test equipment and hose assemblies. Equipment consisted of hoisting and handling equipment. TM 9-5012-1 at 271-289.

For normal cleaning of dirt, grease, and oil from the Nike Ajax guided missile, the use of one

12 March 1961 Change one to TM 9-5012-1 called out T-film sealing compound to replace Non-oxidizing lubricant fluorolube.

part **emulsion cleaner (P-C-576A, type 1)** with four parts of **dry cleaning solvent** applied by brush, mop or rag, followed solvent rinse and wiping dry was prescribed.
TM 9-5016-2 at 135.

The organizational maintenance functions consisted of lubrication, painting, periodic preventive maintenance services, trouble shooting, and specified maintenance of the missile and the missile guidance system.

Aileron attaching pin assemblies required lubrication with **hydraulic oil MIL-L-4343A** while missiles from 7851 and beyond utilized **oilite** bearings and did not require lubrication. Threads of the rocket motor igniter required light lubrication with **corrosion preventive compound**. The igniter was removed every 6 months for thread cleaning, lubrication and reinstallation. TM 9-5012-1 at 291.

The external surfaces and markings of the missile body and rocket motor and external components were painted with one or two coats of **zinc chromate primer**. This surface was regularly inspected for oxidation, fungus or flaking. When found, it was cleaned and repainted in accordance with standard maintenance procedures. TM 9-5012-1 at 291.

Preventive maintenance conducted at specific intervals included checks, inspections, the missiles and systems for proper operation, security, pressure, and damage. The allocated tools and repair parts limited the preventive maintenance services of ready-storage missiles. Inspections for hydraulic and propellant leaks, or scratches, tool marks, paint flaking, or dents acquired during handling, testing, arming, propellant filling or storage were performed regularly. The booster rocket was also inspected for cracked solid propellants, effects of moisture, scratches, paint flaking, or dents. Launching and handling rails were inspected for proper lubrication. Moisture and dirt were removed with a clean rag, compressed air or an approved solvent, as necessary. TM 9-5012-1 at 291-292.

In the case of leaking propellant, depreparation procedures were performed and the missile body was referred to the next highest echelon. Damaged nose tips, steering fins, stabilizer fins, covers, and fairings were replaced at the organizational level. Safety and arming devices were removed and referred to qualified personnel. TM 9-5012-1 at 291-292.

Troubleshooting is the systematic isolation of malfunctions and defective components by observation of symptoms and tests. Troubleshooting included the propulsion system, hydraulic system and electrical systems and components. Tests and remedies were limited to the scope of the organizational maintenance. Unless within the scope of organizational maintenance, when leaks in the high-pressure air, propellant, oxidizer or hydraulic systems leaks developed or when electrical malfunction occurred the missiles were deprepared and referred to the next higher echelon. The complete missile electrical checkout was conducted in the assembly area as a series of steps performed in sequence. TM 9-5012-1 at 296.

Organizational maintenance repair of the missile body involved removal and installation of parts authorized in Standard Nomenclature List ORD 7 SNL Y-2. Removal of oxidizer and fuel lines required shipping the missile body to a higher echelon for flushing. No solvents or other chemicals were mentioned in the description of these replacements. TM 9-5012-1 at 326.

The organizational maintenance of the missile guidance system was as the replacement of parts listed in ORD 7 SNL Y-2 and the associated cleaning and inspection functions. Complete or partial disassembly of the guidance system may be required to perform particular maintenance functions. Due to high acceleration applied to the guidance system during trajectory, rigidly controlled procedures were necessary during maintenance. The guidance system must be secure and free of dust or dirt. The technical manual provides detailed handling, cleaning and inspection instructions. TM 9-5012-1 at 345-346.

Specific instructions direct cleaning bare metal parts that will remain disassembled for a long period of time with **trichloroethylene**. After cleaning the part was lubricated with a day-to-day **special preservative lubricating oil**. The oil was wiped off, the part cleaned with **trichloroethylene** and a permanent lubricant applied as required during the rebuild or repair. TM 9-5012-1 at 346.

Cleaning of a guidance system assembly or part included the removal of all signs of corrosion, dust, grit, grease, mold, fungi, or any other foreign substance. Specified methods of cleaning were dependent upon the material to be cleaned. Compressed air or dry brushes were used to remove loose dirt and grit. Soap and water were used on rubber compounds. Electrical wiring insulation was cleaned with a cloth moistened with denatured alcohol. Sandpaper or abrasive clothes were used to removed corrosion. Metal surfaces were cleaned with **trichloroethylene** or when all non-metal parts could be removed[13] and dip tanks available, **vapor degreasing with trichloroethylene** was recommended. The available information and drawings do not show a dip tank or vapor degreaser in any buildings. TM 9-5012-1 at 347.

4.6.3. Preparation for Shipment:

Preparation of missile bodies, components and rocket motors for shipping required depreparation as described previously as well as handling and repacking the components. Potential solvent usage in the preparation procedure was the cleaning of the missile body, if necessary, along with the steering fins, stabilizer fins, ailerons, and rocket motor fins with **trichloroethylene**. Unpainted surfaces of the steering fins, stabilizer fins, and ailerons were also lubricated with **general purpose lubricating oil**. TM 9-5012-1 at 390-391.

Petroleum distillate (Stoddard solvent also known as dry cleaning solvent, Federal

13 Cleaning compounds were not to come into contact with rubber parts or electrical insulation. TM 9-5012-1 at 346-347.

Specification P-S-661) was used to clean the containers for repacking missile bodies. TM 9-1970-2 at 35.

4.6.4. Destruction and Disposal of Material in the Zone of Interior.

The mission of supporting depots included receipt, storage and disposal of unserviceable fuels and oxidizers. Disposal included burning or by water injection which is neutralization with water and limestone. Geneva Times. TM 9-1970-2 covers Nike Ajax and provides instructions for destruction and/or disposal of limited quantities of unserviceable, hazardous, or unsalvageable explosive components and liquid propellants at posts, camps and stations. They could also be used as a guide for other installations. Before explosive components are destroyed, they were to be reported through channels to the Chief of Ordnance. TM 9-1970-2 at 69-71. The extend to which these operations would have occurred on the missile battery sites should be investigated on a site-specific basis considering the size of the launch area site and the quantity-distant requirements in outlined in the Ordnance Safety Manual ORD M 7-224.

The methods prescribed for explosive components were burning, demolition, or mechanical methods. Burning or neutralization destroyed liquid propellants. These items were not to be disposed of by burying or dumping in waste places, pits, wells, marshes, shallow streams, or inland waterways. The destruction method was determined by the nature, size and number of units to be destroyed; the facilities available; and the topography of the land designated as the destruction area. TM 9-1970-2 at 69-71.

4.6.4.1. Destruction of Explosive components.

The mission of supporting depots included inspection, removal, replacement, and destruction of propellant and returning of the booster to serviceable condition. Geneva Times. The **destruction of JATOs (M5 rocket motors) was not feasible at batteries** because of the special equipment needed to remove the grain. JATOs to be destroyed were reported in accordance with SR 756-140-1. TM 9-1970-2 at 69-71.

TNT and Composition C were to be used for destruction of explosive components by demolition. Nitrostarch could be substituted for TNT. Destruction of explosive components by fire could be fueled by scrap lumber, wood, or excelsior. TM 9-1970-2 at 69-71.

Explosive components to be destroyed were Safety and Arming Devices, Explosive Harness Assembly and Warhead Initiators, and Warheads. Warheads were to be destroyed by detonation in a pit at least 4 feet deep and covered with earth. If practicable, warheads should be detonated by an explosive harness lead initiated by primacord. TM 9-1970-2 at 69-71.

4.6.4.2. Destruction of Liquid Propellants.

Disposal quantities of UDMH and Propellant Mixture M3 were limited to (one bottle) of UDMH

or one drum of propellant mixture M3 by burning with the limitation of a minimum separation of 400 or 1,000 feet respectively from inhabited buildings, public highways, public railways, navigable streams, storage areas, and other intensively utilized areas. UDMH could be disposed of by burning in a shallow metal pan. TM 9-1970-2 at 69-71.

In addition to the distant requirements, safety precautions included maintaining separate disposal areas should be maintained for fuels and oxidizers. Burning pans and disposal pits were to be located in areas where prevailing winds will blow toxic fumes away from inhabited areas and where there is no danger of the contamination of water supplies. TM 9-1970-2 at 69-71.

Disposal of appreciable quantities of unserviceable acid was recognized as an engineering and public health problem. Care was to be used in the selection of the disposal sites to prevent the contamination of water sources and the subjecting of inhabited areas to the hazards of fumes. The selected sites for disposal of limited quantities of acid were to be a minimum of 2,400 feet from installation boundaries, inhabited buildings, public railways and highways, and areas where people congregate. The same distance separated selected sites from inland lakes, rivers, or water used for drinking purposes. A trench half filled with crushed limestone or slaked lime approximately 4 feet wide, 30 feet long, and 4 feet deep was to be used for the disposal of the acid. The lime or limestone was to be completely covered with water to allow the acid to be introduced into the trench under the water. TM 9-1970-2 at 69-71.

4.6.5. Nike Hercules

4.6.5.1. Organizational Maintenance

The technical manual for organizational maintenance for the Nike Hercules, TM 9-1410-250-12/1 dated November 1967 with changes through June 1982, covers assembly, testing, corrective maintenance, winterization, and deactivation performed by assembly and service personnel. TM 9-1410-250-12/1 at A, 1-1.

The manual is restrictive and describes the work that can be performed by organizational personnel. Repair parts issued are those parts likely to become worn, broken, or otherwise unserviceable are supplied for operations within the scope of organizational maintenance facilities. TM 9-1410-250-12/1 at 1-1.

4.6.5.2. Cleaning And Preservation Materials

TM 9-1410-250-12/1, TM 9-1410-250-24P/1/1 and TM 9-1410-250-24P-2-1 list cleaning and preservation materials available for the organizational maintenance of the missile rocket motor cluster, body section, and guidance sets. The TMs specified that the cleaning and preservation materials were “to be requisitioned as required for immediate use only”. The list of these materials is included in Appendix D.
TM 9-1410-250-12/1 at B1-B5; TM 9-1410-250-24P/1/1 at 1 & 33-37 & 15; TM 9-1410-250-24P-2-1 at 2, 8, & 15.

Guidance set models AN/DPW-17, AN/DPW-17A, and AN/DPW-17B used in Nike Hercules missile numbers 10,206-11,970, included one electron tube, Type OA2WA containing **radioactive materials**. These radioactive materials were shipped, stored, handled and disposed of in accordance with TM 3-261 and TM 38-250. TM 9-1410-250-12/1 includes a radiation hazard warning for radioactive tubes 395A and OA2WA. If the tubes were broken, the surfaces where tubes had been broken were to be cleaned by a wet method described as one pass wiping. A wet cloth was used for a single pass wipe, folded and a clean side used for the next single pass. Back and forth motion was not to be used as it may rub the radioactive material into the surface. The broken tube and all cleaning materials were to be sealed in a container for disposal. **Disposal was to be in accordance with TM 3-261**. TM 9-1410-250-24P-2-1 at iii, 5; TM 9-1410-250-12/1 at C1

4.6.5.3. Assembly Process

The missile was shipped disassembled in the major components to the depots for storage or distribution. The depot may have assembled all the components of the booster rocket motor, except the cluster fin assembly, before shipping to the using organization (missile battery). The depot also installed the Nike Hercules warhead in the warhead body assembly. TM 9-1410-250-12/1 at 3-1.

The using organization inspected for damage and uncrated the components for assembly. As with the Nike Ajax sites, the Nike Hercules batteries included a receiving area adjacent to the assembly and test building, a revetted area and a launching area. The components were routed to the appropriate area as shown in Table 4-2. Upon completion of assembly, testing, and servicing, rocket motor subassembly and the warhead body section are installed in the revetted area. The assembled missile is transported to the launching area. TM 9-1410-250-12/1 at 3-2.

Table 4-2: Missile Battery Component Routing

Component	Location
Rear body and forward body section.	Receiving area
Main fins and elevons.	Receiving area
Missile rocket motor subassembly and initiators.	Revetted area
Warhead body section.	Revetted area
Rocket motor cluster fin assembly.	Revetted area
Rocket motor cluster assembly.	Revetted area
Rocket motor.	Revetted area
TM 9-1410-250-12/1 at 3-2.	

After the sequence of assembly and service operations are shown in Figure 4-11 are complete, final preparation of the missile are performed as follows:

- The missile, assembled on the launching-handling rail, is positioned on the monorail launcher, and the ground power cables are connected.
- The missile rocket motor initiators are installed.

- The propulsion arming lanyard is installed and the missile-away switch adjusted.
- Four rocket motor igniters are installed.
- The two safety-and-arming devices are checked for safe indication and installed.

TM 9-1410-250-12/1 at 3-2.1.

The Nike Hercules missile and rocket motor cluster both contain explosive components. Operations involving the handling of explosives were conducted in specifically designated areas that met the quantity-distance requirements for the type and quantity of explosives involved. The assembly area and launching areas facilities were designed and positioned according to the quantity-distance safety requirements. TM 9-1410-250-12/1 at 3-2.1.

Spilled explosive material was to be removed immediately and the area thoroughly decontaminated before work continued. TM 9-1410-250-12/1 at 3-2.1.

During the assembly operations, all Nike Hercules explosive components were grounded at a common ground stake. Drilling, cutting, sawing, soldering, and similar heat producing operations were prohibited on the missiles with assembled components and associated missile equipment such as launchers, handling equipment and storage racks whenever a missile was affixed to the equipment. TM 9-1410-250-12/1 at 3-2.1.

Uncrating and assembling the missile was similar to the Nike Ajax, however, the Nike Hercules manual specified the use of a cleaning solvent to remove all corrosion-preventive compound from the fin spar sockets and unpainted surfaces of all main fins, elevons, and attaching hardware. The cleaning was followed by a light application of general-purpose lubrication-grade oil. TM 9-1410-250-12/1 at 3-23.

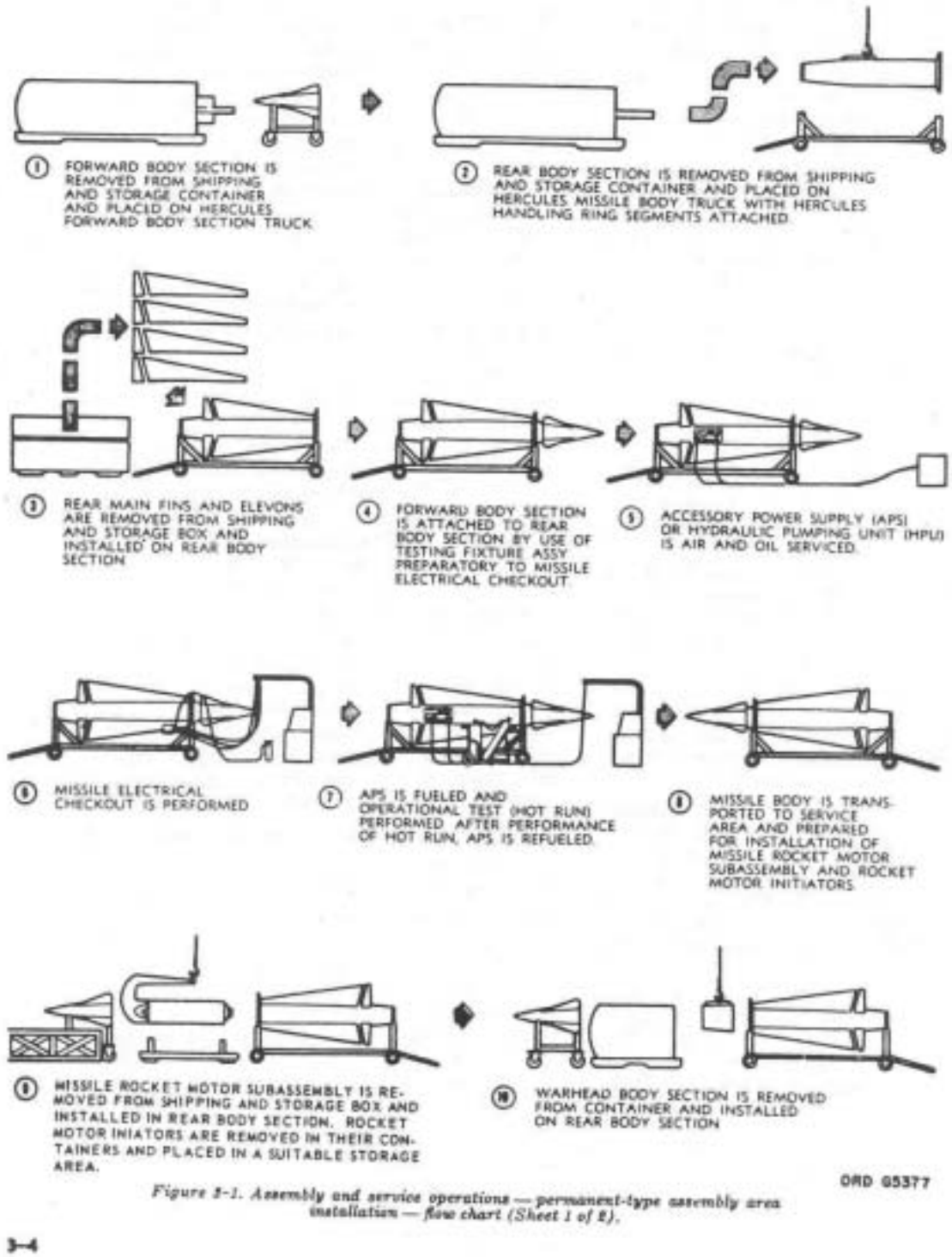

Figure 4-11: Nike Hercules Assembly Process

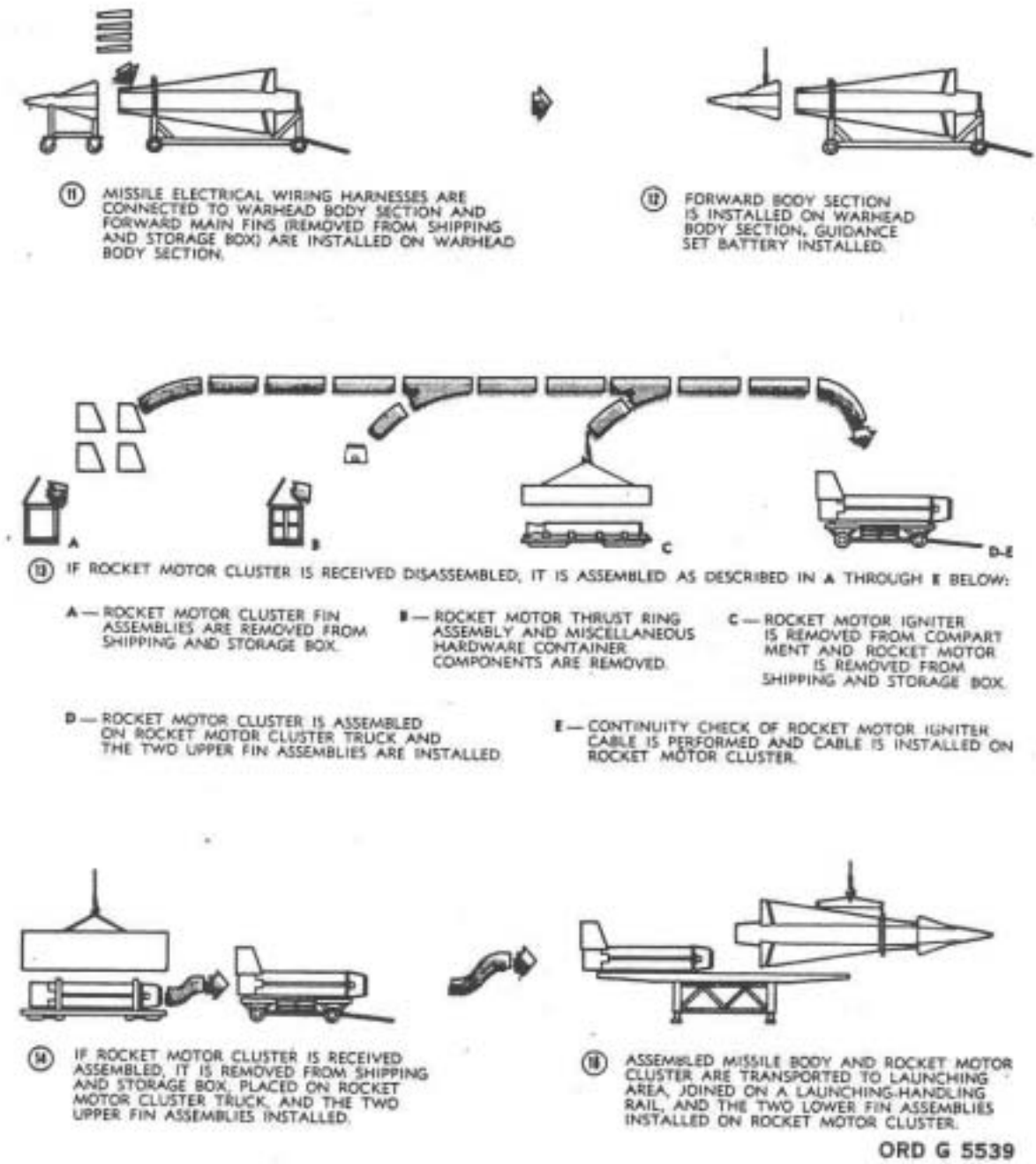

Figure 5-1. Assembly and service operations—permanent-type assembly area installation—flow chart (Sheet 2 of 2).

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Figure 4-11: Nike Hercules Assembly Process (cont'd)

Each Nike Hercules internal accessory power supply (APS) or hydraulic pumping unit (HPU) was serviced with air and oil at the missile assembly site. The **hydraulic oil, MIL-H-5606**, was discharged from the container to the APS through a hose and fitting assembly. Oil drained from the HPU was not reused. The missile electrical checkout was also conducted.[14] TM 9-1410-250-12/1 at 4-1,4-34.

Lubricating oil MS35900-273 was used to service the APS gearbox with a syringe-type means of transferring the oil in the gearbox. This was subject to lubrication after every hour of cumulative run time, whether operated by an external drive motor or with **ethylene oxide (EthO) fuel**. TM 9-1410-250-12/1 at 4-1, 4-8.

Missiles were not to be stored with EthO fuel longer than 12 months. Fueling of the APS was performed outside the assembly building but not necessarily in the revetted area. Fueling equipment consisted of a fuel tank and cart complete with drain valve, drain hose, fuel transfer hose with static ground lead and fuel fill hose with static ground lead. Small quantities of **unserviceable EthO was to be disposed of by burning in applicable instructions or by diluting with a minimum of 22 parts water to each part EthO and dumping into a sanitary sewer or a fast moving stream of water**. TM 9-1410-250-12/1 at, 4-74 & 4-75.

During the assembly process, the missile rocket motor subassembly was uncrated and inspected for damage and to ensure the service life had not been exceeded. The missile rocket motor subassembly contained explosives. Any spilled explosive material was to be immediately removed, and the area thoroughly decontaminated before work continued. The propellant grain and metal parts could be damaged or malfunctions caused could occur due to rough handling, dropping, or extreme temperatures. Inspection for moisture and cracks in the propellant grain structure were conducted. Any moisture was removed with cloth rags. The possible presence of **perchlorate crystals** could cause an explosion during installation of the missile rocket motor subassembly into the blast tube. The potential presence of perchlorate required that the rocket motor adapter[15] be cleaned. **Contaminated rags were disposed of in accordance with existing safety regulations**. TM 9-1410-250-12/1 at, 5-6 to 5-7.

The warhead section installation instructions contained a similar warning as related to explosives. Any spilled explosive material was to be immediately removed, and the area thoroughly decontaminated before work continued. TM 9-1410-250-12/1 at 6-1.

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14 Certain electrical checkout procedures were applicable to certain missiles. For example, during air leakage test of the transponder control group in missile 13001 and subsequent preformed packing, the packing seat, and metal sealing surface were cleaned with a cloth saturated with **toluene** followed by application of a thin coat of **silicone compound, MIL-S-8660**. TM 9-1410-250-12/1 at 4-68.

15 **Note the rocket motor adapter was a small diameter threaded fitting on the subassembly so perchlorate crystals, if present, would be limited.**

Assembly of the rocket motor assembly required removal of all corrosion-preventive compound from unpainted surfaces of the fin assemblies and the unpainted or interior surfaces of fin assembly components. No material was specified for the removal of corrosion-preventive compound. Similar warnings and instructions regarding safe handling explosives according to quantity-distance requirements and cleanup of spilled explosives were given for the rocket motor assembly and rocket motor cluster, as for the missile rocket motor subassembly. TM 9-1410-250-12/1 at 8-1, 8-3, 8-5, 8-16. It should be noted that a function of the depots included assembly of the four M5 rocket motors in the M42 cluster. Geneva Times

The missile body and the rocket motor cluster were transported to the launching area and joined to the launching-handling rail. The missile was installed on the launcher and final connections, adjustments, inspections and installations were accomplished. Warnings and instructions regarding safe handling explosives according to quantity-distance requirements and cleanup of spilled explosives were included in these operations. The missile is now ready to be stored in the underground magazine. TM 9-1410-250-12/1 at 9-1,10-1.

4.6.5.4. Deactivation:

Deactivation procedures on the missiles were accomplished in a designated sequence. Throughout the deactivation procedures, the warnings and advisories regarding safe handling explosives requirements and the cleanup of spilled explosives were included. Deactivation of the missile began with removal of the two safety and arming devices, the propulsion arming lanyard, the four rocket motor igniters and the rocket motor initiators. Squib-activated batteries were disconnected in the launching area for missiles numbers 13684 and later. After the missile was disarmed and removed from the launching-handling rail, the missile was transported or the missile body and the rocket motor cluster were separated and transported separately to the service area. There all components were deactivated and prepared for shipment, storage, or removal to repair shops. TM 9-1410-250-12/1 at 11-1,11-5,11-6,11-8.

The main fins and warhead were removed from missile rocket motor subassembly and the components prepared for shipment. TM 9-1410-250-12/1 at 11-1,11-5,11-6,11-8.

Defueling, depressurization of the APS and HPU, and purging of the APS with nitrogen was required during deactivation of the missile. EthO fuel was drained into a 21/2 gallon container half filled with water. Water was used for personnel decontamination or diluting of spilled EthO. If shoes or clothing became contaminated, clothing was dried and shoes were to be disposed of. Small quantities of unserviceable **EthO was to be disposed** of by burning in applicable instructions or by diluting with a minimum of 22 parts water to each part EthO and dumping into a sanitary sewer or a fast moving stream of water. TM 9-1410-250-12/1 at, 11.16 & 11.16.1, 11-18.

Following the defueling, the main fins were removed elevons and the missile body sections were

prepared for shipment or storage. **Soft-film corrosion preventive compound** was applied to certain body plugs. TM 9-1410-250-12/1 at, 11-20 & 11.22.

4.6.5.5. Corrective Maintenance:

The scope of corrective maintenance was the replacement of authorized parts in the missile guidance set, forward body section, warhead body section, missile motor section, main fins and elevons, rocket motor cluster, and the shipping and storage containers. Certain deactivation procedures of the missile had to be completed before any corrective maintenance was performed. TM 9-1410-250-12/1 at 12-1 to 12-5.

Damage such as dents, scratches, gouges, and pits to the exterior surface skin required inspection by a battalion direct support (DS) unit to determine whether the missile was serviceable or must be rejected. TM 9-1410-250-12/1 at12-6.

The Nike Hercules corrective maintenance of the missile guidance set included specific instructions related to cleaning and inspection functions similar to the Nike Ajax. Complete or partial disassembly of the guidance set may be required to perform particular maintenance functions. Due to high acceleration applied to the guidance system during trajectory, rigidly controlled procedures were necessary during maintenance. The guidance set must be secure and free of dust or dirt. The technical manual provides detailed handling, cleaning and inspection instructions. TM 9-1410-250-12/1 at12-9.

Specific instructions direct cleaning bare metal parts that will remain disassembled for a long period of time with **trichloroethane** (1,1,1-TCA). Prior to assembling, the parts were to be cleaned with trichloroethane and a permanent lubricant applied as required. TM 9-1410-250-12/1 at12-9, 12-25.

Cleaning of the guidance set or parts included the removal of all signs of corrosion, dust, grit, grease, mold, fungi, or any other foreign substance. Specified methods of cleaning were dependent upon the material to be cleaned.

- Compressed air or dry brushes were used to remove loose dirt and grit.
- Soap and water were used on rubber compounds.
- Electrical wiring insulation was cleaned with a cloth moistened with denatured alcohol.
- Metal surfaces were cleaned with trichloroethane.

TM 9-1410-250-12/1 at 12-9 &12-10.

Preformed packing or gaskets, the packing or gasket seats, and metal sealing surface of access doors, such as the guidance access door and transponder front housing cover, were cleaned with **toluene** followed by application of a thin coat of **silicone compound, MIL-S-8660**. TM 9-1410-250-12/1 at 12-13, 12-19, 12-21, 12-27, 12-29, 12-30, 12-42.

Corrective maintenance of the warhead body section and rocket motor cluster contained the same

warnings of explosive safety and cleanup of spilled explosives as in the assembly and deactivation procedures. TM 9-1410-250-12/1 at 12-51.

Corrective maintenance of the APS and HPU and fuel servicing contain the same warnings of hazards of EthO explosive safety, dilution and disposal as in the assembly and deactivation procedures. TM 9-1410-250-12/1 at 12-59.

Preformed packing, plug and thermal battery bracket hole was cleaned with **solvent cleaning compound MIL-C-81302** followed by application of a thin coat of **corrosion preventive compound, MIL-C-16173**. TM 9-1410-250-12/1 at 12-88.3.

Toluene was also used to remove old adhesive from metal surfaces. **Dry cleaning solvent PS-661** was used for removing adhesive from pressure sensitive tape if it did not adhere in the winterization procedures. TM 9-1410-250-12/1 at 12-94.1 & 12-103, 13-23, 13-27.

Disassembly of the Nike Hercules missile or its components beyond the limits authorized for the operator or organizational personnel must never be attempted. TM 9-1410-250-12/1 at 15-1. Removal of the M30 sustainer motor was often performed at missile batteries by depot personnel when it could not be removed in the normal manner. Geneva Times

Moisture sealing procedures for the transponder control group wiring harnesses P1 and J1 required the use of **trichloroethane** supplied in 1-gallon containers. The P1 and J1 connectors were each cleaned with ½ oz. of trichloroethane applied with an acid brush. **The brush and remainder to the ½ oz. trichloroethane were to be discarded**. No additional information was given on disposal method or location. Sealants were removed from connectors and the surface of the transponder control group using a tongue depressor and cloth moisten with trichloroethane. Prior to handling the clean connectors or applying and removing sealants the talc on the rubber gloves were washed off with trichloroethane. TM 9-1410-250-12/1 at D1-D-3, D12-D-13.

5. Deactivation

Nike Ajax sites not modified for Nike Hercules were deactivated nationwide by 1964. In the fall of 1968, a program targeting the deactivation of Nike Hercules sites was initiated nationwide. By 1971, this program was a part of a major realignment of American defense forces. All West Coast operations were planned for deactivation by June 30, 1975. The official notification of this program declared that:

> The action is the latest in a series of economy measures being taken by DOD to cut FY69 expenditures as required by the Revenue and Expenditure Control Act of 1968. Westec,1987 at 65 cited Argus, September 1968, p. 3;

The disbanding of the Nike system was carried out in an orderly manner with closure of individual units planned to take 180 days. The process involved the packaging and shipping of equipment, disposal of excess equipment, and the transfer of the site to U.S. Army Corps of Engineers following implementation of the closure procedures by the Army operating units. The final closure of the installation generally involved:

1) Notification by the Army that the property was in excess of its needs and requirements.
2) Physically securing of the site to prevent accident or vandalism.
3) Preparation by the Corps of Engineers of a Report of Excess Real Property.
4) Submittal of the Property Report to the General Services Administration.
5) Investigation of the sale, demolition, interim use, or alternate use of the deeds or restrictions placed on the property at the time of acquisition.

Westec,1987 at 66.

Table 5-1 illustrates the general schedule followed by most fire units during closure. The sequence and timing could be changed to accommodate individual coordination with support agencies. The deactivation schedule requires preparation and shipment of:

- Power generation equipment
- Radar vans and launch control trailers
- Missile components
- Installed property
- Launchers, rails, and side tracks
- Small arms and riot control equipment
- Missile handling and test equipment
- Motor vehicles
- Aircraft

Westec,1987 Figure 19 at 65.

The deactivation schedule specifically called for retrieval and turn in of diesel fuel and motor gas. Non-mission essential TOE/TA equipment was to be turned in. Non-appropriated fund property was to be disposed of. This materiel was not further identified.

The process for deactivating and preparing this materiel for shipment is contained in the technical manuals. To the extent the TMs identified chemicals used for deactivation and shipment, it is contained in Sections 3 and 4.

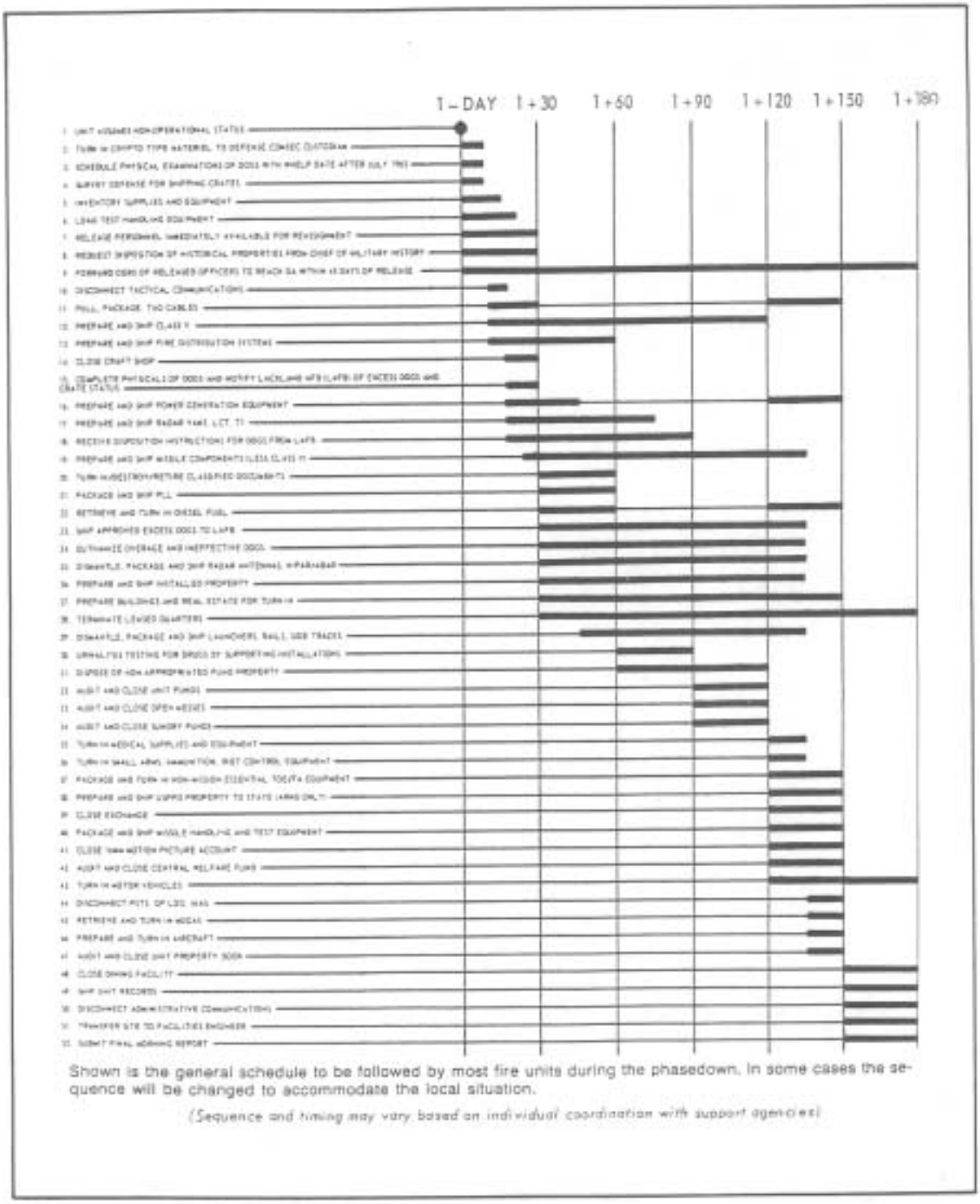


Table 5-1: Deactivation Schedule

Appendix A: Sources

Reference	Document	Source/Library	Y/N Cited
AR 750-530	Dept of Army, AR 750-530, *Maintenance of Supplies and Equipment, Corps of Engineers Equipment at Nike Ajax and Nike Hercules Installations*, 29 Oct 1958	Military History Institute (MHI)	Y
Argus, September 1968	Article cited in Westec report, title not given.	Westec	Y
Bender, 1997	Donald E. Bender, *Nike Missile System Overview*, 1997	Internet	N
Berhow	Fort MacArthur Military Museum Association, Berhow, M.A. and Stokes, S.E.,*Nike Missile Sites of the Los Angeles Defense Area*, undated copy	Plante	Y
BK-6472	U.S. Army, Missile and Munitions Center and School, Redstone Arsenal, AL *Nike Missile System Orientation*, June 1971	Plante	N
Cole	"W-25: The Davidsonville Site and Maryland Air Defense, 1950-1974", *Maryland Historical Magazine*, Vol. 80, No.3 Fall 1985	Plante	Y
Cowell	History of Benicia Arsenal, Benicia, California; January 1851- December 1962	Plante	Y
FM 44-80	January 1956 Field Manual 44-80 "Procedures and Drills for the Nike I System"		Y
FM 44-82	Dept of Army Field Manual, FM 44-82, *Procedures and Drills for Nike Hercules Missile Battery*, Nov 1968	Marine Corps University	Y
Geneva Times	"Original Mission – Storage of Ammunition at Ordnance Depot", *The Geneva Times*, Aug 8, 1961 page 12.	Plante	Y
Lonnquest, 1996	"To Defend and Deter: The Legacy of the United States Cold War Missile Program" by John C. Lonnquest, 1996 and David F. Winkler Also see http://www.cevp.com or http://www.cevp.com/docs/COLDWAR/1996-11-01952.pdf	U.S. Army Corps of Engineers	Y
Loop, 1992	Taken from unidentified U.S. Army Source, 1958 and FM 44-95, ADA Employment Nike Hercules, Apr 1968.	Plante	Y
ME 26-03-34, etc	Refers to Standard Drawings (See Appendix C)	Office of History	Y
ME 35-53-03	General Layout - Combined Field Maintenance Shop "as-built" site map (Redmond Washington)	Maas	N
MS-70 "as built" drawing	Several "as built" drawings	Kinnard	Y
NPS	Two Nat'l Park Service Brochures from SF88-L	Plante	N
Ordnance Support Plan	Ordnance Support Plan for Guided Missiles and Associated Equipment, General Plan and Annex I, 15 Jul 1955	File	Y
PAM 750-1-2	Dept of Army Pamphlet, PAM 750-1-2, *Preventive Maintenance Guide for Commanders, Nike Hercules Antiaircraft Guided Missile System*, 1960	Defense Ammunition Center	Y
Misc	Many articles from Ron Plante and various periodicals, internet items reviewed but not cited.	Various sources/ Plante	N
SAE Journal, 1958	R.B. Canright, *Nike Ajax Propellants*, SAE Journal –Vol. 66, No. 40, 1958 pg 40	SAE Journal	N

Appendix A: Sources

Reference	Document	Source/Library	Y/N Cited
	Soldiers, *Nikes A-Ok and Running*, March 1987	Plante	N
TB 9-337	Dept of Army, Technical Bulletin TB 9-337, Guided Missile Systems Corrosion Control and Treatment, date March 1961	MHI	Y
TM 9-500	Dept of Army, Technical Manual, TM 9-500 *Data Sheets for Ordnance Type Materiel*, Sep 1962	Plante	Y
TM 9-1385-51	Dept of Army, Technical Manual, TM 9-1385-51, *Identification of Ammunition (Conventional) for Explosive Ordnance Disposal*, Feb 1967	Plante	Y
TM 9-1410-206-35	Dept of Army, Technical Manual, TM 9-1410-206-35, *DS, GS and Depot Maintenance Manual, Air Defense Guided Missile Ammunition Items (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), Apr 1963		N
TM 9-1410-250-12/1	Dept of Army Technical Manual, TM 9-1410-250-12/1, *Operator and Organizational Maintenance Manual: Intercept-Aerial Guided Missile, MIM-14A and MIM-14B (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), Nov 1967	Defense Ammunition Center	Y
TM 9-1410-250-24P/1/1	Dept of Army Technical Manual, TM 9-1410-250-24P/1/1, *Organizational, DS and GM Maintenance Repair Parts and Special Tools List for Guided Missile, Intercept-Aerial, MIM-14A and MIM-14B Rocket Motor Cluster, Training, M29 Body Section, Guided Missile Training, M84 Shipping and Storage Container Guided Missile Transponder M466 (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), Dec 1970	MHI	Y
TM 9-1410-250-24P-2-1	Dept of Army Technical Manual, TM 9-1410-250-24P-2-1, *Organizational, DS and GM Maintenance Repair Parts and Special Tools List (including Depot Maintenance Repair Parts and Special Tools) for Simulator, Guided Missile Flight OA-1543C/M, Missile Guidance Set AN/DPW-17, AN/DPW-17A, or AN/DPW-18A (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), Dec 1971	MHI	Y
TM 9-1430-253-34	Dept of Army Technical Manual, TM 9-1430-253-34, *DS and GS Maintenance Manual: Target-Tracking, Target-Ranging, and Missile-Tracking Antenna-Receiver-Transmitter Group and Radar-Test (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System and Nike-Hercules Anti-Tactical Ballistic Missile System*), Jan 1960		N
TM 9-1430-254-12/3	Dept of Army Technical Manual, TM 9-1430-254-12/3, *Operator and Org Maintenance Manual, Assembly and Emplacement Radar Set AN/MPQ-43(Improved Nike Hercules Air Defense Guided Missile System and Nike-Hercules Anti-Tactical Ballistic Missile System*), Aug 1966		

Appendix A: Sources

Reference	Document	Source/Library	Y/N Cited
TM 9-1450-250-12	Dept of Army Technical Manual, TM 9-1410-250-12, *Operator and Organizational Maintenance Manual Assembly and Emplacement Servicing and Handling Equipment (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), May 1964	MHI/ IL State	Y
TM 9-1903	Dept of Army Technical Manual, TM 9-1903, *Care, Handling, Preservation, and Destruction of Ammunition*, Oct 1956	MHI	Y
TM 9-1970-2	Dept of Army Technical Manual, TM 9-1970-2, *Ammunition Antiaircraft Guided Missile M1 (Nike-Ajax) Identification, Description, Packing, Care, Handling, Preservation, and Destruction*, Feb 1958	Plante	Y
TM 9-4935-250-14	Dept of Army Technical Manual, TM 9-4935-250-14, *Technical Manual- Operator, Organizational, DS, and GS Maintenance Manual: Missile and Launcher Test Equipment (Nike-Hercules/ Improved Hercules Air Defense Guided Missile System*), Aug 1971		
TM 9-5000-18	Dept of Army Technical Manual, TM 9-5000-18, *Nike I Systems TTR Transmitter and Receiver Circuitry (U)*, May 1956	Internet	N
TM 9-5000-28	Dept of Army Technical Manual, TM 9-5000-28, *Nike I Systems Guidance Unit (U)*, Apr 1956	Internet	N
TM 9-5012-1	Dept of Army Technical Manual, TM 9-5012-1, *Operation and Organizational Maintenance, Antiaircraft Guided Missile M1 (Nike-Ajax Antiaircraft Guided Missile System)* (U), Aug 1960 w/changes	NARA	Y
TM 9-5016-2	Dept of Army Technical Manual, TM 9-5016-2, *Organizational Maintenance, Guided MissileLaunching Set AN/MSE-2: Launching Control Group OA-868/Mse-2, Control-Indicator C-1448/MSE-2, Simulator Group OA-758/MSE-2, Guided Missile Launcher-Loaders M26A2,M26A3, and Sub-Surface Launcher-Loader, Guided Missile flight Simulator AN/MPM-28, AN/MPM-28A, and AN/MPM-28B (Nike-Ajax Antiaircraft Guided Missile System)*, Jun 1960	NARA	Y
TOE 44-347	Table of Organization and Equipment NR. 44-437E, *Air Defense Artillery Missile Battery, Nike-Ajax*, 25 June 1959	MHI	Y
TOE 44-448	Table of Organization and Equipment NR. 44-448D, *Air Defense Artillery Missile Double Battery, Nike-Ajax, CONUS*, 13 Nov 1957	MHI	Y
TOE 44-547	Table of Organization and Equipment NR. 44-547E, *Air Defense Artillery Missile Battery, Nike-Hercules, CONUS*, 12 Nov 1964	MHI	Y
Website	http://ed-thelen.org/ contains numerous articles and pictures	Internet	Y
Website	www.homestead.com/nenike1/files/niketech.htm	Internet	Y

Appendix A: Sources

Reference	Document	Source/Library	Y/N Cited
Westec, 1987	WESTEC Services, Inc., *Historical Cultural Resources Survey and Evaluation of the Nike Missile Sites in the Angeles National Forest, Los Angeles County, California*, Feb 1987		Y
Whitacre, 1996	Christine Whitacre, Editor, *Last Line of Defense*, Nike Missile Sites in Illinois, National Park Service, 1996 Also see http://www.cevp.com or http://www.cevp.com/docs/COLDWAR/1996-01-02135.pdf	Chicago District	Y

Appendix B: Acronyms and Glossary

AAA Anti-Aircraft Artillery

AADCP Army Air Defense Command Post.

ABAR Alternate Battery Acquisition Radar included: AN/FPS-75, AN/FPS-71 and AN/FPA-16 (which integrates FPS-71 with LOPAR), or AN/FPS-69 issued in place of HIPAR.

ACQR Acquisition radar, later named LOPAR.

ADA Air Defense Artillery.

AN Army/Navy major piece of equipment.

AN/FPA-16 See ABAR.

AN/FPA-69 See ABAR.

AN/FPS-71 See ABAR.

AN/FPS-75 See ABAR.

AN/FSG-1 See Missle Master

AN/TSG-51 See Missile Mentor.

APS Accessory Power Supply for Nike Hercules.

ARAACOM Army Antiaircraft Command. 1950-1957. Predecessor to ARADCOM.

ARADCOM Army Air Defense Command. From 1957 to 1974 the Army component of continental air defense, consisting primarily of Nike battalions.

Augmentation: Additional assets of personnel or equipment added to an Army unit's organization.

Battalion: An Army unit of approximately 500-700 soldiers commanded by a lieutenant colonel and containing its own staff and limited support functions. Subordinate Nike units of a Battalion are called batteries. A typical Nike battalion had four firing batteries and a headquarters battery (HHB). Battalions had distinctive designations.

Battery: In the artillery, the basic fire unit, commanded by a captain and consisting of various sections and platoons. In a Nike battery there was three sections- the fire control platoon, launcher platoon and the company headquarters (with clerks and cooks). Batteries were either HHBs or lettered (firing batteries) A to D).

BDE Brigade.

BIRDIE Battery Integrated Radar and Display Equipment. (AN/GSG-5 or AN/GSG-6)

Bn Battalion

Brigade: A unit above the group commanded either by a brigadier general or a colonel. The brigade oversaw a large geographical area and the normal subordinate unit was the group, although battalions could be directly subordinate to a brigade. Brigades had additional fire control and radar assets. Brigades were subordinate to the air defense regions which were the major subdivisions of ARAACOM/ ARADCOM. Brigades oversaw a large geographical area and the normal subordinate unit was the group.

CONAD Continental Air Defense Command consisting primarily of Nike battalions.

FUIF Fire Unit Integration Facility provided the interface at the battery for data from higher HQs

Group: An artillery unit above a battalion, commanded by a colonel. The group usually had responsibility for several battalions over a specific geographical region and was usually, though not always, subordinate to a brigade. Groups had additional support and fire control assets.

HE High Explosive (warheads)

HHB Headquarters and Headquarters Battery. Each headquarters above the battery-level had a separate headquarters battery that contained the unit's staff sections, maintenance, radar, medical and additional assets at the commander's disposal.

HIPAR High-Power Acquisition Radar.

HPU Hydraulic Pumping Unit

IFC Integrated Fire Control. The section of a Nike firing battery responsible for guiding the missile onto its target typically lettered (firing batteries) A to D) located 1000-6000 yards from the launch site.

LOPAR Low power acquistion radar..

MTR Missile Tracking Radar.

Missile Master: (AN/FSG-1) Area fire control radar for Nike, usually run at the group or brigade level. Operational in 1959 and replaced by the Missile Mentor in the mid-60s.

Missile Mentor: (AN/TSQ-51) Fire Distribution System. A solid state radar system which was deployed starting in 1966 and only took up space in two trailers.

NORAD North American Air Defense Command. The combined (with the Royal Canadian Air Force) command responsible for North American theater air defense.

RRIS Remote Radar Integration Station gap filler to AN/TPQ-51. Loop.

Technician: A full-time civilian employee of the Army National Guard who was also a part-time member of the National Guard.

TOE Table of organization and Equipment. The authorizing document which established the organizational structure and equipment allowances for a unit in the Army.

TTR Target Tracking Radar

Primary sources of terms from Nike Glossary at (www.homestead.com/nenike/files/ngloss.htm) and Fort MacArthur Military Museum Association.

Military Manual Code Number Systems

The numbering of the field manuals and technical manuals referred to in this report follow the standard number system that was started at the beginning of the Second World War. An understanding of this numbering system is necessary as the number is relevant to what echelon conducts the work described.

Field Manuals (FMs) were usually numbered by a one to two digit number followed by a dash followed by a one to two digit number, like “FM 44-82”, with the first series on numbers being the subject classification of the manual and the second series being the particular manual. Early Technical Manuals (TMs) were originally numbered similar to the FMs such as the 1956 “TM 9-5012-1” for the Nike Ajax. The first number being the subject or branch of the Army - number “9” means that it is an Ordnance Branch manual and the second series of numbers (5012) referring to the particular manual. The number of each pamphlet will consist of two parts: the basic number and subnumber.

Because there were considerably more TMs by the early 1960’s, they began to be changed to a more complex numbering system. The many later TM’s, concerned with single pieces of equipment, especially Ordnance equipment, were numbered like “TM 9-1450-250-12”.

- The first number refers to the branch. The number “9” means that it is an Ordnance branch document. (See table C-1 for a list of the basic branches).
- The second series of numbers (1450) refer to the subject type – Nike Hercules/ Improved Hercules Air Defense Guided Missile System.
- The third series refers to the particular piece of equipment or subject -Servicing and Handling Equipment.
- The four series on numbers (12) refer to the level of maintenance that the manual is concerned - operator and organizational maintenance level. The first number indicates the lowest level covered, and the second number indicates the highest, with 0 indicating the same level as the original number.

Other numbers in the fourth series are as follows:

10 = Operator Maintenance
20 = Organizational Maintenance (local unit motor pool)
30 = Direct Support Maintenance (your local maintenance battalion)
40 = General Support Maintenance
50 = Depot Maintenance

The numbers can stand on their own or in combination. For example:

12 = Operator AND Organizational Maintenance
24 = Organizational AND DS AND GS Maintenance

A "P" on the end indicates a parts manual for the levels of maintenance shown by the numbers in front.

20P = Parts Manual for Organizational Maintenance Repairs

A "+P", which means it's a repair manual and a parts manual.

24+P = Repair manual for Organizational, DS, GS mechanics AND a parts manual for the same levels of repair.

Technical Bulletins which are on the same basic subject are listed with the Technical Manuals after the relevant Technical Manual.

Table C-1	
1. Army Air Forces.	20. Miscellaneous.
2. Cavalry.	21. Individual Soldier.
3. Chemical Warfare Service.	22. Individual Drill Regulations.
4. Coast Artillery Corps.	23. Basic weapons, including accessories and ammunition.
5. Corps of Engineers.	24. Communication.
6. Field Artillery.	25. Transportation.
7. Infantry.	26. Interior guard duty.
8. Medical Department.	27. Military law.
9. Ordnance Department	28. Band.
10. Quartermaster Corps.	29. Military Police.
11. Signal Corps.	30. Military Intelligence.
12. Adjutant General's Department.	31. Special Operations.
13. Inspector General's Department.	35. Women's Army Corps.
14. Finance Department.	36. Supply procedures.
15. Judge Adovcate General's Department.	44. Coast Artillery Corps (antiaircraft artillery and barrage balloon T/O's, T/E's, T/BA's and T/A's only).
16. Corps of Chaplains.	55. Transportation Corps.
17. Armored Force.	100. Field Service Regulations.
18. Tank Destroyer.	101. Staff Officers' Field Manual.
19. Military Police.	105. Umpire Manual.
101. Staff Officers' Field Manual.	
105. Umpire Manual.	

http://www.milman.simonides.org/manuals-frame.htm
http://www.military-info.com/freebies/D5.htm

Appendix D:

Technical Bulletin and Manuals

Missiles and Missile Components

a. **TB 9-337 – Table III. Paints and Related Materials**

b. **TM 9-500 Data Sheets for Ordnance Type Material**

c. **TM 9-1410-250-12/1 Appendix B - Cleaning and Preserving Materials**

d. **TM 9-1410-250-24P/1/1 Section II - Cleaning and Preserving Materials**

e. **TM 9-1410-250-24P-2-1 Section II - Cleaning and Preserving Materials**

MHI
Copy 1

TB 9-337

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

GUIDED MISSILE SYSTEMS
CORROSION CONTROL AND TREATMENT

ARCHIVES

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1961

AGO 5024A

Table III. Paints and Related Materials

Item No.	Item	Federal stock No.	Specification	Unit of issue	Responsible technical service	Purpose
1	Acetone, technical	6810–281–1863	0–A–51	1 lb.	Cml	Cleaning metal instruments.
2	Adhesive, synthetic rubber	8040–582–4830	EC–711	1 pt.	----------	Installing rubber gaskets.
3	Alcohol, Butyl	6810–241–4709	MIL–B–11322	1 gal.	Cml	Preparing alcohol-phosphoric-acid solution.
4	Alcohol, denatured	6810–191–1627	O–A–396	1 gal.	Eng	Cleaning wire insulation.
5	Alcohol, Isopropyl	6810–286–5435	MIL–A–10428	1 gal.	Cml	Preparing alcohol-phosphoric-acid solution.
6	Aluminum wool	5350–286–4851	MIL–A–4864	1 lb.	Ord	Cleaning aluminum surfaces.
7	Brush, cleaning, aircraft.*	7920–281–7009	MIL–B–5612	Ea	Qm	Applying paint remover.
8	Brush, dusting, bench	7920–178–8315	H–B–201	Ea	Qm	Cleaning equipment.
9	Brush, paint, flat, 3-in.	8020–242–7266	H–B–0420	Ea	Eng	Painting large areas.
10	Cheesecloth	8305–170–5063	CCC–C–440	Yd.	Qm	Tack rags and general cleaning.
11	Chromic acid	6810–264–6517	O–C–303	5 lb.	Cml	Removing light corrosion from magnesium.
12	Cleaner, anti-static	6850–368–5227	MIL–C–12156	1 pt.	Ord	Cleaning plastic surfaces.
13	Cloth, abrasive, aluminum oxide, grit No. 240, grade 7/0.	5930–161–9715	P–C–451 type I	50 sheets	Ord	Mechanical removal of corrosion.
14	Cloth, abrasive, aluminum oxide, grit No. 320, grade 9/0.	5350–246–0330	P–C–451 type I	50 sheets	Ord	Mechanical removal of corrosion.
15	Cloth, abrasive, silicon carbide, grit No. 240, grade 7/0.	5350–271–5958	P–C–451 type II	50 sheets	Ord	Sanding painted surfaces.
16	Cloth, abrasive, silicon carbide, grit No. 320, grade 9/0.	5350–271–5957	P–C–451 type II	50 sheets	Ord	Sanding painted surfaces.
17	Coating compound, metal pretreatment, resin-acid.	8030–165–8577	MIL–C–15328	5 gal.	Eng	Pretreatment coating for use before paint finish.
18	Corrosion preventive compound	8030–231–2345	MIL–C–16173 grade 1.	1 gal.	Ord	Protecting unpainted metal surfaces.
19	Corrosion removing compound	6850–174–7670	MIL–M–10578 type 1.	5 gal.	Ord	Chemical removal of corrosion products.
20	Corrosion resistant primer	8030–613–3131	MIL–C–5541	4 oz. bottle	----------	Paint base and corrosion resistant film for aluminum.
21	Detergent, painted surface	7930–249–8036	P–C–431	5 lbs.	QM	Cleaning painted surfaces.
22	Enamel, blue	8010–559–3144	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
23	Enamel, gray	8010–559–3143	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
24	Enamel, gray	8010–680–2070	TT–E–487	1 qt.	Eng	Painting interior of equipment cabinets.
25	Enamel, green	8010–559–3138	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
26	Enamel, green (OD)	8010–297–0586	TT–E–527	1 gal.	Eng	OD touch-up and acquisition antenna radome.
27	Enamel, green (OD)	8010–297–2124	TT–E–485	1 gal.	Eng	Exterior OD surfaces. Not to be used on radome.
28	Enamel, light yellow	8010–559–3237	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
29	Enamel, orange	8010–559–3240	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
30	Enamel, red	8010–559–3239	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
31	Enamel, yellow	8010–559–3238	MIL–E–74	½ pt.	Eng	Plug and receptacle identification.
32	Grease	9150–261–8298	MIL–G–3278	1 lb.	QM	General lubrication.

*This brush is supplied without a handle. Be sure to provide a long handle before working with acid solutions.

Table III. Paints and Related Materials—Continued

Item No.	Item	Federal stock No.	Specification	Unit of issue	Responsible technical service	Purpose
33	Lacquer, aluminum	8010–598–5204	MIL–L–7178	1 pt.	----------	Treating aluminum clad steel.
34	Lacquer, gray	8010–324–5781	MIL–L–7178	½ pt.	Eng	Painting inside surfaces of trailers with the exception of the electronic shop.
35	Litmus paper, strip form	6640–291–8722	----------	100 strips	----------	Testing for acidity of prepared surfaces.
36	Nitric acid (SP Gr 1.42) HNO^3	6810–130–1912	----------	1 lb. bottle	Ord	Make-up of chrome-pickle solutions.
37	Oil, lubricating, preservative	9150–231–2361	MIL–G–3150	1 qt.	QM	Medium-weight oil for general lubrication.
38	Paint, design kit	7520–324–5782	MIL–L–7178 color 2650.	1 pt.	Ord	For interior surfaces of the electronic shop and its bins.
39	Paint, white, heat reflective	8010–324–5786	TT–E–529, Class A.	½ pt.	Ord	For exterior touch-up of trailers and tracking antennas.
40	Paper, abrasive, flint gr 4/0	5350–597–4561	P–P–105	100 sheet sleeve.	Ord	Sanding.
41	Paper, abrasive, flint gr 5/0	5350–598–5972	P–P–105	100 sheet sleeve.	Ord	Sanding.
42	Pasajel	Commercially available.	----------	1 qt.	----------	Obtain from Semco Sales and Service Co., 3141 W. Century Blvd., Inglewood, Calif. For use on corrosion resisting steel.
43	Phosphoric acid	6810–551–9578	OME–PD109	5 gal.	Ord	For preparing alcohol-phosphoric-acid solution.
44	Primer coating vinyl-zinc chromate	8010–597–7854	MIL–P–11414	1 gal.	Eng	For priming metal surfaces.
46	Primer, zinc yellow	8010–161–7339	TT–P–666	1 gal.	Eng	For priming magnesium and aluminum surfaces when top coat is lacquer.
47	Rags, wiping, cotton	7920–579–9277	CCC–R–30	50 lb. bale.	QM	General cleaning.
48	Remover, paint, organic solvent type	8010–165–5536	MIL–R–25134	5 gal.	----------	For removing paint and lacquer.
49	Sealing compound	8030–275–8110	MIL–S–11031	1½ pt.	Ord	Installing gaskets and general sealing.
50	Sealing compound	8030–656–1042	EC–801	1 gal.	----------	Coating threaded parts.
51	Soap, automobile and floor	7930–170–5466	P–S–560	1 gal. can	QM	General cleaning.
52	Sodium dichromate	6810–143–2000	O–S–595	1 lb. bottle.	Cml	Make-up of chrome-pickle treatment for magnesium.
53	Solvent, dry cleaning	6850–281–1985 6850–264–9038	P–S–661, type I	1 gal. 5 gal.	QM ----------	General cleaning.
54	Thinner, dope and lacquer	8010–160–5787	TT–T–266	1 gal.	Eng	For thinning lacquer.
55	Thinner, synthetic resin enamel	8010–160–5794	TT–T–306	1 gal.	----------	For thinning synthetic enamels.
56	Thinner, paint, mineral spirits	8010–242–2089	TT–T–291	1 gal.	QM	General cleaning and paint thinning.
57	Toluene	6810–322–7847	JAN–T–171, GR B	1 gal.	Ord	Paint solvent.
58	Trichloroethane	6810–664–0387	O–T–620	1 gal.	Cml	Cleaning parts and metal surfaces.

TM 9-500

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

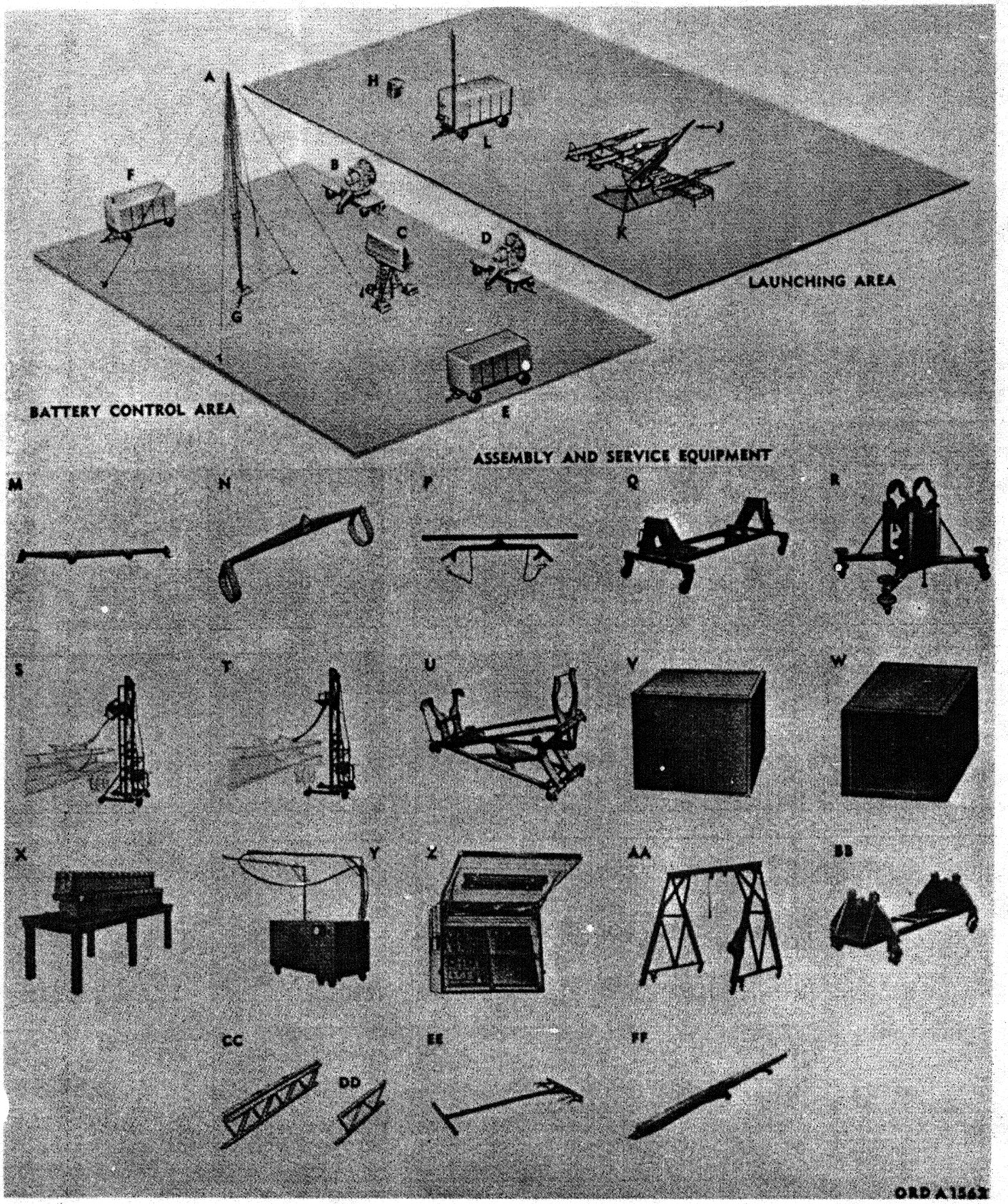
DATA SHEETS FOR ORDNANCE TYPE MATERIEL

This copy is a reprint which includes current pages from Changes 1 through 4. Pen and ink changes to be made are listed in the front of the manual. Read the instructions concerning these pages before using the manual.

HEADQUARTERS, DEPARTMENT OF THE ARMY
SEPTEMBER 1962

AIR DEFENSE GUIDED MISSILE SYSTEM NIKE-AJAX

(Includes specially designed components of guided missile remote control systems; nonairborne guided missile launchers; specially designed trucks for use in transporting guided missiles; specially designed hoisting beams; checkout equipment and test equipment specially designed for use with guided missiles and guided missile remote control systems.)



 Source: TM 9-500, September, 1962

BATTERY CONTROL AREA

A—ANTENNA-MAST GROUP: OA-739/MSW-1

B—ANTENNA-RECEIVER-TRANSMITTER GROUP, MISSILE TRACKING, TRAILER MOUNTED: OA-654/MPA-4 through OA-654G/MPA-4

C—ANTENNA-RECEIVER-TRANSMITTER GROUP, ACQUISITION: OA-653/MS

D—ANTENNA-RECEIVER-TRANSMITTER GROUP, TARGET TRACKING, TRAILER MOUNTED: OA-655/MPA-4 through OA-655G/MPA-4

E—DIRECTOR STATION, GUIDED MISSILE, TRAILER MOUNTED: AN/MSA-7, AN/MSA-7A, AN/MSA-17, AN/MSA-17A

F—TRACKING STATION, GUIDED MISSILE, TRAILER MOUNTED: AN/MPA-4 and AN/MPA-4A

G—TEST SET, RADAR: TS-847/MSW-1 and TS-847A/MSW-1

LAUNCHING AREA

H—CONTROL INDICATOR: C-1488/MSE-2

J—GUIDED MISSILE, AIR DEFENSE: M1

K—LAUNCHER, GUIDED MISSILE: M22, M22A1, M22A2, and M22A3

L—SIMULATOR STATION, RADAR SIGNAL, GUIDED MISSILE SYSTEM, TRAILER MOUNTED: AN/MPQ-36 (15D2)

ASSEMBLY AND SERVICE EQUIPMENT

M—BEAM, HOISTING, GUIDED MISSILE

N—BEAM, ASSEMBLY, BOOSTER

P—BEAM, ASSEMBLY, WARHEAD

Q—TRUCK, GUIDED MISSILE ROCKET MOTOR: M254

R—TRUCK, GUIDED MISSILE BODY SECTION: M255

S—SERVICER, ACID, GUIDED MISSILE: M2

T—SERVICER, FUEL, GUIDED MISSILE: M3 and M3A1

U—CARRIAGE, MISSILE HANDLING: M28

V—DRAINING KIT, FUEL, GUIDED MISSILE: M54

W—DRAINING KIT, OXIDIZER, GUIDED MISSILE: M53

X—RACK, BATTERY: MT-1498/G

Y—STAND, TEST, HYDRAULIC SYSTEM, MISSILE: M14

Z—TEST SET, GUIDED MISSILE: AN/DSM-12, AN/DSM-12A, and AN/DSM-12B

AA—TRUCK, INERT GUIDED MISSILE: M257

BB—TRUCK, INERT GUIDED MISSILE: M256

CC—SIDE TRUSS, LOADING RACK, GUIDED MISSILE:

DD—END TRUSS, LOADING RACK, GUIDED MISSILE:

EE—DRAWBAR, TRUCK, BRACKET, HAND:

FF—RAIL, LAUNCHING AND HANDLING: M1, M1A1, and M1A2

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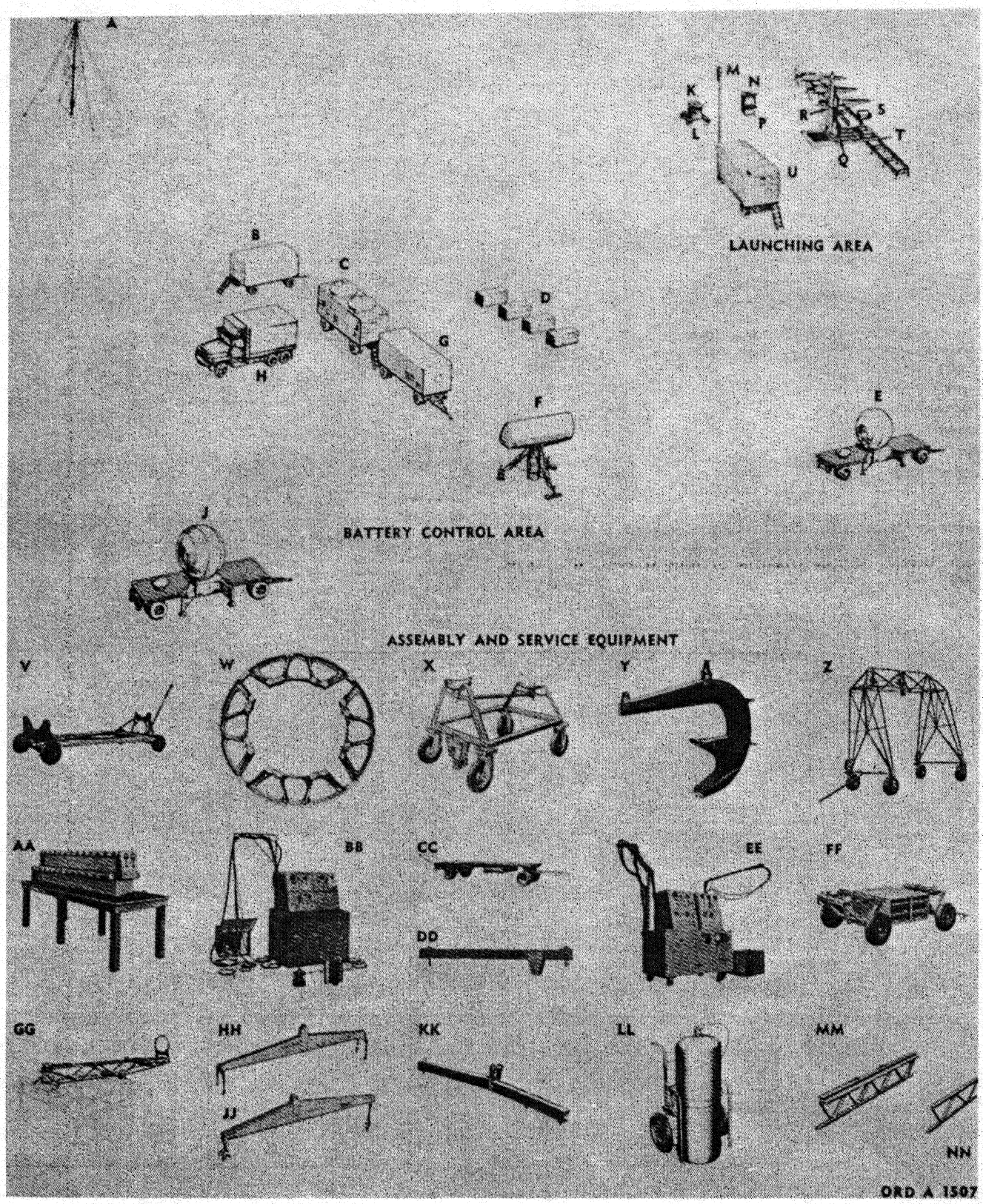
The equipment required to complete the system, which includes maintenance, repair, and check-out equipment especially designed for use with guided missiles and guided missile control systems, will be added at a later date.

AIR DEFENSE MISSILE SYSTEM—NIKE-HERCULES

(Includes specially designed components of guided missile remote control systems; non-airborne guided missile launchers; specially designed trucks for use in transporting guided missiles; specially designed hoisting beams; a special purpose trailer; checkout equipment and test equipment specially designed for use with guided missiles and guided missile remote control systems; and an engine generator set.)



Source: TM 9-500, September, 1962

BATTERY CONTROL AREA

A—ANTENNA-MAST GROUP, COLLIMATION: OA-1600/T
B—ELECTRONIC SHOP, TRAILER MOUNTED:
C—TRACKING STATION, GUIDED MISSILE, TRAILER MOUNTED: AN/MPA-5
D—GENERATOR SET, DIESEL ENGINE:
E—ANTENNA-RECEIVER-TRANSMITTER GROUP, MISSILE TRACKING, TRAILER MOUNTED: OA-1340/MPA
F—ANTENNA-RECEIVER-TRANSMITTER GROUP, ACQUISITION:
G—DIRECTOR STATION, GUIDED MISSILE, TRAILER MOUNTED: AN/MSA-19
H—FIRE UNIT INTEGRATED FACILITY (FUIF) TRUCK
J—ANTENNA-RECEIVER-TRANSMITTER GROUP, TARGET TRACKING, TRAILER MOUNTED: OA-1487/MSA

LAUNCHING AREA

K—TEST SET, GUIDED MISSILE: AN/DSM-33
L—TRUCK, GUIDED MISSILE TEST SET: M451
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N—CONTROL INDICATOR: C-2620/TSW
P—SIMULATOR GROUP: OA-2060/MSW-4
Q—LAUNCHER, MONORAIL, GUIDED MISSILE: M36
R—GUIDED MISSILE, AIR DEFENSE: XM6
S—CONTROL INDICATOR: C-2699/TSW
T—RAIL, LAUNCHING-HANDLING, GUIDED MISSILE: M3
U—LAUNCHING CONTROL GROUP, GUIDED MISSILE, TRAILER MOUNTED: AN/MSW-4

ASSEMBLY AND SERVICE EQUIPMENT

V—TRUCK, GUIDED MISSILE BODY SECTION: XM473
W—RING, HANDLING, GUIDED MISSILE:
X—TRUCK, GUIDED MISSILE, NOSE SECTION: M489
Y—BEAM, HOISTING, GUIDED MISSILE, SOLID MOTOR: XM11
Z—HOISTING UNIT, PORTABLE, GUIDED MISSILE, MISSILE AND JATO UNIT JOINING: XM26E1
AA—RACK, BATTERY: MT-1498/G
BB—TEST SET, GUIDED MISSILE: (ORD NO. 9025326)
CC—TRAILER, FLATBED, GUIDED MISSILE: M261A1
DD—BEAM, HOISTING, GUIDED MISSILE: XM12
EE—TEST STAND, HYDRAULIC SYSTEM COMPONENTS:
FF—TRUCK, GUIDED MISSILE, ROCKET MOTOR: M442, W/E
GG—ADAPTER, ADJUSTABLE, TRAILER TO GUIDED MISSILE COMPONENT: M36, W/E
HH—BEAM, HOISTING, GUIDED MISSILE: BOOSTER CLUSTER, M13
JJ—BEAM, HOISTING, GUIDED MISSILE: COMPLETE MISSILE, XM14
KK—BEAM, HOISTING, GUIDED MISSILE, WARHEAD SECTION: M7E1
LL—FILLER, HYDRAULIC SYSTEM, GUIDED MISSILE:
MM—SIDE TRUSS, LOADING RACK, GUIDED MISSILE, LAUNCHER, TRACK ASSEMBLY LOADING RACK: M1
NN—RACK, LOADING, GUIDED MISSILE, SUPPORT ASSEMBLY LOADING RACK: M10

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The equipment required to complete the SYSTEM, which includes maintenance, repair and checkout equipment especially designed for use with guided missiles and guided missile control systems, will be added at a later date.

TM 9-1410-250-12/1

TM 9-1410-250-12/1

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

BAUER

OPERATOR AND ORG MAINTENANCE MANUAL:

INTERCEPT-AERIAL GUIDED MISSILE MIM-14A AND MIM-14B

(NIKE-HERCULES AND IMPROVED NIKE-HERCULES AIR DEFENSE GUIDED MISSILE SYSTEMS)

This copy is a reprint which includes current pages from Changes 1 through 3. Pages applying to all systems are inserted in proper numerical order in the manual. Pages which have different effectivities are inserted in the front of the manual. Read the instructions concerning these pages before using the manual.

C4, 5 Mar 72
5, 17 Mar 72
6, 23 Dec 72

C15, 2
C16, 2

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NOVEMBER 1967

12, 17 Oct 77

APPENDIX B

CLEANING AND PRESERVING MATERIALS

NSN	*Description*
	BODY, GUIDED MISSILE
6810-00-264-6517	Acid, chromic chromium trioxide, technical, flake form, Spec O-C-303 (5 GL CN) Ref No. OC303TYPE25LBCN 5 LB CAN
8040-00-887-1450	Adhesive, polymerized acrylic resin base, clear liquid, heat and chemical resistant, used w/solvent (toluol) 40% solids, 1 GL CN, Ref No. 8607093
8040-00-701-9546	Adhesive, silicone rubber, paste form (5 oz tube) (FED-STD-313)
8040-00-844-9707	Adhesive, syn resin, liquid form, laminates to wood and S (1 PT PER CN) Ref No. 9978017
8040-00-721-9091	Adhesive, syn-ru, liquid form, 1 PT CN, w/separate catalyst Ref No. MILA25457-1 PT
8040-00-290-4301	Adhesive, syn-ru, liquid form, 1 QT CN, Ref No. 8162031, Ref No. MILA5092TYPE2
8040-00-262-9011	Adhesive, syn-ru, liquid form, 1 PT CN, Ref No. MILA5092TYPE3-1 PT
8040-00-264-5840	Adhesive, syn-ru, liquid, general bonding, 1 GL CN, Ref No. MILA13883, ORD, TYPE II, 1 GA CA
8040-00-887-5857	Adhesive, 3 parts of thermosetting liquid resin and 2 parts of polyamid resin, two to three hours pot life, air cure in six to eight hrs, 1 QT CN, Ref No. 9141496
6810-00-543-7415	Alcohol, denatured, formula No. 3A, 1 GL CN, Ref No. 0E760 GRADE 3
5350-00-286-4851	Aluminum wool, Ref No. MILA4864
8030-00-201-0996	Antiseize compound, asphalt, graphite, lubr oil petrolatum, and white lead ingredients, 1 PT CN, Ref No. TTA00580
8020-00-202-7266	Brush, paint, FL, hog bristle, SQ edge, 3 W, 7/8 thk, 3—1/4 exposed lg, FED SPEC H-B-0420, Class 1, Grade B, size 3, Ref No. 8034078
6850-00-224-6663	Cleaning compound, solvent solution type, 1 GA CA, Ref No. 9156817
6850-00-826-2156	Cleaning compound, solvent Type 1, 1 GA CA, Ref No. PC576ATYPE1, Ref No. PC444TYPE1
1420-00-475-1016	Cloth, lint free (9 in. sq 300 percent) Ref No. 9005198
8030-00-231-2345	Corrosion preventive compound, hard film, for cold application, 1 GL CN (CT) Ref No. MILC16173GRADE1
8030-00-244-1298	Corrosion preventive compound, solvent cutback, cold application, soft film, MIL-C-16173, GR2, 5 GL PL (CL)
6850-00-901-0591	Deicing-defrosting, Ref No. MILA8243A

FSN	Description
6850-281-1985	Dry cleaning solvent, liquid form, for degreasing MTL and dry cleaning, 1 GL CN, Ref No. PD680TYPE1
6850-264-6574	Desiccant, activated, Type D-3464A, Class 2, four desiccant units per bag, Ref No. MKD3464-4, Ref No. 9024584 (U/O Ser No. 13,001 and subsequent)
6850-264-9038	Dry cleaning solvent, liquid form, to remove soil from surfaces in dry cleaning process, FEDP5661B, TYPE 1 (5 GL PL), Ref No. PD 680TY1-5GALPL
6850-264-9037	Dry cleaning solvent, liquid form, to remove soil from surfaces in dry cleaning process, PD680TY1-55 GAL DR, Ref No. 880PS661B, Type 1, 55GALDR1, 6GA, Ref No. PD680TY1-55 GAL DR
6850-285-8012	Dry cleaning solvent, liquid form, to remove soil from surfaces in dry cleaning process, FED-P-S-661B, Type 1, 55 GAL DR, 18 GA, Ref No. 51S4385-55
8010-828-3191	Enamel, brown, lusterless, 1 GL CN, Ref No. MILE10687, Ref No. TTE516
8010-297-3819	Enamel, green, eggshell gloss, 16 hr max air dry hard time, color 3412, FED-TT-C-595, MIL-E-12507, 1 QT CN
8010-297-2111	Enamel, insigna white, lusterless, for ammo, 1 GL CN, Ref No. TTE516-37875
8010-878-5761	Enamel, insigna white, lusterless, 1 PT CN, Ref No. TTE516-37875160ZCN
8010-297-2122	Enamel, jet black, lusterless, for ammo, 1 GL CN, Ref No. TTE516-37038
8010-297-2116	Enamel, OD, lusterless, for ammo, 1 GL CN, Ref No. TTE516-34087, Ref No. TTE516X34087, Ref No. MILE10687X34087
8010-914-3081	Enamel, OD, lusterless, solar heat reflecting, 1 GL CN, Ref No. MILE46096
8010-297-2112	Enamel, orange yellow, lusterless, for ammo, 1 GL CN, Ref No. TTE516-33538
8010-297-2114	Enamel, red, lusterless, quick drying, for ammo, FS-TT-C-595, MIL-E-10687, No. 31136, 1 GL CN
8010-286-7725	Enamel, black, gloss, 5 GL PL, Ref No. TTE489,A,BLK
8010-297-2121	Enamel, lusterless, FS-TT-C-595, MIL-E-10687, jet black, No. 37038, 1 QT CN, Ref No. 52-3423-010-025, Ref No. MILE10687-37038, Ref No. TTE516-37038
9150-269-8255	Grease, aircraft, w/gelling agent and liquid lubricant, low evaporation and oxidation resistant, 260 to 300 worked penetration at 77 deg F, 325 deg F min dropping pt, MILL4343A (1 LB CN) (GPS), Ref No. MILL4343, 1 LB CN
8520-527-9942	Hand cleaner, 1 PT CN, Ref No. PH31TYPE1CLASS1
9150-223-4134	Hydraulic fluid, petroleum base, corrosion and oxidation resistant, designed for syn-ru seal, 1 GL CN (DHA) Ref No. MS35900-219, Ref No. MILH5606

*U.S. GOVERMENT PRINTING OFFICE: 1982--546-033/390

FSN	Description
5970-888-2954	Insulating compound, electrical liquid form, resistant to oil, acid and alkalies, 8 oz CN, Ref No. 9029986
5970-162-7523	Insulating varnish, electrical saltwater resistant, purple, Ref No. ZV903, Ref No. 9059935
5970-647-3676	Insulating varnish, electrical, air drying, clear, for general purpose use, 1 PT CN, Ref No. 9017118, Ref No. 8150350, Ref No. MILV173 1 PT
5970-285-0271	Insulating varnish, electrical, clear, air drying, resistant to fungus and moisture, 1 GL CN, Ref No. MS35632-1, Ref No. MILV173,1GA (U/C rocket motor igniters)
5970-184-2002	Insulation tape, electrical ins, ru, 3/4 in. w. 0.033 in. thk, Spec HH-T-111C, 30 FT RO, Ref No. 875910
5970-965-9639	Insulation tape, electrical ru, adhesive, 1–1/4 W. 0.02 thk, 12 yd lg, Ref No. MPD3350, (U/C Ser No. 13,001 and subsequent)
6810-286-5435	Ispropyl alcohol, 1 GL CN, Ref No. MIL-I-10428A, Ref No. TT-I-735, GRADE A
5970-548-9520	Insulating varnish, electrical clear, moisture and fungus resistant 1 QT CN, Ref No. MIL-V-173, TYPE 1 Clear
9150-754-0064	Lubricant, solid film, acetone 10 0/0 solid content, 12 oz spray CN, Ref No. MILL23398
9150-782-2627	Lubricating oil, aircraft, turbine engine, synthetic base, Ref No. MILL78081QTCA, Ref No. W14-0-2382, Ref No. MILL007808-1QTCN
9150-231-6689	Lubricating oil, general purpose corrosion and oxidation resistant, 1 QT CN (PL-SPECIAL), Ref No. MILL644, Ref No. VVL800
9150-252-6174	Lubricating oil, general purpose LT, Type V, Class 4, FEDVVL820 (1 QT CN)
9150-273-2389	Lubricating oil, general purpose noncorrosive, low temp, symbol PL SP, –7C deg F max pour PT, 275 deg F min flash PT, MIL-L-644A, amend 2, 4 OZ CN (PL-SPECIAL), Ref No. VVL800
6810-264-6715	Molybdenum disulfide, technical powder form, 1 LB CN, Ref No. MILM7866
6830-292-0732	Nitrogen, technical (Used for transferring ETO from commercial container into the fuel tank of the APS unit) (U/O Ser No. 10,206 thru 14,964)
5350-598-5537	Paper, abrasive flint, paper backing, closed coat, 9 x 10 SH, 100 SH SV, GR fine, Ref No. PP105CLASSZFINE
5350-598-6105	Paper, abrasive flint, paper backing, closed coat, 9 x 10 SH, 100 SH SV, GR med, Ref No. PP105CLASS2MEDIUM
5350-264-3483	Paper, abrasive flint, paper backing, closed coat, 9 x 10 SH, 50 SH SV, coarse GR, Ref No. PP105CLASSZCOARSE, Ref No. 42P01175120

FSN	Description
5350-264-3485	Paper, abrasive flint, rope or wood FBR or kraft paper backing, closed-coat, 9 x 10 SH, 100 SH sleeve, P-P-105, Class 2, extra fine GR 4/0 or 3/0, Ref No. 42P01205000
8010-161-7419	Primer coating, 6 hr max air drying time for recoating, pigments C/P magnesium silicate stenna, titanium dioxide fin., clean yellow, 1 GL CN
8010-161-7339	Primer coating, yellow, corrosion resistant, 2 hr drying time, 1 GL CN, Ref No. TTP666
8010-582-5318	Primer coating, color T pretinted to match interior green Color No. 34151, 5 minutes drying time, 1 GL CN, Ref No. MILP8585A, Color T 34151
7920-205-1711	Rag, wiping, cotton, bleached or unbleached, mixture of white and colored, designed for general purpose use, Spec DDD-R-30, 50 LB BE, Ref No. MS16746-131, Ref No. DDDR300L2
8030-881-5238	Sealing compound, syn-ru, w/separate catalyst, semisolid, 1 QT CN, Ref No. MILS8516C, Class I
8030-262-9041	Sealing compound, syn-ru, paste form, block 1/2 PT CN, Ref No. 8050300, Ref No. MILS7124A12, Ref No. MILS7124
8030-721-8929	Sealing compound, syn-ru, semisolid, 1 QT CN Class A base, 1 QT CN Class B base, 1 JR Class B catalyst, w/two 8 OZ CN topcoat, MILS7502CLASSB2
8030-853-6649	Sealing compound liquid polymer, 100 GRAN CN or TU, Ref No. MPD 5010
6850-880-7616	Silicone compound (8 OZ per TU), Ref No. 10581521-1, Ref No. MILS8660
8520-228-0598	Soap, toilet, liquid form, 1 GL CO, Ref No. PS624-1
7920-240-2559	Sponge, cellulose, rectangular, Ref No. LS00626TYPEIICLASS2POROSITYA
6810-270-9989	Talc, technical powdered soap stone, ZZ-T-416A Type IV, Class C, 1 LB sifter type can w/cap
1420-875-6300	Tape, insulation, ru silicone, 1–1/4 x 72 FT RL, Ref No. 9027250, (U/O Ser No. 10,206 and subsequent)
8030-772-2941	Tape, pressure sensitive, adhesive AL foil, w/silicone adhesive, 1 W, 0.002 thk (36 YD per RL), Ref No. 9020003
7510-756-9470	Tape, pressure sensitive adhesive cloth backing, coated w/adhesive on both sides, heat and moisture resistance, 1 w (50 FT RO), Ref No. 9021502
8030-775-2310	Tape, pressure sensitive adhesive, fiberglass, adhesive, 1.5 w, 0.009 thk (72 YD per RL), Ref No. 9027208
7510-266-6711	Tape, pressure sensitive adhesive, paper backing, opaque, FED-UU-T-106A, Type 1, 3/4 w
8010-242-2089	Thinner, paint, mineral spirits, 302 to 410 deg F distillation range, 1 GL CN, Ref No. FEDTTT291A, 1 GA CA

FSN	Description
8010-558-7026	Thinner, paint, mineral spirits, 340 to 485 deg F distillation range, TT-T-291AGR1, 5 GL PL
8010-087-1953	Thinner, synthetic resin enamel, 257 to 410 deg F distillation range, 1 QT CN, Ref No. TTT306
8010-254-4218	Thinner, synthetic resin enamel, 257 to 410 deg F distillation range, FED-TT-T-306, 53 GL DR, Ref No. TTT306-1
6810-281-2002	Toluene, technical, 1 GL CN, Ref No 9060184, Ref No. TTT548
6810-184-4794	Trichloroethylene, technical (5 GL DR), Ref No. OT634-2
6810-664-0387	Trichloroethane, technical, inhibited, 1 GL CN, Ref No. OT620
6850-285-9432	Wetting agent, sodium alkyl aryl sulfonate active ingredient, liquid form, water solvent, 1 QT CN, Ref No. 8162033
1430-00-593-7839	Tape, nylon lacing, waxed, type P, MIL-T-713, Ref No. 9010157
8030-530-6375	Tape, opaque white, adhesive corrosion, resistant 1" 12/48, Ref No. MIL-T-4053B
8010-721-9752	Lacquer, brass, acrylic resin 1 PT pressurized can, Ref No. FED SPEC TTL-50
6850-984-5853	Cleaning compound, solvent, Ref No. MIL-C-81302 5 Gal

TM 9-1410-250-24P/1/

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

ORGANIZATIONAL, DS AND GS MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST
FOR

GUIDED MISSILE, INTERCEPT-AERIAL, MIM-14A AND MIM-14B ROCKET MOTOR CLUSTER, TRAINING, M29 (FSN 6920-580-6481) BODY SECTION, GUIDED MISSILE TRAINING, M84 (FSN 6920-893-3163) SHIPPING AND STORAGE CONTAINER GUIDED MISSILE TRANSPONDER M466 (FSN 8140-724-3014)

(NIKE-HERCULES/IMPROVED HERCULES
AIR DEFENSE GUIDED MISSILE SYSTEM)

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 197

SECTION II. REPAIR PARTS AND SPECIAL TOOLS LIST

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION		(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 15 DAY ORG. MAINT. ALLOW. CO. BTRY. BN.	(7) ILLUSTRATI (A) FIGURE NUMBER	ITEM
		AMMUNITION						
		GUIDED MISSILE, INTERCEPT-AERIAL MIM-14A AND MIM-14B						
		ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT						
		NONE AUTHORIZED						
		CLEANING AND PRESERVING MATERIALS						
		AMMUNITION COMPONENTS OF GUIDED MISSILE, INTERCEPT-AERIAL MIM-14A AND MIM-14B						
---- 1	8040-262-9011	ADHESIVE SYN-RU, LIQUID FORM, 1 PT CN REF NO. MILA5092TYPE3-1PT	C	PT	AR	*	-	
---- 2	8010-297-2116	ENAMEL OD, LUSTERLESS, FOR AMMO, 1 GL CN REF NO. TTE516-34C87 REF NO. TTE516X34087		GL	AR	*	-	
---- 3	5970-647-3676	INSULATING VARNISH, ELECTRICAL AIR DRYING, CLEAR, FOR GENERAL PURPOSE USE, 1 PT CN REF NO. 9017118 REF NO. 815C350 REF NO. MILV173 1 PT	C	EA	AR	*	-	
---- 4	5970-285-0271	INSULATING VARNISH, ELECTRICAL CLEAR, AIR DRYING, RESISTANT TO FUNGUS AND MOISTURE, 1 GL CN REF NO. MS35632-1 REF NO. MILV173,1GA	C	GL	AR	*	-	
---- 5	6830-292-0732	NITROGEN, TECHNICAL REF NO. - (USED FOR TRANSFERRING ETO FROM COMMERCIAL CONTAINER INTO THE FUEL TANK OF THE APS UNIT)	C	CF	AR	*	-	
---- 6	8010-582-5318	PRIMER COATING COLOR T PRETINTED TO MATCH INTERIOR GREEN COLOR NO. 34151, 5 MINUTES DRYING TIME, 1 GL CN REF NO. MILP8585A, COLOR T 34151	C	GL	AR	*	-	
---- 7	8030-853-6649	SEALING COMPOUND LIQUID POLYMER, 100 GRAM CN OR TU REF NO. MPC 5010	C	EA	AR	*	-	
		REPAIR PARTS FOR MAJOR ITEMS						
		SHIPPING AND STORAGE CONTAINER, GUIDED MISSILE BODY SECTION, M410						
		NONE AUTH						

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION		(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 15 DAY ORG. MAINT. ALLOW. CO. BTRY. BN.	(7) ILLUSTRATION (A) FIGURE NUMBER	(7) ILLUSTRATION (B) ITEM NUMBER
		CLEANING AND PRESERVING MATERIALS						
		BODY, GUIDED MISSILE						
---- 235	6810-264-6517	ACID, CHROMIC CHROMIUM TRIOXIDE, TECHNICAL, FLAKE FORM, SPEC C-C-303 (5 GL CN) REF NO. OC3C3TYPE25LBCN 5 LB CAN	C	LB	AR	*	-	
---- 236	8040-844-9707	ADHESIVE SYN RESIN, LIQUID FORM, LAMINATES TO WOOD AND S (1 PT PER CN) REF NO. 9978017		PT	AR	*	-	-
P-O- 237	8040-721-9091	ADHESIVE SYN-RU, LIQUID FORM, 1 PT CN W/SEPARATE CATALYST REF NO. MILA25457-1PT		KT	AR	*	-	-
---- 238	8040-290-4301	ADHESIVE SYN-RU, LIQUID FORM, 1 QT CN REF NO. 8162031 REF NO. MILA5092TYPE2		QT	AR	*	-	-
---- 239	8040-264-5840	ADHESIVE SYN-RU, LIQUID, GENERAL BONDING, 1 GL CN REF NO. MILA13883,CRD,TYPE II, 1 GA CA		GL	AR	*	-	-
---- 240	8040-262-9011	ADHESIVE SYN-RU, LIQUID FORM, 1 PT CN REF NO. MILA5092TYPE3-1PT		PT	AR	*	-	-
---- 241	8020-242-7266	BRUSH, PAINT FL, HOG BRISTLE, SQ EDGE, 3 W, 7/8 THK, 3-1/4 EXPOSED LG, FED SPEC H-B-0420, CLASS 1, GRADE B, SIZE 3 REF NO. 8034078		EA	AR	*	-	-
---- 242	6850-224-6663	CLEANING COMPOUND, SOLVENT SOLUTION TYPE, 1 GA CA REF NO. 9156817		GL	AR	*	-	-
---- 243	6850-826-2156	CLEANING COMPOUND, SOLVENT TYPE 1, 1 GA CA REF NO. PC576ATYPE1 REF NO. PC444TYPE1		GL	AR	*	-	-
P-O- 244	8030-231-2345	CORROSION PREVENTIVE COMPOUND HARD FILM, FOR COLD APPLICATION, 1 GL CN (CT) REF NO. MILC16173GRADE1		GL	AR	*	-	-
---- 245	8030-244-1298	CORROSION PREVENTIVE COMPOUND SOLVENT CUTBACK, COLD APPLICATION, SOFT FILM, MIL-C-16173, GR2, 5 GL PL (CL) REF NO. -	C	PL	AR	*	-	-
---- 246	6850-901-0591	DEICING-DEFROSTING REF NO. MILA8243A	C	GL	AR	*	-	-
---- 247	6850-264-9038	DRY CLEANING SOLVENT LIQUID FORM, TO REMOVE SOIL FROM SURFACES IN DRY CLEANING PROCESS FEDPS661B, TYPE 1 (5 GL PL) REF NO. PD680TY1-5GALPL		GL	AR	*	-	-

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---- 248	6850-264-9037	DRY CLEANING SOLVENT C LIQUID FORM, TO REMOVE SOIL FROM SURFACES IN DRY CLEANING PROCESS, PD680TY1-55 GAL DR REF NO. FEDPS661B,TYPE1,55GALDR1,6GA REF NO. PD680TY1-55 GAL DR	GL	AR	*	-	-
---- 249	6850-281-1985	DRY CLEANING SOLVENT LIQUID FORM, FOR DEGREASING MTL AND DRY CLEANING, 1 GL CN REF NO. PD680TYPE1	GL	AR	*	-	-
---- 250	6850-285-8012	DRY CLEANING SOLVENT LIQUID FORM, TO REMOVE SOIL FROM SURFACES IN DRY CLEANING PROCESS, FED-P-S-661B, TYPE 1, 55 GAL DR, 18 GA REF NO. 51S4385-55	GL	AR	*	-	-
---- 251	8010-828-3191	ENAMEL BROWN, LUSTERLESS, 1 GL CN REF NO. MILE10687 REF NO. TTE516	GL	AR	*	-	-
---- 252	8010-297-3819	ENAMEL GREEN, EGGSHELL GLOSS, 16 HR MAX AIR DRY HARD TIME, COLOR 3412, FED-TT-C-595, MIL-E-12507, 1 QT CN REF NO. -	QT	AR	*	-	-
P-O- 253	8010-878-5761	ENAMEL N INSIGNA WHITE, LUSTERLESS, 1 PT CN REF NO. TTE516-3787516CZCN	PT	AR	*	-	-
---- 254	8010-297-2111	ENAMEL INSIGNA WHITE, LUSTERLESS, FOR AMMO, 1 GL CN REF NO. TTE516-37875	GL	AR	*	-	-
---- 255	8010-297-2122	ENAMEL JET BLACK, LUSTERLESS, FOR AMMO, 1 GL CN REF NO. TTE516-37038	GL	AR	*	-	-
---- 256	8010-297-2116	ENAMEL OD, LUSTERLESS, FOR AMMO, 1 GL CN REF NO. TTE516-34087 REF NO. TTE516X34087	GL	AR	*	-	-
---- 257	8010-914-3081	ENAMEL OD, LUSTERLESS, SOLAR HEAT REFLECTING 1 GL CN REF NO. MILE46096	GL	AR	*	-	-
---- 258	8010-297-2112	ENAMEL ORANGE YELLOW, LUSTERLESS, FOR AMMO, 1 GL CN REF NO. TTE516-33538	GL	AR	*	-	-
---- 259	8010-297-2114	ENAMEL RED, LUSTERLESS, QUICK DRYING, FOR AMMO, FS-TT-C-595, MIL-E-10687, NO. 31136, 1 GL CN REF NO. -	GL	AR	*	-	-
---- 260	9150-269-5255	GREASE, AIRCRAFT W/GELLING AGENT AND LIQUID LUBRICANT, LOW EVAPORATION AND OXIDATION RESISTANT, 260 TO 300 WORKED PENETRATION AT 77 DEG F, 325 DEG F MIN DROPPING PT, MILL4343A (1 LB CN) (GPS) REF NO. MILL4343, 1 LB CAN	LB	AR	*	-	-

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---- 261	8520-527-9942	HAND CLEANER C 1 PT CN REF NO. PH31TYPE1CLASS1	PT	AR	*	-	-
---- 262	9150-933-5278	HYDRAULIC FLUID, PETROLEUM BASE REF NO. M1S10137	GL	AR	*	-	-
---- 263	9150-223-4134	HYDRAULIC FLUID, PETROLEUM BASE CORROSION AND OXIDATION RESISTANT, DESIGNED FOR SYN-RU SEAL, 1 GL CN (OHA) REF NO. MS35900-219 REF NO. MILH5606	GL	AR	*	-	-
---- 264	9150-698-3822	HYDRAULIC FLUID, PETROLEUM BASE C YELLOW, OXIDATION RESISTANT, 2.8 CENTISTOKES AT 100 DEG F MIN VISCOSITY, 300 CENTISTOKES AT 65 DEG F MAX VISCOSITY, 200 DEG F MIN FLASH PT BY CLEVELAND OPEN-CUP TEST METHOD, 75 DEG F MAX POUR PT, DESIGNED FOR SYN-RU SEAL, MPD-2067 (1 GL CN) (OHA) REF NO. 8523877 REF NO. MILH46004	GL	AR	*	-	-
---- 265	7510-179-0451	INK, MARKING STENCIL YELLOW, LIQUID, OPAQUE, 1 GL CN REF NO. TT1558-33538	GL	AR	*	-	-
P--- 266	5970-888-2954	INSULATING COMPOUND, ELECTRICAL LIQUID FORM, RESISTANT TO OIL, ACID AND ALKALIES, 8 OZ CN REF NO. 9029986	OZ	AR	*	-	-
---- 267	5970-162-7523	INSULATING VARNISH, ELECTRICAL C SALTWATER RESISTANT, PURPLE REF NO. ZV903 REF NO. 9059935	EA	AR	*	-	-
---- 268	5970-184-2002	INSULATION TAPE, ELECTRICAL INS, RU, 3/4 IN. W, 0.033 IN. THK, SPEC PH-T-111C, 30 FT RO REF NO. 875910	FT	AR	*	-	-
---- 269	5970-965-9633	INSULATION TAPE, ELECTRICAL C RU, ADHESIVE, 1-1/4 W, 0.02 THK, 12 YD LG REF NO. MPD3350 (U/O SER NO. 13,001 AND SUBQ.)	FT	AR	*	-	-
---- 270	9150-754-0064	LUBRICANT, SOLID FILM C ACETONE 10 C/O SOLID CONTENT, 12 OZ SPRAY CN REF NO. MILL23398	OZ	AR	*	-	-
---- 271	9150-782-2627	LUBRICATING OIL, AIRCRAFT, TURBINE N ENGINE, SYNTHETIC BASE REF NO. MILL7808ICTCA REF NO. W14-0-2382 REF NO. MILL007808-1QTCN	QT	AR	*	-	-
---- 272	9150-231-6689	LUBRICATING OIL, GENERAL PURPOSE CORROSION AND OXIDATION RESISTANT, 1 QT CN (PL-SPECIAL) REF NO. MILL644 REF NO. VVL800	QT	AR	*	-	-
---- 273	9150-252-6174	LUBRICATING OIL, GENERAL PURPOSE LT, TYPE V, CLASS 4, FEDVVL820 (1 QT CN) REF NO. -	QT	AR	*	-	-

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---- 274	9150-273-2389	LUBRICATING OIL, GENERAL PURPOSE C NONCORROSIVE, LOW TEMP, SYMBOL PL SP, - 70 DEG F MAX POUR PT, 275 DEG F MIN FLASH PT, MIL-L-6444A, AMEND 2, 4 OZ CN (PL-SPECIAL) REF NO. VVL800	OZ	AR	*	-	-
---- 275	6810-264-6715	MOLYBDENUM DISULFIDE, TECHNICAL POWDER FORM, 1 LB CN REF NO. MILM7866	LB	AR	*	-	-
---- 276	5350-598-5537	PAPER, ABRASIVE C FLINT, PAPER BACKING, CLOSED COAT, 9 X 10 SH, 100 SH SV, GR FINE REF NO. PP1C5CLASS2FINE	EA	AR	*	-	-
---- 277	5350-598-6105	PAPER, ABRASIVE N FLINT, PAPER BACKING, CLOSED COAT, 9 X 10 SH, 100 SH SV, GR MED REF NO. PP1C5CLASS2MEDIUM	EA	AR	*	-	-
---- 278	5350-264-3483	PAPER, ABRASIVE FLINT, PAPR BACKING, CLOSED COAT, 9 X 10 SH, 50 SH SV, COARSE GR REF NO. PP1C5CLASS2COARSE REF NO. 42PC1175120	SH	AR	*	-	-
---- 279	5350-264-3485	PAPER, ABRASIVE FLINT, ROPE OR WOOD FBR OR KRAFT PAPR BACKING, CLOSED-COAT, 9 X 10 SH, 100 SH SLEEVE, P-P-105, CLASS 2, EXTRA FINE GR 4/0 OR 3/0 REF NO. 42PC12C50CC	SH	AR	*	-	-
---- 280	8010-161-7419	PRIMER COATING 6 HR MAX AIR DRYING TIME FOR RECOATING, PIGMENTS C/C MAGNESIUM SILICATE SIENNA, TITANIUM DIOXIDE FIN., CLEAN YELLOW 1 GL CN REF NO. -	GL	AR	*	-	-
---- 281	8010-161-7339	PRIMER COATING YELLOW, CORROSION RESISTANT, 2 HR DRYING TIME, 1 GL CN REF NO. TTP666	GL	AR	*	-	-
---- 282	7920-205-1711	RAG, WIPING COTTON, BLEACHED OR UNBLEACHED, MIXTURE OF WHITE AND COLORED, DESIGNED FOR GENERAL PURPOSE USE, SPEC DDD-R-30, 50 LB BE REF NO. MS16746-131 REF NO. DDDR30CL2	LB	AR	*	-	-
---- 283	8030-721-3929	SEALING COMPOUND SYN-RU, SEMISOLID, 1 QT CN CLASS A BASE, 1 QT CN CLASS B BASE, 1 JR CLASS A CATALYST, 1 JR CLASS B CATALYST, W/TWO 8 OZ CANS TOPCOAT REF NO. MILS7502CLASSB2	KT	AR	*	-	-
---- 284	6850-880-7616	SILICONE COMPOUND (8 OZ PER TL) REF NO. 10581521-1 REF NO. MILS866C	OZ	AR	*	-	-
---- 285	8520-228-0598	SOAP, TOILET LIQUID FORM, 1 GL CO REF NO. PS624-1	GL	AR	*	-	-
---- 286	7920-240-2559	SPONGE, CELLULOSE, RECTANGULAR REF NO. LSCC626TYPEIICLASS2PORCSITYA	EA	AR	*	-	-

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---- 287	7920-267-4923	SPONGE, VINYL RECT SHAPE, 3-3/4 W, 2-3/4 THK, 6-3/4 LG, MIL-S-11036, TYPE 1, CLASS 2 REF NO. -	EA	AR	*	-	
---- 288	6510-270-9989	TALC, TECHNICAL POWDERED SOAP STONE, ZZ-T-416A, TYPE IV CLASS C, 1 LB SIFTER TYPE CAN W/CAP REF NO. -	LB	AR	*	-	
---- 289	7510-756-9470	TAPE, PRESSURE SENSITIVE ADHESIVE CLOTH BACKING, COATED W/ADHESIVE ON BOTH SIDES, HEAT AND MOISTURE RESISTANCE, 1 W (50 FT RD) REF NO. 9021502	EA	AR	*	-	
---- 290	7510-266-6711	TAPE, PRESSURE SENSITIVE ADHESIVE PAPR BACKING, OPAQUE, FED-UU-T-106A, TYPE 1, 3/4 W REF NO. -	YD	AR	*	-	
---- 291	8010-242-2089	THINNER, PAINT, MINERAL SPIRITS 302 TO 410 DEG F DISTILLATION RANGE, 1 GL CN REF NO. FEDTTT291A, 1 GA CA	GL	AR	*	-	
---- 292	8010-558-7026	THINNER, PAINT, MINERAL SPIRITS 340 TO 485 DEG F DISTILLATION RANGE, TT-T-291AGR1, 5 GL PL REF NO. -	GL	AR	*	-	
---- 293	8010-087-1953	THINNER, SYNTHETIC RESIN ENAMEL 257 TO 410 DEG F DISTILLATION RANGE, 1 QT CN REF NO. TTT306	C PT	AR	*	-	
---- 294	8010-254-4218	THINNER, SYNTHETIC RESIN ENAMEL 257 TO 410 DEG F DISTILLATION RANGE, FED-TT-T-306, 55 GL DR REF NO. TTT306-1	GL	AR	*	-	
---- 295	6810-281-2002	TOLUENE, TECHNICAL 1 GL CN REF NO. 906C184 REF NO. TTT548	GL	AR	*	-	
---- 296	6810-184-4794	TRICHLOROETHYLENE, TECHNICAL (5 GL DR) REF NO. OT634-2	C GL	AR	*	-	
---- 297	6810-664-0387	TRICHLOROETHANE, TECHNICAL INHIBITED, 1 GL CN REF NO. OT620	GL	AR	*	-	
---- 298	6850-285-9432	WETTING AGENT SODIUM ALKYL ARYL SULFONATE ACTIVE INGREDIENT, LIQUID FORM, WATER SOLVENT, 1 QT CAN REF NO. B162033	C PT	AR	*	-	

TM 9-1410-250-24P-2-1

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

MHRC COPY

TECHNICAL MANUAL

ORGANIZATIONAL, DS AND GS MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST
(INCLUDING DEPOT MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS)

FOR

SIMULATOR, GUIDED MISSILE FLIGHT OA-1543C/M (FSN 4935-084-2972) MISSILE GUIDANCE SET AN/DPW-17, AN/DPW-17A OR AN/DPW-17B MISSILE GUIDANCE SET AN/DPW-18 OR AN/DPW-18A

(NIKE-HERCULES/IMPROVED HERCULES
AIR DEFENSE GUIDED MISSILE SYSTEM)

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1971

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 15 DAY ORG. MAINT. ALLOW. CO. BTRY. BN.	(7) ILLUSTRATION (A) FIGURE NUMBER	(7) ILLUSTRATION (B) ITEM NUMBER
		ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT					
		SIMULATOR, GUIDED MISSILE FLIGHT OA-1643C/M (9989312)					
		NONE AUTHORIZED					
		REPAIR PARTS FOR MAJOR ITEMS					
		SIMULATOR, GUIDED MISSILE FLIGHT OA-1643C/M (9989312)					
P-OS 1	4935-897-7297	AMPLIFIER-DECODER REF NO. 9158653 (REPLACES 9006519 AFTER DA MWO 9-1430-250-30/2 IS APPLIED.)	EA	1	*	-	-
P-OS 2	1420-701-4627	CONVERTER, SIGNAL DATA C/O DETONATION CONTROL, PULSE DEMODULATOR, DELAY PULSE GENERATOR, SIGNAL DATA CONVERTER SUB ASSY, GUARDS, HANDLES AND ATTACHING HARDWARE, 9-15/16 DIA, 4.156 H, W/4 8-32 THD SCREWS REF NO. 9001921	EA	1	1	-	-
P-O- 3	5935-258-4449	COVER, ELECTRICAL CONNECTOR CORROSION RESISTANT MTL, 1 DIA, 5/8 LG, W/CHAIN REF NO. 8176471 REF NO. 10606730-1 REF NO. 10609518-1 REF NO. CW339U	EA	1	*	-	-
P-O- 4	1420-568-8284	DELAY LINE REF NO. 8512414	EA	1	*	-	-
P-OF 5	1420-613-8797	DETECTOR DRIVER, DELAY LINE C/O CHASSIS, COVER, RESISTOR ASSY, 2 AMP VIDEO ASSY, PULSE OSCILLATOR, 6 CONNECTORS AND ATTACHING HARDWARE, MTD BY THREE NO. 8-32 SCREWS, 5-1/16, 3-9/32 H, 7-13/32 LG REF NO. 9006809	EA	1	*	-	-
P-OR 6	1430-573-0749	DETECTOR, RADIO FREQUENCY CONNECTOR J1 LOCATED ON LEFT SIDE REF NO. 8172699	EA	1	*	-	-
P-OR 7	1430-568-8304	DETECTOR, RADIO FREQUENCY C/O 2 CONNECTORS, 1-1/4 W, 3 H, 2-5/16 LG REF NO. 8023123 REF NO. 8172668	EA	1	*	-	-
P-O- 8	5960-636-0001	ELECTRON TUBE TYPE RK6229/6230 REF NO. 8170564 REF NO. 9006567	EA	1	*	-	-
P-O- 9	4130-546-2233	FILTER ELEMENT, AIR PERMANENT TYPE, AL FILTERING MEC, MTL FRAME, 89 CFM, 6-1/2 W, 1/2 THK, 6-1/2 H REF NO. 9003200	C EA	1	*	-	-
P-O- 10	4130-322-7829	FILTER ELEMENT, AIR PERMANENT TYPE, AL SCREEN, MTL FRAME, 5 W, 1 THK, 7-1/2 LG REF NO. 8175686	C EA	1	*	-	-

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P-OT 11	1420-341-2353	MODULATOR, RADAR 4,000 V PEAK PULSE OUTPUT, 0.25 USEC. 2,000 PULSE PER SEC REPETITION RATE, 2-5/8 X 3-19/32 X 5-3/32 REF NO. 8023058	EA	1	*	-	-
P-OR 12	4935-807-7812	RELAY ASSEMBLY AL MTG BOARD, 2 W, 0.064 H, 4.5 LG REF NO. 8511415	EA	1	*	-	-
P-O- 13	5960-860-7709	SHIELD, ELECTRON TUBE REF NO. 10034220-2 REF NO. M24251-6-2	EA	1	*	-	-
P-O- 14	5961-898-4234	SEMICONDUCTOR DEVICE, DIODE REF NO. 9976139	EA	2	*	-	-
		CLEANING AND PRESERVING MATERIALS					
		SIMULATOR, GUIDED MISSILE FLIGHT OA-1643C/M (9989312)					
---- 15	6850-281-1985	DRY CLEANING SOLVENT LIQUID FORM, FOR DEGREASING MTL AND DRY CLEANING, 1 GL CN REF NO. PD680TYPE1	GL	AR	*	-	-
---- 16	6810-664-0387	TRICHLOROETHANE, TECHNICAL INHIBITED, 1 GL CN REF NO. OT620	GL	AR	*	-	-

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 15 DAY ORG. MAINT. ALLOW. CO. BTRY. BN.	(7) ILLUSTRATION (A) FIGURE NUMBER	(7) ILLUSTRATION (B) ITEM NUMBER
P-O-28	1420-612-3030	DELAY LINE GA1C424-L14 REF NO. 9007625	EA	AR	*	-	-
P-O-29	1420-612-3031	DELAY LINE GA1C424-L15 REF NO. 9007626	EA	AR	*	-	-
P-O-30	1420-612-3032	DELAY LINE GA1C424-L16 REF NO. 9007627	EA	AR	*	-	-
P-O-31	6850-264-6574	DESICCANT, ACTIVATED TYPE D-3464A, CLASS 2, FOUR DESICCANT UNITS PER BAG REF NO. MILD3464-4 REF NO. 9024584	LB	AR	*	-	-
P-OT 32	1420-613-8797	DETECTOR DRIVER, DELAY LINE C/O CHASSIS, COVER, RESISTOR ASSY, 2 AMP VIDEO ASSY, PULSE OSCILLATOR, 6 CONNECTORS AND ATTACHING HARDWARE, MTD BY THREE NO. 8-32 SCREWS, 5-1/16, 3-9/32 H, 7-13/32 LG REF NO. 9006809 (U/O SER NO. 10,206 THRU 11,970.)	C EA	1	1	-	-
P-OR 33	1430-568-8304	DETECTOR, RADIO FREQUENCY C/O 2 CONNECTORS, 1-1/4 W, 3 H, 2-5/16 LG REF NO. 8023123 REF NO. 8172668	EA	1	*	-	-
P-OR 34	1430-573-0749	DETECTOR, RADIO FREQUENCY CONNECTOR J1 LOCATED ON LEFT SIDE REF NO. 8172699 (U/O SER NO. 10,206 THRU 11,970.)	C EA	1	*	-	-
P-O-35	5960-284-9285	ELECTRON TUBE TYPE 5727/2D21W REF NO. 9000897 REF NO. 5727/2D21W (U/C SER NO. 10,206 THRU 11,970.)	C EA	1	1	-	-
P-O-36	5960-503-4880	ELECTRON TUBE (R) TYPE OA2WA REF NO. 8034150 REF NO. OA2WA (U/C SER NO. 10,206 THRU 11,970.)	C EA	3	*	-	-
P-O-37	5960-636-0001	ELECTRON TUBE TYPE RK6229/6230 REF NO. 8170564 REF NO. 9006567 (U/C SER NO. 10,206 THRU 11,970.)	C EA	1	*	-	-
P-O-38	1420-591-2997	HORN, WAVEGUIDE GS18756-L1 REF NO. 8520831	EA	AR	*	-	-
P-O-39	1420-591-3473	HORN, WAVEGUIDE GS18756-L2 REF NO. 8520832	EA	AR	*	-	-
P-O-40	1420-591-2998	HORN, WAVEGUIDE GS18756-L3 REF NO. 8520833	EA	AR	*	-	-
P-O-41	1420-591-2999	HORN, WAVEGUIDE GS18756-L4 REF NO. 8520834	EA	AR	*	-	-

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		CLEANING AND PRESERVING MATERIALS					
		MISSILE GUIDANCE SET AN/DPW-17 (90C2298), AN/DPW-17A (9141683), OR AN/DPW-17B (9015783)					
---- 68	8030-262-9041	SEALING COMPOUND SYN-RU, PASTE FORM, BLACK, 1/2 PT CN REF NO. 8050300 REF NO. MILS7124A12 REF NO. MILS7124	PT	AR	*	-	-

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 15 DAY ORG. MAINT. ALLOW. CO. BTRY. BN.	(7) ILLUSTRATION (A) FIGURE NUMBER	(B) ITEM NUMBER
P-O-82	1420-614-0556	WAVEGUIDE ASSEMBLY C FLEX, V SHAPED W/TWISTS AND OFFSET BENDS, 6-5/16 W, 13 LG REF NO. 9007631 (U/C SER NO. 13,001 AND SUBQ.)	EA	1	*	-	-
P-O-83	1420-614-0557	WAVEGUIDE ASSEMBLY C U BEND TYPE, 7/8 RAD OF BEND, ONE LEG 2.898 LG, OTHER LEG 5-1/16 LG REF NO. 9009558 (U/C SER NO. 13,001 AND SUBQ.)	EA	1	*	-	-
		CLEANING AND PRESERVING MATERIALS					
		MISSILE GUIDANCE SET AN/DPW-18 (9017423) OR AN/DPW-18A (9149099) OR AN/DPW-2 (10666975)					
---- 84	6810-543-7415	ALCOHOL, DENATURED FORMULA NO. 3A, 1 GL CN REF NO. OE760GRADE3	GL	AR	*	-	-
---- 85	8030-201-0996	ANTISIEZE COMPOUND ASPHALT, GRAPHITE, LUBR OIL, PETROLATUM, AND WHITE LEAD INGREDIENTS, 1 PT CN REF NO. TTA580 REF NO. TTA00580	PT	-	*	-	-
---- 86	6850-224-6663	CLEANING COMPOUND, SOLVENT SOLUTION TYPE, 1 GA CA REF NO. 9156817	GL	AR	*	-	-
---- 87	6850-880-7616	SILICONE COMPOUND (8 OZ PER TU) REF NO. 10581521-1 REF NO. MILS8660	OZ	AR	*	-	-
---- 88	6810-664-0387	TRICHLOROETHANE, TECHNICAL INHIBITED, 1 GL CN REF NO. OT620	GL	AR	*	-	-

(1) SM & R CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEAS	(5) QUANTITY INCORPORATED IN UNIT	(6) 30 DAY MAINTENANCE ALLOWANCE (A) DIRECT SUPPORT MAINT	(B) GENERAL SUPPORT MAINT	(7) DEPOT MAINT ALW PER 100 EQUIP	(8) ILLUSTRATION (A) FIGURE NUMBER	(B) ITEM NUMBER
P-D-148	1420-573-0760	RECEIVER, TRANSMITTER SUBASSEMBLY C/O COP. CLAD LAMINATED NYLON TERM. BOARD AND 10 COILS, 2 SQ, 1/16 THK REF NO. 8512421	EA	1	-	-	5	-	-
P-D-149	5945-295-3270	RELAY, ARMATURE 110 V AC, 3 AMP RESISTIVE CUR., 24 V DC, 3 AMP RESISTIVE CUR., 1 W, 1-9/32 H, 1-19/32 LG REF NO. 8175668	EA	1	-	-	5	-	-
P-D-150	5945-535-4371	RELAY, ARMATURE SPDT, 115 V AC, 1 AMP, 4-15/16 LG REF NO. 8518360 REF NO. 8518360-2	EA	1	-	-	5	-	-
P-OR 151	4935-807-7812	RELAY ASSEMBLY AL MTG BOARD, 2 W, 0.064 H, 4.5 LG REF NO. 8511415	EA	1	1	*	5	-	-
P-D-152	5905-110-0992	RESISTOR, FIXED, COMPOSITION REF NO. RCR32G511JS	EA	1	-	-	10	-	-
P-D-153	5905-104-5755	RESISTOR, FIXED, COMPOSITION 1/2 W, 10 OHMS, TYPE RCR20G100JS (+- 5 0/0) REF NO. RCR20G100JS	EA	1	-	-	10	-	-
P-D-154	5905-106-9344	RESISTOR, FIXED, COMPOSITION 1/2 W, 100 OHMS, TYPE RCR20G101JS (+- 5 C/O) REF NO. RCR20G101JS	EA	2	-	-	20	-	-
P-F-155	5905-141-0727	RESISTOR, FIXED, COMPOSITION 1/2 W, 200 OHMS, TYPE RCR20G201JS (+- 5 0/0) REF NO. 8307-34 REF NO. RCR20G201JS	EA	1	-	-	10	-	-
P-D-156	5905-114-5407	RESISTOR, FIXED, COMPOSITION 1/2 W, 270 OHMS, TYPE RCR20G271JS (+- 5 0/0) REF NO. RCR20G271JS	EA	1	-	-	10	-	-
P-D-157	5905-935-8541	RESISTOR, FIXED, COMPOSITION 1/2 W, 300 OHMS, TYPE RCR20G301JS (+- 5 0/0) REF NO. 301-0301-00 REF NO. RCR20G301JS	EA	1	-	-	10	-	-
P-D-158	5905-104-8349	RESISTOR, FIXED, COMPOSITION 1/2 W, 510 OHMS, TYPE RCR20G511JS (+- 5 0/0) REF NO. RCR20G511JS	EA	1	-	-	10	-	-
P-D-159	5905-106-1274	RESISTOR, FIXED, COMPOSITION 1/2 W, 910 OHMS, TYPE RCR20G911JS (+- 5 0/0) REF NO. RCR20G911JS	EA	1	-	-	10	-	-
P-D-160	5905-110-0196	RESISTOR, FIXED, COMPOSITION 1/2 W, 1,000 OHMS, TYPE RCR20G102JS (+- 5 0/0) REF NO. RCR20G102JR REF NO. 8176288 REF NO. RCR20G102JS	EA	3	-	-	15	-	-
P-D-161	5905-111-4738	RESISTOR, FIXED, COMPOSITION 1/2 W, 1,500 OHMS, TYPE RCR20G152JS (+- 5 0/0) REF NO. RCR20G152JS	EA	1	-	-	10	-	-

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P-D-162	5905-141-1168	RESISTOR, FIXED, COMPOSITION 1/2 W, 2,200 OHMS, TYPE RCR20G222JS (+- 5 C/O) REF NO. RCR20G222JS	EA	1	-	-	10	-	-
P-D-163	5905-111-4744	RESISTOR, FIXED, COMPOSITION 1/2 W, 5,100 OHMS, TYPE RCR20G512JS (+- 5 0/0) REF NO. 307-0057-00 REF NO. RCR20G512JS	EA	10	-	-	150	-	-
P-D-164	5905-141-1116	RESISTOR, FIXED COMPOSITION 1/2 W, 5,600 OHMS, TYPE RCR20G562JS (+ - 5 0/0) REF NO. RCR20G562JS	EA	1	-	-	20	-	-
P-D-165	5905-141-0591	RESISTOR, FIXED, COMPOSITION 1/2 W, 10,000 OHMS, TYPE RCR20G103JS (+- 5 0/0) REF NO. RCR20G103JS	EA	1	-	-	15	-	-
P-D-166	5905-111-4841	RESISTOR, FIXED, COMPOSITION 1/2 W, 13,000 OHMS, TYPE RCR20G133JS (+- 5 0/0) REF NO. RCR20G133JS	EA	2	-	-	10	-	-
P-D-167	5905-106-1273	RESISTOR, FIXED, COMPOSITION 1/2 W, 15,000 OHMS, TYPE RCR20G153JS (+- 5 0/0) REF NO. RCR20G153JS	EA	4	-	-	60	-	-
P-D-168	5905-106-1282	RESISTOR, FIXED, COMPOSITION 1/2 W, 22,000 OHMS, TYPE RCR20G223JS (+- 5 0/0) REF NO. RCR20G223JS	EA	1	-	-	10	-	-
P-D-169	5905-141-0599	RESISTOR, FIXED, COMPOSITION C 1/2 W, 39,000 OHMS, TYPE RCR20G393JS (+- 5 0/0) REF NO. RCR20G393JS	EA	1	-	-	10	-	-
P-D-170	5905-141-0597	RESISTOR, FIXED, COMPOSITION 1/2 W, 51,000 OHMS, TYPE RCR20G513JS (+- 5 0/0) REF NO. RCR20G513JS	EA	1	-	-	10	-	-
P-D-171	5905-106-9345	RESISTOR, FIXED, COMPOSITION 1/2 W, 68,000 OHMS, TYPE RCR20G683JS (+- 5 0/0) REF NO. RCR20G683JS	EA	1	-	-	10	-	-
P-D-172	5905-104-8331	RESISTOR, FIXED, COMPOSITION 1/2 W, 300,000 OHMS, TYPE RCR20G304JS (+- 5 0/0) REF NO. RCR20G304JS	EA	3			15	-	-
P-D-173	5905-111-4840	RESISTOR, FIXED, COMPOSITION 1/2 W, 510,000 OHMS, TYPE RCR20G514JS (+- 5 0/0) REF NO. RCR20G514JS	EA	1	-	-	10	-	-
P-D-174	5905-171-2000	RESISTOR, FIXED, COMPOSITION 1/2 W, 680,000 OHMS, TYPE RC20GF684J (+- 5 0/0) REF NO. MS35043-155 REF NO. 8531222 REF NO. EB6845 REF NO. EB6841 REF NO. RC20GF684J	EA	1	-	-	15	-	-

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	5905-104-5755	CONTINUED (U/O SER NO. 10,206 THRU 11,970.)								
P-D-243	5905-421-0623	RESISTOR, FIXED, COMPOSITION 1/2 W, 12 OHMS, TYPE RCR20G120JS (+- 5 C/O) REF NO. RCR20G120JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	3	-	-	35	-	-
P-D-244	5905-935-8540	RESISTOR, FIXED, COMPOSITION 1/2 W, 30 OHMS, TYPE RCR20G300JS (+- 5 O/O) REF NO. RCR20G300JS (U/O SER NO. 10,206 THRU 11,970.)		EA	1	-	-	10	-	-
P-D-245	5905-111-4734	RESISTCR, FIXED, CCMPOSITION 1/2 W, 47 OHMS, TYPE RCR20G470JS (+- 5 C/C) REF NO. RCR20G470JS		EA	8	-	-	80	-	-
P-D-246	5905-114-5361	RESISTOR, FIXED, COMPOSITION 1/2 W, 120 OHMS, TYPE RCR20G121JS (+- 5 0/0) REF NO. RCR20G121JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	2	-	-	25	-	-
P-D-247	5905-111-4736	RESISTCR, FIXED, COMPOSITION 1/2 W, 160 OHMS, TYPE RCR20G161JS (+- 5 C/O) REF NO. RCR20G161JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	1	-	-	10	-	-
P-D-248	5905-104-8349	RESISTOR, FIXED, COMPOSITION 1/2 W, 510 OHMS, TYPE RCR20G511JS (+- 5 0/J) REF NO. RCR20G511JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	1	-	-	15	-	-
P-D-249	5905-106-1274	RESISTOR, FIXED, CCMPOSITION 1/2 W, 910 OHMS, TYPE RCR20G911JS (+- 5 0/0) REF NO. RCR20G911JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	1	-	-	15	-	-
P-D-250	5905-110-0196	RESISTOR, FIXED, COMPOSITION 1/2 W, 1,000 OHMS, TYPE RCR20G102JS (+- 5 0/0) REF NO. RCR20G102JR REF NO. 8176288 REF NO. RCR20G102JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	2	-	-	25	-	-
P-D-251	5905-111-4738	RESISTOR, FIXED, COMPOSITION 1/2 W, 1,500 OHMS, TYPE RCR20G152JS (+- 5 0/0) REF NO. RCR20G152JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	1	-	-	15	-	-
P-D-252	5905-141-0593	RESISTCR, FIXED, COMPOSITION 1/2 W, 1,800 OHMS, TYPE RCR20G182JS (+- 5 0/0) REF NO. RCR20G182JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	2	-	-	25	-	-
P-D-253	5905-935-8539	RESISTCR, FIXED, COMPOSITION 1/2 W, 2,000 OHMS, TYPE RCR20G202JS (+- 5 0/0) REF NO. RCR20G202JS (U/O SER NO. 10,206 THRU 11,970.)	C	EA	1	-	-	15	-	-

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P-D-254	5905-141-1130	RESISTOR, FIXED, COMPOSITION 1/2 W, 2,700 OHMS, TYPE RCR20G272JS (+- 5 0/0) REF NO. EB2721 REF NO. RCR20G272JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	1	-	-	15	-	-
P-D-255	5905-111-4744	RESISTOR, FIXED, COMPOSITION 1/2 W, 5,100 OHMS, TYPE RCR20G512JS (+- 5 0/0) REF NO. 307-0057-00 REF NO. RCR20G512JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	2	-	-	25	-	-
P-D-256	5905-141-1116	RESISTOR, FIXED COMPOSITION 1/2 W, 5,600 OHMS, TYPE RCR20G562JS (+ - 5 0/0) REF NO. RCR20G562JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	2	-	-	25	-	-
P-D-257	5905-116-8568	RESISTOR, FIXED, COMPOSITION 1/2 W, 7,500 OHMS, TYPE RCR20G752JS (+- 5 0/0) REF NO. RCR20G752JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	1	-	-	15	-	-
P-D-258	5905-141-0591	RESISTOR, FIXED, COMPOSITION 1/2 W, 10,000 OHMS, TYPE RCR20G103JS (+- 5 0/0) REF NO. RCR20G103JS	EA	5	-	-	50	-	-
P-D-259	5905-106-1273	RESISTOR, FIXED, COMPOSITION 1/2 W, 15,000 OHMS, TYPE RCR20G153JS (+- 5 0/0) REF NO. RCR20G153JS	EA	1	-	-	15	-	-
P-D-260	5905-104-8330	RESISTOR, FIXED, COMPOSITION 1/2 W, 33,000 OHMS, TYPE RCR20G333JS (+- 5 0/0) REF NO. RCR20G333JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	2	-	-	25	-	-
P-D-261	5905-141-0596	RESISTOR, FIXED, COMPOSITION 1/2 W, 47,000 OHMS, TYPE RCR20G473JS (+- 5 0/0) REF NO. RCR20G473JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	2	-	-	25	-	-
P-D-262	5905-114-5441	RESISTOR, FIXED, COMPOSITION 1/2 W, 56,000 OHMS, TYPE RCR20G563JS (+- 5 0/0) REF NO. EB5631 REF NO. RCR20G563JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	1	-	-	15	-	-
P-D-263	5905-104-8336	RESISTOR, FIXED, COMPOSITION 1/2 W, 100,000 OHMS, TYPE RCR20G104JS (+- 5 0/0) REF NO. RCR20G104JS	EA	2	-	-	25	-	-
P-D-264	5905-104-8331	RESISTOR, FIXED, COMPOSITION 1/2 W, 300,000 OHMS, TYPE RCR20G304JS (+- 5 0/0) REF NO. RCR20G304JS (U/O SER NO. 10,206 THRU 11,970.)	C EA	3	-	-	35	-	-
P-D-265	5905-141-1071	RESISTOR, FIXED, COMPOSITION 1/2 W, 470,000 OHMS, TYPE RCR20G474JS (+- 5 0/0) REF NO. RCR20GF474J REF NO. RCR20G474JS	EA	1	-	-	15	-	-

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		REPAIR PARTS FOR MAJOR ITEMS								
		MISSILE GUIDANCE SET, AN/DPW-18 (9017423) OR AN/DPW-18A (9149099) OR AN/DPW-2 (10666975)								
P-D-1	1420-083-8249	ABSORBER, RADIO FREQUENCY RADIATION 1-9/16 W, 1-5/8 H, 2-15/16 LG REF NO. 9991584		EA	1	*	*	*	-	-
P-D-2	1420-769-6169	ACCELEROMETER, GUIDED MISSILE REF NO. 9010143 (U/O SER NO. 13,001 AND SUBQ.)	C	EA	2	-	-	8	-	-
P-D-3	4935-800-6101	ADAPTER S, ZN-PLTD W/CHROMATE FIN., 0.032 THK, 13/32 H, 1/2 LG, CONCAVE SHAPE AT TOP REF NO. 8006101 (U/O SER NO. 13,106 AND SUBQ.)	C	EA	2	-	-	10	-	-
P-D-4	8040-887-5857	ADHESIVE 3 PARTS OF THERMOSETTING LIQUID RESIN AND TWO PARTS OF POLYAMID RESIN, TWO TO THREE HRS POT LIFE, AIR CURE IN SIX TO EIGHT HRS, 1 QT CN REF NO. 9141496		QT	1	-	-	10	-	-
P-D-5	8040-887-1450	ADHESIVE POLYMERIZED ACRYLIC RESIN BASE, CLEAR LIQUID, HEAT AND CHEMICAL RESISTANT, USED W/SOLVENT (TOLUOL) 40 O/O SOLIDS, 1 GL CN REF NO. 8607093		PT	AR	-	-	1	-	-
P-D-6	8040-290-4301	ADHESIVE SYN-RU, LIQUID FORM, 1 QT CN REF NO. 8162031 REF NO. MILA5092TYPE2		QT	1	-	-	10	-	-
P-OT 7	1420-056-6975	AMPLIFIER, DECODER REF NO. 9989896		EA	1	1	*	2	-	-
P-D-8	1420-712-2939	AMPLIFIER, ELECTRONIC CONTROL REF NO. 9012373 (U/O SER NO. 13,001 AND SUBQ.)	C	EA	1	1	*	2	-	-
P-D-9	1420-703-7776	AMPLIFIER, ELECTRONIC CONTROL REF NO. 10666546 (U/O SER NO. 13,001 AND SUBQ. AFTER MWO 9-1410-250-20/16 IS APPLIED, REPLACES FSN 1420-712-2940, REF NO. 9012378.)	N	EA	2	1	*	4	-	-
P-F-11	1430-768-0154	ARM, LEVER REF NO. 9141421 (U/O SER NO. 13,001 AND SUBQ.)	C	EA	2	*	*	20	-	-
P-D-12	1420-975-8524	BLOCK, MOUNTED REF NO. 9017480 (U/O SER NO. 13,001 AND SUBQ.)	C	EA	1	-	-	10	-	-
P-F-13	5340-132-3257	BRACKET, ANGLE REF NO. 9144523		EA	1	*	*	4	-	-

Appendix E: Standard Building Drawings

Upon deactiviation and sale subsequent to the DoD ownership and use of the Nike sites, the site specific "as-builts" drawings were typically left with the new owner. The drawings in this appendix represent those standard operational buildings. Select drawings used in the report are those that show sewer locations, heating and fuel tanks, transformers and operational equipment locations that need to be consider in environmental investigations. The drawings included are a good representation of those available from the U.S. Army Corps of Engineers Office of History.

Following list of drawings are available at the Office of History.

CORRIDORS
Box 22
26-24-02, Sheets 1-6 -- interconnecting, modified emergency construction, special AAA, between radar control vans, engine generator, and frequency changer building, for control area
26-24-03, Sheets 1-14 -- interconnecting, with FUIF room, modified emergency construction, special AAA, between radar control vans, engine generator, and frequency changer building
26-24-04, Sheet 1 -- interconnecting, AN/FSG-1 tactical facilities

FREQUENCY CHANGER BUILDINGS
Box 22
DEF-26-24-07, Sheets 1-3 -- modified emergency construction, special AAA, modifications to existing building, NIKE-AJAX sites

GENERATOR BUILDINGS
Box 21
ME-26-03-33, Sheets 1,3 -- NIKE-1[1], battery launching area
ME-26-03-34, Sheets 1,3 -- NIKE-1, battery control area
ME-26-03-35, Sheet 3 -- NIKE-1, battery launching area
ME-26-03-38, Sheet 3 -- NIKE-1, battery launching area
ME-26-03-40, Sheets 1-4 -- battery launching area, special AAA
Box 22
26-03-45, Sheets 1-3 -- modified emergency construction, special AAA
DEF-26-24-08, Sheets 1-12 -- NIKE-Hercules, tactical power improvement, control area
Box 76
40-01-29, Sheet 1 -- modified emergency construction, installation of mufflers on roof

HEADQUARTERS AND HEADQUARTERS BATTERY BUILDINGS
Box 32
DEF-30-07-21, Sheets 1-6 -- Army Air Defense Program, modified emergency construction, attached to Nike Hercules firing battery

[1] Nike 1 is used on the drawings but is equal to Nike Ajax.

HIPAR BUILDINGS
Box 22
26-27-01, Sheets 1-22A -- non-consolidated and consolidated, modified emergency construction, improved NIKE-Hercules system

LATRINES - MISSILE AREA
Box 65
ME-38-03-16, Sheets 1-3 -- launching area, NIKE-1
ME-38-03-17, Sheets 1-3 -- battalion assembly area, NIKE-1
ME-38-03-18, Sheets 1-3 -- control area, NIKE-1
ME-38-03-19, Sheets 1-2 -- control area, NIKE-1
ME-38-03-20, Sheets 1-3 -- control area, NIKE-1
ME-38-03-21, Sheet 1 -- pit, launching area, NIKE-1
ME-38-03-22, Sheet 1 -- launching area, NIKE-1
ME-38-03-23, Sheet 1 -- pit, launching area, NIKE-1

MISSILES - ELECTRICAL DISTRIBUTION SYSTEMS
Box 82
ME-71-03-08, Sheets 1-2 -- special AAA, battery control area
71-03-12, Sheets 2, 4 -- special AAA, battery launching area, type D
ME-71-03-15, Sheets 1-2 -- special AAA, battery launching area, type F
ME-71-03-16, Sheets 1-3 -- special AAA, battery launching area, type G
71-03-17, Sheets 1-2 -- modified emergency construction, special AAA, battery control area
71-03-18, Sheet 2 -- modified emergency construction, special AAA, battery control area, alternate layout
71-03-19, Sheet 1 -- modified emergency construction, special AAA, battery launching area, type F
71-03-20, Sheets 1-2 -- modified emergency construction, special AAA, battery launching area, type G
71-03-21, Sheets 1-2 -- modified emergency construction, special AAA, HQ & HQ battery
71-03-56, Sheet 1 -- special AAA, battery launching area, type L
71-03-63, Sheet 1 -- Army Air Defense Program, modified emergency construction, battery control area - HERCULES

MISSILES - GENERAL (also see Latrines, Platforms)
Box 49
33-03-17, Sheets 1-6 -- interim cellular above ground launcher-prototype, special AAA, NIKE-AJAX and NIKE-HERCULES, White Sands Proving Ground, NM
33-03-17, Sheets 1-9 -- interim cellular above ground launcher-prototype, special AAA, NIKE-AJAX and NIKE-HERCULES
Box 51
AW-33-37-09, Sheets 1-54 -- operational facility
AW-33-37-09, Sheets 1-56 -- T/M launching facility

AW-33-37-10, Sheets 1-81 -- T/M operational facility, 8 cells
ME-33-38-01, Sheets 1-4 -- NIKE-1, warhead installation building
33-38-03, Sheets 1-4 -- modified emergency construction, warheading building
Box 52
SK-35-01-35, Sheet 1 -- guided missile assembly facility
Box 54
35-53-34, Sheets 1-18 -- modified emergency construction, special AAA, field maintenance shop, NIKE
SK-35-53-38, Sheets 1-2 -- combined field maintenance shop, NIKE, one battalion
SK-35-53-39, Sheets 1-2 -- combined field maintenance shop, NIKE, two battalions
SK-35-53-40, Sheets 1-2 -- combined field maintenance shop, NIKE, three battalions
SK-35-53-41, Sheets 1-2 -- combined (forward support) field maintenance shop, one to three battalions
SK-35-53-42, Sheets 1-2 -- combined field maintenance shop, HAWK, one battalion
SK-35-53-43, Sheets 1-2 -- combined field maintenance shop, NIKE and HAWK, one battalion
ME-35-60-04, Sheets 1-11 -- assembly and test building, NIKE-1
ME-35-60-05, Sheets 1-4 -- joining building, NIKE-1
ME-35-60-08, Sheets 1-4 -- special AAA, assembly and test building
35-60-16, Sheets 3-4 -- modified emergency construction, special AAA, assembly and test building
35-60-29, Sheets 1-6 -- modified emergency construction, Army Air Defense Program, assembly and test building
Box 76
40-02-88, Sheet 1 -- modified emergency construction, special AAA, minimum pad for AJAX launcher
40-02-93, Sheet 1 -- Army Air Defense Program, spreader beam for monorail hoist in NIKE warheading building
Box 79
60-02-62, Sheets 1-5 -- Army Air Defense Program, modified emergency construction, launcher section , control center
Box 164
16-06-299, Sheet 2 -- improved NIKE-HERCULES system, typical layout diagram, control area

MISSILES - NIKE
(special section listed separately)
Box 162
12-20-40 -- cold storage facility
PRE-35-35-06, Sheets 1-3 -- technical operations building
S-109, Sheets 1-19 -- FY 59 composite structures
C-SK-202-1 -- 45 kw motor generator set
SK-2888, Sheets 1-4 -- industrial enginator unit (also in box 166 with sheet 5 added)
D-10572-53 -- firefighting equipment
D-10791, Sheets 1-2 -- hatch cover counterbalance

D-10791A -- escape hatch latch
D-11434-1 - 16 -- crane, acquisition radar tower, mounted
D-11523-1 - 3 -- buffer type pedestal
D-11584, Sheets 1-5 - D-11584-1A - 5 -- tracking radar tower
NE-20620, Sheet 1 -- field modification of safety check valve
NE-30422, Sheet 1 -- controller system
NE-40363, Sheet 1 & NE-40366, Sheet 1 -- power unit controllers
134741, Sheet 1 -- wiring diagram, control panel
9156145, Sheet 1 -- junction box
9976123, Sheets 1-4 -- circuit breaker meter assembly (sheet 1missing
9976222, Sheets 1-2 -- switch box
9976282, Sheets 1-4, 9986300, Sheets 1-4, & 9986301, Sheets1-5 -- circuit breaker meter assemblies
13200E1151, Sheets 1-13 -- support, radome
13200E1401, Sheets 2-3 -- crane, portable floor
13200E1461, Sheets 1-8 -- extension support, radome
13201E6401, Sheet 1 -- valve, combination rate of flow controller & automatic fuel shutoff
13201E6404, Sheet 1 -- gage, liquid valve
13201E6409, Sheet 1 -- bolt, swing
13201E6413, Sheet 1 -- canister, single cartridge, assembly
13201E6419, Sheet 1 -- pin, locating
13201E6422, Sheet 1 – skid
13201E6426, Sheet 1 -- body, canister
13201E6427, Sheet 1 -- plate, seal
13201E6432, Sheet 1 -- adapter, flanged
13201E6434, Sheet 1 -- cover, head
13201E6444, Sheet 1 -- spider
13201E6446, Sheet 1 -- canister assembly, double cartridge (also in box 166)
PL13201E6446, Sheets 1-2 -- canister assembly, double cartridge
13201E6447, Sheet 1 -- retainer
13201E6448, Sheet 1 -- support, valve
13201E6449, Sheet 1 -- adapter, flanged
Box 163
13201E6450, Sheets 1-2 -- filter/separator (also in box 166)
DL13201E6450, Sheets 1-6 -- filter/separator
PL13201E6450, Sheets 1-6 -- filter/separator
13201E6451, Sheets 1-3 -- body, vessel
13201E6470, Sheet 1 -- plate, seal, intermediate
13207E1096, Sheet 1 -- filter element
13207E7810, Sheet 1 -- lug
13207E7811, Sheet 1 -- eccentric
13207E7812, Sheet 1 -- valve, automatic water drain
13208E9126, Sheets 1-4 -- filter/separator

DL13208E9126, Sheets 1-7 -- filter/separator
PL13208E9126, Sheets 1-6 -- filter/separator
13208E9127, Sheets 1-5 -- body, vessel
13208E9128, Sheet 1 -- indicator, differential pressure Plates 1-5 -- Saturn Facilities Study Elbow

PLATFORMS - GENERAL (also see Towers - Water)
Box 60
ME-36-40-16, Sheet 1 -- J.P. fueling, NIKE-1
ME-36-40-17, Sheet 1 -- acid fueling, NIKE-1
36-40-27, Sheet 1 -- Army Air Defense Program, for FUIF shelter

TOWERS - GENERAL
(also see Tactical Facilities & Fortifications)
Box 53
ME-35-03-01, Sheets 1-2 -- radar, NIKE-1
35-03-02, Sheet 1 -- modified emergency construction, special AAA, acquisition radar
35-03-03, Sheets 1-2 -- modified emergency construction, special AAA, tracking radar
35-03-47, Sheets 1-3 -- modified emergency construction, Army Air Defense Program, acquisition radar
35-03-48, Sheets 1-4 -- modified emergency construction, Army Air Defense Program, tracking radar
35-03-49, Sheets 1-2 -- modified emergency construction, Army Air Defense Program, acquisition radar (existing)
35-03-50, Sheets 1-3 -- modified emergency construction, Army Air Defense Program, tracking radar (existing)
35-03-51, Sheets 1-6 -- modified emergency construction, Army Air Defense Program, ground mounts with radomes, acquisition radar
35-03-52, Sheets 1-6 -- modified emergency construction, Army Air Defense Program, ground mounts with radomes, tracking radar
35-03-53, Sheets 1-4 -- modified emergency construction, Army Air Defense Program, ground mounts with radomes, acquisition radar (existing)
35-03-54, Sheets 1-6 -- modified emergency construction, Army Air Defense Program, ground mounts with radomes, tracking radar (existing)
35-03-55, Sheets 1-2 -- modified emergency construction, Army Air Defense Program, acquisition radar supports, modified for radome
35-03-56, Sheets 1-11 -- modified emergency construction, Army Air Defense Program, high power acquisition radar for improved NIKE-HERCULES system
35-03-57, Sheets 1-5 -- modified emergency construction, Army Air Defense Program, with radomes, alternate battery acquisition radar

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
F10AK0850	Nike Site Bay	Anchorage	Bay		*	HIPAR	NW Anchorage, Goose Bay		AK
F10AK0579	Nike Alaska Point	Anchorage	Point		*	HIPAR	SW Anchorage		AK
		Anchorage	Summit		*	HIPAR	Anchorage/ Chugach Moutains		AK
C03MD0073	Nike Ba-03 (Phoenix)	Baltimore	BA-03	*	*	HIPAR	Phoenix/ Sweet Air	Baltimore	MD
C03MD0234	Nike Ba-09 (Fork)	Baltimore	BA-09	*			Fork	Baltimore	MD
		Baltimore	BA-18	*	*	ABAR/75, SMFU	Edgewood Arsenal		MD
C03MD0237	Nike Ba-30/31 (Tolchester)	Baltimore	BA-30/31	*	*	HIPAR	Chestertown	Kent	MD
C03MD0240	Nike Ba-43 (Fort Smallwood)	Baltimore	BA-43	*			Anne Arundel Co	Anne Arundel	MD
C03MD0244	Nike Ba-79 / W-05 (Granite)	Baltimore	BA-79	*	*	ABAR/75, AN/FPA-16	Granite	Baltimore	MD
C03MD0246	Nike Ba-92 (Towson)	Baltimore	BA-92	*			Cronhardt	Baltimore	MD

[1] Note: This list represents all known operational batteries, most of which are FUDS. The Fort Bliss training sites are not listed, nor are the temporary above ground Ajax sites.

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
A06LA0037	Barksdale AFB - Nike BD-10	Barksdale	BD-10		*	HIPAR	Bellevue	Bossier	LA
A06LA0036	Barksdale AFB - Nike BD 50	Barksdale	BD-50		*	HIPAR	Stonewall	De Soto	LA
K06TX0996	Nike BG-40	Bergstrom	BG-40		*	HIPAR	Elroy	Bastrop	TX
		Bergstrom	BG-80		*	HIPAR	Austin		TX
D01MA0064	Nike BO-03	Boston	BO-03	*			Reading	Middlesex	MA
D01MA0065	Nike BO-05	Boston	BO-05	*	*	HIPAR, SMFU, RRIS	Danvers	Essex	MA
D01MA0066	Nike BO-15	Boston	BO-15	*			Beverly	Essex	MA
D01MA0067	Nahant Nike 17	Boston	BO-17	*			Nahant	Essex	MA
		Boston	BO-36	*	*	HIPAR	Weymouth		MA
D01MA0069	Nike BO-37	Boston	BO-37	*			Quincy	Norfolk	MA
		Boston	BO-38	*			Hingham		MA
D01MA0039	Nike Bat BO-55	Boston	BO-55	*			Blue Hills		MA
D01MA0071	Nike 63	Boston	BO-63	*			Needham	Norfolk	MA
D01MA0072	Nike Bat BO-73	Boston	BO-73	*	*	ABAR/71, FPA-16	Lincoln	Middlesex	MA
D01MA0073	Nike BO-84	Boston	BO-84	*			Burlington	Middlesex	MA

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FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
		Boston	BO-85	*			Bedford		MA
D01CT0024	Nike 04	Bridgeport	BR-04	*	*	ABAR/71	Ansonia	New Haven	CT
		Bridgeport	BR-15	*			New Haven		CT
		Bridgeport	BR-17	*			Bridgeport		CT
D01CT0054	Nike Br-65	Bridgeport	BR-65	*			Bridgeport	Fairfield	CT
D01CT0055	Nike Br-23	Bridgeport	BR-73	*			Westport	Fairfield	CT
		Bridgeport	BR-94	*			Monroe		CT
C02NY0091	Nike BU 09	Buffalo	BU-09	*			Amherst	Erie	NY
C02NY0076	Nike BU 18	Buffalo	BU-18	*	*	ABAR/71	Lancaster	Erie	NY
C02NY0077	Nike BU 34/35	Buffalo	BU-34/35	*			Aurora	Erie	NY
C02NY0079	Nike BU 51/52	Buffalo	BU-52	*			Hamburg	Erie	NY
E05IL0035	Nike C-03 - Belmont HarBOr	Chicago-Gary	C-03	*	*	ABAR/75	Chicago	Cook	IL
		Chicago-Gary	C-32	*	*	HIPAR, SMFU	Porter/Chestert on		IN
E05IL0005	Nike C-40 - Burnham Park	Chicago-Gary	C-40	*			Burnham Park	Cook	IL
E05IL3258	Nike C-41 - Jackson Park	Chicago-Gary	C-41	*	*	ABAR/71	Jackson Park	Cook	IL
E05IL0204	Nike C-44 - Wolf Lake	Chicago-Gary	C-44	*			Hegewisch/Wol f Lake	Cook	IL

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
G05IN0986	Nike C-45, Gary Airport	Chicago-Gary	C-45	*			Gary	Lake	IN
G05IN0990	Nike Site C-46, Munster, Indiana	Chicago-Gary	C-46	*	*	ABAR/75	Munster	Lake	IN
G05IN0093	Nike Site 47	Chicago-Gary	C-47	*	*	HIPAR	Hobart	Porter	IN
G05IN0092	Nike Site C-48	Chicago-Gary	C-48	*			Gary	Lake	IN
E05IL0071	Nike C-49 - Homewood	Chicago-Gary	C-49/50	*	*	HIPAR	Homewood	Cook	IL
E05IL0072	Nike C-51 - Alsip	Chicago-Gary	C-51	*			Worth/Palos Heights/ La Grange	Cook	IL
E05IL0073	Nike C-54 - Orland Park	Chicago-Gary	C-54	*			Orland Park	Cook	IL
E05IL0074	Nike C-61 - Argonne Labs	Chicago-Gary	C-61	*	*	ABAR/75	Lemont	Du Page	IL
E05IL0027	Nike C-70 - Naperville	Chicago-Gary	C-70	*			Naperville	Du Page	IL
E05IL0075	Nike C-72 - Addison	Chicago-Gary	C-72	*	*	HIPAR	Addison	Du Page	IL
		Chicago-Gary	C-80				Arlington		IL
E05IL0076	Nike C-80/81 - Arlington	Chicago-Gary	C-80/81	*			Arlington Hts.	Cook	IL
E05IL0077	Nike C-84 - Palatine	Chicago-Gary	C-84	*			Palatine	Lake	IL
E05IL0078	Nike C-92/94 - Libertyville	Chicago-Gary	C-92/94	*			Libertyville	Lake	IL

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
E05IL0079	Nike C-93 - Skokie Lagoons	Chicago-Gary	C-93	*	*	HIPAR	Northfield	Cook	IL
E05IL0080	Nike C-98 - Fort Sheridan	Chicago-Gary	C-98	*			Fort Sheridan	Lake	IL
G05OH0044	Nike Site CD-27	Cincinnati-Dayton	CD-27		*	ABAR/69	Wilmington	Clinton	OH
G05OH0045	Nike Battery 46	Cincinnati-Dayton	CD-46		*	HIPAR	Clermont Co	Clermont	OH
		Cincinnati-Dayton	CD-63		*	ABAR/75	Dearborn		IN
G05OH0046	Nike Site CD-78	Cincinnati-Dayton	CD-78		*	HIPAR, SMFU	Oxford	Butler	OH
G05OH0048	Nike #CL-02	Cleveland	CL-02	*	*	ABAR/75	Bratenahl/Cleveland	Cuyahoga	OH
G05OH0049	Nike CL-11	Cleveland	CL-11	*	*	HIPAR, RRIS	Painesvile	Lake	OH
G05OH0050	Nike CL-13	Cleveland	CL-13	*			Eastlake/Willowick	Lake	OH
G05OH0051	Nike Site CL-34	Cleveland	CL-34	*			Warrensville/ Highland Hills	Cuyahoga	OH
G05OH0052	Nike CL-48	Cleveland	CL-48	*			Independence/ Garfield Heights	Cuyahoga	OH
G05OH0053	Nike Site Launch Site 59	Cleveland	CL-59	*			Parma	Cuyahoga	OH

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
G05OH0054	Nike Site Cl-67	Cleveland	CL-67	*			Cleveland Burke Lakefront Airport	Cuyahoga	OH
G05OH0047	Nike #Cl-69	Cleveland	CL-69	*	*	HIPAR	Fairview Park	Cuyahoga	OH
A04MS0031	Columbus Nike C-60	Columbus	Surveyed only				Columbus	Lowndes	MS
K06TX0265	Denton Nike (Dfw Nike Bat 1)	Dallas-Ft Worth	DF-01		*	HIPAR	Denton	Denton	TX
K06TX0264	Da-Ft Wor Def Nike Bat 20	Dallas-Ft Worth	DF-20		*	ABAR/71, AN/FPA-16	Terrell	Kaufman	TX
K06TX0263	Da-Ft Wor Def Nike Bat 50	Dallas-Ft Worth	DF-50		*	HIPAR	Alvarado	Johnson	TX
		Dallas-Ft Worth	DF-70		*	ABAR/71, AN/FPA-16	Ft Walters		TX
E05MI0121	Nike Site D-06	Detroit	D-06	*	*	ABAR/69 & 75, AN/FPA-15	Utica	Macomb	MI
E05MI0122	Nike D-14-16	Detroit	D-14	*			Selfridge AFB	Macomb	MI
		Detroit	D-16	*	*	HIPAR	Selfridge AFB		MI
E05MI0189	Usarc & Nike D-17l	Detroit	D-17	*			Algonac/ Marine City	St Clair	MI
E05MI0125	Nike D-23-26	Detroit	D-23	*			Detroit City/ Kercheval	Wayne	MI
		Detroit	D-26	*	*	ABAR/71	Ft Wayne/ Detroit		MI

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
E05MI0123	Nike D-51	Detroit	D-51	*			NAS Gross Isle	Wayne	MI
E05MI0115	Nike D-54-55	Detroit	D-54	*			Riverview/ Wyandotte	Wayne	MI
E05MI0116	Nike D57/58, Newport	Detroit	D-57	*			Carleton	Monroe	MI
E05MI0116	Nike D57/58, Newport	Detroit	D-58	*	*	HIPAR	Carleton/ Newport NAS	Monroe	MI
E05MI0124	Nike D-61	Detroit	D-61	*	*	ABAR/75	Romulus/ Dearborn	Wayne	MI
		Detroit	D-69	*			River Rouge Park/ Detroit	Wayne	MI
		Detroit	D-86	*			Franklin/ Bingham	Wayne	MI
E05MI0119	Nike D-87	Detroit	D-87	*	*	HIPAR	Commercial/ Union Lake	Oakland	MI
		Detroit	D-97	*			Auburn Hts		MI
K06TX0056	Dyess AFB-Nike Dy10	Dyess	DY-10		*	HIPAR	Fort Phantom Hill/ Abilene	Taylor	TX
K06TX0169	Nike Battery Dy-50	Dyess	DY-50		*		Camp Berkeley/ Abilene	Johnson	TX
B08SD0340	Ellsworth AFB Nike Battery E-01	Ellsworth	E-01	*	*	HIPAR	Ellsworth AFB	Meade	SD
B08SD0338	Ellsworth AFB Nike Battery E-20	Ellsworth	E-20	*			Ellsworth AFB	Meade	SD

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
B08SD0339	Ellsworth AFB Nike Battery E-40	Ellsworth	E-40	*			Ellsworth AFB	Pennington	SD
B08SD0341	Ellsworth AFB Nike Battery E-70	Ellsworth	E-70	*			Ellsworth AFB	Meade	SD
F10AK0853	Nike Site Jig	Fairbanks	Jig		*	HIPAR	Fairbanks, Se. Of		AK
F10AK0854	Nike Site Love	Fairbanks	Love		*	HIPAR	Fairbanks, N. Of		AK
		Fairbanks	Mike		*	HIPAR	Eielson AFB		AK
		Fairbanks	Peter		*	HIPAR	Eielson AFB		AK
		Fairbanks	Tare		*	HIPAR	Newman		AK
F10AK1006	Eielson Nike	Fairbanks						Aleutians East	AK
F10WA0303	Fairchild Defense Area Nike 07	Fairchild	F-07	*			Spokane	Spokane	WA
		Fairchild	F-37	*			Cheney		WA
F10WA0305	Fairchild Defense Area Nike 45	Fairchild	F-45	*	*	HIPAR	Medical Lake	Spokane	WA
		Fairchild	F-87		*		Deep Creek		WA
		Hanford	H-06	*	*		Saddle Mt.		WA
		Hanford	H-12	*			Othello		WA

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FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
		Hanford	H-52	*			Rattlesnake Mtn		WA
		Hanford	H-83	*			Priest Rapids		WA
D01CT0025	Nike 08	Hartford	HA-08	*	*	HIPAR	East Windsor	Hartford	CT
D01CT0056	Nike Ha-25	Hartford	HA-25	*			Manchester	Hartford	CT
		Hartford	HA-36	*			Portland		CT
D01CT0058	Nike 48	Hartford	HA-48	*	*	HIPAR	Cromwell	Middlesex	CT
D01CT0059	Nike Ha-67	Hartford	HA-67	*			Plainville	Hartford	CT
		Hartford	HA-85	*			Avon/ Simsbury		CT
		Homestead - Miami	HM-03		*	ABAR/75, SMFU	Opa Locka		FL
		Homestead - Miami	HM-40		*	HIPAR	Key Largo		FL
		Homestead - Miami	HM-66		*	HIPAR	Florida City		FL
I04FL0003	Everglades (Nike HM-69)	Homestead - Miami	HM-69		*	Mobile HIPAR, ABAR/75	Florida City	Dade	FL
		Homestead - Miami	HM-95		*	ABAR/75	Southwest Miami		FL
B07MO0149	KCDA Nike Battery 10	Kansas City	KC-10		*	HIPAR	Lawson	Ray	MO
B07MO0002	KCDA Nike Battery 30	Kansas City	KC-30		*	ABAR/75	Pleasant Hill	Cass	MO

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FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
B07KS0150	KCDA Nike Battery 60	Kansas City	KC-60		*	HIPAR	Gardner	Johnson	KS
B07KS0990	KCDA Nike 80-Radar Area	Kansas City	KC-80		*	ABAR/75	Fort Leavenworth	Leavenworth	KS
B07NE0075	Lincoln AFB Nike Battery Li-01	Lincoln	LI-01		*		Ceresco/ Davey	Lancaster	NE
B07NE0001	Lincoln AFB Nike Battery Li-50 (Control)	Lincoln	LI-50		*		Crete	Lancaster	NE
D01ME0028	Nike LO-13	Loring	L-13	*	*		Caswell	Aroostook	ME
D01ME0076	Nike L-31	Loring	L-31	*			Limestone	Aroostook	ME
D01ME0077	Nike 58	Loring	L-58	*	*		Caribou	Aroostook	ME
D01ME0005	Nike LO-85	Loring	L-85	*			Conner	Aroostook	ME
		Los Angeles	LA-04	*	*	HIPAR	Mt. Gleason/ Palmdale		CA
		Los Angeles	LA-09	*			Barley Flats/ Mt. Disappointment		CA
J09CA0423	Nike Battery 14 - Silos	Los Angeles	LA-14	*			South El Monte	Los Angeles	CA
J09CA7057	Former Nike Site La-14, Launcher Area	Los Angeles	LA-14	*			South El Monte	Los Angeles	CA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
J09CA0420	Nike Battery 29	Los Angeles	LA-29	*	*	HIPAR, ABAR/71, AN/FPA-16	Brea/ Puente Hills	Los Angeles	CA
J09CA0424	La Def Area Nike Batt 32	Los Angeles	LA-32	*	*	HIPAR	Garden Grove	Los Angeles	CA
J09CA0421	La Def Area Nike Bat40	Los Angeles	LA-40	*			Long Beach Airport/ Lakewood	Los Angeles	CA
		Los Angeles	LA-43	*	*	HIPAR	Ft. MacArthur/ White Point		CA
J09CA0155	Nike Battery 55-Point Vicente	Los Angeles	LA-55	*	*	ABAR/71, AN/FPS-7, AN/FPA-16	Point Vicente	Los Angeles	CA
J09CA0418	Nike Battery #57	Los Angeles	LA-57	*			Torrance/Redo ndo Beach	Los Angeles	CA
J09CA0419	Nike Bty 70	Los Angeles	LA-70	*			El Segundo/ Hyperion	Los Angeles	CA
		Los Angeles	LA-73	*			Playa Del Rey		CA
J09CA0004	Saddle Peak Nike	Los Angeles	LA-78	*	*	HIPAR	Malibu	Los Angeles	CA
J09CA0417	La Def Area Nike 88	Los Angeles	LA-88	*	*	HIPAR	Chatsworth/ Oak Mtn.	Los Angeles	CA
J09CA0162	Nike 94 Mca Housing Site	Los Angeles	LA-94	*	*	ABAR/75	Los Pinetos/ Newhall	Los Angeles	CA
J09CA0422	La Def Area Nike Btry 96	Los Angeles	LA-96	*	*	HIPAR, ABAR/75, AN/FPS-78	Van Nuys/ Sepulveda	Los Angeles	CA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
		Los Angeles	LA-98	*			Magic Mtn/ Lang/ Saugus		CA
E05WI2065	Nike Site M-02	Milwaukee	M-02	*	*	HIPAR	River Hills	Milwaukee	WI
E05WI0067	Nike M-20/Lake Park Grounds	Milwaukee	M-20	*	*	LOPAR	Milwaukee	Milwaukee	WI
E05WI1067	Nike Site M-42	Milwaukee	M-42	*			Cudahy	Milwaukee	WI
E05WI2067	Nike Site M-54	Milwaukee	M-54	*			Hales Corners/ Paynesville	Milwaukee	WI
E05WI3067	Nike Site M-64	Milwaukee	M-64	*			Muskegon/ Prospect	Milwaukee	WI
E05WI4067	Nike Site M-74	Milwaukee	M-74	*	*	HIPAR, RRIS	Waukesha	Milwaukee	WI
E05WI5067	Nike Site M-86	Milwaukee	M-86	*			Menominee Falls	Milwaukee	WI
E05WI1065	Nike M-96/ Havenwoods Nature Preserve	Milwaukee	M-96	*			Milwaukee	Milwaukee	WI
E05WI0065	Nike Site MSP-20	Minneapolis	MS-20		*	ABAR/75	Roberts	St Croix	MN
E05MN0040	Nike Site Battery MSP-40	Minneapolis	MS-40		*	ABAR/71	Farmington	Dakota	MN
E05MN0070	Nike Site MSP #70	Minneapolis	MS-70		*	HIPAR	St Bonifacius	Hennepin	MN

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
E05MN0225	Nike Msp-90/Mn. Sheriffs Boy's Ranch	Minneapolis	MS-90		*	HIPAR	Bethel	Isanti	MN
C02NY0065	Nike NY 04/05	New York	NY-03/04	*	*	HIPAR	Orangeburg/ Mount Nebo	Rockland	NY
C02NY0094	Nike NY 09	New York	NY-09	*			Kenisco/ White Plains	Westchester	NY
C02NY0018	Nike Bat NY 15 Launch	New York	NY-15	*			Ft. Slocum	Bronx	NY
C02NY0068	Nike NY 20	New York	NY-20	*			Lloyd Harbor/ Huntington	Suffolk	NY
C02NY0089	Nike NY 23	New York	NY-23	*			Hicksville/ Oyster Bay	Nassau	NY
C02NY0069	Nike NY 24	New York	NY-24	*	*	HIPAR	Amityville/ Farmington	Suffolk	NY
C02NY0066	Nike NY-25 Con Area	New York	NY-25	*	*	HIPAR, SMFU, RRIS	Rocky Point/ Brookhaven	Suffolk	NY
C02NY0090	Nike NY 29/30	New York	NY-29/30	*			Lido Beach	Nassau	NY
		New York	NY-49	*	*	2 HIPARs, SMFU	Ft Tilden/ Rockaway Point Road		NY
C02NJ0798	Nike Bat #53	New York	NY-53	*			Leonardo/ Belford	Monmouth	NJ
C02NJ0051	Nike NY 54	New York	NY-54	*	*	HIPAR	Holmdel/ Hazlet	Monmouth	NJ

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
		New York	NY-56	*	*	2 HIPARs, ABAR/75, DCL	Ft. Hancock		NY
C02NJ0046	Nike NY-60	New York	NY-58/60	*	*	ABAR/75	South Amboy	Middlesex	NJ
C02NJ0050	Nike NY 65	New York	NY-65	*	*	ABAR/75	South Plainfield	Middlesex	NJ
C02NJ0056	Nike NY-73	New York	NY-73	*			Summit/ Watchung	Union	NJ
C02NJ0037	Nike Bat NY 80	New York	NY-80	*	*	HIPAR	Livinngston/ Essex Falls/ East Hannover	Hudson	NJ
C02NJ0058	Nike NY 88	New York	NY-88	*			Mt. View	Passaic	NJ
C02NJ0054	Nike NY 93/94	New York	NY-93/94	*	*	ABAR/71 AN/FPA-16	Ramsey/ Darlington/ Mahwah	Bergen	NJ
C02NJ0060	Nike Bat 93 (See Nike NY 93/94)	New York	NY-93/94				Mahwah	Bergen	NJ
C02NY0067	Nike NY 99	New York	NY-99	*			Spring Valley/ Ramapo	Rockland	NY
C02NY0022	Nike Missile Base	New York					Harriman	Orange	NY
C02NY0074	Nike NF 03	Niagara	NF-03	*			Model City	Niagara	NY
C02NY0093	Nike Bat NF16	Niagara	NF-16	*	*	HIPAR	Sanborn/ Cambria	Niagara	NY
C02NY0078	Nike NF-41	Niagara	NF-41	*	*	HIPAR	Grand Island	Erie	NY

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
		Niagara	NF-74	*			Grand Island	Erie	NY
		Niagara	NF-75	*			Grand Island	Erie	NY
C03VA0130	Nike N-02	Norfolk	N-02	*			Fox Hill	Hampton	VA
		Norfolk	N-20	*			Ocean View	Hampton	VA
		Norfolk	N-25	*	*	HIPAR, SMFU, RRIS	Ft Story		VA
C03VA0131	Nike N-36	Norfolk	N-36	*			Kempsville	Virginia Beach	VA
		Norfolk	N-52	*	*	HIPAR	Deep Creek/ Portsmouth		VA
C03VA0033	Nike Site N-63	Norfolk	N-63	*			Nansemond/ Suffolk	Suffolk	VA
		Norfolk	N-75	*			Smithfield/ Carrollton		VA
		Norfolk	N-85	*	*	ABAR/69, ABAR/75, AN/FPA-15	Denhigh/ Patrick Henry/ Camp Patrick/ Newport News Airport		VA
		Norfolk	N-93	*			Hampton/ Spiegelville		VA
D01MA0027	Nike Headquarters, Ma	Norfolk					Quincy	Norfolk	MA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
	Site 2	Oahu	OA-17		*		Kaukai/ Kahuhu	Honolulu	HI
H09HI0453/ H09HI0455	Nike Site No. 3/ Nike Site No. 4	Oahu	OA-32		*		Bellows AFS/ Waimanalo	Honolulu	HI
H09HI0456/ H09HI0457	Nike Site No. 5/ Nike Site No. 6	Oahu	OA-63		*		Ewa/ Makakilo	Honolulu	HI
H09HI0452	Nike Site No. 1	Oahu	OA-84		*		Waialua/ Dillingham	Honolulu	HI
B07IA0420	Offutt AFB Nike Battery OF-10	Offutt	OF-10			HIPAR	Council Bluffs	Pottawattamie	IA
B07IA0430	Offutt AFB Nike Battery OF-10 (Launcher)	Offutt	OF-10		*		Council Bluffs	Pottawattamie	IA
B07NE0002	Offutt AFB Nike Battery OF-60 (Launcher)	Offutt	OF-60		*		Cedar Creek	Cass	NE
B07NE0082	Offutt AFB Nike Battery OF-60 (Control)	Offutt	OF-60			HIPAR	Cedar Creek	Cass	NE
C03PA0072	Nike PH-07 (Richboro)	Phildelphia	PH-07	*			Richboro	Bucks	PA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location	County	State
C03PA0228	Nike PH-15 (Bristol)	Phildelphia	PH-15	*			Newportville/ Corydon	Bucks	PA
C02NJ0063	Nike Bat #23-25	Phildelphia	PH-23/25	*	*	HIPAR, ABAR/75, AN/FPS-78	Lumberton	Burlington	NJ
C02NJ0055	Nike PH 32	Phildelphia	PH-32	*			Marlton	Passaic	NJ
C02NJ0053	Nike PH 41/43	Phildelphia	PH-41/43	*	*	2 HIPARs, SMFU, RRIS, DCL	Berlin/ Clementon	Gloucester	NJ
C02NJ0064	Nike PH 49	Phildelphia	PH-49	*			Pittman	Gloucester	NJ
C02NJ0044	Nike PH 58	Phildelphia	PH-58	*	*	ABAR/75	Swedesboro	Gloucester	NJ
C03PA0229	Nike PH-67 (Chester)	Phildelphia	PH-67	*			Chester/ Village Green/ Media	Delaware	PA
C03PA0230	Nike PH-75/78 (Media)	Phildelphia	PH-75	*	*	ABAR/69, RRIS	Edgemont/ Delaware City	Chester	PA
		Phildelphia	PH-82	*			Paoli/ Valley Forge		PA
C03PA0232	Nike PH-91 (Worcester)	Phildelphia	PH-91	*			Worcester/ Center Square	Montgomery	PA
C03PA0233	Nike PH-97/99 (Lansdale)	Phildelphia	PH-99	*	*	HIPAR	Warrington/ Eureka	Bucks	PA
C03PA1082	Nike PH-66 (Philadelphia)	Phildelphia					Philadelphia	Philadelphia	PA
C03PA0070	Nike PI-02 (Rural Ridge)	Pittsburgh	PI-02	*			Rural Ridge	Allegheny	PA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
C03PA0221	Nike PI-03 (Dorseyville)	Pittsburgh	PI-03	*	*	HIPAR	Dorseyville/ Indianola	Allegheny	PA
C03PA1045	Nike PI-25 (Plum BOrough)	Pittsburgh	PI-25	*			Murrysville/ Monroe	Allegheny	PA
C03PA0222	Nike PI-36 (North Huntingdon)	Pittsburgh	PI-36	*	*	ABAR/75	Irwin	Westmoreland	PA
C03PA0223	Nike PI-37 (Rillton)	Pittsburgh	PI-37	*	*	HIPAR, SMFU	Cowansburg/ Herminie	Westmoreland	PA
C03PA1047	Nike PI-42 (Elizabeth Twp)	Pittsburgh	PI-42	*			Elizabeth	Allegheny	PA
		Pittsburgh	PI-43	*	*	ABAR/71, AN/FPA-16	Elrama		PA
C03PA1046	Nike PI-52 (Finleyville)	Pittsburgh	PI-52	*			Finleyville	Washington	PA
C03PA1048	Nike PI-62 (Oakdale)	Pittsburgh	PI-62	*			Bridgeville/ Hickman	Allegheny	PA
C03PA0225	Nike PI-71 (Coraopolis)	Pittsburgh	PI-71	*	*	HIPAR	Coraopolis/ Beacon	Allegheny	PA
		Pittsburgh	PI-92	*			Bryant/ North Park		PA
		Pittsburgh	PI-93	*	*	ABAR/71, AN/FPA-16	Westview		PA
D01MA0013	Nike PR-19	Providence	PR-19	*			Rehoboth	Bristol	MA
D01MA0075	Nike 29	Providence	PR-29	*			Swansea	Bristol	MA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
D01RI0061	Bristol Nike 38	Providence	PR-38	*	*	HIPAR	Bristol	Bristol	RI
D01RI0062	Nike Control PR-58	Providence	PR-58	*			North Kingston	Washington	RI
D01RI0017	Nike PR-69	Providence	PR-69	*			Coventry	Kent	RI
D01RI0063	Nike PR-79	Providence	PR-79	*			Foster Center/ Foster	Providence	RI
		Providence	PR-99	*	*	ABAR/71, AN/FPA-16	North Smithfield/ Woonsocket		RI
I04GA0576	Nike Bat28,Rob AFB Def	Robbins	R-28	*			Jeffersonville	Twiggs	GA
I04GA0385	Nike 88	Robbins	R-88	*			Byron	Peach	GA
E05IL0081	Nike SL-10 - Marine	Saint Louis	SL-10		*	ABAR/71, AN/FPA-16	Marine	Madison	IL
E05IL0082	Nike SL-40 - Hecker	Saint Louis	SL-40		*	HIPAR	Hecker	Monroe	IL
B07MO0986	Nike Hercules SL-60	Saint Louis	SL-60		*	ABAR/71, AN/FPA-16	Pacific	Jefferson	MO
E05IL0203	Nike SL-90 - Grafton	Saint Louis	SL-90		*	HIPAR	Alton/ Pere Marquette	Jersey	IL
		San Francisco	SF-08	*			San Pablo Ridge		CA
		San Francisco	SF-09	*			Berkeley/ San Pablo Ridge		CA
J09CA0937	SF Nike 25	San Francisco	SF-25	*			Rocky Ridge	Contra Costa	CA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
J09CA1103	San Francisco Nike 31	San Francisco	SF-31	*	*	HIPAR	Lake Chabot/ Castro Valley	Alameda	CA
		San Francisco	SF-37	*			Newark/Coyote Hills		CA
J09CA3115	SF Nike 51 (SweeNY Ridge)	San Francisco	SF-51			HIPAR	Milagra	Marin	CA
J09CA7077	SF Nike 51, Malagra Ridge	San Francisco	SF-51	*	*		Milagra	San Mateo	CA
J09CA0941	SF Nike Batt 59	San Francisco	SF-59	*			Ft Funston/ Mt San Bruno	San Francisco	CA
		San Francisco	SF-87	*	*	ABAR/75	Ft. Cronkhite/ Sausalito		CA
		San Francisco	SF-88	*	*	HIPAR	Ft. Barry/ Sausalito		CA
J09CA0943	SF Nike Batt 91	San Francisco	SF-91	*			Angel Island	Marin	CA
J09CA0944	SF Nike Batt 93	San Francisco	SF-93	*	*	ABAR/71 AN/FPA-16	San Rafael	Marin	CA
		Seattle	S-03	*			Kenmore		WA
F10WA0092	Redmond Nike 13-14	Seattle	S-13	*	*	ABAR/75, SMFU	Redmond	King	WA
F10WA0013	Cougar Mt. Nike 20	Seattle	S-20	*			Cougar Mtn/ Issaquah	King	WA
F10WA0090	Youngs Lake Nike 32-33	Seattle	S-32	*			Lake Youngs	King	WA
		Seattle	S-33	*			Lake Youngs/ Renton		WA

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
F10WA0515	Nike Midway 43	Seattle	S-43	*			Kent/ Midway	King	WA
F10WA0094	Vashon Nike 61	Seattle	S-61	*	*	HIPAR	Vashon Island	King	WA
F10WA0089	Olalla Nike 62	Seattle	S-62	*			Ollala	Kitsap	WA
F10WA0037	PoulsBO Nike 81	Seattle	S-81	*			Poulsbo	Kitsap	WA
F10WA0088	Winslow Nike 82	Seattle	S-82	*			Winslow/ Bainbridge Island	Kitsap	WA
F10WA0087	Kingston Nike 92	Seattle	S-92	*	*	HIPAR	Kingston	Kitsap	WA
J09CA0974	Tra AFB Nike 10	Travis	T-10	*	*	HIPAR, SMFU	Elmira	Solano	CA
J09CA0975	Tra AFB Nike 33	Travis	T-33	*			Dixon/ Lambie	Solano	CA
J09CA0976	Tra AFB Nike 53	Travis	T-53	*			Potrero Hillls	Solano	CA
J09CA0977	Tra AFB Nike 86	Travis	T-86	*	*	ABAR/75	Fairchild/ Cement Hills	Solano	CA
		Turner	TU-28		*		Willingsham/ Sylvester		GA
I04GA0399	Turner AFB Nike Bat#79	Turner	TU-79		*		Armenal/ Sasser	Lee	GA
K06NM0504	WAFB Def Ar Nike Bat Wa10	Walker	WA-10		(not operated)		Walker AFB	Chaves	NM

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
K06NM0505	WAFB Def Ar Nike Bat Wa50	Walker	WA-50		(not operated)		Walker AFB	Chaves	NM
C03MD0235	Nike W-25 (Davidsonville)	Washington	W-25	*	*	HIPAR	Davidsonville	Anne Arundel	MD
C03MD0236	Nike W-26 (Annapolis)	Washington	W-26	*	*	ABAR/75	Annapolis/ Skidmore/ Bay Bridge	Anne Arundel	MD
C03MD0239	Nike W-35 (Croom)	Washington	W-35		*		Croom/ Marlboro	Prince George's	MD
C03MD0238	Nike W-36 (Croom)	Washington	W-36		*		Brandywine/ Naylor	Prince George's	MD
C03MD0241	Nike W-44 (Waldorf)	Washington	W-44	*	*	ABAR/71, AN/FPA-16	Mattawoman/ Waldorf/ La Plata	Charles	MD
C03MD0242	Nike W-45 (Laplata)	Washington	W-45		*		Waldorf	Charles	MD
C03MD0243	Nike W-54 (Pomonkey)	Washington	W-54		*		Pomonkey	Charles	MD
		Washington	W-64	*	*	HIPAR	Lorton		VA
C03VA0249	Nike W-Ba-74	Washington	W-74		*		Fairfax/ Pohick	Fairfax	VA
C03VA0003	Carrollton Nike Park	Washington	W-75				Isle Of Wight Co	Isle Of Wight	VA
		Washington	W-83		*		Herndon/ Dranesville		VA
C03MD0245	Nike W-92 (Rockville)	Washington	W-92	*	*	HIPAR	Rockville	Montgomery	MD

Appendix F : Nike Missile Battery Control and Launch Areas by Air Defense Area.[1]

FUDSMIS Property Number	FUDSMIS Property Name	Defense Area	Designation	Ajax	Hercules	Hercules Radars	Location		State
C03MD0247	Nike W-93 (Olney)	Washington	W-93		*		Laytonville/ Deerwood	Montgomery	MD
C03MD1019	Nike W-93 (Laytonsville)	Washington	W-94		*		Gaithersburg	Montgomery	MD

Appendix G: Researching Nike Missile Batteries

Nike Program:
The Nike air defense program deployed the Nike-Ajax and the Nike-Hercules missiles inside the Continental United States. The steps below, obtained from http://www.army.mil/cmh-pg/faq/nike.htm , provides a quick overview of one approach to locating Nike program records.

- Determine the originating agency for the records you need and how those records were preserved and retired.
- "Research and development records normally were retired in a regular process by the various agencies and subordinate staff elements, and requests for information from or access to those records" may need to be addressed through the Freedom of Information and Privacy Act Division.
- Contact successor agency history offices to determine whether any compiled monographic studies or assembled background historical files.

Redstone Arsenal has historical monograph on both Nike Ajax and Nike Hercules systems: *Historical Monograph Development, Production, And Deployment Of The Nike Ajax Guided Missile System 1945 - 1959* by Mary T. Cagle available at http://www.redstone.army.mil/history/pdf/welcome.html or, *History Of The Nike Hercules Weapons System*, Mary T. Cagle available at http://ed-thelen.org/h_mono-1.html .

"To Defend and Deter: The Legacy of the United States Cold War Missile Program" by John C. Lonnquest, 1996 and David F. Winkler provides an overview of the Nike systems and contains a listing of the Nike sites by defense area, missile, launcher and magazine type, and date of operations. See http://www.cevp.com or http://www.cevp.com/docs/COLDWAR/1996-11-01952.pdf

Last Line of Defense, Nike Missile Sites in Illinois, Christine Whitacre, Editor for National Park Service, 1996 contains a description and drawings of the various buildings. Also see http://www.cevp.com or http://www.cevp.com/docs/COLDWAR/1996-01-02135.pdf

Battery and Unit Histories:
Records of individual missile batteries are more difficult because the records themselves have been split into several locations.

- Procurement and construction records of individual sites normally were withdrawn from other Army record holdings, and now are normally housed in either the Engineer District Offices of the U.S. Army Corps of Engineers, or in the responsible regional site of the National Archives and Records Administration (the regional archives division of the nearest Federal Records Center). We suggest that the first step in attempting to locate those materials should be to contact the archivist at the Historical Office of the U.S. Army Corps of Engineers.
- Both the Regular Army and the Army National Guard contained NIKE units. The first step in searching for unit records should be to determine if the unit in question belonged to the Army National Guard; if so, then the records probably are still in the custody of the

individual state's Adjutant General. Most NIKE unit records created by the Regular Army, and possibly some Army National Guard ones, should have been sent to the Military Operational Archives, National Personal Records Center, 9700 Page Boulevard, St. Louis, Missouri 63132. That agency has indicated that records which can be identified contain correspondence, charts, plans, architectural drawings, but are not consistent in content. If records are not at St. Louis, contact the Freedom of Information Act and Privacy Division.

Source: http://www.army.mil/cmh-pg/faq/nike.htm

The Modern Military Records, Textual Archives Services Division of National Archives at College Park advised that "unit histories and supporting documents for Army units….. after 1954, …., if they still exist, remain in the custody of the Department of the Army." They advised contacting FOIA/Privacy Act Office, 7798 Cissna Road, Suite 205, Springfield, VA 22150-3197.

Operating unit number by battery:
Rings of Supersonic Steel, Air Defenses of the United States Army 1950-1979 - an introductory history and site guide, 2nd Edition, 2002 by Mark A. Berhow and Mark L. Morgan is one source that identifies the individual batteries by battalion and artillery regiment number as well as the operational period of each missile battery.

People:
People that have served on individual batteries can provide useful information. The http://ed-thelen.org/ contains a link to personnel at http://ed-thelen.org/ppl.html which can be useful to locate persons for interviews. Information on ordnance support units can be found at http://www.zianet.com/dpiland/ordnance/UnitedStates.htm .

Websites:
The following are a few worldwide websites that contain information on the Nike missile programs, operations, units, and other information. This by no means a comprehensive list but reflects websites reviewed in preparing this report.

- http://www.goerigk-jever.de/doing.html#operations
- http://alpha.fdu.edu/~bender/nike.html
- http://ed-thelen.org/ (Note this site contains many links to other Nike related sites.)
- http://ed-thelen.org/research.html provides additional sources of potential interest when researching Nike sites.
- http://ed-thelen.org/Nike-SiteswithTerraServerImages.html contains links to TerraServer images which show the sites in current conditions.
- http://www.zianet.com/dpiland/ordnance/ also contains many links to Nike related sites.

Engineer Pamphlet:
EP 870-1-64, *Guides to Environmental Research*, Environmental Cleanup at Former and Current

Military Sites: *A Guide to Research*, Nov 2001, by Michael W. Harper, Thomas R. Reinhardt, and Barry R. Sude should also be utilized to assist in develop a research approach to the missile battery history. See http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep870-1-64/toc.htm

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