



Bergen County, Where America Begins

COLD WAR AT CAMPGAW MOUNTAIN: Nike Missile Battery NY-93/94 by Donald E. Bender

When the Army activated its Nike missile site at Campgaw Mountain in 1955, it was another clear sign for Bergen County residents of how serious the international tensions between the United States and the Soviet Union were becoming. Residents of Franklin Lakes and Mahwah where the Nike site was built did not consider their quiet, woody towns to be on the front lines of the Cold War – at least certainly not in the sense of a Korea or a divided Germany. Yet, the notion of a “front line” in this new era of superpower confrontation had been dramatically altered by the development of the atomic bomb and the ability to deliver such weapons to almost any part of the globe via long-range bombers with intercontinental range.

For several years after the end of the Second World War, the United States enjoyed



a unique nuclear monopoly. However, during 1949, the Soviet Union exploded its first atomic “device” (it was not yet a practical bomb) and would soon have its own atomic bombs. At the same time, the Tupolev design bureau in the Soviet Union was working diligently to produce a copy of the American B-29 bomber. Several examples of the long-range Boeing-designed aircraft had made emergency landings on Soviet territory after attacking targets in Japan late in the war. These

aircraft were carefully studied, flown and disassembled in a successful effort to give the Soviet Air Force a new postwar bomber capable of striking distant targets, including potential targets within the continental United States.

In response to the new and growing capabilities of the Soviet Air Force, and to growing international tensions (in particular, the outbreak of hostilities on the

Korean peninsula during 1950), the United States began to deploy air defenses to protect major urban areas, industrial sites, key military installations and nuclear research and production facilities. Included in these defenses were long-range radar sites, anti-aircraft artillery (gun) batteries, radar-equipped “picket” ships and aircraft, fighter-interceptor aircraft and guided anti-aircraft missiles. The Nike anti-aircraft missile batteries of the U.S. Army were a key element in the Cold War air defenses of the United States.

Named for the mythical Greek goddess of victory, the history of the Nike missile can be traced back to the last months of the Second World War. At that time, the development of faster, high-flying military aircraft propelled by turbojet engines, and the limited deployment of such aircraft in combat by the German Luftwaffe, made it clear that new methods of defending against such aircraft would be required in any future conflicts.

To meet such future threats, during 1944, the Army asked New Jersey-based Bell Telephone Laboratories to outline the concept for a new guided missile. Bell responded with the “Anti-Aircraft Guided Missile” (AAGM) report, which, delivered in 1945, provided the foundations for what would later be known as the Nike missile system, the first widely-deployed surface-to-air missile system in the world.

The process of producing a practical and reliable guided missile was an arduous one. Over 8 years passed from the time the AAGM report was received, until the first Nike missiles were received by an Army air defense unit during late 1953. The Army’s new Nike missile, later known as the Nike “Ajax”, was a slender, pencil-like missile fitted with aerodynamic fins and control surfaces to direct its flight. It sat atop a detachable booster rocket capable of blasting the missile from the ground and into the stratosphere in only seconds.

Together, the missile and booster rocket measured roughly 35 feet in length and weighed slightly over 2,400 pounds. Nike Ajax had maximum speed of over 1,600 mph, a maximum range of 25 to 30 miles, and could reach aircraft flying at altitudes as high as 70,000 feet. The missile was armed with three high-explosive, fragmentation-type warheads located at the nose, center and aft portions of the missile body.

When the Nikes were first introduced, select cities and other strategic sites were already being defended by anti-aircraft gun batteries equipped with upgraded equipment of World War Two vintage. In the northern portion of New Jersey, such anti-aircraft batteries were located at Fort Lee, Paterson, Newark, Elizabeth, Fort Hancock and elsewhere. The advantage of the new Nike missile over conventional artillery was it was continuously guided to its target, regardless of any evasive

action the pilot of the aircraft might take. By comparison, an artillery shell travels along a predetermined and fixed ballistic trajectory.

The areas to be defended by the new Nike missile batteries included the sites already covered by anti-aircraft artillery batteries, as well as dozens of new sites nationwide. Included in this list were major U.S. cities, important industrial facilities, select Strategic Air Command bomber bases and sites associated with nuclear weapons production. The sprawling New York metropolitan area with its densely populated urban and suburban districts, important industrial and manufacturing facilities, ports, railways, highways and airports was destined to be heavily defended by the Army's new missiles.

Nineteen Nike missile batteries were ultimately constructed throughout the New York metropolitan area. Arguably, the New York metropolitan area was the best-defended region within the continental United States. Ten of the Nike batteries were located in New York State, in Rockland and Westchester counties, on Long Island, and even within the boundaries of New York City. Nine additional sites were located within the northern half of the Garden State.

The sites were located so as to encircle the region with a defensive “ring?” of missile defenses which no aircraft could successfully penetrate. The Nike batteries on the outside of that ring were situated roughly 25 miles from the geographic center of the area being defended, which was located within New York City. A few sites were placed closer to the center of this area, providing a “defense in depth”. Due to the relatively short range of the new Nike Ajax missiles, the sites were generally spaced at intervals of only about 10 miles, in order to provide overlapping fields of fire.

The Nike missile site at Campgaw Mountain in Bergen County was the northernmost Nike installation in the Garden State. Becoming operational in 1955 under the command of the Army's 483rd Anti-Aircraft Artillery Guided Missile Battalion, the base actually consisted of two separate facilities: a Control Area at the top of Campgaw Mountain in Franklin Lakes; and, a Launcher Area, located one mile north on the west side of Campgaw Road in Mahwah. A housing area was also constructed adjacent to the Launcher Area.

Officially the site was designated, “Nike Battery NY-93/94”, the two letters indicating the New York Defense Area and the numerical designators indicating its location with respect to the center of this area, and the fact that it was a “double” battery. It was also known more simply as the “Franklin Lakes” Nike site.

The Control Area at the top of Campgaw Mountain was officially known as the “Battery Control Area” or “Integrated Fire Control” Area, abbreviated as “IFC”.

The Battery Commander was located at this facility and would have directed any engagements of hostile aircraft from this location. The mountain top location of this site was hardly accidental: this elevated spot guaranteed relatively clear and unobstructed coverage of the region by the radar units located there.

The Nike system used three types of ground-based radar to locate and track hostile aircraft and to guide the missiles to their targets. The rotating Acquisition Radar (ACQR) first located or “acquired” a target (a hostile aircraft) at a range of about 125 miles. Its position known, the Target Tracking Radar (TTR) with its narrow, pencil-like radar beam, would then be turned and pointed at the aircraft. Generally, once the beam of the TTR was focused onto a targeted aircraft, it could be switched into an automatic mode, following its every movement. Missiles were guided by yet a third radar, the Missile Tracking Radar (MTR) which both tracked the missile and sent pulse-coded electronic steering commands to guide it during its flight.



The Nike system’s radar “eyes” were backed up by an electronic “brain” in the form of an analog intercept computer. Located within the Battery Control Trailer at the Control Area, the computer received information from the TTR (regarding the position of the hostile aircraft) and from the MTR (regarding the position of the missile during its flight). By rapidly and continuously comparing the relative positions of both the targeted aircraft and the missile sent to destroy it, the computer generated steering commands, guiding the missile to intercept its target. At the moment of closest approach, the computer issued a “burst command”, detonating the missile’s warheads.

The reason the Control Area in Franklin Lakes had to be separated from the Mahwah Launcher Area (from which the missiles would have been fired) was related to the Nike system's ground-based radar. Had the Missile Tracking Radar been located less than 3,000 feet from the missile being launched, it would not have been able to rotate upward with sufficient speed to follow the missile during its (extremely rapid) launch phase effectively aborting a fire mission. For safety reasons, Nike missiles would self-destruct within 3 seconds if no guidance signal was received.

A clear and unobstructed “line of sight” had to exist between the Missile Tracking Radar at the Control Area and the missiles at the Launcher Area. This was necessary, for the MTR had to first be aimed and electronically locked onto the

missile selected for firing, prior to that event. The parcels of land acquired by the Army for Nike installations, as well as certain line of sight easements (enabling the Army to trim intervening tree tops and vegetation and to control development within this narrow corridor) reflected this important requirement.

The radar antennas were placed atop tall steel towers and were protected from snow and ice by flexible, protective coverings (“radomes”) during the winter months. Views from the tops of these towers are said to have been impressive. The New York City skyline was plainly visible in the distance and the tall spire of the Empire State Building was reportedly used as a visible geographic reference point to help align the site’s radar antennas.

Output from the radar was displayed on radar screens and on plotting boards located within two portable trailers at the Control Area. Nike was originally designed as a portable system and the trailers were components of this system. However, at fixed sites, such as Franklin Lakes, the trailers’ wheels were removed and they were simply docked to a modest building.

The Battery Commander was located within the Battery Control Trailer, which contained plotting boards displaying a broad view of the area being defended, in addition to radar screens. The analog intercept computer was also located here. The adjacent Radar Control Trailer contained additional radar screens and personnel who tracked hostile aircraft. Although missiles were never fired “in anger” from this site, simulated engagements were a frequent event.

In addition to the radar towers and related control facilities, the Control Area also contained an administration building, barracks, utility buildings and standby generator facilities. The latter facilities were considered vital for the operation of the site, for it was feared that electrical supplies might be cut off during an attack either as a result of bomb damage or via the actions of saboteurs. The site always switched to internal power during practice alerts. To enhance site security, the entire facility was surrounded with a 6-foot-tall (and in some places, even taller) steel fence topped with barbed wire and was guarded around the clock by armed personnel.



The other half of Nike site NY-93/94, the Launcher Area, was located approximately one mile north of the Control Area, in Mahwah. At the Launcher Area, Nike missiles were assembled, tested, and stored. It was from this site that the missiles would have been launched in the event of a war.

Due to Interstate Commerce Commission regulations regarding the shipment of explosive materials, complete Nike missiles could not be shipped to the site. Instead, the major components arrived separately and were then assembled inside of the Missile Assembly and Test Building. After the missiles passed a series of evaluations to ensure the correct functioning of all systems, they were wheeled over to a separate area for fueling (in the case of the liquid-fueled Ajax missiles) and to have their warheads attached. This fueling and warheading area was surrounded by 10-foot-tall sloped earthen berms designed to deflect the force of an accidental explosion. Missiles were subsequently placed inside of the site's underground missile magazines, ready for use.

There were six of these underground missile storage magazines at site NY-93/94, reflecting its status as a "double" Nike site (a typical Nike installation had only 3 missile magazines). Each magazine consisted of a large, heavily-constructed, reinforced concrete room measuring approximately 60 feet in length and about 40 or 50 feet width, depending on which version was used. Within each magazine room, the Nike missiles were stored horizontally atop storage racks. This contrasts with the popular notion of a missile "silo" in which missiles are stored in a vertical, ready-to-fire position.

The underground basing mode was chosen by the Army in order to provide greater protection against the unlikely event of an accidental explosion of a missile or missiles. This basing method also enabled the Army to reduce its land acquisition costs because less acreage was required for the safety zones surrounding each site – an important consideration in areas where real estate costs were high.

When needed, missiles were brought to the surface of the site by means of an elevator located near the center of each underground magazine. Once at the surface, each missile was then pushed to a satellite launching position, although in some cases, there was a launcher mounted directly atop the elevator itself. Generally, there were 4 launcher positions at the surface of each magazine.

After passing some last-minute tests, missiles would be raised to a near-vertical position for firing. This slightly less than vertical orientation ensured that the jettisonable booster sections would not fall directly back onto the site from which the missiles were launched. Instead, they would have landed within a carefully calculated booster impact area located in an unpopulated wooded area roughly one mile from the base.

Although practice drills were almost an everyday event, no missiles were ever fired from the site. Instead, Nike crews traveled to the deserts of New Mexico every year for annual firing practices in which they fired live missiles at various types of flying targets.

The 6 missile magazines were divided into two separate batteries, each having 3 missile magazines. Each battery had its own Launch Control Trailer (LCT) which acted as a link between the Battery Commander at the Control Area in Franklin Lakes, and the missile launching sections at the Launcher Area. Each LCT was physically connected to a distant Battery Control Trailer by a special underground cable over which various commands, including those for a missile firing, could be sent.

Other buildings and structures located at the Launcher Area included barracks, standby electrical generating facilities, and recreational facilities, including a basketball court. This facility was also completely surrounded by barbed wire topped fences and was guarded on a 24 hour basis.

Between the Launcher Area and Campgaw Road, the Army also constructed a family housing area. This area contained about three dozen small houses constructed for Nike personnel and their families. This type of housing was an important feature at Nike sites nationwide, particularly for those located in areas where real estate costs were prohibitive and suitable rental properties were not available.

Although the Nike Ajax missile offered a superior performance when compared to conventional anti-aircraft artillery, it was not without its shortcomings. Its relatively short range (roughly 25 miles) meant that attacking aircraft would fly uncomfortably close to the areas being defended, before they could be engaged by the Nike batteries. The development of “stand-off” bombs – the precursors of today’s sophisticated cruise missiles – meant that an aircraft could launch one of these devices while still out of range of the Nike batteries.

Further testing revealed that the Nike Ajax radar system could not reliably track a single, individual aircraft within a closely spaced formation of several aircraft. Instead the beam of the tracking radar would “hunt” from one aircraft to another within the formation, degrading its accuracy and possibly rendering the system ineffective.

In order to address these shortcomings, consideration was first given to modifying the Nike Ajax missile and providing it with a much more powerful warhead to compensate for this lack of accuracy. However, in the end, it was instead decided to design an entirely new Nike missile, one which would combine greater firepower with increased range, while still using the ground facilities already designed for the Nike Ajax missile. This second-generation Nike missile was first known as “Nike-B” and later as the Nike Hercules.

The Nike “Hercules” missile exceeded nearly all of the Army’s requirements. The 40-foot-long, 5-ton Hercules missile had a maximum range of nearly 90 miles, more than three times that of its predecessor. It was faster (over 2,300 mph), could fly higher (over 100,000 feet) and could be equipped with either a conventional or a nuclear warhead. The latter capability, if utilized, would have permitted a single Hercules missile so equipped to destroy a closely-spaced formation of several attacking aircraft and any nuclear weapons they were carrying.

Deployment of the first Nike Hercules missiles was at Fort Tilden in Far Rockaway (Queens), New York during 1958. Due to the vastly increased performance of the Hercules missile, when compared with that of the Nike Ajax, fewer missile sites were needed to defend a given area. Plans called for the new Hercules missiles to be installed at only 10 sites within the New York Defense Area. The remaining 9 Nike missile sites, were to be inactivated by 1963.

Nike site NY-93/94 was one of the 10 sites chosen to receive the new Hercules missiles. However, both of its “sister” sites – site NY-88 in Wayne Township, New Jersey, and site NY-99 in Spring Valley/Ramapo, New York – did not and were closed only a few years later. The conversion process for the site involved one missile battery, and lasted for a period of one year. Among the changes needed to accommodate the much heavier Hercules missiles were upgraded missile elevators, launchers and storage racks, a larger missile assembly building, increased generator capacity and a new warheading building. These modifications were completed during 1959.

Site security at the Launcher Area was also greatly increased after the new missiles arrived. A second, inner fence was constructed around the missile magazines, and entrance to this area was severely limited. Additional military police units equipped with German Shepherd dogs also arrived on the scene. Dog kennels and an exercise area for the dogs were constructed.

Changes at the Control Area included upgraded radar and display equipment and the addition of a fourth radar system, the Alternate Battery Acquisition Radar, known as “ABAR”. The combination of the more advanced Nike Hercules missiles and upgraded radar and control equipment markedly improved the defensive



capabilities of the site. In theory, aircraft nearly as far distant as Binghamton, New York and Scranton, Pennsylvania could have been destroyed before they were able to deliver their deadly cargoes of nuclear bombs within the New York metropolitan area.

The effectiveness of all Nike missile batteries in the New York area was also bolstered by the opening of a new regional missile control facility during 1960. Prior to that time, control of the Nike batteries within the New York region was accomplished manually from Fort Wadsworth on Staten Island. In an age of jet aircraft armed with nuclear bombs, this relatively slow and cumbersome process was hardly desirable.

However, when the Army Air Defense Command Post at Highlands, New Jersey opened during 1960, this situation changed considerably. The Army's new base, co-located with the Highlands Air Force Station, contained a "Missile Master" fire distribution system. The Missile Master enabled Army controllers to rapidly identify hostile aircraft and to assign Nike batteries to engage them, greatly improving their effectiveness.

Only two years after the Missile Master became operational, it was discovered that the Soviet Union was planning to install Intermediate Range Ballistic Missiles (IRBMs) with nuclear warheads on the island of Cuba. During this crisis, which brought the superpowers to the brink of a nuclear war, all U.S. military forces were placed on a high level of alert. Nike site NY-93/94 and others like it were placed on a heightened state of alert. Their missiles remained elevated on their launchers, ready to fire, for an extended period until this situation was finally resolved.

From September 1958 through November 1968, the base was manned by the 5th Battalion of the Army's 737th Artillery. During November 1968, operation of the site became the responsibility the 7th Battalion of the 112th Artillery of the New Jersey Army National Guard. At this time, New Jersey's state militia was already highly experienced in the air defense role. Elements of the state militia had manned anti-aircraft artillery gun batteries during the Fifties, and assumed command of Nike Ajax missile sites across the state, beginning in 1959.

A shortage of Nike-trained National Guard personnel in New Jersey at that time meant that appropriately trained Guardsmen from other states would have to be recruited to operate the site. This recruiting drive was successful and personnel from three other states, including Arizona, soon arrived at Franklin Lakes and Mahwah. The site soon became known as the "Four Flags" site flying the flags of each of the states from which the Nike personnel had been drawn.

The year 1968 was also a year of changing military and budgetary priorities. Although the bomber threat had not disappeared, Soviet Intercontinental Ballistic Missiles (ICBMs) were a new and growing threat and the Nikes were not designed to defend against this type of attack. Strategic military planning in the U.S. had also come to rely more on deterring an attack on the nation (by threatening an overwhelming and destructive retaliatory response) rather than attempting to provide a complete national defense, further marginalizing the value of the Nike system. A desire to control military spending and the growing war in Vietnam also provided an environment in which Nike sites nationwide would increasingly become targets – not for Soviet bombs – but for base closings as a way of freeing up funds for other defense-related programs and commitments.

Although the Franklin Lakes site survived the first round of base closures, two other New York Defense Area Nike sites (both located in New Jersey) were closed during 1968. Three years later, it was announced that three additional Nike sites in this region (two in New Jersey and one on Long Island) were to be closed. The Franklin Lakes site, Nike missile battery NY-93/94, was one of them.

Closure of the site was a lengthy process that took several months to accomplish. The ordering of nonessential supplies and spare parts was halted. At the Launcher Area, the Nike missiles were disassembled and their component parts removed by truck or helicopter. The radar antennas were removed from their towers at the Control Area, and shipped, along with the control trailers, to other locations. Small arms and ammunition used to defend the base was trucked to an appropriate armory for storage. Electrical connections, including the inter-area cable connecting the Control and Launcher Areas were severed, and radios and telecommunications equipment were removed. Finally, official closing ceremonies were held.

The last personnel to leave the Control Area chained and locked the front gate and during June, 1971, Nike Battery NY-93/94 passed into history. Although the Cold War would endure for another two decades the missiles at Campgaw Mountain and the circumstances which brought them there 16 years earlier were gone forever.

Subsequently, the Launcher Area was retained by the New Jersey Army National Guard as an armory for several years before being abandoned. Attempts to acquire the site as a park or to use it for educational purposes failed, and the base with its once impressive underground missile facilities was eventually demolished. The nearby housing area, originally constructed for Nike personnel and their families, remained in use as military housing for several years. It is still intact today, although abandoned at this time and is likely to be demolished in the near future. The Control Area was transferred to Bergen County shortly after the Nike site was closed, with the provision that the land be used as a park. Some of the Army's original buildings were retained, although a scheme to convert the radar towers to

observation platforms became too costly and all eight radar towers were demolished. A few foundation remnants indicating the towers locations can still be seen today by careful observers.

This site (the former Control Area) is presently in use as the Saddle Ridge Riding Area. Three of the Army's original Cold War era buildings – including the administration building and barracks – are still present. All were repainted in a decidedly non-regulation barn red (with contrasting white trim) and today serve as offices, horse stables and tack rooms. In a rather bizarre turn of events, horses are now boarded where Nike missile personnel once lived, worked and planned to fight the Cold War.

These buildings, the foundation remnants and the rusting chain link fences which still enclose portions of the site today are the final, silent reminders of a very different time when tensions between the global superpowers were growing, when fear of the atomic bomb was widespread, and when a small although not insignificant chapter in the history of the Cold War was played out in western Bergen County on the wooded slopes of Campgaw Mountain.

About the Photos, in the order they appear: **1.** The Launcher Area in Mahwah once contained six underground missile magazines. This photo shows Nike Ajax missiles inside of a magazine at an unidentified Nike site. **2.** Some of the Army's original buildings atop Campgaw Mountain have been adapted for use as horse stables at the Saddle Ridge Riding Area. **3.** Powerful radar elements, similar to the one depicted in this photograph, were once located atop Campgaw Mountain at the Integrated Fire Control area of Nike site NY-93/94. Photo credit US Army. **4.** Nike Hercules missiles offered superior performance, enhancing the defensive capabilities of site NY-93/94. No missiles were ever fired from sites in the Hudson Valley area.

About the Author

Donald E. Bender is the founder of the New Jersey Nike Missile Site Survey, a self-sponsored historical project designed to document the history and present condition of former Nike missile sites located in the New York, New Jersey and Philadelphia areas. He has assisted governmental, military, academic and historical organizations with research related to former Nike missile sites and other Cold War era military installations across the nation and internationally. He is presently completing a book about New Jersey during the Cold War. He can be reached via e-mail at bender@alpha.fdu.edu. You also may be interested in visiting this web site: <http://alpha.fdu.edu/~bender/nike.html>