Supplementary Listing Record

NRIS Reference Number: SG100003053 Date Listed: 10/23/18

Property Name: RSL-3

County: Cavalier State: ND

This Property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation

Signature of the Keeper | Date of Action: 10/23/18

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Amended Items in Nomination:

In Section 3 the box that the property meets National Register Criteria was inadvertently left blank.

The property is listed as a "building". With over 43 acres and a combination of buildings and structures, classification as a "district" may be more appropriate.

The NORTH DAKOTA SHPO was notified of this amendment.

DISTRIBUTION:

National Register property file

Nominating Authority (without nomination attachment)

NPS Form 10-900 OMB No. 1024-0018
United States Department of the Interior
National Park Service

SG 3053

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

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NAT. REGISTER OF HISTORIC PLACES NATIONAL PARK SERVICE

1. Name of Property

Historic name: RSL-3

Other names/site number: Remote Sprint Launch Site #3, Remote Launch Site #3

Name of related multiple property listing:

N/A

(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: 12329 State Highway 5

City or town: Concrete State: ND County: Cavalier

Not For Publication: [ ] Vicinity: [x]

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this _x_ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property ___ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

_x_national ___statewide ___local

Applicable National Register Criteria:

_x_A ___B ___C ___D

Signature of certifying official/Title: **Date**

NDSHPO

State or Federal agency/bureau or Tribal Government

In my opinion, the property _✓_ meets ___ does not meet the National Register criteria.

[signature] 9.7.18

Signature of commenting official: **Date**

Title : North Dakota SHPO **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

✓ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) ____________________

For [signature] 10/23/18

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private: [x]

Public – Local [ ]

Public – State [ ]

Public – Federal [ ]

Category of Property

(Check only **one** box.)

Building(s) [ ]

District [ ]

Site [ ]

Structure [x]

Object [ ]

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
3		buildings
		sites
2		structures
		objects
5		Total

Number of contributing resources previously listed in the National Register: N/A

6. Function or Use
Historic Functions
(Enter categories from instructions.)

DEFENSE: air facility

Current Functions
(Enter categories from instructions.)

Recreation & Culture: museum

7. Description

Architectural Classification
(Enter categories from instructions.)

Other

Materials: (enter categories from instructions.)
Principal exterior materials of the property: hardened concrete, earth

Narrative Description

Summary Paragraph

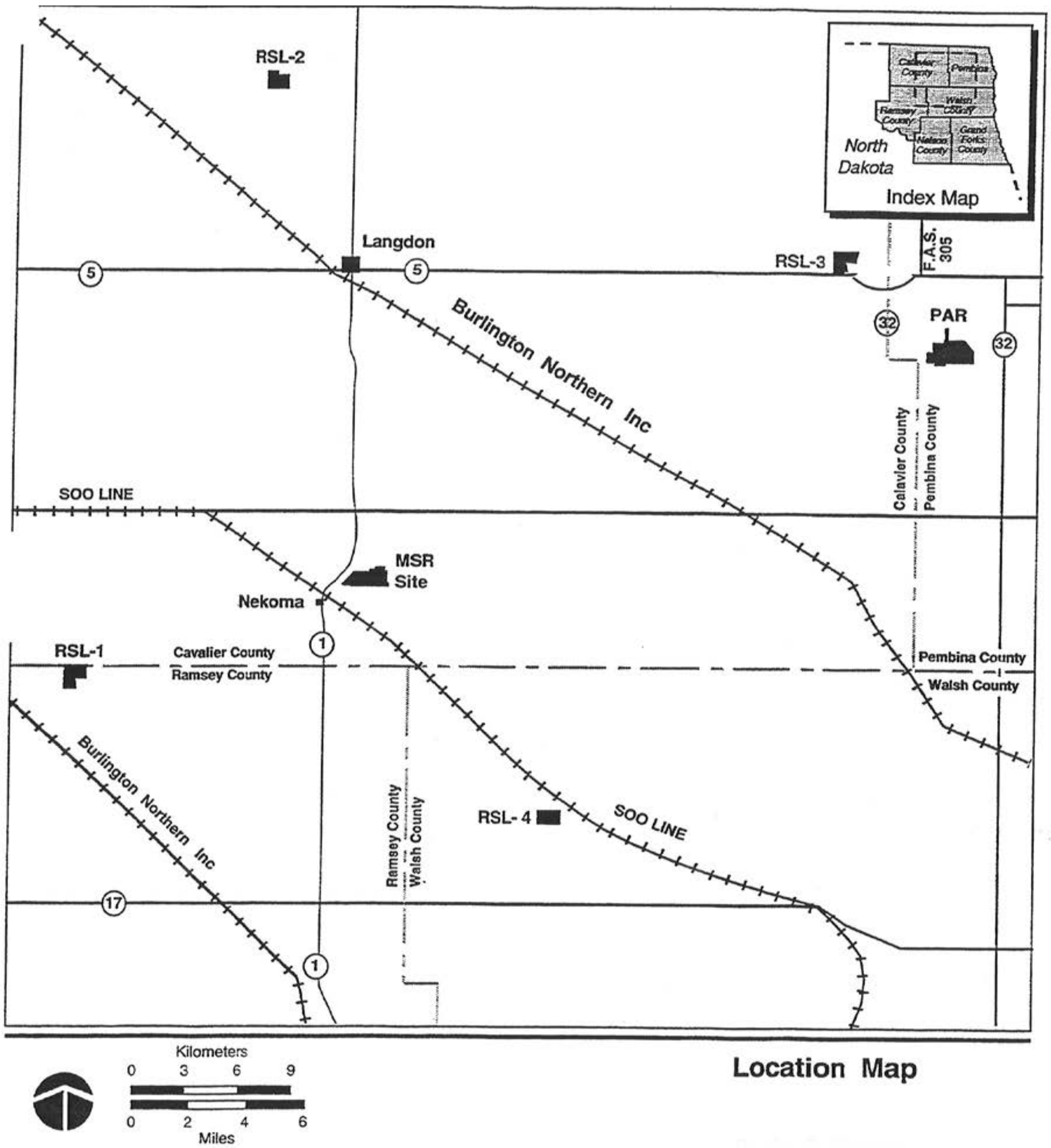
The RSL-3 site looks primarily as it did when it was completed in 1973. Its sprawling 43 acres are enclosed within an elaborate set of four fencing plans and includes an earth-covered, hardened remote launch operations building (RLOB) with two concrete ventilation towers that look as though they just popped-up out of the ground, sentry stations, heat sinks, fuel storage tanks, waste stabilization ponds, and a Sprint missile launch area containing 16 Sprint launch stations. RSL-3 has eight times the underground square footage compared to above ground. Its uniqueness and extensive lighting configuration among the surrounding miles of farmland and rolling hills around the Pembina Escarpment demand a second look when passing by along the highway.

Narrative Description

RSL-3 is in Cavalier County, about 17 miles east of Langdon and 5 miles west-northwest of the Perimeter Acquisition Radar (PAR) site near Concrete; approximately 50 percent of the area within 6,562 ft is agricultural, about 45 percent is wooded, and there are occasional, though limited, wetlands. The considerable topographic relief ranges from 1,280 ft to 1,540 ft above msl, with RSL-3 at 1,500 ft above msl. In the four county area of the SRMSC, land use is almost exclusively agricultural; the landscape is dominated by cultivated crops, farmsteads, wetlands, wooded stream banks, shelterbelts, municipal skylines (primarily grain elevators and water towers), and radio and microwave towers. The rural landscape is relatively flat, drained by intermittent streams to the Red River. The most prominent natural landscape feature is the Pembina Hills along the Pembina Escarpment near RSL-3.

Situated on the edge of the Pembina Escarpment, RSL-3’s location was tactically chosen to allow for the interception of incoming nuclear missiles due to the topographical (1500 msl) elevation advantage and a 650 feet height advantage to the northeast stretching hundreds of miles over what was once the largest lake on earth.

A Historic American Engineering Record (HAER) report was prepared for the whole Stanley R. Mickelsen Safeguard Complex (SRMSC) in 1999 and is record number HAER ND-9. That report provides detailed descriptions of the SRMSC components, as well as photographs and drawings; portions of that and other reports are included in this nomination. Sections HAER ND-9-F, AB, AC, AD, and AE relate to RSL-3. Full copies of the reports are available through the State Historical Society of North Dakota and the Midwest Regional Office of the National Park Service.



Map from The Earth Tecnology Corporation's "Historical Context for Properties: Located on the Stanley R. Mickelsen Safeguard Complex and Considered Potentially Eligible for Listing on the National Register of Historic Places," 7 October 1992, page 1-2

The four Remote Sprint Launch (RSL) sites, which were located within 10 to 20 miles of the Missile Site Control Building (MSCB), were in the general area of the Minuteman missiles which they were to defend. Each occupied from 37 to 45 acres of land with RSL-3 occupying 43 acres in the eastern half and southwestern quarter of Section 14, Township 161 North, Range 57 West of the Fifth Principal Meridian, Cavalier County, North Dakota.

It was decided that the smaller scaled, less demanding RSL sites should be separate from the main Missile Site Radar (MSR) / Perimeter Acquisition Radar (PAR) bidding package. Following the design of the Leo A. Daly Company, the construction contracts were awarded to the Woerfel Corporation and Towne Realty, Inc. for RSL sites #2 and #3 on 26 March 1971 in the amount of $7,630,950 and for RSL sites #1 and #4 on 30 August 1971 in the amount of $7,870,533. Chris Berg, Inc. designed and erected the support facilities. Each site was composed of sentry stations, heat sinks, fuel storage tanks, waste stabilization ponds, a Sprint missile launch area containing 12 to 16 Sprint launch stations, and a buried, reinforced concrete remote launch operations building (RLOB). The only design differences between the sites were the number of launch stations and the length of the tunnel to the RLOB.

RSL-3 Site Components

The RLOB (Remote Launch Operations Building)

The RLOB (Building 3110) is a hardened, buried, reinforced concrete, single-story structure. The approximate exterior dimensions are 142 feet long, 80 feet wide, and 17 feet 6 inches high with an access tunnel, 11 feet by 11 feet and approximately 74 feet long. Intake and exhaust stacks extend above grade. The roof and floors were designed as either flat, one-way, or two-way slabs to carry vertical loads. In addition, they were designed as diaphragms to transfer lateral loads to the shear walls.

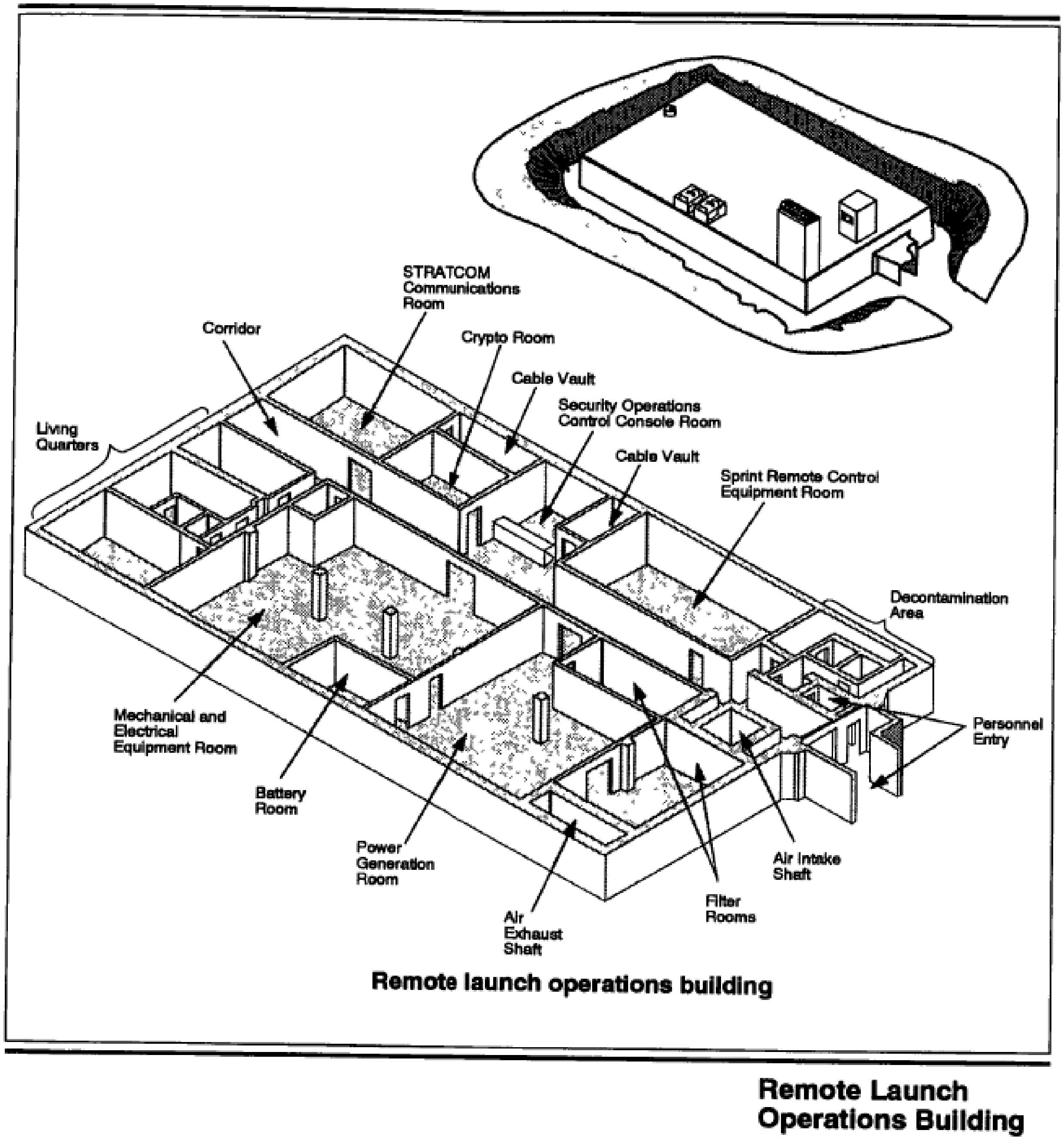
The RSL site is remotely monitored and controlled through the RLOB from the MSCB. The RLOB contained remote control equipment, communication equipment, security operations equipment, onsite control equipment, bunk room and kitchen facilities, and power, mechanical, and electrical systems.

The RLOB is hardened and shielded to withstand effects of nuclear weapons including overpressure, ground shock, thermal radiation, dust, nuclear radiation, and NEMP (Nuclear Electromagnetic Pulse). The design problems associated with nuclear weapons effects and the solutions of these problems were similar to those for the MSR and PAR facilities. Exterior walls are 2 feet 6 inches thick and interior walls are 10 and 12 inches thick. The floor slab is 2 feet 7 inches thick and has a 4-inch thick sub-slab. The roof slab is 2 feet thick and is covered with 3 feet of earth fill. Sensitive technical and support equipment is protected from the shock environment by means of shock isolation platforms. About 15 percent of the building floor area is shielded for RFI/NEMP (Radio Frequency Interference) protection of sensitive equipment. The interior walls, floors, and ceilings of the separately isolated shielded areas within the RLOB are lined with an 11-guage steel liner plate continuously-welded at all seams. All conduits and ducts entering the shielded areas are equipped with filters designed to attenuate RFI. Apertures resulting from utilities and other systems entering the RLOB were possible sources of contamination and required preventive measures. All conduits and ducts entering the RFI shielded areas were equipped with filters designed to attenuate RFI.

The main level contains equipment rooms (including the SRCE room (Sprint Remote Control Equipment)), cable vaults, vestibules, corridors, personnel areas, Chemical, Bacteriological, and Radiological (CBR) filter rooms, power and battery rooms, a Security Operations Control Console (SOCC) room, a fan room, and a crypto room. The upper level contains a storage room and a fan room.

The floor finish for the RLOBs was as follows: epoxy over concrete (16 rooms); concrete floor hardener (13 rooms); vinyl asbestos tile (VAT) (5 rooms); VAT on shock isolated platforms and painted liner plate (communication and crypto rooms); and VAT on removable panels (SRCE room). Each RLOB room, corridor, and separate enclosure was individually lined with 11-gauge steel liner plate to avoid compromising the structural integrity of junctions between interior floors, walls, and columns and the exterior walls, roof, and floor slabs. The RLOB wall finish was as follows: exposed concrete (22 rooms); concrete with gypboard (6 rooms); liner plate (6 rooms); and acoustical treatment (2 rooms). The RLOB ceiling finish was as follows: exposed concrete (24 rooms); acoustical lay-in panel (7 rooms); and liner plate (6 rooms).

During normal operation, electrical power for the RSL site is supplied through the RLOB from a soft commercial substation. During commercial power outages and during alert or attack conditions, power was supplied by gas turbine generators within the RLOB. Combustion air for the gas turbines was provided during the attack mode through an extensive air filtering and scrubbing system similar to that used in the MSR and PAR power plants. No-break power, at both 208 V and 460 V for mission critical loads, is provided by a recitfier/battery/motor-generator scheme. Storage batteries have a capacity for 4 to 6 minutes operation without other sources of power.



Layout from The Earth Tecnology Corporation, page 3-19

The RLOB is interconnected with heat sinks, fuel and water storage tanks, launch stations, and other auxiliary structures with numerous buried pipes and conduits. Many of these utilities serve critical systems and had to function following a nuclear attack. The design solution for protecting these critical lines and permitting them to respond to seismic motions with the surrounding soil is unique to the RSL sites. It was not economical to concentrate the lines in one location and use a corrugated arch structure such as was utilized at the PAR and MSR facilities. A low compressive strength (6 psi) foam insulation was placed around individual lines and groups of lines which, in turn, was protected from normal soil pressures with a layer of higher strength foam insulation. Expansion joints were utilized in the lines inside the foam jacket, where required, to withstand longitudinal forces.

The entrance tunnels are the only deviation from the generally identical plan of the four RLOBs. All tunnels have elastomeric roofing. The tunnel entrance at the lower level is underground but rises to ground level at the outside entrance, where a transformer pad (126 ft^2) is located. RSL-3 has the shortest tunnel at 74 ft in length with an area of 886 ft^2.

RSL Limited Area Sentry Station (LASS)

This station controlled the sally-port gates that permitted entrance into the RSL facility. The LASS (also Building 3101) is a one story, concrete building (2,259 ft^2) of permanent construction that had electric, water, and sewer utilities, as well as heating and exhaust units. The roof is suspended concrete slab with elastomeric roofing, and the floor is slab on grade. The LASS is considered "soft" (non-hardened) and expendable under an environment of nuclear weapons effects.

The LASS was designed by the Ralph M. Parsons Co. and was constructed by Woerfel Corp. - Towne Realty, Inc. for $50,000 over the period 9 May 1972-2 July 1973.

RSL Exclusion Area Sentry Station (EASS)

The EASS (also Building 3115) controlled ingress/egress of the Remote Sprint Launch (RSL) Exclusion Area. This one-man sentry station, with approximately 38 ft^2 of gross floor area, is a one story, concrete building of permanent construction that had electric light and power, two security windows, and one security door. The roof is concrete slab with elastomeric roofing, and the floor is slab on grade. The EASS is of "soft" (non-hardened) construction.

The EASS was designed by the Ralph M. Parsons Co. and was constructed by Woerfel Corp. - Towne Realty, Inc. for $9,300 over the period 9 May 1972-6 August 1973.

Sprint Launch Area Description
(Adapted from HAER No. ND-9-F, Missile Launch Area)

The Sprint Launch Area (also Structure 3501-3516) consists of 16 Sprint Launch Stations. The foundation of each of the steel cylindrical Sprint launch stations was buried vertically underground to a depth of some 32 ft and had an inner diameter of approximately 9.5 ft. Each was closed with a hatch and had a Launch Preparation Equipment Chamber.

When operational, each cell contained a Sprint missile that would be launched by a gas-propelled piston through its cell cover, which would be explosively fragmented to allow the missile's exit.

Prior to launch, Sprint missile status and commands were relayed to/from the MSR via (1) the SRCE located within the RLOB, and (2) a digital data link between the RLOB and the MSR. After launch, the MSR used its radar beam to communicate directly with the Sprint missile.

Sprint Specifications:

- Launchers: 16 (70 total in the system)
- Length: 27 feet
- Diameter: 4 feet 6 inches (at base)
- Weight: 7,500 pounds
- Fuel: Solid propellant
- Stages: 2
- Maximum engagement altitude: 24 miles
- Range: Approximately 25 miles
- Guidance: Ground-based radio directed
- Warhead: Nuclear, low-kiloton range yield
- Primary Contractor: Martin Marietta

Alterations and Additions:

By 1977 all missiles had been removed from the silo launchers, the silos were sealed, and the RSLs salvaged and sealed as part of the SRMSC deactivation phase. At this point, the RSL sites were essentially "abandoned in place."

In December 1989, an on-site environmental inspection found various facilities containing polychlorinated biphenyls (PCBs); this resulted in testing, disposal, and cleanup of these items. The USASDC, (United States Army Strategic Defense Command) along with the Omaha District and Huntsville Division of the Army Corps of Engineers, completed the cleanup. Much remediation has been performed within the RSL area regarding PCB contamination. Following a 23 July 1991 collection of soil and destructive samples from a stained RSL 4 concrete transformer pad, it was determined that elevated concentrations of PCBs (specifically Aroclor 1254) existed. Approximately 3 inches of concrete were removed from the upper portion of the pad, and soil around its perimeter was excavated to a depth of 6 inches. Lighting ballasts containing small amounts of PCBs were removed from all RSL sites from June through November 1991. RSL-3 had 196 lighting ballasts and 85 Radio Frequency (RF) filters were removed.

The RLOB facilities interior are considerably deteriorated. The air conditioners/heating components were scrapped off the top of the RLOB as were the four Siren Horns mounted to the exhaust tower which were used to alert the surrounding areas of possible incoming threats. The fresh air intake, exhaust tower, tunnel and berm are as they were when constructed.

The concrete construction of the above ground structures and buildings are well preserved. The parameter fencing and lighting are also present as the site was earmarked for historical status. A few lights are missing from the entrance poles (found inside EASS) and some barbed wire/brackets were removed off the roof but for the most part this building and sally port entrance gates, as well as a personnel turn-buckle of sorts, inside the guard station is intact. Doors and windows are intact as well as the three garage doors which stored the guard vehicle during the extreme winters. The asphalt pavement connecting the RLOB, site entrance, missile field, and LASS has deteriorated about 50%.

The EASS, which controlled ingress/egress of RSL Exclusion Area (or missile field) has a few bullet holes in the door. The 16 launch tubes covers are in place and original fencing and duel entry gates are as constructed. The security/motion system was removed from inside the missile field as was the antenna which allowed for remote launch from the MSR/PAR sites in the event communication was lost to the RLOB.

The million-gallon Waste Stabilization Lagoon (Structure 3135) remains as it was constructed. The two 86,000 gallon underground heat-sinks measure 60 ft x 20 ft x 9 ft, each are as was built.

The current owner employs an original caretaker to maintain the grass, security, monitor humidity/water and assist in the entry of the site to include recent pumping out of remaining antifreeze from one of the heat sinks (6-14-2014), fiber optic and electrical entrance to the LASS (2013), replacement of sewage ejector pump RLOB (5-15-2013) and personal access/tours of interested parties. City water was connected in the winter of 2015.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [x] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark “x” in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [x] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Military
Communications
Politics/Government

Period of Significance
1969-1977

Significant Dates
1973
1975

Significant Person
(Complete only if Criterion B is marked above.)

Cultural Affiliation

Architect/Builder
Leo A. Daly Company, design
Chris Berg Inc., design and construction
Ralph M. Parsons Co., design
Woerfel Corporation, construction
Towne Realty, Inc., construction

Statement of Significance Summary Paragraph

RSL-3 of the Stanley R. Mickelsen Safeguard Complex (SRMSC) is significant at the national level under Criterion A in the categories of military, communications, and politics/government. This site is the most intact of only four Remote Sprint Launch sites built for the only anti-ballistic missile (ABM) facility ever built in the United States (part of the Safeguard Anti-Ballistic Missile program). The construction and activation of the SRMSC is generally recognized by Cold War historians as instrumental in successfully negotiating the ABM and Strategic Arms Limitation Talks (SALT) Treaties with the Soviet Union.

Narrative Statement of Significance

The history below is taken from the HAER report and the historical context completed in 1992.

> The history of strategic defense is the story of meeting and overcoming technological threats. The U.S. Army has played a pivotal role in that process since 1794 when the U.S. Congress tasked the Army to build and staff coastal defense fortifications. As the threat changed from cannon-bearing ships to bomb-laden aircraft, the Army changed the focus of its defense from coastal forts to urban defense anti-aircraft installations.
>
> With the end of World War II, the uneasy coalition of anti-axis powers began to break up. Many points of friction began to develop between the USSR and the western nations, led by the United States. The most predictable issues were over Soviet control of East Germany and other Eastern European nations. Tensions were further heightened when communist forces threatened Greece and Turkey. Three events in 1949-1950 accelerated a move toward confrontation: the Soviet Union exploded its first atomic weapon and became a nuclear threat; the Chinese Communists gained control of China; and the Soviets and Chinese backed a North Korean invasion of South Korea. To contain the communist threat of expansion in Europe, a new coalition of western states called the North Atlantic Treaty Organization (NATO) was created. The Soviets countered by forming the "Warsaw Pact", a military coalition of eastern European nations. With the exception of a few neutral nations, the world polarized into two hostile factions and all international issues were measured with an East-West theme. The Cold War had begun in earnest and each camp used diplomatic maneuvers, threats, espionage, economic pressure, and propaganda to consolidate its position. Each faction's power, however, evolved from different sources in the post-World War II era. The Soviet Union continued to maintain a very large land army after the war, deployed in the occupation of central and eastern Europe. The United States, which was held in greatest military respect due to possession of atomic weapons, quickly demobilized its large conventional military force in the years immediately after World War II.
>
> The nature of the Cold War dramatically changed when the Soviet Union successfully tested an Inter-Continental Ballistic Missile (ICBM) and successfully orbited Sputnik in 1957. The

Soviets were no longer only a threat to Western Europe; with nuclear armed ICBMs, they could threaten the American homeland. The distant communist menace become a very real and immediate threat to the American people five years later when the Soviet Union targeted the United States with nuclear weapons based in Cuba. The world was on the brink of nuclear war for several anxious days in October 1962, before the Soviets, under U.S. pressure, removed the weapons. The Cuban Missile Crisis and the Chinese entry into the-nuclear arms race in 1964 convinced U.S. planners that a defense based on offensive nuclear weapons was not a complete deterrent against communist aggression. In 1967, the U.S. determined to develop an anti-ballistic missile (ABM) system which would protect the American homeland by intercepting incoming Soviet ICBMs. The Stanley R. Mickelsen Safeguard Complex was the eventual product of that 1967 decision and utilized the achievements of the earlier developmental NIKE-ZEUS and NIKE-X ABM systems.

2.1 THE U.S. ARMY AND ABM SYSTEM DEVELOPMENT

The Army's Ballistic Missile Defense (BMD) program, centered in Huntsville, Alabama, may best be characterized as evolutionary and incremental, pursuing potentially revolutionary technologies to leap-frog existing research (Currie-McDaniel, 1986: 38). Realizing the importance of maintaining a technological advantage over the Soviets, the Army has taken every opportunity to invest in R&D.

The Army's involvement with BMD grew out of its air defense role. The Army recognized the need for missile defense in the 1940s. The first generation of missiles, Nike, was designed and developed at first to cope with air-breathing targets and then strategic ballistic missiles… In the 1950s, the Nike-Ajax missile system was deployed near select U.S. cities and air bases for defense against manned military aircraft. The nuclear-armed Nike-Hercules became operational in 1958. However, as this second-generation missile was being developed, the U.S. Army Ordnance Corps contracted for the first true antimissile missile system. This missile system was developed specifically to defend against strategic ballistic missiles, both intercontinental and submarine or surface-launched intermediate-range types. This ABM was designated Nike-Zeus.

The first program office for BMD, the Redstone Antimissile Missile System office, was established in 1957 under the Army Ballistic Missile Agency in Huntsville. The program at this facility developed the R&D necessary for the successful testing of the Nike-Zeus system. The Army Ballistic Missile Agency was replaced by the Army Rocket and Guided Missile Agency, an element of the new Army Ordnance Missile Command.

As a result of studies concerning ABM capabilities for intercepting an ICBM, the program objectives were revised to concentrate solely on the ICBM defensive missile; hence, work on the seeker nose for air-breathing targets was terminated. The project designation for the development of an anti-ICBM defense system was changed from Nike-Hercules to Nike-Zeus.

The surveillance function for the Nike-Zeus system was to be performed by the Zeus Acquisition Radar (ZAR).

The Missile Track Radar (MTR) provided position data on the defensive missile to the Target Intercept Computer (TIC). It also transmitted steering, burst, and other orders from the TIC to the defensive missiles via the radar beam. The tactical TTR operated in conjunction with the TIC.

The Nike-Zeus Battery comprised all the elements required for carrying out the engagement of an assigned target. This included radars for tracking and discrimination, defensive missiles, and computers for all the calculations needed to accomplish a successful intercept.

The defense center of the Nike-Zeus program assigned a cloud of threatening objects to a battery, a point within a cloud designated for use by a Discrimination Radar in tracking the entire cloud. The function of this radar was to provide sufficient information on all the objects in the cloud so that non-lethal objects could be filtered out and true targets identified.

The entire Nike-Zeus system, consisting of the ZAR, two Target Track Radars (TTRs), one Discriminating Radar (DR), and three MTRs and battery control equipment with a TIC and four Zeus launch cells, was installed on the island of Kwajalein in the South Pacific. It was operational and ready for the first test of intercepting an ICBM on 26 June 1962. The first test was a failure, but improvements to the system, provided later successes.

In 1962, an Army-wide reorganization resulted in the creation of the U.S. Army Missile Command which supplemented the Army Ordnance Missile Command. The Nike program came under the Supervision of the Commanding General of the Army Material Command; however, the U.S. Army Missile Command continued to supply administrative support.

By 1963 it was accepted that the Soviet Union had the technological ability and the expressed intention to at least develop parity in warhead yield with the United States. This escalation of the assumed Soviet threat was a breakpoint in the general approach to the Nike-Zeus development. The Nike-Zeus system had been designed to defend population and industrial centers from a relatively light attack.

Projections of a rapidly increasing Soviet threat emphasized the following Nike-Zeus shortfalls: the Zeus radars were mechanically steered, limiting the number of targets that could be accommodated, and making deployment of sufficient radars prohibitively expensive, and the Zeus missile itself was not designed for low-altitude intercepts that would take advantage of atmospheric filtering of non-lethal ICBM hardware (Currie-McDaniel, 1986: 5). Thus, the Nike-Zeus system was not deployed.

2.1.1 NIKE-X SYSTEM

The Nike-X was not a single ABM system concept but a collective term to cover a number of studies and exploratory developments aimed at leading to the next-generation ABM system. Development of the Nike-X began about 1960, when it became apparent that the Soviet Union might be able to mount a high-traffic attack against the United States by the early 1970s.

The first Nike-X system study, in 1963, considered a terminal defense for the larger U.S. cities against the sophisticated Soviet attack postulated for the mid-1970s.

The Nike-X project and its development were conducted as a high priority effort. It was separated from the U.S. Army Missile Command administratively and it operated in Huntsville, directly under the Army Material Command.

In developing concepts to meet these city defense objectives, several major subsystems were defined. The Multifunction Array Radar (MAR), which performed search, track, and discrimination, was the center piece of city defense. The Missile Site Radar (MSR) and a high-acceleration, atmospheric interceptor, the Sprint missile, formed a team for fast-reaction, high-traffic, terminal interception of attacking ICBMs. The MAR, MSR, and Sprint were also responsible for self-defense of the ABM facilities. By 1968, the city defense concepts were reassessed, and the decision was made to shift the defense objective to an area defense against relatively light attacks. With this shift in emphasis, the ABM program moved away from the city defense concept. As a result, a much different sensor was required, one that could detect, tract, and designate targets above the atmosphere at very long ranges. This role was first assigned to a new Very High Frequency (VHF) radar, which, late in the Nike-X period, became the Ultra High Frequency (UHF) Perimeter Acquisition Radar (PAR). The interceptor chosen for an area defense was an extension of the Zeus missile called Spartan.

Defense of strategic forces moved toward hardened defensive and offensive sites. The objective was to present significant, obvious uncertainties to the offense planner and, hence, reinforce deterrence. These terminal defense efforts led to a series of system studies: Hardpoint, Hardsite, and Virtual Radar Defense. One study of the defense of U.S. strategic forces took place in 1963-1964. For this study, two configurations were considered: one for defending hardened sites near defended urban areas and the other for autonomous defense of isolated sites. The study focused on the protection of command and communication facilities and the U.S. strategic offensive force, including clusters of ICBMs and Strategic Air Command (SAC) bases. In a later study, only hardened silos having the Titan II and Minuteman forces and the hardened defense elements were to be defended. Each study conducted indicated that MSR technology would be adequate, and each study increased the radar hardness levels.

2.1.2 SENTINEL SYSTEM

In September 1967, Secretary of Defense McNamara announced the decision to deploy some components of Nike-X as the Sentinel BMD system. In November 1967, the U.S. Army Sentinel System Command (SENSCOM) was established in Huntsville under the supervision of the Washington-based Sentinel System Manager. The personnel and resources of the Nike-X Project Office were transferred at this time from the Army Material Command to SENSCOM.

In 1967, the Department of Defense (DOD) Director of Defense Research and Engineering directed that SENSCOM responsibilities, be limited to the engineering development required to support the approved Sentinel deployment. In compliance with that guidance, the Army created, separate from SENSCOM, an organization based on the Advanced Technology Office of the Chief of R&D. Initially labeled the Ballistic Missile Defense Research Office, its mission was to conduct advanced R&D. The following year, this office was renamed the U.S. Army Advanced Ballistic Missile Defense Agency (ABMDA) reporting to the Army's Chief of R&D.

The Sentinel system was formulated to defend against the potential ICBM threat from both the People's Republic of China and the Soviet Union during the 1970s. The deployment decision limited its initial role to a complete area defense against a Chinese industrial/urban attack on the CONUS and contained a growth option for defending certain U.S. ICBM bases against Soviet attack.

The Sentinel system consisted of the following major subsystems:

- PAR and associated PAR Data Processor (PARDP) for long-range surveillance and tracking, of attacking ICBMs
- MSR and associated MSR Data Processor (MSRDP) for close-in target surveillance and tracking and for command guidance of defensive missiles
- Spartan missiles with high-yield nuclear warheads for long-range intercepts
- Sprint missiles with low-yield nuclear warheads for close-in, fast-response intercepts

The initial Sentinel deployment, to provide an area countervalue defense of the CONUS and Alaska, was to consist of 6 PARs, 16 MSRs, 480 Spartans, and 192 Sprints. An additional MSR and 28 Sprints were to be provided for Hawaiian defense. The PARs would have their single arrays generally faced to the north. The MSRs would have one, two, or four array faces depending on their location and role in the defense. This initial deployment could grow to include defense of strategic missile bases by the addition of 208 Sprints and modification of the data processing hardware and software at the sites located near Minuteman bases.

This system was to be closely netted and would have the ability to modify its response to specific attacks. Overall command and control, administration, and status of the system was to be effected through netting of local and area defense centers and, these in turn, with the Continental Air Defense Command (CONAD).

In 1969 the Nixon Administration review of the Sentinel program resulted in the decisions to move away from urban defense and to employ BMD components to defend U.S. land-based ICBMs. The new command was the Safeguard System Command (SAFSCOM).

In the total story of ABM development, the Sentinel system is but one brief chapter. Although not actually deployed, Sentinel was significant in that it was the first ABM system on which an affirmative decision to deploy was made.

This decision initiated development and other related activities not addressed as specifically, or in as much depth, for earlier systems. Some of these activities turned up important problems that required significant attention and therefore became important conclusions in the planning for Safeguard.

The Safeguard ABM system was designed to protect U.S. Minuteman ICBM bases from attacks by enemy ballistic missiles. Development of the Safeguard system began with a redirection of the Sentinel program in March 1969. Its deployment plan called for a number of sites to be constructed primarily in the westem part of the United States. As a result of the Strategic Arms Limitation Talks (SALT) agreements and related program decisions, actual deployment was subsequently limited to a single complex in North Dakota and a system command center in Colorado.

The initial Safeguard plan called for up to twelve sites deployed in two phases. The first phase, for which authorization was originally granted, provided Minuteman defense at Grand Forks Air Force Base (AFB), North Dakota, and at Malmstrom AFB, Montana, together with a Ballistic Missile Defense Center (BMDC) at Cheyenne Mt., Colorado. The second phase would have added Minuteman defense at Whiteman AFB, Missouri, and at Warren AFB, Wyoming, as well as defense of the National Command Authority (NCA) in Washington, DC. This phase also retained the option to add additional sites to protect SAC bases and population centers. In March 1971, approval was granted to proceed with the installation at Whiteman and to plan for the Warren site. Whiteman was designated as the Fire Control Center (FCC) and Malmstrom as the Alternate FCC. The FCC was an intermediate command center reporting to the BMDC. A year later, however, authorization for the Whitman site was rescinded, and Malmstrom was designated as the FCC.

In accordance with the terms of the SALT agreement of June 1972 and a subsequent Congressional decision not to authorize the permitted deployment the Washington, DC area, the Safeguard system was further reduced to provide Minuteman defense only at Grand Forks AFB. Thus, the planned deployment consisted of a PAR and a Missile Direction Center (MDC) in North Dakota, both under overall command of the BMDC in Colorado. Included in the MDC was a MSR and associated Sprint and Spartan missile farms.

The three types of sites in the Safeguard system were to be interconnected by communications links. The PAR site was planned as a single-faced, phased-array radar to provide early detection and target trajectory data on threatening ICBMs. Functions of this site included long-range surveillance, detection and selection of threatening objects, and ICBM threat tracking for Spartan intercept. This last capability significantly increased the long-range Spartan field of fire. The PAR site was not planned to perform missile guidance but instead to transmit trajectory and target classification data over the tactical communication links to the MDC. The MDC would use this information together with data from its own multi-faced, phased-array MSR. This site would provide additional surveillance and target tracking as well as track and guidance for Sprint and Spartan missiles. Both PAR and MDC sites would report to the BMDC, which would provide a command interface with other military systems and a means of disseminating command directives and controls.

The PAR and MSR would be controlled through digital commands issued by collocated Data Processing Systems (DPS). These commands were planned to manage such radar functions as beam pointing, frequency selection, receiver gating, thresholding, etc. In addition, application programs in the PARDP and MSRDP would manage the major system functions of surveillance, tracking, target classification, radar testing, inter-site communication, and command/control display. At the MDC, other programs would support engagement management and missile guidance. The BMDC DPS would primarily perform command, control, and display functions.

The SAFSCOM and ABMDA had distinct but interrelated R&D programs in the early 1970s. In May of 1974 all BMD efforts were consolidated under management in the Ballistic Missile Defense Organization. The ABMDA became the Ballistic Missile Defense Advanced Technology Center (BMDATC) in Huntsville, and its Washington office was disbanded. Concurrently, SAFSCOM became the Ballistic Missile Defense Systems Command (BMDSCOM).

Two primary factors determined the BMD direction in the 1970s. First, on 26 May 1972, the United States and the Soviet Union signed the Treaty on the Limitation of Antiballistic Missile Systems. Although the treaty permitted both signatories to deploy defensive systems at two separate locations, Congressional action, in Fiscal Year 1973 Authorization Bill limited U.S. deployment to the site near Grand Forks, North Dakota. In July 1974, the United States and the Soviet Union entered into an agreement to limit each country to only one ABM site that could be located either at the NCA or at an ICBM complex. The agreement was incorporated into a Protocol to the 1972 ABM Treaty, ratified by the Senate in November 1975, and put into effect with the signature of the President in May 1976.

The second directional factor was the guidance given by Congress in 1974 to cease prototyping. Perhaps influenced by a certain anti-military attitude that resulted from the Vietnam War, this action limited the site defense project to R&D at the subsystem and component level. In October 1975, site defense evolved into the systems technology program under BMDSCOM.

Congressional guidance also affected Safeguard. Despite intense Senatorial debate over deployment, changes in appropriations, and the complexity of the project itself, SAFSCOM had met the time schedule within budget with a system that worked. The equipment-readiness date for the North Dakota site was achieved on 10 October 1974, a target that had been established in 1970. Installation of the missiles began in 1974; initial operating capability was reached in April 1975; and the Safeguard system achieved full operational capability on 1 October 1975. The DOD hoped to keep the site functional for at least one year in order to obtain operational experience. Some Congressional leaders, however, feared an increased vulnerability for a single site because of Soviet ICBMs with multiple independently targeted reentry vehicles (MIRVs) (Currie-McDaniel, 1986: 15). Congress directed that operation and maintenance of the Safeguard system, except for the PAR, be terminated.

The experience gained in developing and deploying the Safeguard system was invaluable. Major technological breakthroughs and advances in the state of the art in both components and systems integration resulted. This put the United States in a favorable technological position which was to be preserved following the BMD redirection exclusively to R&D.

2.2 RESEARCH AND DEVELOPMENT OF THE ABM SYSTEM

The results of ABM research over the years has indicated that deployment may be designed to defend against various types of offensive attacks. The U.S. Army developed an ABM deployment plan designed specifically for protection against a possible Chinese threat with capabilities to expand to defend against a larger Soviet attack. At the time of this development it was believed that China would have a first generation of ICBMs in the early 1970s. The deployment plan was designed to provide an area defense against such a first-generation threat. The original plan consisted of (1) several PARs across the northern boundary of the United States and in Alaska to perform the long-range detection and acquisition function, (2) MSRs and Spartan batteries in the CONUS and Alaska, and (3) one MSR and Sprint battery in Hawaii. The deployment required several hundred Spartans for overall defense, a lesser number of Sprints for overall defense, and a lesser number of Sprints to defend the PARs (Jane's, 1969-70: 34). However, as amended by the 1974 protocol, the ABM treaty limited the United States to one ABM site, having a radius of 150 kilometers (km) (93.2 miles, [mi]) with 100 interceptors and 100 launchers either around the national capital or an ICBM field (Longstreth, Pike and Rhinelander, 1985: 5-6). As stated· in Article III of this treaty, as amended by the 1974 protocol, the site selected to defend an ICBM facility may have no more than two large ABM radars and eighteen smaller ABM radars.

The ABM system designed for the SRMSC was deployed under these constraints. The research, testing and development of the ABM system deployed at the SRMSC took place at various places in the CONUS, the Atlantic, and the South Pacific. The principal components of the system include the radar, defensive missiles and launchers, and the communication/data processing systems responsible for operation of the radars and missiles.

The technological developments for hardening buildings proved useful in other areas of security as well. In July 1977, the LASS at RSL 4 was used by the Federal Aviation Agency and the Defense Nuclear Agency to test simulated terrorist bomb blast effects; interior damage was only slight, with no structural damage. The tests were successful in developing criteria for hardening baggage storage and locker areas of airport terminals to contain the explosion effects of small expedient bombs.

2.2.1 RADAR DEVELOPMENT

Radar as a means of detection has been in existence for more than 50 years, and although military technology has become immensely more sophisticated than it was in the 1930s, the basic requirement remains the same - to measure the range and bearing of a target. Efforts in development over the past 50 years have been aimed at the following requirements:

- Improvement in the extraction of return signals from their background of noise
- Provision of more information to the operator
- Improvement of displays
- Increased automation
- Tracking of moving targets, including airborne targets at supersonic and hypersonic speeds
- Normal surveillance and tracking of a number of targets simultaneously

The results of research in the mid-1950s defined the radar requirements of an ABM system. It was concluded that a long-range, high-data-rate acquisition radar was essential to any BMD solution. Long-range systems have a requirement for target detection at ranges of 370 km (230 mi) and upwards (Hall et. al., 1990: 101). Detection of target position at this distance is necessary for effective defensive measures to be implemented against a target traveling 7,315.2 meters (24,000 feet) per second. A second radar requirement for an ABM system was the ability to discriminate between the missile as it reentered the atmosphere and the various decoys and junk that might accompany it. The radar should also be able to track the missile continuously as it progressed on its course. Furthermore, the radar would need to be capable of tracking the progress of the defensive missile launched to intercept the ICBM.

At the time the study was conducted, radar technology did not permit accommodation of all four requirements in a single radar structure. Initial research for the proposed Nike-Zeus ABM system indicated that the discrimination and target-tracking functions might be compatible within the same structure. However, further studies of various threat possibilities concluded that the proposed radar assembly had the major disadvantage in having a multi-function requirement in a mechanical dish-type radar. The decision was made to have a completely separate DR and time-share the TTR to provide precise tracking of designated targets 6 to 10 seconds before intercept (Bell Laboratories, 1975: 1-16). Later system studies of threat scenarios indicated a need for 3 DRs, 6 TTRs, and 12 MTRs in a firing battery (Bell Laboratories, 1975: 1-16).

The ABM system studies initially indicated requirements for a Forward Acquisition Radar [FAR] and a Local Acquisition Radar (LAR) near the, firing battery to perform the long-range acquisition. Eventually, the FARs were eliminated, and all search and acquisition functions were assigned to the LARs at each battery. The LAR design was changed from a spherical design to a hemispherical Luneberg lens, since the hemispheric lens could be made less sensitive to nuclear weapons overpressure effects (Bell Laboratories, 1975: 1-18). The LAR became known as the ZAR.

All important radar parameters known at the time of the study and their sensitivity to frequency were taken into account in establishing the 500-MHz frequency for the ZAR (Bell Laboratories, 1975: 1-18). Further study revealed that radar-signal attenuation due to nuclear blast effects is reduced by the square of the radar frequency, and this was taken into account in balancing the optimum frequency of the ZAR (Bell Laboratories, 1975: 1-20).

A Zeus TTR and support system was installed on Ascension Island in the Atlantic Ocean which was to serve as the target area planned for ICBM launches from Cape Canaveral, Florida. At Whippany, a similar TTR installation was built simultaneously to provide a local prototype for correcting design problems (Bell Laboratories, 1975: 1-21). The first attempts of the TTR at Ascension in 1961 failed, but they did permit analysis of target characteristics and measurement of the ability to track high-speed targets (Bell Laboratories, 1975: 1-23).

A third TTR was made operational at White Sands Missile Range (WSMR) in New Mexico based on previous testing at Whippany and Ascension (Bell Laboratories, 1975: 1-24). Tests conducted at the WSMR were historic in that the ZAR became the first track-while-scanning radar system to successfully cover the entire hemisphere surrounding a radar position, detect the objects in that space, remember their past positions, and predict where the objects would be next in three dimensions, all automatically, beginning with initial detection (Bell Laboratories, 1975: 1-24).

Kwajalein Atoll of the Marshall Islands in the South Pacific was chosen for further testing of the ABM system. Ascension Island was not a U.S. possession, and its use for missile firings was considered too sensitive (Bell Laboratories, 1975a: 1-21). Kwajalein was not a U.S. possession but had been under American stewardship since 1944. Furthermore, Kwajalein was roughly 7,724.6 km (4,800 mi) from the West Coast, a range nearly ideal for testing current ABMs against ICBM targets to be launched from Vandenberg AFB in California (Bell Laboratories, 1975: 1-21). The entire ABM system, consisting of the ZAR, two TTRs, one DR, three MTRs, and battery control equipment with a TIC and four Zeus launch cells was installed on Kwajalein and ready for testing in 1962. Initial tests provided data needed to improve the system for the following successful tests later that year and in 1963.

In 1963 construction of a MAR technical facility began at the WSMR. This phase-controlled, scanning antenna, array-type radar possessed the advantages of (1) increased blast-resistance capability, (2) greater power-handling capability, (3) flexibility of beam adjustment, and (4) capability of combining several functions in one radar (Bell laboratories, 1975: 1-33). Even as this radar facility was being built, a much more powerful MAR, the MAR-II, was under study. Also proposed at this time was the MSR to provide multiple tracking of defensive missiles and short-range target tracking. Development of the MSR began in 1963 and in 1965 the decision was made to provide the MSR with its own data processing and command and control operation (Bell Laboratories, 1975: 1-38). A two-faced MSR was scheduled to be in operation on Meck Island in the Kwajalein Atoll in 1968. Deployment of an R&D prototype MAR II on Kwajalein was eventually scaled down in 1968, due to costs, to an R&D field-site radar referred to as a Common Aperture MAR to provide basic field data on discrimination. However, the project, then supported by the ABMDA, was cancelled in 1969 (Bell Laboratories, 1975: 1-40).

In 1965 a new study of active defense for hardened sites was initiated by the Director of Defense Research and Engineering. Also in 1965 the concern about the type of threat China represented initiated investigations about possible modification to the ABM system in 1965. In 1966 study on the radar for this type system began. A schedule for completing design definition in 1967 was established for this radar, called the PAR.

In 1966 a model ABM system designed to combine area defense with Hardsite defense capabilities came under study. This model was designated as the Plan 1-67 Area/Hardsite Defense (Bell Laboratories, 1975: 1-44). The major objectives of the deployment of this system were defense against a deliberate Chinese-launched industrial/urban attack and defense against a deliberate high-level ICBM attack from the Soviets aimed at U.S. strategic forces. The results of the study were strongly influenced by three conditions: specific design threat, total investment cost not to exceed 5 billion dollars, and initial operating capacity (IOC) within 54 months of a deployment decision (Bell Laboratories, 1975: 1-45). This modified system was to include the PAR, MSR, Sprint, and Spartan. The PAR and MSR would be operated at different frequencies as a precaution against the probable blinding effects of a nuclear detonation in the atmosphere. It was believed that such an event would not have equally deleterious effects on two different frequencies. Thus, each radar would maintain some degree of detection ability.

2.2.2 MISSILE DEVELOPMENT

In the initial studies conducted in the mid-1950s it was determined that the development of effective ABMs would require greater knowledge of ICBM trajectory. Since the first successful ICBMs were not flown until 1959-1960 (Bell Laboratories, 1975: 1-16), an analog simulation laboratory was designed to study defensive missile guidance for ICBM intercept. After some 50,000 intercept runs under varying threat parameters and intercept altitudes, it was convincingly demonstrated that ICBMs could be accurately intercepted when guidance was properly scaled to the high-speed target (Bell Laboratories, 1975: 1-11).

The initial missile studies and exploratory development efforts were conducted using wind tunnel tests at high supersonic velocities and heat tests of various ablative coatings such as teflon and fiberglass, materials proposed for protection of the missile structure. However, the extent of the challenge in missile development was not fully appreciated until the early Zeus ABMs were flown at the WSMR. Discovery and solution of the problem resulted in examination of recovered missile parts as stated by Bell Laboratories:

It was clear from examining the four control fins that their large-diameter hardened-steel shafts were sliced off by aerodynamic heating which resulted in loss of control and missile destruction. The control fins were purposely shaped to have wide separation from the missile skin based on aerodynamic wind-tunnel data. After returning to the wind tunnel with much finer measurement of pressures under the fin surface, high-pressure points were discovered that resulted in concentrated heat levels. On redesign, a teflon ramp was provided under the control fin giving close spacing. In addition, circular traps were provided to protect the control shaft ... With these changes, the major aerodynamic problem was solved, opening the way to successful Zeus missile firings. This ramp design and close spacing for the control fins was adopted…for the Sprint missile some six years later. As a result, even though Sprint's velocity was higher at lower altitudes, with much greater aerodynamic heating, the same basic design was successful in protecting its control fins.

The other major step forward in missile design was providing aerodynamic and thrust control from the same control fins. The problem of handling the hot gases of the third-stage motor through a manifold system into the control fins was solved by extensive ground testing with many configurations of tungsten and carbon materials. As a result, relatively few failures of the jet control system occurred in early flights at high altitudes from the Pt. Mugu range in California. (Bell Laboratories, 1975: 1- 22, 112)

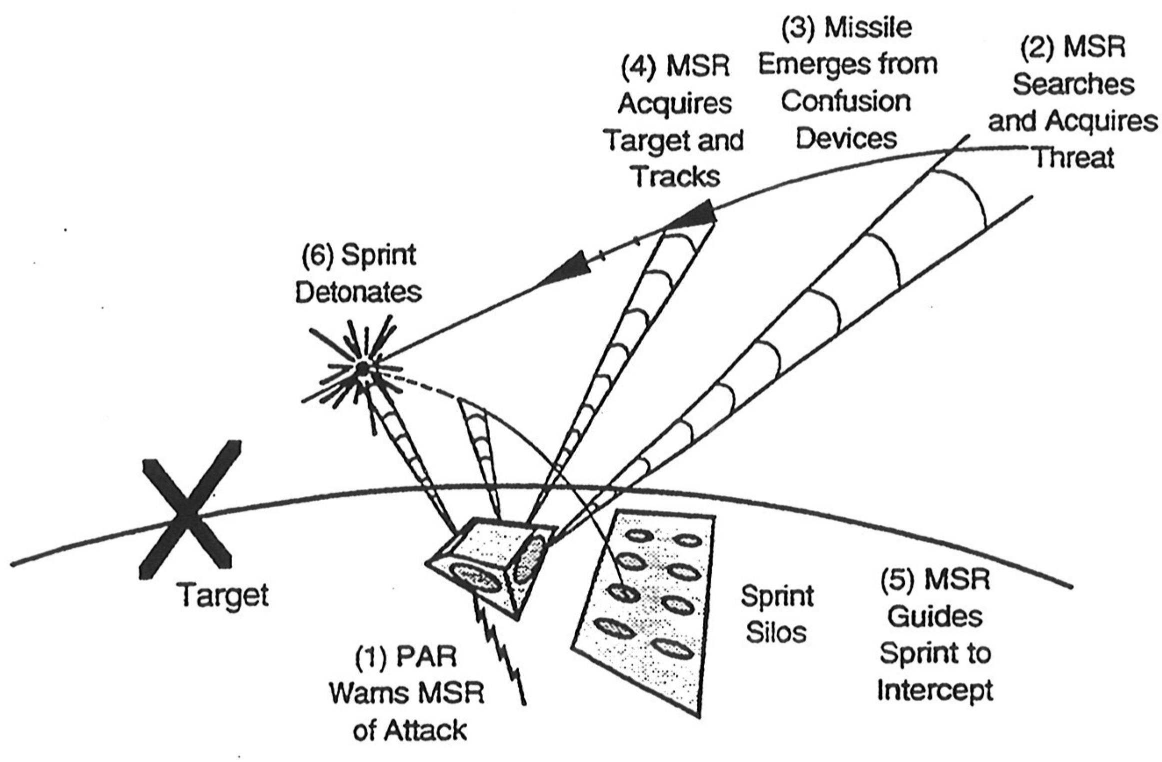
The objective of the Sprint development program was to develop a missile subsystem capable of terminal defense intercepts at any azimuth, at relatively close ranges, and at altitudes at the extremes of the sensible atmosphere with the smallest practical vehicle capable of fast delivery of a specified nuclear payload (Bell Laboratories, 1975: IX-1). Elements of this subsystem included propulsion, first-stage control system, second-stage control system, heat shield, autopilot, launch eject, and staging. Problems in design of each of these elements were identified and solved using laboratory and flight testing.

Development flights were originally conducted at WSMR to recover and examine flight hardware. Forty-two Sprint missions were flown there to provide testing of all Sprint missile subsystems in as many flight environments as possible (Bell Laboratories, 1975: IX-12). Thirty-four test flights were conducted at Kwajalein Missile Range to gather data to support the evaluation of the tactical Safeguard system. Flight test results demonstrated that important missile characteristics were significantly better than those specified before the start of the development program (Bell Laboratories, 1975: IX- 23). Design, performance, and results of tests were thoroughly documented by Bell Laboratories.

The role of the Spartan in Safeguard was to intercept ballistic missile targets at long range with a large payload in the exoatmosphere (Bell Laboratories, 1975: X-1). The Spartan evolved from the Nike-Zeus configuration. It was modified to increase motor performance, improve missile guidance, and increase warhead yield. Phases I and II of the R&D included defining the

Zeus missile subsystem based on Nike-X system requirements and design trade-off studies, planning the development program and completing the preliminary design. Phase III included continued system and design trade-off studies and formal design (Bell Laboratories, 1975: X-1). The program consisted of a 29-month detailed engineering design, hardware fabrication, and ground test phase and flight tests at Kwajalein and Meck Islands.

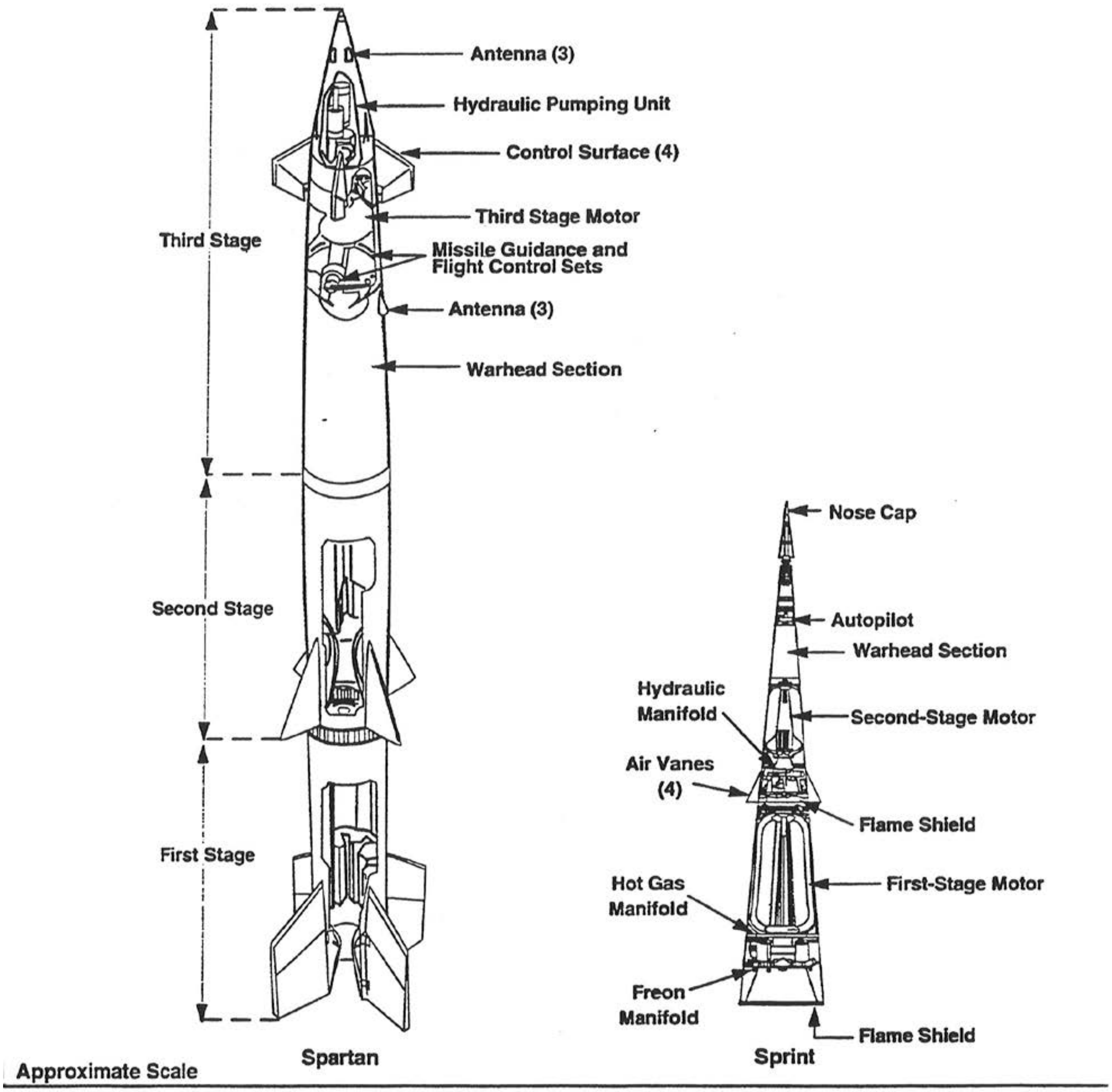
An extensive functional and environmental test program, which included several months of system integration testing in the laboratory, was carried out before the first flight test in 1968 at Kwajalein (Bell Laboratories, 1975: X-1). The elements of this subsystem included propulsion missile-born guidance equipment, launch preparation equipment, hydraulic system, and launch cell protective cover.



Missile Engagement by Sprint System (Terminal Defense)

The Earth Tecnology Corporation, page 3-15

The primary requirements placed on the Kwajalein development flight tests were to develop, verify, and document the performance of individual missile subsystems and their ability to function as an integrated missile in the overall weapon system (Bell Laboratories, 1975: X-16). Fifteen missiles were launched at Kwajalein for this purpose. The Meck Island test program demonstrated Safeguard's ability to launch and guide Spartan missiles to intercept a live or simulated reentry vehicle (Bell Laboratories, 1975: X-17). Twenty Spartans were launched from Meck Island for this purpose. Both the Kwajalein and Meck test flights showed that all important missile performance characteristics were significantly better than those specified before the development program started (Bell Laboratories, 1975: X-17).



EXPLANATION

Safeguard ABMs

	Spartan	Sprint
Type:	Land-based, silo-launched ABM	Ground-to-air missile interceptor
Guidance:	Radar command	Radar command
Warhead:	Thermonuclear, appx. 5 megatons	Nuclear, low-kiloton range
Missile length:	16.825 meters	8.2 meters
Launch weight:	13,000 kilograms	3,400 kilograms
Max engagement altitude:	About 550 kilometers	40-kilometer range
Range:	644 kilometers	40 kilometers

The Earth Tecnology Corporation, page 3-14

2.2.3 COMMUNICATIONS/DATA PROCESSING SYSTEM

The first studies exploring the requirements of an effective ABM system in the mid-1950s indicated that an extensive communications network, data processing, computation, and tactical control would be necessary. The communications system would be, required to process all the available data acquired from the radars characterizing the threat within the 10-to-15-mmute early warning period. However, once the target was acquired, all system elements would have to function as an integrated whole to successfully accomplish mission objectives. The ABM system was to be maintained in a state of constant combat readiness and full automation because it was believed that all actions of launching and guiding, the missile should not take more than one minute (Anureev, 1972: 138). To accomplish mission objectives the following general features were proposed:

- The system should be completely automatic with all elements electronic and capable of operating at high speed.
- The system should employ mechanisms to reduce the number of channels required for a full CONUS defense network.
- Multi-alternate routing should be used to provide reliability.
- Error checking should be incorporated to ensure accuracy in transmission.
- Each message should be acknowledged to increase reliability.
- Voice-bandwidth channels should be used universally.

(Bell Laboratories, 1975: 1-14)

Research revealed that a multiprocessor hardware design would provide the system with the necessary capabilities. Further studies in 1963 on the ABM system data processing requirements indicated that no computer available had, the necessary capabilities, so plans were made for providing such a system (Bell Laboratories, 1975: I-40). A prototype DPS began operations in 1967 at Whippany, and a second system was later installed on Meck Island (Bell Laboratories, 1975: Xl-1). This was referred to as DPS-1. The DPS-1 was modified into the DPS-2 to improve the ease and economy of manufacture and test and to achieve higher operational reliability, increased, throughput, and ease of maintenance (Bell Laboratories, 1975: Xl-1). The DPS-2 was scheduled to be operational in 1970.

The general approach to development of software required integration of a basic working system with increasingly more complex capabilities and was performed at the Tactical Software Control Site using special system exerciser arrangements (Bell Laboratories, 1975: IV-8). The separate phases of the development cycle were as follows:

- Requirements Generation - initial system requirements were determined, established, negotiated, documented, and rigorously controlled.
- Software Design - in process design, system requirements were translated into a software format which defined certain requirements for the data processing environment. In

program design, the local data base, algorithms, and control structure for individual tasks were determined.

- Coding and Unit Testing - codes were written, compiled, and checked at the unit or task level using standard techniques and equipment.
- Process and Functional Integration - facilities of TSCS were used to combine blocks of new code into processes of increasing functional capability. When the tactical, software attained a predefined level of capability, it was sent to site for final integration.

(Bell Laboratories, 1975: IV-8)

Centran was the computer language developed to produce code for Central Logic and Control. Studies of the suitability of Centran for the ABM system were conducted and results were affirmative (Bell Laboratories, 1975: IV-23).

2.3 SUMMARY

Extensive research, testing, and development over the 15-year period from 1955 through 1969 resulted in the formulation of parameters for the ABM system design and operation. Within these parameters the ABM system was developed to be capable of adapting to a variety of threat scenarios. Systems could be designed and deployed in response to projected threats characterized within the range of sophisticated, massive ICBM attacks to small first-generation attacks. Systems could also be designed to defend urban/industrial areas or larger areas. Constraints of the ABM treaty also imposed limits on the configuration of an ABM deployment. The maximum number of missiles, launchers, and radars were determined by this agreement as well as the maximum total area of the complex. Budget and construction time limits were also factors contributing to the selection of the ABM system deployed. The number and requirements of operation personnel, discussed in the following section, further refined the final site configuration of the only ABM system deployed in the United States, the SRMSC.

3.1 INTRODUCTION [STANLEY R. MICKELSEN SAFEGUARD COMPLEX]

Construction of the SRMSC involved a monumental effort in planning and coordination of personnel recruitment, training, and scheduling as well as materials acquisition, storage, and transfers on site. While working with advanced technologies requiring materials and construction methods never used previously on this scale, the facility was completed on schedule. This required a large work force which placed extreme demands on the surrounding communities' existing infrastructure. However, the necessary accommodations were made and work schedules were not hampered. The majority of the local residents were enthusiastic about the project, and the socioeconomic impacts were considered positive.

3.3 CONSTRUCTION/ENGINEERING

Initially, construction of Safeguard sites was announced for two locales: near the Grand Forks AFB, where groundbreaking took place on 6 April 1970, and at Malmstrom AFB, where construction began in June.

However, as a result of the ABM treaty, only one ABM site was permitted within a U.S. Minuteman field (the other would protect Washington, DC). Therefore, on 27 May 1972, construction at Malmstrom was abandoned by order of the Secretary of Defense. Later, deployment was to be narrowed further. On 3 July 1974, the protocol to the treaty limited the U.S. to one site only.

At this point, the North Dakota site was 85-percent complete and mostly on schedule. The terminal date of construction, otherwise known as the Beneficial Occupancy Date (BOD), was the major goal of the construction schedule. The BOD had been established as 21 August 1972 for the PARB and 1 January 1973 for the MSCB; both dates were met. Although the signing of the ABM treaty relieved much of the deadline pressure, the timely fulfillment of these commitments for Grand Forks represented one of the major objectives during the period of transition that followed the treaty.

Preparation for the turn-over of the sites to the ARADCOM was underway in September 1971 when the announcement was made of the creation of the first two units to man Safeguard installations. The first unit was the Army Safeguard Command, Grand Forks, with an authorized strength of 784 personnel. This number was comprised of 62 officers, 22 warrant officers, 432 enlisted men, and 168 civilians. Their mission was to "defend the CONUS from a ballistic missile attack; specifically, to establish an area defense for existing retaliatory missile sites." This unit would man the MSR and be the command element for the Grand Forks Safeguard detachment.

The second unit, the Army Surveillance Battalion, Grand Forks, was assigned to the PAR with the mission of providing long-range surveillance and early warning of ballistic missile attack against the CONUS. The battalion's authorized strength of 401 called for 41 officers, 14 warrant officers, 209 enlisted men, and 136 civilians.

The initial alignment of the PAR radar was completed by August 1973. During this month, the first satellite track and the first radio-star track were successfully accomplished.

The Equipment Readiness Date, indicating the completion of the construction phase, was 10 October 1974. Initial operating capability was reached by 1 April 1975. Full Safeguard operating capability was reached on 1 October 1975. The SRMSC was the only operational ABM facility ever completed in the United States.

3.3.2 SCHEDULES

The priorities of the Safeguard program dictated a rigorous construction schedule with the shortest possible time allocated for completion of the building shells and installation of their tactical support equipment (air conditioning, electrical lines, cooling system, utilities, etc.). By the BOD, the Weapon System Contractor (WSC) had to be admitted to begin installation of the radars and attendant components. In order to meet the BOD, interim goals had to be on schedule. Intermediate deadlines were most important during the 1970 construction season; the first and second levels of the PARB and MSCB had to be roofed before the onset of severe cold made outside work impossible. (Kitchens, 1978: 64)

The PARB was to be roofed by September 1971 and ready for the WSC in August 1972. The MSRB was to be roofed by October 1971 and ready for the WSC a few months later. Thus, about two and one-half to three years were allowed for the majority of the construction.

The Area Engineer and his staff were responsible for ensuring that construction proceeded on schedule. Col. Roy Beatty, previously Area Engineer for the Boston Sentinel project, was named Area Engineer for Safeguard. Col. Beatty did not begin working until after ground, breaking, but a temporary area office was opened in Langdon on the day after his appointment. This area office at first occupied one room in the Langdon Masonic Temple, but later expanded to take in all of the basement and the entire first floor. The first Civil Service examinations for staffing the office were administered at the Post Office in Devils Lake, North Dakota, in January 1970, and permanent clerical personnel arrived soon thereafter. The office transferred its operations to the PAR site when an office building was completed there during the summer of 1970. (Kitchens, 1978: 50)

3.3.3 RESTRICTIONS

The remoteness of the construction sites and the hostile climate in North Dakota required strict scheduling to ensure that work was completed within the time frame established by the SAFSCOM. Weather extremes ranged from 38° Celsius (C) (100° Fahrenheit [F]) to -40° C (-40° F) with frequent ground blizzards. The result was a very short construction season and mandatory enclosed work areas.

Every effort, including sustained two-shift operations, was made to maximize use of long, warm, dry days to complete steel and concrete as rapidly as possible. A three-shift schedule using artificial lights was employed to hasten the work, and the contractor's work force increased from 340 men at the beginning of June to 1,545 by the first of August.

Another factor greatly affecting Safeguard scheduling was the highway load restrictions in effect at the time. In early spring, during the April/May ground thaw, the North Dakota highways would become increasingly susceptible to damage from heavy construction loads that were being transported to various worksites. To minimize this damage, the state imposed load restrictions for about 60 days. This restraint had to be considered when scheduling construction activity during the second quarter of the year.

3.3.4 MATERIALS

An extraordinary amount of material was used in constructing the Safeguard facilities. The PARB, MSRB, and their powerplants required over 20,218 m^3 (714,000 ft^3) of concrete and over 25,000,000 kilograms (27,500 tons) of reinforcing steel. Also used for construction were 3,658 km (2,273 mi) of wire (not including radar or weaponry), 20 million kilograms (44 million pounds) of rebar, 1,207 km (750 mi) of conduit, 64 km (40 mi) of piping, and 621,418 kilograms (685 tons) of duct material (U.S. Army Corps of Engineers, 1974: 2). Ten wells provided water for the coolant system through a 93-kilometer (58-mile) waterline capable of delivering 3,785 liters (1,000 gallons) of water per minute as required for the project.

3.3.5 PERSONNEL

The ABM project was the largest single contract award given by the U.S. Army Corps of Engineers at the time, resulting in a total project cost of $468 million. A competitive bidding process yielded a low bid of $137,858,850 by Morrison-Knudsen & Associates (M-KA), consisting of Morrison-Knudsen, Inc., Peter Kiewit Sons' Company, Fischbach & Moore, Inc., and C.H. Leavell & Co.

The ABM construction work force reached 2,200 by October of 1970 and, at the peak of construction during the summer and fall of 1972, about 3,200 persons were employed. By the end of June 1973, the authorized civilian strength had been reduced to 1,105. The overall support personnel was reduced to 58 percent of the manning level authorized prior to the signing of the ABM treaty.

Construction was completed early in 1974 and the facility was turned over to an operating work force of about 2,000 (of which 600 were military personnel) for a training and testing period. The operating work force was expected to stabilize at about 1,300 workers by mid-1975. (Coon, et al., 1976: 37)

3.4.1 LOCAL ECONOMICS

The local economy began to feel the effects of Safeguard construction in April 1970, with the arrival of project employees and their dependents. Up to the initial period of construction this region had experienced a decline in population. In many ways the mass influx was overwhelming.

The tight schedule of the Safeguard project gave the local communities less lead time for planning than was typical for a non-defense project. In order to prepare the communities, the

Safeguard command prepared a report indicating the projected population increases for each community and assessing the adequacy of existing facilities to meet the increased demands. Once construction was actually underway a revised, more accurate version was provided. Moreover, an Area Resource and Development agent was assigned to the area from 1970 through 1974 to serve as a technical assistant and a liaison between the Safeguard command and local community leaders.

Langdon is a prime example of the effects of the ABM project on a community. The economy of the Langdon area was greatly stimulated by the impact of the construction, and private business activity during this period expanded accordingly. Employment increased by 47.1 percent from 1969 to 1973 in Cavalier County, compared to only an 8.3-percent increase for North Dakota as a whole. From 1969 to 1971 total sales for Langdon businesses increased by 40.2 percent.

Employment increased 22.3 percent in Pembina County over the same period, while 10.4- and 14.5-percent increases were experienced in Walsh and Ramsey counties, respectively. Personal income in Cavalier County increased 202 percent between 1969 and 1972, compared to 27 percent for the entire state during the same period.

After 1970, approximately 70 new businesses opened in the region and 45 expanded. Two new banks were opened in Langdon and private sector utility systems were greatly expanded. (Office of Economic Adjustment, 1916: 2)

Due to population increases, local communities experienced an increase in their tax base; however, the tax base did not increase at the same rate as civic growth. Two factors contributed to this discrepancy. First, because the ABM installation itself was Federal property, it was not subject to taxation. Second, the relocated workers lived largely in mobile homes, a negligible addition to the tax structure, or they resided in exempt government quarters.

With a rapidly growing citizenry and such a slowly incremental tax base, the communities affected by the project could have experienced severe financial difficulties. However, these problems were eased considerably by Federal impact payments. Also, increased sales volumes not only benefited local merchants, but may have single-handedly saved some "main street" businesses from closure (Love, 1984: 2).

3.4.2 HOUSING SHORTAGES

ABM workers settled primarily in two small towns near the construction sites -- Langdon and Cavalier… As Langdon was centrally located in relation to the various sites, it received the bulk of the population influx. Langdon's population nearly doubled in three years, rising, from 2,182 residents in 1970 to 3,957 by 1973 -- an average annual growth rate of 22 percent per year. As a result, Langdon and the surrounding area experienced many of the problems associated with rapid population growth.

Housing shortages resulted in issuance of building permits for 72 single unit homes and over 270 rental units between 1971 and 1975. Nevertheless, a housing shortage still occurred in the Langdon area. Of the workers employed in the project, about 70 percent relocated to the area, creating a need for almost 3,000 additional housing units (including group quarters) in the impact area within a two- to three-year period. Competition for housing caused rental, rates to rise substantially for local residents relative to most local residents' income increases.

To offset the sudden growth, Federal impact payments were made to help communities adjust to the new situation. Initially Congress made no provisions for community impact funds, but senators Young of North Dakota and Mansfield of Montana sponsored new legislation known as "The Young-Mansfield Amendment," which appropriated $14 million to help defray local community costs resulting from the construction in the North Dakota and Montana (the eventually canceled Malmstrom site) regions. Although initial payments were not received until March, these Federal funds did much to alleviate the financial burden of the areas most directly affected.

3.4.3 PUBLIC UTILITIES

Public utilities had to be upgraded to meet the requirements of the population explosion. This included local water and waste systems which were considerably expanded at a cost of roughly $1.3 million.

In Langdon, the extant water mains were extended and a new water tower was constructed; however, there was some problem when, due to increased pressures, over one hundred water main breaks occurred in the city's older lines during the winter of 1970-71.

The sewer system upgrading was not quite as difficult, as an improved system was already in process prior to the ABM construction period. Solid waste, however, was a problem. The open dump system had to be replaced by a sanitary landfill which was welcomed as an improvement.

Telephone installations in Langdon soared. There was an increase from 4,164 phones in 1968 to 5,934 in 1974, resulting in increased service rates, difficulty in meeting the demand for experienced employees, and a considerable quantity of unpaid bills.

Fortunately, the local electric company did not have serious difficulty in meeting the increased electrical demands resulting from the ABM project. Delinquent bills did not pose a major problem as the required deposit was usually sufficient to cover any unpaid bills. (Coon et al., 1976: 11)

3.4.4 SCHOOLS

Constructed as they were for the small, diffused community, the school systems required extensive modification to sustain the increase in enrollment. In the first year of the construction project alone, 637 children of ABM workers poured into the area's school systems. About 50 percent of these students were in the Langdon school system, causing overcrowded school facilities. During the early ABM project years, overcrowding and turnover were common problems. Other affected school systems were Grand Forks, Cavalier, Lakota, Edmore, and Nekoma. Enrollment for the Nekoma school system increased 155 percent (124 students) during the project. Impact payments of $2.3 million were made for educational purposes, with Langdon receiving construction grants of $537,388.

It was noted by local school administrators that despite the influx of students, truancy and dropout rates did not appreciably change. New children were easily integrated into the student body, and four of Langdon's five honor students in the 1974 graduating class were from families employed by the ABM project. (Coon et al., 1976: 13)

3.4.5 OTHER FACILITIES

Law enforcement personnel and facilities were expanded in response to the ABM project. Federal grants of $71,000 and $104,000 allowed for the enlargement of the law enforcement staffs in Langdon and in Cavalier County, respectively. Overall funding for northeastern North Dakota totaled $481,000 between 1 January 1971 and 31 March 1974. Public opinion and police data provide conflicting reports as to increased criminal activity due to Safeguard construction. Police records in Cavalier and Grafton indicate no increase, but Langdon police data, revealed that crime rates due to drug and alcohol violations, shoplifting, and burglaries did multiply appreciably.

Medical resources also underwent modifications. Primarily as a result of Federal impact funds (98 percent of the $449,180 cost), Cavalier County Memorial Hospital (CCMH) capacity was increased from 28 to 38 beds. Pembina County Hospital, also expanded, but only 15 percent was covered by Safeguard. The augmented services were fortuitous, for the CCMH administrator noted an increase in industrial and traffic accidents associated with the project, and Langdon also experienced an increase in venereal disease partially due to ABM impact. Furthermore, numerous problems with mental depression among migrant wives were reported by Langdon doctors. It appeared that the major causes of depression were a lack of extra curricular and social interaction activities and the extremely long, harsh cold winters which left many homebound.

The Safeguard construction initially strained local medical facilities, but many reported medical services of a higher caliber as the result of added staff and capacity. Those that did feel the medical support deteriorated complained primarily about doctor-to-patient ratios and long waits for appointments.

3.4.6 TRANSPORTATION NETWORKS

A significant impact from the Safeguard project involved heavy demands on the area's transportation network, especially during the actual period of construction. The region between Grand Forks and Langdon was well supplied with railroads, but the line nearest the PAR site was 21 km (113 mi) away and had no direct delivery routes to the area. Additionally, roads linking the railroads to the PAR and MSR sites were two-lane, unsurfaced roads intended for light farm traffic. The size and number of vehicles supporting Safeguard construction would severely damage these rural roads, which were also affected by bitter cold which eroded the surfaces through splitting and surface freezing. (Kitchens, 1978: 46)

Consequently, major street and highway construction and repair projects were undertaken. Defense Access Funds allowed improvement of any roads providing a means of admission to the worksites. By 1974, Federal support totaling roughly $700,000 aided in repairing damage by heavy construction truck traffic on Langdon roads, and an impact grant of $115,000 was provided for the streets of Nekoma. By 31 March 1974, the total street and highway repair costs had, reached $11.6 million, of which 74 percent was Federal funds.

State and Federal funding also covered half of the construction costs for a new airport in Langdon in 1969. This was followed up in 1974 with a $134,000 Federal airport grant for general improvements and the addition of a much needed parking apron and taxiway. (Coon, 1976: 15)

3.4.7 ENVIRONMENTAL

Anticipated environmental problems included thermal releases from cooling towers; combustion by-products from power sources; liquid wastes from sanitary, storm, industrial and cooling tower blowdown sources; solid wastes; radio frequency interference (RFI); and radiation safety. Studies, however, indicated no significant environmental impact from ABM construction.

3.5 LOCAL, REGIONAL, AND NATIONAL ATTITUDES

3.5.1 LOCAL

The far-reaching influence of an ABM installation was not lost on the current news media; it seemed that the furor would engulf the entire country. But even so, skeptics chose to keep the North Dakota news scene in the headlines, giving the foes of Safeguard a more basic, personal approach. One of the most critical articles appeared in The Nation in 1969:

> "When the ABM was moved from the cities to the wide-open spaces, the hope of its sponsors was that opposition would wither away. Indeed, in some sections, the prospect of

> an influx of mammoth construction funds overrode all other considerations. Not in Fargo, North Dakota, however. At Fargo, population 50,000, and regarded as a, slightly overgrown country town, several hundred citizens gathered to hear Rep. George Brown of California, a member of the Science and Astronautics committee, and Dr. George Stanford, a nuclear physicist attached to the Argonne National Laboratory in Chicago, deliver scathing attacks on Safeguard. The meeting adopted a policy statement to the effect that fallout over the wheatlands was no more acceptable than fallout over the cities ... North Dakota is said to have the highest concentration of nuclear weaponry per acre of any state: evidently some of the citizens want no more of it" (MacWilliams, 1969: 586).

In retrospect, however, after SRMSC was nearly in full swing, opinions softened somewhat.

In a North Dakota State University interview poll taken in 1974 of both long-time residents, newcomers, and local officials, four out of five respondents indicated that the overall effect of the Safeguard project had been beneficial in terms of the augmentation of business activity and employment opportunities, whereas only one in ten felt the effects were detrimental. When asked if they felt they were personally better or worse off as a result of the ABM impact, more than half believed the changes brought about by the project were beneficial.

Only one in six insisted that the effects had been detrimental to their way of living. For instance, residents and community leaders felt that failure to provide adequate housing in the short run caused housing costs and rents to increase significantly.

The majority of residents felt the ABM project led to an overall improvement in public services and utilities and the area school systems, and interviews with Langdon high school students indicated, that extracurricular and sports activities had been bolstered and that the new students' talents and skills only served to stimulate their own. However, some had a difficult time adjusting, due primarily to shortages in equipment and supplies.

The problems of Langdon were best summarized by one resident who, when asked of the impact of the Safeguard system on his town commented, "The impact on Langdon can be compared to the problems a 180-pound person would have if he woke up one morning weighing 250 pounds." (Coon, et al., 1976: 33)

3.5.2 REGIONAL

In the early stages of Safeguard construction, many North Dakotans were not happy at the prospect of an ABM system in their area. Hence, "International ABM Day," an anti-war, anti-ABM event was planned to coincide with Armed Forces Day, 16 May 1970. The Safeguard sites at Grand Forks were obvious protest targets, and the first tangible indication of demonstrations there appeared as a short article in the Fargo, North Dakota, Forum on 19 April 1970.

The same announcement spread to the Grand Forks Herald on 21 April and reappeared in several area newspapers and in newscasts after 30 April. By this time, representatives of the "North Dakota Citizens for a Sane Nuclear Policy" and the "North Dakota Clergy and Laymen Concerned," two of the sponsoring groups, were advocating mass demonstrations at Fargo, the Nekoma MSR location, and at the campus of the University of North Dakota at Grand Forks. In early May, organizers announced that some 2,000 people were anticipated from a five-state area, at which point this demonstration could become the "largest political protest ever staged in North Dakota." Outside of the planting of durum wheat seeds, musical entertainment, and scheduled appearances by activists, including the notorious "Chicago Seven," officials were unsure as to what path the demonstrations might take. (Kitchens, 1978: 56)

This anticipated "Festival of Life and Love" was a great matter of aggravation to both the Corps of Engineers and M-KA. The worries centered around the presence of M-KA's huge, costly earthmoving equipment at Nekoma and, the possibility that the demonstration might disrupt the construction schedule.

Accordingly, as the North Dakota anti-ABM activities took shape, Col. Beatty, representatives of M-KA, and security officers from Huntsville agreed on appropriate measures to preclude obstruction or property damage. Policies directed from the Huntsville Corps of Engineers to the Area Office, recommended a cautious approach. They intended to provide for the comfort and freedom of the protestors without hinting at any potential for retribution. Local law enforcement officials were briefed and their assistance was solicited with the understanding that in order to avoid any hostilities, a bare minimum of visibility was to be maintained. On the site itself, a plot was staked off for the demonstrators to use away from the large foundation excavation. On the plot were plastic sheeting, portable outhouses, and even a flatbed trailer complete with electric power for the use of orators and bands. Around the excavation itself, M-KA placed simple barricades and posted "no-trespassing" signs in the hopes of passive deterrence. Moreover, once it had been determined that North Dakota Governor William Guy would not authorize state resources for the protection of a Federal installation, all mobile equipment was evacuated to an off-site location, and the Saturday construction shift was canceled completely.

Demonstrators began arriving at the Nekoma site area before noon on Saturday. According to USCOE reports, 500 people had assembled on the site by 12:30 pm. No violence erupted, and no arrests were made. The "Festival of Life and Love" in North Dakota proved to be just one of hundreds of similar events across the United States during the time, but state officials had already taken sides. "In a stinging letter to Senator John Stennis, chairman of the Senate Armed Services Committee," said The Nation, "North Dakota Governor William L. Guy repudiated the notion that he should support the ABM program as good for his state's economy ... Senator Milton Young has given a measure of support to ABM sites in North Dakota, but Senator Quentin Burdick has voiced opposition." (MacWiliams, 1969: 586) Indeed, North Dakota never fully endorsed Safeguard; some welcomed the boon to industry, citing higher salaries and better opportunities, whereas others pointed out the difficulty in meeting employee demands for increased wages. (Coon et al., 1976: 23)

3.5.3 NATIONAL

Throughout the fall of 1968, opposition to the deployment of the then-current ABM Sentinel system had steadily grown more extensive and vocal, becoming a significant citizens' movement in the north-central and New England states as well as in some smaller isolated enclaves on the West Coast. The anti-ABM movement especially began to make itself heard after the adjournment of Congress in late October and the election of Richard M. Nixon as President in early November.

Prior to this, anti-ABM activists had been primarily limited to the scientific and academic communities. However, the well-publicized leadership in these circles and general local concerns about Sentinel's potential dangers vis-a-vis, its actual worth prompted a spread of opposition to ABM programs.

In Washington, Senator Edward Kennedy maneuvered himself into the midst of the controversy, writing to the Secretary of Defense that Sentinel was technically deficient, dangerously sited, unduly costly, and deleterious to domestic priorities as well as to prospects for an arms agreement with the Soviet Union (Kitchens, 1978: 32). This letter fueled bitter debate in Congress, which resulted in the House Armed Services Committee's threat to cut off approval for Sentinel land acquisition unless the entire ABM plan was reviewed. As a result of this Presidential review the Sentinel gave way to what was to become the Safeguard system, but the arguments did not end there. Few issues in American history have been debated so long, so hard, and so seriously in public forums, the media, and Congress as the ultimate authorization of the Safeguard program. Regardless of opposition, though, the Senate reaffirmed its support of the President's decision and authorized the go-ahead of the system on 7 August 1969, by a 50-50 vote, with the Vice President casting the deciding vote. (Kitchens, 1978: 35)

The debate did not stop on the floor of Congress; the Facts on File series provides an overview of the public outcry at the time. For example, on May 3, 1969, a petition against Safeguard by the "Federal Employees for a Democratic Society" was circulated among Federal employees, collecting approximately 1,500 signatures from nine departments and agencies (FOF, 1969: 308). The Alliance for Labor Action, composed of the teamsters and auto workers, drafted a request for a deferral of the Safeguard ABM system that same year “on the grounds that it would increase, not U.S. Security, but the threat of nuclear war." (FOF, 1969: 392) The following year on 27 June, a Princeton professor of physics, brought into Congress to debunk the pro-Safeguard experts, called the project a "technically makeshift system" (FOF, 1970: 495). Even as late into the construction as 19 January 1972, presidential hopeful George McGovern made ABM a part of his platform, saying that proceeding with Safeguard was the difference between "conservatism and paranoia," and between a "buying what we need" approach and a "wasteful arms race" (FOF, 1972: 57).

In "The ABM Blues," editor Carey MacWilliams opined "the only true friends it (Safeguard) seems to have are the President, Secretary Laird, and of course, Gerald R. Ford, the House

Republican leader." He also cited a meeting at the Massachusetts Institute of Technology, wherein scientist and students took part in a "research stoppage" and listened to scholarly anti-ABM sentiment. (MacWilliams, 1969: 586) And even, in Canada, a dispute erupted over Safeguard when it was learned that the Canadian government was never consulted for permission by the United States to fire defensive warheads over Canadian soil (Adams, 1971: 202). This is not to say that the SRMSC project was universally maligned; there was a great number who saw Safeguard as an important check to Soviet missile advances, both in the military and in the scientific world. Rather, it demonstrates just how important the issue was to the nation and its neighbors as a whole. It also appears, years after the wrath and contention, that in a seemingly "middle-of-the-road" opinion for the time, one source stated: "Even if the complex never sees action, its champions assert, it is worth the cost if, its presence deters Russia from making the test." (U.S. News and World Report, 1975: 43)

3.6 PHASE-OUT/ABANDONMENT OF THE SRMSC

In an informative 1969 article on Safeguard, a question was posed concerning the mission's fate should arms talks proceed. The reply: "Most likely deployment will be slowed, but not halted." (U.S. News and World Report, 1969: 60) Unfortunately, such was not the case. In early 1975, there were indications that the SRMSC might be closed and dismantled, and the ABM system found itself embroiled in yet more polemics:

> "Even more dangerous is the action now contemplated by the Congress of closing, down the one ABM site authorized by the SALT I treaty .... Yet Congress is heading, toward a unilateral scrapping, of this key defense system, already paid for, on the flimsy grounds of saving some operational funds and the fuzzy hope that Soviet restraint will make it unnecessary." (Hotz, 1975: 103)

Such predictions proved prescient. Grand Forks had proven too costly to justify continued operation in the face of the Soviet MIRVs; there was also the question of its feasibility - that is, how a system that had worked only in tests would respond in actual battle, short of instigating nuclear war. It was described as a "highly complex machine stretched out over the entire nation." (Hohenemser, 1972: 4) At any rate, it was felt that the effectiveness of one site was questionable and there, was, under treaty guidelines, no way to offset it. Basically, they had proved its potential, but couldn't afford to maintain it, as it was too expensive to operate employing contractor maintenance. (Daughtry/Hawkins, 1992)

Approximately 48 days after the SRMSC was fully operational, the Senate voted to concur with a House decision to close it down. The House's original decision did not provide for the transition period, but the Senate allotted $19 million. Still, FY76 ABM funding was cut drastically, narrowed down by several million dollars. Furthermore, remaining monies were to be used for the purpose of the "expeditious termination and deactivation of all operations” at Grand Forks, effectively mothballing the system. Funds for the PAR were excluded. Decision for closure of the SRMSC was to comply with guidance in Title III of the Operations and

Maintenance Section of the FY76 Defense Appropriations Bill, effectively eliminating 433 military and 108 civilian authorized spaces by 30 September 1976.

It was not to be an easy dismantling. In a 1975 editorial in "The Nation," Carey MacWilliams observed,

> “Safeguard played havoc with the lives and fortunes of the people of Langdon, ND ... 1,500 persons, about a third of Langdon's population, were employed in connection with the ABM. Many others had found work and business opportunities in the influx of capital surrounding the Safeguard's construction. Workers migrated from all over the country for jobs on the missile site. When Safeguard closes ... Langdon will be hit by a depression made in Washington.” (MacWilliams, 1975: 613)

One Pentagon official, obviously displeased at the turn of events, commented that the House "wanted the system completely torn down and wheat growing at the site." Another feared the collapse of Grand Forks would extend into other areas of BMD and become a "national disaster." (Aviation Week & Space Technology, 1975: 17)

By February 1976, the first rumblings of economic hardships to come in the SRMSC area were being felt. In Cavalier and Pembina counties, unemployment rose to 7.5 and 8.6 percent, respectively. This put both towns above the overall North Dakota rate; up to that time Cavalier had usually been lower. It was felt that these February 1976 rates represented early indications of unemployment associated with Safeguard realignments (Economic Adjustment Program, 1976: 2-5). There was an approximate loss of $1.3 million in regional procurement, primarily affecting Langdon, Walhalla, and Grand Forks. In a Technical Interchange Meeting (TIM) of the Community Impact Assistance Planning (CIAP) group held in February of 1984, the adverse effects of the SRMSC abandonment were discussed at great length. According to Dr. Hudson, BMDSCOM, there followed a major population loss in the region, whereupon the tax base was severely depleted. Local populations experienced a major drop, as evidenced by the following figures supplied at the TIM: Langdon, 45%; Elton, 43%; Nekoma, 49%; Osnabrock, 40%; Cavalier, 43%; Mountain, 55%; and Walhalla, 23%. Direct effects included decreased local procurements of goods and services by base and base payrolls, whereas indirect influences were felt in the decrease in retail, trade and personal services needs. Hudson stated, "Had they planned for the "Boom-Bust" cycle ... things would've been left at a level that their resources could have handled it ... they were left with bonded indebtedness ...” (CIAP, 1984: 8). For example, one town had installed a new water system during the boom, but after the closure could not afford to hire a technician to read the meters. Also, in some areas, telephone switching centers had been built with no money "up front," as it were. Companies that had anticipated recuperating their capital from the monthly phone bills were left in a poor position. As a result of the hardship, several claims were made against the Federal Government; indeed, some 126 were processed, including complaints as diverse as those concerning radar interference with television reception and garage, door openers, pastures ruined by the diversion of water flow, and even the contention of one resident that trucks entering and leaving SRMSC had turned her laundry yellow.

According to Delmar Lewis, Langdon High School Superintendent, the area schools were severely impacted; enrollment fell by approximately 50 percent after SRMSC closure (Love, 1984: 5). In a poll conducted by North Dakota State University, others interviewed added that businesses that had extended themselves too far financially were hurt; predominately restaurants and groceries. Anyone who had borrowed money to finance prospective business did not have the requisite funds to pay their debts once the boom abruptly terminated. Conversely, many expanded utilities precluded financial disaster, remaining intact by servicing the needs of other, smaller communities in their vicinity.

Adjustments in downgrading, according to some, were just as difficult as the adjustment upward had been (Love, 1984:6). Langdon's mayor, John MacFarlane, had choice words for the project:

> "We didn't ask them to come," Langdon Mayor John MacFarlane told William K. Stevens of the New York Times ... Langdon won't easily forget Safeguard, even if it eventually recovers from the shock of its withdrawal ... the town's one permanent change, the Mayor told Stevens, was its loss of confidence in the government in Washington. (MacWilliams, 1975: 613)

As tempers flared, dismantling was underway on-site. Between December of 1975 and 1977, all missiles were removed from the MSR and RSL areas. Missile silos were sealed, and the MSCB, along with the MSRPP, was salvaged (stripped of support beams, stair rails, etc.) and sealed. Warheads and interceptors were removed from the sites, and the silos were sealed and abandoned.

3.7 SRMSC POST-CLOSURE ACTIVITIES

Inactivation in earnest began 10 February 1976. As previously stated, the only component of the Safeguard system left in use was the PAR, which became part of the North American Aerospace Defense Command as an early-warning PAR Attack Characterization sensor, by Permit No. DACA45-4-77-6232, in direct support to the NORAD Attack Assessment mission. It was rechristened Cavalier Air Force Station and assigned to the 10th Missile Warning Squadron, Space Command, which allowed the Department of the Air Force to use the PAR area and its waterlines for five years. This permit has been renewed twice; the option will come up again on 30 September 1992. [The PAR is still active and known in 2018 as the Cavalier Air Force Station.]

The PAR mission was now a Satellite Surveillance Network tasked to provide tactical warning and attack assessment of a sea-launched ballistic missile attack against the United States and Canada. A second mission was to provide warning and attack assessment of an intercontinental land mass. Finally, it provided space surveillance, tracking, and space object identification support for the U.S. Spacetrack system and intelligence operations.

After closure, the MSR and RSL sites saw less action. A portion of the MSR (110.9 ha [274 ac]) was accessed by the General Services Administration (GSA) in 1977. This area included the non-tactical portion of the site. While in possession of this land, the GSA made little provision for maintenance and repair of many of the buildings. Just as they had during the days of SRMSC construction, the severe winter seasons during this period posed quite a problem, causing significant damage to many of the structures. When the USASDC, as a result of the Warren-Nunn BMD treaty stipulations, reacquired this land area in 1991, many of the facilities had suffered irreparable damage. The MSCB, itself, had flooded; salvaging left an access for ground water to seep in, and a mammoth effort was required to remove the water. Due to the hazards they represented, other buildings were simply dismantled. A few, however, were retrievable and have been repaired and restored to assist in their protection from the mercurial climatic conditions. The remaining domestic structures have been removed for use as housing facilities.

A preliminary building availability and conditions survey was conducted in 1991 to provide a description of the current status of SRMSC facilities. Recommended actions (see Table 3-4) to be taken for each facility as a result of this survey are not yet complete.

[from Table 3-4]
Remote Launch Site (RSL)

Building No.	Type	Condition	Recommendation
3110	Remote Launch Op. Bldg.	Rein Concrete – good	SBE/retain
3115	Sentry Station – RSL 3	Concrete Block – good	PM/retain
3501-3516	Sprint Launch Stations	Silos – good	retain

3.8 SUMMARY

The SRMSC had a profound influence upon the surrounding economy and, as an ABM site, proved to be of import on all levels. During its planning and construction phases, the ramifications of literally flooding a previously sparsely populated area produced a backlash of shortages in facilities and support infrastructure. With the help of Government funding, however, the shock was somewhat offset by a general betterment in existing resources.

Moreover, Safeguard enabled the United States to actually gauge the cost of defense as opposed to offense and added immeasurably to missile and radar technology.

Perhaps its reputation rests on the fact that no other weapons systems like it has been implemented before or since. It was located in a remote area and still remained self-sustaining, (Hawkins, 1992). It is tribute to the technical skill of the United States and a solemn reminder of Cold War threats, bomb shelters, military public relations, and the indomitable American will to survive.

On October 9th 2012 the GSA published an invitation for bids (IFB No. GSA-R-1687) for the former SRMSC. All 5 locations auctioned (RSL-l, RSL-2, RSL-3, RSL-4 and the MSR) were bought by different individuals/parties. All North Dakota locations associated with the SRMSC were determined eligible for the National Register of Historic Places in 1998 (DOE files 65009055-65009059, 65009779) but only the tactical portion of the MSR and key features of RSL-3, as the RSL with the highest level of integrity, had a preservation covenant that was placed on them prior to the auction. RSL-3 opened this summer as a museum.

This uniqueness of the SRMSC, and complementing array of both offensive and defensive capabilities interconnected, was responsible for bringing the USSR to the negotiating table as a prelude to unilateral disarmament and the eventual end of the cold war. The research and development of the Safeguard system and RSL-3 had a direct impact on changing history.

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

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The Earth Technology Corporation. "Historical Context for Properties: Located on the Stanley R. Mickelsen Safeguard Complex and Considered Potentially Eligible for Listing on the National Register of Historic Places." North Dakota Cultural Resource Survey Manuscript 6447, State Historical Society of North Dakota, Bismarck. 7 October 1992.

Previous documentation on file (NPS):

_____ preliminary determination of individual listing (36 CFR 67) has been requested
_____ previously listed in the National Register
_x__ previously determined eligible by the National Register - #65009058
_____ designated a National Historic Landmark
_____ recorded by Historic American Buildings Survey #____________
_x__ recorded by Historic American Engineering Record # HAER ND-9
_____ recorded by Historic American Landscape Survey # ___________

Primary location of additional data:

_x__ State Historic Preservation Office
_____ Other State agency
_____ Federal agency
_____ Local government
_____ University
_____ Other
Name of repository: _____________________________________

Historic Resources Survey Number (if assigned): ________________

10. Geographical Data

Acreage of Property 43.22

UTM References
Datum (indicated on USGS map):

☐ NAD 1927 or ☒ NAD 1983

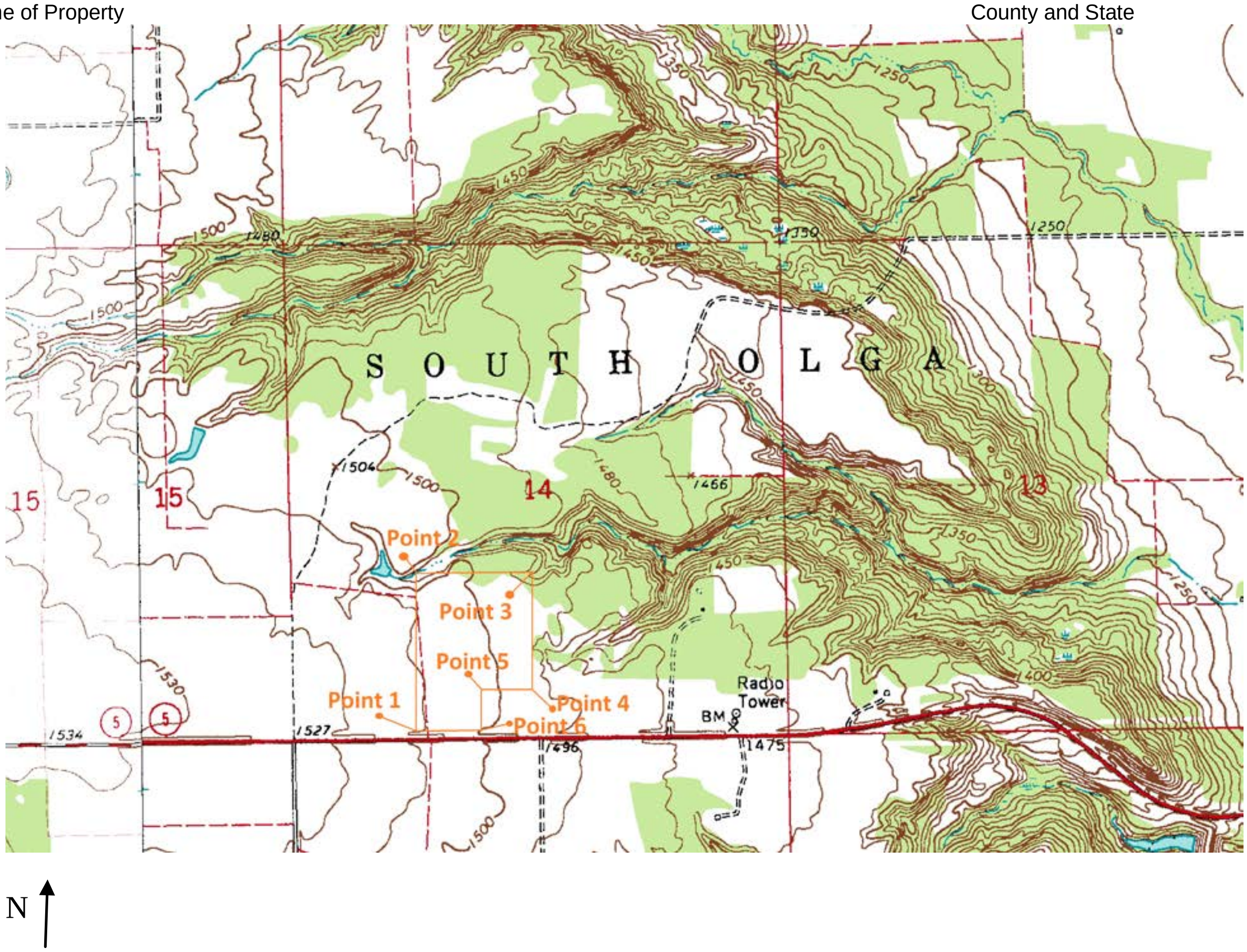
1. Zone: 14	Easting: 574358	Northing: 5401411
2. Zone: 14	Easting: 574358	Northing: 5401936
3. Zone: 14	Easting: 574739	Northing: 5401936
4. Zone: 14	Easting : 574739	Northing: 5401555
5. Zone: 14	Easting: 574564	Northing: 5401555
6. Zone: 14	Easting : 574564	Northing: 5401411

Verbal Boundary Description (Describe the boundaries of the property.)

Commencing at the Southwest corner of said Section 14,Township 161 North, Range 57 West; thence North 88° 20' 41" East along the South line of said Section 14, 1,320.66 feet; thence North 01° 39' 19" West, 100.00 feet to a point on the North right-of-way line of State Highway No. 5, said point being the point of beginning; thence continuing along the last described course, 1,725.00 feet; thence North 88° 20' 41" East, 1,250.00 feet; thence South 01 ° 39' 19" East, 1,250.00 feet; thence South 88° 20' 41" West, 575.00 feet; thence South 01° 39' 19" East,, 475.00 feet to the North right-of-way line of State Highway No. 5; thence South 88° 20' 41" West along North right-of-way line, 675.00 feet to the point of beginning.

Boundary Justification (Explain why the boundaries were selected.)

The property boundary encompasses the parcel historically associated with the RSL-3 site.



11. Form Prepared By

name/title: Melbourne H. Sann
street & number: 8141 Old Floyd Rd
city or town: Rome state: NY zip code: 13440
e-mail: msann@twcny.rr.com
telephone: 315-865-8739 315-982-2338
date: 7-7-2014

Property Owner

name/title: Melbourne H. Sann
street & number: 8141 Old Floyd Rd
city or town: Rome state: NY zip code: 13440
e-mail: msann@twcny.rr.com
telephone: 315-865-8739

Photo Log

Name of Property: Remote Sprint Launch Site #3
City or Vicinity: Concrete vic.
County: Cavalier State: North Dakota
Photographer: Lorna Meidinger
Date Photographed: 21 June 2018

Photos stitched together for panoramic overview, looking north
1 of 18

Overview, looking northwest
2 of 18

Overview, looking northeast
3 of 18

LASS and entry gate, looking north
4 of 18

LASS and entry gate, looking south
5 of 18

Controlled entry turnstile in LASS, looking south
6 of 18

RLOB, looking northwest
7 of 18

RLOB secondary emergency exit, looking north
8 of 18

RLOB entrance, looking west
9 of 18

RLOB main hallway, looking west
10 of 18

RLOB main hallway and personnel entrance to decontamination area, looking northwest
11 of 18

Security Operators Control Console Room, looking north
(A photo of this area at the RSL-2 site from 1976 by Greg Preston can be found online at https://srmsc.org/images/004633l0.jpg)
12 of 18

Sprint Remote Control Equipment Room, looking northwest
13 of 18

STRATCOM Communications Room suspension, looking north
14 of 18

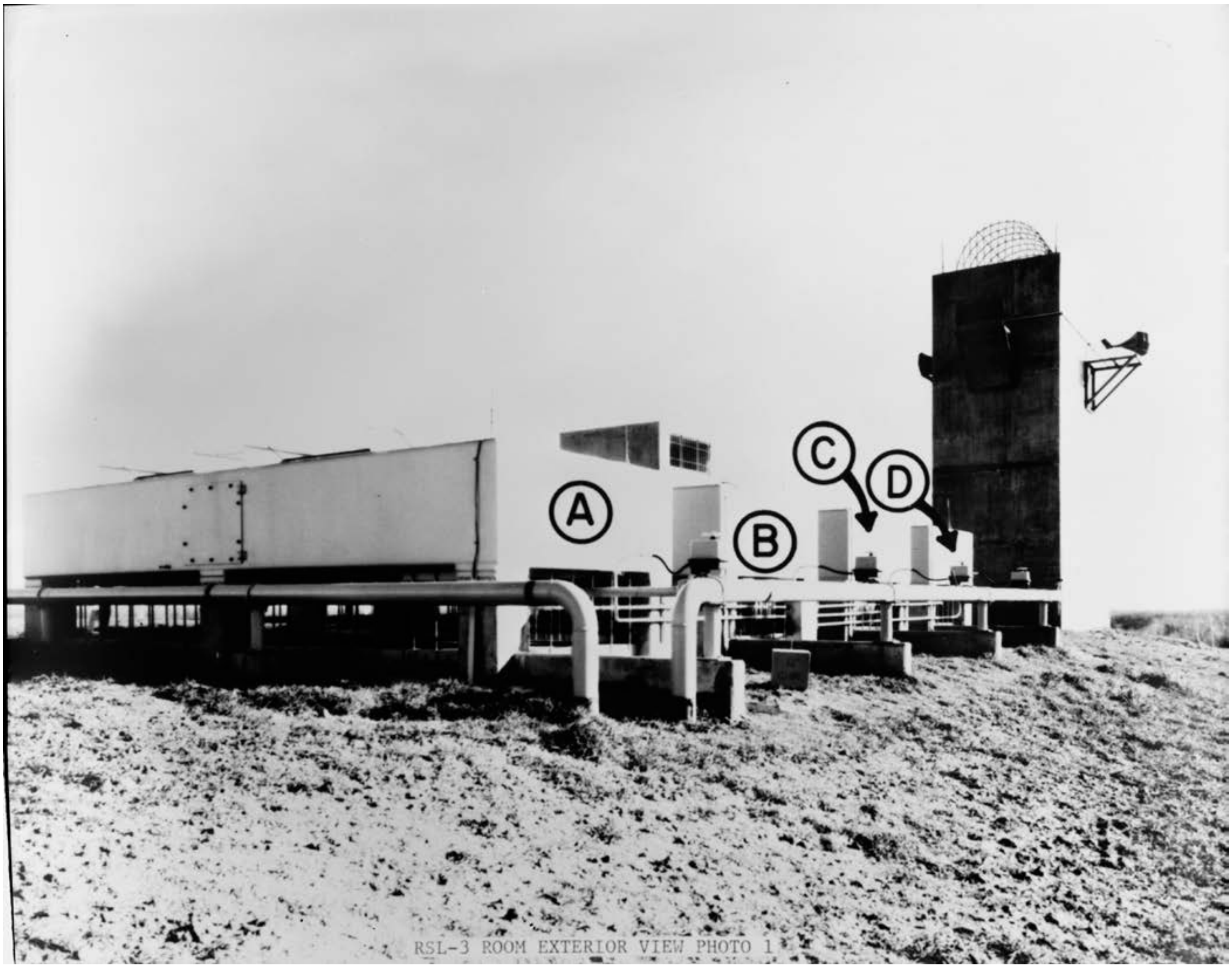
Overview of missile field from on top of RLOB, looking north-northeast
15 of 18

EASS and entry gates, looking north
16 of 18

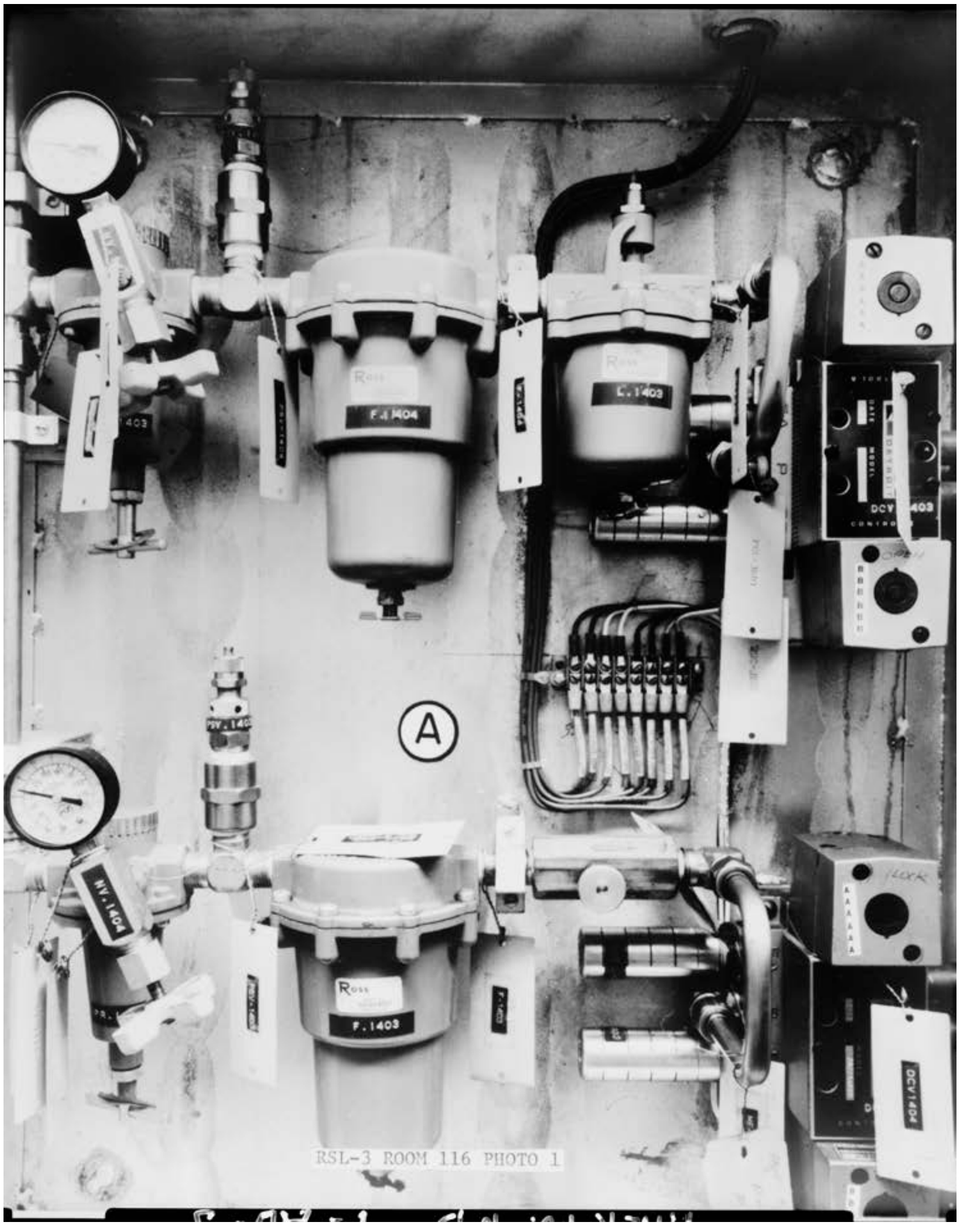
EASS and entry gate looking south
17 of 18

Missile launch station, looking southeast
18 of 18

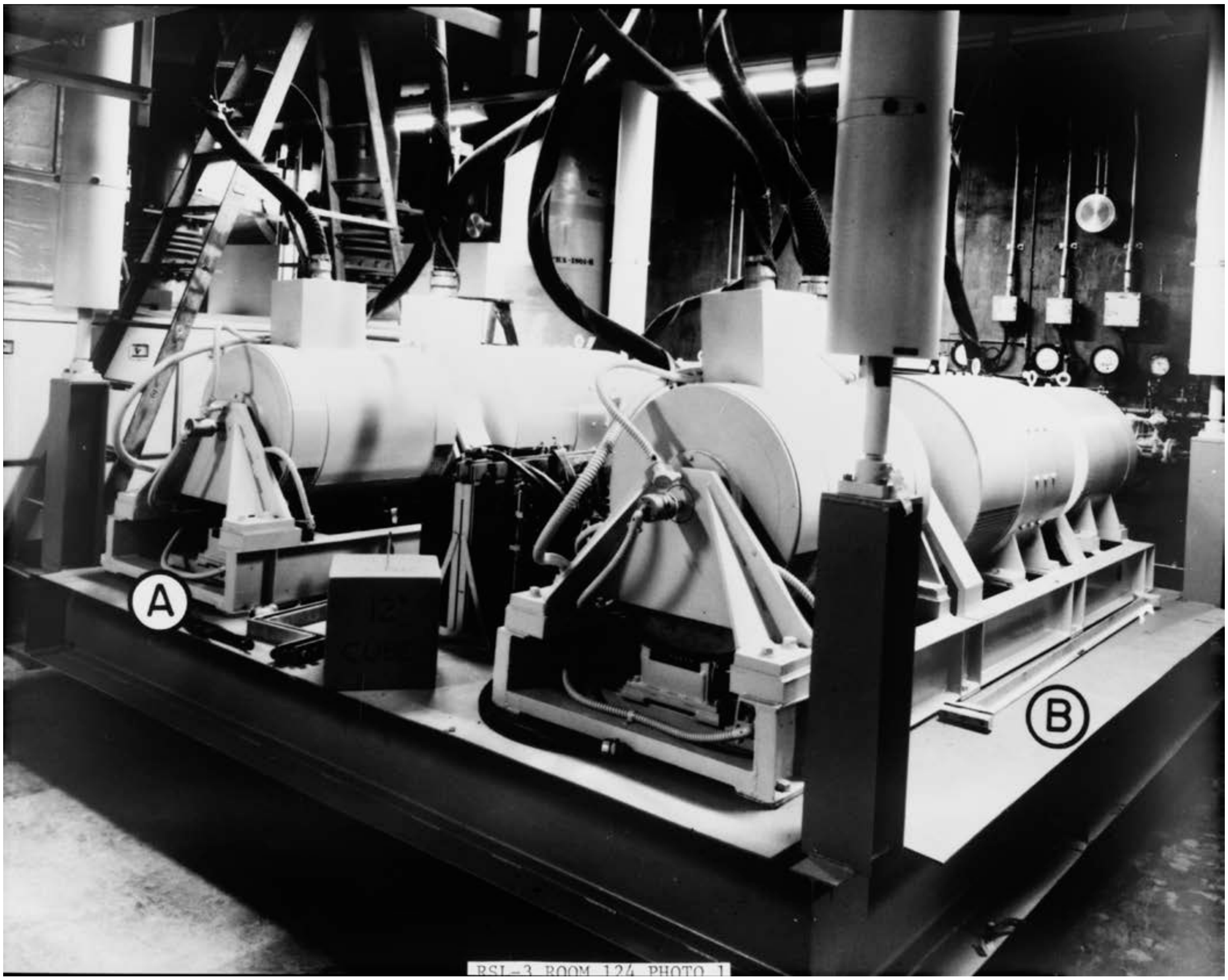
2016 aerial from ND GIS HUB



Photographic copy of a photograph taken from paste-up negatives for U.S. Army Corps of Engineers document GF-500-MCP, entitled "Grand Forks Site RLS Army Operating Drawings, Master Composite Photographs for SAFEGUARD TSE Systems and Equipment," Page 9, dated 1 September 1974 (original document and negatives in possession of U.S. Army Corps of Engineers, Huntsville, AL). Photographer unknown. View of remote launch operations building exterior (southwest corner), prior to earth mounding. A,B,C, and D are heat exchangers HX-1102B, HX-1102A, HX-1101B, and HX-1101 A, respectively. The heat exchangers transferred heat from the cooling water to the outside air during the normal operating mode. On the far right is the air exhaust shaft - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND PHOTOS FROM SURVEY HAER ND-9-AD, 1 September 1974



Photographic copy of a photograph taken from paste-up negatives for U.S. Army Corps of Engineers document GF-500-MCP, entitled "Grand Forks Site RLS Army Operating Drawings, Master Composite Photographs for SAFEGUARD TSE Systems and Equipment," Page 9, dated 1 September 1974 (original document and negatives in possession of U.S. Army Corps of Engineers, Huntsville, AL). Photographer unknown. View of pneumatic control panel regulating entrance to waiting room #116. The panel activated the pneumatic cylinder for opening and closing of blast doors #116 and #118. A rotary air motor actuated locking and unlocking of the doors. - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND
PHOTOS FROM SURVEY HAER ND-9-AD 1 September 1974



Photographic copy of a photograph taken from paste-up negatives for U.S. Army Corps of Engineers document GF-500-MCP, entitled "Grand Forks Site RLS Army Operating Drawings, Master Composite Photographs for SAFEGUARD TSE Systems and Equipment," Page 9, dated 1 September 1974 (original document and negatives in possession of U.S. Army Corps of Engineers, Huntsville, AL). Photographer unknown. View of remote launch operations building, power generation room #124, showing no-break units NB-1002 (A) and NB-1001 (B). This equipment consisted of a 150 horsepower, d.c. operational motor which drove, on each end of the extended shaft, a 70 kw generator and a 30 kw generator unit. It was designed to provide continuous power service for launch equipment. In particular, the photo is an excellent representation of the shock isolation scheme, as evidenced by the supporting air springs and equipment platform - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND PHOTOS FROM SURVEY HAER ND-9-AD 1 September 1974

1. Acronym List
2. Information page from HAER ND-9
3. Photographic copy of original as-built drawing, dated 10 July 1973 (original drawing in the possession of U.S. Army corps of Engineers, Huntsville Division). Floor plan - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND PHOTOS FROM SURVEY HAER ND-9-AD
4. Photographic copy of original as-built drawing, dated 10 July 1973 (original drawing in the possession of U.S. Army corps of Engineers, Huntsville Division). Roof and tunnel plan - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND PHOTOS FROM SURVEY HAER ND-9-AD
5. Photographic copy of original as-built drawing, dated 10 July 1973 (original drawing in the possession of U.S. Army corps of Engineers, Huntsville Division). Building cross sections - Stanley R. Mickelsen Safeguard Complex, Remote Launch Operations Building, Near Service Road exit from Patrol Road, Nekoma, Cavalier County, ND PHOTOS FROM SURVEY HAER ND-9-AD

1. Acronym List – some acronyms are not spelled out in the text as the quote came from after the first occurrence in the original document.

ABM	antiballistic missile
ABMDA	Advanced Ballistic Missile Defense Agency
AFB	Air Force Base
ARADCOM	Army Air Defense Command
BMD	Ballistic Missile Defense
BMDATC	Ballistic Missile Defense Advanced Technology Center
BMDSCOM	Ballistic Missile Defense Systems Command
BOD	Beneficial Occupation Date
CBR	Chemical, Bacteriological and Radiological (2018 Army Acronym is Biological)
CCMH	Cavalier County Memorial Hospital
CIAP	Community Impact Assistance Planning
CONAD	Continental Air Defense Command
CONUS	Continental United States
DOD	Department of Defense
DOE	Determination of Eligibility
DPS	Data Processing Systems
DR	Discrimination Radar
EASS	Exclusion Area Sentry Station
FAR	Forward Acquisition Radar
FCC	Fire Control Center
GSA	General Services Administration
HAER	Historic American Engineering Record
ICBM	Intercontinental Ballistic Missile

IOC	initial operating capacity
LAR	Local Acquisition Radar
LASS	Limited Area Sentry Station
MAR	Multifunction Array Radar
MDC	Missile Direction Center
MIRV	Multiple Independently Targeted Reentry Vehicle
MSCB	Missile Site Control Building
MSR	Missile Site Radar
MSRDP	Missile Site Radar Data Processor
MSRPP	Missile Site Radar Power Plant
MTR	Missile Track Radar
NCA	National Command Authority
NEMP	Nuclear Electomagnetic Pulse
NORAD	North American Air Defense
PAR	Perimeter Acquisition Radar
PARB	Perimeter Acquisition Radar Building
PARDP	Perimeter Acquisition Radar Data Processor
R&D	research and development
RF	radio frequency
RFI	radio frequency interference
RLOB	Remote Launch Operations Building
RSL	Remote Sprint Launch
SAC	Strategic Air Command
SAFSCOM	Safeguard System Command
SALT	Strategic Arms Limitation Talks

SENSCOM	Sentinel System Command
SOCC	Security Operations Control Console
SRCE	Sprint Remote Control Equipment
SRMSC	Stanley R. Mickelsen Safeguard Complex
TIC	Target Intercept Computer
TIM	Technical Interchange Meeting
TSCS	Tactical Software Control Site
TTR	Target Track Radar
UHF	ultra-high frequency
USASDC	U.S. Army Strategic Defense Command
USCOE	U.S. Army Corps of Engineers (modern acronym is USACE)
VAT	vinyl asbestos tile
VHF	very high frequency
WSC	Weapon System Contractor
WSMR	White Sands Missile Range
ZAR	Zeus Acquisition Radar

THE STANLEY R. MICKELSEN SAFEGUARD COMPLEX (SRMSC) WAS THE ONLY OPERATIONAL ANTIBALLISTIC MISSILE (ABM) FACILITY EVER COMPLETED IN THE UNITED STATES. IT IS GENERALLY RECOGNIZED THAT ITS CONSTRUCTION AND ACTIVATION WERE INSTRUMENTAL IN SUCCESSFULLY NEGOTIATING THE ABM AND STRATEGIC ARMS LIMITATION TALKS (SALT) TREATIES WITH THE SOVIET UNION.

AS A RESULT OF THE USSR'S SUCCESSFUL TESTING ON 26 AUGUST 1957, OF AN INTERCONTINENTAL BALLISTIC MISSILE (ICBM) AND SUBSEQUENT ORBITING OF THE SPUTNIK I SATELLITE, DEFENSE OF THE UNITED STATES AGAINST ICMBs BECAME A NATIONAL PRIORITY. FOLLOWING A DECADE OF TECHNOLOGY DEVELOPMENT AND SYSTEM TESTS, CONGRESS AUTHORIZED CONSTRUCTION OF A SAFEGUARD ABM SITE NEAR NEKOMA, NORTH DAKOTA TO DEFEND MINUTEMAN ICBMs BASED NEAR GRAND FORKS, NORTH DAKOTA.

DURING THE DEVELOPMENT AND TESTING OF THE SAFEGUARD ABM SYSTEM, SIGNIFICANT TECHNOLOGICAL ADVANCES WERE MADE IN SUCH AREAS AS RADARS, ROCKET MOTORS, LAUNCH VEHICLE GUIDANCE AND CONTROL, ELECTRONICS AND AVIONICS, AND COMPUTERS.

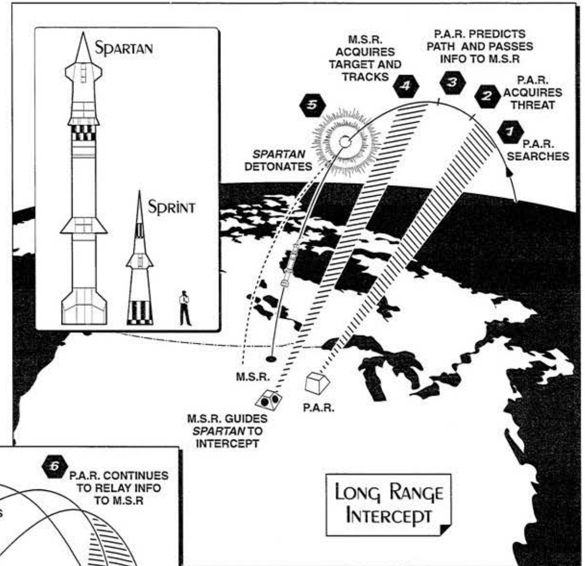
CONSTRUCTION OF SRMSC WAS AN IMMENSE UNDERTAKING. THE SRMSC PROJECT WAS THE LARGEST SINGLE CONTRACT AWARDED BY THE U.S. ARMY CORPS OF ENGINEERS TO THAT DATE, RESULTING IN A TOTAL PROJECT COST OF $468 MILLION.

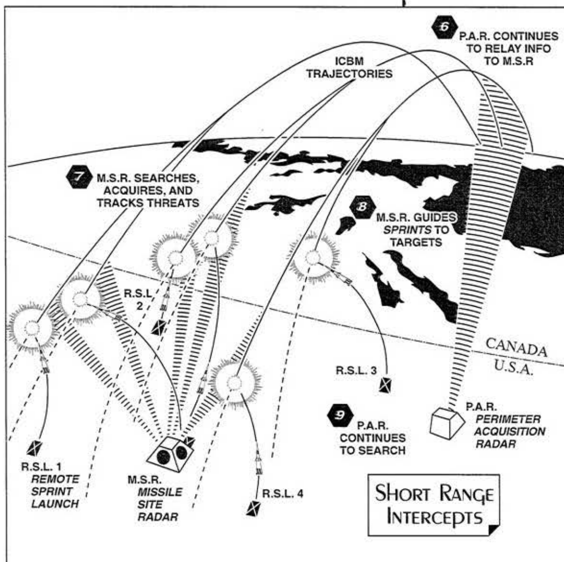
ALTHOUGH SRMSC REACHED FULL OPERATIONAL CAPABILITY ON 1 OCTOBER 1975, IT WAS INACTIVATED ONLY FOUR MONTHS LATER, ON 10 FEBRUARY 1976. THE PERIMETER ACQUISITION RADAR (PAR) HAS REMAINED CONTINUOUSLY IN SERVICE WITH THE UNITED STATES AIR FORCE AS AN INTEGRAL COMPONENT OF THE SATELLITE SURVEILLANCE NETWORK.

THE SRMSC DOCUMENTATION PROJECT WAS UNDERTAKEN AT THE DIRECTION OF THE U.S. ARMY SPACE AND STRATEGIC DEFENSE COMMAND (USASSDC), HUNTSVILLE, ALABAMA. THE PROJECT WAS DIRECTED BY MR. JACK BOSWELL AND MS. FRANCIS MARTIN OF USASSDC, WITH PROFESSIONAL ASSISTANCE BY MR. DOUGLAS R. CUBBISON OF TELEDYNE BROWN ENGINEERING AND MS. PAIGE PEYTON OF THE EARTH TECHNOLOGY CORPORATION. PHOTOGRAPHY WAS BY MR. BENJAMIN HALPERN. THE PROJECT WAS PERFORMED BY MR. JAMES EDWARD ZIELINSKI OF THE EARTH TECHNOLOGY CORPORATION. MR. MARK HUBBS, TELEDYNE BROWN ENGINEERING, WROTE THE HISTORICAL OVERVIEW WITH TECHNICAL REVIEW BY DR. JAMES WALKER, USASSDC, CHIEF HISTORIAN. FUNDING FOR THE PROJECT WAS PROVIDED BY USASSDC AND THE BALLISTIC MISSILE DEFENSE ORGANIZATION.

Stanley R. Mickelsen SAFEGUARD COMPLEX (SRMSC)

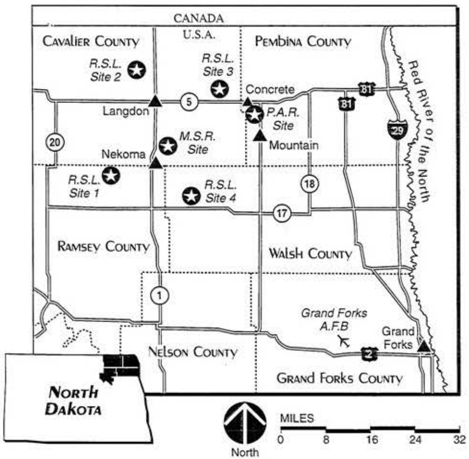
VICINITY OF NEKOMA
CAVALIER COUNTY
NORTH DAKOTA





SAFEGUARD WAS ORIGINALLY ENVISIONED AS A REGIONAL DEFENSE SYSTEM WHICH WOULD PROVIDE PROTECTION FOR ALL AREAS OF THE UNITED STATES. EACH REGION WOULD INCLUDE A PAR AND SEVERAL MISSILE SITE RADARS (MSR) AND THEIR ASSOCIATED MISSILE FIELDS. THE PAR AND MSR AT THE SRMSC WERE THE ONLY ONES EVER CONSTRUCTED. THE SAFEGUARD SYSTEM PROVIDED DEFENSE FROM ICBMs IN THE FOLLOWING SCENARIO:

1) PAR SEARCHES OUT TO 1000 MILES FOR TARGETS COMING OVER THE NORTH POLE
2) PAR ACQUIRES THE TARGET
3) PAR TRACKS TARGET AND PREDICTS ITS PATH, PASSES THE INFORMATION TO THE MSR
4) MSR ACQUIRES TARGET AND TRACKS IT
5) MSR GUIDES LONG RANGE SPARTAN MISSILE TO INTERCEPT TARGET ABOVE THE ATMOSPHERE
6) PAR CONTINUES TO RELAY TARGET INFORMATION TO THE MSR. IF WARHEAD REENTRY VEHICLES HAVE SURVIVED, THE MSR CONTINUES TO TRACK
7) MSR SEARCHES, ACQUIRES AND TRACKS THREAT
8) MSR GUIDES SHORT RANGE SPRINT MISSILES TO TARGETS
9) PAR CONTINUES TO SEARCH



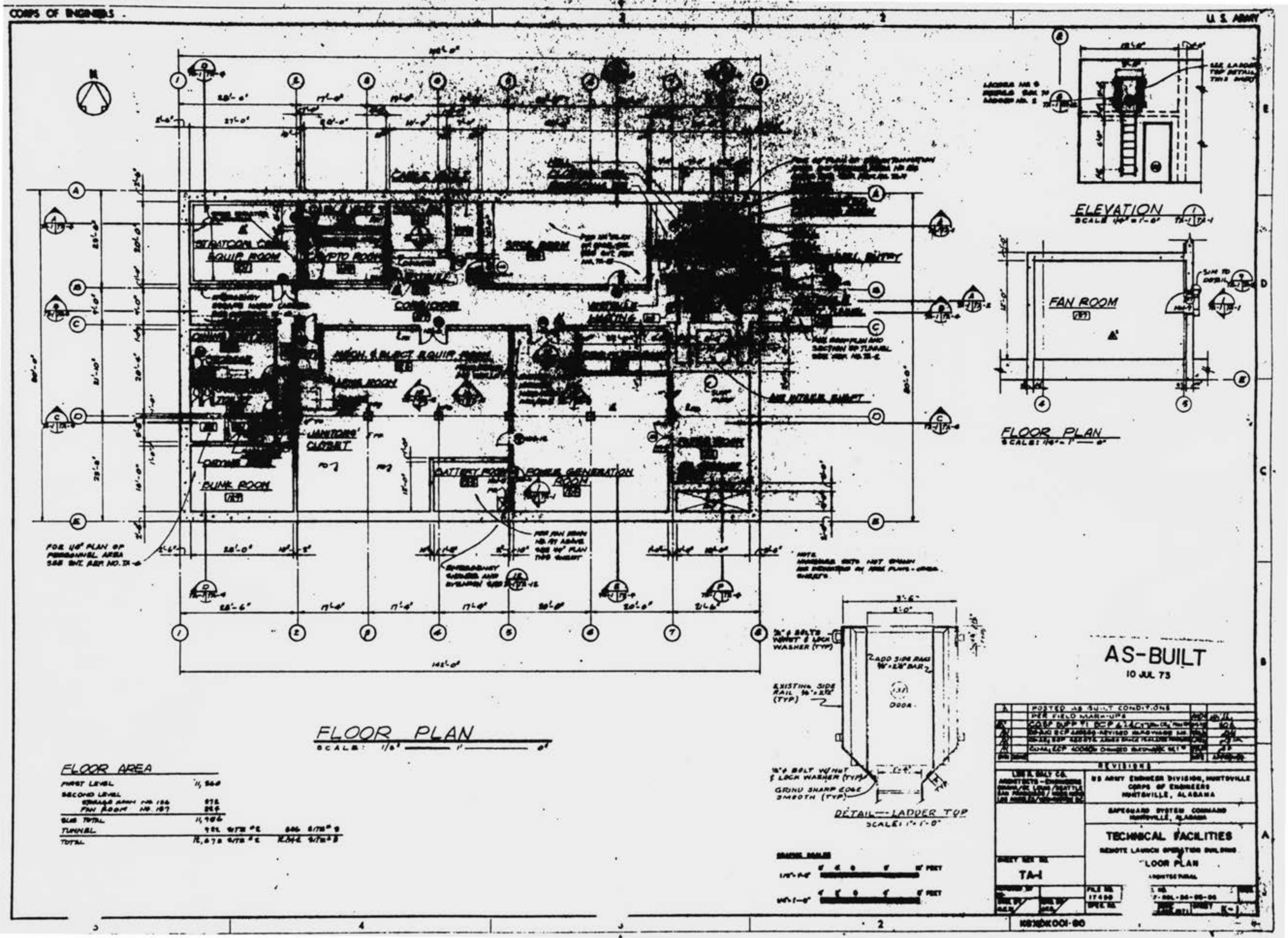
HISTORIC AMERICAN ENGINEERING RECORD SHEET 1 OF 3 SHEETS

SURVEY NO. ND-9

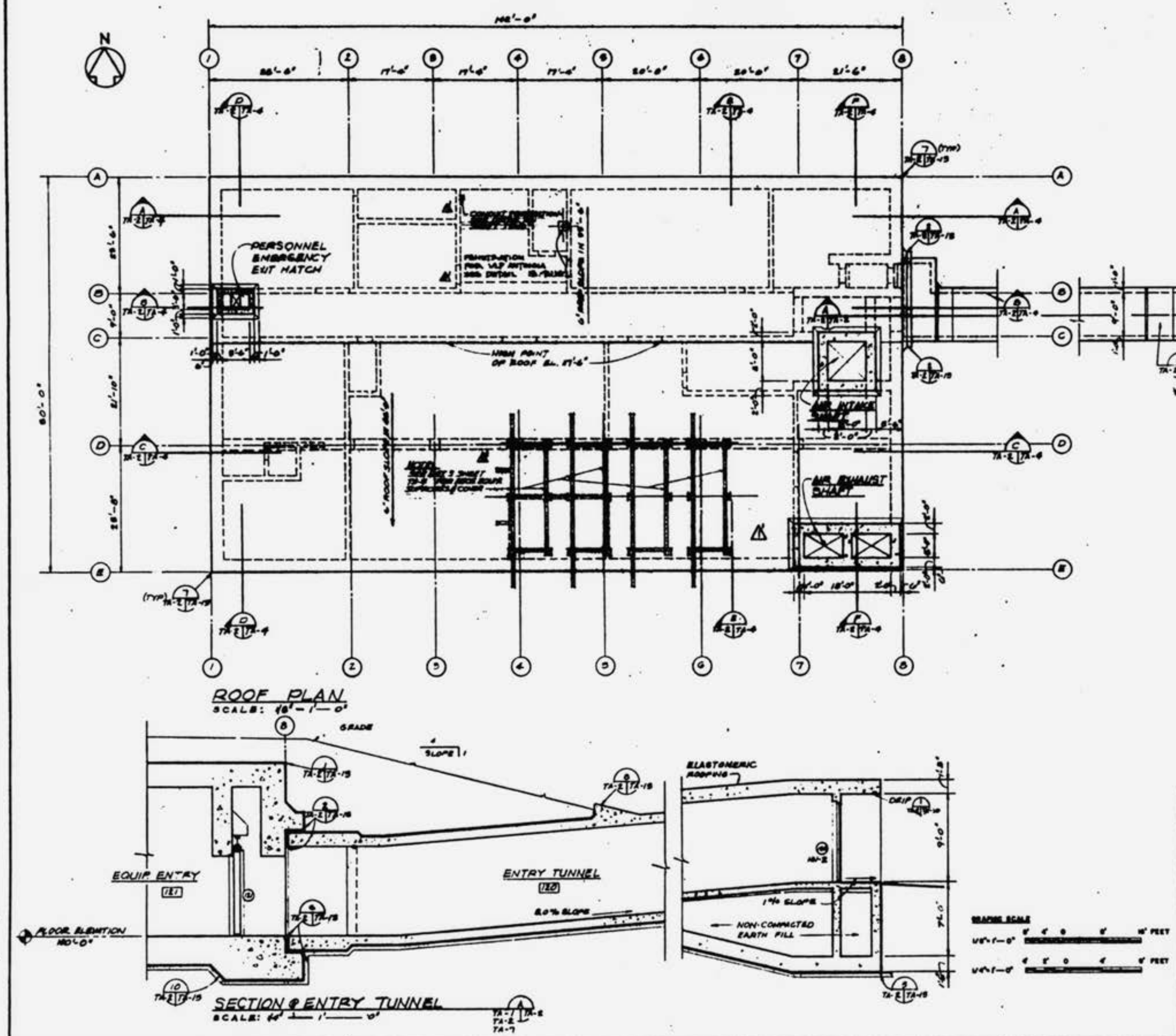
STANLEY R. MICKELSEN SAFEGUARD COMPLEX
VICINITY OF NEKOMA · CAVALIER COUNTY · NORTH DAKOTA

DELINEATED BY: LEE GILES – TELEDYNE BROWN ENGINEERING – MARCH, 1997

ROCKY MOUNTAIN REGIONAL OFFICE / DENVER
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR



CORPS OF ENGINEERS
U.S. ARMY
FAN ROOM
ELEVATION
FLOOR PLAN
STRATCOM COMM EQUIP ROOM
CORRIDOR
MECH. & ELECT. EQUIP ROOM
JANITORS' CLOSET
BATTERY ROOM
POWER GENERATION ROOM
BUNK ROOM
AIR INTAKE SHAFT
FLOOR PLAN
FLOOR AREA
FIRST LEVEL
SECOND LEVEL
FAN ROOM NO. 157
SUB TOTAL
TUNNEL
TOTAL
EXISTING SIDE RAIL
DOOR
DETAIL--LADDER TOP
AS-BUILT
10 JUL 73
POSTED AS BUILT CONDITIONS
PER FIELD MARK-UPS
REVISIONS
US ARMY ENGINEER DIVISION, HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA
SAFEGUARD SYSTEM COMMAND
HUNTSVILLE, ALABAMA
TECHNICAL FACILITIES
REMOTE LAUNCH OPERATION BUILDING
FLOOR PLAN
ARCHITECTURAL
TA-1



AS-BUILT

10 JUL 73

SYM	ZONE	REVISIONS	DATE	APPROVED
		POSTED AS BUILT CONDITIONS PER FIELD MARK-UPS		
		CO-B6 ECP-044147-C1 ADDED VLF PENETRATION		
		CO A5-ECR600125 ADD ... SUPPORTS & INDICATED CONDUIT PENETRATION		HCB
		... DELETE ... EQUIP SUPPORT ON ROOF		

LEO A. DALY CO.
ARCHITECTS - ENGINEERS
OMAHA / ST. LOUIS / SEATTLE
SAN FRANCISCO / HONG KONG
LOS ANGELES / WASHINGTON DC

US ARMY ENGINEER DIVISION, HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

SAFEGUARD SYSTEM COMMAND
HUNTSVILLE, ALABAMA

TECHNICAL FACILITIES

REMOTE LAUNCH OPERATION BUILDING

ROOF & TUNNEL PLAN

ARCHITECTURAL

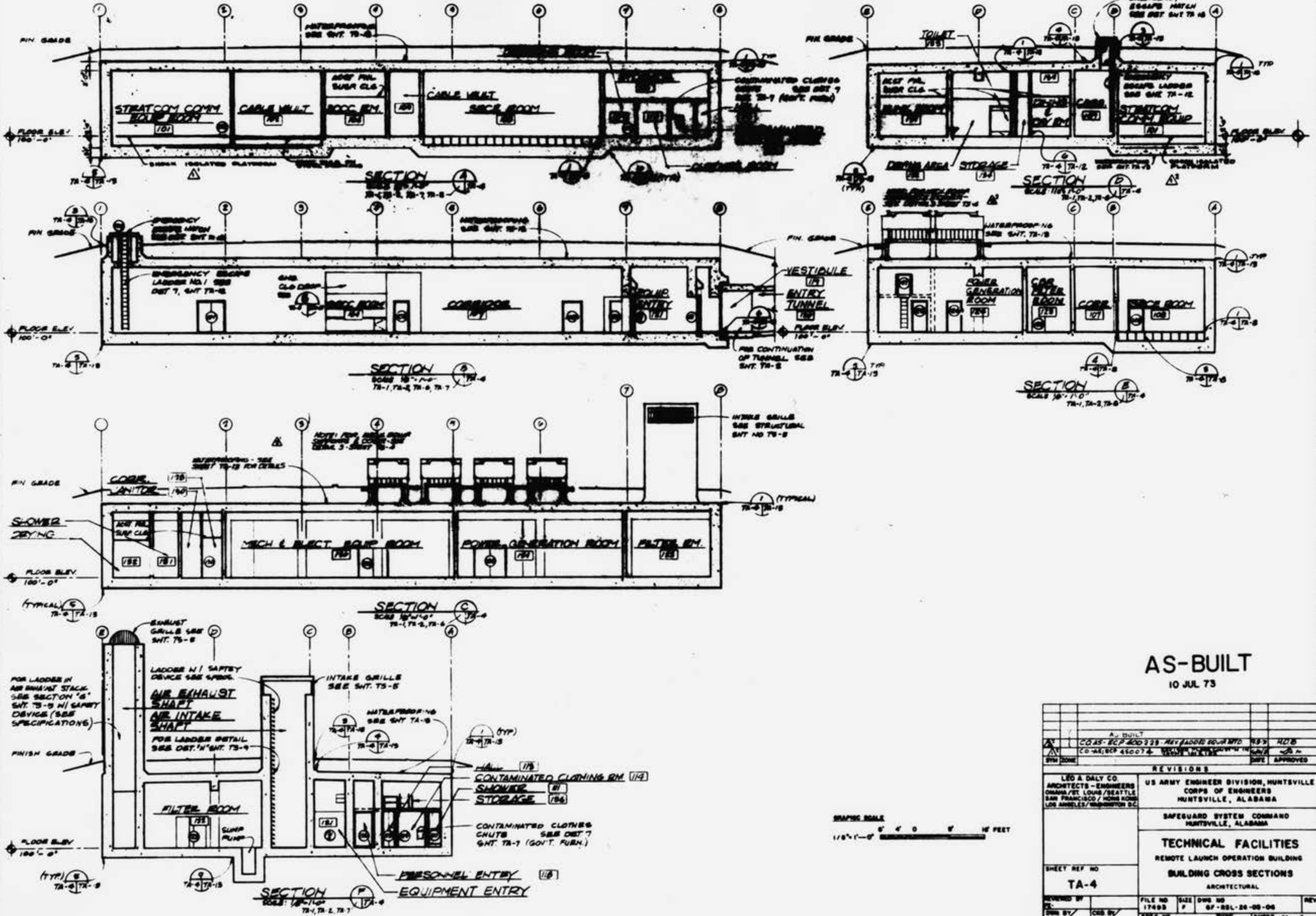
SHEET REF. NO. TA-2

FILE NO 17491

RSL-26-03-06

SHEET K-2

CORPS OF ENGINEERS | U. S. ARMY



AS-BUILT

10 JUL 73

SYM	ZONE	REVISIONS	DATE	APPROVED
		AS BUILT		
2		CO AS-ECP 400 329 - REV LADDER EQUIP MTD		
1		CO-AE; ECP 450074		

LEO A. DALY CO.
ARCHITECTS - ENGINEERS
OMAHA/ST. LOUIS/SEATTLE
SAN FRANCISCO / HONG KONG
LOS ANGELES/WASHINGTON D.C.

US ARMY ENGINEER DIVISION, HUNTSVILLE
CORPS OF ENGINEERS
HUNTSVILLE, ALABAMA

SAFEGUARD SYSTEM COMMAND
HUNTSVILLE, ALABAMA

TECHNICAL FACILITIES

REMOTE LAUNCH OPERATION BUILDING

BUILDING CROSS SECTIONS

ARCHITECTURAL

SHEET REF NO TA-4

DWN BY S.L.C. | CKD BY J.F.B.

FILE NO 17493 | SIZE F | DWG NO SF-RSL-26-08-06 | REV

SPEC NO | SHEET K-4

KGXDK004-00

Photos stitched together for panoramic overview, looking north
1 of 18

Overview, looking northwest
2 of 18

Overview, looking northeast

LASS and entry gate, looking north

LASS and entry gate, looking south
5 of 18


WELCOME

Controlled entry turnstile in LASS, looking south
6 of 18

RLOB, looking northwest
7 of 18

RLOB secondary emergency exit, looking north
8 of 18

RLOB entrance, looking west
9 of 18

RLOB main hallway, looking west
10 of 18


PERSONNEL ENTRANCE

RLOB main hallway and personnel entrance to decontamination area, looking northwest
11 of 18

Security Operators Control Console Room, looking north
12 of 18


NO SMOKING
FIRE

Sprint Remote Control Equipment Room, looking northwest
13 of 18

FIRE
DANGER
NOT ENTER

STRATCOM Communications Room suspension, looking north

Overview of missile field from on top of RLOB, looking north-northeast


EXCLUSION AREA
SENTRY STATION
(EASS)

EASS and entry gates, looking north
16 of 18

EASS and entry gate looking south


CAUTION
NO STEP

Missile launch station, looking southeast


WELCOME


PERSONNEL ENTRANCE


FIRE
DANGER
NOT ENTER


EXCLUSION AREA
SENTRY STATION
(EASS)


CAUTION
NO STEP

National Register Information System

Evaluation/Return Sheet For Single/Multi Nomination

1 of 1

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

Requested Action: Nomination

Property Name: RSL-3

Multiple Name:

State & County: NORTH DAKOTA, Cavalier

Date Received:	Date of Pending List:	Date of 16th Day:	Date of 45th Day:	Date of Weekly List:
9/13/2018	10/5/2018	10/22/2018	10/29/2018	

Reference number: SG100003053

Nominator: State

Reason For Review:

__ Appeal	__ PDIL	__ Text/Data Issue
__ SHPO Request	__ Landscape	__ Photo
__ Waiver	__ National	__ Map/Boundary
__ Resubmission	__ Mobile Resource	__ Period
__ Other	__ TCP	X Less than 50 years
	__ CLG	

X Accept ____ Return ____ Reject 10/23/2018 Date

Abstract/Summary Comments:

Recommendation/ Criteria

Reviewer Roger Reed [signature] Discipline Historian

Telephone (202)354-2278 Date 10/23/18

DOCUMENTATION: see attached comments : No see attached SLR : No

If a nomination is returned to the nomination authority, the nomination is no longer under consideration by the National Park Service.

Back

To: Keeper, National Register of Historic Places
From: Claudia J. Berg/ Lorna Meidinger
Date: September 10, 2018
Subject: National Register Nomination

RECEIVED 2280
SEP 13 2018
NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

Former DOE

The following materials are re-submitted on this 10th day of September 2018, for the nomination of the RSL-3 (Remote Sprint Launch Site -3) to the National Register of Historic Places.

______ National Register of Historic Places nomination form on archival paper

______ Multiple Property Nomination form on archival paper

______ Photographs

______ USGS map(s)

______ Sketch map(s)/figure(s)/exhibit(s)

______ Pieces of correspondence

2 CDs

1 Signature Page

______ Other: ______

COMMENTS:

______ Please insure that this nomination is reviewed

______ This property has been certified under 36 CFR 67

______ The enclosed owner objections ____ do ____ do not constitute a majority of property owners.

______ Other: