# CHAPTER IV

## *SALT AND AFTER*

As has been seen in Chapters II and III, the years 1970 and 1971 were years of advancement for the SAFEGUARD System. During these years Congress showed itself willing to endorse at least a modified version of ABM comprising four sites, and the Corps of Engineers had made substantial progress towards making the initial deployment at Grand Forks and Malmstrom AFB's a reality. In 1970 and 1971, too, the weapons system's hardware and software were proven workable through extensive laboratory and field testing. Technically, politically, and militarily the SAFEGUARD System was achieving both wider acceptance and verified performance as its deployment proceeded. Just as SAFEGUARD grew into maturity, however, disarmament discussions were inaugurated between the U.S. and the USSR with the objective of clamping a lid on the arms race. One of the biggest issues at these Strategic Arms Limitation Talks, or SALT, sessions was the question of limiting or terminating ABM development and deployment.

In the years since the SENTINEL System's inception in 1967, the need for some kind of armaments limitation had become ever plainer, primarily because of U.S.-Soviet rivalry. Though the Soviet Union had generally been rather cautious in undertaking adventurous foreign involvements, it had also clearly clung to a commitment of world domination by offering military equipment, technical advisers, and moral support to its friends in the Warsaw Pact countries, to the Arab states, and in Southeast Asia. The Czechoslovakian invasion of 1968 also demonstrated Soviet determination to keep its satellites within the fold of communist orthodoxy. Moreover, the Soviets had continued to build up their strategic arsenal beyond the needs of mere self-defense, apparently striving for superiority rather than nuclear parity with the U.S. By 1972 the USSR possessed about 280 huge SS-9 missiles with multiple, but not year independently targeted, multi- megaton warheads roughly equivalent to the American TITAN II or MINUTEMAN III, along with greater numbers of smaller or older ICBM's. The Soviets also started about fifty or sixty new launching silos in the twenty-one months after August 1969, the latest of which seemed to be a modified design to accommodate a missile even larger than SS-9. In the winter of 1971, after SALT began, some observers detected a slowdown in silo construction attributable to good intentions of agreement on limitation, but other experts ascribed the slowing to a decision to retroactively harden SS-9 silos to a degree comparable with MINUTEMAN's. Finally, by 1971 the Soviet Union had completed an ABM system called GALOSH around Moscow with about sixty-four interceptor missiles, but no further sites had been started.

While the Soviet threat thus became more menacing after 1967, the threat from Communist China became less ominous with the passage of time. During the late 1960's it had commonly been asserted that the Chinese were on the road to becoming a great nuclear power and that they might very well flex their new-found muscle in irrational ways such as a preemptive strike. By the early 1970's, however, a reassessment of these views was in order. Certainly, Chinese technological and military capabilities continued to mature, but the pace of their growth was proving to be considerably less rapid than previously thought and no aberrant behavior had materialized. Even more significantly, the sabre-rattling emanating from Peking became less vociferous as the "Cultural Revolution" receded into the past. A further sign of thawing relations with the West was President Nixon's unprecedented week-long visit to China in February 1972.

The changing complexion of international, technological, and military affairs in the early 1970's made some kind of American-Soviet discussions about limiting strategic arms more desirable than ever, while Chinese participation was still unlikely. Overtures for initiation of arms talks between the two superpowers had been exchanged since before the signing of the Nuclear Non-Proliferation Treaty on 1 July 1968, but any conference had subsequently been thwarted by the Vietnam War, Presidental elections, the Czech invasion, and similar perturbations. Thus, the preliminaries to the SALT talks did not get underway in Helsinki, Finland, until 19 November 1969, and the first substantive proposals were not made until the talks resumed in Vienna on 16 April 1970. The first SAFEGUARD site at Grand Forks was then just underway.

More than two years of toe-to-toe negotiations at Vienna and Helsinki were necessary to iron out a bilateral agreement on major elements in a limitation treaty, but in the spring of 1972 a basic concurrence was finally achieved. On Friday, 26 May, in Moscow, President Nixon and First Secretary Leonid Brezhnev formally signed the "Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile

Systems."[1] According to the terms of the brief ten-page document, each side was limited to the deployment of two ABM sites, one within a radius of 150 kilometers of the national capital, the other within an ICBM deployment area radius of 150 kilometers. At each site the party could have two large phased-array radars or no more than eighteen smaller ABM radars (six at the capital site) and less than 100 interceptor missiles. In effect, these provisions recognized the different deployment directions taken by SAFEGUARD and the Soviet GALOSH and allowed the signatories to match each other if they chose to. Article IV excepted ABM systems or components used for development or testing and test ranges, and Article V applied the Treaty to sea-based, air-based, space-based, or mobile land-based systems. Article XIII called for establishment of a "Standing Consultative Commission" to consider questions of interpretation, implementation, and the exchange of information. Subparagraph (e) provided that this Commission would also "agree upon procedures and dates for destruction or dismantling of ABM Systems or their components in cases provided for by the provisions of this Treaty." Article XVI provided that the Treaty would be a "unlimited duration." Finally, on the same day, 26 May 1972, the U.S. and the Soviet Union also signed a separate agreement limiting offensive strategic weapons.

The ABM Treaty was of immense consequence for SAFEGUARD, and its effects were felt immediately after the Moscow ceremonies. The Treaty permitted only one ABM site located within American MINUTEMAN fields, so on 27 May 1972 the Secretary of Defense directed a suspension of all SAFEGUARD construction at Malmstrom and all future work at other sites except Grand Forks.[2] But a permanent termination of contracts, dismantling or destruction of extraneous sites, and reorientation of the program could not take place until the Senate ratified the Treaty, and this took four months. The Senate approved the ABM Treaty by a vote of 88-2 on 2 August, but it bogged down on the companion treaty limiting offensive nuclear weapons. This in turn delayed appointment of members to the U.S.-Soviet Standing Consultative Commission necessary to preside over site disposal. The two pacts were not finally ratified and signed by the leaders of both countries until 3 October 1972.[3]

While the resolutions of ratification for the two arms treaties were debated in the Senate during the summer, the Congress as a whole proceeded to drastically prune the SAFEGUARD program to the one site at Grand Forks that was then about 85 percent complete. On 19 August a joint committee of the House and Senate agreed on a military procurement authorization bill that eliminated any funding for construction of the second permissible SAFEGUARD site near Washington, D.C. This action did not preclude the possibility that the Administration could ask for Washington site funding the next year, or the next, but in fact this did not happen. The signing and ratification of the ABM Treaty actually meant the reduction of SAFEGUARD to completion of the North Dakota site, termination of the Montana site, and cessation of preliminary work at Whiteman AFB.

When the ABM Treaty was signed in Moscow on 26 May 1972, the Malmstrom SAFEGUARD sites were about 10 percent complete. It will be recalled that labor disputes had delayed the initiation of Phase II construction until November 1971, when a joint venture headed by Peter Kiewit Sons' Co. was awarded a 90-day letter contract with limited spending authorization. PKS&A began start-up immediately, but relatively little was accomplished during the dead of winter except preparation for what lay ahead. The PKS&A letter contract was turned into a regular contract for $160,927,922 on 24 February 1972, and construction activities began to accelerate after this time as warmer weather returned. At the end of February, grading and leveling of the contractor's office complex area was complete and twenty-seven office units had been moved on-site. The foundations had been poured for the contractor's warehouse, motor shop, maintenance shop, and change house, while the carpenter and liner plate buildings were finished. By this time, too, the Phase I batch plants had been dismantled and foundations for the new batch plants were underway.[4]

Three months later, when the Defense Department teletyped a suspension to all Malmstrom activities as of 27 May, mobilization had essentially been completed and actual construction had just gotten underway. At the PAR site all utilities were functioning and the concrete batch plant was completed. Forms, reinforcing steel, and concrete were being placed in the first level interior and exterior walls of the PAR Power Plant, while one concrete placement had been made on an exterior second level wall of the PAR Building. At the MSR site, the level of mobilization and start-up was about the same. All utility lines were in and functioning, the batch plant was running satisfactorily, and the contractor's workshops had been completed, but only a small amount of concrete had been poured in the MSR Building and its power plant. Marginally more progress had taken place in the SPARTAN and

SPRINT excavations, where twenty-four of the thirty SPARTAN launch shafts had been augered and one deflector can placed. Malmstrom RLS's 2 and 3 had just been started, while the Notice to Proceed was not issued for RLS's 1 and 4. At the time of suspension, all twenty-one miles of the Malmstrom waterline were completed, and water from Tiber Reservoir was flowing to all three sites.[5]

*THE PAR SITE near Conrad, Montana, as it appeared in March 1972.*

The winding-down and termination of large, complicated contracts like those at Malmstrom were operations fraught with almost as much complexity as their initial formulation and issuance. There were not only contractors but subcontractors and suppliers down to the fourth or fifth level to be dealt with, multiple claims to be settled, and sometimes considerable legal tangles to be uraveled by the Office of Counsel. In the case of Malmstrom, too, there was for a time the slim possibility that the ABM Treaty might not survive Senate examination to further confuse proper procedure. These factors bedeviled all aspects of SAFEGUARD contracting, but they especially played hob with the long-range planning required in the SAFEGUARD GFP procurement program where many multi-site, long-lead items had been contracted for delivery over a period of years.

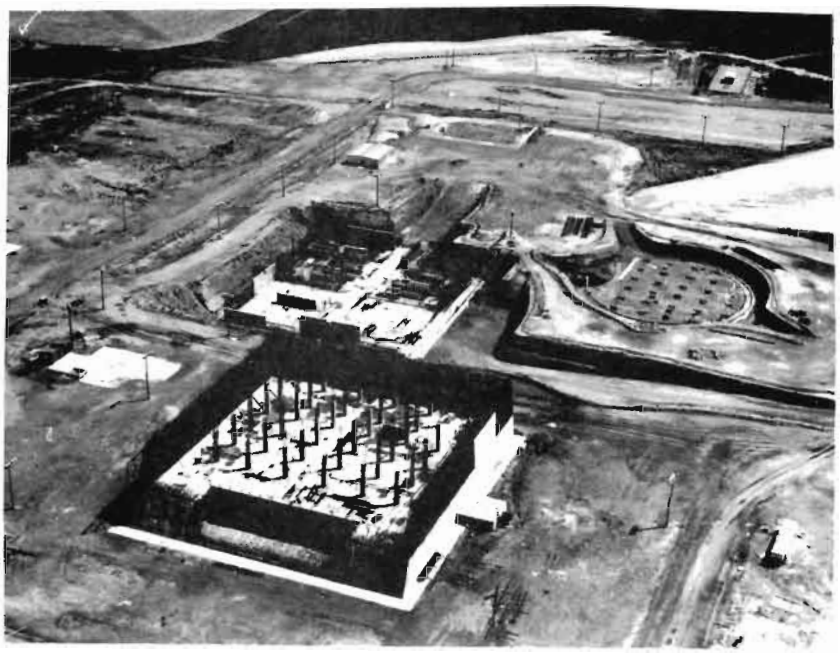
The lengthy process of settlement with contractors began immediately after the 26 May Treaty signing. Although the Department of Defense termed the cessation a "suspension of work," the probabilities seemed great that the Malmstrom job would not be resumed, so special arrangements had to be made expeditiously to reduce standby costs to the minimum while preserving a work-resumption option should it be needed. Upon receipt of message notification from the Department of Defense, telephone calls went out on extremely short notice to Procurement and Supply Division personnel to report for work on Saturday, 27 May, and Sunday, 28 May. That was a hectic weekend in the Procurement and Supply Division, since employees had to review about fifty-six contracts, determine the propriety of issuing Government "Delay of Work" notices for each contract, and prepare and issue the notices. About twenty contracts required notification of the contractor, and in the interests of time, a large majority of the notices were issued on Sunday, 28 May. For each contract involved, the contracting officer issued a formal communication to the contractor advising him to stop work on the contract in view of the ratification of the SALT Treaty, pending further instructions from the contracting officer.[6] This sudden change in direction of the GFP program was further complicated by the refusal of at least one manufacturer to honor the Delay of Work notice. Instead, he requested a termination for convenience. By regulation, terminations in excess of $25,000 required approval from OCE, and in this case expedient action was demanded to obtain OCE approval and to issue the requisite termination notice.[7]

A meeting to advise contractors of special interim procedures was held at Malmstrom on 22-23 June 1972. Here it was laid down that all subcontracts and purchase orders were to be fully terminated; plant visitation to this effect was to commence the week of 26 June; all settlements would be on a total cost basis and fully audited as required; and settlement proposals should consider work done, changes, suspension, termination, and claims, if any. Profit, interest, bid costs, and standby equipment costs were also discussed. In general, the sites themselves were to be securely mothballed with minimum expense until final disposition.[8]

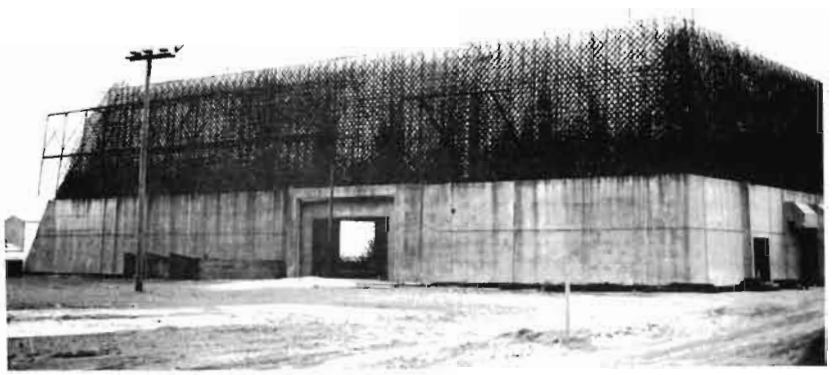
Every contract termination of this magnitude generates its own peculiar variety of wry feelings among the parties, and Malmstrom was no exception. For the contractors, subcontractors, and suppliers, compensation would eventually come in the form of Government payment for work done or materials supplied. For some Conrad-Shelby area citizens, the rather abrupt loss of anticipated free spending by construction workers and military personnel was balanced by the knowledge that the quiet life and stable environment of their locality would return and that federal funds would still be forthcoming to ease the adjustment period. But for Malmstrom area labor unions, the termination of construction activity was the last in a long line of bruises in the battle for higher wages and substantial benefits, and their reaction was correspondingly sour. On 2 June 1972, a week after the cessation of construction work, the North Central Montana Building and Construction Trades Council addressed a unanimous resolution to their Congressman, John Melcher, complaining that "it is now apparent that the manipulation of the 'on again - off again' status of the construction at Conrad, Montana, was nothing more than a card in an international poker game of strategic arms limits" and that "the long delay [of wage negotiations, 1970-71] was nothing more than a manipulated play in the game." The resolution further requested that "our elected representatives in the Congress of the United States take issue with the government contention that the high cost of labor was the reason for the long delay in staring the project."[9] Congressman Melcher's reaction to the resolution has not been recorded in Division files.

Final termination of the Malmstrom contracts and disposal of the sites could begin only after the final signatures were placed on the ABM Treaty on 1 October. On 2 October 1972 letters from the Department of Defense terminated all Malmstrom SAFEGUARD construction contracts as of 5 October. These contracts included DACA87-72-C-0019 with Peter Kiewit Sons' and Associates for the main buildings; DACA87-72-C-0060 and DACA87-72-C-0072 with Smith-Boeing for the four RLS's; and DACA87-72-C-0066 with Chris Berg for the Non-Technical Support Facilities. With the termination action, Huntsville Division instructed the contractors to remove forms, shoring, and equipment, but to continue operation of the Area Office waterline and to provide security for the sites pending disposition.[10] Area Engineer Col. L.B. Dezarn remained with a small staff to supervise custodial operations, and, ultimately, the close-out.

The final act in the unfortunate history of the Malmstrom ABM facilities came on 11 September 1973, when Huntsville Division awarded two contracts for cleanup and restoration of the sites to as near natural condition as practicable. Restoration work at the MSR site was to be conducted by William Clairmont, Inc., of Bismarck, North Dakota, for $364,000 and that at the PAR site and RLS 3 by PKS&A for $239,997.[11] Over the next six months these firms cut away protruding reinforcing steel, bundled it, and shipped it out for scrap salvage. The same treatment was given wiring, piping, fencing, light poles, and other salvageable fixtures. Roads, parking lots, curbs, gutters, trailer sites, the heat sink, waste water pond, and the SPARTAN and SPRINT holes were ripped up or filled in and landscaped. Various federal and

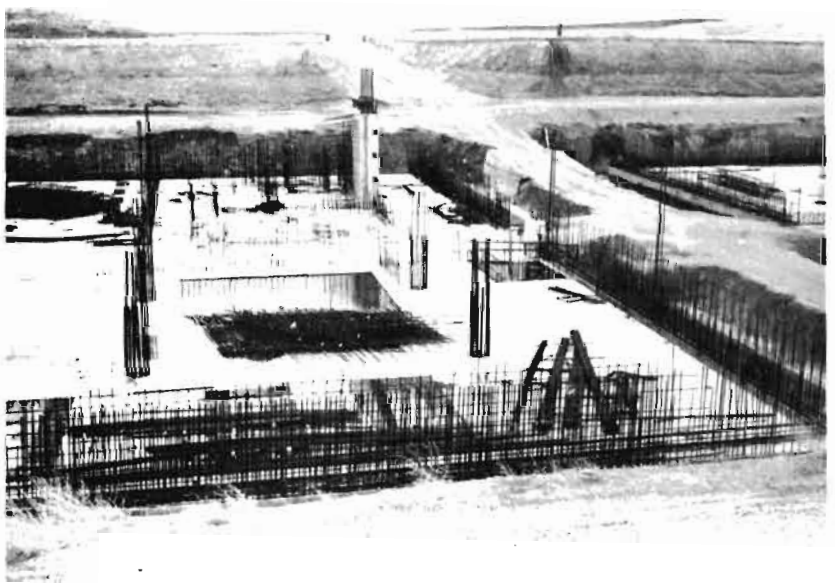


*MALMSTROM PAR SITE prior to restoration and cleanup (September 1973). PARB in foreground facing the "A" wall, power plant in center, and heat sink in center left.*

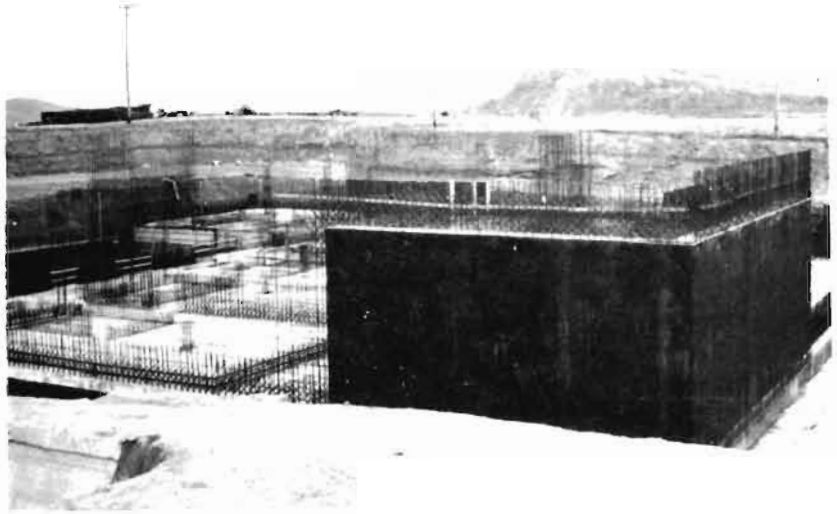


*West Wall of Malmstrom PARB (September 73)*

*MALMSTROM PARB interior (September 73)*



*MONTANA MSCB with MSR Power Plant on right (September 73)*



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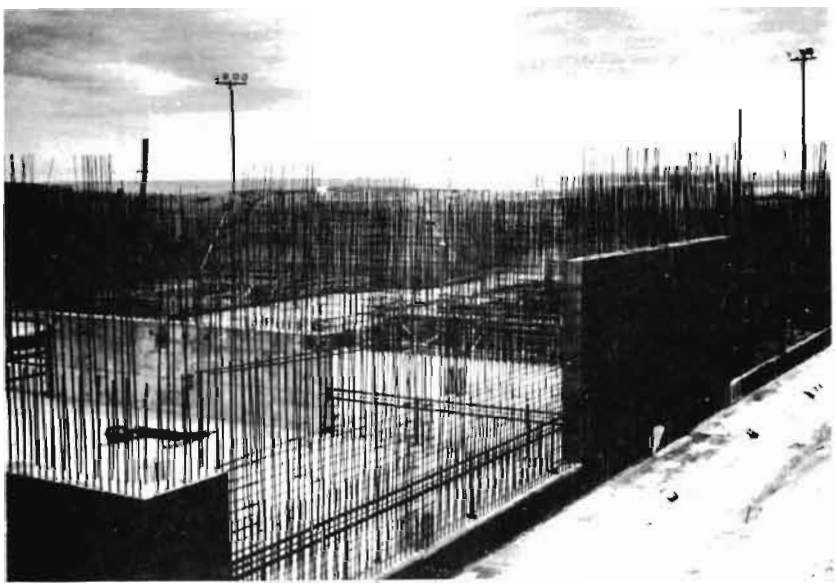


*MSCB Montana September 73*

local agencies carried off most useful items--the excess office furniture and supplies, for example, were hauled to Malmstrom AFB Property Disposal. Most of the vast aggregate piles were tranferred to Pondera County, eventually to be spread over its roads; the Air Force claimed the PAR Resident Engineer's Office; and the complete PAR batch plant minus its 8,000 gallon buried water tank was requisitioned by the Bureau of Indian Affairs in Scottsdale, Arizona. As the final step, topsoil was bulldozed over the foundation ruins, graded, and seeded. By July 1974 most concrete remainders of the SAFEGUARD facilities at Conrad and Shelby had received a dignified burial beneath thousands of yards of earth and a waving cover of wind-blown grass. The unfinished first level of the PAR Building alone stood above ground as a mute monument to what might have been America's second ABM installation.[12]

*MALMSTROM PAR SITE after restoration work. Buildings were donated to local government agencies. (May 1974)*

*MONTANA MSR SITE after restoration (May 1974) Building left were donated to local government agencies.*

While the Malmstrom facilities were being buried under Montana earth, much of the rest of the SAFEGUARD program was being reduced or obliterated under piles of reorganization studies and disposal forms. Simultaneous with the termination of SAFEGUARD construction, the Defense Department also cancelled most of the $1.7 billion worth of weapons system production contracts outstanding with Western Electric Co., Raytheon Co., General Electric Co., McDonnell-Douglas Astronautics Co., and Martin-Marietta Corporation for radars and missiles since April 1968.[13] Out of these massive buys, only enough equipment and supplies for the Grand Forks and potential Washington, D.C..

sites were to be delivered, with a large part of the spares inventory for these being provided by items now on hand but surplus to the Malmstrom facilities. The Army decided for reasons of economy to provide remaining SAFEGUARD logistic support by contract rather than through Government agencies. In a major reorganization of the SAFEGUARD System, on 15 January 1973 the SAFEGUARD Logistics Command (SAFLOG) were merged with SAFSCOM to become the Logistics Management Directorate. The SAFEGUARD Army Depot at Glasgow, Montana, was converted into a Government-owned, contractor, operated facility, and the Central Training Facility at Fort Bliss, Texas, was dissolved. By the end of June 1973, personnel strength in support of the SAFEGUARD program had been reduced to about 58 percent of the manning level authorized prior to the signing of the ABM Treaty. The authorized civilian strength ceiling for the SAFSCOM infrastructure was trimmed to 1105 as of 30 June 1973.[14]

The implementation of the ABM Treaty and Congressional authorization of only one SAFEGUARD site posed several large questions for the Army regarding the long-range direction and organization that ballistic missile defense activities should take in the future. The ABM Treaty made another BMD deployment like SAFEGUARD problematical, but it set no bounds on BMD research and development. In the interests of national security, it was imperative to continue to explore the paths of advanced BMD technology, particularly the possibilities extended by the Site Defense program, should the Soviets abrogate the ABM Treaty. The Site Defense program involved a new generation of weapons systems and facilities intended from the beginning for defense of hardened ICBM sites.

In accordance with the dual needs of completing the Grand Forks SAFEGUARD site and continuing BMD research and development, the Secretary of the Army on 26 March 1974 announced plans to realign and consolidate BMD management under a single organization. This new direction was implemented on 20 May 1974 when the SAFEGUARD System was redesignated the Ballistic Missile Defense Organization (BMDO) and the SAFEGUARD System Command was renamed the Ballistic Missile Defense Systems Command (BMDSCOM). The assigned mission of the BMDO was to deploy and operate the SAFEGUARD System, execute the Site Defense program, to conduct research and development in advanced BMD technology, and manage the Kwajalein Missile Range. The Advanced Ballistic Missile Defense Agency (ABMDA) in Washington, D.C., and old and prestigious Government institution dated to the 1950's, was deactivated, and ABMDA Huntsville was redesignated the BMD Advanced Technology Center (BMDATC) under command of the BMD Program Manager.[15]

In the wake of reorganization and reorientation of SAFSCOM following the acceptance of the ABM Treaty, Huntsville Division's BMD mission remained very much as it had before the Treaty. Nor did the formation of the new hybird BMDSCOM in 1974 greatly affect the Division's client-patron relationship with the Army's ballistic missile defense command. When Huntsville Division was organized and mobilized in the fall of 1967, its mission had been defined as one of offering engineering and construction support for antiballistic missile deployment--in military language, the Division was a "BMD-dedicated organization." The promulgation of the ABM Treaty in October 1972 meant a drastic diminution in the active scope of the SAFEGUARD deployment, but it did not mean abolition, nor did it mean that there would not be other deployments of more advanced systems such as Site Defense in the future should the need arise. Potential future ABM deployments would require technical and non-technical facilities, just as SENTINEL and SAFEGUARD had, and logic dictated that Huntsville Division should execute the design and construction of these facilities. Hence, even though the ABM Treaty made the SAFEGUARD System a lame duck after 1972, a part of the Engineering Division staff continued to advance BMD concepts through the research and development of second and third generation facilities. At the same time, as the BMD mission shifted more and more to future possibilities rather than contemporary actualities, Huntsville's primary assignment remained the completion of the Grand Forks SAFEGUARD site and its guidance through checkout and acceptance by the Army Air Defense Command. The execution of this part of the Division's mission in North Dakota will be examined in more detail below.

While Huntsville Division's primary mission after the SALT I Treaty remained BMD facilities, the Division also began to broaden the scope of its activities through new mission assignments unrelated to BMD. One of the most outstanding requirements of the BMD program had been its massive GFP procurement. In the course of contracting for more than 1,600 line items of Tactical Support Equipment to be delivered to SAFEGUARD contractors,

Huntsville Division's Procurement and Supply personnel had acquired considerable expertise, experience, and reputation in the formulation of specifications and in the administration of large numbers of supply contracts for technical items. In November 1971 the newly reorganized United States Postal Service sought the managerial help of the Division in awarding and administering dozens of contracts for thousands of industrial mechanization items going into the Postal Service's new Bulk Mail Centers then being erected across the country.

The Postal Service mission became the first of a series of additional activities assumed by Huntsville Division during and after 1972. In May 1972, just as the ABM Treaty was concluded, Huntsville Division joined NASA in the Space Shuttle effort by providing design engineering and construction of those test facilities needed by Marshall Space Flight Center's portion of the Shuttle program. The Postal Service and NASA missions were later joined by others which, taken together, gradually changed the complexion of Huntsville Division from an institution solely serving the BMD community to one performing a variety of design engineering, construction, and procurement functions for a wide spectrum of Government agencies. Thus it can be fairly said that the phasing down of the SAFEGUARD program after the SALT I agreements of 1972 marked the beginning of a transition to a new era for Huntsville Division, an era in which the BMD mission was joined by a diversity of other types of technical challenges. This broadening and redirection of the Division's activities is further described beginning with Chapter V.

The transition to the post-ABM Treaty era was, of course, marked by manpower, personnel, and organizational adjustments within the Division. The limitations on SAFEGUARD imposed by the ABM Treaty and subsequent Congressional authorizations drastically reduced personnel requirements, and for a time during 1972 the prospects for the Division's future looked gloomy indeed. With the completion of SAFEGUARD, the Postal mission, and NASA tasks there could be little or no justification for maintaining Huntsville Division as a Corps field agency. During the course of 1972, however, the Department of the Army concluded that it would be prudent to maintain an engineering force-in-being as a contingency against future BMD facilities design and construction. By PBD 290 "SAFEGUARD" of 14 December 1972, the Division was authorized 240 civilian and ten military positions for BMD work; about sixty additional spaces were authorized for Postal and NASA missions. In FY 1975 further manpower studies provided 240 civilian spaces to be included in the Army's five-year defense program ending in FY 1981. These spaces preserved a Corps of Engineers presence in Huntsville with the primary mission of rapid deployment of additional BMD facilities should the provisions of the ABM Treaty be abrogated by the USSR. Under the terms of the Manpower Program, the Corps could utilize Huntsville Division in the performance of work of comparable sophistication as long as the ongoing BMD work retained top priority.[16]

Throughout FY 1972 the manpower level of the Division headquarters in Huntsville remained relatively stable, fluctuating between 425 on board on 30 September 1971 (430 authorized) to 418 on board on 30 June 1972 (437 authorized). Naturally, there was a good deal of growth in the field staff during this time because of the resumption of work at Malmstrom. Total Huntsville Division field personnel in the two SAFEGUARD area offices rose from 234 on 30 September 1971 to 299 on 30 June 1972. But after the signature of the ABM Treaty, a steady shrinkage in personnel manifested itself in keeping with smaller authorizations. One year and one month after the first signature of the Treaty, the actual military and civilian strength of the Huntsville office had fallen to 364 (373 authorized), with an additional 115 present in Grand Forks, ten at Malmstrom, and thirteen at the new Mississippi Test Facility Area Office opened for NASA work near Bay St. Louis, Mississippi. Two years after the Treaty, in June 1974, Division staff in Huntsville fell to 318 (292 authorized), with an additional sixty-four (thirty-eight authorized) in the field. By the end of FY 1975, the staff in Huntsville was reduced to 291 (310 authorized), with an additional thirteen (thirteen authorized) in field offices.[17]

In the era after SALT I, retirements and reassignments took the sting out of much of the reduction-in-force so that few "adverse actions" were required to keep the Division within operating authorizations. A scanning of the Division's "Historical Summaries" reveals that between 1970 and 1973 several original "plank owners" of 1967 retired or transferred away. Notables among them included Joe Harvey and John Coony in the Engineering Divisions; Margaret Jerge in the Personnel Office; William Campbell in the Office of the Comptroller; Ralph Loschialpo in the Personnel Office; and W.S. Worthington in the Safety Office. Quite probably the most notable changes of all occured in Divisional changes-of-command. On 13 April 1973 Col. Lochlin Caffey replaced Brig. Gen. Bates C. Burnell to become the Division's third Division Engineer. General Burnell was reassigned as commander of SAFSCOM,

*COLONEL LOCHLIN W. CAFFEY*
*Huntsville Division Engineer*
*April 1973 - June 1975*


*COLONEL JOHN V. PARRISH, JR.*
*Huntsville Division Engineer*
*June 1975 - October 1977*

physically a short move to new offices on the second floor of the same SAFEGUARD Building that housed Huntsville Division. Colonel Caffey led the Division until 30 June 1975, when he retired after thirty years of military service. His successor was Col. John V. Parish, Jr.

As noted above, Huntsville Division's primary reason for being after the ABM Treaty continued to be BMD facilities in general and SAFEGUARD construction in particular, with the new Postal Service and NASA support activities just getting underway. But the services of Government institutions really belong to the people, and public service has always come high on the list of Corps of Engineers' priorities, especially when its engineering talents are needed in an emergency situation. Through their involvement with water works and flood control, the Corps' geographic Divisions and Districts were no strangers to public emergencies, but Huntsville Division had no such familiarity since it had no civil works responsibilities. With the disaster created by Hurricane Agnes in June 1972, however, some fifty members[18] of Huntsville Division received an unscheduled initiation into the demands of flood relief.

Agnes, described by the National Hurrican Center as "the greatest rainstorm of all time," blew up the eastern seaboard states between 17 and 23 June with 110 mph winds, leaving behind a swatch of staggering destruction caused mostly by flooding. The storm's greatest impact was felt over the five state area of Pennsylvania, Virginia, West Virginia, Ohio and New York, where Agnes dumped an estimated 28 trillion, 100 billion gallons of water during her death agonies. The greatest amount of suffering was in Pennsylvania, where more than 70,000 homes were damaged or destroyed at a cost of more than $500 million. Damage surveys revealed 4,300 permanent residences destroyed, 31,400 with major damage, and 31,500 more with minor damage. An additional 1,300 mobile homes were destroyed and 1,900 damaged. It was by any measure a national catastrophe of the first magnitude.

The "Disaster Relief Act of 1970" (P.L. 91-606) provides for assistance to communities and individuals in recovering from damage caused by major disasters from natural causes. On 23 June 1972 the President declared certain areas in Pennsylvania, Maryland, Virginia, West Virginia, and New York as being subject to a major disaster classificiation because of Hurricane Agnes' flooding. The resources of

Corps of Engineers divisions and districts in the devastated region were overwhelmed, and on Saturday, 24 June, the Chief of Engineers reconnoitered the disaster area by air, determined that total Corps support would be required, and sent out radiotelephone messages directing a mobilization of all available individuals. By the next day, more than 100 personnel had assembled in Baltimore, and that figure grew to more than 400 over the next few days. Huntsville Division contributed more than fifty to this number, the members taking TDY and flying into the affected area for stays ranging up to several weeks. First priority was given to the restoration of human safety and public health, debris removal, and restoration of flood control structures. Much of this work was done by regular Army, National Guard, and reserve units, but as in other activities where the Government was a party, a great deal was done by contract with private individuals and firms. Contracting was a procedure in which Huntsville Division was expert, and Division personnel contributed heavily in this area. Frequently cleanup contracting was done on an ad hoc, on-the-spot fashion that slashed through red tape. As the Division's "Information Bulletin" put it,

> the first contracts in many cases consisted of a contractor informing the Area Engineer of his equipment and capability; the Area Engineer nodding; making a note of the facts; defining an area to work; and the man and crew going to work. The paper work was handled later.[19]

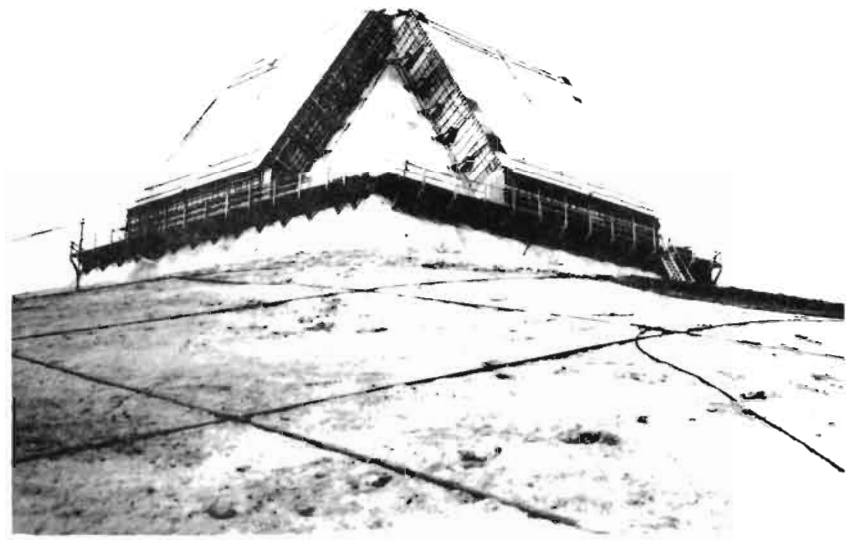
By 23 July, almost 1,900 contracts had been awarded at a value of over $34 million with work continuing. The final phase of the cleanup operation was conducted after 17 July by the Susquehanna District, a temporary district assembled specifically for the job. This office officially closed on 30 November 1972. By this time, however, most Huntsville Division employees had returned to the home office.

When the ABM Treaty was first promulgated in May 1972 the construction of the Grand Forks facilities was about 85 percent complete, and the work was roughly on schedule. BOD for the PAR Building had been established as 21 August 1972 and as 1 January 1973 for the MSR, and although the signing of the ABM Treaty lifted much of the pressure from schedules, the timely fulfillment of schedule commitments for Grand Forks represented one of the major objectives of Huntsville Division during the period of transition that followed the Treaty. Preparation for the turn-over of the sites to ARADCOM, the using command, had already gotten underway in September 1971 when the Army Air Defense Command announced creation of the first two units to man SAFEGUARD installations. The units formed as of 1 September 1971 were the Army SAFEGUARD Command, Grand Forks, with an authorized strength of 784, comprised of 62 officers, 22 warrant officers, 432 enlisted men, and 168 civilians. Their mission was to "defend the Continental United States 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 a ballistic missile attack against the Continental United States. The Battalion's authorized strength of 401 called for 41 officers, 14 warrant officers, 209 enlisted men, and 136 civilians. Contemporary 1971 plans called for a similar unit at Malmstrom; these plans were scrapped along with the Malmstrom site after October 1972.[20]

Construction at both the PAR and MSR had continued throughout the winter of 1971-1972 without unusual problems because the buildings were fully closed in and on extensive winterization provisions were required. By this time all major structural concrete pourings were complete except for minor "fill-in" around the tardy MSR antenna rings, hence the bulk of activity at both the PAR and MSR centered about the myriad of detail work necessary to finish up the interior of the buildings and install mechanical and electrical systems. At the close of the 1971 construction year on 31 December, 53 percent of the mechanical and 42 percent of the electrical work was finished in the MSR Building; corresponding figures are lacking for the PAR but were doubtless much higher than this.[21] By the end of the year the MSR SPRINT field was virtually complete with all sixteen missile cells set and backfilled; in the SPARTAN field, all concrete and backfilling had been completed and the contractor had begun to install liner plate for RFI/NEMP shielding. At this time the Universal Missile Building was about 86 percent complete; the Warhead Handling Building was structurally complete and about 50 to 60 percent fitted with mechanical and electrical components. At the PAR, most of the late 1971 construction season was spent setting and welding liner plate, installing phase shifter platforms, erecting metal partitions, installing blast doors, and assembling the shock isolation platforms.[22]

For the most part, M-KA was able to make steady and rather uneventful progress through the detail

work of the winter season. Perhaps the most spectacular, if not the most damaging, setback came on 20 January 1972, when an early-morning fire gutted the forty-three trailer M-KA office trailer complex. The blaze destroyed many records and caused $2 million in damages, but there were no injuries and full operations were resumed in about a week. [23] When the winter snows of 1971-1972 were shaken off and work commenced in the 1972 season, weapon system



*MSCB Turret (April 1972)*

contractor personnel were already appearing in some numbers in preparation for installation of the radar equipment. This part of the construction was not properly part of the Corps of Engineers' responsibility, but it often involved a close mesh with the Corps' contractor, M-KA. This was particularly true in the installation of the MSR turret rings which had to be assembled and aligned with test jigs, then permanently set in concrete. The first of the rings began to be assembled in April; the installation and test alignment of all thirty-six segments had to be completed on one face before the adjoining wall surfaces could be filled in with concrete. The fourth and final ring was assembled, aligned, and set by the middle of July. With the setting of the antenna rings and the removal of construction scaffolding, the truncated pyramid shape of the MSR was clearly revealed for the first time.

The installation of thousands of external radar elements on the face of the "A" wall of the PAR Building represented a different and far more spectacular scene as the building neared acceptance during the spring and summer. Clinging like flies on the nearly vertical face of the 120-foot wall, dozens of WECo technicians brought up thousands of small machined bits and pieces and painstakingly assembled them over the 6,500 four-inch perforations through the "A" wall face leading to the phase shifter equipment inside. Writing in the Division's "Information Bulletin," the Historian likened the curious process to some kind of fantastic Christmas Eve played out on a grand scale:

> What parent hasn't been frustrated on Christmas Eve --after the kiddies are in bed -- trying frantically to assemble all the loose nuts, bolts, washers, and panels of a doll house, tricycle, or swing set? The "easy-to-follow" instructions never seem to quite match all the loose parts strewn over the living room floor. The problem at the Grand Forks Safeguard complex could be somewhat the same. . .when the contractor begins erecting the front face ground plane and edge seal forming the 120-foot diameter radar "eye" on the PARB.

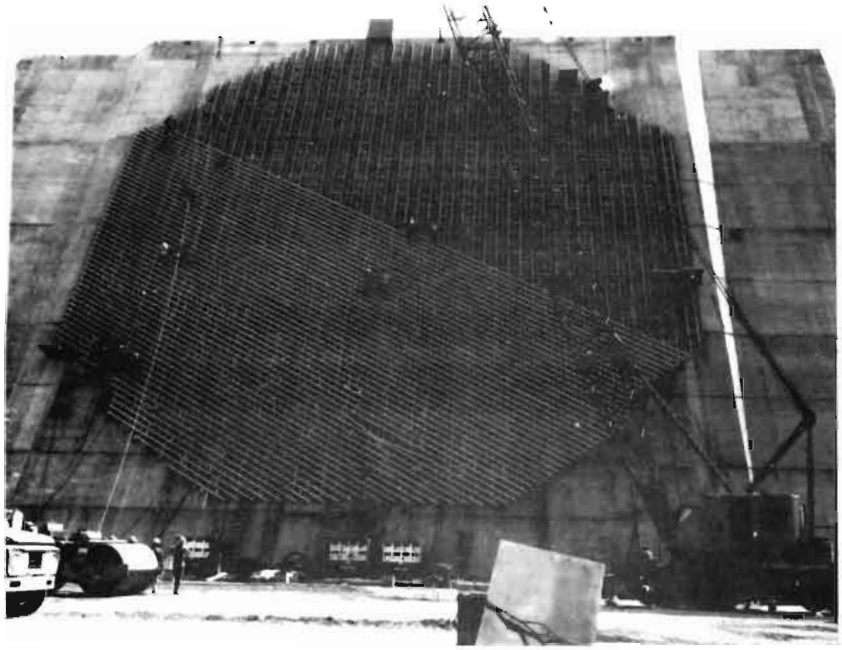
Then the writer went on to underline the complexity and precision involved in WECo's Christmas Eve parent role:

> The total hardware for the working "eye" consists of 245,828 individual pieces -- bolts, screws, washers, gaskets, seals, frames, plates, and channels. It could be called the world's largest erector set. The component parts will be fabricated to precise dimensions by at least

three different manufacturers and about 10 suppliers, piece-marked and shipped to the job site. Because of the magnitude of the structure, preassembly before erection is unfeasible. Under the Area Engineer's supervision, the contractor must erect over 175,000 of these pieces and end up with a plane surface about 120 feet in diameter, flat from edge to edge within 1/4-inch tolerance, and with its 6-thousand plus holes all within 1 inch of true position. This involves properly matching and aligning over 40,000 bolted connections, each torqued to predetermined requirements. After the construction contractor's erection is completed, the Weapon System Contractor (WSC) will install and cable-up the remaining 70,000 individual pieces that make up the 6-thousand plus radar elements.[24]

The installation of the antenna ground plane on the PAR Building face was the last major step to be taken before the building could be turned over to the site activation team from SAFSCOM. As the antenna installation drew to a close in June 1972, prefinal inspections were going on throughout the PAR Building with painters, electricians, and plasterers performing the final stages of finishing work. Last minute cleanup and housekeeping were accompained by a flurry of activity, but the contractor was ready when the long awaited BOD arrived on 21 August 1972. The event was one of the most significant milestones in the history of Huntsville Division, and it was duly noted with a small "turn-over" ceremony at the PAR. Division Engineer General Burnell made some brief remarks and passed control of the PAR from the Corps of Engineers to Brig. Gen. John E. Sterling, Director of Site Activation for SAFSCOM. With the transfer of the PAR Building, representatives

*PAR FACILITIES of the SAFEGUARD Ballistic Missile Defense near Grand Forks, North Dakota, as they appeared on April 19, 1972. At the upper left is the PAR control building with its associated power plant to the right. In the background are some of the support facilities of the installation. In the center and on the right are temporary contractor buildings and workers' automobiles.*



*THE FACE PLAIN of the Perimeter Acquistion Radar Building (PARB) as it appeared in later June 1972.*

of Western Electric Co., the weapons system contractor moved into the building and began installation and testing of tactical equipment for the building.[25] M-KA met with even more success in completing the adjoining PAR Power Plant, BOD for which was reached on 18 November 1972, twelve days ahead of schedule.

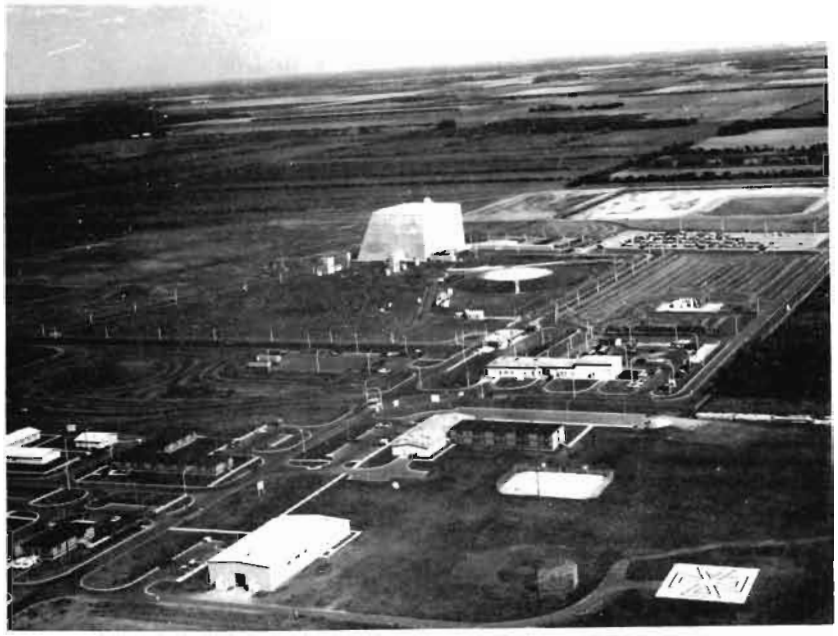
*TRANSFER OF THE FIRST OF THE MAJOR TACTICAL BUILDINGS OF THE NORTH DAKOTA SAFEGUARD BALLISTIC MISSILE DEFENSE SYSTEM, the Perimeter Acquistion Radar Building, from control of the Huntsville Division to the Safeguard System Command on August 21, 1972. From left to right: S.N. Purinton, PAR Project Manager, M-KA; G.W. Gilfillan, Division Manager, Missile and Space Division, M-K; A.D. (Doc) Poteat, Resident Manager, M-KA; Paul C. Steidl, PAR Resident Manager; Colonel Lochlin W. Caffey, Contracting Officer and Deputy Division Engineer, Huntsville; Brigadier General Bates C. Burnell, Huntsville Division Engineer; Barney L. Trawicky, Chief, Construction Division, Huntsville; and Colonel John L. Lillibridge, Grand Forks Area Engineer.*

The second major portion of Grand Forks facilities was released for occupancy on schedule on 3 January 1973, when the Corps of Engineers transferred the MSR Building to the SAFSCOM Site Activation Team. As with the PAR, a brief ceremony conducted by General Burnell marked the occasion. Other participants included representatives of the Area Office, SAFSCOM, M-KA, and WECo. With the transfer to SAFSCOM, WECo employees moved in to initiate the installation and testing of the tactical equipment, completion of which operation was scheduled for 1974. BOD for the MSR Power Plant was 4 March 1973, twenty-six days in advance of the construction schedule date of 1 April 1973.[26]

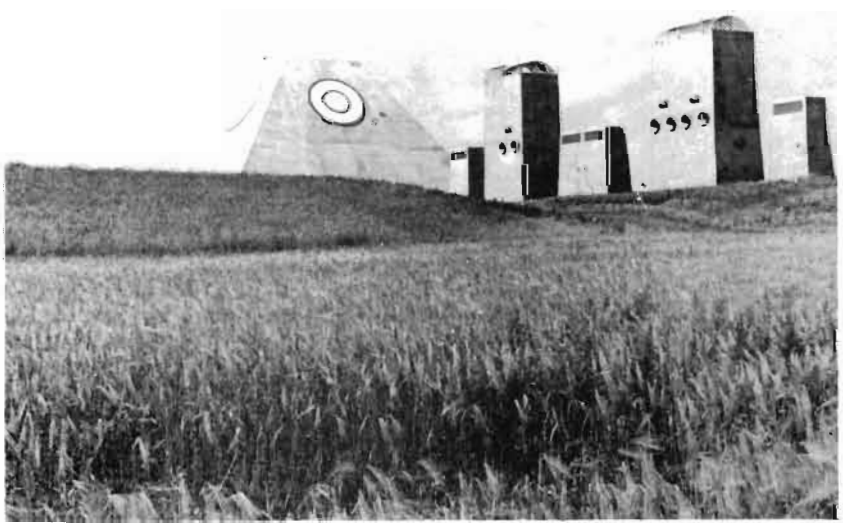
An evaluation of Grand Forks SAFEGUARD contractor performance is a difficult matter. All contractors were under firm pressure from the Defense Department's deployment schedule to meet all deadlines in the interest of national security. Additionally, all contractors on technical facilities faced novel techniques, technical sophistication, massive numbers of changes, high quality demands, and natural geographic and demographic obstacles to their jobs. Officially, the Corps' Form 1596 "Construction Contractor Evaluation Report" completed at the termination of proceedings gave all three major Grand Forks contractors a "satisfactory" rating on all five evaluation criteria and an overall "satisfactory" rating.[27]

In meeting or exceeding the expected BOD dates, M-KA had generally turned in a more than satisfactory performance on the Grand Forks sites. It should be remembered, however, that the talent and resources available to this construction giant were immense. As shown by the last edition of the Ballistic Missile Defense Systems Command Site Activation Program Status Report (SSCS-127), 31 October 1974, the other contractors were delayed somewhat more by changes in achieving their schedule objectives. Chris Berg, contractor for the Non-Technical Support Facilities, turned over the MSR Community Center on 5 December 1972, four months after the anticipated BOD; the MSR Chapel, received on 6 October 1972, was two months beyond the schedule date; the Industrial Building was two and three-quarters months later than scheduled; and the MSR Gymnasium, completed on 7 February 1973, was more than two months behind schedule. At the PAR site, the PAR Gymnasium was completed on 9 February 1973, more than two months after its scheduled BOD of 15 November 1972; most other Non-Technical Support Facilities at the PAR had averaged about a month's overrun.[28]

*TACTICAL FACILITIES OF THE SAFEGUARD BALLISTIC MISSILE DEFENSE SYSTEMS' MISSILE SITE RADAR site constructed near Grand Forks, North Dakota. Right foreground is the Helipad; right is the circular underground heat sink; to its left the intake and exhaust stacks of the underground power plant; the turret of the partially buried Missile Site Control Building; to the left the Spartan and Sprint Missile Fields; and the mounded earth covered Missile Assembly Building.*



*THE PERIMETER ACQUISTION RADAR SITE BEING CONSTRUCTED NEAR GRAND FORKS, NORTH DAKOTA. In the foreground are the nontactical and support facilities, in the center the Perimeter Acquisition Radar Building, the intake and exhaust stacks of the Power Plant, the circular buried Heat Sink and in the background the waste disposal systems.*



*THE TURRENT OF THE MSCB and the intake and exhaust stacks of the underground power plant.*

*THE NORTH SIDE or face of the PARB with the intake and exhaust stacks of its underground power plant on the right.*

A large number of engineering changes caused Woerfel Corporation & Towne Realty, Inc., the most difficulty in meeting schedule dates. The venture's prior experience had been mostly in the field of real estate and residential construction, where it was well qualified, but in taking on the four RLS contracts it had, as the expression goes, "bitten off all it could chew." The "History of the Grand Forks Area Office" bears testimony to Woerfel & Towne's performance problems on the highly sophisticated technical work, encumbered as it was by the significant design changes. A typical entry from the "Area Office History" dated 20 November 1972 is indicative of these difficulties:

> **20 Nov 72:** The plethora of clarifications and "how to" do the work continues to flow to this Contractor. . . .At one point Woerfel said he was astonished by the magnitude of the work involved in this contract.[29]

Under these circumstances, it is hardly surprising that a considerable slippage was generated in completion of the RLS facilities. RLS 1 was slipped from 11 July 1973 until 20 November 1973; RLS 2 from 15 June to 26 September 1973; RLS 3 from 5 July to 26 September 1973; and RLS 4 slipped from 15 August until 5 November 1973.[30]

The passage of BOD dates for Grand Forks marked completion of the bulk of the Corps of Engineers' responsibility for construction of these facilities. Corps work at the site continued, however, in maintenance, supervisory, and testing roles for sometime. Several lesser contracts were awarded during this phase-down period for miscellaneous services. A large part of maintenance and operations services were done under a $1.1 million contract with the Federal Electric Corporation (FEC) on 4 August 1972. FEC was to operate and maintain the tactical support equipment from 1 September 1972 until 30 June 1973, with options to carry through to 30 September 1974. FEC's responsibilities included the power generators, heating, air conditioning, electrical distribution, monitoring and control, plant mechanical, environmental, fire detection, fire alarm, and fire suppression systems and related apparatus. Under this contract FEC was also to conduct a formal training program at Grand Forks, preparing Army personnel to replace the FEC technical team when the contract expired.[31]

While the duties and staff of the Corps' Area Office dwindled during 1973 and 1974, the testing, verification, and acceptance of the SAFEGUARD weapons system proceeded under SAFSCOM direction. Operation of the PAR radar, the first full scale model in existence, began in June 1973 as part of the installation and testing program, and tests showed that the PAR could track from its minimum to its maximum range using the entire visibility angle for which it was designed. By early October the PAR was tested at full power and successfully tracked earth-orbiting satellites ranging in size from a basketball to

the largest objects then in space. On 3 September 1974 the U.S. Army SAFEGUARD Command (SAFCMD), Nekoma, North Dakota, and the Ballistic Missile Defense Operations Activity (BMDOA), Colorado Springs, Colorado, were established as the operational elements for the SAFEGUARD System. On the same date, the SAFSCOM Site Activation Commands at the two locations were relieved. Ceremonies held at Nekoma, North Dakota, and Colorado Springs, Colorado, on 27 September 1974 marked Government acceptance of the SAFEGUARD System at Grand Forks. Four days later, on 1 October 1974, the SAFEGUARD System met its Equipment Readiness Date and SAFCMD assumed responsibility for operation and maintenance. A memorialization ceremony held on this date officially named the North Dakota site the "Stanley R. Mickelson Complex." Following the Equipment Readiness Date, five contractor demonstration tests were run at the Mickelson Complex against various BMD scenarios. These tests led to initial operational capability of the System. Between 8 February and 6 June 1975 the Mickelson Complex received its complement of nuclear SPARTAN and SPRINT missiles under Operation "Green Mittens," and on 1 April 1975 the Complex was declared operational with twenty-eight SPRINT and eight SPARTAN missiles in inventory.[32]

As it happened, the operational career of the Mickelson SAFEGUARD Complex proved to be less than a year. The signature of a Protocol to the ABM Treaty on 3 July 1974 limited American and Soviet ABM deployment to one site, and Congress subsequently acted to eliminate operation of the one facility allowed. In February 1976 the only SAFEGUARD facilities to reach operational status were "abandoned in place" and put on a caretaker status. As of the present, there seems to be no interest in reviving their use for BMD or other purpose.[33]

The formal termination of Corps of Engineers presence at Grand Forks came on 27 June 1975 when the doors of the Grand Forks Area Office were locked for the last time. By this time, construction of the facilities was rapidly becoming a matter of record with the conclusion of negotiations for final contract settlements. The most significant of these settlements came on 4 April 1974, when a formal Memorandum of Understanding was reached between Huntsville Division and M-KA. Under the terms of the Understanding, all change orders and claims against the Government under construction contract DACA87-70-C-0013 were settled for $61,200,000. This was in addition to the basic contract price of $137,731,439.00, bringing the total price paid to M-KA for the main Grand Forks facilities to a total sum of $198,931,439.00.[34] The final figure represented an escalation of 44 percent over the original contract price, but several considerations must be borne in the mind when evaluating this increase. During the four years of construction, the rate of inflation in the nation's economy had run about 6 to 8 percent per year, and although M-KA's contract was fixed-price, inevitably some inflation adjustment crept in on all changed work items. Additionally, and most importantly, it must be remembered that the Grand Forks facilities were the first SAFEGUARD facilities completed, and thus they bore the brunt of thousands of modifications and change orders resulting from subsequent implementation of engineering designs produced in great haste during 1968 and 1969. Undoubtedly later facilities, had they materialized, would have benefited substantially from the pioneering forged with Grand Forks. Finally, what price can be put on the technical, contractual, and constructional expertise gained, or the worth of this demonstration of American technological competence and determination to defend herself while SALT talks were being conducted? These contributions were perhaps best recognized by Assistant Secretary of the Army, Norman R. Augustine, in August 1974 ceremonies marking acceptance of the SAFEGUARD System from its prime contractor, Western Electric Company. On this occasion, he said that the SAFEGUARD System "represents in terms of enormity and difficulty of technical challenge one of the three or four most demanding undertakings in history." He also spoke of SAFEGUARD's influence in attaining the ABM Treaty and the Interim Offensive Weapons Agreement with Russia: "The benefits in terms of peace for peoples throughout the world are the real payoff." No higher compliment could be paid to the SAFEGAURD System and to the Corps of Engineers which had contructed it.

# CHAPTER IV FOOTNOTES

[1]The text of the ABM Treaty is in U.S. Department of State, **United States Treaties and Other International Agreements,** Vol. XXIII, Pt. 4. "Limitation of Anti-Ballistic Missile Systems," TIAS No. 7503, May 26, 1972, pp. 3437-3447.

[2]USAEDH-PAO, "Historical Summary FY 1972," II, Documents, pp. 29-31.

[3]**New York Times,** 3 October 1972, p. 1.

[4]USAEDH-PAO, "Historical Summary FY 1972," I, Narrative, pp. 135-137.

[5]Ibid., 195-199.

[6]Memo to the author from James W. Reynolds, Contract Specialist, Procurement and Supply Division, 20 June 1978. Each GFP contract included a clause entitled "Delay of Work." This clause provided for an adjustment in the contract price if the Government or contracting officer took an action or failed to take an action which caused a delay in the contractor's performance of the contract. None of the contracts included a "Suspension of Work" or "Stop Work" clause which would have allowed the Government to stop or suspend temporarily the contractor's performance. These clauses were not required to be included in fixed-price supply contracts. A notice to terminate the contracts for the convenience of the Government could not be issued because the full impact of the treaty ratification was not immediately known. On the other hand, the contractors could not be allowed to continue performance on the contracts for the future requirements of the ABM system. In the absence of any more appropriate alternative, the decision was made to issue a notice to the contractors involved directing a delay of work pursuant to the "Delay of Work" clause although the clause does not specifically permit such direction.

[7]Memo to the author from Thor S. Anderson, Chief, Procurement and Supply Division, 16 June 1978.

[8]USAEDH-OC, "History of the Office of Counsel," Supp. 5 (Oct. 1971 - Oct. 1972), p. 15.

[9]USAEDH-OC, "History of the Office of Counsel," Ex. 297, letter of North Central Montana Building and Construction Trades Council to Congressman John Melcher, 2 June 1972.

[10]USAEDH-PAO, "Historical Summary FY 1973," I, Narrative, pp. 57-58.

[11]USAEDH-PAO, "Historical Summary FY 1974," II, Documents, pp. 115-116.

[12]For disposition activities at Malmstrom between September 1973 and July 1974 see the Weekly Area Reports in USAEDH Office of Counsel file 401-07, SAFEGUARD Status Reports Malmstorm 1973 and 1974.

[13]BMDSCOM, "Summary of the SAFEGUARD Program, FY 73," p. 7; **Huntsville Times,** 5 October 1972.

[14]BMDSCOM, "Summary of the SAFEGUARD Program, FY 73," pp. 1-2.

[15]BMDSCOM, "Ballistic Missile Defense Program Summary, FY 74," pp. x-xi.

[16]USAEDH-PAO, "Historical Summary FY 1975," I, Narrative, pp. 1-2; personal interview with Dewey Rhodes, Manpower Management Officer, 3 August 1978.

[17]USAEDH-PAO, "Historical Summary FY 1972," I, Narrative, p. 1; USAEDH-PAO, "Historical Summary FY 1973," I, Narrative, p. 1; USAEDH-PAO, "Historical Summary FY 1974," I, Narrative, p. 2.

[18]The figure of eighty individuals from Huntsville Division is given in USAEDH-OC, "History of the Office of Counsel," Supp. 5 (Oct. 1971 - Oct. 1972), pp. 6-7.

[19]USAEDH-PAO, "Information Bulletin," V, No. 7 (9Aug. 1972), pp. 1-4.

[20]USAEDH-PAO, "Information Bulletin," V, No. 1 (14 Jan. 1972), pp. 1-2.

[21]USAEDH-GF, "History of the Grand Forks Office," Pt. I, FY 1972, pp. 84-87.

[22]Ibid.

[23]Ibid., pp. 91-92.

[24]USAEDH-PAO, "Information Bulletin," IV, No. 18 (19 Nov. 1971), pp. 1-2.

[25]USAEDH-PAO, "Information Bulletin," V, No. 8 (25 Aug. 1972), pp. 1-2.

[26]USAEDH-PAO, "Information Bulletin," VI, No. 1 (24 Jan. 1973), p. 1.

[27]Government Form 1596 "Construction Contractor Evaluation Report" offers only two choices in evaluating contractors' performance, "satisfactory" and "unsatisfactory." According to Edwin Kircher, Trial Attorney (Contract), Office of Counsel, it is unusual for a contractor's performance to be classified as "unsatisfactory."

[28]BMDSCOM, Site Activation Program Status Report (SSCS-127): Grand Forks, 31 Oct. 1974, pp. 2-23, 4-17.

[29]USAEDH-GF, "History of the Grand Forks Office," Pt. III, DACA87-71-C-0055, FY 1973, p. 55.

[30]BMDSCOM, Site Activation Program Status Report (SSCS-127): Grand Forks, 31 Oct. 1974, pp. 6-4, 6-8, 6-12, 6-16.

[31]USAEDH-PAO, "Information Bulletin," V, No. 8 (25 Aug. 1972), p. 2; USAEDH-PAO, "Historical Summary FY 1972," II, Documents, p. 62.

[32]BMDSCOM, "Ballistic Missile Defense Program Summary, FY 74," pp. xi-xiv; BMDSCOM, "(U) Summary of BMDSCOM Activities, FY 75," pp. xiii-xvii; BMDSCOM, "Summary of BMDSCOM Activities, FY 76/7T (sic)," pp. xii-xviii.

[33]BMDSCOM, "Summary of BMDSCOM Activities, FY 76/7T **(sic)," pp. xv-xviii.**

[34]Memorandum of Understanding with M-KA, 4 April 1974, USAEDH-OC file Morrison-Knudsen Co. & Associates Correspondence 1974, Contract DACA87-70-C-0013.