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ADC HISTORICAL STUDY NO. 20

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NUCLEAR ARMAMENT

ITS ACQUISITION, CONTROL
AND APPLICATION
TO MANNED INTERCEPTORS
1951-1963

by THOMAS W. RAY



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FOREWORD

The history contained within these covers endeavors to unfold the stories of the MB-1, the GAR-11 and GAR-9, as they applied to ADC up to mid-1963. The old designations are employed throughout the narrative; therefore a table equating the old versus the new designations is herewith included:

<u>Old</u>	<u>New</u>
MB-1	AIR-2A
MMB-1	AIR-2B
GAR-11	AIM-26A
GAR-11A	AIM-26B
GAR-9	AIM-47A

The narrative history is accompanied by three volumes of supporting documents cited in the narrative footnotes. In addition to corroborating statements made in the narrative, the supporting documents amplify information contained in the narrative. Much credit for the preparation of this document rightfully belongs to specialists in the Headquarters staff who opened their minds and files in order to supplement and render understandable the information gathered by the historian. The fact that members of the ADC staff provided invaluable help in the preparation of this history does not mean, however, that the history necessarily reflects the viewpoint of the Command. Readers are cautioned not to make the history the basis for official action.

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INTRODUCTION: THE IMPORT OF NUCLEAR ARMAMENT

For the past seven years -- almost half of its lifetime -- ADC has employed nuclear armament. Use of MB-1 and GAR-11 air-to-air weapons and BOMARC IM-99A/B ground-to-air missiles has multiplied by many times the command's capability for stopping enemy bomber attacks. Along with the advantages brought by these weapons, however, came formidable disadvantages.

The presence of atomic weapons, in effect, placed ADC under a sword of Damocles: one false step might lead to an accidental detonation, and an exploded nuclear weapon at a tactical base might virtually wipe out the unit involved. If a 20 kiloton atomic charge could level the good part of a city (as one did at Hiroshima in 1945), it scarcely overtaxed the imagination to visualize what damage would ensue if one of ADC's MB-1 (admittedly "63" as powerful),

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was inadvertantly detonated to full power. But more than the safety of each atomic-capable tactical unit was at stake. In addition to blasting a squadron sky-high, toxic residual radiation could be scattered for miles from the scene of detonation and cause plutonium poisoning. NATO nations storing U.S. nuclear weapons abroad might be tempted to revoke permission for their further storage, while at home, the adverse publicity resulting from such an explosion, and consequent Congressional action, could prevent within a short time further use of nuclear armament which had taken ADC years to plan for, develop, finance, and implement. Worse for the national defense, ADC's ability to strike down attacking enemy bombers would be cut to a fraction of its existing capability. But worst of all, the possibility, though remote, that an "accidental war" might be started was not to be ruled out. The magnitude of the problem of handling and using nuclear weapons safely and efficiently, therefore, was staggering.

1. AECOM 355-1, Response to Nuclear Weapons Accidents, 1 Jan 1962 [HRF]; RESTRICTED DATA, Fred C. Ikle, et al, On the Risk of an Accidental or Unauthorized Nuclear Detonation (RAND Research Memorandum RM-2241, 15 Oct 1958); RESTRICTED DATA, AFM 122-1, The Nuclear Weapon Safety Program, 15 Sep 1961 [HRF].

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EARLY PLANNING, 1951-1955

(U) ~~(S)~~ No one seemed against ADC's proposal (suggested in 1951; embodied in a formal requirement 31 January 1952) that atomic ordnance be adapted to air defense use. Although a small warhead proportional in size to interceptor armament had not, as of then, been developed, encouragement came from several quarters, not the least of which was USAF, and including the Joint Air Defense Board of the Joint Chiefs of Staff. It was the way ADC first intended to use atomic armament that made Air Force Special Weapons Center (AFSWC), an agency of the then ARDC, to take exception, particularly after studying the matter in Project Heavenbound (1952-53). Until an atomic warhead was produced as a package small enough to fit inside an interceptor air-to-air rocket -- something that would take years to develop -- ADC considered employing existing atomic bombs with interceptors for purposes of dropping them as "free-fall" air-to-air bombardment weapons on hostile targets. ADC reasoned that nuclear armament could be made available for air defense purposes comparatively soon by drawing from weapons in the existing stockpile and adopting toss-bombing techniques; but AFSWC discouraged it on grounds that such tactics, while possibly

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effective under ideal circumstances, would be futile against maneuvering targets or targets concealed by foul weather. Tests of the bombing proposal were carried out by Air Proving Ground Command (APGC) in 1954, resulting in the proposal² being scrapped.

(u) ~~(S)~~ Meantime, ADC's long-term requirement, reaffirmed 23 March 1953, for development of a light-weight warhead in the low-kiloton power bracket ended with more favorable results. The warhead was to equip an air-to-air rocket designed for use with ADC interceptors. In late 1953, USAF instructed ARDC to investigate methods for mating a small-sized nuclear warhead to an air-to-air missile, since theretofore none had been constructed. On 2 April 1954, the JCS approved the development of such a missile. Before 1954 was over, the characteristics desired for the projected atomic rocket, temporarily named "Ding Dong," were drawn up, and a contract for its development was awarded Douglas Aircraft Company.

2. RESTRICTED DATA, ADC Historical Study No. 2, Nuclear Weapons in the Air Defense System, Sep 1953; Ltr, ADC to ARDC, "Nuclear Weapons for Air Defense," 21 May 1952 [DOC 1]; Ltr, ADC to USAF, "Atomic Weapons in Air Defense," 26 Nov 1954 [DOC 2].

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The Atomic Energy Commission (AEC) commenced work on developing a warhead. An unguided rocket was sought that was powered by a solid-propellant rocket motor capable of transporting it three to five miles. It was to weigh about 800 pounds and have a diameter of 15 inches. As envisioned, it would contain "a sealed warhead (nuclear and explosive components, detonators, and firing system), a sealed fuzing unit with necessary safety features, and an aerodynamic case and stabilizing vanes." * The JCS designated 1 January 1957 as the target date for ADC to become operational with nuclear armament -- a target date reaffirmed by the National Security Council. While several interceptors were considered to be prospective users of the new rocket, the F-89D was singled out as the one interceptor adaptable in the few years remaining before the 1 January 1957 target date. Along with the planning for the projected "Ding Dong" (subsequently redesignated, after development, the MB-1 "Genie") and its carrier interceptor, considerable thought was given to perfecting safety devices, storage facilities and associated ground handling equipment, as well as practice and training versions of the nuclear rocket fitted with dummy or conventional HE warheads. The F-89J/MB-1 system and support equipment was authorized for development during the 1955-56 time period.

3. RESTRICTED DATA. ADC Historical Study No. 2, Sep

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GENERAL SAFETY CONSIDERATIONS

- (4) (5) Maintaining ADC's future atomic arms free from unauthorized or accidental detonation (without disabling them of their nuclear impact when needed) entailed guarding them against three categories of vulnerability: (1) technological imperfections and malfunctions; (2) human errors that traditionally had figured high -- over 50 per cent -- in accident causation; and (3) deliberate attempts to trigger them without authorization (either by saboteurs or persons of unbalanced mentality). The first category, technological imperfections and malfunctions, included not only defective apparatus inside and attached to the rocket, but also ground handling equipment, storage and checkout facilities and interceptor launching equipment coming into contact with the rocket. Fortunately, ADC was not alone in facing these

[Cont'd] 1953; Ltr, ADC to USAF, "Atomic Weapons in Air Defense," 26 Nov 1954 [DOC 2]; * RESTRICTED DATA, USAF, "Hq USAF Logistic Planning Guidance Air-To-Air Rocket," 8 Nov 1954 [DOC 3]; DF ADC, DCS/M to DCS/O, "Special Weapons Briefing, Albuquerque, 19 Jul 1954," 22 Jul 1954 [DOC 4]; Hist of ADC, Jan-Jun 1954, pp. 146-47; Hist of ADC, Jul-Dec 1954 pp. 88-89; RESTRICTED DATA, Ltr, ADC to USAF, "Storage and Handling Dolly for Ding Dong," 20 Apr 1955 [DOC 5]; Rpt, AFSWC to ADC, "Weekly Summary Status of Project Ding Dong," 10 May 1955 [DOC 6]; Msg AFOOP-OP-D, USAF to ADC, 10 Jun 1955 [DOC 7]; Hist of ADC, Jan-Jun 1955, p. 90; Ltr, ADC to USAF, "Utilization of Atomic Weapons on F-89D/H," 21 Feb 1955 [Doc 315 in Hist of ADC, Jan-Jun 1955].

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problem areas; other USAF commands (including AFSC, AFLS and ATC), the Atomic Energy Commission, the Joint Chiefs of Staff, and various prime contractors, among others, were also deeply involved.⁴

MB-1 "GENIE" AND FACILITIES

(u) (S) While planning for, and fabrication of, the MB-1 air-to-air rocket (subsequently carried by the F-89J, F-101B, and F-106A) dated back to 1951-1955, it was 1957 before the MB-1 actually entered the air defense scene. Between times, prototypes of the rocket were fabricated and, beginning in late 1955, test fired without warheads at Holloman AFB, New Mexico. Starting on 8 March 1956, live ballistic tests fired from interceptors were conducted for the first time, again without warheads. Difficulties revealed with rocket motor performance and flight stability were shortly solved and corrected. Because of time limitations, the MB-1 development and production schedule was telescoped to coincide with conversion of F-89D's to the "J" configuration, so that some of both would be ready, together with necessary support facilities, by the 1 January 1957 target date. Consequently,

4. Ikle, op. cit., pp. iv-v, 10-21.

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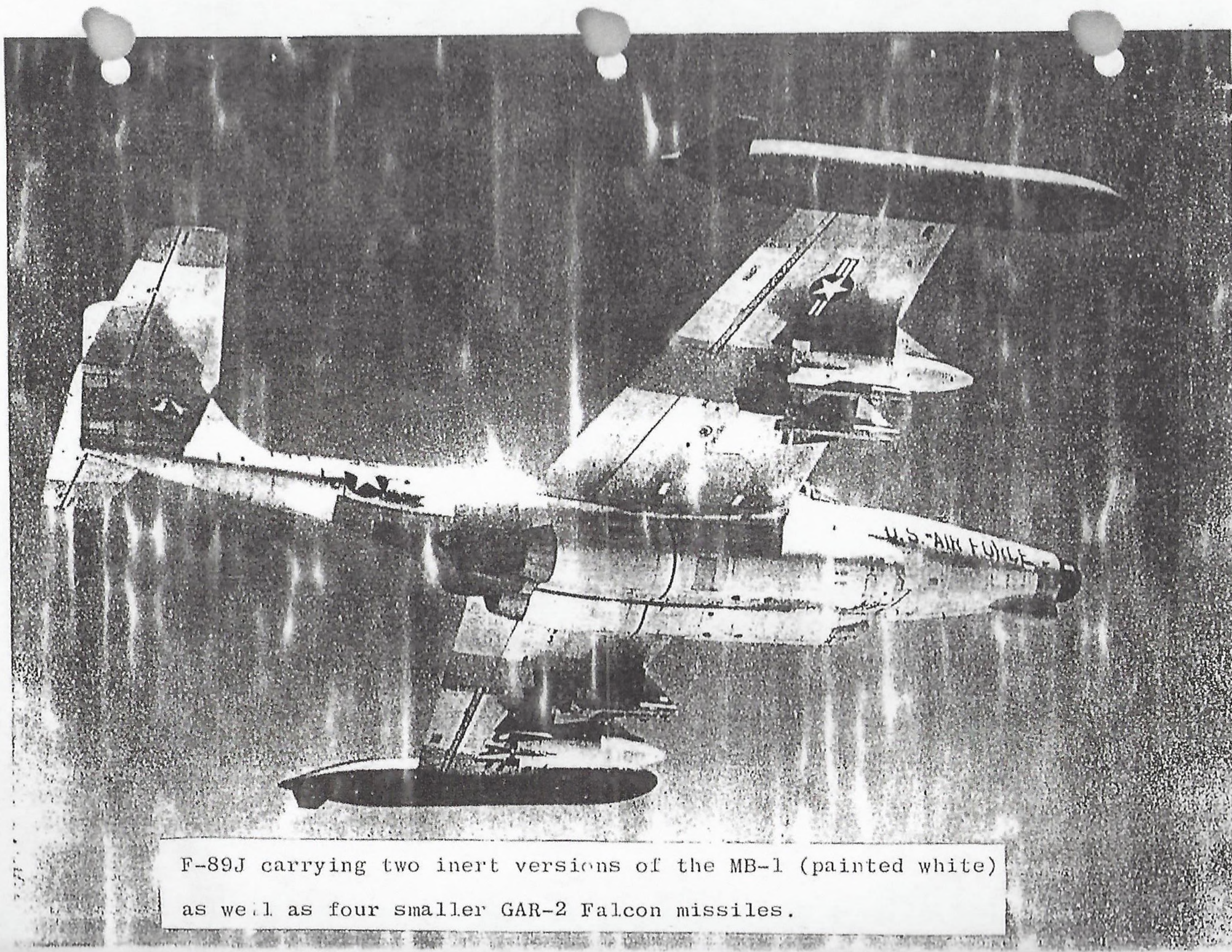
tests of the MB-1 were incomplete as of the end of
1956.⁵

(U) (S) By mid-1957, physical tests of the MB-1 were over. Nineteen more airborne MB-1's without warheads were aimed at QB-17 and QF-80 drones, only a few of which failed to burst. The total count amounted to 34 probable hits out of 37 attempts, resulting in a 92 per cent kill probability for the MB-1. No sooner were these accomplished when in July 1957, the one and only (as of mid-1963) MB-1 containing a nuclear warhead, launched by an F-89J, was detonated above the Nevada atomic testing area in Operation PLUMBOB, proving certain theoretical calculations of MB-1 performance. Elaborate plans were laid the following year for further tests of live MB-1's in late 1958, called Project OPERA HAT. But this time ADC was caught in the cross currents of international pressure to halt atomic testing -- manifested in part by the U.S. moratorium announced in November 1958 -- and the tests, accordingly, were cancelled.

5. Hist of ADC, Jul-Dec 1955, p. 105; Hist of ADC, Jan-Jun 1956, p. 56; Hist of ADC, Jul-Dec 1956, p. 107; Msg RDZPD-6-4-E, ARDC to ADC, 6 Jun 1956 [Doc 283 in Hist of ADC, Jan-Jun 1956]; Msg OOMWA-657, AMC to WRAMA, 22 Nov 1956 [Doc 133 in Hist of ADC, Jul-Dec 1956]; RESTRICTED DATA, ADC Historical Study No. 14, History of Air Defense Weapons 1946-1962, pp. 289-94.

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F-89J carrying two inert versions of the MB-1 (painted white) as well as four smaller GAR-2 Falcon missiles.

Virtually this same pattern repeated itself in late 1963 as ADC's hopes for tests of live MB-1's and GAR-11's in Project BLUE STRAW were doomed to frustration by restoration of the moratorium.⁶

(U) (S) As finally developed, the MB-1 pocketed a king-sized punch. Manufactured by the Douglas Aircraft Company, the MB-1 was a large, heavy weapon, as air-to-air rocket sizes go, weighing over 800 pounds and extending nine and one-half feet in length. At its widest girth, it measured nearly a foot and one-half in diameter. Therefore, by virtue of its dimensions alone, the MB-1 required special handling. A four-wheel trailer designated the MF-9 was especially designed and produced to cradle the "Genie" in storage and transport it to and from the alert area for use. The MF-9 trailer possessed a self-contained hydraulic lift so that loading crews could safely raise and lower the MB-1 for loading and unloading operations and minimize physical contact with the weapon. The MB-1 contained a solid propellant MD-1 rocket motor made by Aerojet General Corporation that propelled it about six miles at speeds approximating Mach 3; it could reach altitudes up to 75,000 feet.⁶

6. RESTRICTED DATA, Msg DCS, O-TR 0849C, APGC to USAF, 2 Jul 1957 [DOC 8]; RESTRICTED DATA, Msg ADPRQ-A 0072, ADC

The MK-25 sealed warhead of the MB-1 weighed about 219 pounds.

"b3"

A timer fuze ignited the HE imploding it symmetrically, compressing the plutonium to a point of detonation. The resulting "b3" explosion pulverized anything caught within one mile's radius of the blast. Although it received no guidance outside that provided by the interceptor's fire control system, the "kill area" of the MB-1 was so great as virtually to preclude a miss. It was estimated, as noted above, to have a kill rate of 92 per cent.⁷

[Cont'd] to Air Def Forces, 17 Jan 1958 [DOC 9]; Hist of ADC, Jul-Dec 1957, p. 107; RESTRICTED DATA, Hist of ADC, 1958, pp. 225-30; RESTRICTED DATA, ADC Historical Study No. 14, op. cit., pp. 293-94; RESTRICTED DATA, Msg ADLPW 2790, ADC to USAF 24 Jul 1963 [DOC 10].

7. Ikle, op. cit., pp. 2, 12-13, 21-37, passim; RESTRICTED DATA, Hq USAF Special Weapons Center, Safety Study of the MK-25/MB-1 Air-to-Air Rocket for the F-89J Application, SWVN-58-1, Jan 1958 [DOC 11]; ADCM 27-4, Program Control Plan F-89J, 15 Apr 1959, pp. 6-7 [DOC 12]; Hist of EADF, Jan-Jun 1957; p. 86, and Jan-Jun 1958, pp. 13-14; Hist of ADC, 1958, p. 225.

(u) (s) MMB-1. Almost from the day the MB-1 came off the drawing board, thought was given to equipping it with a radar proximity fuze to improve its reliability in an ECM environment. Originally proposed by ADC in 1955, the plan for an MB-1 proximity fuze dragged on several years before finally being approved. Not till October 1961 was a contract awarded to the Douglas Aircraft Company to develop a nose cone containing both a timer and a proximity fuze, with a view to perfecting the MMB-1 "Super Genie," as it was called, for operational use by 1963. Air Force Systems Command foresaw an increased kill probability for the MMB-1 since aircrews, prior to triggering their "Super Genies," would select the fuze best suited to their targets. The first MMB-1 prototype was readied for testing in February 1963; but a hitch occurred in the plans. Mounting costs for MMB-1 development, together with Defense Department cuts in USAF development funds, had placed the project squarely in competition with higher-priority projects for additional USAF funds. The upshot was that the MMB-1's downfall as a going project was precipitated. Notwithstanding ADC's strongest protests, further MMB-1 development was officially cancelled on 5 March 1963.

8. Hist of ADC, Jul-Dec 1957, pp. 107-08; Hist of ADC, Jul-Dec 1960, p. 246; Hist of ADC, Jan-Jun 1961, p. 207;

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(U) ~~(S)~~ Despite its powerful charge, the MB-1, like the GAR-11 and BOMARC warheads that came later, was a weapon "one-point" safe. Fissionable materials were sealed in a container that rendered contamination impossible as long as the container remained intact. Unless intentionally triggered (by deliberately performing a prescribed number of positive, independent actions in proper sequence to energize the fuzing and firing systems), neither the MB-1, the GAR-11, nor the BOMARC IM-99A/B could experience a full-scale nuclear explosion, according to expert opinion. Before the arming system inside the MB-1 could actuate the fuzing and firing mechanisms that ignited the warhead, the rocket had to be properly launched and travel a certain distance from the carrying interceptor. Furthermore, the

[Cont'd] ADC Historical Study No. 14, op. cit., pp. 294-95; FORMERLY RESTRICTED DATA, USAF, Current Status Report, Feb. 1963, p. 3-5 [HRF]; Msg ADODC 3183, ADC to USAF, 19 Nov 1962 [DOC 13]; NOFORN EX CANADA, Msg ADCCR 1950, ADC to USAF, 14 Sep 1961 [DOC 14]; Msg SCGV-27-9-27, AFSC to ADC, 27 Sep 1961 [DOC 15]; Msg ASZDGW-31-10-21, ASD to ADC, 31 Oct 1961 [DOC 16]; Msg AFSSA-AS-5 94723, USAF to AFSC, 22 Jan 1962 [DOC 17]; Msg ADCCR-1719, ADC to USAF, 22 Jun 1962 [DOC 18]; Msg ADCVC 1816, ADC to USAF, 9 Jul 1962 [DOC 19]; Msg ADOOP-WT 318, ADC to SAAMA, 31 Jan 1963 [DOC 20]; Msg ADCVC 299, ADC to USAF, 30 Jan 1963 [DOC 21]; Msg Douglas Acft Co to ASD, 14 Feb 1961 [DOC 22]; Msg ADCVC 538, ADC to USAF, 19 Feb 1963 [DOC 23]; Msg ADOOP-WT 627, ADC to ASD, 1 Mar 1963 [DOC 24].

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interceptors employed to carry the MB-1, and later the GAR-11, contained certain safety features, including separate launching circuits and "Arm/Save" and "Armament Selector" switches ordinarily kept safety-wired and sealed, calling for a deliberate conscious effort on the part of the aircraft commander to break the seals and re-adjust the switches before rendering the nuclear weapons launchable.

(U) ~~(S)~~ About the worst that might happen to the MB-1 or to any warhead "one-point" safe was for the High Explosive (HE) element of the triggering mechanism, because of fire or impact (resulting from a smashup or from being dropped in flight), to catch fire and burn, or explode. If the HE did explode, it would not result in a symmetrical implosion, which the fuzing and firing systems alone could generate; therefore a nuclear detonation would not ensue. Nevertheless, the sealed container was apt to rupture,

While the safeguards and techniques perfected to protect against accidental nuclear blasts of the MB-1 were reassuring, they were no reason for complacency. In addition to grave consequences issuing from an inadvertant

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explosion of the HE component or of the solid propellant contained in the rocket motor, there lingered the everlasting menace of an irrational person or a saboteur familiar with the working mechanism of the MB-1 purposely touching off a full-scale explosion. Furthermore, the possibility that an MB-1 or other atomic weapon might fully detonate if struck directly by lightning had never been altogether ruled out.

(U) ~~(S)~~ For the most part, however, the lightning issue was academic. Except when in the open while in transit or while deployed for loading operations, tactical MB-1's employed with alert aircraft were protected with cover afforded either by an alert hangar or by the interceptor fuselage (in later Century series models); while those in storage (where they spent most of their lifetime tucked safely away) were sheltered in specially constructed bins.

(U) ~~(S)~~ Indeed, getting MB-1 storage assembly and maintenance compounds authorized, sited, surveyed, funded, contracted

9. Ikle, op cit., pp. 2, 12-13, 21-37, 52, 98; RESTRICTED DATA, Hq USAF Special Weapons Center, Safety Study of the MK-25/MB-1 Air-to-Air Rocket for the F-89J Application, SWVN-58-1, Jan 1958 [DOC 11]; ADCM 27-4, Program Control Plan F-89J, 15 Apr 1959, pp. 6-7 [DOC 12]; Hist of EADF, Jan-Jun 1957, p. 86, and Jan-Jun 1958, pp. 13-14; Hist of ADC 1958, p. 225; ADCM 355-1, op. cit., 1 Jan 1962 [HRF].

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and erected. consumed much of the time spent by ADC on nuclear subjects from 1955 to 1957. No MB-1's could be delivered, according to a DOD policy, until facilities were completed to house and maintain them in the style prescribed. ADC siting teams visited a number of bases in early 1955; and mindful of security requirements and applicable explosive quantity distances, they selected prospective sites for MB-1 facilities at Oxnard, Hamilton, Paine, Truax, Bunker Hill, Youngstown, Dover, Otis, Presque Isle, Griffiss, Wurtsmith and K.I. Sawyer. Meanwhile, ADC originally asked USAF for \$10,000,000, raised later to \$18,000,000, to pay construction costs of the first round of MB-1 facilities. By the end of 1955, USAF approved a construction schedule for fiscal years 1956 and 1957, which was subsequently revised and expanded to conform to changing needs. In February 1956, the standards for storing and maintaining the MB-1 were codified and published in the MB-1 Weapon System Logistic Plan. The rush was on to arm a portion of the regular ADC interceptor force with nuclear rockets, with the 1 January 1957 target date imposed on ADC by USAF and the National Security Council kept uppermost in view.

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were sufficiently completed by year's end to allow several F-89J's based there to assume an alert posture armed with MB-1's as of 1 January 1957, thus meeting the NSC-assigned¹⁰ deadline.

Costing over \$1,000,000 per complex, the MB-1 storage, testing and security facilities erected at each base assigned the "Genie" was purposely set apart from other on-base components to localize whatever damage might originate therein, yet be near enough to interceptor loading aprons to allow expeditious loading in case of emergency. A typical MB-1 storage area, designed and constructed uniformly to serve an F-101B or F-106A squadron as well as the F-89J squadron first to employ the "Genie," occupied upwards of fifteen acres of ground and contained from three to five storage magazines plus an assembly and check-out building. If bunched closely together, the magazines and maintenance building were individually shielded by earthen barricades.

10. Msg ADMIS-2 3178, ADC to USAF, 28 May 1955 [DOC 25]; Rpt, ADMIS to DCS/M "Narrative Visit Report, Pre-Negotiation Conference for Selection of an Architect-Engineer to Design 'Ding Dong' Facilities," 8 Aug 1955 [DOC 26]; Msg 52766, USAF to ADC, 1 Dec 1955 [DOC 27]; Msg ADMAC-CD 0020, ADC to USAF, 24 Jul 1957 [DOC 28]; Msg ADMAC-CA 383, ADC to WADF, 26 Feb 1958 [DOC 29]; Hist of ADC, Jan-Jun 1956, p. 52.

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Each storage magazine, measuring 156 feet long by 35 feet wide, contained 30 cubicles or bins made of reinforced concrete and hung with steel doors, housing one MB-1 apiece cradled on an MF-9 trailer or a storage pallet. The self-contained assembly and check-out building was compartmentalized into an uncrating room, heating and air conditioning area, ready room, latrine, office and records area, maintenance and parts storage area, and an assembly and test area.

(U) (S) Pressure and electrical tests on the MK-25 warhead were among the tests performed in this building. Pressure tests were ordinarily administered every 30 days. Fearing that an inadvertant detonation might occur, electrical tests of the MK-25 were discontinued in late 1957 until the T-284 tester was modified or replaced. Eventually, the T-304A electrical tester became available and warhead electrical tests were resumed. Other components of the "Genie" were regularly checked every 60 days with warhead disconnected. including tests of the fuze section, igniter circuitry, and heater blanket circuitry.

(U) (S) To protect the "Genie" from detonation by saboteurs, the entire MB-1 ordnance compound was surrounded by a layer of seven-foot high, chain-link fencing extending about 1360

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feet long by 490 feet wide. Together with a security control building guarding the entranceway, the fencing figured prominently in barring access to all but authorized personnel. Alarm systems were installed to sound warning of unauthorized penetrations. As a further precautionary measure, qualified guards or armament technicians were detailed to accompany the weapons anytime they were removed from the storage compound. While loaded aboard interceptors assigned the alert duty, guards were posted nearby to protect the nuclear armament from unwanted intrusions.

(U) (S) While fulfillment of the MB-1 facilities program represented one of ADC's greatest obstacles to achieving an early nuclear capability, there were lesser ones besides.

11. ADCM 27-4, op. cit., 15 Apr 1959, pp. 8-11 [DOC 12]; RESTRICTED DATA, AFSWC, SWVN-58-1, op. cit., January 1958, pp. 14-16 [DOC 11]; ADCM 27-8, Program Control Plan, F-101B, 15 May 1958, pp. 9-12, 23 [HRF]; Ltr, USAF to All Major Cmds, "Explosive Safety Criteria Applicable to Rocket, Air-to-Air, Type MB-1," 17 Jun 1955 [Doc 221 in Hist of ADC, Jul-Dec 1955]; RESTRICTED DATA, Msg SWVWT 18-65-E, AFSWC to AMC, 15 Aug 1957 [DOC 30]; RESTRICTED DATA, Msg MC 7-16110-E, AMC to AFSWC, 16 Aug 1957 [DOC 31]; RESTRICTED DATA, Msg SWVWT 1-7-97-E, AFSWC to AMC, 21 Aug 1957 [DOC 32]; RESTRICTED DATA, Msg AFMME -AR 59614, USAF to AMC, 26 Aug 1957 [DOC 33].

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Like any weapons system being newly introduced, there were collateral needs for developing proper handling techniques and suitably configured tools and other equipment for MB-1 ground servicing crews -- sometimes by trial and error -- all of which took time to perfect. Work in this area began in 1955; as noted above, the MF-9 trailer was developed for use. Equipment and engineering evaluation tests were conducted in late 1956, months before ADC received the MB-1, during which time changes deemed essential to safety and efficiency were adopted. During the same year, an MB-1 dummy rocket was developed for purposes of exercising ground handling crews in the skills of practice assembly, check-out and loading procedures. A training version, also with inert warhead, was devised for aircrew practice launching.

(U) ~~(S)~~ Despite these advance preparations, however, standardized handling procedures were woefully lacking during the first months of ADC's nuclear air-defense career, requiring improvisation based on experience gained by ADC representatives the year before during the dry runs and experimental trials.

12. Hist of WADF, Jan-Jun 1957, pp. 97-98, Hist of WADF, Jul-Dec 1958, pp. 42-43.

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(U) (S) To ease the problem of standardizing procedures, ADC issued manuals, SOP's, regulations, checklists and other official literature directive in nature over a period of years, spelling out step by step, in considerable detail. the sequence and progression of activities involving nuclear armament. Armament crew assignments were carefully systematized and expounded and aggressive OJT programs were enforced. An energetic suggestion program was adopted that encouraged the development of improved techniques and features calculated to dispatch nuclear activities with further safety and alacrity. Engineering improvements were constantly sought that would further the integrity and inviolability of nuclear missiles as well as associated subsystems.¹³

(U) (S) F-89J/MB-1 Combination. The Northrop two-place F-89 model interceptor originally entered service with ADC in 1951; but it was 1957 before it was capable of carrying nuclear armament. Beginning in March 1956, during modification

13. Ikle, op. cit., pp. 13-21; ADCM 355-1, op. cit., 1 Jan 1962 [HRF]; ~~RESTRICTED DATA~~, AFM 122-1, op. cit., 15 Sep 1961 [HRF]; ADCR 52-1, Technical Training MB-1 Assembly and MB-1 and GAR Loading Training, 15 Jul 1962 [HRF]; ADCM 136-1, ADC Munitions Technical Manual Weapons Loading Management, 1 Nov 1962 [HRF].

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project "Bellboy," F-89D-style interceptors were converted to the F-89J configuration expressly to equip them for carrying two MB-1 "Genie" nuclear rockets attached to pylons suspended from either wing. The MG-12 fire control system was developed and installed for aiming and triggering the MB-1 at targets singled out by the radar. The first F-89J's were delivered to the Command in December 1956. On 1 January 1957, as noted above, F-89J's were standing alert equipped with the MB-1, nine at Hamilton Air Force Base, California, and six at Wurtsmith AFB, Michigan, marking the advent of nuclear arms in U.S. air defense. The F-89J/MB-1 combination comprised ADC's sole atomic weapons system until 1959, when F-101B, F-106A and BOMARC squadrons began phasing in. Each F-89J squadron deployed in the United States was assigned 112 MB-1's. Besides two MB-1's, the F-89J carried as secondary armament two GAR-2A's.¹⁴

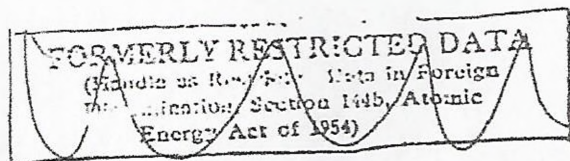
(u) (~~SECRET~~) During 1957, construction of MB-1 facilities was unable to keep abreast of expectations, as delays at Dover, Paine, Griffiss, Otis and Oxnard pushed scheduled completion

14. ADC Historical Study No. 14, Air Defense Weapons, 1946-1962, pp. 209-10, 293; ADCM 27-4, Program Control Plan F-89J, 15 Apr 1959, pp. 1-12 [DOC 12]; Hist of ADC, Jan-Jun 1957, pp. 129, 142; Hist of ADC, Jul-Dec 1956, p. 118.

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dates months behind. At mid-1957, the F-89J squadrons at Hamilton and Wurtsmith were still the only ones maintaining alerts armed with the MB-1, although ADC had fully intended that four others join them by this time. Foreseeing the trend of things and anxious to become more nuclear-capable without undue delay, ADC asked in early 1957 that waivers be granted to the edict requiring completed MB-1 facilities before "Genies" were delivered. ADC was convinced that existing facilities could be altered to provide suitable interim storage areas. But the DOD refused to budge from its original position. Steadfast to the last, however, ADC finally dissuaded DOD in late 1957, so that squadrons equipped with adequate interim storage facilities and pronounced ready to assume operations with the F-89J/MB-1, were assigned four MB-1's for standing alerts until permanent facilities were finished. Provision was also made to airlift more MB-1's to these squadrons when forewarned of an impending attack.

15. Msg ADOOP-O 0115, ADC to Air Def Forces, 25 Sep 1957 [Doc 248 in Hist of ADC, Jul-Dec 1958]; Hist of ADC, Jan-Jun 1956, p. 52; Hist of ADC, Jul-Dec 1956, p. 119; Hist of ADC, Jan-Jun 1957, pp. 129-30, 142-43; Hist of ADC, Jul-Dec 1957, pp. 72-73; Hist of WADF, Jan-Jun 1958, pp. 80-81; Hist of WADF, Jul-Dec 1958, pp. 42-43; Msg ADMAC-OD 00649, ADC to AMC, 1 Feb 1957 [Doc 217 in Hist of ADC, Jan-Jun 1957];



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(u) (p) Lt. General Joseph Atkinson, then Commander of ADC, stressed the urgency for F-89J units to become operationally ready with the MB-1. Obviously pleased with the magnitude of additional air defense capability offered by the F-89J/MB-1 combination, he informed the Air Defense Forces in September 1957:

The F-89J is the only MB-1 carrier in the current ADC inventory and must be considered equally important as the weapon. We are being equipped with these aircraft and weapons as rapidly as possible, commensurate with production, base facilities and training of personnel. It is my desire that commanders of all echelons take necessary actions to assure the most rapid and effective integration of this nuclear weapon system into our air defense complex. We must make every possible effort to ascertain that each F-89J we possess can be armed with MB-1 rockets and effectively utilized in the event of hostilities.

[Cont'd] Hist of ADC 1958, pp. 267-68; Hist of CADF, Jan-Jun 1958, pp. 50-52; Hist of EADF, Jan-Jun 1958, pp. 11, 63 (fn 26); Msg ADOOP-O 0185, ADC to Air Def Forces, 15 Nov 1957 [Doc 203 in Hist of ADC, Jul-Dec 1957]; Hist of CADF, Jul-Dec 1958, pp. 28-29; Msg ADMAC-CD 0020, ADC to USAF, 24 Jul 1957 [DOC 28]; Msg EAMAC-3 9979, EADF to ADC, 9 Aug 1957 [DOC 34]; Msg AFMSS-EA-1 59919, USAF to AMC, 4 Sep 1957 [DOC 35]; Msg EAMDM 1096, EADF to ADC, 9 Sep 1957 [DOC 36]; Msg AFMSS-EA-1 50156, USAF to AMC, 10 Sep 1957 [DOC 37]; Msg ADMAC-CA 0833, ADC to SAC, 23 Dec 1957 [DOC 38]; Msg MAC378, 32 AD to ADC, 22 Sep 1959 [DOC 39].

* Msg ADOOP-O 0115, ADC to Air Def Forces, 25 Sep 1957 [Doc 248 in Hist of ADC, Jul-Dec 1958].

By the end of 1957, five more F-89J squadrons were phased in together with allocated MB-1's, despite the fact that only three of them owned completed MB-1 storage compounds. At the height of their use in 1958, more than 260 F-89J's were on hand to equip eleven squadrons. Their useful service lifetime in the regular force lasted till the end of 1960. While most F-89J squadrons had become operational by 1959, it did not spell an end to construction of MB-1 storage compounds. Indeed, some 30 bases in all were slated for them because of Century interceptors to phase in by 1961, as a result of which construction work continued for the rest of the decade.

One of the eleven F-89J squadrons, the 59th FIS, was stationed at Goose Air Base, Labrador. The 59th FIS acquired its F-89J's in July 1957 with the expectation that the Canadian government would shortly permit the storage of

16. Hist of ADC, Jan-Jun 1957, pp. 129-30, 142-43; Hist of ADC, Jul-Dec 1957, pp. 95-96; Hist of WADF, Jan-Jun 1957, pp. 72-73; Hist of WADF, Jan-Jun 1958, pp. 80-81; Msg ADMAC-OD 00649, ADC to AMC, 1 Feb 1957 [Doc 217 in Hist of ADC, Jan-Jun 1957]; Hist of ADC, 1958, pp. 267-68; Hist of CADF, Jan-Jun 1958, pp. 50-52; Hist of EADF, Jan-Jun 1958, pp. 11, 63 (fn 26); Msg ADOOP-O 0185, ADC to Air Def Forces, 15 Nov 1957 [Doc 203 in Hist of ADC, Jul-Dec 1957]; Hist of CADF, Jul-Dec 1958, pp. 28-29; Msg ADMAC-CD 0020, ADC to USAF, 24 Jul 1957 [DOC 28]; Msg EAMAC-3 9979, EADF to ADC, 9 Aug 1957 [DOC 34]; Msg AFMSS-EA 1 59919,

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U.S. nuclear weapons on Canadian soil. So confident, indeed, was USAF that an agreement would soon be consummated that an MB-1 storage and maintenance complex was authorized, funded and constructed. But political undertones permeated the whole problem; the issue became controversial with one Canadian faction siding for and another against allowing the United States this privilege. Some Canadian leaders were willing to settle for jointly controlled storage rights. As the years rolled by without formal dispensation being granted by the Canadian Government, alternate plans were carefully weighed. After much soul-searching, a plan was adopted whereby the 64th Air Division would airlift MB-1's to the 59th FIS at Goose in times of emergency, which at best was clumsy and time-consuming. In July 1959, an ORI team, after observing a test of the plan, concluded that, given the most ideal of circumstances, at least six hours would be absorbed delivering MB-1's from the United States to the 59th FIS -- scarcely time enough to help repel early waves of

[Cont'd] USAF to AMC, 4 Sep 1957 [DOC 35]; Msg EAMDM 1096, EADF to ADC, 9 Sep 1957 [DOC 36]; Msg AFMSS-EA01 50156, USAF to AMC, 10 Sep 1957 [DOC 37]; Msg ADMAC-CA 0833, ADC to SAC, 23 Dec 1957 [DOC 38]; Msg MAC 378, 32 AD to ADC, 22 Sep 1959 [DOC 39].

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attacking bombers. However, the impetus to obtain atomic storage rights at Goose slowed down in 1960 when the 59th FIS exchanged its F-89J's for F-102A's that were equipped to carry conventional weapons only. But the issue cropped up anew when the F-102A's were modified to carry GAR-11 atomic armament in 1961, not only at Goose but at Thule, Greenland, where nuclear storage rights had yet to be granted by Denmark.

(b)(3) 42 USC § 2162 (Atomic Energy Act of 1954)

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As for Thule, a select number of tactical GAR-11's were housed at Seymour Johnson for airlift to Thule during an emergency.

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(u) (S) Meanwhile, as regards the F-89J fleet, tactical methods for delivering the MB-1 by F-89J, at first fluid, gradually shifted from the lead-collision course style, to that of the front quarter attack, adopted as dogma in 1958. To offset an altitude advantage enjoyed by oncoming bombers, the

17. Hist of ADC, 1958, pp. 193-95; Hist of ADC, Jul-Dec 1959, pp. 119-20; Hist of ADC, Jan-Jun 1960, pp. 93-94, [Doc 400 in Hist of ADC, Jan-Jun 1960]; Msg ADMAC-CA 1895, ADC to 59 FIS, 6 Aug 1959 [DOC 40]; ADC Historical Study No. 18, Interceptor Missiles and Space Weapons, 1962-63; Toronto Globe and Mail, 10 Oct 1963 [DOC 41]; Msg ADMDC 2903, ADC to CINCNORAD, 8 Aug 1963 [DOC 42].

* A broadside approach so the interceptor could take advantage of added time and larger target surface to achieve a lock-on with the interceptor fire control system.

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climbing and snap-up modes of frontal attack were regularly practiced. Escape maneuvers were also perfected, so that the pilot gained reasonable confidence that he could turn in time, following release of an MB-1, to avoid the dangerous¹⁸ aftereffects of the explosion.

(u) (b) Until permanent, fully certified doctrine governing F-89J/MB-1 activities could be firmly established, interim rules were drafted and circulated formulating policy with respect to these matters. Before alerts were first assumed with the MB-1 in early 1957, the JCS granted interim permission for use of the F-89J/MB-1 weapons system. By ordaining that live MB-1's could not be flown in tactical aircraft unless under conditions of Air Defense Readiness or higher states of alert, the JCS, in effect, removed the risk of an airborne MB-1 accident during peacetime resulting from an inadvertant rocket launching or jettisoning, or from the impact of an interceptor crash. In essence, the JCS ruling, except during emergencies, grounded the MB-1 inventory.

18. RESTRICTED DATA, Msg DCS/O-TR 0849C, APGC to USAF, 2 Jul 1957 [DOC 8]; Hist of ADC, Jul-Dec 1956, pp. 92-93; Hist of ADC, Jan-Jun 1957, pp. 123-24; Hist of ADC, Jul-Dec 1957, pp. 82-87; Hist of WADF, Jul-Dec 1957, pp. 79-81; Hist of ADC, 1958, p. 186; ADCM 55-5, 1 Mar 1958, p. 24 [Doc 348 in Hist of ADC, 1958].

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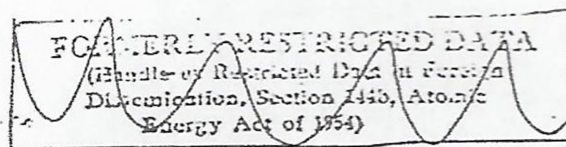
(u) ~~(S)~~ But ADC felt strongly that MB-1's should be flown in peacetime by the F-89J, both during day-to-day identification missions in case unknowns proved to be hostile, and during practice missions exercising wartime plans to reposition MB-1's in a dispersed posture; preferably before advanced states of alert were implemented. Pointing to a scientific

analysis which concluded that plutonium contamination caused by an accidental MB-1 detonation (as might result from the crash of a Genie-laden F-89J) could be adequately controlled, ADC asked in 1957 that the JCS edict be rescinded or eased. But ADC's efforts were in vain; the command was forced to bow to higher authority, which remained adamant to its ruling that MB-1's during peacetime remain earthbound until a substantial threat existed. For a brief time in late 1957, some thought was given to devising an alternate, safer MB-1 warhead, tentatively called "Fleegle." The "Fleegle" was to be produced exclusively so it could be carried on identification flights since it would contain an

warhead; but this proposal soon came to nought. In consequence of the JCS policy, no live MB-1's were flown for tactical purposes by the command for over five years, till late 1962, when dispersal operations implemented during the Cuban Crisis called for them to be flown

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from home base to various preselected bases by Century
 series aircraft.¹⁹ *Internal storage, only key*

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While this may have limited MB-1 use in the air solely to times of emergency, there were no similar restrictions at first to their use on the ground. They were employed both for practice drills and for active air defense alerts. On December 6, 1957, ADC levied an operational requirement for F-89J squadrons to load two live MB-1's on 18 F-89J's within one hour's time. Accordingly, three-fourths of each F-89J squadron would be readied to stop the worst of oncoming waves of enemy bombers. This directive was modified at mid-1958, however, after discovery that it was simply unachievable during off-duty periods at those squadrons lacking on-base housing (because of the necessity to recall MB-1 ground servicing teams from miles away), while it imposed morale-breaking hardships on those squadrons having on-base housing (by keeping MB-1 teams on call during their leisure time). *18 = 3/4 of 24*

19. Hist of WADF, Jul-Dec 1958, pp. 42-43, 78; Hist of ADC, Jul-Dec 1959, pp. 134-35; Msg ADORQ-A 0223, ADC to Air Def Forces, 20 Sep 1957 [DOC 43]; Msg ADOOP-O 0030, ADC to USAF, 24 Jan 1958 [DOC 44]; Hist of EADF, Jul-Dec 1958, p. 123; Hist of ADC, Jul-Dec 1957, pp. 108-09; Msg AFORQ-AD 50227, USAF to ADC, 12 Sep 1957 [Doc 250 in Hist of ADC, Jul-Dec 1957]; Msg ADORQ-A 0222, ADC to USAF, 25 Sep 1957 [Doc 251 in Hist of ADC, Jul-Dec 1957]; RESTRICTED DATA, Msg SWVWT 6 10-111-E, AFSWC to ARDC, 11 Oct 1957 [DOC 45]; ADC Historical Study No. 14, op. cit., pp. 208-10.

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Consequently, on 1 June 1958, ADC changed the requirement so that F-89J units were to maintain the capability of mass-loading MB-1's on all operationally ready interceptors (up to 18) in one hour during normal duty hours, and on a minimum of five interceptors in one hour during off-duty hours. Command and force level representatives from the office of Inspector General regularly and frequently conducted mass-loading exercises on the F-89J fleet to test and appraise its performance of this task. By diligent training, practice and close adherence to loading procedures painstakingly perfected for their guidance, ground handling crews demonstrated time and again their skillfulness and dexterity in handling MB-1's expeditiously and safely, enabling them to meet ADC's criteria for successful mass-loading. These exercises, together with another exercise simulating interceptor crashes involving nuclear armament, were ordinarily incorporated as part of a squadron tactical evaluation or operational readiness inspection.²⁰

(wi) (4) The alert requirement enjoined by CINCNOR^{AD} was tied to the JCS injunction prohibiting flight with the MB-1, for

20. Hist of EADF, Jan-Jun 1958, pp. 63-66; Hist of WADF, Jan-Jun 1958, pp. 82-83 and Jul-Dec 1958, p. 43; Msg ADOOP-O 0022, ADC to SAC, 20 Jan 1958 [DOC 46]; Hist of ADC, Jul-Dec 1957, pp. 85-86.

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reasons of safety, under air defense conditions less than Air Defense Readiness (i.e. during periods of Normal Preparedness or Increased Readiness). Since one of ADC's primary functions was identification of aerial targets sighted on radar, which, when of significant import but of unknown origin (and un-identifiable on the ground), entailed scrambling one or both of two interceptors maintained on five-minute alert to execute visual identifications, it meant that interceptors assigned this duty must, of necessity, not be armed with nuclear armament. On the other hand, unless some suitable air defense posture, aside from that provided by ADC's mass-loading requirement, was offered, the whole purpose of the F-89J/MB-1 weapons system would be subverted. The answer, a compromise at best, lay in a partial standby alert for emergency use. In addition to maintaining two interceptors on five-minute alert armed merely with conventional (non-atomic) GAR missiles (so they could fly identification missions during periods of Normal Preparedness and Increased Readiness), two other F-89J's loaded with live MB-1's stood a 30-minute alert in alert hangars at each squadron in the interest of exploiting the maximum weapons-potential in case of attack. *

* Actually, only one of the two F-89J's assigned 30-minute alert with two MB-1's had to have them loaded; the

Although certain refinements were introduced in November 1958 and later, substantially the same requirements obtained, with minor variations, for the rest of the useful lifetime of the F-89J/MB-1 in the regular interceptor force. 21

(u) (b) Insofar as mating the MB-1 rocket to the F-89J interceptor was concerned, the hookup was comparatively simple. Having ample room to operate in, F-89J loading crews were practically immune to the awkward handling, slipping and fumbling situations sometimes caused by cramped working conditions in loading the later Century interceptor models. Unlike successor Century series aircraft, which contained armament bays where MB-1's and GAR-11's, together with conventional GAR missiles, were crowded into the belly of a fuselage (after considerable exertion on the part of loading crews inching them into position from crouched postures), the F-89J was armed openly, with MB-1's connected about shoulder-level above the ground. Two MB-1's on MF-9 trailers

[Cont'd] other two MB-1's, if preferred, could be positioned on trailers in the alert hanger near their designated F-89J.

21. Hist of ADC, Jul-Dec 1957, pp. 84-85; CONAD/NORAD Hist Summaries, Jul-Dec 1957, p. 72, Jan-Jun 1958, pp. 79-81, and Jul-Dec 1958, pp. 109-13; Hist of EADF, Jul-Dec 1958, p. 123; Hist of CADF, Jan-Jun 1958, pp. 41-42, 53-54.

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were positioned under armament pylons suspended from either wing, then raised by the MF-9 lift and mounted on launcher rails affixed to the armament pylons. Umbilical cables were connected so the MB-1 might receive electronic guidance signals and necessary power from the F-89J. Explosive bolts fastened a portion of the launcher rail to the pylon, thus enabling pilots to jettison their MB-1 rockets during flight in case they were forced into a crash landing.²²

(u) (~~S~~) F-89J Incidents/Accidents (1957-1959). Partially as a result of this roomy access for mounting the MB-1 on F-89J armament rails, personnel errors by MB-1 loading crews were practically non-existent. For the most part, the handful of reported incidents involving the F-89J in combination with the MB-1 concerned technical malfunctions and defects, most of which involved inert dummy or training versions of the MB-1 (reported for analysis and correction because of the implication that like episodes might be repeated when live "Genies" were used under similar conditions). Such an incident occurred on 3 December 1957, then thrice again in

22. AFSWC, SWVN-58-1, op. cit., Jan 1958, pp. 10-11 [DOC 11]; Hist of EADF, Jan-Jun 1958, pp. 88-92 (pictorial sequence of MB-1/F-89J loading).

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1958 (13 and 15 March and 28 April), when MB-1 practice rockets fitted with dummy warheads dropped off their pylon racks as the F-89J's carrying them were landing. Each mishap resulted because a rocket shear bolt snapped which, though supposedly designed to endure stresses up to three "G's" strong, failed to withstand the considerably lesser stress of alighting. On 23 July 1959, a fourth shear bolt failed. Stronger ones were fabricated to replace them.

(U) (S) Meanwhile, starting in July 1958, another potentially dangerous situation developed when explosive jettison bolts (designed to free the F-89J of its nuclear load during in-flight emergencies) accidentally detonated, at several bases. MB-1 practice rounds were consequently released.

In one instance [at Ellsworth] (27 May 1959), a tactical MB-1 was involved, but the MF-9 trailer stationed beneath it kept the MB-1 from dropping to the ground. On at least five different occasions F-89J jettison bolts exploded accidentally during 1958-1959. In time, it was discovered that MB-1 rocket motor heater blankets were short-circuiting and

23. AFSWC, SWVN-58-1, op. cit., Jan 1958, pp. 2, 11 [DOC 11]; ADC, Office Chief of Safety, Project 10 Accident/Incident List 1956-1958, ca. 1960 [DOC 47]; ADC, Office Chief of Safety, Project 10A Accident/Incident List for 1959, 8 Dec 1960 [DOC 48].

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grounding out on the rocket motor case, causing the jettison bolts to fire. After the defective blankets were singled out and replaced, the hazard from this quarter ceased existing.
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MB-1 SAFETY RULES

(d) (S) But one substantial reason no large outbreak of accidents involving the MB-1 materialized early in their operational lifetime was the creation and enforcement of iron-clad MB-1 safety rules spelling out step by step, in painstaking detail, the processes for arming interceptors with the "Genie" and protecting them from all but authorized, deliberately actuated launches. As early as 1957, as noted above, interim safety rules had been approved by the JCS for application with the F-89J/MB-1 weapons system. By early 1958, the Air Force Special Weapons Center (Kirtland AFB, New Mexico) had thoroughly tested and, aside from certain

24. ADC Chief of Safety, Project 10 Accident/Incident List 1956-1958, ca. 1960 [DOC 47]; ADC, Office Chief of Safety Project 10A Accident/Incident List for 1959, 8 Dec 1960 [DOC 48]; Msg WVCT-6-6-E, AFSWC to OOAMA, 3 Jun 1959 [Doc 351 in Hist of ADC, Jan-Jun 1959]; Msg FSO 543, 54 FIS to ADC, 8 Jun 1959 [Doc 352 in Hist of ADC, Jan-Jun 1959]; Msg ADMME-CA 2497, ADC to Air Divs, 30 Oct 1959 [Doc 139 in Hist of ADC, Jul-Dec 1959]; Hist of ADC, Jan-Jun 1959, pp. 226-27 and Jul-Dec 1959 p. 133.

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recommendations, endorsed as sound the F-89J/MB-1 mechanics and safety techniques so long as arming procedures were scrupulously adhered to. Similar studies of the F-101B/MB-1 and F-106A/MB-1 conducted at the Center during 1958 confirmed the basic safety of these systems -- again providing that the procedures prescribed were strictly followed. Then in August 1959, the Secretary of Defense granted interim approval to MB-1 safety rules for the F-101B and F-106A as drawn up by Nuclear Weapons Systems Safety Group (NWSSG), whereupon ADC was permitted to load "Genies" on the "Voodoos" and "Delta Darts" phasing into the Command. The F-101B and F-106A started phasing in during 1959; the F-89J fleet, while phased out of the regular force by 1960, changed hands to the ANG.

(A) (b) Safety rules developed by the Nuclear Weapons Systems Safety Group (NWSSG) to govern MB-1/interceptor activities called for foolproof safeguards and controls for regulating

25. AFSWC, SWVN-58-1, op. cit., Jan 1958 [DOC 11]; Air Force Special Weapons Center, SWVN-58-11, Safety Study of Nuclear Weapon Suspension and Release systems of F-101B/MB-1 and F-106A/MB-1, June 1958 [DOC 49]; USAF, Nuclear Weapon System Safety Group, Final Study of the F-106A/MB-1 Weapon System, NWSSG 58-27, Dec 1958 [HRF]; USAF, Nuclear Weapon System Safety Group, Final Study of the F-101B/MB-1 Weapon System, NWSSG 58-25, Nov 1958 [HRF]; Hist of ADC, Jul-Dec 1959, pp. 134-35; Msg ADOOP-WM 12-H-14, ADC to Air Divs, 12 Aug 1959 [Doc 144 in Hist of ADC, Jul-Dec 1959]; Hist of CADF, Jan-Jun 1958, pp. 41-42.

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"Genie"-armed interceptors under every situation -- while parked on the ground, flying, and preparing to land. The business of balancing nuclear air defense readiness essential to protect North America, against safety devices to prevent damage from nuclear accidents, was a delicate one. When assigned ground alert duty, MB-1 armed interceptors, were prohibited from being moved under their own power. As soon as electrical in-flight ejection rack locks were installed on the F-101B and F-106A, they were kept locked, safetied and sealed; the trigger restraining pin of the F-89J was left inserted. Until the rack locks were installed, safety pins were required on the ejector racks. During interceptor loading and down-loading operations, rocket motor igniter safety pins were left inserted to rule out any chance of the rocket motor starting prematurely. Inside interceptor cockpits, the Armament Selector switch and Arm/Safe switch were safetied and sealed. During periods of air defense readiness or high states of alert (redefined in 1960 as

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Defense Condition (DEFCON) 1 or Air Defense Emergency, when

* In April 1960, NORAD reconstituted the categories of the alert into five progressive defense readiness conditions (DEFCON's) and the Air Defense Emergency, defined as follows: DEFCON 5, normal readiness; DEFCON 4, increased intelligence watch; DEFCON 3, above normal readiness; DEFCON 2, preparations for maximum readiness, if required; DEFCON 1, maximum readiness; Air Defense Emergency, readiness to implement all air defense agreements involving civilian and military agencies.

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MB-1 loaded interceptors at last became eligible for scrambling, procedures were carefully defined for controlling all contingencies of nuclear activity. Interceptor commanders were instructed to avoid flights over densely populated areas when possible, to break the seal on the Armament Selector Switches only after receiving confirmation that hostile aircraft were present, and when returning to base with an MB-1 still aboard, to "safety" this switch before landing (or in the case of the F-89J, reinsert the trigger restraining pin). Procedures for jettisoning nuclear rockets over predesignated water areas in case of in-flight emergencies were carefully spelled out. These and other rules were designed to maintain an effective, yet suitably safe posture requiring a deliberate, calculated effort on the part of the aircraft commander during times of emergency to launch his MB-1 armament, while precluding chances of an accidental launch on the ground or in the air. As F-106A and F-101B's obtained electrical in-flight ejection rack locks, certain restrictions were relaxed. On January 6, 1960, ADC was informed that the MB-1 safety rules as they applied to the F-89J, F-101B and F-106A, had been signed by President Eisenhower in late 1959. Refinements and changes were incorporated from time to time, but basically their

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character remained substantially the same. Rules similar to these were issued for the F-102A/GAR-11 system at mid-26 1961.

THE F-101B/F-106A -- MB-1

(u) ~~(S)~~ ~~(S)~~ The advent of MB-1-armed Century aircraft brought in train new griefs and headaches. In place of 11 squadrons made up from an inventory of about 260 F-89J's, the regular

26. RESTRICTED DATA, Msg AFCIS 75416, USAF to ADC, 3 Jan 1961 [DOC 50]; RESTRICTED DATA, Msg BLACK BEAR #19, ADMME-DE 104, ADC to Air Divs, et al, 17 Jan 1961 [DOC 51]; Msg BLACK BEAR #34, ADCSA-M 349, ADC to Air Divs, et al, 15 Feb 1961 [DOC 52]; Msg BLACK BEAR #35, ADCSA-M 350, ADC to Air Divs, et al, 15 Feb 1961 [DOC 53]; Msg ADOOP-WM 3402, ADC to USAF, 22 Dec 1960 [DOC 54]; Msg AFOOP-DE 78685, USAF to AFDCF, 19 Jan 1961 [DOC 55]; Msg AFCAV 98021, USAF to SAC, 30 Aug 1961 [DOC 56]; RESTRICTED DATA, Ltr, ADCL 122-5, ADC to Air Divs, et al, "Summary of Safety Rules for the Peacetime Operation of Nuclear Weapons -- F-101B, BLACK BEAR #23, 27 Jan 1961 [Doc 589 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Ltr, ADCL 122-6, ADC to Air Divs, et al, "Summary of Safety Rules for the Peacetime Operations of Nuclear Weapons -- F-106A, BLACK BEAR #24, 27 Jan 1961 [Doc 590 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Msg AFIIS 79334, USAF to CINCNORAD, 19 Jun 1961 [Doc 591 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Msg AFIIS 83928, USAF to AFINS (Kirtland), 7 Jul 1961 [Doc 592 in Hist of ADC, Jul-Dec 1961]; Hist of ADC, Jul-Dec 1959, pp. 134-36; Msg AFCFN-N 60833, USAF to ADC, 6 Jan 1960 [Doc 146 in Hist of ADC, Jul-Dec 1959]; Hist of ADC, Jan-Jun 1960, pp. 126-30; ADCM 136-1, ADC Munitions Technical Manual Weapons Loading Management, 1 Nov 1962 [HRF]; Hist of ADC, Jul-Dec 1961, p. 246; Hist of ADC, Jan-Jun 1959, pp. 228-29; Hist of WADF, Jan-Jun 1960, pp. 65-66; NORAD/CONAD Historical Summaries, Jul-Dec 1959, p. 58 and Jan-Jun 1960, pp. 38-39.

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force employing the MB-1 gradually grew to 17 squadrons of the F-101B and 14 of the F-106A drawn from an inventory approaching 400 "Voodoos" and 250 "Delta Darts" -- considerably more than twice the number as before. Accordingly, the quantity of MB-1's in use and the amount of activity involving them could not help but multiply. Each F-101B

squadron was authorized 148 MB-1's; each F-106A squadron, 107 of them. While storage, testing, and handling facilities and methods were generally the same, the loading and unloading chores considerably worsened. Unlike the F-89J which was armed openly at shoulder level (as described above), the F-101B and F-106A contained armament bays within the fuselage, about waist-high above the ground, calling for loading crews to squat and arm them from crouched positions in working space that, at best, was cramped. When nuclear fledged F-102A's later joined the inventory, they, too, exacted similar hardships from GAR-11 loading crews. ²⁷

27. Hist of ADC, Jul-Dec 1961, p. 175; Msg ADMAC-CA 383, ADC to WADF, 25 Feb 1958 [DOC 29].

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(a) (7) To illustrate this problem, F-101B loading crews originally faced considerable difficulty aligning the MF-9 trailer, together with its MB-1 load, beneath the proper rack destined to receive the "Genie." That the crews, often as not, were racing against the clock during mass-loading exercises did not serve to help matters, either. Their work-area vision thus obscured by the aircraft's close proximity to the ground, the crews later found it profitable to compensate by painting guidelines on certain portions of the aircraft for matching the position of the MF-9 trailer in proper relation to the ejector rack.²⁸

(a) (8) The F-101B carried for primary armament two MB-1 rockets mounted side by side on ejector racks attached to a hydraulically actuated rotary armament door. Two forward lugs and one aft lug on each MB-1 secured the weapon to hooks on the rack. As discussed later, this hookup system was to give rise to a number of problems. Electrical in-flight ejector rack locks were subsequently developed and, by 1962, applied to the F-101B, as well as to the F-100, as further surety that the MB-1 mounting lugs would not become detached prematurely and allow the MB-1 to fall. When

28. ADCM 136-1, op. cit., 1 Nov 1962, p. 63 [HRF].

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loaded with two MB-1's, the F-101B armament door was flipped so that the "Genies" were carried internally. Hence, before they were automatically launched by the MG-13 fire control system of the F-101B, the armament door was rotated 180 degrees to place them in proper firing position. Secondary armament for the F-101B was comprised of either two GAR-1D's or two GAR-2A's.

(u) (S) The F-106A could only deliver one MB-1 per flight, which was fastened to an ejector rack mounted in the center of the aft section of the F-106A armament bay. The F-106A's MA-1 aircraft and weapon control system automatically triggered the MB-1 at the critical moment. The F-106A secondary armament numbered four conventional GAR-3A/4A falcons.

(u) (S) Rocket Motor Problem. Introduction of the F-101B and F-106A raised again a rocket motor problem that had troubled the MB-1 long before. While the original military characteristics for MB-1 rocket power had called for a motor

29. ADCM 27-8, op. cit., 15 May 1958 [HRF]; AFSWC, SWVN 58-11, op. cit., Jun 1958, pp. 33-34 [DOC 49]; ADCM 136-1, op. cit., 1 Nov 1962, pp. 63-70 [HRF].

30. ADCM 136-1, op. cit., 1 Nov 1962, pp. 97-107 [HRF]; AFSWC, SWVN 58-11, op. cit., Jun 1958, pp. 63-64 [DOC 49]; ADCM 27-10, Program Control Plan F-106, 22 Jun 1960 [HRF].

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capable of operating from -65 degrees to +160 degrees Fahrenheit, the MD-1 Aerojet motor actually developed in 1955-56 only qualified for use between the temperatures of -20 degrees and +140 degrees. A heating blanket containing thermostatic controls was incorporated in the rear of the MB-1, therefore, to encircle the Aerojet motor and warm it in winter when connected to the heater circuitry of the F-89J. As long as the MB-1 was mated to the F-89J, cold weather would not bother it.

(u) ~~(S/FO)~~ But the story changed when the F-101B and F-106A entered the scene, because neither of them was equipped with heating circuitry for warming the MB-1 heater blanket during cold weather. It was not uncommon for temperatures to drop during mid-winter to the minus 40's and 50's, particularly at bases near the northern border like Glasgow, Grand Forks, Loring, Duluth and Dow. Experiments were therefore carried out to develop substitute rocket motors conditioned to withstand extreme temperatures considerably lower than the -20 degrees the Aerojet motor was good for. The Thiokol Corporation, by 1959, had developed one capable of operating down to -40 degrees, while Aerojet General designed another that test-fired on six occasions at -75 degrees. But for various reasons, neither of these two proved suitable and the

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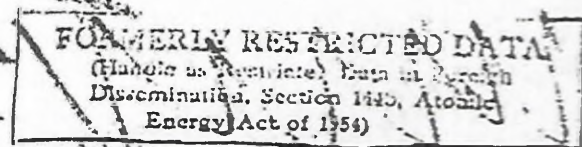
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development contract then in force was cancelled near the end of 1961. ADC, nevertheless, pressed the issue vigorously, stressing the importance of acquiring an MB-1 motor operable during extreme cold, preferably to -75 degrees. Meanwhile, the MC-1 and MD-1 portable blower heaters were successfully tested in 1960 so that in wintertime, they were wheeled out to MB-1 armed F-101B's and F-106A's standing alert, then positioned to funnel a stream of hot air into armament bays for purposes of warming the "Genies." 31

(u) (S) In 1961, OOAMA, after conducting tests on the Aerojet MD-1 motor still in use concluded that even the -20 degree capability of the MD-1 had been wrongfully optimistic, and that 0 degree Fahrenheit was about the lowest temperature that MD-1 propellant would fire. The positive low-operating limit was accordingly re-adjusted to zero degrees, necessitating surveys of storage bin temperatures during winter time conditions, and a modification to enable MB-1's to be

31. AFSWC, SWVN-58-1, op. cit., Jan 1958, p. 9
 [DOC 11]; Msg ADMME-DE 2307, ADC to AFSWC, 19 Oct 1961
 [DOC 57]; Msg SWVCT 27-10-74, AFSWC to ADC, 27 Oct 1961
 [DOC 58]; Msg ADMME-DE 2481, ADC to AFSWC, 7 Nov 1961
 [DOC 59]; Msg ADMME-DE 2633, ADC to AFSWC, 24 Nov 1961
 [DOC 60]; Msg SWVCT 8-12-9, AFSWC to ADC, 8 Dec 1961
 [DOC 61]; Msg ADMME-EB 2654, ADC to RCAF, 9 Jul 1963
 [DOC 62]; Hist of ADC, Jan-Jun 1959, p. 276; Hist of ADC, Jul-Dec 1960, pp. 246-47.

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kept warm enough while in storage. Where the surveys showed a need for storage area temperature control, step-down transformers were placed in MB-1 storage bins during the winter of 1961-62 to feed low voltages into the MB-1 heater blankets. Consequently, the "Genie" whether in storage or on an alert interceptor, was protected against the sub-zero temperatures that might render its rocket motor inert. In 1963, hope was restored that a replacement motor was in the offing as word filtered down that OOAMA had consummated a development contract for another MB-1 rocket motor.

(u) (S) Tactics were painstakingly worked out so the F-101B and F-106A interceptors followed the most advantageous approach to target for exploiting interceptor, FCS and MB-1 capabilities against hostile bombers. Beginning in 1959, the 4750th Test Squadron at Tyndall experimented with the various feasible attacks, codifying the results in ADCM 55-5.

32. Interview w/Maj E.A. Rogers, ADMME, 29 Oct 1963; Msg ADMME-DE 1177, ADC to OOAMA, 6 Jun 1961 [DOC 63]; Msg ADMME-DE 1433, ADC to OOAMA, 10 Jun 1961 [DOC 64]; FORMERLY RESTRICTED DATA, Msg ADMME-DE 2684, ADC to OOAMA, 30 Nov 1961 [DOC 65]; Msg ADMME-DE 2140, ADC to OOAMA, 3 Oct 1961 [DOC 66]; Msg ADMME-DE 2523, ADC to Air Divs, 9 Nov 1961 [DOC 67]; Msg ADMME-DE 2533, ADC to OOAMA, 13 Nov 1961 [DOC 68]; Msg ADMME-DE 2616, ADC to 25 AD, 22 Nov 1961 [DOC 69]; Msg ADMME-DE 13 ADC to Air Divs, 3 Jan 1962 [DOC 70]; Msg 30-MME-D S-296-62, 30 AD to ADC, 31 Jan 1962 [DOC 71].

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standard tactics manual. The preferred basic attack ultimately decided on called for an approach off the target's stern, unless the target possessed a speed or altitude advantage. Escape maneuvers were also perfected to allow F-101B and F-106A aircrews to evade the aftermath of the MB-1 nuclear explosion.

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(u) (S) As with the F-89J, the MB-1 figured prominently in F-101B/F-106A mass-loading requirements and in their alert commitments. Furthermore, in 1961, another issue -- that of dispersal involving more MB-1 activity -- was ushered into the air defense picture. Actually all three elements -- the mass-loading requirements, the alert posture, and dispersal -- were closely interrelated, with the latter two particularly depending on each other. They aimed to constitute the regular force into versatile weapons system capable of surviving early wave ICBM attacks, then cope with ensuing waves of hostile manned bombers. As regards mass-loading goals, ADC enjoined F-101B/F-106A interceptor units

33. Hist of ADC, Jan-Jun 1959, pp. 222-24; Hist of ADC, Jul-Dec 1959, p. 131; Hist of ADC, Jan-Jun 1960, pp. 130-32; Hist of ADC, Jul-Dec 1960, pp. 179-81; Hist of ADC, Jul-Dec 1961, pp. 274-77; ADCM 55-5, 1 Jan 1963 [HRF]; Msg ASNDSL-16-7-23, ASD to ADC, 16 Jul 1963 [DOC 72]; Msg ADOTT-D 2805, ADC to ASD, 26 Jul 1963 [DOC 73]; Msg ADOTT-D 2834, ADC to Air Divs, 29 Jul 1963 [DOC 74].

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to demonstrate, with little or no advance notice, a capability to arm all operationally ready aircraft (excepting those committed to an early alert) with primary and secondary armament within one hour during normal duty hours. At least one mass-loading training exercise per unit was to be conducted each month. By the same token, these same units were supposed to strive for a fifteen-minute turnaround capability resulting in five aircraft being simultaneously rearmed with MB-1 and secondary armament, refueled and otherwise reserviced for another mission within one quarter hour after "landing" following a previous mission. The goal of a 15-minute turnaround, long sought by both ADC and USAF, had lapsed into abeyance while the MB-1/F-106A and F-101B weapons combination were yet new and the loading crews handling the MB-1 inexperienced. In late 1960, it was reinstated as a goal to achieve so long as safety standards were not sacrificed in the process, which conceivably might lead to detonation of an MB-1 and disaster for the MB-1 armed unit. By 1962, turnaround crews were expected to have gained experience enough to accomplish the turnaround in 15-minutes time with only minor exceptions. In addition, each F-101B and F-106A squadron gradually worked up to achieve a limited mutual turnaround capability starting in

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1961, so that by 1962 each F-101B squadron was expected to be capable of reservicing and providing MB-1 armament for four F-106A's and vice versa, preferably within a half-hour's time. As of September 1963, this mutual turnaround requirement was reduced from four to two interceptors of the opposite number.

(u) (S) Meanwhile, beginning in 1961, at USAF's bidding ADC developed a dispersal plan calculated to save the interceptor force from annihilation by a sudden shower of first and second-wave enemy ICBM's. The dispersal concept was destined to manifest considerable impact on the conventional alert commitment, in the course of which activities involving the MB-1 and GAR-11 were drastically stepped up. Secondary dispersal bases were picked for most squadrons of the regular interceptor force, where one-third or more of a squadron's interceptors, armed with primary armament, could deploy when warned of an impending ICBM attack, presumably to escape

34. ADCR 55-9, Armament Loading Capability, 1 May 1962 [DOC 75]; Hist of ADC, Jan-Jun 1960, pp. 129-30; Hist of ADC, Jul-Dec 1960, pp. 204, 219; Hist of ADC, Jan-Jun 1961, pp. 176-77; Msg ADMME-DE1116, ADC to 25 AD, 24 Apr 1962 [DOC 76]; RESTRICTED DATA, BLACK BEAR #185, Msg ADOOP-WM 1308, ADC to Air Divs, et al, 10 May 1962 [DOC 77]; Msg ADOOP-WM 4004, ADC to Air Divs, 4 Sep 1963 [DOC 78].

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obliteration thereby. Eventually, dispersal bases were to house permanent contingents from parent squadrons on a rotational basis, and house sufficient nuclear and conventional armament to equip them for a series of missions.

(u) (S) Anticipating future nuclear storage needs at dispersal bases, ADC engineers designed a new type of multiple-cell magazine that was comparatively inexpensive in cost and, following a detonation test conducted in April 1963, proved promising for confining damage from explosive propagation to the cell of original detonation. The cells were made of an arch of metal resting on a concrete foundation, and were covered by a layer of earth two feet thick over their tops. Each cell was separated from the others by a minimum of 16.5 feet, with fill dirt sandwiched in between. Additional tests of the storage cells were scheduled for late 1963. Meanwhile, to further protect from explosive propagation the tactical MB-1's then in storage at home bases, sandbag barricades were ordered at ADC's direction in mid-1962 and, upon delivery, stacked inside the center cells of existing MB-1 storage magazines. At the same time ADC was experimenting with new MB-1 storage magazines for dispersal bases, the command was also casting around for authorization to lengthen the 30-day inspection interval for

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alert MB-1's at dispersal bases to 60 days, and to allow certain MB-1 inspections to be performed at dispersal sites. But as of mid-1963, ADC still awaited approval.

(u) (S) It was clear that the traditional alert commitment * could not possibly satisfy the demands of the dispersal concept. Obviously, serious readjustments were demanded to expand the size of interceptor alerts before one-third or more of a squadron's interceptors could disperse with only fifteen minutes advance notice. In February 1962, therefore, an increased alert posture was implemented. Interceptor squadrons of the regular force placed one-third of all possessed tactical aircraft on a 15-minute (or less) alert status, with two of them as before, standing five-minute alerts armed with non-nuclear secondary missiles, while all others in the alert contingent were armed with both primary and secondary armament. Because of the greater workloads and round-the-clock operations thrust on weapons loading crews to meet the demands of increased alert, thereby reducing the number

* The traditional alert called for two interceptors armed solely with secondary non-nuclear missiles standing 5-minute vigils and readied for scrambling on identification missions against unknown targets; two others armed with primary nuclear armament served on backup alert for emergency action against known hostiles once DEFCON 1 or an Air Defense Emergency was declared.

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of crews on hand at any one time, ADC doubled the time allowed them during mass-loading exercises, permitting them two hours, instead of one to equip all operationally ready interceptors with primary and secondary armament, excepting the two interceptors assigned the 5-minute, identification alert. "Genie"-armed interceptors were still prohibited from flying, however, unless either Defense Readiness Condition (DEFCON) 1 or an Air Defense Emergency was declared, according to regulations. While denied this privilege by regulation, actual dispersal of interceptors armed with MB-1's and GAR-11's was ordered by CINCONAD (upon receiving JCS authorization), and subsequently carried out during the Cuban crisis of October 1962, despite a DEFCON that never rose to the gravity of a DEFCON 1 situation calling for maximum readiness. * In all, 169 nuclear-armed interceptors from 28 squadrons (about one-fifth of the regular interceptor force) deployed to 16 dispersal bases -- the first time ADC interceptors were permitted to fly armed with atomic weapons. So that dispersed interceptors could stand alerts at dispersal bases where less space was available than stipulated by regulations, ADC granted interim waivers

* DEFCON 3 was the highest number reached during the Cuban crisis.

to quantity-distance criteria permitting nuclear-loaded interceptors to be bunched more closely together. During the period of the Cuban quarantine, lasting from 22 October to December 1962, the handling and loading of nuclear weapons multiplied many times more than usual. Some 2,200 X 5 = 11k nuclear weapons were loaded and subsequently unloaded; 707 nuclear weapons were transported by interceptors; 517 separate sorties, involving 350 flying hours, were flown by interceptors laden with nuclear rockets. Yet not a single serious accident occurred that involved an MB-1 or a GAR-11 -- a dramatic tribute to the efficacy of the nuclear safety program.

35. Hist of ADC, Jan-Jun 1961, pp. 174-76; Hist of ADC, Jul-Dec 1961, pp. 180-88; ADC Draft, "Remarks at Commanders Conference," 29 Nov 1962 [DOC 79]; ADCR 55-28, Control of Peacetime Operations with Nuclear Weapons, 14 Jun 1962 [DOC 80]; ADCR 55-32, Armament Loads for Fighter-Interceptor Aircraft, 9 May 1962 [DOC 81]; FORMERLY RESTRICTED DATA, Msg ADMME-EB 3425, ADC to AFCC (Ft Ritchie, Md), 11 Dec 1962 [DOC 82]; Msg ADCIO-H 3462, ADC to USAF, 14 Dec 1962 [DOC 83]; Msg 30-CVC 1202, 30 AD to ADC, 7 Dec 1962 [DOC 84]; Hist of WADF, Jan-Jun 1960, p. 66; ADC Historical Study No. 15, The Air Defense Command in the Cuban Crisis, October-December 1962; Msg ADMME-EC 174, ADC to Air Divs, 18 Jan 1963 [DOC 85]; ADC Munitions Bulletin, No. 63-2, 15 Feb 1963, p. 1 [DOC 86]; Msg ADMME-DE 116, ADC to 25 AD, 24 Apr 1962 [DOC 76]; RESTRICTED DATA, BLACK BEAR #185, Msg ADOOP-WM 1308, ADC to Air Divs, et al, 10 May 1962 [DOC 77]; RESTRICTED DATA, Msg ADMME-EC 474, ADC to OOAMA, 12 Feb 1963 [DOC 87]; RESTRICTED DATA, Msg ADMME-EC 550, ADC to OOAMA, 20 Feb 1963 [DOC 88]; Msg ADMME-EC 663, ADC to 32 AD, 6 Mar 1963

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(u) (S) The interceptor dispersal thus ordered and successfully implemented during the Cuban crisis focused attention again on several privileges ADC had been seeking which entailed loosening the safety rules a notch or two. It seemed only reasonable to ADC that "Genie" loaded interceptors on 15-minute alert should be given the right to taxi under their own power so their reaction capabilities to dispersal orders could be properly evaluated. In April 1963, ADC obtained authorization to taxi MB-1 armed alert aircraft providing suitable obstacles were situated to prevent unauthorized takeoffs. For various reasons, this was found impossible to fulfill at all bases, so at mid-1963 ADC was prepared to relinquish the taxiing concept as long as the right was retained to start the engines of these alert-duty interceptors. Perhaps more important was ADC's wish that F-101B's and F-106A's be permitted to flight-ferry their tactical MB-1's between home and dispersal bases, as directed by CONAD even during periods of normal readiness (DEFCON 5), for purposes of testing and implementing

[Cont'd] [DOC 89]; Msg ADMME-EB 847, ADC to OOAMA, 20 Mar 1963 [DOC 90]; FORMERLY RESTRICTED DATA, Msg ADMME-EC 1858, ADC to OOAMA, et al, 16 May 1963 [DOC 91]; Msg ADMME-EB 2030, ADC to 28 AD, 4 Jun 1963 [DOC 92]; ADC Munitions Bulletin, No. 63-4, 15 Apr 1963 [DOC 93].

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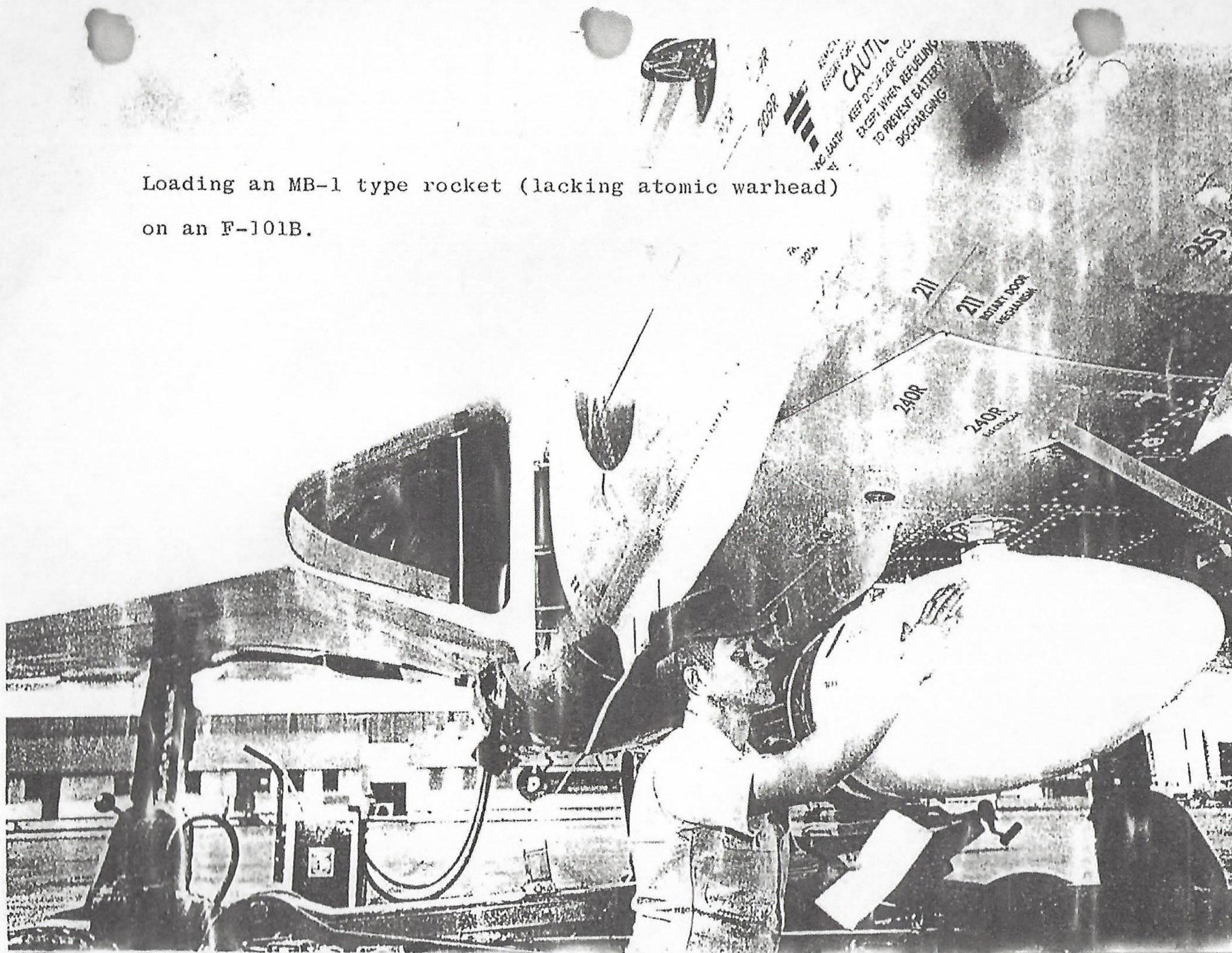
the requirements of dispersal. For safety's sake, the rocket motor igniter would be disconnected to preclude an unauthorized launching of an MB-1 being carried. Furthermore, ADC eagerly sought the right to scramble MB-1 armed interceptors for identification and dispersal missions, under the aegis of CONAD, at the DEFCON 3 instead of the DEFCON 1 level. As of mid-1963, however, ADC still awaited approval from higher authority.³⁶

(c) (S) Just how did the Command manage to operate with nuclear weapons so long without one major atomic accident? Seven years skipped by without a nuclear catastrophe -- that most decisive of all criteria for judging the success or failure of the program. One answer, of course, lay in the technological safeguards perfected for and incorporated in each weapon -- the self-contained "one-point safe" network inside each rocket together with finely-tooled paraphernalia placed in interceptors so that a certain sequence of positive actions was necessitated to launch and energize the weapons, as described above. But, more than this was required to keep down an accident rate that potentially

36. RESTRICTED DATA, AFR 122-36A and 35A, 29 Apr 1963; Interview w/Maj K.M. Kirchofer, 23 Oct 1963; Msg ADOOP-WM 1994, ADC to Air Divs, 29 May 1963 [DOC 93A]; Msg ADOOP-WM 2881, ADC to USAF, 6 Aug 1963 [DOC 94].

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Loading an MB-1 type rocket (lacking atomic warhead)
on an F-101B.



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could get out of hand by virtue of the multitude of weapons and crewmen, and their bustling activity. Admittedly, several incidents did occur, as described later herein, which in some cases may have come close to serious accidents. But, considering the size of the inventory and the operations, remarkably few resulted. The number of nuclear episodes striking of very real danger, contrary to expectations, surprisingly decreased as the quantity of nuclear weapons and the amount of their activity increased.

TIGHTENING NUCLEAR CONTROL

(u) (S) The safety and success of the nuclear armament program was traceable in large part to the groundwork laid for controlling the conduct of this activity, including application of the safety rules approved by USAF, DOD, JCS and the President. In preparation for integrating F-101B/F-106A-MB-1 weapons, IM-99A/B BOMARC missile units, and F-102A/GAR-11 squadrons, and in anticipation of the inevitable hike in nuclear activities that the introduction of these systems would generate, ADC established a Directorate of Missile/Nuclear Safety under the Chief of Safety in late 1958, not long after USAF had created the Nuclear Weapon System Safety Group (NWSSC) headquarters at Kirtland AFB, New Mexico.

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(u) (s) From that time on, control over nuclear matters was gradually strengthened and enlarged, both at headquarters ADC and in the field. In the spring of 1959, the "buddy system" (later redesignated the "two-man" concept) was ordered implemented at all tactical units employing nuclear armament, so that at least two qualified individuals would always be on hand when access to a nuclear warhead was required. This guaranteed that any mentally deranged persons or saboteurs who somehow gained access to a warhead would not be with it alone and unobserved. About this same time, MB-1 Assembly and Loading Teams were organized by Air Training Command to visit ADC tactical units for familiarizing them with MB-1 handling procedures. Mass-loading exercises were encouraged. Check lists and directives were published and disseminated regularly and frequently, and Base Nuclear Accident Response Teams were drilled. In the autumn of 1959, USAF focused anew on the importance of nuclear safety by making it a special subject for inspection. Tactical units employing nuclear weapons were subjected to rigorous, comprehensive inspections at least once every 18 months. Inspections were conducted by special teams representing the Inspectors General of either ADC or USAF. Tactical weapons were employed during mass-loading phases

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of the test. In late 1959 and 1960, a full-time, qualified missile/nuclear safety officer was authorized for each defense force, division and tactical unit using nuclear ordnance. In addition to monitoring compliance with ADC's safety directives, technical orders and check lists, these safety officers were expected to prepare training literature pertaining to missile/nuclear safety. Procedures were established for reporting accidents or incidents affecting
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nuclear armament.

(u) (S) But this was still not enough. Surveys and inspections conducted during 1960 revealed that information and directives pertaining to nuclear arms were not reaching all pertinent channels up and down the line, that weapons handling proficiency (for which F-89J squadrons had achieved

37. ADCR 122-1, "Missile/Nuclear Accident Prevention," 2 Jan 1961 [Doc 578 in Hist of ADC, Jul-Dec 1961]; AFR 122-1, "Responsibilities for Nuclear Safety Accident and Incident Prevention Programs," 15 May 1960; ADC Suppl 1 to AFR 58-4, "Responsibilities for Missile Accident Prevention Programs," 8 Feb 1961; Ltr, Chief of Safety ADC to Cmdr ADC, "Reorganization of the Chief of Safety," 9 Oct 1961 [Doc 579 in Hist of ADC, Jul-Dec 1961]; Ltr, ADC to WADF, "Guidance-Missile/Nuclear Safety Officers," 11 Jan 1960 [Doc 580 in Hist of ADC, Jul-Dec 1961]; Hist of ADC, Jan-Jun 1959, p. 224; ADCR 55-28, op. cit., 14 Jun 1962 [DOC 80]; AFM 122-1, op. cit., 15 Sep 1961, pp. 1-2 to 1-3 [HRF]; Hist of WADF, Jan-Jun 1959, pp. 51-52; Hist of WADF, Jan-Jun 1959, p. 79; Hist of WADF, Jul-Dec 1959, pp. 87-89; Hist of WADF, Jan-Jun 1960 pp. 59-60.

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a high and stable reputation), was wanting for Century model interceptor systems because of their newness, and that uniformity and standarization among units for accomplishing the storage, handling, maintenance and loading activities left much to be desired despite the existence of check lists, technical orders (T.O.'s) and directives spelling out each successive step in detail.

(u) (b) Several innovations were introduced, therefore, in late 1960-early 1961. For one thing, the "Black Bear" communications system was adopted to transmit instructions to pertinent units in the field. Until ADC could codify in regulations and manuals the policies and procedures regarding the storage, assembly, maintenance, handling, loading and safety of nuclear weapons, written communications discussing these subjects were designated "Black Bear" documents which were given preferential treatment assuring rapid, direct automatic distribution. Consequently, the time lag between the period when orders were issued and implemented was reduced to a fraction of what once had obtained. The "Black Bear" communications system had particular significance in the light of the command's nuclear safety policy, expounded by Lt General Robert M. Lee, ADC Commander, in 1961:

Safety is paramount in all activities involving

38. "Black Bear" Msg 65, n.d., but about May 1961

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nuclear weapons. The written instructions and procedures which govern these activities are designed to achieve absolute safety. Therefore, rigid, detailed compliance with these instructions and procedures is mandatory. Perfection is the only acceptable standard.

- (a) (S) To instill disciplined, unequivocal compliance to accepted, standardized methodology, a series of ADC technical manuals in the -136 series was formulated, published and accordingly delivered to proper units to serve as dogma on matters of nuclear activities. The field training program, thoughtfully composed to cover every facet of nuclear activity, was intensified. While a carefully prepared interceptor weapons launcher checkout program, requiring frequent periodic checks, was aggressively pursued. As a further guarantee that storage, maintenance, handling and loading operations were systematically standardized on a command-wide basis, a six-man "Bear Cat" Munitions Standardization Team was organized at ADC in December 1960 and began visiting field units in 1961. In the middle of 1961, the team was

[Cont'd] [DOC 95]; Col W. Comstock, Dep Dir of Maint., ADC, "Nuclear Safety in Air Defense Command," United States Air Force Nuclear Safety (published by Directorate of Nuclear Safety, Kirtland AFB, N.M.), Vol IX (Mar 1962), pp. 24-25, [DOC 96]; ADCR 11-5, "Black Bear" 15 May 1961 [Doc 581 in Hist of ADC, Jul-Dec 1961]; ADC HOI 11-20, "Black Bear," 15 May 1961 [Doc 582 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 2256, ADC to USAF, 14 Oct 1961 [Doc 583 in Hist of ADC, Jul-Dec 1961].

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assigned the added task of assuring standardized operations involving conventional weapons as well as nuclear weapons. The team, drawn from both DCS/Materiel and Chief of Safety, visited a number of Air National Guard squadrons as well as the squadrons of the regular interceptor force. In February 1962, the "Bear Cat" team was expanded into two ADC Command Assistance Teams (ADCAT), which persevered in making the rounds of tactical units for insuring the uniformity and systemization of the various weapons functions. Meanwhile, in mid-1961, the ADC Munitions Bulletin was inaugurated by the Maintenance Directorate to transmit, on a monthly basis, helpful advice, suggestions and informal information regarding nuclear armament to the tactical units. 39

(U) (S) Evidence of ADC's continuing close attention to matters of this kind was manifested with the creation, in May 1961, of a Missile/Nuclear Safety Council. The Council

39. Col Comstock, "Nuclear Safety in ADC," op.cit., Mar 1962, pp. 25-29 [DOC 96]; ADCR 136-3, "Munitions Standardization Team," 14 Jul 1961 [Doc 585 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Presentation to Missile/Nuclear Safety Council, ADMME, "Bear Cat Standardization Team," 4 Aug 1961 [Doc 586 in Hist of ADC, Jul-Dec 1961]; ADC Munitions Bulletin No.62-2, 15 Feb 1962 [DOC 97]; ADC, ADMME-E, "ADC Munitions Bulletin," 1 Jun 1961 [DOC 98]; ADCR 52-1, MB-1 Assembly and MB-1 and GAR Loading Training, 1 May 1961 [HRF]; ADCR 52-1 op.cit., 15 Jul 1962 [HRF]; ADCR.66-2, ADC Interceptor Weapons Trainer Checkout Program, 8 Aug 1962 [DOC 99].

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was headed by the Chief of Staff, ADC, and included the Chief of Safety, Chief of Weapons Systems Safety Division, Command Inspector General, Command Surgeon, Command Director of Information, and the Assistant Deputy Chiefs of Staff for Operations, Materiel and Personnel. The Council was charged with "assisting and expediting the solution to problems that have Missile/Nuclear Safety implications, and... [insuring] the safest operation in every phase of nuclear weapons...." As a result of the combined efforts of the Council, the Weapons Systems Safety Division and its accident/incident analysis program, the "Bear Cat" and "ADCAT" teams, the safety officers in the field, the USAF and ADC Inspectors General, plus the ADC Munitions Bulletin and the "Black Bear" communications system, a conspicuous reduction resulted from year to year in the accident/incident rate involving nuclear weapons in proportion to the increasing amount of activity. During calendar year 1962, for example, movements involving GAR-11 types were reported at 3,000, while those involving MB-1 types numbered 90,000! Despite the growing number of weapons integrated into the Command's resources, the one-third interceptor alert posture assumed in 1962, the dispersal with nuclear armament during the Cuban crisis, and the ANG alerts using MB-1 armed F-89J

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starting in late 1962 -- all of which added up to a formidable rise in accident exposure -- a decrease in incidents/
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 accidents occurred.

(U) (P) Lt General Herbert E. Thatcher, shortly after assuming command of ADC in August 1963, endorsed the following policy for application by the Command as regards responsibility for
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 nuclear safety:

Every command echelon in ADC is charged with the responsibility for nuclear safety. However, the primary and basic command responsibility rests squarely on the squadron commander. In turn, direct responsibility for supervision and for work performance rests squarely on every officer, non-commissioned officer and airman for their specific area of supervision and/or specific functional task.

The responsibility of the ADC commander is to insure that each individual clearly understands and discharges his responsibilities. This means that each individual who fails to do so, according to the standard cited herein, will be identified and specific corrective action will be taken in each case. It is expected that all personnel will fully discharge their responsibilities in achieving this goal.

40. ADC HOI 122-1, "Missile/Nuclear Safety Council," 25 May 1961 [Doc 587 in Hist of ADC, Jul-Dec 1961]; IOC, ADCSA-M to Member, Missile/Nuclear Safety Council, "Minutes of Missile Nuclear Safety Council Meeting," 10 Aug 1961 [Doc 588 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-EB 396, ADC to AFSWC, 6 Feb 1961 [DOC 100].

41. ADC Policy Directive, Air Defense Command Policy for Nuclear Safety, signed by Lt Gen Herbert Thatcher, ca. Sept 1963 [DOC 101].

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GAR-11/F-102A

(U) ~~(S/FOUO)~~ In the midst of all this activity emerged the F-102A/GAR-11 nuclear force. Beginning in November 1960, the F-102A fleet (in use since 1956) was subjected to the Figure 7/GAR-11 modification program so the F-102A, like the F-101B and F-106A, would also have a nuclear capability. Airframe changes (USAF No. 976) were incorporated in 1960-61, therefore, to rig the F-102A for carrying two GAR-11's, fastened to two ejector racks mounted in the fore and aft section of the F-102A armament bay. By the end of 1961, all but two of the F-102A squadrons had obtained the necessary changes. In all, about 200 F-102A's were involved. Each F-102A squadron (reduced from 11 to 9 in 1963) authorized GAR-11's was assigned 136 of the nuclear missiles. Not till October 1963 was the F-102A squadron based at

* An optional armament load for the F-102A called for one GAR-11 together with secondary armament of three GAR-2A's or three GAR-1D's. For a brief time in 1959-60, the GAR-11 was contemplated for use with the F-101B and F-106A in place of their MB-1 primary armament; but the idea was discarded, among other reasons, because of conversion costs involved. Another proposal to construct a different nuclear Falcon missile especially for the F-106A, identified as the GAR-3B, had been turned down in 1959.

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The 57th FIS flying F-102A's at Keflavik, transferred to ADC in 1962, was programmed for the GAR-11 modification in January 1964. Meantime, a conventional continuous rod H.E. warhead was developed, and in 1962 successfully tested, that would fit the missile -- designated GAR-11A. But ADC, as of mid-1963, had not stipulated a requirement for ordering this non-nuclear version.

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(u) ~~(S/AD)~~ The roots of GAR-11 development were traceable to a decision made in 1956 not to reconfigure the F-102A, then in production, so it could carry the MB-1, as previously proposed. A later decision to reduce the number of F-106A's to be produced forced a prolongation of the F-102A's effective life span in the tactical inventory, giving rise once more to thoughts of arming the F-102A fleet with nuclear ordnance. When General Curtis E. LeMay (then Vice Chief of Staff, USAF), in December 1957, expressed a desire to see the Falcon missile fitted with an atomic warhead, ADC needed no further

42. Hist of ADC, 1958, pp. 235-36; Hist of ADC, Jan-Jun 1959, pp. 280-83; Hist of ADC, Jul-Dec 1960, pp. 228-31; Hist of ADC, Jan-Jun 1961, pp. 202-05; Hist of ADC, Jul-Dec 1961, p. 212; RESTRICTED DATA, USAF, Current Status Report, Feb 1962, p. 3-4 [HRF]; FORMERLY RESTRICTED DATA, ADC to ADC Staff Agencies, "USAF Current Status Report - May 1962," 21 Jun 1962, p. 2 [HRF]; Msg ADMME-CA 0284, ADC to 29 AD, 15 Dec 1959 [DOC 102]; Msg ADLPG-IF 83, ADC LAMA, 11 Jan 1960 [DOC 103]; FORMERLY RESTRICTED DATA, Msg ADMME-DB 2826, ADC to USAF, 15 Dec 1961 [DOC 104]; NOFORN EX CANADA, Msg ADOOP-WM

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encouragement. Within months Hughes was awarded a development contract; by 13 May 1958, a prototype was ready for testing and the first unguided firing was conducted, followed nine days later (22 May) by the first guided firing of a GAR-11, as it came to be known. The JCS approved development of an atomic warhead for the missile the same month. In June the Office of the Secretary of Defense authorized the Atomic Energy Commission to undertake its development -- a task considerably simplified by the fact that the "63" nuclear warhead developed for the Army was found adaptable for use with the GAR-11. February 1960 was originally established as the target date for GAR-11 operational readiness; but unlike the MB-1, the GAR-11 was not destined to meet its deadline.

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Extensive testing of the GAR-11 began in the late summer of 1959. Category I testing (conducted primarily by

[Cont'd] 984, ADC to Air Divs, 11 Apr 1962 [DOC 105]; Msg ADMME-DB 1291, ADC to 25 AD, 9 May 1962 [DOC 106]; Msg ADOOA 2065, ADC to USAFE, 3 Aug 1962 [DOC 107]; Msg ASZDGW-28-11-41 ASD to AFSC, 28 Nov 1962 [DOC 108]; Msg ADMME-D 3543, ADC to 29 AD, 26 Dec 1962 [DOC 109]; Msg ADOOP-WM 1740, ADC to 26 AD, 3 May 1963 [DOC 110].

43. Hist of ADC, 1958, pp. 235-36; Hist of ADC, Jan-Jun 1956, p. 54; Hist of ADC, Jul-Dec 1956, p. 109; ADC Historical Study #14, op. cit., pp. 296-97; Hist of ADC, Jan-Jun 1959, pp. 279-81.

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the contractor) started eventfully when seven accurate GAR-11 hits were scored out of the first seven tries. Any missile passing within 185 feet of the target was considered a hit, because the GAR-11 contained a proximity fuze and would, in tactical use, carry a nuclear warhead. The eighth try, however, made on 10 August 1959, missed the target when the fuze was prematurely triggered. The next five test missiles, launched between 15 September 1959 and 1 March 1960, passed within lethal range of the target destruction. The 14th Category I launching, made on 20 April 1960, was unsuccessful when the missile failed to guide properly because of a faulty micro switch in the launch rail. The three subsequent tests -- 2, 9 and 20 May 1960 -- produced hits. A malfunctioning MG-10 fire control system caused failures on 10 and 27 June. Between 3 August and 6 December 1960 another 20 Category I GAR-11's were launched, 16 of which came within target's destruction radius. Of a total of 39 Category I missiles tested during the 16-month period ending 6 December 1960, 32 guided successfully and 44 31 of these were regarded as scoring hits.

44. Msg RDZSDG-30992-E, Dir Sys Mgt to ARDC, 28 Aug 1959 [Doc 406 in Hist of ADC, Jul-Dec 1960]; Msg RDZSDG-31129-E, Dir Sys Mgt to ARDC, 1 Oct 1959 [Doc 407 in Hist of ADC, Jul-Dec 1960]; Msg RDZSDG-31167-E, Dir Sys Mgt to ARDC, 19 Oct 1959 [Doc 408 in Hist of ADC, Jul-Dec 1960];

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(u) (S) In certain respects, ARDC Category II tests, which began in May 1960 and were conducted concurrently with Category I tests at Holloman Air Force Missile Development Center, achieved results similar to those of Category I. The first three Category II GAR-11's test-launched 25 May, 14 June and 22 June scored hits. The first Category II failure occurred 22 June when a test missile lost guidance after three seconds of flight and missed by 200 feet. By 29 August 1960, when Category II tests ended, 20 test missiles had been fired. Seventeen of these achieved

[Cont'd] Msg RDZSDG-31325-E, Dir Sys Mgt to ARDC, 3 Dec 1959 [Doc 409 in Hist of ADC, Jul-Dec 1960]; Msg RDZSDG-30286-E, WADD to ARDC, 11 Mar 1960 [Doc 410 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG 30471-E, WADD to ARDC, 22 Apr 1960 [Doc 411 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG-30515-E, WADD to ARDC, 6 May 1960 [Doc 412 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG-30560-E, WADD to ARDC, 17 May 1960 [Doc 413 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG-30601, WADD to ARDC, 27 May 1960 [Doc 414 in Hist of ADC, Jul-Dec 1960]; msg WWZDG-30751-E, WADD to ARDC, 30 Jun 1960 [Doc 415 in Hist of ADC, Jul-Dec 1960]; Msg WWADG 9-8-535, WADD to ARDC, 12 Aug 1960 [Doc 416 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG-4-18-8-586, WADD to ARDC, 18 Aug 1960 [Doc 417 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG-3-18-8-587, WADD to ARDC, 19 Aug 1960]; Msg WWZDGA-3-11-528, WADD to ARDC, 4 Nov 1960 [Doc 419 in Hist of ADC, Jul-Dec 1960]; Msg MCLDC-1789, ADC (MCLDC) to ADC, 6 Sep 1960 [Doc 420 in Hist of ADC, Jul-Dec 1960]; Msg WWZDGA-8-12-526, WADD to ARDC, 9 Dec 1960 [Doc 421 in Hist of ADC, Jul-Dec 1960]; ADC, ADLPG-I, Weekly Act Rept, 11 May 1960 [HRF].

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guidance and 16 scored hits. At least seven of the 16 successful Category II missiles were estimated to have come within ten feet of the target.

(U) (S) The fact that 80 per cent of all GAR-11's launched during Categories I and II had guided with lethal range of the target did not mean that all GAR-11 components had

45. Msg MDTFN 4-6-E, AFMDC to ADC, 16 Apr 1960 [Doc 422 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 4-16-E, AFMDC to ADC, 26 Apr 1960 [Doc 423 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 4-19-E, AFMDC to ADC, 2 May 1960 [Doc 424 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN-5-4-E, AFMDC to ADC, 10 May 1960 [Doc 425 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 5-12-E, AFMDC to ADC, 23 May 1960 [Doc 426 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 5-16-E, AFMDC to ADC, 27 May 1960 [Doc 427 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 6-3-E, AFMDC to ADC, 6 Jun 1960 [Doc 428 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 6-8-E, AFMDC to ADC, 11 Jun 1960 [Doc 429 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 6-14-E, AFMDC to ADC, 17 Jun 1960 [Doc 430 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 6-18-E, AFMDC to ADC, 21 Jun 1960 [Doc 431 in Hist of ADC, Jul-Dec 1960]; Msg MWEFN 2-23-E, AFMDC to ADC, 24 Jun 1960 [Doc 432 in Hist of ADC, Jul-Dec 1960]; Msg MDTBF 6-26-E, AFMDC to WADD, 1 Jul 1960 [Doc 433 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 7-2-E, AFMDC to ADC, 6 Jul 1960 [Doc 434 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 20-7-14-E, AFMDC to ADC, 22 Jul 1960 [Doc 435 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 28-7-21, AFMDC to ADC, 2 Aug 1960 [Doc 436 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 4-8-4, AFMDC to ADC, 4 Aug 1960 [Doc 437 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 10-8-11, AFMDC to ADC, 16 Aug 1960 [Doc 438 in Hist of ADC, Jul-Dec 1960]; Msg MDTFE 18-8-17, AFMDC to ADC, 18 Aug 1960 [Doc 439 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 25-8-25, AFMDC to ADC, 26 Aug 1960 [Doc 440 in Hist of ADC, Jul-Dec 1960]; Msg MDTFN 1-9-1, AFMDC to ADC, 3 Sep 1960 [Doc 441 in Hist of ADC, Jul-Dec 1960]; Msg WWZDGA 3-11-528, WADD to ARDC, 4 Nov 1960 [Doc 419 in Hist of ADC, Jul-Dec 1960]; ADC, ADLPG-I, Weekly Act Repts; 25 May, 28 Jul 1960 [HRF].

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functioned smoothly. Despite the fact that a fairly high amount of reliability was demonstrated, there were 21 proximity fuze malfunctions reported out of 36 firing as of the first week of September 1960. No fuze impulse at all was generated in two high-altitude (49,000 feet) shots, while the fuze was activated either early or late in the other 19 instances. These latter 19 failures were ascribed to random and spurious fuze pulses caused by over-sensitivity of the fuze, inability of the fuze to distinguish target returns from other radiation, and random radiation within the GAR-11 missiles themselves. The proximity fuze employed in Category I and II tests, a transistorized version of an earlier vacuum tube type, was susceptible to inadvertent triggering by pulses on the power supply line and the power output line. As a result of this proximity fuze trouble, the live-firing portion of the ADC Category III tests, originally scheduled for Tyndall between 6 September and 30 October 1960, were suspended in order to allow sufficient time for development of an adequate proximity fuze. Non-firing portions of the Category III tests were conducted between July and October 1960.

46. Msg ADOOP-T 2461, ADC to USAF, 1 Sep 1960 [Doc 442 in Hist of ADC, Jul-Dec 1960]; Msg MCLDC-1789, ADC

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(W) (S) Work on such a fuze commenced in early September 1960. By late October Hughes was becoming confident that the spurious fuze pulsing problem had been solved. Two fuzes, a "C" and a "D" model, were devised, the first to serve as an interim fuze until the second became available in June 1961. The "C" model was a fuze essentially isolated from the induced energies of the GAR-11. The "D" model incorporated "C" model improvements plus other circuits to increase reliability and improve countermeasures capabilities. By early December 1960, firing tests of both fuzes had commenced. By the end of January 1961, eight GAR-11's equipped with the new proximity fuzes were fired but the results were mixed. Five of the eight missiles were launched at high-altitude targets (50,000 to 60,000 feet), and the fuzes functioned as desired. The other three, aimed at low-altitude targets (3,000 to 5,000 feet), ended with unsuccessful fuzing.

[Cont'd] (MCLDC) to ADC, 6 Sep 1960 [Doc 420 in Hist of ADC, Jul-Dec 1960]; SECRET/NOFORN EX CANADA, Msg ADOOP-T 2559, ADC to USAF, 15 Sep 1960 [Doc 443 in Hist of ADC, Jul-Dec 1960]; Msg ADOOP-T 2584, ADC to USAF, 16 Sep 1960 [Doc 444 in Hist of ADC, Jul-Dec 1960]; Msg ADMME-DB 2781, ADC to 28 AD, 10 Oct 1960 [Doc 445 in Hist of ADC, Jul-Dec 1960]; Msg WWZDGA-9-11-535, WADD to ADC, 11 Nov 1960 [Doc 344 in Hist of ADC, Jul-Dec 1960]; ADC, ADLPG-I, Weekly Act Repts, 16 Sep and 7 Oct 1960 [HRF]; 73 AD Category III Test F-102/MG-10/GAR-11, Phases I, II and III [HRF].

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Random fuze pulses were detected in two of the three low-altitude shots. The "D" model fuzes went into production later in 1961.⁴⁶

(u) Even if the proximity fuze problem had not caused a delay of some six to eight months, operational GAR-11's would have been delayed this length of time from another cause. Delivery of nuclear warheads for GAR-11 missiles, scheduled to be furnished by the Atomic Energy Commission (AEC) in October 1960, was delayed till late 1961. Accidents, involving high explosives, at the Los Alamos Scientific Laboratory, necessitated changes in production facilities and safety procedures which halted production of certain components needed in development tests of the nuclear warhead. First it was believed that warheads for the GAR-11

46. Msg WWZDG 1-9-528, WADD to ADC, 1 Sep 1960 [Doc 446 in Hist of ADC, Jul-Dec 1960]; Msg SWVSE 29-9-49, AFSWC to WADD, 30 Sep 1960 [Doc 447 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG 19-10-526, WADD to ARDC, 13 Oct 1960 [Doc 448 in Hist of ADC, Jul-Dec 1960]; Msg WWZDGA 9-11-535, WADD to ADC, 11 Nov 1960 [Doc 344 in Hist of ADC, Jul-Dec 1960]; Msg LMDC 443, AMCASC to AFPR Hughes, 26 Oct 1960 [Doc 449 in Hist of ADC, Jul-Dec 1960]; Msg AFOOP-DE 67100, USAF to USAFE, 6 Dec 1960 [Doc 345 in Hist of ADC, Jul-Dec 1960]; Msg WWZDGA-1-2-526, WADD to ARDC, 2 Feb 1961 [Doc 550 in Hist of ADC, Jan-Jun 1961]; Msg WWZDGA 8-12-526M, WADD to ARDC, 9 Dec 1960 [Doc 421 in Hist of ADC, Jul-Dec 1960]; Msg LMDC 497, AMC to USAF, 20 Dec 1960 [Doc 346 in Hist of ADC, Jul-Dec 1960]; ADC, ADLPG-I, Weekly Act Rept, 7 Oct 1960 [HRF]; Msg ADMME-DB 1907, ADC to AFLC, 11 Sep 1961 [DOC 111].

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could be made available in February 1961. Then in late 1960 it was discovered that the neutron flux was lower in density than was required for the desired yield. This called for a redesign of the high explosive envelope and created additional delays.⁴⁷ The firing phase portion of the GAR-11 Category III tests (conducted by ADC at Tyndall) had been purposely delayed, first (as noted above) until another proximity fuze was fabricated, and second, until the AEC's reconfigured warhead underwent its operational suitability test. After the latter was accomplished in December 1961, other things combined to push back the live-firing phase of the Category III testing period, including shortages of adequate target drones, test missiles and testing time on the Eglin Gulf Range. Finally, Category III live-firing tests were held from May to July 1962. Twenty-five GAR-11 missiles, lacking atomic warheads, were launched against QF-80 and QB-47 drone targets at altitudes ranging

47. Msg SWVST 1-41-E, AFSWC to ADC, 23 Jan 1960 [Doc 450 in Hist of ADC, Jul-Dec 1960]; Msg WWZDG 30457-E, WADD to AFPR Hughes, 20 Apr 1960 [Doc 451 in Hist of ADC, Jul-Dec 1960]; SECRET/RESTRICTED DATA, Msg ADLSW 11-1-E, ADC (Kirtland Res Rep) to ADC, 2 Nov 1960 [Doc 452 in Hist of ADC, Jul-Dec 1960]; Msg LMDC 497, AMC to USAF, 20 Dec 1960 [Doc 346 in Hist of ADC, Jul-Dec 1960]; ADC, ADLPG-I, Weekly Act Rept, 7 Oct 1960 [HRF].

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from 2,000 to 35,000 feet. Of 20 missiles providing valid guidance tests, 19 coming within an average distance of 29.8 feet of the target were successful, with 74 feet being the farthest and two direct hits, the closest. Only one failure also resulted from evaluations of the Safety and Arming Unit (incorporated in the GAR-11 as a nuclear safety device to prevent warhead detonation before the missile had been spirited a safe distance from the F-102A launching it). But the FM-CW radar proximity fuze supposed to trigger a signal to the warhead when within approximately 185 feet of the target, despite the reworking it had undergone by Hughes, failed about half the time.

(U) (S) Meanwhile, GAR-11's equipped with warheads had been released for tactical use with the F-102A fleet, beginning in 1961, because of ADC's need to increase its arsenal of atomic weapons. With the prospect that only half of them, if launched against hostile targets, might detonate because of defective fuzing mechanisms, ADC hastened tests of specially modified fuzes in early 1963 in hopes that a retrofit program could get under way in late 1963 for replacing unreliable fuzes with good ones.

48. 73 AD, Final Rpt Category III F-102/MG-10/GAR-11 Phase IV tests, 21 Sep 1962 [HRF]; Msg ADOOP-P 1874, ADC to

While the Hughes GAR-11 was a shorter and less powerful air-to-air weapon than the MB-1, its nuclear destructive capability was by no means small. Containing a semi-active radar homing mechanism, the GAR-11 could lock on and pursue its target once automatically launched by the F-102A/MG-10 fire control system, making it a rocket to reckon with during any air defense battle. It weighed about 250 pounds, measured 85 inches long by 11.4 inches in diameter at its widest point. The Thiokol solid propellant rocket motor that powered the GAR-11 provided 12,900 pound-seconds of thrust, enabling the GAR-11 to reach altitudes up to 60,000 feet and travel several miles distance.

The MK-54 nuclear warhead of the GAR-11, together with its HE primer, weighed 50 pounds. Its explosive power ranged "b3" giving it a lethal

[Cont'd] 73 AD, et al, 16 Jul 1962 [DOC 112]; Msg ADOOP-P 1935, ADC to ASD, 19 Jul 1962 [DOC 113]; Msg ADMME-DB 1029, ADC to SAAMA, 4 Apr 1963 [DOC 114]; Msg ADOOP-WT 1737, ADC to USAFE, 3 May 1963 [DOC 115]; FORMERLY RESTRICTED DATA, Msg ADMME-D 2021, ADC to Dir Spec Wpns, 3 Jun 1963 [DOC 116]; FORMERLY RESTRICTED DATA, Msg ADMME-DB 2601, ADC to Dir Spec Wpns, 3 Jul 1963 [DOC 117]; ADC Munitions Bulletin, No. 63-3, 15 Mar 1963, p. 5 [DOC 118]; Hist of ADC, Jan-Jun 1961, pp. 205-07; ADC Historical Study No. 14, op. cit., pp. 298-300.

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range calculated at 200 to 400 feet against a Bison-type bomber. Because of the accuracy of the missile and explosive power of its warhead, the GAR-11 probability of kill was rated at 90 per cent. The warhead was a self-contained, sealed unit "one-point" safe measuring 10.7 inches in diameter, 15 inches in length, and about 50 pounds in weight.

Certain facilities for the GAR-11 were not unlike those employed for the MB-1. The GAR-11 "Falcon," for example, was stored in the same type magazine, only with

1 MB-1
for
Magazine

"63" instead of merely one as in the case of the MB-1. One storage magazine composed of "63" was capable of housing all GAR-11 missiles assigned an F-102A squadron. For ground handling and loading operations, the GAR-11 was carried on a modified MF-9 trailer -- the same as used with the MB-1 but adapted to GAR-11 needs.

49. 73 AD Rpt, "Category III Test F-102/MG-10/GAR-11," ADC/73AD/59-8, 15 Nov 1960, p. 6 [HRF]; 73 AD Rpt, "Final Report Category III F-102/MG-10/GAR-11," ADC/73AD/59-8, Rpt No. 2, Phase IV, 21 Sep 1962, pp. 2-3 [HRF]; Msg ADMDC 428, ADC to CADF, 31 Dec 1959 [DOC 119]; ADCM 136-1, op. cit., 1 Nov 1962 [HRF]; ADCM 27-5, Program Control Plan F-102 (GAR-11), 15 May 1959 [DOC 120]; ADCM 65-2, Atch 4, GAR-11 Logistic Support Concept, 1 Nov 1960 [DOC 121]; Msg ADMDC 0428, ADC to CADF, 31 Dec 1959 [DOC 122]; Interceptor Weapons Newsletter (73 Air Div), Vol 3, 1960, p. 35.

(U) (S) During checkout functions, the GAR-11 was subjected to a number of tests on a missile checkout console, including those of the angle tracking, range tracking, steering, internal power, fuzing and relock components. In 1961, a controversy arose over GAR-11 console checkout procedures. The Air Force Special Weapons Center (AFSWC) contended that the MK-54 warhead should be detached from each GAR-11 before the missile underwent console checkout -- contrary to prescribed methods allowing the marriage of warhead to missile during checkout. AFSWC argued that until a complete interlock modification embracing all console circuitry could be fabricated and incorporated in the console, separation of warhead from missile was essential during the checkout phase to prevent unwanted and potentially dangerous console electrical charges from reaching the warhead. An interlock console modification would serve as a positive check against this possibility, because it would require disconnecting the arming and fuzing cable from the warhead connector before console power could be admitted to any portion of the GAR-11. The Aeronautical Systems Division (ASD) reviewed this matter from a technical standpoint and tentatively deduced that a major and costly modification was in the offing if this interlock system was required.

Furthermore, ASD estimated that GAR-11 checkout time would be doubled (from 15 to 30 minutes) if the warhead was removed, then reinstalled, for the checkout process. ASD, nevertheless, agreed that warhead separation was desirable during checkout until a foolproof solution was devised.

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(U) (S) ADC was quick to contest this viewpoint, reminding ASD that the existing console protected the warhead so long as proper checkout procedures were followed and the warhead arming and fuzing unit was disconnected before any current was applied to the missile. ADC complained, moreover, that doubling the checkout time to 30 minutes would mean that only half of the needed quantity of GAR-11's could be processed for use, unless the number of technicians assigned to each squadron was increased. Besides, detaching the GAR-11 warhead for each console check would raise another nuclear safety problem -- that of excessive handling of atomic ordnance -- since the frequency of warhead handling would increase considerably. Despite ADC's arguments, Middletown Air Materiel Area (MAAMA), on 31 August 1961,

50. ADCR 52-14, "Technical Training GAR-11 "Technical Training GAR-11 Maintenance, Storage and Loading," 1 May 1961 [HRF]; RESTRICTED DATA, Msg ADLSW 28-7-3, ADC Rep, AFSWC (Kirtland) to ADC, 31 Jul 1961 [Doc 595 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Msg AFSWC 2-7-02, ASD to AFSC, 3 Aug 1961 [Doc 596 in Hist of ADC, Jul-Dec 1961].

ordered F-102A/GAR-11 squadron to remove warheads for GAR-11 checkouts until a console modification was effected. The order, however, was applicable only a brief time. The Nuclear Weapons Systems Safety Group met two weeks later and declared that the GAR-11 could safely undergo console testing with warhead attached, providing that established procedures were followed. MAAMA's order, therefore, was rescinded. GAR-11 technicians were cautioned to follow procedures that would make sure the warhead cable was the first cable connected to the test console and the last cable removed.

(U) (S) Safety rules similar to those approved earlier for MB-1 carrying interceptors were authorized at mid-1961 for the F-102A/GAR-11 combination. Following the inadvertent release of a missile by an F-101B during the summer of 1961,

51. RESTRICTED DATA, Msg ADCSA-M 1700, ADC to ASD, 14 Aug 1961 [Doc 597 in Hist of ADC, Jul-Dec 1961]; Msg MANBS-8, MAAMA to 5040 Consol Acft Maint Sq, 31 Aug 1961 [Doc 598 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Msg AFIDF-A-3-09-03-E, Dep IG for Safety, USAF to ADC, 6 Sep 1961 [Doc 599 in Hist of ADC, Jul-Dec 1961]; RESTRICTED DATA, Msg AFIDF-A-3-09-8-E, Dep IG for Safety, USAF to ADC, 14 Sep 1961 [Doc 600 in Hist of ADC, Jul-Dec 1961]; Msg ASZDGW 20-9-4, ASD to MAAMA, 21 Sep 1961 [Doc 601 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-DB 2020 Black Bear 117, ADC to Air Divs, 21 Sep 1961 [Doc 602 in Hist of ADC, Jul-Dec 1961]; Msg MANBS 1070, MAAMA to ADC, 25 Sep 1961 [Doc 603 in Hist of ADC, Jul-Dec 1961].

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ADC re-evaluated the operating procedures pertaining to the F-101B/F-106A/MB-1 and F-102A/GAR-11 systems, and subsequently reaffirmed their validity.

(U) (S) In at least one respect, however, the F-102A/GAR-11 rules, by early 1963, were one step ahead of the MB-1 rules. The F-102A was privileged to ferry the tactical GAR-11 (with rocket motor igniter disconnected to preclude an inadvertent launch) if directed by CINCNORAD/CINCONAD. This was the same right ADC was seeking at this time for the MB-1 systems. The mass-loading, turnaround, alert commitment and dispersal requirements were practically the same as those for the F-101B/F-106A/MB-1 systems.

52. RESTRICTED DATA, Msg ADOOP-WM 2718, ADC to USAF, 6 Dec 1961 [DOC 123]; ADCM 136-1, op. cit., 1 Nov 1962 [HRF]; ADCR 55-9, op. cit., 1 May 1962 [DOC 75]; ADCR 55-32, op. cit., 9 May 1962 [DOC 81]; RESTRICTED DATA, Msg AFIIIS 83928, USAF to AFINS (Kirtland), 7 Jul 1961 [Doc 592 in Hist of ADC, Jul-Dec 1961]; Hist of ADC, Jan-Jun 1961, pp. 127-29; Msg ADCSA-M 1854, ADC to Dep IG for Safety, USAF (Norton), 1 Sep, 1961 [Doc 593 in Hist of ADC, Jul-Dec 1961]; Msg ADCSA-W 2015, ADC to Dep IG for Safety, USAF, 21 Sep 1961 [Doc 594 in Hist of ADC, Jul-Dec 1961]; Msg ADCSA-M 1847, ADC to Dir Nuclear Safety Research (Kirtland), 1 Sep 1961 [DOC 124]; Msg AFINS-1-9-18-61-E, Dir Nuclear Safety Research to ADC, 7 Sep 1961 [DOC 125]; Msg ADCSA-W 2081, ADC to AFSWC, 27 Sep 1961 [DOC 126]; Msg SWVCT 12-9-11, AFSWC to ADC, 13 Sep 1961 [DOC 127]; BLACK BEAR 63-25, Msg ADOOP-WM 947, ADC to Air Divs, 28 Mar 1963 [DOC 128]; FORMERLY RESTRICTED DATA, Msg ADMME-EB 991, ADC to 28 AD, 2 Apr 1963 [DOC 129]; Msg ADOOP 1597, ADC to Air Divs, 19 Apr 1963 [DOC 130]; Msg ADOOP-WM BLACK BEAR 63-25, 1835, ADC to Air Divs, 14 May 1963 [DOC 131].

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(u) (S) Tactics were carefully ironed out by the 4750th Test Squadron at Tyndall to assure that the F-102A approach to target would be most suited for launching, and exploiting the GAR-11 to best advantage. Unless the target possessed a decided speed or altitude advantage, a front quarter attack at an angle 135 degrees from the target's tail was favored. Also an escape maneuver was worked out to permit F-102A aircrews to turn to avoid the atomic contamination⁵³ resulting from the GAR-11 detonation.

GAR-9 AIR-TO-AIR ATOMIC GUIDED MISSILES (HUGHES)

(u) The GAR-9 was unique in that it was orphaned before it was born. At least in 1959, years before a GAR-9 prototype was ready, plans were dropped to build the F-108 interceptor originally intended as the GAR-9's mother aircraft. Development of the GAR-9 was continued, together with the advanced ASG-18 fire control system designed to launch it, in hopes that a suitable high-speed interceptor capable of

53. Hist of ADC, Jul-Dec 1960, pp. 180-81; Hist of ADC, Jul-Dec 1961, p. 276; ADCM 55-5, 1 Jan 1963 [HRF]; 73 AD Final Report Category III F-102/MG-10/GAR-11 Phase IV Tests, 21 Sep 1962 [HRF]; Msg ADOOP-WT 1737, ADC to USAFE, 3 May 1963 [DOC 115].

using them, perhaps of the Improved Manned Interceptor class, would be authorized sometime in the future. Beginning in July 1956, ADC formulated specifications and characteristics, from which Hughes, by 1961, constructed a prototype model.

The GAR-9 contained a semi-active radar guidance component designed to lock on a target up to 43 nautical miles away (100 nautical miles on certain targets employing electronic jamming) and flying up to 100,000 feet high. The missile measured 150.5 inches long by 13.5 inches in diameter, and weighed 800 pounds. It was powered by an Aerojet-General solid-propellant rocket motor weighing 325 pounds and measuring 58.6 inches long by 12 inches in diameter. When fully developed for tactical use, it would pocket an XW-42 fission nuclear warhead weighing 75 pounds and containing an HE primer. When detonated, the XW-42 would produce "b3" yield. An alternate HE warhead would also be available for use.

In August 1961, the first GAR-9 missile was launched on the ground. By January 1962, three unguided missile firings had been accomplished to verify the GAR-9 launching envelope. On 15 January, a GAR-9 launched from the ground came within 55 feet of its QF-80 drone target flying at 13,500 feet above. Four months later, on 25 May 1962, the

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first GAR-9 air-to-air launching was tested from a B-58 flying at 36,000 feet, resulting in a six-foot near miss of its QF-80 drone target flying 15 nautical miles from the B-58. Striking even closer was the next air-to-air guided launch from a B-58 on 17 August 1962, during which the QF-80 drone target was grazed.⁵⁴

(u) While nothing short of complete success seemed to attend the 1962 GAR-9 test firings, a sharp turn of direction occurred in early 1963. On 21 February 1963, a GAR-9 was launched, again from a B-58, but this time at a supersonic Regulus II target. Failure ensued; the rocket motor failed to ignite and the GAR-9 plunged into the water. Within about a month's time, another GAR-9 was test fired against a Regulus II, resulting this time in the Hughes missile disintegrating in flight, whereupon an investigation was started to ferret out the reasons for its break up. Also, methods to increase availability of the B-58 test bed, which had been denied the test team an inordinate number of times

54. RESTRICTED DATA, USAF, Current Status Reports for Jan 1962, pp. 3-17, 3-18, Feb 1962, p. 3-16, Jun 1962, p. 3-17, Aug 1962, p. 3-16 [HRF]; Msg ASZDH-29-5-5, ASD to AFSC, 29 May 1962 [DOC 132]; Msg ASZDH 21-8-4, ASD to AFSC, 21 Aug 1962 [DOC 133]; Msg ASZDH-19-1-5, ASD to AFSC, 12 Jan 1962 [DOC 134]; Hist of ADC, 1958, pp. 236-37; Hist of ADC, Jan-Jun 1959, pp. 281-82.

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because of repeated groundings and numerous maintenance difficulties and repairs, were under investigation at this time. By July 1963, certain modifications had been applied to the B-58 enabling it to make supersonic test flights with the ASG-18/GAR-9 advanced weapon system. More changes were in the offing for the B-58 test bed, besides.

AIR NATIONAL GUARD

(u) (S) Beginning in late 1959, F-89J's released by ADC's regular interceptor squadrons (in exchange for Century series aircraft) began pouring into ANG interceptor squadrons assigned an M-day commitment with ADC. Originally, 12 ANG squadrons were earmarked for F-89J's; but a change to the ADC/ANG program, which was in a fluid state between 1960 and 1961, reduced the number to eight squadrons equipped with the F-89J and, by 1961, assigned to ADC. A ninth F-89J squadron was added in 1962. Meanwhile, ANG units authorized the F-102A, raised from four to six squadrons in 1960, received their "Delta Darts" in early 1961. And beginning

55. RESTRICTED DATA, USAF, Current Status Report, March 1963, pp. 3-16, 3-17 [HRF]; ADC, ADLPW-A, Weekly Act Rept, 8 Apr 1963 [HRF]; RESTRICTED DATA, USAF, Current Status Report, Jul 1963, p. 3-23 [HRF].

* The six ADC/ANG F-102A squadrons were: 182nd

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on 1 July 1961, the operational ADC/ANG interceptor force, except for a few squadrons, began placing two interceptors per squadron on five-minute, around-the-clock alerts analogous to those performed by ADC's regular interceptor force.

(U) (S) Since mid-1960, ADC had supported a proposal to equip the ADC/ANG F-89J squadrons with MB-1 nuclear rockets. ADC figured that 50 MB-1's assigned each F-89J augmentation unit, while stored and maintained under the custody of ADC technicians, would strengthen the Command's hand for dealing with massed bomber attacks. Moreover, both in October 1960 and January 1961, ADC expressed a desire to arm the six ADC/ANG F-102A squadrons with GAR-11's. To complicate matters, there was a sizeable funding problem involved. Only three F-89J squadrons were situated on USAF bases where nuclear storage facilities were available -- the 116th FIS at Spokane, the 179th FIS at Duluth, and 132nd FIS at Dow -- meaning that the others would require having small-sized storage facilities constructed for them at an estimated cost of \$500,000 per base. Aside from construction costs, a contingent of ADC personnel would have to be assigned to guarantee

[Cont'd] (Kelly AFB, Tex); 111th (Ellington AFB, Tex); 122nd (New Orleans NAS, La); 159th (Imeson Aprt, Fla); 175th (Joe Foss Fld, Sioux Falls, SD); and 146th (Greater Pittsburgh Aprt, Pa).

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continuation of federal custody and control of allocated MB-1's as required by law. Despite these cost and staffing obstacles, the JCS and Department of Defense, as well as USAF, approved (by mid-1961) the arming of ADC/ANG F-89J squadrons with the MB-1. Construction of MB-1 facilities was accordingly approved the same year at five non-located ANG F-89J units: the 123rd FIS (Portland IAP, Ore), 134th FIS (Burlington MAP, Vt), 176th FIS (Truax Fld, Wisc), 178th FIS (Hector Aprt, Fargo, ND), and 186th FIS (Great Falls MAP, Mont). The 124th FIS (Des Moines, Iowa), which exchanged F-86L's for F-89J's in 1962, was subsequently accorded authorization for an MB-1 facility, too, making six in all. In September 1961, the JCS and DOD approved ADC's proposal to modify the six ADC/ANG F-102A squadrons for carrying GAR-11. Calendar year 1964 was later forecast as the time period for accomplishment.

56. Hist of ADC, Jan-Jun 1959, pp. 190-91; Hist of ADC, Jan-Jun 1960, pp. 100-02; Hist of ADC, Jul-Dec 1960, pp. 173-74; Hist of ADC, Jul-Dec 1961, pp. 198-200; msg ADMME-DE 2311, ADC to Air Divs, 17 Aug 1960 [Doc 437 in Hist of ADC, Jan-Jun 1961]; FORMERLY RESTRICTED DATA, Msg ADMME-DE 2585, ADC to USAF, 16 Sep 1960 [Doc 438 in Hist of ADC, Jan-Jun 1961]; Msg ADMME-DE 2840, ADC to OOAMA, 13 Oct 1960 [Doc 439 in Hist of ADC, Jan-Jun 1961]; FORMERLY RESTRICTED DATA, Msg ADODC 3090, ADC to 30 AD, 10 Nov 1960 [Doc 440 in Hist of ADC, Jan-Jun 1961]; Msg ADCCR 100, ADC to USAF, 17 Jan 1961 [Doc 366 in Hist of ADC, Jul-Dec 1960]; Msg ADCMO-G 720, ADC to USAF, 6 Apr 1961 [Doc 441 in Hist of ADC, Jan-

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(U) (S) Over a year elapsed between the time F-89J squadrons were authorized tactical MB-1's and when any actually employed them for alert duty. Meantime, the lines of custodial responsibility, embracing the storage, servicing, maintenance, loading and guarding of MB-1's, were clarified and carefully spelled out in early 1962 so that Federal control over them would be sustained inviolate. ADC received DOD permission to employ ANG air technicians to help guard nuclear-loaded F-89J's, thereby alleviating a burdensome manpower drain that otherwise would have been levied on the Command's limited resources. Arrangements were also made to transmit applicable BLACK BEAR nuclear activities messages to F-89J guard units. F-89J/MB-1 support plans were drawn up; interrelationships were ironed out; manpower tables were established; and other essential details resolved. Then in late 1962, the three F-89J squadrons having on-base access to MB-1 storage, maintenance and servicing facilities (because they were

[Cont'd] Jun 1961]; Msg ADMME-DE, ADC to NGB, 19 May 1961 [Doc 442 in Hist of ADC, Jan-Jun 1961]; Msg AFOOP 78221, USAF to CINCONAD, 14 Jun 1961 [Doc 443 in Hist of ADC, Jan-Jun 1961]; NORAD Historical Summary, Jan-Jun 1961, pp. 55-56; RESTRICTED DATA, USAF, Current Status Reports, Jan 1961, pp. 3-34; Mar 1961, p. 3-33, May 1961, p. 3-31, Jun 1961, p. 3-33, and Jul 1961, p. 3-33 [HRF]; RESTRICTED DATA, Msg ADLSP 2695, ADC to 26 AD, et. al., 8 Oct 1962 [DOC 135]; Msg ADOOP-WM 0051, ADC to 30 AD, 20 Oct 1959 [DOC 136].

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collocated with regular ADC squadrons possessing these facilities) -- the 132nd (Dow), 179th (Duluth) and 116th (Spokane) -- assumed an alert posture calling for two F-89J's armed with MB-1's on 15-minute alert status. All the restrictions pertaining to the MB-1 in combination with the F-89J, itemized in safety rules governing ground alert and airborne (during DEFCON 1 or Air Defense Emergency) situations, were made to apply to the ANG squadrons.

(u) (f) Five of the six non-collocated F-89J squadrons, according to early schedules, were due to assume comparable alert postures armed with "Genies" in 1963, since MB-1 facilities for them were programmed for completion by December 1962. But lagging construction work caused postponements in anticipated completion dates, first to mid-1963,

57. ADCM 27-2, Vol II, Chg G, 3 Dec 1962 [HRF]; RESTRICTED DATA, ADC to ADC Staff Agencies, "USAF Current Status Report - January 1961," 19 Feb 1962 [HRF]; Msg AFOOP 98594, USAF to ADC, 5 Feb 1962 [DOC 137]; Msg ADOOP-WM 397, ADC to USAF, 9 Feb 1962 [DOC 138]; Msg ADMME-DE 385, ADC to USAF, 8 Feb 1962 [DOC 139]; Msg ADOOP-WM 654, ADC to Air Divs, 7 Mar 1962 [DOC 140]; Msg ADOOP-WM 666, ADC to Air Divs, 8 Mar 1962 [DOC 141]; Msg ADOOP-WM 1686, ADC to CINCNORAD, 20 Jun 1962 [DOC 142]; Msg ADCIG-S 370, ADC to USAF, 7 Feb 1962 [DOC 143]; RESTRICTED DATA, Msg ADCCS 625, ADC to USAF, 5 Mar 1962 [DOC 144]; BLACK BEAR Msg 172, ADCIG-S-I 1082, ADC to Air Divs, et. al., 19 Apr 1962 [DOC 145]; Msg ADCMO-E 1226, ADC to USAF, 4 May 1962 [DOC 146]; ADCR 11-5, "Administrative Practices 'BLACK BEAR'," 5 Nov 1962 [DOC 147]; Interview with L/Col J.A. Patalive, 9 May 1963; Msg ADCIG-S 971, ADC to AFLC, 29 Mar 1963 [DOC 148].

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then to December 1963. It seemed likely that 1964 would arrive before they commenced standing atomically-armed alerts. Necessary ADC/ANG relationships, meantime, were perfected to insure that the integrity of federal custody and control of allocated MB-1's would continue intact at these non-allocated bases. The F-89J squadron at Des Moines (added in 1962), while programmed to acquire its MB-1 facility during FY 1964, would not actually see it readied for use before the spring of 1965, according to forecasts. Although construction delays were thus preventing non-allocated F-89J squadrons from assuming nuclear alerts, the half dozen squadrons involved were not denied access to MB-1's during an emergency. A limited number of "Genies" were kept in store for them at ADC storage facilities on bases within range of the non-allocated F-89J units, so that interceptors from them, in case of attack, would fly to these bases to obtain their MB-1's.

(U) (S) As regards the six ADC/ANG F-102A squadrons, the period for interceptor GAR-11 modifications remained firm (as of mid-1963) for 1964. During the first half of 1963, another two ADC/ANG squadrons -- the 157th FIS (McEntire AFB, SC) and the 151st FIS (McGhee Tyson Apt, Tenn) -- traded their F-104's for F-102A's. Presumably these two would

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also be converted, possibly in 1964 along with the other six, in which case a total of eight ADC/ANG F-102A squadrons would be issued GAR-11's.

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NUCLEAR SAFETY INSPECTIONS

(u) (S) To check the methods by which nuclear weapons were handled, loaded, stored and protected at interceptor and BOMARC squadrons, USAF and ADC inspection teams regularly conducted Initial Capability Inspections, Capability Inspections, and Nuclear Weapon Spot Checks. The Initial Capability Inspection was held 30 or more days before the squadron was scheduled to receive nuclear ordnance.

58. FORMERLY RESTRICTED DATA, ADC to ADC Staff Agencies, "USAF Current Status Report - May 1962," 21 Jun 1962, p. 2 [HRF]; FORMERLY RESTRICTED DATA, Msg ADCES 437, ADC to Air Divs, 8 Feb 1963 [DOC 149]; FORMERLY RESTRICTED DATA, Msg ADOOP-WM 408, ADC to 30 AD, 6 Feb 1963 [DOC 150]; Msg ADMME-EB 482, ADC to SAAMA, 13 Feb 1963 [DOC 151]; FORMERLY RESTRICTED DATA, Msg ADMME-EB 748, ADC to Det 1, CHADS, 12 Mar 1963 [DOC 152]; Msg ADMME-D 860, ADC to NGB, 21 Mar 1963 [DOC 153]; Msg ADCMO 1033, ADC to USAF, 5 Apr 1963 [DOC 154]; RESTRICTED DATA, Msg 30-CIG 05005, 30 AD to ADC, 21 May 1963 [DOC 155]; NOFORN/RESTRICTED DATA, Msg ADCCS 2100, ADC to USAF, 11 Jun 1963 [DOC 156]; Msg ADMDC 2903, ADC to CINCONAD, 8 Aug 1963 [DOC 42]; Msg ADPDP-L 2968, ADC to NGB, 14 Aug 1963 [DOC 157]; Msg ADOOP-WM 2995, ADC to USAF, 21 Aug 1963 [DOC 158]; Msg ADMME-EB 5094, ADC to Air Divs, 25 Sep 1963 [DOC 159]; Msg ADOOP 5251, ADC to USAF, 10 Oct 1963 [DOC 160].

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Capability Inspections, which accounted for the majority of the inspections performed, were conducted within 90 days after the unit obtained nuclear weapons, and thereafter at intervals not exceeding 18 months. If possible, the Capability Inspection was performed in conjunction with an Operational Readiness Inspection (ORI). Nuclear weapon Spot Checks, on the other hand, were performed on any unit at any time. For the most part, the inspections, and particularly the Capability Inspections, covered the following nuclear weapon activities: security system (including the intrusion alarm network as well as implementation of the "buddy system"); weapons storage, maintenance, and assembly; warhead mating, testing, handling, and loading. Other phases of the inspection covered ground transportation of weapons, base logistical and administrative support, and weapon training programs. While in most instances, the inspections resulted in satisfactory ratings, they served to uncover defects and reveal shortcomings which, if left uncorrected, might lead to serious consequences. Units adjudged unsatisfactory were relieved of their combat-ready status until again proved proficient with nuclear weapons within 90 days after failing an inspection.

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59. ADCM 127-2, "Missile/Nuclear Safety Criteria,"

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(U) (P) Although USAF singled out nuclear safety as a special subject for inspection in late 1959, months elapsed before qualified teams could be organized at USAF and ADC to bring this about. In the meantime, units earmarked to possess nuclear weapons received advance inspections for testing their capability to operate and maintain them. And certain activities peculiar to operational nuclear-armed units, such as exercises simulating "Broken Arrow" nuclear accidents, and tests of nuclear mass-loadings and turnarounds (generally involving inert training versions of the MB-1) were covered as an integral part of the unit ORI. Security systems of MB-1 storage compounds were checked and DECUF (Defense Capability Under Fallout) plans were observed as part of the customary ORI. By mid-1960, individual tests of the nuclear activities of units were well under way.

[Cont'd] 1 Aug 1962 [DOC 161]; Msg ADMME-EB 2619, ADC to USAF, 28 Sep 1962 [DOC 162]; AFR 123-9, 31 Aug 1960 [Doc 620 in Hist of ADC, Jul-Dec 1961]; AFR 123-5, 16 Nov 1961 [Doc 621 in Hist of ADC, Jul-Dec 1961]; ADCR 122-2, "Missile/Nuclear Safety Criteria," 8 May 1961 [Doc 622 in Hist of ADC, Jul-Dec 1961].

* After mid-1962, mass-loading tests were conducted with live nuclear rockets.

60. RESTRICTED DATA, ADC, Tactical Evaluation/ORI of 25 AD, 10 Nov 1959, pp. 1A-2A, D1-D6, 2F-8F [Doc 399 in Hist of ADC, Jan-Jun 1960]; RESTRICTED DATA, ADC, Tactical Evaluation ORI of 28 AD, 25 Jan 1960 [Doc 402 in Hist of ADC, Jan-

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(u) (S) During late 1960, nearly half of ADC's interceptor squadrons were inspected to ascertain their competence in matters related to nuclear armament. As part of an ORI of the 26th Air Division in July 1960, for example, the 98th FIS (Dover) submitted to an armament capability test. While four other interceptor squadrons of the 26th were adjudged satisfactory, the 98th FIS was stripped of its combat operational readiness status because of violations detected in MB-1 procedures and safety rules. For one thing, one of the rockets had been accepted and was loaded in an F-101B without a motor safety pin installed. Moreover, supervisors and loading personnel were not properly qualified and certified; and supervisors were not employing prescribed check lists during the critical armament loading function.

(u) (S) Shortly afterward, the USAF team found that the 445th FIS (Wurtsmith) "could not satisfactorily accomplish assigned nuclear weapon responsibilities," chiefly owing to unsatisfactory weapons loading procedures resulting from use of unauthorized, locally developed check lists. In contrast, the 15th FIS (Davis-Monthan) -- the next squadron to undergo

[Cont'd] Jun 1960]; RESTRICTED DATA, ADC, Tactical Evaluation ORI of 28 AD, 11 Apr 1960 [Doc 405 in Hist of ADC, Jan-Jun 1960]; RESTRICTED DATA, ADC, ORI of 29 AD, 6 May 1960 [Doc 406 in Hist of ADC, Jan-Jun 1960]; Hist of WADF, Jan-Jun 1958, pp. 82-83; Hist of WADF, Jul-Dec 1958, pp. 89-90.

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a capability inspection -- although failing to pass an ORI, was passed by the ADC inspection team on that part of the ORI dealing with nuclear weapons and nuclear safety. Again three months later, when it underwent (and incidentally passed) a second ORI, the 15th FIS was still considered satisfactory with respect to its nuclear weapons activities.

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(u) (S) Meantime, the 98th FIS was re-inspected by a USAF team in August, and again fell short. This time two F-101B's standing a five-minute alert were discovered not to have their master armament switch guards "safetied" and sealed, as required; two other F-101B's standing a one-hour alert, each loaded with two tactical MB-1's and two GAR-2's, did not have the switch guards and restraints on their armament selector switch properly "safetied" and sealed. Moreover, the team learned that rescinded check lists were being employed, despite the fact that revised check lists had been made available.

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61. Field Memo Rpt, 26 AD ORI, 11-22 Jul 1960 [Doc 246 in Hist of ADC, Jul-Dec 1960]; Msg AFCRM 07-8, USAF Dep IG for Inspection to USAF, 21 Jul 1960 [Doc 247 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-ORI 6-60, ADCIG-ORI Team to USAF, 6 Aug 1960 [Doc 248 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG 14-60, ADCIG ORI Team to USAF, 23 Nov 1960 [Doc 249 in Hist of ADC, Jul-Dec 1960].

62. Msg AFCRM Y-74, USAF Dep IG for Inspection to USAF, 27 Aug 1960 [Doc 250 in Hist of ADC, Jul-Dec 1960].

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(u) (A) When informed of the results, General Atkinson found "such utter disregard for the requirement of safety, operational capability and military discipline...intolerable." Immediately afterward, the 98th FIS was drastically reorganized, especially as regards maintenance of nuclear weapons, and the 26th Air Division formed an inspection and assistance team to visit its fighter squadrons, including the 98th FIS, every quarter.
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(u) (A) Then the 29th FIS (Malmstrom), during a capability inspection conducted by an ADC team, was not only rated unsatisfactory on the nuclear weapons aspect of an ORI, but was also stigmatized by an MB-1 accident in the course of its ORI. Weaknesses were detected in the squadron's MB-1 training program as well as in the testing, inspection and loading phases of its MB-1 activities.
64

(u) (A) By the end of September 1960, ADC was convinced that drastic action was required to halt carelessness in the

63. Msg ADCCR 2476, ADC to 26 AD, 6 Sep 1960 [Doc 251 in Hist of ADC, Jul-Dec 1960]; Msg ADCSA-M 2447, ADC to Air Divs, 1 Sep 1960 [Doc 252 in Hist of ADC, Jul-Dec 1960]; Msg 26CCR 0517-S, 26 AD to ADC, 9 Sep 1960 [Doc 253 in Hist of ADC, Jul-Dec 1960].

64. Msg ADCIG-I 004429, ADC to USAF, 21 Sep 1960 [Doc 254 in Hist of ADC, Jul-Dec 1960].

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handling of nuclear weapons. Division commanders were told
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on 30 September:

This matter is of the gravest concern to the Commander and, in fact, is considered by him to be the most critical and important single problem within the Air Defense Command at this time....General Atkinson's policy has been and remains that deficiencies in nuclear safety are simply unacceptable...He desires that responsible commanders at every echelon give daily personal attention to the status of each of his nuclear equipped units and take action as required to insure compliance with established standards of safety, reliability and reaction time.

(u) (7) It did not take long for the 29th FIS to improve its MB-1 program. By the end of October, acceptable procedures had been adopted. Personnel and equipment were brought more quickly and safely to the MB-1 loading area. technicians were schooled to attain standardization and follow safety criteria, supervision was substantially bettered, and the MB-1 training program was revamped. Teams from ADC, the 28th Air Division, USAF, and ATC visited the 29th FIS to provide special assistance in various categories of its MB-1 program. Then, in November, the 29th FIS was subjected to another capability inspection by ADC and was given a rating of satisfactory as regards nuclear weapons. The 29th FIS

65. Msg ADCCS 2691, ADC to All Air Divs, 30 Sep 1960
[Doc 254 in Hist of ADC, Jul-Dec 1960].

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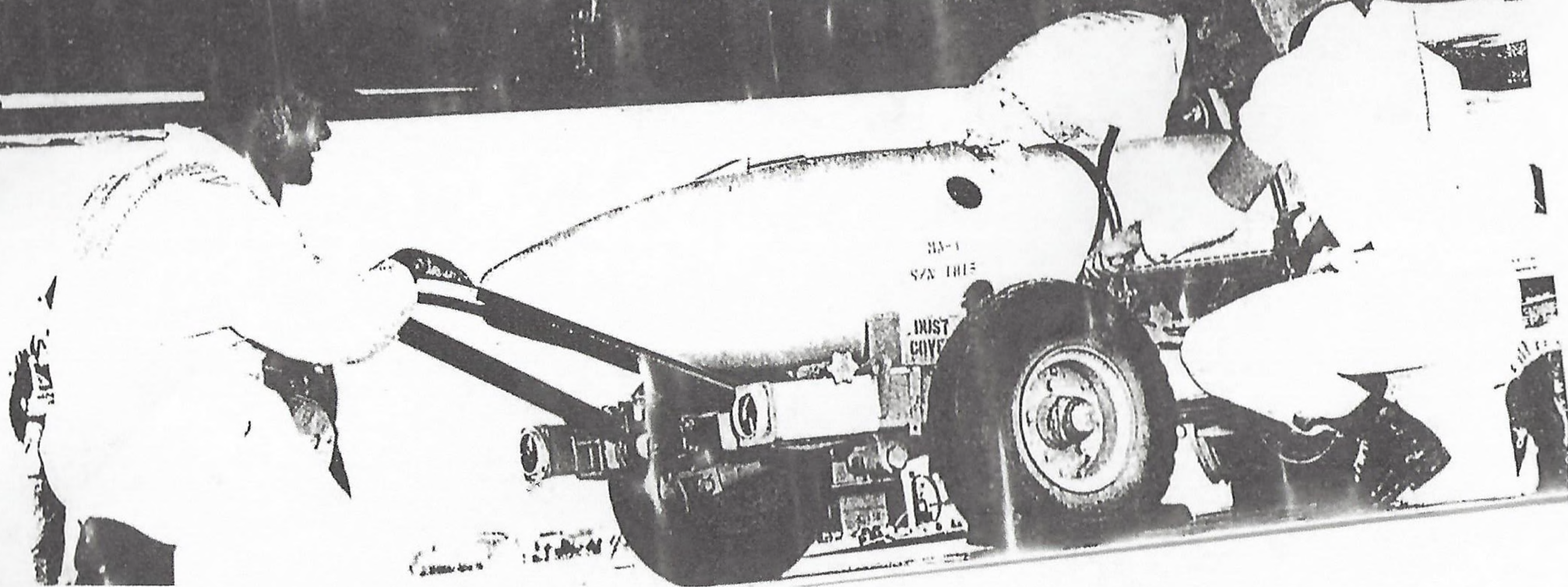
again demonstrated its competence in all facets of nuclear weapons activities in January 1961.

(U) (S) From the time ADC brought into sharp focus for division commanders the gravity of the nuclear weapons problem, the trend swung in the opposite direction. The preponderance of squadrons inspected for the rest of the year earned satisfactory ratings in this category. As noted above, the 29th FIS, upon re-inspection, proved satisfactory. The 445th FIS also underwent re-inspection and was awarded a satisfactory rating. Soon the 62nd, 84th, 322nd, 49th, and 27th squadrons followed suit by gaining satisfactory ratings of their own and subsequently strengthening weaker portions of their programs disclosed in the inspection reports. Two other units, however, did not pass inspection. The 325th Fighter Wing, servicing the 318th FIS (McChord), (1) lacked the

66. Msg 29CIG 004888, 29 AD to ADC, 13 Oct 1960 [Doc 256 in Hist of ADC, Jul-Dec 1960]; Msg 29CIG 004889, 29 AD to ADC, 13 Oct 1960 [Doc 257 in Hist of ADC, Jul-Dec 1960]; Msg 29OOT 004909, 29 AD to ADC, 14 Oct 1960 [Doc 258 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 2941, ADC to USAF, 25 Oct 1960 [Doc 260 in Hist of ADC, Jul-Dec 1960]; Msg ADCCS 2967, ADC to USAF, 31 Oct 1960 [Doc 259 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 115-C, ADC to USAF, 10 Nov 1960 [Doc 261 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 3392, ADC to USAF, 21 Dec 1960 [Doc 262 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-ORI 1-61, ADCIG-ORI Team to ADC, 9 Jan 1960 [Doc 263 in Hist of ADC, Jul-Dec 1960].

← YANBUKE HANO
OVERMORANGI DRINKS

Loading an MB-1 type rocket (lacking atomic warhead)
on an F-106A.



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capability to mass-load F-106A's efficiently in one hour (the maximum time allowed at that time); (2) neglected to adhere to established technical orders; (3) employed insufficiently qualified loading crews; and (4) left something to be desired in nuclear weapons training and supervisory functions. An intensified training program was thereupon launched, and within six weeks qualified crews were on duty, technical orders were religiously followed and the other flaws were ironed out in preparation for a re-inspection sometime in February 1961. Interceptors of the 319th FIS (Bunker Hill), somewhat like those of the 98th FIS several months before, were discovered without guards on special weapon release lock switches and without armament selector switches properly "safetied" and sealed, while certain additional shortcomings were also unearthed in other portions of the squadron's armament program. Considerable effort then took place to put the 319th on a satisfactory footing. Certain personnel changes were effected, a full scale training program in all phases of missile/nuclear safety was tackled, a safety council was established, an accident/incident prevention program was inaugurated, and loading personnel were recertified. By the end of the year, the 319th FIS considered

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itself sufficiently toned up to undergo another unannounced
 inspection anytime in 1961.⁶⁷

(u) (4) The year 1961 proved a busy one as regards nuclear weapons inspections. Aside from inspections conducted at BOMARC missile bases, there were 30 capability inspections, four initial capability inspections and eight spot inspections. USAF inspection teams undertook eight of the inspections; ADC inspection teams performed 34 of them. The 42 inspections involved 31 units of the fighter force and included two fighter wings that supported two squadrons apiece. Thus 33 of the command's then 41 squadrons -- equal to 80 per cent of the fighter force -- were inspected. Two units were inspected three times, and seven units twice.

67. Field Memo Rpt, 30 AD ORI, 12-21 Oct 1960, 21 Oct 1960 [Doc 264 in Hist of ADC, Jul-Dec 1960]; Msg AFCRM OS 244, USAF Dep IG for Insp to USAF, 2 Nov 1960 [Doc 265 in Hist of ADC, Jul-Dec 1960]; Msg AFCRM 5954, USAF Insp Team to ADC, 4 Nov 1960 [Doc 266 in Hist of ADC, Jul-Dec 1960]; Msg AFCRM ODC 11-6, USAF Dep IG to USAF, 17 Nov 1960 [Doc 267 in Hist of ADC, Jul-Dec 1960]; Msg 26CIG 040, 26 AD to ADC, 9 Dec 1960 [Doc 268 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 12-3, 12-4, ADC Insp Team to SAC, 8 Dec 1960 [Doc 269 in Hist of ADC, Jul-Dec 1960]; Msg 26CIG 045, 26 AD to ADC, 28 Dec 1960 [Doc 270 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 066, ADC to USAF, 11 Jan 1961 [Doc 271 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 00-4137, ADC Insp Team to USAF, 10 Nov 1960 [Doc 272 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 3393, ADC to USAF, 21 Dec 1960 [Doc 273 in Hist of ADC, Jul-Dec 1960]; Msg AFCRM 11-10, USAF Dep IG to USAF, 9 Nov 1960 [Doc 274 in Hist of ADC, Jul-Dec 1960]; Msg 30CIG-S-90-60, 30 AD to ADC, 11 Nov 1960 [Doc 275 in Hist of ADC, Jul-Dec 1960]; Msg ADSA-M 3140,

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(u) (S) Not quite half the inspections took place during the first six months of the year. These started conspicuously well, with the first eleven of 20 inspections ending in satisfactory ratings. The three units inspected in January -- 343 Fighter Group (servicing the 11th FIS at Duluth), 78th Fighter Wing (servicing the 83rd and 84th squadrons at Hamilton), and 507th Fighter Group (servicing the 438th FIS at Kincheloe) -- earned satisfactory ratings unhindered by major flaws. Although discrepancies were unearthed in the security and maintenance areas of the 329th FIS (George) during the next ADC Capability Inspection (held from 30 January to 2 February 1961), this squadron performed well enough to receive a satisfactory score.

68

[Cont'd] ADC to Air Divs, 16 Nov 1960 [Doc 276 in Hist of ADC, Jul-Dec 1960]; Msg ADCIG-I 3270, ADC to USAF, 5 Dec 1960 [Doc 277 in Hist of ADC, Jul-Dec 1960]; Msg 30CIG-S-128-60, 30 AD to ADC, 6 Dec 1960 [Doc 278 in Hist of ADC, Jul-Dec 1960].

68. FORMERLY RESTRICTED DATA, Msg ADCIG-I 61-39-S, ADC (IG Insp Team) to USAF, 7 Jan 1961 [Doc 623 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg WGCAS S-05, ADC (IG Insp Team) to ADC, 7 Jan 1961 [Doc 624 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 61-S-1, ADC (IG Insp Team) to USAF, 12 Jan 1961 [Doc 625 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-1329-035, ADC (IG Insp Team) to ADC, 3 Feb 1961 [Doc 626 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 28CIG OS77, 28 AD to ADC, 18 Feb 1961 [Doc 627 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 501, ADC to USAF, 7 Mar 1961 [Doc 628 in Hist of ADC, Jul-Dec 1961].

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(u) (b) Soon afterward, the 319th FIS (Bunker Hill) and the 325th Fighter Wing (servicing the 318th FIS at McChord), both of which had obtained unsatisfactory ratings during inspections in late 1960, were subjected to ADC Capability Inspections. In both cases, the units achieved satisfactory evaluations unmarred by major defects. A similar result was attained by the 75th FIS (Dow) during a USAF Capability Inspection several days later. Although the three inspections that immediately followed at the 13th FIS (Glasgow), 87th FIS (Lockbourne) and 456th FIS (Castle), conducted between 20 February and 9 March, culminated in satisfactory ratings, various shortcomings were observed. The 13th FIS, for example, fell short in its security equipment; while both the 456th and 87th squadrons were considered undermanned at their MB-1 storage sites. The 84th Fighter Group (servicing the 498th FIS at Spokane), on the other hand, passed its inspection blemishfree later that same month (13-16 March).⁶⁹

69. Hist of ADC, Jul-Dec 1960, pp. 197-98; FORMERLY RESTRICTED DATA, Msg ADCIG-1-2-11, ADC (IG Insp Team) to USAF, 9 Feb 1961 [Doc 629 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 02253, ADC (IG Insp Team) to USAF, 10 Feb 1961 [Doc 630 in Hist of ADC, Jul-Dec 1961]; Msg AFIRI-A-3-2-45, USAF (IG Insp Team) to USAF, 22 Feb 1961 [Doc 631 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 13 MAEO23C, ADC (IG Insp Team) to USAF,

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(u) (S) Despite the limitations in nuclear weapons activities discovered at some units, as mentioned above, it was not until the first week of April, when the 60th FIS (Otis) underwent an ADC capability inspection, that a squadron was stigmatized with an unsatisfactory grade. Several glaring deficiencies were uncovered at the 60th, including violations in the security and maintenance departments. Furthermore a weapons maintenance team accepted an MB-1 suspected of being defective. The 60th FIS was instantly relieved of its status as an active nuclear-capable unit until it could demonstrate, upon re-inspection, competence enough for reinstatement, as it subsequently did. To be sure, the 60th FIS corrected practically every deficiency discovered in a matter of hours. Then from 5 to 6 May, during a reinspection of its nuclear weapons activities, the 60th

[Cont'd] 24 Feb 1961 [Doc 632 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I-C 670, ADC to USAF, 30 Mar 1961 [Doc 633 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 87MA61-36, ADC (IG Insp Team) to USAF, 24 Feb 1961 [Doc 634 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I-C 682, ADC to USAF, 31 Mar 1961 [Doc 635 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 465CAS 61-625, ADC (IG Insp Team) to USAF, 9 Mar 1961 [Doc 636 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I-C 712, ADC to USAF, 5 Apr 1961 [Doc 637 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 33, ADC (IG Insp Team) to USAF, 17 Mar 1961 [Doc 638 in Hist of ADC, Jul-Dec 1961].

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FIS performed satisfactorily, thereupon reverting to a
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 nuclear capable status.

(u) (S) Lt. General Lee, ADC Commander, observed about this
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 time that:

In the past six months, we have made marked progress throughout this command in nuclear weapons safety and efficiency. For this I compliment all of you who have contributed. However, in recent weeks, inspections by the Inspector General and assistance visits by the Bear Cat Team have identified units which are not capable of handling their weapons with safety. This indicates to me a lack of complete and precise understanding of the rigid requirement for perfection in all nuclear weapons activity. I am, therefore...[re-emphasizing] this requirement to all commanders and...[bringing] it directly to the attention of every individual concerned.

(u) (S) All seven of the remaining inspections conducted to the mid-year turning point ended with satisfactory ratings. Although shortcomings were discovered at three of them -- the 95th FIS (Andrews), 456th FIS (Castle) and 87th FIS (Lockbourne),

70. FORMERLY RESTRICTED DATA, Msg ADCIG-I 61-281, ADC (IG Insp Team) to USAF, 6 Apr 1961 [Doc 639 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 260DC 0193-S, 26 AD to NORAD, 8 Apr 1961 [Doc 640 in Hist of ADC, Jul-Dec 1961]; Msg 551MME-Q, 551 AEW&C Wg to MOAMA, 8 Apr 1961 [Doc 641 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 26CIG 023, 2C AD to ADC, 24 Apr 1961 [Doc 642 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 984, ADC to USAF, 9 May 1961 [Doc 643 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 61-368, ADC (IG Insp Team) to USAF, 6 May 1961 [Doc 644 in Hist of ADC, Jul-Dec 1961].

71. "Black Bear" Msg 65, Lt Gen Lee to all members of ADC concerned with nuclear weapons, n.d. (ca. May 1961 [DOC 95]).

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the latter two of which had experienced one inspection earlier in the year (as noted above) -- they were not serious enough to prevent satisfactory scores. Host base support provided by Headquarters Command for the 95th FIS (Andrews AFB), for example, left something to be desired, while the 87th FIS (Lockbourne) lacked its allotment of skilled technicians in the nuclear weapons field, particularly at supervisory levels, as a consequence of which the squadron's nuclear weapons training program lagged behind ADC's standards, and its weapons mass-loading capability suffered. After stepping up the frequency of its mass-loading training exercises to compensate in some measure for this personnel shortage, the 87th FIS (in August) was subjected to, and successfully passed without reservation, a third inspection of its nuclear weapons activities. Meanwhile, up to mid-year, the 78th Fighter Wing (servicing the 83rd and 84th Squadrons at Hamilton) passed its second inspection on 11 April; and the 414th Fighter Group (servicing the 437th FIS at Oxnard), 1st Fighter Wing (servicing the 71st and 94th Squadrons at Selfridge), 49th FIS (Griffiss), and as described above, the 60th FIS (Otis) passed inspections during April and May. Hence, the 20 inspections carried out during the first part of the year were subdivided into 12 satisfactory ratings,

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seven satisfactory ratings limited by shortcomings, and
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 one unsatisfactory rating.

(U) (P) Practically this same success-failure ratio repeated itself during the second half of the year. Between 17 and 20 July, the 48th FIS (Langley) successfully passed an initial capability inspection, qualifying thereby to receive nuclear weapons. Later the same month, the 52nd Fighter

72. FORMERLY RESTRICTED DATA, Msg ADCIG-I 3070, ADC (IG Insp Team) to USAF, 7 Apr 1961 [Doc 645 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 017, ADC (IG Insp Team) to USAF, 13 Apr 1961 [Doc 646 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 1039, ADC to USAF, 17 May 1961 [Doc 648 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg FCCG-I 61-445, ADC (IG Insp Team) to USAF, 13 Apr 1961 [Doc 647 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I-61S-192, ADC (IG Insp Team) to USAF, 21 Apr 1961 [Doc 649 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 61-446, ADC (IG Insp Team) to AMC, 13 Apr 1961 [Doc 650 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I C-6188, ADC (IG Insp Team) to USAF, 28 Apr 1961 [Doc 651 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 22-E, ADC (IG Insp Team) to USAF, 19 May 1961 [Doc 652 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 87-CAS-61-367, ADC (IG Insp Team) to 30 AD, 5 Jun 1961 [Doc 653 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 30-CIG-S-216-61, 30 AD to ADC, 26 Jun 1961 [Doc 654 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 1417, ADC to USAF, 7 Jul 1961 [Doc 655 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA/NOFORN, Msg 30-CCR-S-309-61, 30 AD to ADC, 7 Aug 1961 [Doc 656 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 587, ADC (IG Insp Team) to USAF, 25 Aug 1961 [Doc 657 in Hist of ADC, Jul-Dec 1961].

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Group (servicing the 2nd FIS at Suffolk) and 98th FIS (Dover) were subjected to, and passed, capability inspections performed by the command, but a number of insufficiencies of a lesser nature were turned up at both units. The three capability inspections performed in August on the 478th Fighter Wing (servicing the 18th FIS at Grand Forks), 32nd Fighter Wing (servicing the 5th FIS at Minot) and as noted above, the 87th FIS (Lockbourne) all culminated in satisfactory ratings. ⁷³

(U) But the first one conducted in September on the 15th FIS (Davis-Monthan) uncovered a number of faults with that squadron's nuclear weapon loading activities, resulting in the second and last unsatisfactory rating given during the

73. FORMERLY RESTRICTED DATA, Msg ADCIG-I 1218, ADC (IG Insp Team) to USAF, 20 Jul 1961 [Doc 658 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-IS-601, ADC (IG Insp Team) to USAF, 28 Jul 1961 [Doc 659 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 1861, ADC to USAF, 5 Sep 1961 [Doc 660 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 2600P-WF 0578-S, 26 AD to ADC, 20 Oct 1961 [Doc 661 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-IXY 45, ADC (IG Insp Team) to USAF, 3 Aug 1961 [Doc 662 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADPTR-TM 1654, ADC to 26 AD, 7 Aug 1961 [Doc 663 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG 1889, ADC to USAF, 8 Sep 1961 [Doc 664 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-18-18-4, ADC (IG Insp Team) to USAF, 18 Aug 1961 [Doc 665 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 8-27, ADC (IG Insp Team) to USAF, 23 Aug 1961 [Doc 666 in Hist of ADC, Jul-Dec 1961].

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year. The inspection team found that unreliable stray voltage checks had been accepted as valid, that certain steps prescribed by weapon-loading ADC check lists were sometimes omitted or performed out of sequence, and that loading crew members displayed below average proficiency. Management and supervision of the weapon loading function was declared sub-standard, and standardization was found lacking in the weapon-loading training program. The squadron embarked on a program to correct its defects; training activities were improved, check lists were religiously followed, and supervisory personnel underwent rigorous schooling. Within a month's time the 15th was sufficiently toned up to undergo another inspection. It satisfactorily passed a re-inspection on 12 October.⁷⁴

(U) ~~(S)~~ The remaining fifteen inspections ended in ratings of satisfactory, or ~~of~~ satisfactory with some room for improvement. An initial capability inspection from 6 to 7 September at the

74. Msg ADCIG-161-90, ADC (IG Insp Team) to USAF, 8 Sep 1961 [Doc 667 in Hist of ADC, Jul-Dec 1971]; Msg 28MME-D 1C411, 28 AD to ADC, 4 Oct 1961 [Doc 668 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 28CIGIS 415, 28 AD to ADC, 6 Oct 1961 [Doc 669 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-1 61-105, ADC (IG Insp Team) to USAF, 13 Oct 1961 [Doc 670 in Hist of ADC, Jul-Dec 1961].

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57th Fighter Group (64th FIS at Paine) showed that that unit was prepared to receive nuclear weapons. Aside from improvements needed in security, manning and other designated areas, the 325th Fighter Wing (servicing the 318th FIS at McChord), 444th FIS (Charleston) and 84th Fighter Group (servicing the 498th FIS at Spokane), where nuclear weapons spot inspections were conducted by USAF in September, demonstrated competence enough to earn satisfactory ratings. For two of them -- the 325th Fighter Wing and the 84th Fighter Group -- these inspections amounted to their second for the year. The 445th FIS (Wurtsmith) and 56th Fighter Wing (servicing the 62nd FIS at K.I. Sawyer) passed capability inspections later the same month, although the 56th Fighter Wing was found improveable in its security category.

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75. Msg ADCIG-I 61-09-07, ADC (IG Insp Team) to USAF, 8 Sep 1961 [Doc 671 in Hist of ADC, Jul-Dec 1961]; Msg ADCIG-I 2849, ADC to USAF, 19 Dec 1961 [Doc 672 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg AFIWI-C-09 421, USAF Dep IG for Insp to USAF, 8 Sep 1961 [Doc 673 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 2256, ADC to USAF, 14 Oct 1961 [HRF]; FORMERLY RESTRICTED DATA, Msg 26CYG 039, 26 AD to ADC, 22 Sep 1961 [Doc 674 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg 26CIG 043, 26 AD to ADC, 13 Oct 1961 [Doc 675 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 2365, ADC to USAF, 25 Oct 1961 [Doc 676 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg AFIWI-C 82, USAF Dep IG for Insp to ADC 22 Sep 1961 [Doc 677 in Hist of ADC, Jul-Dec 1961]; Msg AFIWI-09-16-E, USAF Dep IG for Insp to ADC, 25 Sep 1961 [Doc 678 in

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(u) (9) As described above, the 15th FIS (Davis-Monthan), during its second inspection of the year 12 October, re-deemed its previous rating of unsatisfactory. Earlier the same month, the 29th FIS (Malmstrom) had successfully passed an inspection, too; while later on, during November and early December, the 27th FIS (Loring), 48th FIS (Langley), 539th FIS (McGuire), and 76th FIS (McCoy) were awarded, upon inspection, satisfactory ratings. For the 48th FIS, this was the second inspection of the year. Later in December, three USAF Spot Inspections were performed at the 78th Fighter Wing (servicing the 83rd and 84th squadrons at Hamilton) -- its third inspection of the year; the 329th FIS (George) -- its second of the year; and the 408th Fighter Group (servicing the 322nd FIS at Kingsley). All three units won satisfactory ratings qualified by imperfections detected in their security system, which were subsequently rectified.

(u) (9) The overall figures for the latter half of 1961 tallied at 12 satisfactory ratings, nine satisfactory (but

[Cont'd] in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 9-15, ADC (IG Insp Team) to USAF, 29 Sep 1961 [Doc 679 in Hist of ADC, Jul-Dec 1961]; Msg Uncl ADCIG-I-W 6200, ADC (IG Insp Team) to USAF, 20 Sep 1961 [from ADCIG files].

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improveable) ratings, and one unsatisfactory rating. For the entire year, there existed only two unsatisfactory ratings out of 42 inspections (about five per cent). Compared with results of those performed during the second half of 1960, when six inspections out of about 14 (approximately 43 per cent) proved unsatisfactory, this reflected considerable progress.

(u) (S) Again the preponderant amount of the regular interceptor force was subjected to rigorous inspections of nuclear functions during 1962. About 80 per cent of the interceptor force experienced at least one nuclear inspection by ADC, USAF or Defense Atomic Support Agency (DASA), with

76. Hist of ADC, Jul-Dec 1960, pp. 193-98; Msg ADCIG-I 0249, ADC (IG Insp Team) to USAF, 6 Oct 1961 [from ADCIG files]; Msg NYMDC 61S-4927, NYADS to USAF, 18 Nov 1961 [Doc 680 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 1535, ADC (IG Insp Team) to USAF, 5 Dec 1961 [Doc 681 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg AFIWI-C-1-2924, USAF Dep IG for Insp to USAF, 9 Dec 1961 [Doc 682 in Hist of ADC, Jul-Dec 1961]; Msg ADCIG-I-A 137, ADC to USAF Dep IG for Insp, 17 Jan 1962 [Doc 683 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 192, ADC to USAF, 23 Jan 1962 [Doc 684 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg AFIWA-C-2115, USAF Dep IG for Insp to USAF, 12 Dec 1961 [Doc 685 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 176, ADC to USAF, 23 Jan 1962 [Doc 686 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg AFIDI 6379, USAF Dep IG for Insp to USAF, 14 Dec 1961 [Doc 687 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Msg ADCCS 158, ADC to USAF, 22 Jan 1962 [Doc 688 in Hist of ADC, Jul-Dec 1961].

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one unit receiving four inspections, seven receiving three inspections, 13 receiving two, and ten, one. Out of a total of 61 inspections (aside from those performed at field-level echelons), 37 were performed by ADC, 13 by DASA (called Technical Standardization Inspections), and 11 by USAF. In all but five cases, a satisfactory rating was earned. Nevertheless, certain factors were discovered that limited the nuclear armament performance of most of the units pronounced satisfactory which were soon corrected. Often, these were found in the security, ground communications, and alarm systems. Several units lacked nuclear weapons officers because of the acute shortage of personnel qualified in this speciality. Explosive ordnance disposal (EOD) operations were found wanting at some units, as well.

(U) (S) The five units rated unsatisfactory were based at Grand Forks, Duluth, Suffolk County, Griffiss and Bunker Hill. Most of the imperfections of the 478th Fighter Wing (supporting the 18th FIS at Grand Forks), as turned up by inspectors in January, were in the physical security area. An alert hangar intrusion alarm system failed to work; ground

77. Msg ADCIG-S 2110, ADC to Air Divs, 8 Aug 1962 [DOC 163]; FORMERLY RESTRICTED DATA, Msg 26CIG 019, 26 AD to ADC, 8 Aug 1962 [DOC 164].

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communications, both primary and secondary, were less than satisfactory; snow was piled against the security fencing; and access to the alert hangar area was considered vulnerable to penetration. Within a day's time, however, practically all these defects were ameliorated, so that the unit passed a re-inspection, and thus was restored to a nuclear-armed alert status, just two days after failing. The 343rd Fighter Group (supporting the 11th FIS at Duluth), which was next to fail an inspection on February 23 and 24, lost out because among other faults: five uncertified maintenance technicians performed storage inspections on about 30 MB-1 weapons (a fault that alone was automatically cause for an unsatisfactory rating); weapons maintenance and historical records were incorrect; quality control of records was substandard; and test set electrical connectors used in MB-1 storage inspections were contaminated by foreign matter. These failings were promptly cleared up and the unit, upon passing a re-inspection three weeks later, resumed nuclear-armed alerts.

(u) ~~(S)~~ More than a month elapsed before the third unsatisfactory unit, the 52nd Fighter Group (servicing the 2nd FIS at Suffolk County), was recertified as competent to resume nuclear-armed alerts. The unit was adjudged unsatisfactory

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in early June for faulty procedures when breaking out MB-1's from storage, and delivering them for loading on F-101B's, besides certain glaring shortcomings in its physical security network. By the end of the month most of the trouble was over: new procedures were adopted and the technicians drilled in their use, with approved check lists scrupulously followed; proficiency training was practiced by crews responsible for the breakout, transportation and loading of MB-1's; and the security force was schooled repetitively in areas needing improvement. Then, during a re-inspection of the 52nd Fighter Group 16 to 18 July, personnel connected with nuclear weapons and the nuclear safety program showed they could discharge their tasks to the letter of the rules and the satisfaction of the inspectors.

(u) (9) The last two unsatisfactory reports for the year, the 49th FIS (Griffiss) and 319th FIS (Bunker Hill), were inspected at mid-August and mid-September, respectively. Both squadrons were guilty of two violations in common: (1) poles supporting power transmission lines near armament storage areas were spaced so far apart that a power line, if broken, might drop on a building housing nuclear armament; and (2) sand bag barricades were not positioned in storage magazines as required by ADC in June of the year.

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The 49th, moreover, wrongfully passed a defective firing mechanism timer unit during an inspection cycle, and committed lesser infractions, all of which were subsequently remedied, as satisfactorily demonstrated during a re-inspection of the squadron at the end of August. A sizeable list of faults in addition to the two named above were catalogued at the 319th during its September Capability Inspection. The faults included improper handling and maintenance of MB-1's with a result that warheads, firing mechanisms and nose cones had become scratched and gouged; management and supervision of certain nuclear weapons functions left something to be desired; weapons maintenance technicians were insufficiently trained; the quality control program was substandard; weapons maintenance check lists were not up to date; handling equipment was improperly maintained; and SOP's had not been revised, as required. As if this were not enough, discrepancies were noted on every nuclear weapon examined. By the time the squadron was re-inspected in late October, however, either these wrongs had been righted or they were in process of correction. Vigorous training programs revision of check lists, SOP's and quality control records, management and supervisory improvements, repair and refurbishing of weapons and ground handling equipment --

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all reflected the energy expended in earning the satisfactory rating awarded the 319th upon re-inspection October 22 to 23.⁷⁸

(U) (S) During the first half of 1963, the volume of inspections concerning nuclear activities, management and control at manned interceptor units, as compared with the volume during the same period one year before (January-June 1962), shrank to half the number. This was attributable in part to the USAF Inspector General's Office, which conducted only one Capability Inspection during the entire six months. The ADC office of the Inspector General was responsible for 13 Capability Inspections, which, together with four Technical Standardization Inspections performed by DASA, and the single USAF inspection, constituted 18 inspections in all. A satisfactory rating was earned all but once. While the units inspected (except one) passed during their first go-round for 1963, certain shortcomings were revealed by the inspectors at each, which limited the units performance. Sometimes

78. FORMERLY RESTRICTED DATA/NOFORN, The documentation for this section, consisting of inspection reports and ensuing correspondence generated by the inspections, is contained in 94 inspection reports and follow-up messages numbered Documents 165 thru 258. Interview with L/Colonel R.E. Dent, Jr., 3 May 1961; ADC Munitions Bulletin, No. 63-3, 15 Mar 1963 [DOC 118].

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these factors amounted to scratched tactical MB-1's, not deep or serious enough to warrant a "dull sword" report, but indicative that the unit, at some time, had mishandled the weapons involved. Often, the limiting factors were traceable to tardy base support. Four units, for example, while able to demonstrate competency in handling their nuclear weapons, lacked the sandbag barricades ADC had ordered positioned in the center cubicles of the storage magazines. And several units contained power-line poles that were spaced too far apart, so that a power line, if broken, conceivably might land on a munitions building housing atomic ordnance. Generally where the need existed for sandbag barricades and additional power-line poles, the base responsible for support had been notified months in advance of the inspection. Yet action had been unduly delayed or postponed by the support base, leaving the tactical unit shortchanged.

(U) (S) Whatever the cause for complaints voiced by the inspection teams, prompt attention was given them soon after the reports appeared. In most cases, they were either rectified or in course of being corrected within days. By giving impetus for removal of hazardous conditions and potentially dangerous situations, the various inspection teams

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helped circumvent what otherwise might result in a "bent spear" or "broken arrow" occurrence.

(U) (S) The single instance of an unsatisfactory rating occurred at the 414th Fighter Group, which serviced the 437th FIS at Oxnard. From 25 January through 2 February 1963, during its third inspection within 14 months, the 414th demonstrated unacceptable performances in the fields of security and training. Aside from several lesser violations, the 414th was guilty of permitting armament technicians whose certification had lapsed to work on war reserve MB-1's -- an offence which in itself constituted grounds for an automatic grading of unsatisfactory. Within two weeks time, nevertheless, the 414th corrected enough of the discrepancies to pass a re-inspection held from 11 through 14 February.

79. FORMERLY RESTRICTED DATA/NOFORN, The documentation for this section, consisting of some fifty inspection reports and ensuing correspondence generated by the inspections, is contained in Documents 259 through 309. ADC Munitions Bulletin, No. 63-3, 15 Mar 1963, p. 4 [DOC 118]; Interview, ADCIG-M, on 12 Sep 1963.

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1962 Inspections of Nuclear Activities at Manned Interceptor Squadrons

Unit	Base	Month	Result	Type Inspection
78 Ftr Wg (83 & 84 FIS)	Hamilton	Jan	S	ADC Capability
13 FIS	Glasgow	Jan	S	USAF Spot
414 1tr Gp (437 FIS)	Oxnard	Jan	S	ADC Capability
329 FIS	George	Jan	S	ADC Capability
507 Ftr Wg (438 FIS)	Kincheloe	Jan	S	ADC Capability
482 FIS	Seymour-Johnson	Jan	S	ADC Initial Capability
478 Ftr Wg (18 FIS)	Grand Forks	Jan	U	USAF Spot
478 Ftr Wg (18 FIS)	Grand Forks	Jan	S	ADC Capability Re-Inspection
445 FIS	Wurtsmith	Feb	S	USAF Spot
319 FIS	Bunker Hill	Feb	S	DASA
414 Ftr Gp (437 FIS)	Oxnard	Feb	S	ADC Spot
87 FIS	Lockbourne	Feb	S	USAF Spot

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Unit	Base
343 Ftr Gp (11 FIS)	Duluth
507 Ftr Wg (438 FIS)	Kincheloe
76 FIS	Westover
1st Ftr Wg (71 & 94 FIS)	Selfridge
33 FIS	Webb
48 FIS	Langley
343 Ftr Gp (11 FIS)	Duluth
343 Ftr Gp (11 FIS)	Duluth
84 Ftr Gp (418 FIS)	Spokane
56 Ftr Wg (62 FIS)	K.I. Sawyer
325 Ftr Wg (318 FIS)	McChord
57 Ftr Gp (64 FIS)	Paine
13 FIS	Glasgow

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Month	Result	Type Inspection
Feb	U	ADC Capability
Mar	S	DASA
Mar	S	ADC Capability
Mar	S	DASA
Mar	S	ADC Initial Capability
Mar	S	USAF Spot
Mar	S	ADC Capability Re-Inspection
Mar	S	DASA
Mar	S	ADC Capability
Mar	S	DASA
Mar	S	ADC Capability
Mar	S	ADC Capability
Apr	S	ADC Capability

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Unit	Base
87 FIS	Lockbourne
1st Ftr Wg (71 & 94 FIS)	Selfridge
507 Ftr Wg (438 FIS)	Kincheloe
328 Ftr Wg (326 FIS)	Richards-Gebaur
52 Ftr Gp (2 FIS)	Suffolk
84 Ftr Gp (498 FIS)	Spokane
98 FIS	Dover
539 FIS	McGuire
78 Ftr Wg (83 & 84 FIS)	Hamilton
84 Ftr Gp (498 FIS)	Spokane
325 Ftr Wg (318 FIS)	McChord
328 Ftr Wg (326 FIS)	Richards-Gebaur
82 FIS	Travis

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Month	Result	Type Inspection
25 Apr- 2 May	S	ADC Capability
25 Apr- 2 May	S	ADC Capability
25 Apr- 2 May	S	ADC Capability
May	S	ADC Initial Capability
Jun	U	ADC Capability
Jun	S	DASA
Jun	S	ADC Capability
Jun	S	ADC Capability
Jun	S	DASA
Jun	S	DASA
Jun	S	DASA
Jul	S	ADC Capability
Jul	S	ADC Capability

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Unit	Base
52 Ftr Gp (2 FIS)	Suffolk
15 FIS	Davis-Monthan
329 FIS	George
482 FIS	Seymour Johnson
49 FIS	Griffiss
328 Ftr Wg (326 FIS)	Richards-Gebaur
49 FIS	Griffiss
48 FIS	Langley
95 FIS	Andrews
57 Ftr Gp (64 FIS)	Paine
444 FIS	Charleston
328 Ftr Wg (326 FIS)	Richards-Gebaur
319 FIS	Bunker Hill

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Month	Result	Type Inspection
Jul	S	ADC Capability Re-Inspection
Jul	S	USAF Spot
30 Jul- 3 Aug	S	USAF Spot
Aug	S	DASA
Aug	U	ADC Capability
Aug	S	USAF Spot
Aug	S	ADC Capability Re-Inspection
Sep	S	ADC Capability
Sep	S	ADC Capability
Sep	S	DASA
Sep	S	ADC Capability
Sep	S	DASA
Sep	U	ADC Capability

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Unit	Base
56 Ftr Wg (62 FIS)	K. I. Sawyer
445 FIS	Wurtsmith
75 FIS	Dow
60 FIS	Otis
319 FIS	Bunker Hill
482 FIS	Seymour Johnson
225 Ftr Wg (318 FIS)	McChord
98 FIS	Dover
29 FIS	Malmstrom
57 Ftr Gp (64 FIS)	Paine

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Month	Result	Type Inspection
Sep	S	ADC Capability
Sep	S	ADC Capability
Oct	S	ADC Capability
Oct	S	ADC Capability
Oct	S	ADC Capability Re-Inspection
Nov	S	ADC Capability
Nov	S	USAF Spot
Nov	S	DASA
Nov	S	USAF Spot
Dec	S	USAF Spot

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January-June 1963 Inspections of Nuclear Activities at Manned Interceptor Squadrons

Unit	Base	Month	Result	Type Inspection
456 FIS	Castle	Jan	S	USAF Capability
414 Ftr Gp (437 FIS)	Oxnard	25 Jan- 2 Feb	U	ADC Capability
329 FIS	George	25 Jan- 2 Feb	S	ADC Capability
15 FIS	Davis-Monthan	25 Jan- 2 Feb	S	ADC Capability
5 FIS	Minot	Feb	S	ADC Capability
414 Ftr Gp (437 FIS)	Oxnard	Feb	S	ADC Capability
408 Ftr Gp (322 FIS)	Kingsley	Feb	S	ADC Capability
78 Ftr Wg (83 & 84 FIS)	Hamilton	Feb	S	ADC Capability
27 FIS	Loring	Mar	S	ADC Capability
75 FIS	Dow	Mar	S	ADC Capability
60 FIS	Otis	Mar	S	ADC Capability

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Unit	Base
444 FIS	Charleston
29 FIS	Malmstrom
29 FIS	Malmstrom
328 Ftr Wg (326 FIS)	Richards-Gebaur
95 FIS	Andrews
13 FIS	Glasgow

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Month	Result	Type Inspected for
Apr	S	DASA
Apr	S	DASA
May	S	ADC Capability
May	S	ADC Capability
May	S	DASA
Jun	S	ADC Capability

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INCIDENTS AND ACCIDENTS

(U) (S) No matter how carefully safety rules and check lists were composed and disseminated, how assiduously inspection teams checked tactical units, and how thoroughly nuclear weapon teams were trained in the art of working with nuclear weapons, the command was sure to suffer nuclear mishaps. Although the accident rate objective never ceased being zero per cent, ADC personnel handled hundreds of weapons, both nuclear and non-nuclear, every day, and alert aircraft by the score were subjected to the nuclear weapon loading and unloading process. As noted above, 90,000 movements involving live and inert versions of the MB-1 and 3,000 involving tactical and training versions of the GAR-11 were reported for calendar year 1962 alone. The opportunity for error was great and the Law of Chance had never been repealed. But despite the growing increase in nuclear weapons from 1959 to mid-1963, while the F-101B/F-106/MB-1 and F-102A/GAR-11 systems entered the inventory of air defense weapons, the number of accidents/incidents concerning ADC's air-to-air atomic ordnance gradually declined, especially after 1960, testifying to the effectiveness of the nuclear operating, training, inspection and safety programs.

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At no time was a nuclear warhead, or the HE element of a nuclear air-to-air rocket, accidentally detonated.

(u) (S) Few nuclear mishaps occurred in 1959 besides those involving the F-89J/MB-1 (see pages 34 and 35), because the F-101B and F-106A were just being phased into the command. Nevertheless, on 23 and 24 August 1959, two inert training models of the MB-1 were inadvertently released, one on each day, by the same F-101B. Faulty wiring in the F-101B's MG-13 fire control system was the cause. The gravity of the episode was evident aside from the loss of trainer rockets costing thousands of dollars. Had tactical MB-1's been aboard in their place, they would probably have been released instead.
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(u) (S) The total number of 1960 nuclear episodes was comparatively high. The F-101B/F-106A -- MB-1 systems were new; recently formed armament crews, while academically trained, lacked the practical skills that only experience could foster, and thus were more apt to make mistakes. The

80. Hist of ADC, Jan-Jun 1959, pp. 225-28; Hist of ADC, Jul-Dec 1959, pp. 133-34; ADC, Ofc Ch of Safety, Project 10A Accident/Incident List for 1959, 8 Dec 1960 [DOC 48].

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factor of cramped working conditions during the armament loading and unloading processes involving century series aircraft, as noted before, was in part instrumental for personnel errors that occurred.

(u) (S) The first incident was caused not by personnel error, however, but by materiel failure. The front hooks by which the MB-1 (or its inert training version) was suspended to F-101B Bohanan carrier racks gave way on an F-101B at the 78th Fighter Wing (Hamilton) shortly after the turn of the year. While a trainer rocket consequently fell, it was caught between the armament door and fuselage, preventing it from dropping completely out the aircraft. Similar incidents occurred on 23 and 31 May while the F-101B's affected were on the ground. What damage ensued to the MB-1's involved was not serious enough to detonate the high explosive components. Rockwell hardness tests conducted on F-101B suspension hooks showed that many of them failed to meet original specifications, for which replacements were ordered. However, this was not the end to armament materiel problems for the F-101B. Mishaps involving the

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F-101B ejector rack mechanism dogged ADC during later years
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as well.

(a) Other 1960 nuclear episodes caused by mechanical defects or materiel failures included (1) the accidental firing of an MB-1 initiator pin when a cable employed in the downloading process became fouled; (2) a warhead that fell about two feet (but luckily stopped approximately 18 inches above the ground) at Bunker Hill on 10 May, when the safety stand holding it tipped and a worn quick release safety pin slipped from its position in the H-16 beam, allowing the hoist holding the warhead to drop; and (3), slippage of a dummy MB-1LT during a practice loading when a clevis pin broke. In none of these instances, nor for that matter, in any of those described below, did a detonation of the warhead or the HE occur. Toward the end of the year, a malfunctioning F-101B ejector rack was responsible for an inert MB-1 training round striking the aircraft after
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being fired at a target.

81. ADC, ADLPG-I, Weekly Act Rept, 25 Jan 1960 [HRF]; ADC, Ofc Ch of Safety, Project 10B Accident/Incident List for 1960, 27 Jan 1961 [Doc 714 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-CB 182, ADC to 78 Ftr Gp, 13 Jan 1960 [Doc 228 in Hist of ADC, Jan-Jun 1960]; Msg ADMME-CB 127, 14 Jan 1960 [DOC 310]; Msg ADMME-CB 173, ADC to F-101 WSPO, 20 Jan 1960 [Doc 230 in Hist of ADC, Jan-Jun 1960].

82. ADC, Ofc Ch of Safety, Project 10B Accident/

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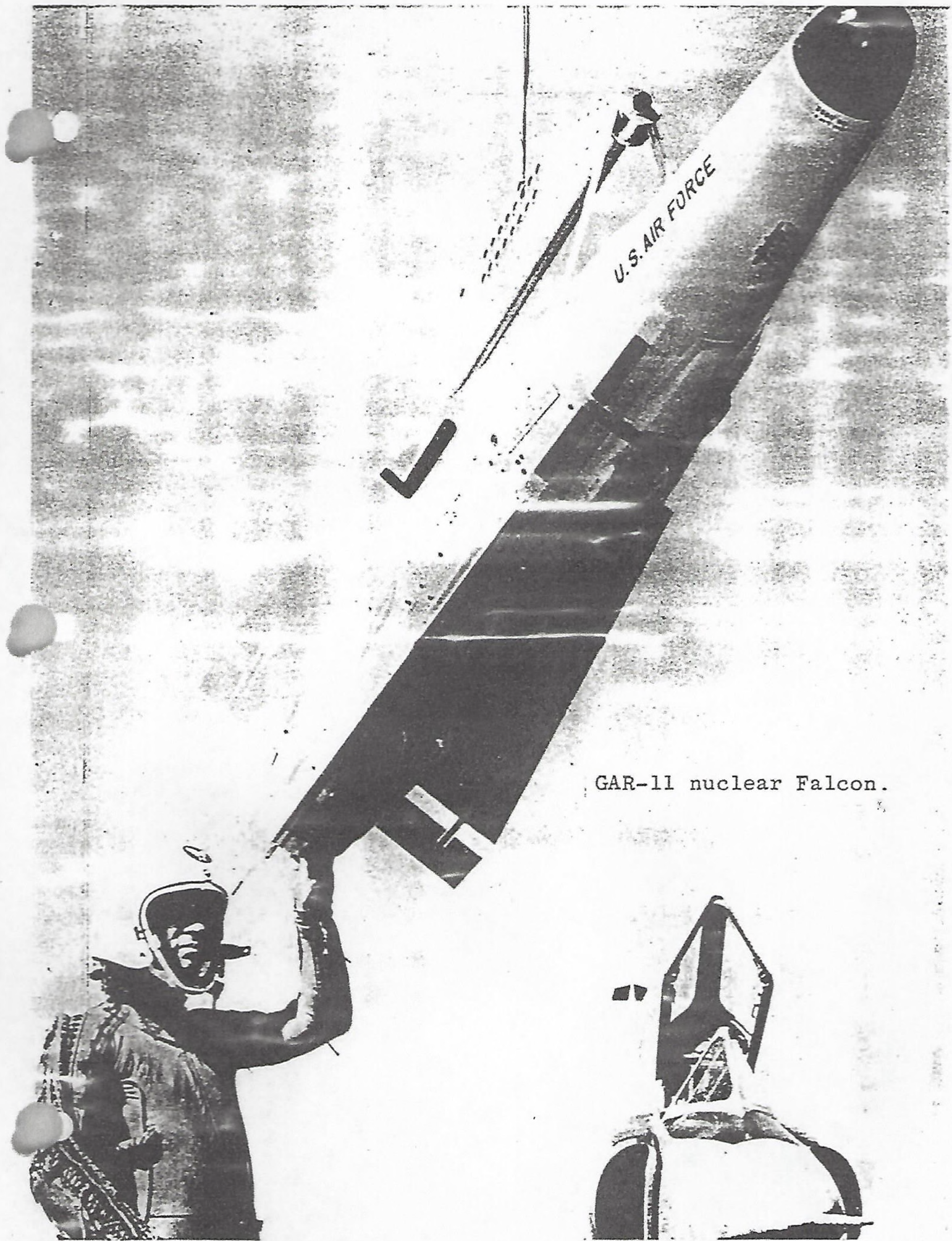
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(u)(b) Nuclear episodes attributable to personnel errors were in considerable number. In most of the cases, loading crew members, generally because they failed to obey check lists, were guilty of igniting initiators of MB-1 tactical or training rockets, but fortunately without ensuing damage to the rocket. This occurred at least six different times, once in April, two or three times in June, at least once in August and twice in October. Other personnel errors resulted in (1) an MB-1 LT falling to the ground in June at Wurtsmith, probably because the driver towing several of the rockets stopped his towing vehicle too suddenly, causing the MB-1LT to roll off its MF-9 trailer; (2) a dented MB-1 rocket motor shell the same month, when the loading crew accidentally struck it with a rocket housing handle; (3) cracked fins of an MB-1 in August due to improper handling operations; (4) damaged fins of an MB-1 in September at Malmstrom because of the loading crew's failure to secure the aft lug to the F-101B launch rack; and (5) inadvertant

[Cont'd] Incident List for 1960, 27 Jan 1961 [Doc 714 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-CA 199, ADC to Air Divs, 21 Jan 1960 [Doc 231 in Hist of ADC, Jan-Jun 1960]; Msg 30MME-CA C-1451-60, 30 AD to 319 FIS, 18 May 1960 [Doc 235 in Hist of ADC, Jan-Jun 1960]; Msg SWVCT-23-12-18, AFSWC to OOAMA, 23 Dec 1960 [DOC 311].

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jettison of an MB-11T in November because a certain air-
craft relay had been substituted without authorization. ⁸³

(u) (S) Accidents and incidents in connection with air-to-air nuclear rockets and missiles numbered eleven in 1961 and generally involved a training version equipped with dummy warheads, or ballast rounds equally devoid of an atomic charge. Nonetheless, though most of them involved substitute weapons, the implication remained clear. The same mishaps would have occurred if tactical nuclear weapons had been in use. Therefore, for purposes of nuclear accident prevention, they counted as nuclear episodes.

(u) (S) The F-101B/MB-1 weapon system was responsible for six of the occurrences. On 1 June, the forward launch lugs of an MB-1T training rocket failed on an F-101B of the 4750th Test Squadron (Tyndall), because the linkage of the rocket ejector rack had worked out of adjustment. Consequently, the MB-1T rocket hung loose in the armament bay,

83. ADC, Ofc Ch of Safety, Project 102 Accident, Incident List for 1960, 27 Jan 1961 [Doc 714 in Hist of ADC, Jul-Dec 1961]; Msg ADCSA-M 1203, ADC to Air Divs, 21 Apr 1960 [Doc 232 in Hist of ADC, Jan-Jun 1960]; Msg ADMME-DE 1733, ADC to Air Divs, 13 Jun 1960 [Doc 236 in Hist of ADC, Jan-Jun 1960]; RESTRICTED DATA, Msg ADCSA-M 3102, ADC to Air Divs, 10 Nov 1960 [Doc 241 in Hist of ADC, Jul-Dec 1960]; FORMERLY RESTRICTED DATA, Msg ADCIG-I 004451, ADC ORI Team to USAF, 23 Sep 1960 [Doc 239 in Hist of ADC, Jul-Dec 1960].

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but was subsequently eased out of the plane without further damage.

(U) (S) Two weeks later, an MB-11T assigned to a detachment of the 322 FIS (based at Kingsly, but temporarily deployed to McChord) was damaged when the loading crew, during a practice mass-loading exercise, neglected to fit the aft launching lug properly to the aft hook. On 28 June, an F-101B of the 60th FIS (Otis) accidentally dropped an MN-11 Loader Trainer ballast round in flight while the armament door was rotating for an armament check. The MN-11 ballast round fell free after its aft launch lug became sheared. ⁸⁴

(U) (S) This was followed in July by two occurrences, the first of which also involved the aft rocket launch lug. Because a war reserve MB-1 was improperly installed aboard an F-101B of the 75th FIS (Dow) being readied for alert duty, its aft launch lug became disengaged from the aft hook as the armament door revolved. As a result, the MB-1 dropped

84. Rpt, 4750 Test Sq, "Report of AF Missile Incident," 1 Jun 1961 [Doc 716 in Hist of ADC, Jul-Dec 1961]; Msg 551MME-Q 551 AEW&C Wg to OOAMA, ca. 29 Jun 1961 [Doc 717 in Hist of ADC, Jul-Dec 1961]; Msg 322FIS-MME 06-068, 322 FIS to USAF, 17 Jun 1961 [Doc 718 in Hist of ADC, Jul-Dec 1961]; Rpt, 60 FIS to ADC, "Investigation of MN-11 Incident 60 FIS, 28 Jun 1961," n.d. [Doc 719 in Hist of ADC, Jul-Dec 1961]; Ltr, AFSWC to USAF Dep IG for Safety, "Preliminary Summary of F-101B/MN-11 Incident," 10 Aug 1961 [Doc 720 in Hist of ADC, Jul-Dec 1961].

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and became wedged between the armament door and fuselage,
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breaking the MB-1's lower left fin.

(u) (b) Then, three days later, an F-101B of the 445th FIS (Wurtsmith) dropped an MB-1 ballast round in flight while rotating the armament door. Although the similarity between this incident and the loss of the MN-11 ballast round at Otis the month before was obvious, the blame could not be positively imputed to a sheared aft launch lug. When located, the MB-1 ballast round was so badly damaged that exact cause of the failure could not be ascertained. Nevertheless, it was surmised that either the aft or forward lugs had failed, or that the locking lug responsible for securing the rocket to the ejector rack had not been properly torqued because of a faulty helicoil.

85. Rpt, 75 FIS to ADC, "Investigation of F-101B/MB-1 Incident," n.d. [Doc 721 in Hist of ADC, Jul-Dec 1961]; Msg ADCSA-M 1606, ADC to Air Divs, 1 Aug 1961 [Doc 722 in Hist of ADC, Jul-Dec 1961].

86. Rpt, 445 FIS to ADC, "Investigation of F-101B/MB-1 Ballast Round Incident," n.d. [Doc 723 in Hist of ADC, Jul-Dec 1961]; Msg DCMQ 27 N, 379 Bombardment Wg to WRAMA, 26 Jul 1961 [Doc 724 in Hist of ADC, Jul-Dec 1961]; Msg 445CSA D-89-10, 445 to 30 AD, 13 Oct 1961 [Doc 725 in Hist of ADC, Jul-Dec 1961]; Ltr, WRAMA to 30 AD, "Inadvertent Loss of MB-1 Ballast Round," 25 Oct 1961 [Doc 726 in Hist of ADC, Jul-Dec 1961]; 2nd Ind, 30 AD to ADC, 15 Nov 1961 to Ltr, 445 FIS to 30 AD, 17 Aug 1961 [Doc 727 in Hist of ADC, Jul-Dec 1961]; Ltr and Ind, 445 FIS to SMADS, "Supplemental Report of Investigation of Nuclear Incident of 21 Jul 1961," 5 Dec 1961 [Doc 728 in Hist of ADC, Jul-Dec 1961].

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(U) (S) In any event, USAF became concerned over the prospects of losing a tactical MB-1 during an F-101B mission and suggested that ADC's requirement for F-101B's to transport MB-1's as part of the upcoming dispersal plan might be rejected unless something was done soon. ADC reminded USAF that the two instances of ballast loss occurred while the F-101B armament door was rotating and assured USAF that the tactical ferrying of MB-1 weapons during dispersal would in no way involve rotating the door.⁸⁷

(U) (S) Meanwhile, something was being done. The problem, not being a simple one, was researched at several places. Immediately following the episode at Otis (on 28 June), OOAMA began to conduct engineering test on the air launch lug. WRAMA embarked on an engineering study of the rocket ejector rack, and AFSWC investigated the history of past occurrences of this kind prior to 1961.⁸⁸ By late August, OOAMA had concluded (despite a recommendation from one of

87. Msg AFOOP-DE 88732, USAF to ADC, 26 Jul 1961 [Doc 729 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-DE 1642, ADC to USAF, 4 Aug 1961 [Doc 730 in Hist of ADC, Jul-Dec 1961].

88. IOC, ADMME-DE to ADCSA-M, "MN-11 Incident, 60 FIS, 28 Jun 1961," 25 Aug 1961 [Doc 731 in Hist of ADC, Jul-Dec 1961].

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its directorates that the aft lug be strengthened by enlarging its diameter) that the aft lug, by passing tensile strength and shearing tests, proved "fully capable of supporting the [MB-1] rocket under normal conditions." Pointing out that the F-101B at Otis was maneuvering at the time its MN-11 aft launch lug was sheared, OOAMA reasoned that the lug had been subjected to an abnormal combination of tensile and shear stresses exceeding its design parameters. It was therefore regarded as an isolated instance, unlikely to recur.

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(U) (S) AFSWC was of the opinion that had the armament door been rotated at a slower speed, as prescribed by a Time Compliance Technical Order (TCTO) issued in January 1961, it was probable that neither of the two accidental drops would have happened. McDonnell, the builder of the F-101B, had endorsed this solution in 1960 after investigating three previous inadvertent rocket releases by F-101B's. The TCTO had not been performed on the F-101B aircraft involved, however, because of a lack of funds and manpower at OOAMA. AFSWC was convinced that slower rotation of the armament

89. Ltr, and Atchs, OOAMA to ADC, "Failure of Aft Launching Lug, MB-1 Rocket," 24 Aug 1961 [Doc 732 in Hist of ADC, Jul-Dec 1961].

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door would reduce the dynamic loads on the suspension hooks,
 and in turn reduce the dynamic loads on the launching lugs. ⁹⁰

(u) (S) WRAMA, meanwhile, came up with an interim solution pending a final "fix." Technical Order IF 101B-773 of late July called for replacement of worn preload torque bolts and helicoil inserts on ejector racks. This order created a maintenance task of some magnitude, since it was discovered at Tyndall, for example, that all helicoil inserts were defective. It was suspected that, in certain cases, faulty helicoils had caused false readings during the torquing process, resulting in improper tightening of the rocket release mechanism. Later, a snap lock was devised to prevent the preload torque bolt from loosening under the stress of heavy vibrations, while the eye bolt was studied for possible redesign so the helicoil would maintain a fixed position, as it was supposed to do under torquing pressures. Even so, these innovations constituted only another interim "fix" as WRAMA moved on to more tests

90. .Msg SWVGT-4-8-19, AFSWC to WRAMA, 4 Aug 1961 [Doc 733 in Hist of ADC, Jul-Dec 1961]; Ltr, AFSWC to Dep IG for Safety (USAF), "Preliminary Summary of F-101B/MN-11 Incident," 10 Aug 1961 [Doc 720 in Hist of ADC, Jul-Dec 1961]; Msg SWUNT-10-10-15, AFSWC to OOAMA, 13 Oct 1961 [Doc 734 in Hist of ADC, Jul-Dec 1961].

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and experiments during 1962 in search of a permanent cure
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for the chronically ailing F-101B ejector racks.

(u) ~~(S)~~ The last nuclear occurrence of 1961 involving the F-101B/MB-1 weapon system took place on the ground. During a check of F-101B armament release apparatus on 11 August in the alert hangar of the 49th FIS (Griffiss), the loaded right rack instead of the empty left rack was tripped and a tactical MB-1 was accidentally dropped. The MB-1 struck a trailer positioned beneath it and suffered structural damage, although no explosion resulted. Also in August, three of four nuclear occurrences involving the F-102A/GAR-11 system took place. On 8 August, during a practice loading session at the 331st FIS (Webb), a GAR-11 attached to an F-102A was damaged when its MF-9 missile trailer lift, while being withdrawn from beneath the plane, accidentally struck and bent a fin. Two weeks later, at the 482nd FIS (Seymour Johnson), another GAR-11 was damaged under similar circumstances and on the 30th of August, almost

91. Msg WRNQ 56372, WRAMA to 56 Ftr Wg, et al, 22 Jul 1961 [Doc 735 in Hist of ADC, Jul-Dec 1961]; Msg ADMME-DE 1582, ADC to WRAMA, 27 Jul 1961 [Doc 736 in Hist of ADC, Jul-Dec 1961]; NOFORN EX CANADA, Msg ADMME-DE 1612, ADC to WRAMA, 1 Aug 1961 [Doc 737 in Hist of ADC, Jul-Dec 1961]; Msg WRMQS 61138, WRAMA to USAF Dep IG for Safety, 8 Aug 1961 [Doc 738 in Hist of ADC, Jul-Dec 1961].

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the same thing happened at the 82nd FIS (Travis). The last of the F-102A/GAR-11 nuclear incidents took place on 31 October, when a missile bay door lock fell and dented a GAR-11 training missile. This occurred at the 92nd FIS (Palme) during a weapon launch system check.

(u) (S) The only nuclear episode involving the F-106A/MB-1 system during 1961 took place 22 August at the Tyndall training center. An F-106A from the 71st FIS (Selfridge), while on a rocket firing mission, received considerable damage to its armament bay doors and the MB-1T it carried when the missile doors opened shortly after the fire control system locked on the target, then clamped shut on the rocket as it began to fall. The MB-1T tail fins were broken,

92. FORMERLY RESTRICTED DATA, Msg 49CSA-F-32H, 49 FIS to USAF, 18 Aug 1961 [Doc 739 in Hist of ADC, Jul-Dec 1961]; FORMERLY RESTRICTED DATA, Ltr, AFSWC to USAF Dep for Nuclear Safety, "Preliminary Summary of F-101B/MB-1 Incident," 25 Aug 1961 [Doc 740 in Hist of ADC, Jul-Dec 1961]; Msg 331CSA-M-922/61, 331 FIS to USAF, 15 Aug 1961 [Doc 741 in Hist of ADC, Jul-Dec 1961]; Msg MANBS 79173, MAAMA to 331 FIS, 23 Aug 1961 [Doc 742 in Hist of ADC, Jul-Dec 1961]; Msg 482MME-AE 8-46, 482 FIS to USAF, 29 Aug 1961 [Doc 743 in Hist of ADC, Jul-Dec 1961]; Msg 482MME-AE 9-4, 482 FIS to USAF Dep IG for Safety, 6 Sep 1961 [Doc 744 in Hist of ADC, Jul-Dec 1961]; Msg 82CSA 8-128, 82 FIS to USAF, 1 Sep 1961 [Doc 745 in Hist of ADC, Jul-Dec 1961]; Msg MANBRS 86377, MAAMA to 82 FIS, 7 Sep 1961 [Doc 746 in Hist of ADC, Jul-Dec 1961]; Msg 57ODC 11-3209, 57 Ftr Gp to USAF, 4 Nov 1961 [Doc 747 in Hist of ADC, Jul-Dec 1961].

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the nose cone was crushed and the fusing mechanism was
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destroyed.

(u) Of the mishaps occurring in 1962, about three-fourths were attributable to personnel error, mostly during the loading and unloading process, and one-fourth to materiel failure. The ultimate objective, of course, never ceased being zero per cent in the accident category, called "Broken Arrow," which pertained to nuclear weapons lost in flight or detonated, and in the incident category, called "Bent Spear," pertaining to nuclear armament damaged or malfunctioned seriously enough to warrant their return to the AEC for repair. A third category, labeled "Dull Sword," was added during 1962 to cover nuclear safety deficiencies involving damage, malfunctions and failures so slight (such as scratches and bent fins) that they could be repaired by USAF field depot units. Moreover, damage to, or loss of MB-1 and GAR-11 training rounds lacking warheads came under this third category, in addition to defects and malfunctions in equipment employed for handling, loading, storing, maintaining,

93. Msg 73CSA 40H, 73 AD to USAF, 22 Aug 1961 [Doc 748 in Hist of ADC, Jul-Dec 1961]; Msg 73CSA 42H, 73 AD to USAF, 25 Aug 1961 [Doc 749 in Hist of ADC, Jul-Dec 1961]; Msg 30CSA 0835, 30 AD to DEADS, 30 Aug 1961 [Doc 750 in Hist of ADC, Jul-Dec 1961].

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transporting and testing nuclear armament while in use with the MB-1 or GAR-11. Over a third of the 1962 "Dull Sword" incidents involved MB-1 heater blankets for example. Other deficiencies were grouped under the "Dull Sword" category as well.⁹⁴

(u) (P) Those incidents directly connected with nuclear air-to-air missiles or their training counterparts (equipped with dummy warheads) numbered about fifteen. They were nearly evenly divided between GAR-11 and MB-1 episodes or their training versions. Three of the eight GAR-11 involvements occurred at the 76th FIS (Westover), where on January 2 and 10, armament crews, during uploading operations, punctured two GAR-11's and on June 18, a GAR-11 was discovered to be defective because two pins were lodged in the rubber base of its warhead wiring. Two GAR-11 incidents occurred at the 82nd FIS (Travis), where a fin of a GAR-11 training round (lacking nuclear warhead), was dented when

94. Msg AFCIG 1484/62, USAF to All Major Cnds, 28 Aug 1962 [DOC 312]; ADC, Charts and Graphs, ADCSA, "Summaries of 1961-1962 Air-to-Air and Ground-to-Air Accidents/Incidents," n.d., ca. Jan 1963 [DOC 313]; Mins of Mtg and Atch, ADC, ADCSA, "Minutes of Missile/Nuclear Safety Council," and presentation to the Council of 1962 Bent Spears and Dull Swords, 23 Jan 1963 [DOC 314]; ADC Munitions Bulletin No. 63-2, 15 Feb 1963 [DOC 86]; ADC Munitions Bulletin, No. 63-3, 15 Mar 1963 [DOC 118].

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it struck an MF-9 trailer on January 18, and where a GAR-11 was scratched while undergoing a console checkout on August 2. Only a few weeks before, on July 16, a GAR-11 was scarred during a rail loading operation at the 331st FIS (Webb). And in November, two GAR-11's belonging to the 328th Fighter Wing (Richards-Gebaur) were dented during the loading process at the Grand Island Dispersal base, the first happening on November 7 and the second, on November 20.

(U) ~~(S)~~ But the MB-1 inventory did not escape without its share of troubles for the year, though like the GAR-11 inventory, none of the mishaps proved drastic enough to detonate a weapon. In two instances, at the 408th Fighter Group (Kingsley) on January 4, and at the 414th Fighter Group (Oxnard) on March 8, initiator pins were inadvertently pulled. Between times, on February 27, an MB-1 was discovered with a dent in its warhead at the 75th FIS (Dow), rendering suspect the MF-9 trailer employed during the unloading process. Mounting lugs that shook loose in flight resulted in damage to an MN-11 training round belonging to the 10th Fighter Wing (Hamilton) on July 9, and similarly to an MN-11 round of the 414th Fighter Group (Oxnard) on September 12. Both instances smacked suspiciously of the ejector rack troubles that had hounded the F-101B fleet

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since 1959-60. About three weeks later, on October 4, a third MB-1 dummy training rocket was discovered damaged during a periodical inspection at the 456th FIS (Castle). Since an electrical connector had become separated after several screws broke, it was surmised that an armament crew, when mating the dummy missile to an F-101B rack, had misaligned the missile the last time it was employed for training purposes. Perhaps the worst mishap in the MB-1 category, and the last one for the year, was caused by the 1st Fighter Wing on December 15 during a cold snap at Selfridge. Ground servicing crews activated MC-1 heaters to warm MB-1's loaded on alert F-106A's for maintaining MB-1 rocket motor operating temperatures. The hose of one MC-1, however, was inadvertently connected to the wrong heater outlet. Consequently, heat in excess of 150 degrees -- more than twice as hot as desired -- was funnelled onto one MB-1, melting its High Explosive to a plastic state. No explosion resulted, fortunately.

95. Msg 76CSA 0042, 76 FIS to USAF, 5 Jan 1962 [from ADCSA-W files]; Rpt, AF FM 711, 408 Ftr Gp to USAF, "USAF Accident/Incident Report," Serial No. NI 012, Jan 1962 [from ADCSA-W files]; Msg 76MME-AM0101, 76 FIS to USAF, 16 Jan 1962 [from ADCSA-W files]; Msg 82CSA-1-115, 82 FIS to USAF, 25 Jan 1962 [from ADCSA-W files]; RESTRICTED DATA, Msg 75CSA2-21 S, 75FIS to USAF, 27 Feb 1962 [DOC 315]; Msg 1616C, 414 Ftr Gp to USAF, 8 Mar 1962 [DOC 316]; RESTRICTED DATA, Msg 76MME-AM

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(U) (S) As in past years no episodes occurred during the first six months of 1963 that caused detonation of the HE element in any nuclear air-to-air rockets, let alone trigger a full-scale atomic detonation. As a result of the "Dull Sword" category of mishap (introduced late in 1962 to bring to light lesser deficiencies in atomic armament and allied support equipment), more of this type of occurrence was reported. In several instances MB-1 heater blankets were damaged by armament crewmen or by the cradle strap latch of the MF-9 trailer, for which a modification was effected. As usual, personnel error accounted for the majority of mishaps.

[Cont'd] 1130, 76 FIS to Dir Nuc Safety (Kirtland), 18 Jun 1962 [DOC 317]; FORMERLY RESTRICTED DATA, Msg 507WG-CSA C-2-62, 507 Ftr Wg to USAF, 9 Jun 1962 [DOC 318]; Msg 32FSWA 06-3028, 32 Ftr Wg to USAF, 20 Jun 1962 [DOC 319]; Msg WGCSA-M3076, 78 Ftr Wg to USAF, 10 Jul 1962 [DOC 320]; Msg ADMME-EA 1842, ADC to WRAMA, 11 Jul 1962 [DOC 321]; Msg WGCSA-M 2177, 78 Ftr Wg to USAF, 12 Jul 1962 [DOC 322]; Msg 331CSA 755/62, 331 FIS to USAF, 21 Jul 1962 [from ADCSA-W files]; FORMERLY RESTRICTED DATA, Msg S-8-050-C, 3096 Avn Dep Sq (Travis) to USAF, 3 Aug 1962 [DOC 323]; Msg MANBSS 100097, MAAMA to ADC, 13 Aug 1962 [DOC 324]; RESTRICTED DATA, Msg 414CSA-M/N 62S485, 414 Ftr Gp to ADC, 19 Sep 1962 [DOC 325]; Msg 414CSA-M 33021, 414 Ftr Gp to USAF, 13 Sep 1962 [DOC 326]; Msg 456CSA-M 1402, 456 Ftr Gp to USAF, 12 Oct 1962 [DOC 327]; Msg 328 FWCVC-S 6993, 328 Ftr Wg to USAF, 10 Nov 1962; Msg 328FWCVC-S 7105, 328 Ftr Wg to USAF, 21 Nov 1962 [DOC 328]; Msg IWCSA S-62-210, 1st Ftr Wg to USAF, 19 Dec 1962 [DOC 329]; Msg ADMME-EB 3538, ADC to Air Divs, 26 Dec 1962 [DOC 330]; RESTRICTED DATA, Msg AFINS-E-1-1-67-63E, Dep Tig USAF to ADC, 22 Jan 1963 [DOC 331]; RESTRICTED DATA, Msg AFINS-E-1-5-20-63E, Dir Nuc Safety to ADC, 9 May 1963 [DOC 332].

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(u) (S) The first instance directly involving nuclear armament and most serious by USAF standards, concerned a violation of the two-man concept at the 432nd FIS (Seymour-Johnson) on 7 February 1963. When informed that a lone armament technician had been allowed to deliver two GAR-11's from the storage to the alert area without the required security escort, USAF heatedly complained:

The incident...is considered by this Headquarters to be one of the most serious examples of violation of the precepts of the entire USAF nuclear safety program yet reported....The seriousness of the situation which allowed a single individual at night the uninterrupted opportunity to take any action he desired with two nuclear weapons cannot be under emphasized.

A formal investigation was immediately launched, and corrective measures established to preclude a recurrence of this violation.

96. Mins of Missile/Nuclear Safety Council Mtg, 18 Jul 1963, 19 Jul 1963 [DOC 333]; FORMERLY RESTRICTED DATA, Msg 482 CSA-S C-13, 482 FIS to USAF, 9 Feb 1963 [DOC 334]; *RESTRICTED DATA, Msg AFINS-W-2-2-48-63E, Dep TIG USAF (Kirtland) to ADC, 16 Feb 1963 [DOC 335]; Msg 482CSA-S 63-249, 482 FIS to USAF, 16 Feb 1963 [DOC 336]; RESTRICTED DATA, Msg ADCSA-W 578, ADC to 26 AD, 26 Feb 1963 [DOC 337]; FORMERLY RESTRICTED DATA, Msg ADCSA-W 934, ADC to Dir Nuc Safety (Kirtland), 27 Mar 1963 [DOC 338]; FORMERLY RESTRICTED DATA, Msg 507WG-MDC-MME 63-S-19, 507 Ftr Wg to Nuc Safety Dir (Kirtland) 27 Mar 1963 [DOC 339]; Msg CAS 5-41, 27 FIS to USAF, 28 May 1963 [DOC 340]; Msg FIS49-ODC-5-3, 49 FIS to USAF, 29 May 1963 [DOC 342]; Msg CAS 5-42, 27 FIS to USAF, 28 May 1963 [DOC 341]; Msg 507WG-MDC-MME 63-5-23, 507 Ftr Wg to Dir of

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(u) (S) A week afterward, another tactical weapon -- this time an MB-1 -- was also involved in an incident because of personnel error. An armament crew at the 87th FIS (Lockbourne) was guilty of misaligning an aft lug of a "Genie" when affixing it to the launcher rack of an F-101B being readied for alert duty. Consequently, when the F-101B armament door was rotated, the MB-1 slipped from position, cracking a fin in the process. Similar episodes had occurred at the 29th FIS (Malmstrom) in September 1960, at the 322nd FIS (Kingsley) in June 1961, and at the 75th FIS (Dow) in July 1961, as noted above. The next episode involving a tactical MB-1, which took place that same month (20 February 1963) at the 84th Fighter Group (servicing the 498th FIS at Spokane), was less serious by comparison. Again because of personnel error, an MB-1 was jeopardized, but fortunately not harmed, when an airman caused a gate to close prematurely, catching a "Genie"-loaded trailer in an MB-1 convoy

[Cont'd] Aerospace Safety, 18 Jun 1963 [DOC 343]; Msg SAN88201, SAAMA to ADC, 23 May 1963 [DOC 344]; Msg 88233, SAAMA to MAAMA, 31 May 1963 [DOC 345]; Msg ADCIG-I 2600, ADC to Dir of Nuc Safety, 3 Jul 1963 [DOC 346].

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returning to storage. Aside from a bent gate frame, damage⁹⁷ was slight, involving mostly the MF-9 trailer.

(u) (4) On 4 March, a little over a week later, an incident occurred at the 98th FIS (Dover) that harkened back to ejector rack troubles that had dogged ADC's F-101B fleet for years. After an inert version of the MB-1 was loaded on an F-101B, the ejector rack was improperly torqued. The launcher hooks, rather than securely fasten the missile by the torquing process, allowed the missile to squeeze past a slight opening. The loading crew managed to catch the missile as it fell, thus averting injury to it. During most of 1962, WRAMA had continued testing F-101B ejector rack hook linkages as they were affected by the pre-load torquing process (designed to remove existing slack). New preload bolts were tried, omitting helicoil inserts altogether, but this failed to solve the problem. The tests conducted in 1962 proved frustrating at first, since little headway was forged toward a permanent "fix" before mid-year. It was even proposed at one time that the entire ejector rack be redesigned. Finally a solution was found in a redesign

97. Msg 87-CSA100-63, 87 FIS to USAF, 17 Feb 1963 [DOC 347]; RESTRICTED DATA, Msg 84CSA-M14, 34 Ftr Gp to Dir Nuc Safety (Kirtland), 22 Feb 1963 [DOC 348].

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of the helicoil insert itself. The helicoil was lengthened and staked to prevent movement when preload bolts (which also were improved in design) were tightened or loosened. Replacement of helicoil inserts was incorporated as part of a technical order 11B29-3-20-507 scheduled to be made available in December 1962, but not actually distributed in time to prevent the incident at the 98th FIS in March 1963. It was expected that this technical order, once applied, together with T.O. 11B29-3-20-508 calling for readjustments of the linkage (issued in late 1963), would finally remedy the F-101B's chronic ejector rack problems.⁹⁸

(u) (P) On March 12, an MB-1 at the 408th Fighter Group (servicing the 322nd FIS at Kingsley) was found to have a dented casing. Personnel error was blamed for the damage because the same "Genie" had been bumped several months earlier while being transferred from an MF-9 trailer to a pallet.⁹⁹

98. Msg 98CSA3-5-1, 98 FIS to USAF, 5 Mar 1963 [DOC 349]; Rpt, 4750 Test Sq (73AD), Final Report Project ADC/73AD/62-14/F-101B/MB-1 Ejector Rack Preload, 17 Aug 1962 [DOC 350]; ADC Munitions Bulletin No. 62-11, 15 Nov 1962 [DOC 351]; Mins, OOAMA Flight Safety Materiel Deficiency Task Group Mtg, 5 Sep 1962 [DOC 352]; ADC Munitions Bulletin No. 63-4, 15 Apr 1963 [DOC 93]; Msg ADMME-EA 08178, ADC to USAF, 8 Mar 1963 [DOC 353]; ADC, ADCSA, Resume of F-101B/MB-1 Rack Problems, n.d. (ca. Apr 1963) [DOC 354].

99. RESTRICTED DATA, Msg 408 CSA 3 0888, 408 Ftr Gp to Dir Nuc Safety, 14 Mar 1963 [from ADCSA files].

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Near the end of March, a mishap occurred at Goose, where the F-102A's employed by the 59th FIS, though modified to carry live GAR-11's, were limited to the use of inert training versions as long as ADC lacked authorization to store nuclear armament on Canadian soil. It was while transporting a missile on 29 March over a rutted, slippery road that an inert GAR-11 tumbled off its trailer and bounced on the ice. A faulty quick release pin on the rail assembly of the trailer was declared to be the cause. The GAR-11 training missile was split, chipped, and bent in several places.

(U) ~~(S)~~ The final mishap of the season, while not resulting in damage to a tactical or training version of a nuclear weapon, caused many an eyebrow to raise. A bolt of lightning, struck an F-106A belonging to the 48th FIS (Langley) during flight. Fortunately for both pilot and interceptor, nothing permanently disabling resulted. However, the abnormally high electrical surge had triggered the primary armament circuitry, even possibly causing the missile bay doors to open and shut. While it was concluded that a live MB-1, given the same circumstances, would not experience a full-scale atomic detonation because the in-flight ejector rack

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lock, by remaining steadfastly engaged, would prevent a launching, this offered little solace to the pilot. It was felt that the rocket motor would ignite, destroying the aircraft in the process.

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100. Msg AFIAS-R1 03 080, Dep TIG USAF to MAAMA,
6 Apr 1963 [DOC 355]; Msg ADCSA-W ALADC 936, ADC to ALADC,
2 May 1963 [DOC 356]; Msg ADMME-CB 1829, ADC to AFWL,
14 May 1963 [DOC 357].