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January 1965

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EVALUATIONS OF SOVIET SURFACE-TO-SURFACE MISSILE DEPLOYMENT

16TH REVISION

A Report of the Deployment Working Group

of the

Guided Missile and Astronautics Intelligence Committee

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The Guided Missile and Astronautics Intelligence Committee (GMAIC) wishes to express its appreciation to the National Photographic Interpretation Center for its assistance in the editing, illustration, and publication of this report.

GUIDED MISSILE AND ASTRONAUTICS INTELLIGENCE COMMITTEE

25X1A

DEPLOYMENT WORKING GROUP

MEMBERSHIP

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Photographic Interpreter support is provided by the Photographic Analysis Group, NPIC.

NOTE: All correspondence relative to this report should be directed to the Chairman, Guided Missile and Astronautics Intelligence Committee (GMAIC).

PREFACE

This report, published bimonthly by the GMAIC Deployment Working Group (DWG), provides a comprehensive, ready-reference listing of all ICBM, IRBM, and MRBM deployment locations, types of site configurations, photographic references, estimated construction and operational status, and other evaluations by the DWG. These data constitute the majority view of the DWG membership, and may not correspond precisely to individual assessments by each member. Additional data may be added to future revisions.

Dissemination of the report was previously limited to holders of the DWG report, Soviet Surface-to-Surface Missile Deployment. Because the information contained herein is both supplemental and self-sustaining, distribution will no longer be limited to holders of the above report.

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ILLUSTRATIONS

ILLUSTRATIONS (Continued)

ILLUSTRATIONS (Continued)

INTRODUCTION

This report is the 16th Revision of Evaluations of Soviet Surface-to-Surface Missile Deployment prepared by the Deployment Working Group (DWG) of the Guided Missile and Astronautics Intelligence Committee (GMAIC). While information contained in this and previous revisions is self-sustaining, it serves to supplement the basic DWG report Soviet Surface-to-Surface Missile Deployment, which provides detailed information on individual launch facilities of the Soviet Strategic Rocket Forces. The basic report, dated 1 January 1962 (Control Number TH 0747-62KH), has been revised and updated on a periodic basis. Further updating is accomplished in reports prepared and published for GMAIC by the National Photographic Interpretation Center.

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previous missions and other sources have provided additional information on the Soviet strategic ballistic missile deployment program. The new data are reflected in Table 1 and in the estimated operational status shown in Tables 2, 3, and 4. Cutoff date for information contained in this report is 20 December 1964.

SOVIET ICBM DEPLOYMENT

Soviet ICBM deployment activity since the 15th Revision is highlighted by the apparent completion of 6 Type IIIA sites and the abandonment of another, and the identification of 2 confirmed and 3 probable single-silo sites at 2 complexes. At the Tyuratam Missile Test Center, significant developments include the completion of 3 launch sites and continued construction activity at what now is assessed as a probable launch facility at Complex J.

CURRENT DEPLOYMENT

The number of identified ICBM complexes remains at 24, with the search for new single-silo complexes on available photography nearing completion. See Figure 1 for locations of deployed ICBM complexes.

The 24 complexes now contain a total of 271 confirmed and probable launchers, of which 150 are soft and 121 are hard. Included in the hard launchers are 40 single-silo configurations. Additionally, we are carrying 1 more single silo in the possible category.

Of the 271 confirmed and probable launchers, 215 are considered to be operational, including 69 in a hard configuration. In addition, we believe that 26 of the 35 confirmed launchers at the Tyuratam Missile Test Center, including 9 hard, are operational.

The ICBM sites have been designated by type as shown and explained in Figure 2. We continue to be unable to determine with confidence the missile system or systems associated with single-silo configurations identified at Tyuratam and at deployed complexes. Neither can we ascertain the final configuration(s) for these sites, nor for the new probable rail-served soft sites at Plesetsk. Therefore, we have not added diagrams of these sites to Figure 2 and will continue to refer to them as Type III (single) and Type IB, respectively.

Evaluation of all evidence received since our last revision has resulted in changes at the following complexes:

ADDITIONS:

IMENI GASTELLO, Launch Site F(6), Type III (single), under construction

OLOVYANNAYA, Launch Site D7(6), Type III (single), under construction: Probable Launch Sites D8, D9, and D10, Type III (single), under construction.

DELETIONS:

GLADKAYA, Launch Site E(6), Type IIIA, abandoned.

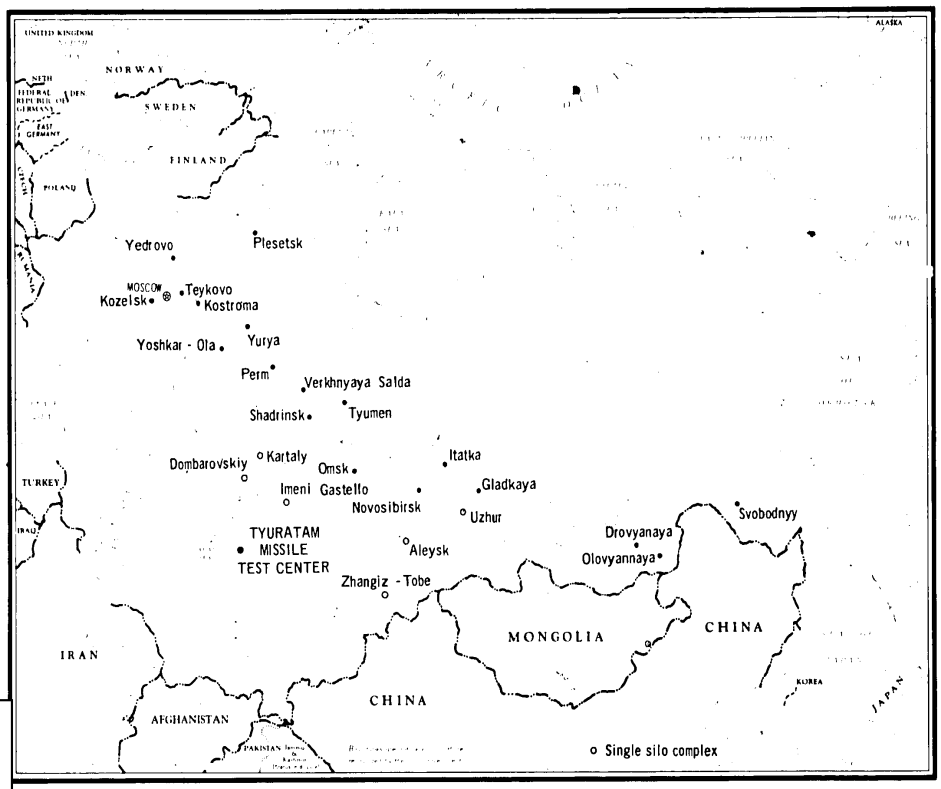

FIGURE 1. DEPLOYMENT OF SOVIET ICBM COMPLEXES.

SINGLE-SILO COMPLEXES

General

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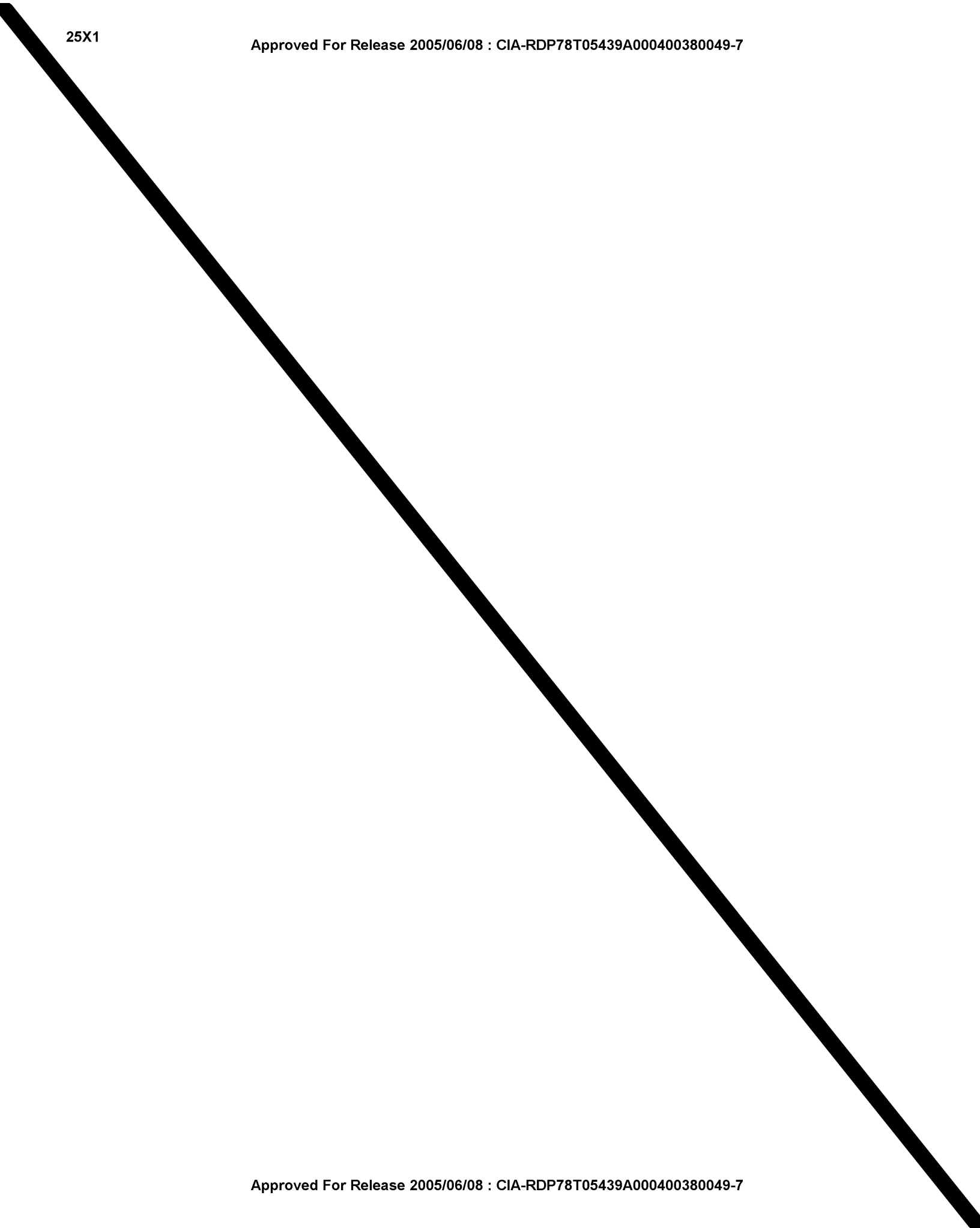
The 6 single-silo complexes begun since [redacted] 25X1D (excluding Launch Group D at the Olovyannaya Complex) now contain a total of 30 confirmed and probable silos in early and midstages of construction. Total silos within the individual complexes range from a low of 2 (plus 1 possible) at Kartaly to a high of 6 at Aleysk, Imeni Gastello, and Uzhur.

Since the 15th Revision, 4 of the 6 single-silo complexes (Aleysk, Dombarovskiy, Imeni Gastello, and Uzhur) have been covered by usable [redacted] photography. From this and continuing analysis of previous coverage of all 6 complexes, a general picture of the Soviet construction program at these complexes can be depicted. Construction is begun at 1 or more launch sites at approximately the same time that construction of the complex support facility is initiated. No complex main road is evident, although this feature may be added as construction progresses. Instead, maximum advantage is taken of existing roads and, where these are lacking, it appears that equipment and vehicles are moved cross-country without benefit of any road preparation. These procedures differ markedly from those observed at the 18 older ICBM complexes, where the complex support facility and a complex main road were brought to a fairly advanced stage of construction before work on the launch areas was initiated.

Construction techniques appear to be similar at those single-silo launch sites on which good coverage has been obtained. A square excavation served by 2 earth ramps appears to be the first step in silo construction, followed by a silo coring in the approximate center of the excavation. Spoil from the excavation is arranged in a neat flat-topped rectangle on 1 side and a smaller flat-topped square on the opposite side. At Aleysk, the tops of these earth mounds have been surfaced with what appears to be concrete, suggesting that the earth mounding provides a hardstand at a specific level, probably to facilitate future missile handling and servicing. No evidence of construction under the earth mounds has been detected. An artist's concept of a typical single-silo launch site in a midstage of construction is shown in Figure 3.

We have noted that certain launch sites at 3 of the complexes--Aleysk A(1) and C(3), Dombarovskiy B(3), and Imeni Gastello D(4)--have security fences encompassing a much larger area than those visible at other launch sites within the same complexes. These large fenced areas are similar in pattern to the fenced area at Launch Complex I(14) at Tyuratam, which contains an L-shaped probable guidance facility (interferometer) as well as a launch silo. While no interferometer is yet visible at the deployed sites, the fenced areas are large enough to contain one. Furthermore, at Launch Site D(4) at Imeni Gastello, an excavation is visible near the silo in the same relative position as a mounded structure in the apex of the "L" at Launch Complex I(14) at Tyuratam.

An analysis of the complexes at Aleysk, Dombarovskiy, and Imeni Gastello suggests that each may contain troikas of sites, i.e., groups of 3, although at this stage other possibilities also exist. Such a grouping is reminiscent of Launch Sites A3(15) and B2(16), and Launch Complex I(14) at Tyuratam. The 3 sites at Tyuratam are connected by what appear to be cable ditches (see 15th Revision). This feature is not yet evident at any of the 6 deployed single-silo complexes.



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Aleysk Complex

25X1D

The Aleysk Complex was covered by Mission [redacted] but only the [redacted] mission yielded interpretable results. The complex consists of a complex support facility, a possible rail-to-road transfer point, and 6 single-silo launch sites, all in a midstage of construction. The entire complex is served by a network of unimproved roads and trails. A schematic layout of the complex is shown in Figure 4.

Construction of this complex was begun subsequent to Mission [redacted] Initial construction activity at the complex was observed on [redacted] when Launch Site A(1) was identified. The complex support facility, negated on [redacted]

The 6 launch sites are in a midstage of construction and are typical examples of the construction techniques at single-silo complexes. All 6 have square excavations containing a silo under construction. Spoil from the excavations has been placed on either side of the silos, forming a rectangle on 1 side and a square on the other. At 5 of the 6 sites, the spoil piles appear to be level and surfaced with concrete. All 6 launch sites are inclosed by security fences. The fences at Launch Sites A(1) and C(3) inclose a considerably larger area than those at the other 4 sites, suggesting space for an interferometer, although none is evident at either site as yet. Launch Site C(3) is shown in Figure 5.

Dombarovskiy Complex

25X1D

The Dombarovskiy Complex is covered by poor-quality stereo photography on Mission [redacted] The complex consists of a complex support facility, a possible rail-to-road transfer point, and 5 single-silo launch sites, each containing a silo under construction. A schematic layout of this complex is depicted in Figure 6.

The complex can be negated on Mission [redacted] although a survey line for the rail spur was present at that time. First evidence of construction activity was observed on [redacted] when the complex support facility and Launch Sites A(4) and B(3) were identified.

Launch Sites A(4), B(3), C(2), and D(1) are in a midstage of construction; Launch Site E(6), confirmed as a launch facility on [redacted] in [redacted] remains in an early stage. The construction techniques at all 5 launch sites are characteristic of single-silo complexes. Four of the launch sites, (all except Launch Site E(6), are fenced; the secured area at Launch Site B(3) is larger than the others and similar in pattern to Launch Complex I(14) at Tyuratam. Launch Site B(3) is shown in Figure 7.

Imeni Gastello Complex

25X1D

[redacted] provides the first good-quality stereo coverage of the Imeni Gastello Complex (Figure 8), the most recently identified of the 6 single-silo complexes. Highlighted on this coverage is the identification of Launch Site F(6), a single-silo facility in a midstage of construction.

Construction at the complex can first be identified on Mission [redacted] at which time activity can be observed at the complex support facility, the rail-to-road transfer point, and Launch Areas C(3), D(4), and E(5). Launch Sites A(1) and B(2) were not covered on this mission, and were first observed on Mission [redacted] Launch Site F(6) is first visible on Mission [redacted] in [redacted] A schematic layout of this complex is shown in Figure 9.

25X1D

The complex is situated in an agricultural area of relatively flat-to-gently rolling terrain. The various components of the complex are connected by a network of previously existing farm roads. No extensive road construction or repair is evident. Some deviation from existing roads has been necessary to reach the various construction sites. This has been accomplished with a minimum of new road surfacing, and often is no more than tracking across open fields.

In general, construction techniques at the launch sites conform to the pattern previously described, although the rectangular and square areas on either side of the silos are not apparent. Security fences can be observed around 4 of the launch sites, including that at Launch Site D(4) whose sides average in excess of 1,600 feet (Figure 10). This site also contains an excavation near the silo, in the same relative position as the mounded structure at the apex of the L-shaped probable guidance facility at Launch Complex I(14) at Tyuratam. Another large fence around Launch Site C(3) predates site construction and may not be significant.

25X1D
25X1D

Kartaly Complex

25X1D

The Kartaly Complex has not been covered by photography since Mission in and available information was presented in the 15th Revision. It consists of a complex support facility and 1 confirmed, 1 probable, and 1 possible single-silo launch sites, all in an early stage of construction. Construction at this complex was probably initiated after Mission although only the complex support facility and the confirmed Launch Site B(2) can be negated on that photography.

25X1D

Uzhur Complex

Mission provided fair-quality coverage of the Uzhur Complex, but interpretation was hindered considerably by snow cover and low sun angle.

The complex consists of a complex support facility, a rail-to-road transfer point, and 6 single-silo launch sites, all in a midstage of construction. A schematic layout of the complex is shown in Figure 11.

25X1D

Construction activity at this complex can first be identified on Mission

25X1D

At that time the complex support facility and Launch Sites B(2), D(4), and F(6) were visible. Because of cloud cover, negation of the entire complex cannot be affirmed before

25X1D

However, based on construction timing, we believe that work at this complex began in late

While construction techniques at this complex generally parallel those at the other 5 single-silo complexes, certain differences are also apparent. Extensive effort has been made to improve existing roads leading to several of the construction areas. Additionally, because of the nature of the terrain, the square and rectangular areas on each side of the silos at some of the sites have been prepared by cutting into the sides of hills. The signature of these sites, however, is comparable to those at the other 5 complexes. Launch Site B(2) is shown in Figure 12.

25X1D

Zhangiz-Tobe Complex

The Zhangiz-Tobe Complex is covered on Mission but the small scale and obliquity of the photography prevent interpretative results that would add to our knowledge of construction activity and site

signatures. A diagram of this complex, based on previous coverage, is shown in Figure 13.

25X1D This complex, the first single-silo complex to be identified, was first observed on Mission 25X1D when the complex support facility and Launch Site A(1) were visible. While lack of coverage precludes negation prior to Mission 25X1D we believe, based on construction timing, that work at this complex was initiated late in 25X1D It currently consists of a complex support facility and 5 launch sites, all in a midstage of construction.

The signature of the launch sites, characterized by a U-shaped area formed by a generally square excavation serviced by 2 inclined earth ramps, is similar to those at the other 5 complexes. Launch Site A(1) is shown in Figure 14.

OLOVYANNAYA COMPLEX

25X1D Mission provided fair-quality stereo coverage of the Olovyannaya Complex. No significant changes are visible at Launch Site A(1), a completed Type IIIA, or at Launch Sites B(2) and C(3), both Type IIIA configurations in a late stage of construction.

At Launch Group D, another single-silo launch site, designated D7(6), is confirmed approximately 3,200 feet northwest of the probable support/control facility (Figure 15). In addition, 3 probable new silos, designated D8, D9, and D10 (Figure 16), are under construction on the eastern side of the launch group. (One DWG member carries these 3 sites in the possible category.) An extensive network of cable ditches is being constructed rapidly

The lack of good-quality, high-resolution photographic coverage of Launch Group D precludes a definitive assessment at this time, but several general observations can be made. It is apparent that the overall configuration of the launch group and the method in which it is being constructed differ considerably from the configuration and construction techniques observed at the other 6 single-silo complexes. The silo excavations at Olovyannaya appear circular rather than U-shaped, cover a smaller area, and appear shallower. The silo structures also appear to be round, while those at the other complexes are square. Accurate mensural data cannot be obtained from available photography, but it appears that the silo corings and silo apertures at the Olovyannaya launch group are somewhat smaller in diameter than those at the newer complexes. In summary, it appears possible that Launch Group D at Olovyannaya will accommodate a different missile system than will be employed at the other 6 complexes.

Lack of high-resolution coverage at Olovyannaya also prevents a firm association of these silos with a prototype site or sites at Tyuratam, if indeed such a prototype exists at the rangehead. Certain similarities in silo configuration and facilities are suggested when comparing some of the Olovyannaya single-silo sites with Launch Site G8/G9 at Tyuratam, although the latter is dual-silo configuration (Figures 18, 37, and 38). The Olovyannaya and Tyuratam sites both appear to have the circular rather than a square silo structure. Two mounded structures at Launch Site D2(2) at Olovyannaya are located in the same relative position as one of the probable equipment bunkers and the control bunker at G8/G9. This association is tenuous, however, and not conclusive.

TYPE IIIA SITES
Site Abandonment

Mission 25X1D confirmed our suspicion that Launch Site E(6) at Gladkaya

25X1D

25X1D

has been abandoned (Figure 19). This site, first observed in an early stage of construction on Mission had not been

25X1D

covered by usable photography since It is the second aban-

25X1D

doned Type IIIA site of the group of 12 begun during the spring and after a 9-month break in construction starts. One Type

25X1D

IIIA site of the original group of 15 begun prior to was also abandoned in an early stage of construction, as reported in our 15th Revision. Of the remaining 10 sites in the group of 12, we suspect that construction has also ceased at Launch Site H(8) at Kostroma. However, we are awaiting further confirmation before dropping this site from the inventory.

Site Completions

photography since our last revision indicates that 6 of the 9 remaining Type

25X1D

IIIA sites (excluding Launch Site H(8) at Kostroma) in the group begun in have been completed, and that construction is nearing completion at the other 3.

25X1D

Mission revealed that Launch Sites G(7) at Svobodnyy and K(10) at Yurya are complete (Figure 20). Launch

25X1D

Sites E(5) and F(6) at Drovyanaya (Figure 21) appear complete on Mission

25X1D

We also estimate that Launch Sites C(3) at Shadrinsk and F(4) at Perm are operational,

25X1D

based on construction timing. Both were in a very late stage of construction when last observed on Missions

25X1D

and

Associated Missile System

We still have been unable to distinguish any significant difference between the first and second groups of Type IIIA sites deployed in

25X2

25X2

We had surmised that this later group of 10 sites was related to Launch Site D2(9) rather than D1(4) at Tyuratam (associated with the SS-7 system) and that an L-shaped guidance facility would appear as the launch facilities neared completion. There is no evidence that any such facilities are under construction. This indicates, of course, that the associated missile system utilizes all-inertial guidance. The SS-7 ICBM utilizes an all-inertial guidance scheme and no guidance facilities have been observed at SS-7 sites. While flight tests of the newer SS-9 ICBM indicate that it utilizes a radio-guidance link, we believe that it, like the SS-7, can be flown in all-inertial mode without the necessity of a ground-based guidance link. In summary we are unable to determine whether the later group of 10 Type IIIA sites are for the SS-7, the SS-9, or, less likely, for both.

SOFT SITES

In our 13th Revision we included artist's concepts of Type IIB, IIC, and IID soft sites, as well as Type IIIA and IIIB hard sites. Similar illustrations of Type IA and IIA soft sites were not included because of lack of high resolution photography. Such photography has since been obtained and concepts of these categories are shown in Figures 22 and 23.

PLESETSK COMPLEX

There has been no usable photographic coverage of the Plesetsk ICBM Complex since our last revision, and therefore we cannot report on construction progress at the 2 new probable rail-served soft sites, designated in our 15th

25X1D

Revision as Probable Launch Sites G(9) and H(10). Lack of new information also precludes further assessment of Launch Site F, the completed 2-pad configuration which resembles Launch Site 5C1 at Kapustin Yar rather than any known ICBM configuration.

TYURATAM MISSILE TEST CENTER

Test Range Facilities

25X1D

The Tyuratam Missile Test Center was only partly covered on Missions [redacted] 25X1D The quality of the photography ranges from poor-to-good and reveals that construction has continued at all uncompleted complexes. Recent significant developments at the test center include completion of Launch Sites D2(9), G3/G4(11) and G5/G6(12); the assessment that a probable launch facility is under construction at Complex J; and evidence of additional construction activity at Launch Sites E(6) and F(5).

25X1D

At Launch Complex A no change was observed at Pad A1(1). However, on Mission [redacted] 2 linear objects are visible on the rails adjacent to the launch pad (Figure 24). One, on a side rail, is a probable crane. The other, on the center rail to the pad, is a possible missile or missile component approximately 125 feet long. No change was visible at Pad A2. Mission [redacted] indicates that the single-silo Launch Site A3 (15) is still in a midstage of construction, with the silo not yet up to ground level (Figure 25).

No significant changes at Launch Complex B could be discerned on poor-quality photography.

25X1D

Facilities at Launch Complex C(3) showed no change on Missions [redacted] 25X1D and [redacted] However, on the [redacted] photography a probable missile is erected on Pad C1 (Figure 26).

Launch Complex D is covered by fair-quality, small-scale photography on Mission [redacted] Except for construction of a new settling basin outside the secured area, no change is visible at Launch Site D1(4). Launch Site D2(9) appears to be complete except for unidentified construction activity in the southern part of the secured area (Figure 27). Five unidentified objects have been added within the electronic facility west of the interferometer. Their position and orientation suggest an operational rather than an administrative function.

25X1D

Mission [redacted] revealed no changes within the secured area at Launch Complex E(6). However, a new dead-end rail spur has been constructed from the rail line west of the complex to a point near the access road south of the secured area (Figure 28).

25X1D

Mission [redacted] revealed that a ramp-like excavation has been dug at Launch Complex F(5), from the west end of the loop road down t[redacted]

25X1B

25X1B

Launch Complex G was covered on Mis-[redacted] in November 1964. No change in facilities can be observed at Launch Site G1/G2(7), which is firmly associated with the SS-10 flight test program (Figures 31 and 32). At Launch Site G3/G4(11), both launch pads and the electronic facility appear complete on Mission [redacted] (Figures 33 and 34). Launch Site G5/G6(12), a road-served soft facility, appears complete on Mission [redacted] (Figure 35). The single gantry associated with this site is approximately 90 feet high. Launch Site G7(18) remains

25X1D

25X1D

25X1D

in a midstage of construction (Figure 36), as viewed on [redacted] The square silo structure has been built up from the bottom of the excavation, but is not yet up to ground level. The access road has been partially looped in the vicinity of the silo. Construction continues on the L-shaped electronic facility, but it has not yet been backfilled. The dual-silo configuration at Launch Site G8/G9(19) remains in a late stage of construction. A hardstand has been constructed immediately south of each silo. See Figures 37 and 38 for photography and line drawings of this launch site in mid and late stages of construction.

A review of available photography of Launch Complex G indicates that what appears to be a cable ditch runs from Launch Site G5/G6(12) to Launch Site G8/G9(19); with connections to Launch Site G3/G4(11), the possible guidance facility in the vicinity of Launch Site G1, G2(7), and the probable technical support area in the complex support facility (Figure 39). A second probable cable ditch under construction appears to be intended to connect Launch Site G7(18) with Launch Complex K(13). At each facility the ditch currently ends somewhat short of the associated electronic facility (Figure 40).

No change in facilities is apparent on coverage of Launch Complex H(8) since our last revision. Photography and a line drawing of this site are shown in Figures 41 and 42.

25X1D Mission [redacted] shows no significant change at Launch Complex I(14) since our last revision. Figure 43 presents an artist's concept of this single-silo launch facility, which is currently in a midstage of construction.

At Complex J (Figure 44) the excavation located 3,000 feet northeast of the end of the road leading to the support facility has been enlarged considerably, and is now approximately the size of the blast pit at Pad A1(1). A ramp-like cut extends into the deepest part of the excavation. Spoil is being piled approximately 1,800 feet northeast of the excavation. A well-graded road from the main complex road to the rear of the support area for Launch Complex A is under construction. The location and nature of the excavation indicate that it will probably be developed into a launch facility. 25X1D

Construction is continuing at Launch Complex K(13). Mission [redacted] (Figure 45) shows that a rectangular hardstand/service apron has been constructed on the north side of K1. Similar construction appears to be in progress at K2. Four unidentified objects are located adjacent to the 150- by 50-foot building. Ditching connects this building and the 2 silos. The silos appear to be nearly at ground level and backfilling may have commenced. An artist's concept of this launch facility is depicted in Figure 46.

Test Range Activity 25X1D 25X1D

During the period [redacted] only 5 ICBM flight test operations were noted at the Tyuratam Missile Test Range. An extended-range firing of a probable SS-10 took place from Launch Complex G on 20 October. There were 2 successful SS-9 firings to the Kamchatka Impact Area, on [redacted] and [redacted] both from Launch Complex C(3). An operation on [redacted] possibly represented an SS-9 failure. An SS-7 was launched to Kamchatka on [redacted] the first such operation in [redacted].

25X1D 25X1D 25X1D 25X1D 25X1D

In addition, an unidentified vehicle was launched on [redacted] but failed after 5 minutes of flight. It appears that this vehicle may be new, but whether intended for an ICBM or space role (or both) cannot be determined.

SS-9 firings now total 17, of which 4 were failures. The failures occurred on [redacted]

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25X1D

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Latest firings of this missile system are believed to be a continuation of the systems refinement and accuracy improvement tests initiated on after completion of tests to the Pacific.

The event brought the total SS-7 firings to 87, of which 14 have failed. This flight appeared to be a limited R&D flight or a troop-training firing. SS-10 firings now total 8, of which 1 failed; the SS-8 flight total is 58, including 24 failures; and the SS-6 scoreboard shows 5 failures in a total of 46 firings.

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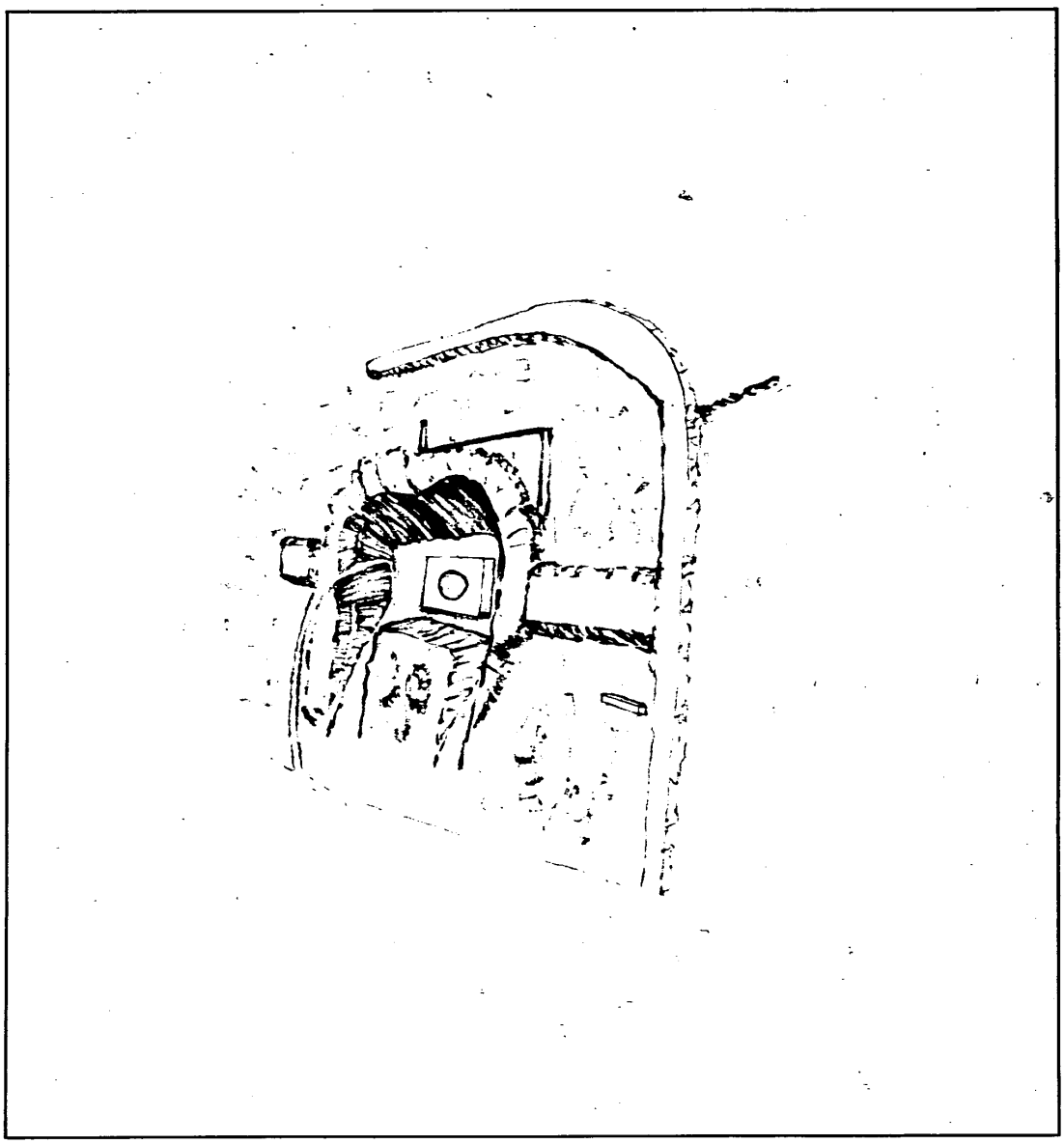


FIGURE 3. ARTIST'S CONCEPT OF TYPICAL SINGLE-SILO LAUNCH SITE IN MIDSTAGE OF CONSTRUCTION.

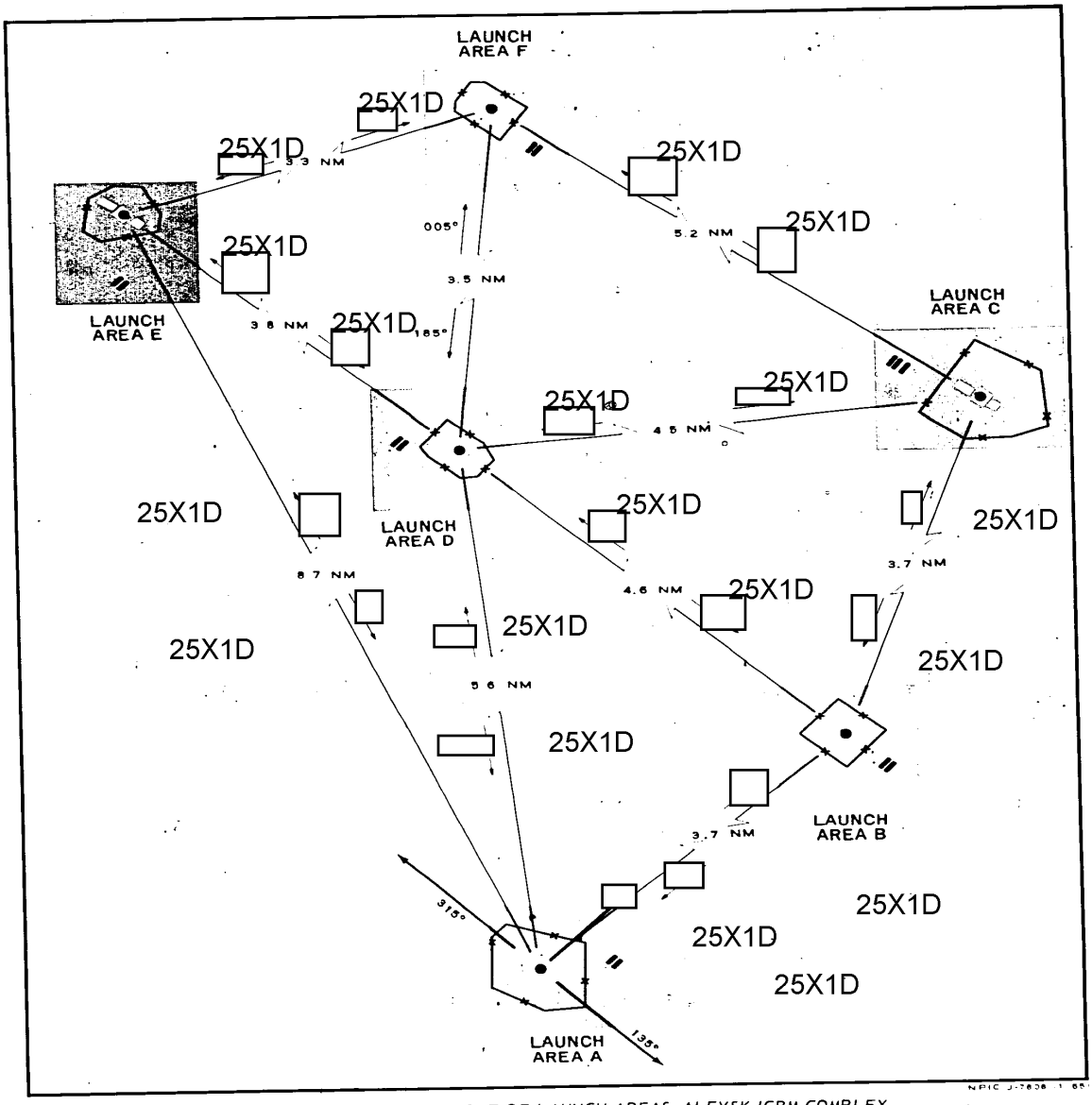
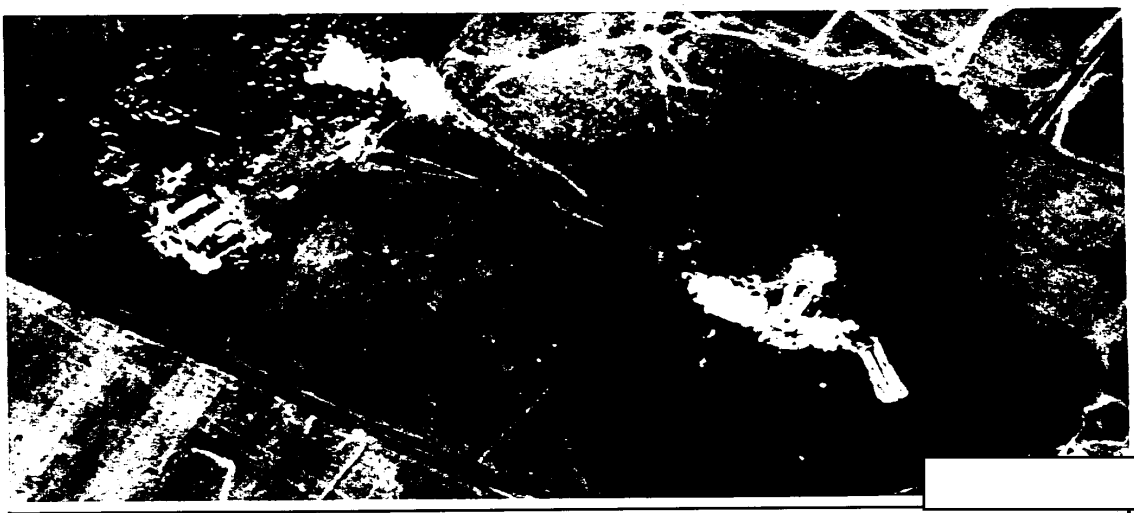
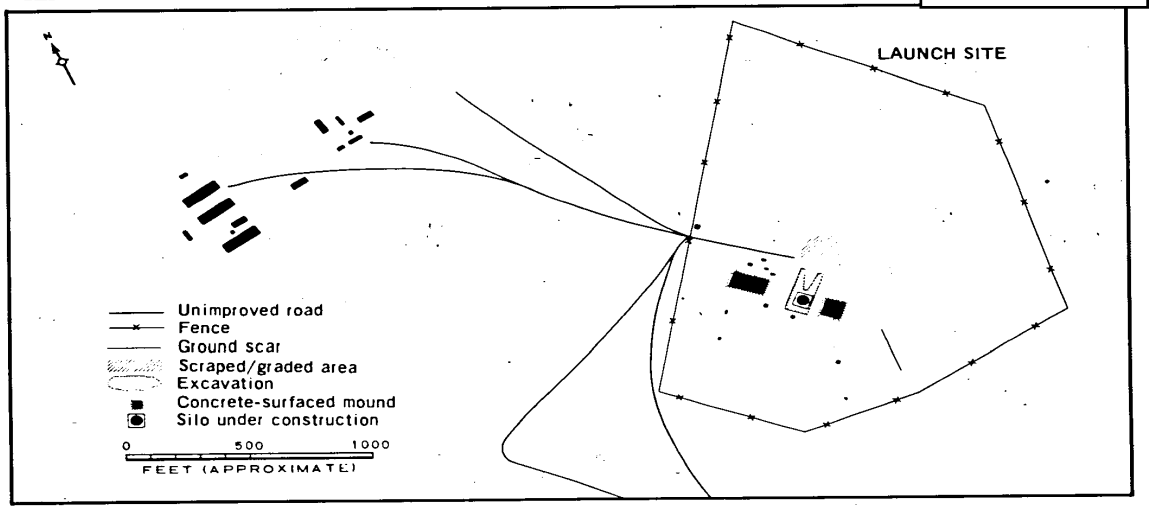


FIGURE 4. SCHEMATIC LAYOUT OF LAUNCH AREAS, ALEYSK ICBM COMPLEX.





LAUNCH SITE		ASSOCIATED BUILDINGS	
Concrete-surfaced mound	155 x 65	3 Buildings	175 x 45
Excavation	105 x 85	1 Building	80 x 30
Concrete-surfaced mound	75 x 75	2 Buildings	75 x 25
Silo	65 x 60	1 Building	60 x 25
Silo aperture	25Diam	1 Building	55 x 25
		1 Building	35 x 20

FIGURE 5. LAUNCH SITE C(3), ALEYSK ICBM COMPLEX.

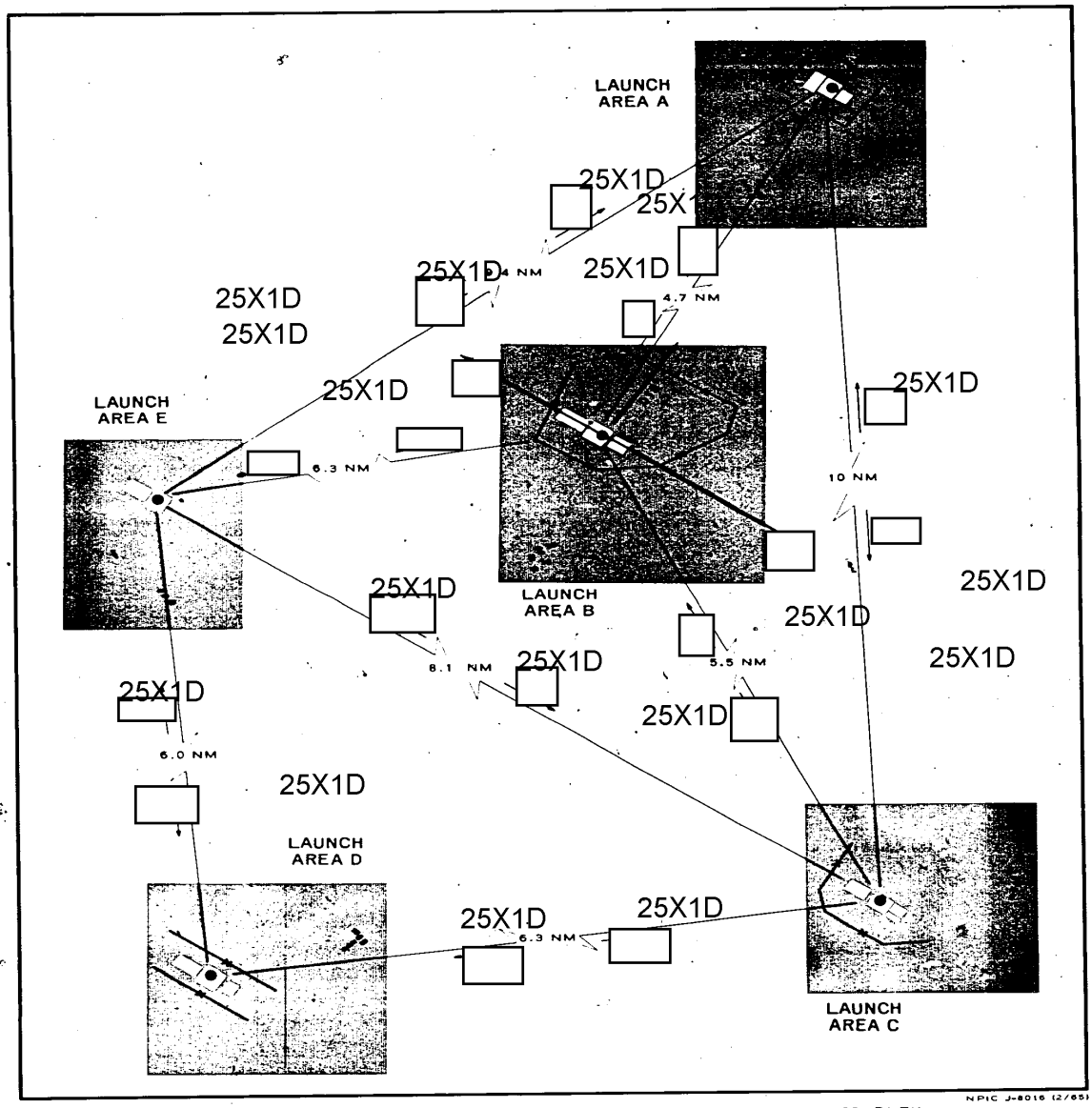
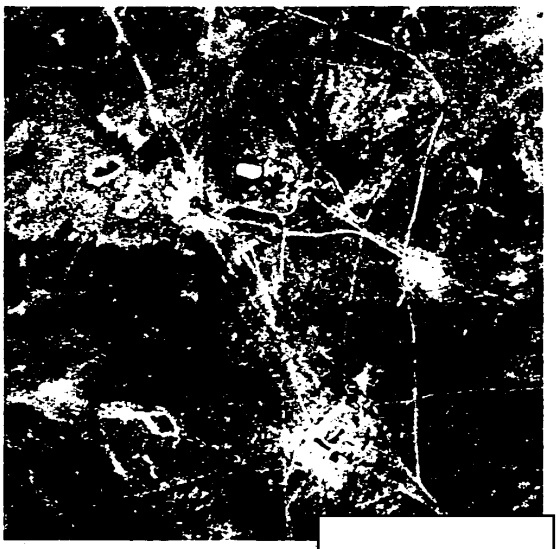
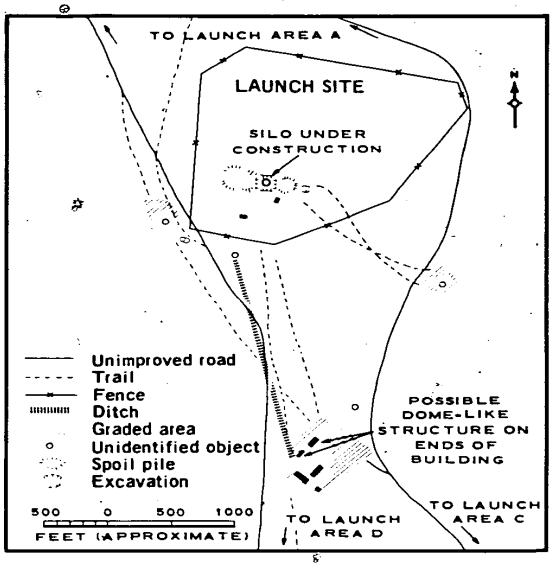


FIGURE 6. SCHEMATIC LAYOUT OF LAUNCH AREAS, DOMBAROVSKIY ICBM COMPLEX.

25X1D





LAUNCH SITE

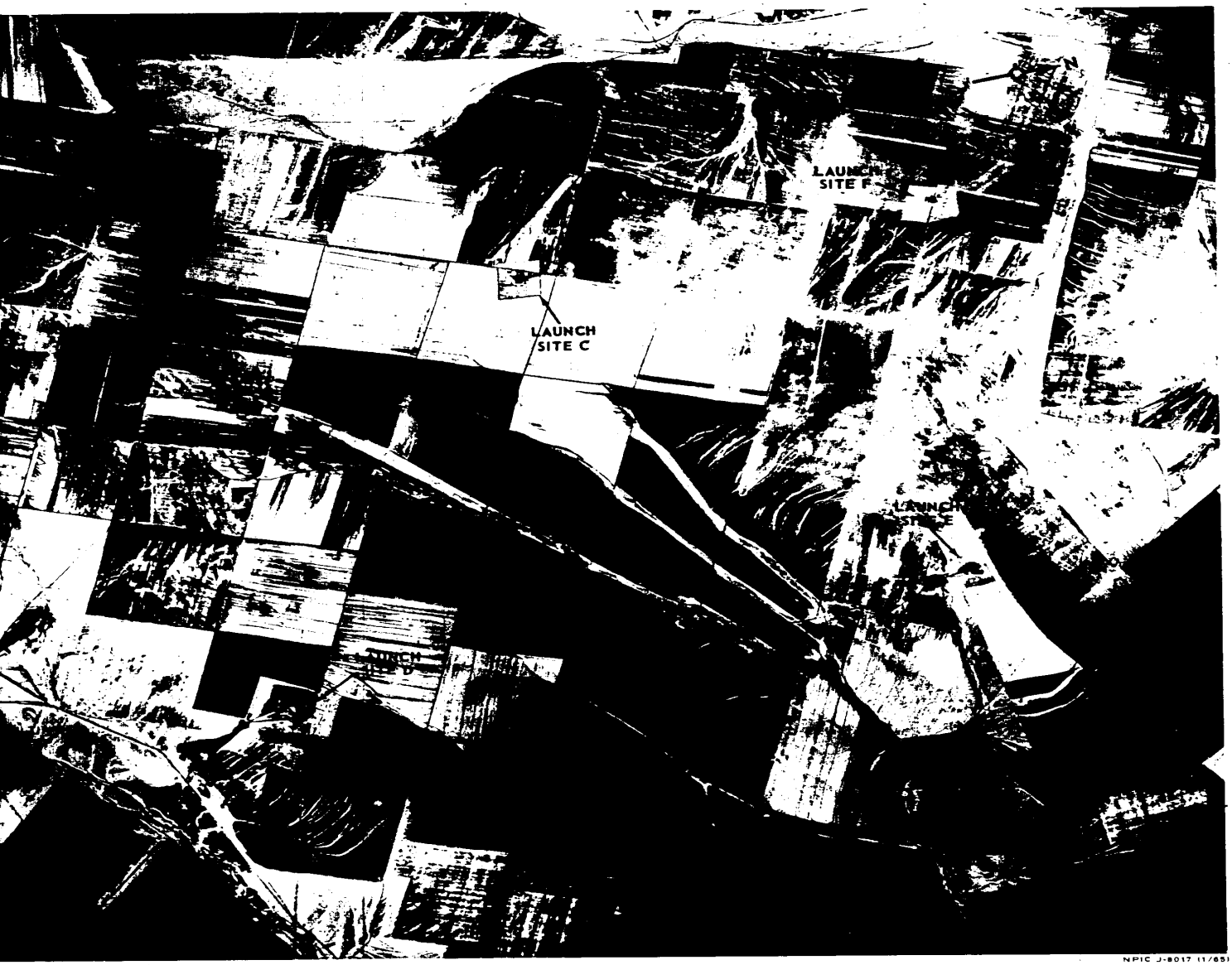
1 Spoil pile	200 x 105	1 Building	70 x 15	1 Building	180 x 45	2 Buildings	90 x 25
1 Spoil pile	110 x 95	1 Building	75 x 15	1 Building	160 x 30	1 Building	45 x 45

NPIC J-6215 (1 65)

FIGURE 7. LAUNCH SITE B(3), DOMBAROVSKIY ICBM COMPLEX.

FIGURE 8. LAUNCH SITES A(1) - F(6) AND RAIL-TO-ROAD TRANSFER POINT, IMENI GASTELLO ICBM CO

25X1



NPIC J-8017 (1/65)

FIGURE 8. LAUNCH SITES A(1) - F(6) AND RAIL-TO-ROAD TRANSFER POINT, IMENI GASTELLO ICBM COMPLEX.

25X

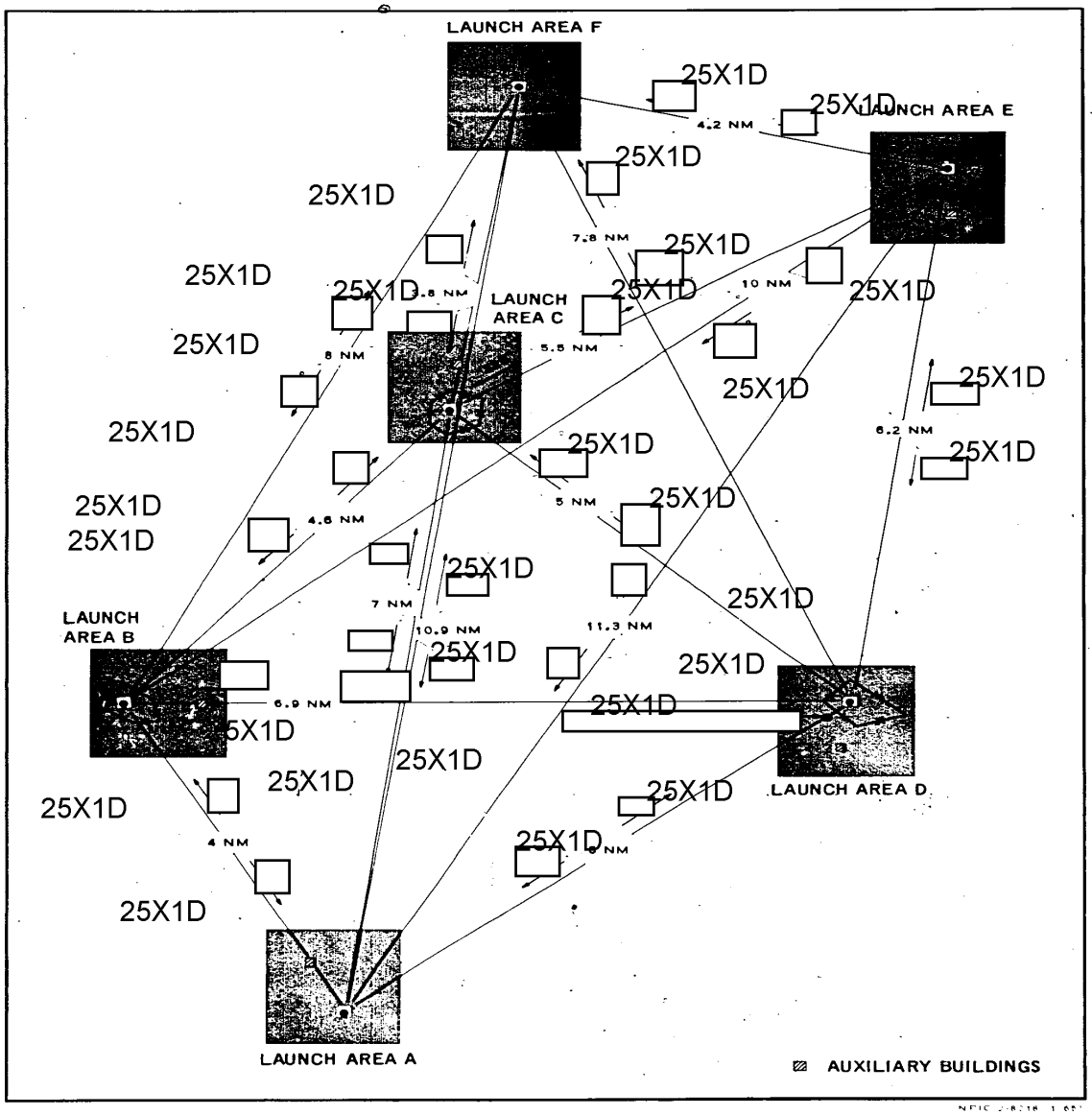
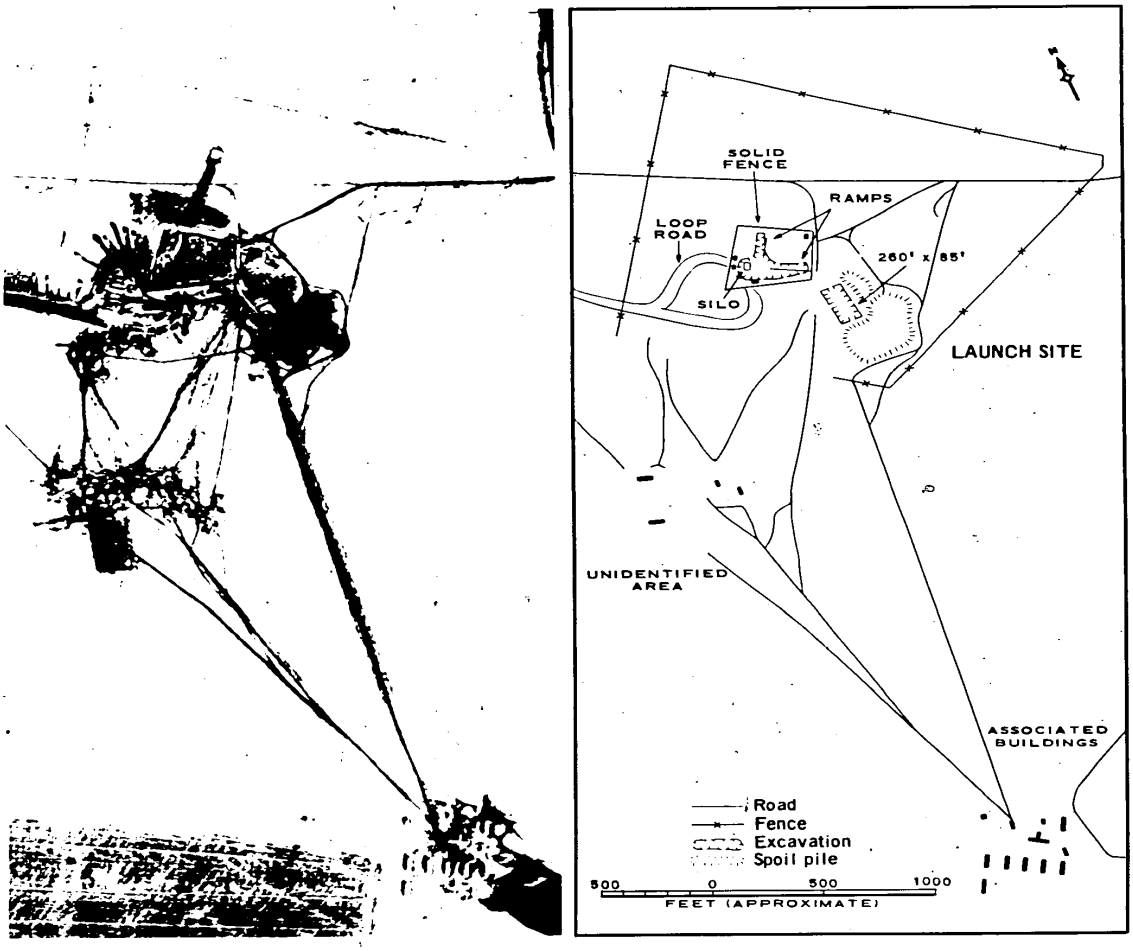


FIGURE 9. SCHEMATIC LAYOUT OF LAUNCH AREAS, IMENI GASTELLO ICBM COMPLEX.



LAUNCH AREA

1 Building -
1 Building -
1 Building -
1 Building -
Silo footing -

UNIDENTIFIED AREA

2 Buildings -
1 Building -
1 Building -

ASSOCIATED BUILDINGS

1 T-shaped Building -
7 Buildings -

NPIC J-8019 11-65

FIGURE 10. LAUNCH SITE D(4), IMENI GASTELLO ICBM COMPLEX.

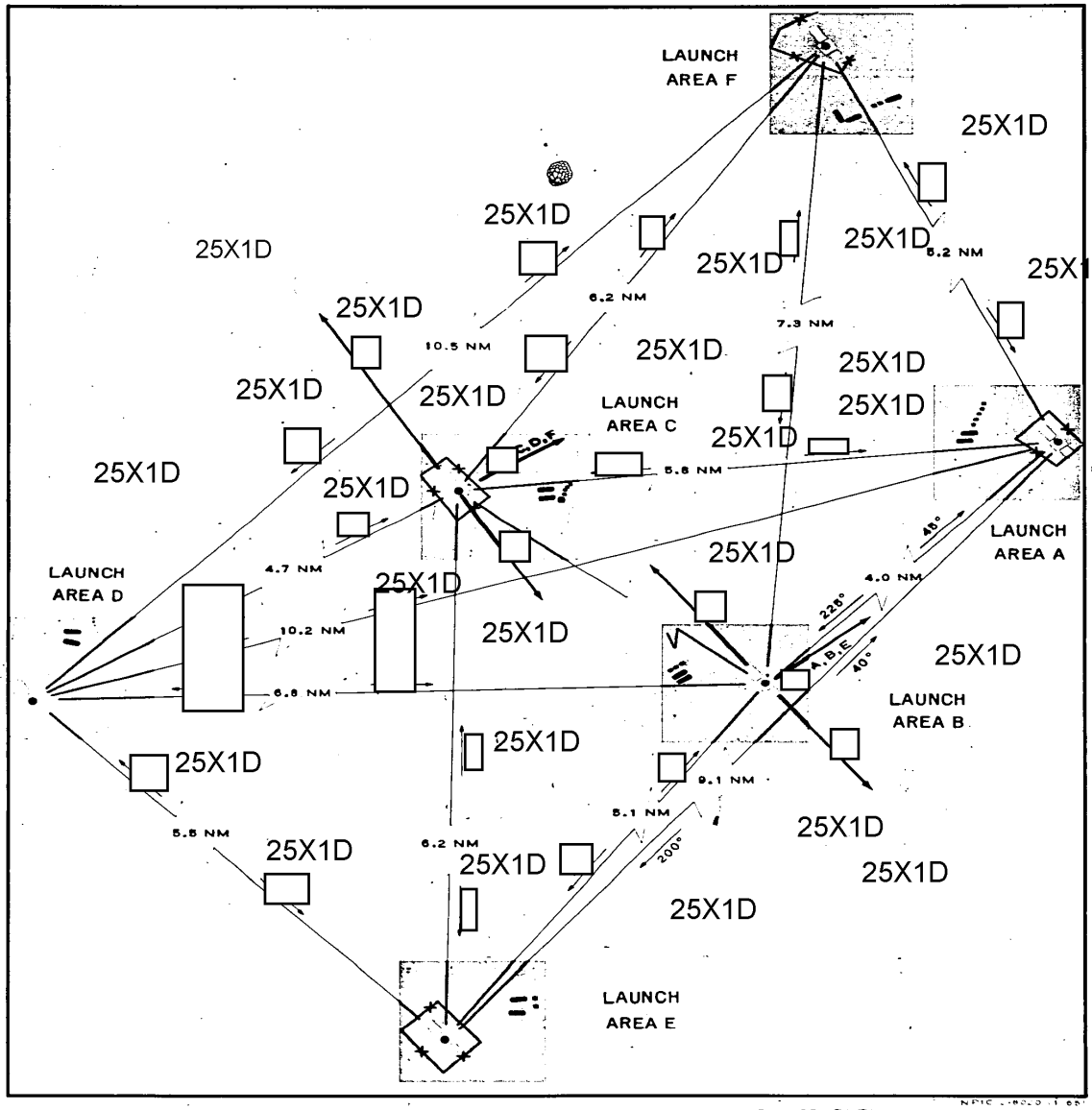
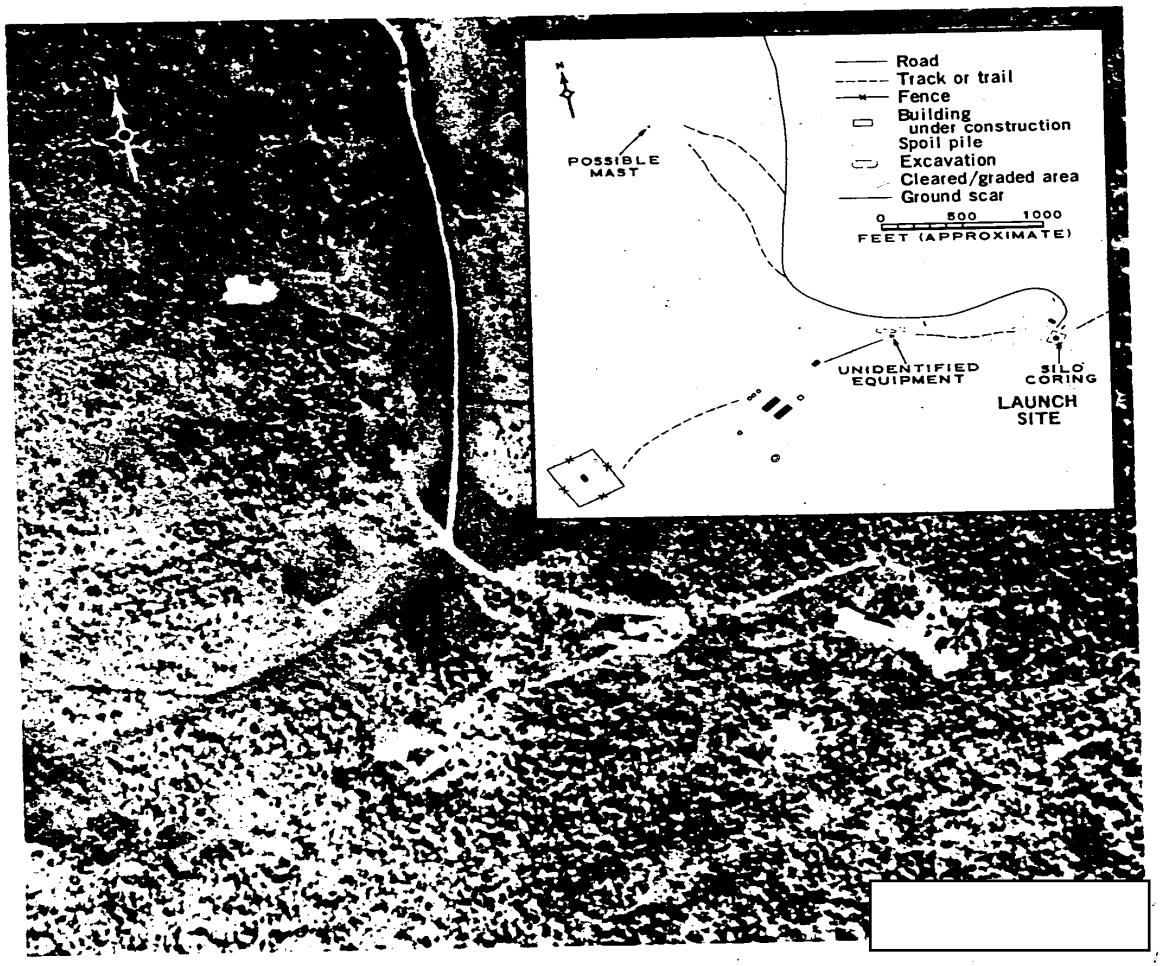


FIGURE 11. SCHEMATIC LAYOUT OF LAUNCH AREAS, UZHUR ICBM COMPLEX.



LAUNCH SITE		AUXILIARY BUILDINGS	
Excavation	110 x 105	1 building	140 x 45
Silo coring	16 diameter	1 building	135 x 35
Prepared spoil pile	250 x 110	1 building	120 x 35
Graded area	65 x 50	1 building (U/C)	70 x 20
3 buildings	50 x 15 (approx)	3 structures	30 x 25
		1 building	35 x 20
		1 building	75 x 25

ALL DIMENSIONS ARE IN FEET.

NPIC

FIGURE 12. LAUNCH SITE B(2), UZHUR ICBM COMPLEX.

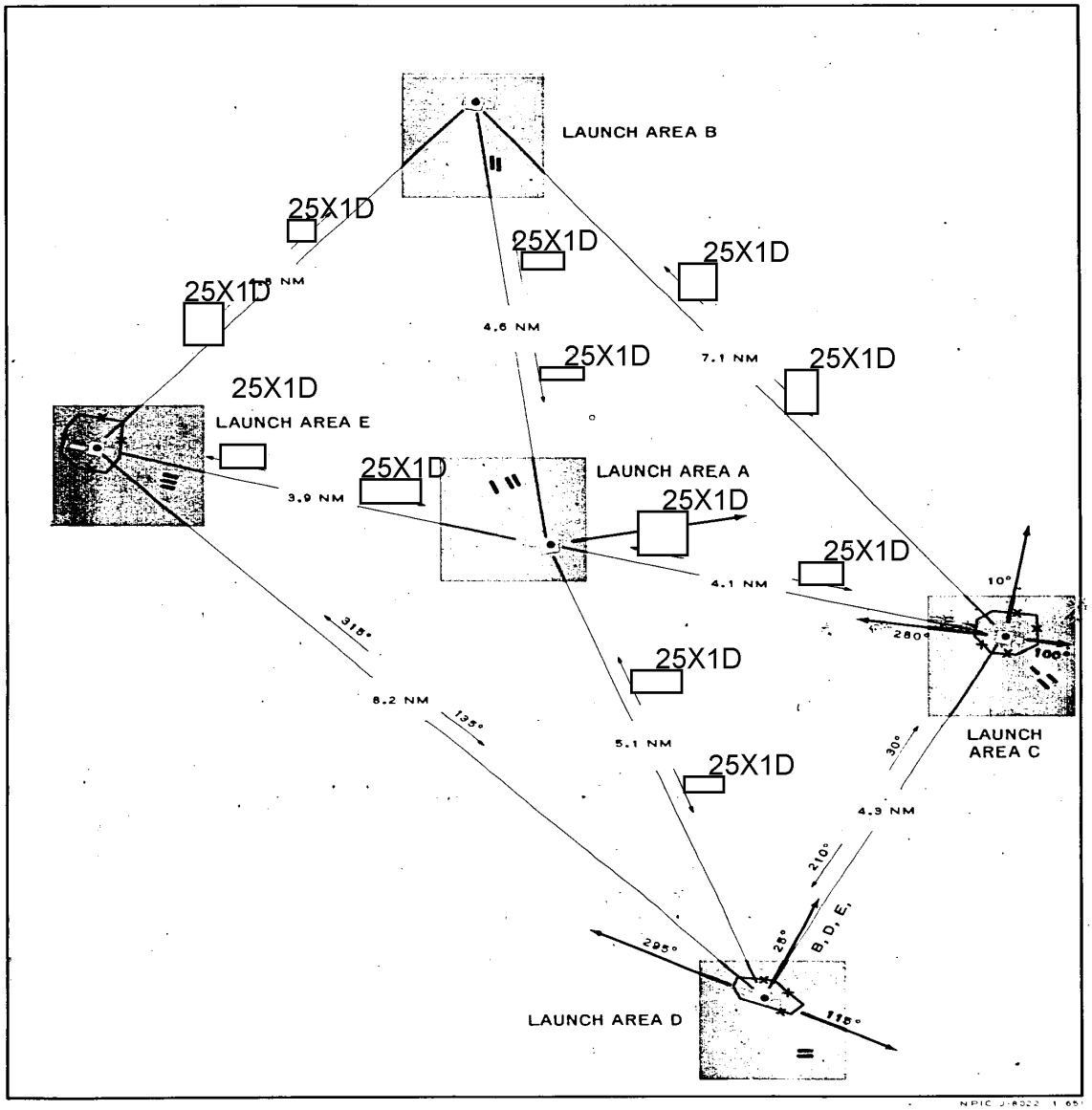


FIGURE 13. SCHEMATIC LAYOUT OF LAUNCH AREAS, ZHANGIZ-TOBE ICBM COMPLEX.

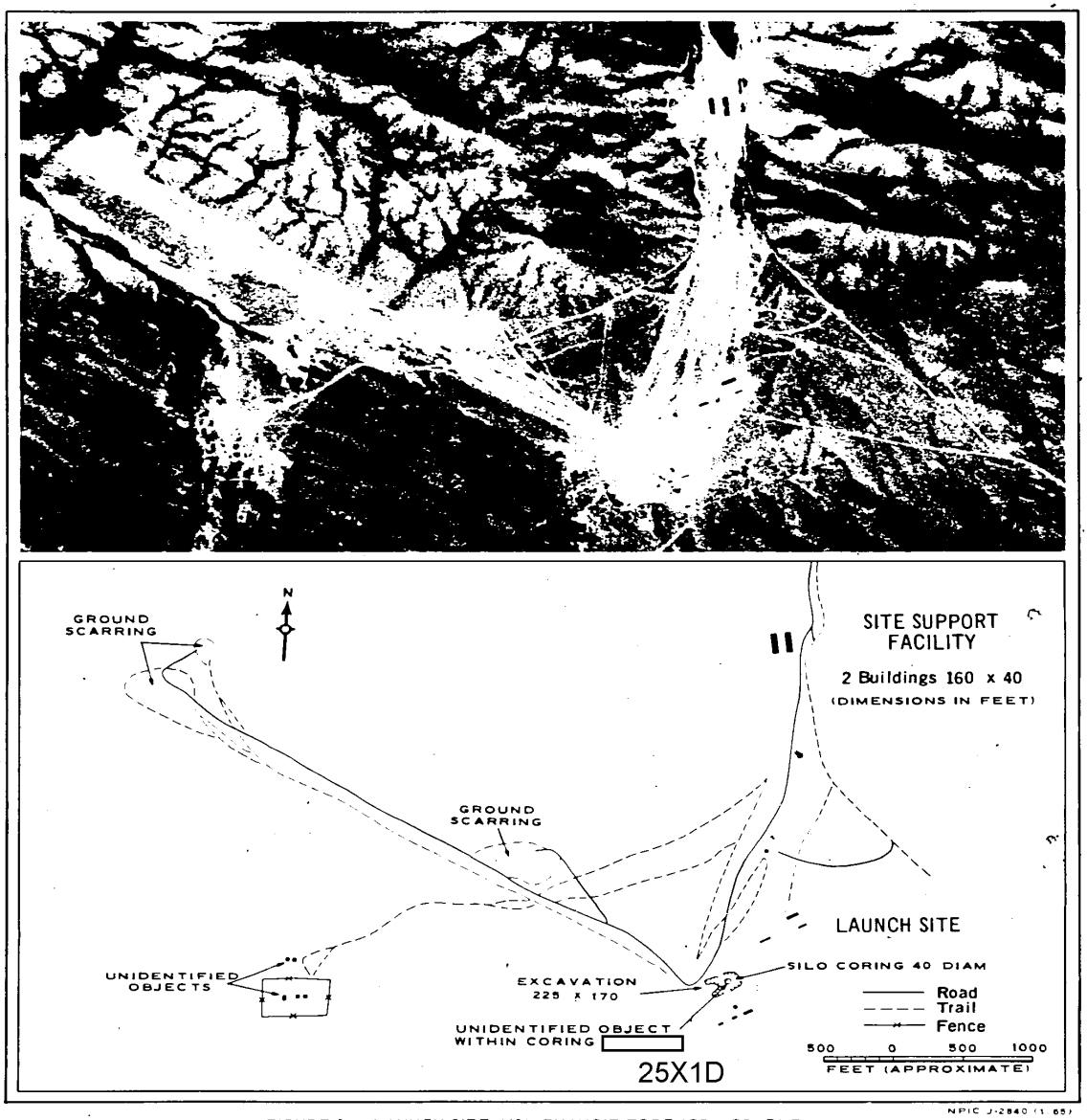


FIGURE 14. LAUNCH SITE A(1), ZHANGIZ-TOBE ICBM COMPLEX.

25X1D

FIGURE 15. LAUNCH SITE D7(6), LAUNCH GROUP D, OLOVYANNAYA ICBM COMPLEX.

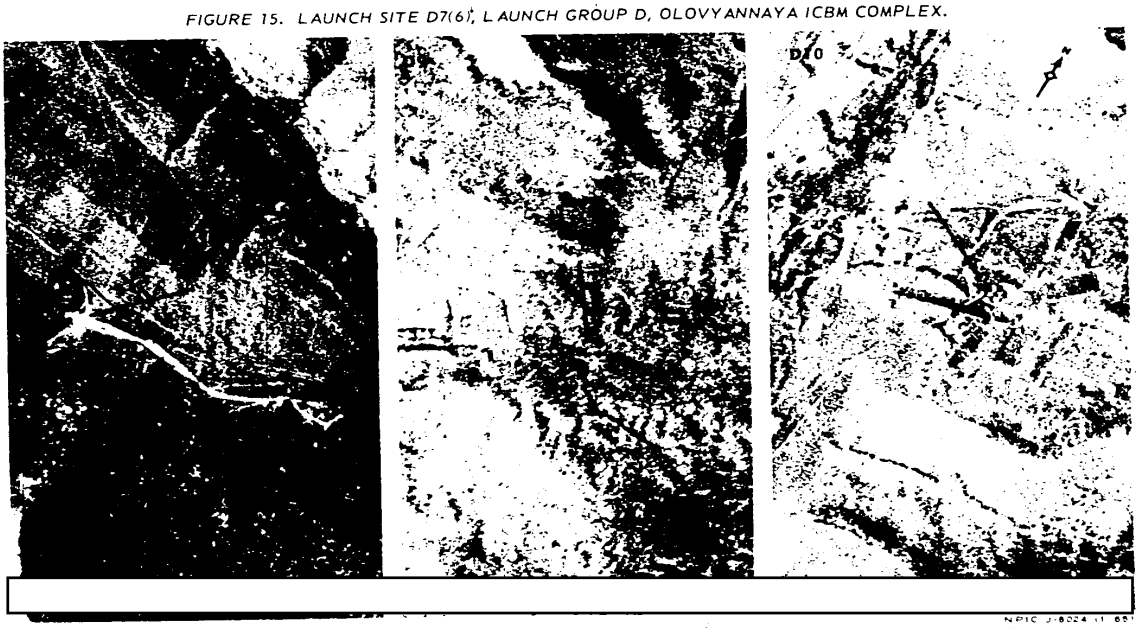


FIGURE 16. PROBABLE LAUNCH SITES D8, D9, AND D10, LAUNCH GROUP D, OLOVYANNAYA ICBM COMPLEX.

25X1D

25X1D

FIGURE 17. CABLE DITCHING, LAUNCH GROUP D, OLOVYANNAYA ICBM COMPLEX.

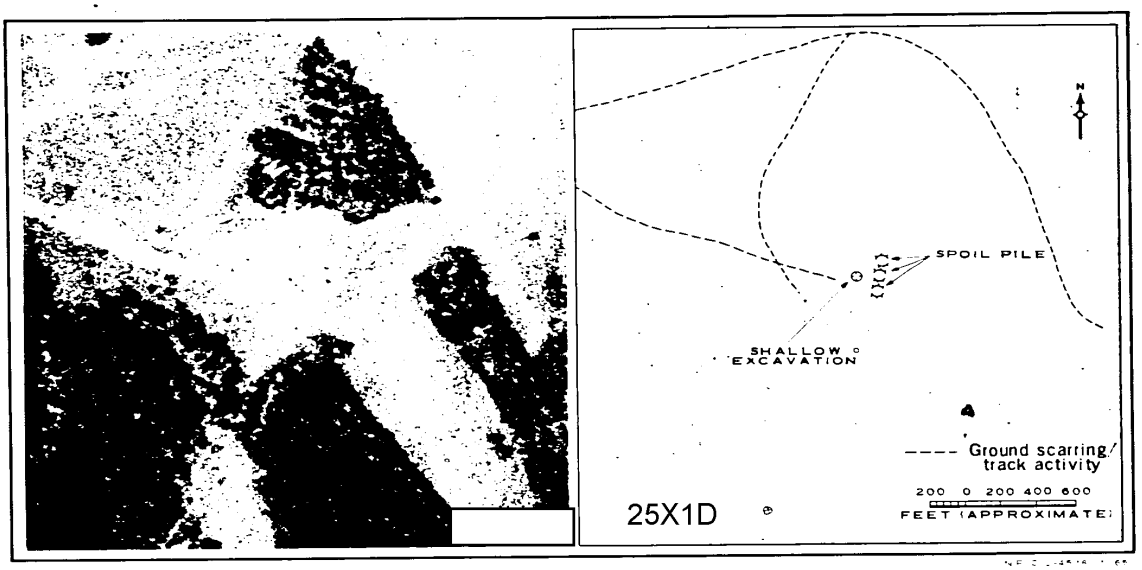
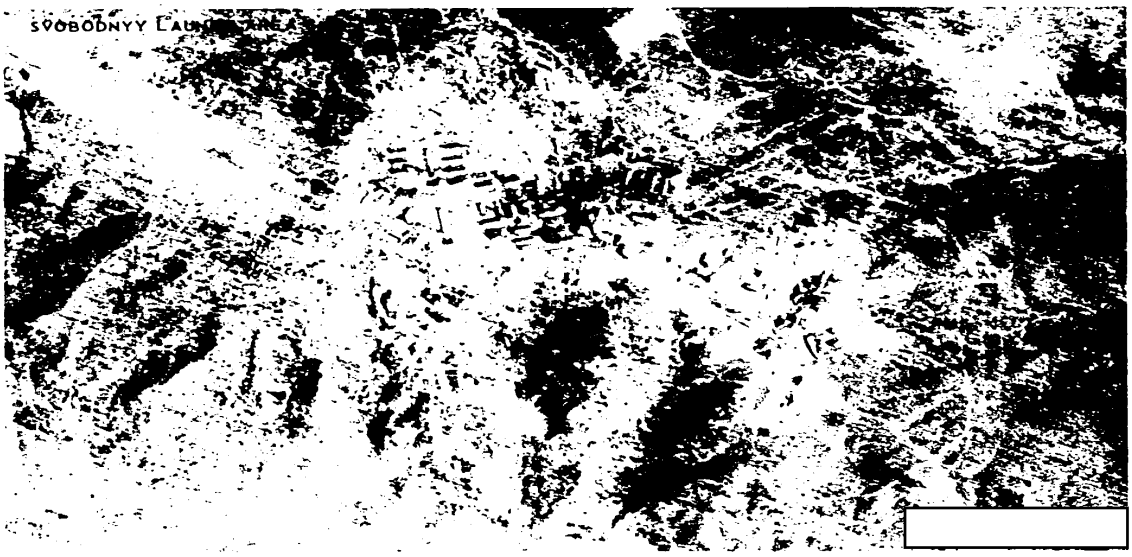


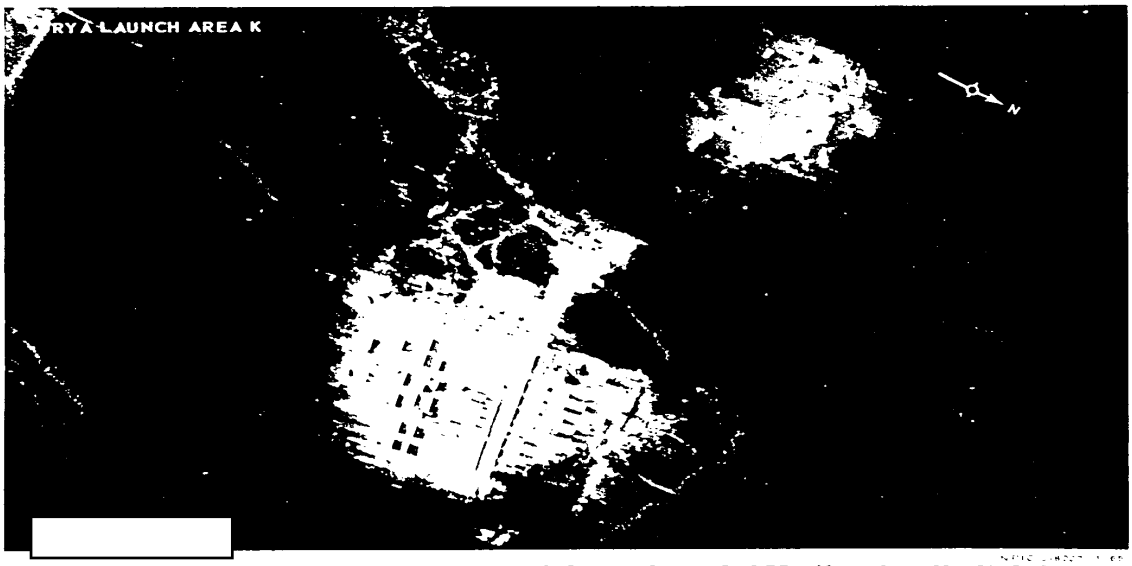
FIGURE 18. LAUNCH SITE D-2, LAUNCH GROUP D, OLOVYANNAYA ICBM COMPLEX.

FIGURE 19. LAUNCH SITE E-6, GLADKAYA ICBM COMPLEX.

25X1D



25X1D



25X1D

FIGURE 20. LAUNCH SITE G(7), SVOBODNYY ICBM COMPLEX AND LAUNCH SITE K(10), YURYA ICBM COMPLEX.

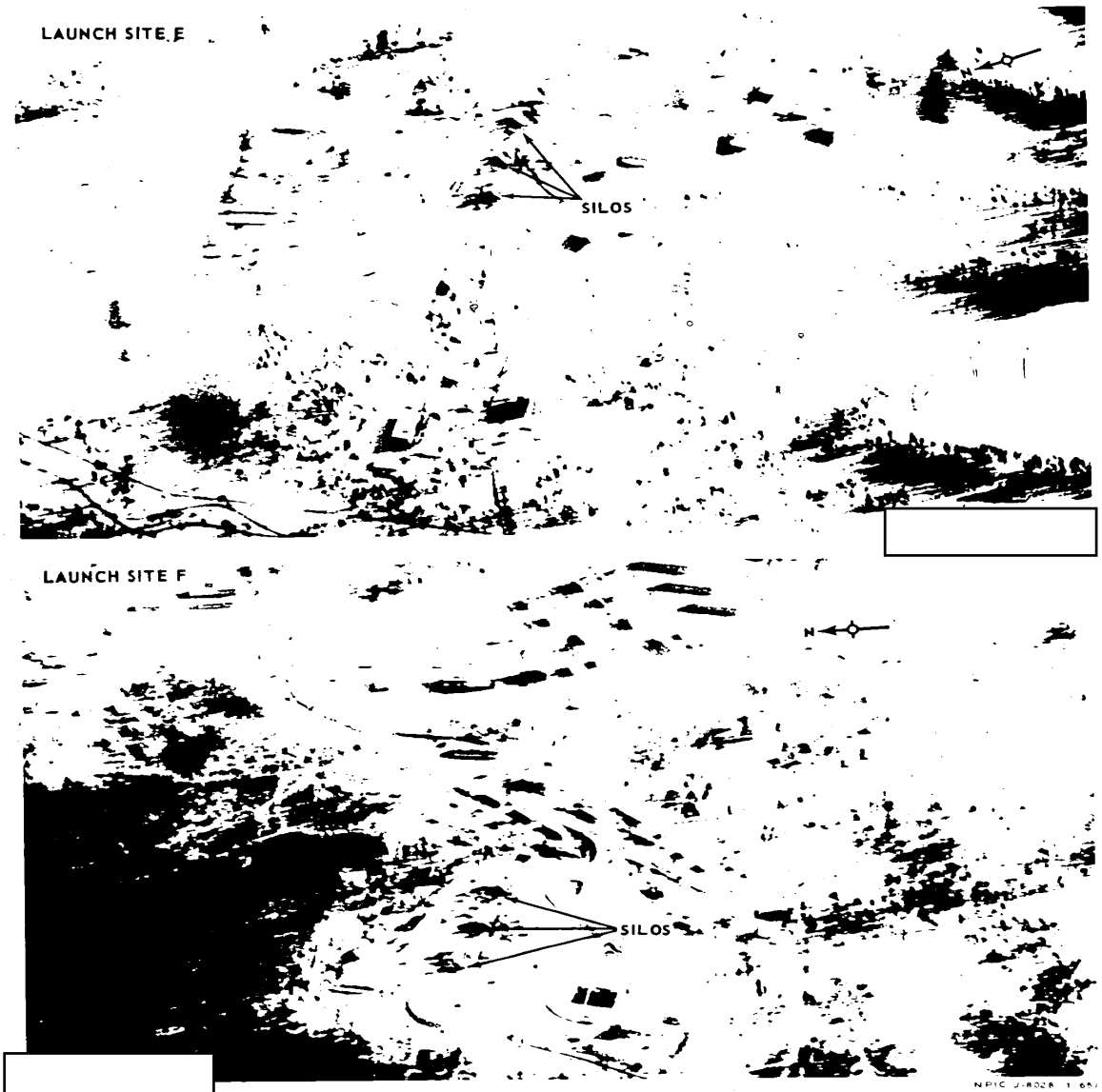


FIGURE 21. LAUNCH SITES E(5) AND F(6), DROVYANAYA ICBM COMPLEX.

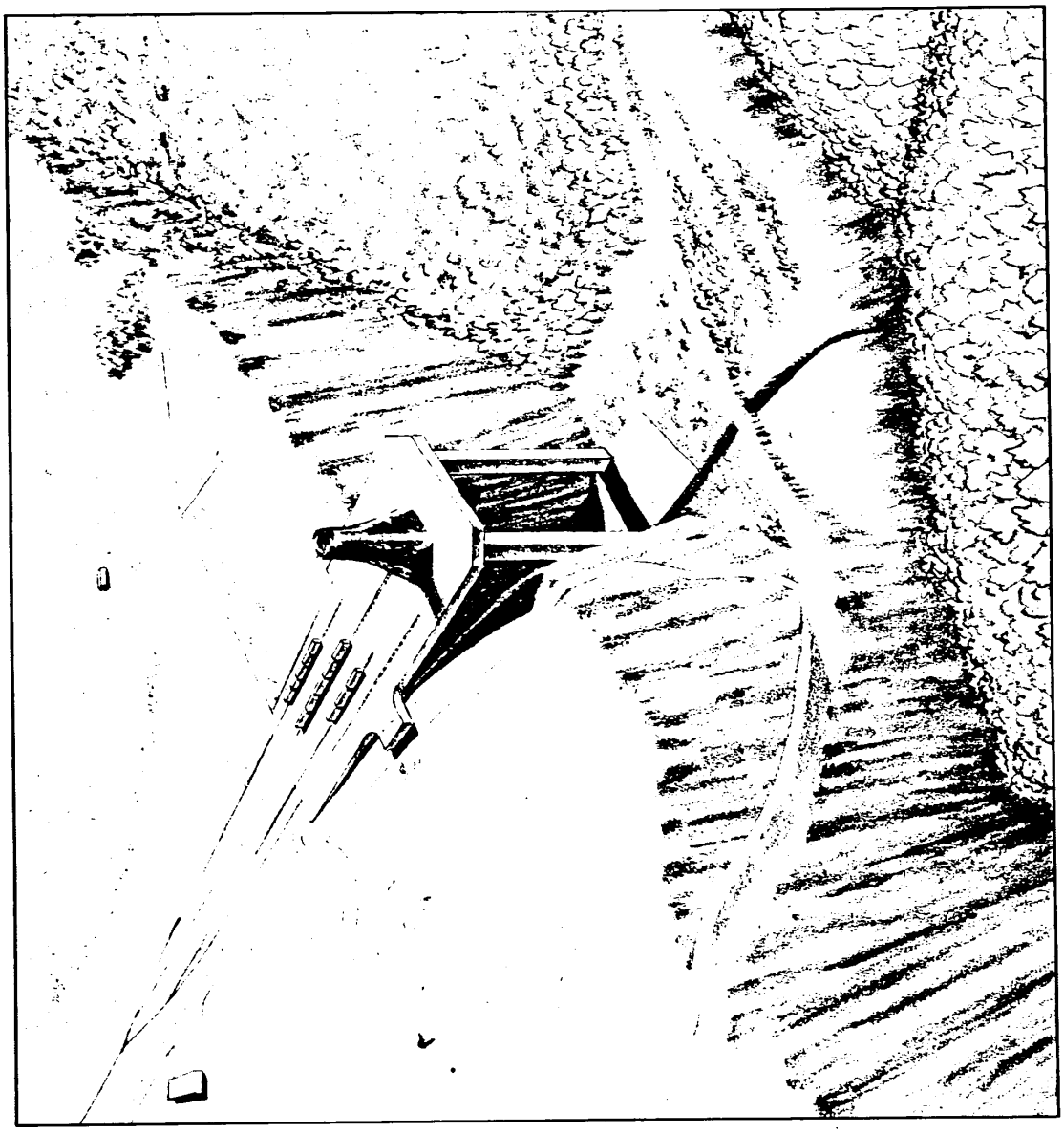


FIGURE 22. ARTIST'S CONCEPT OF TYPE IA ICBM LAUNCH SITE.

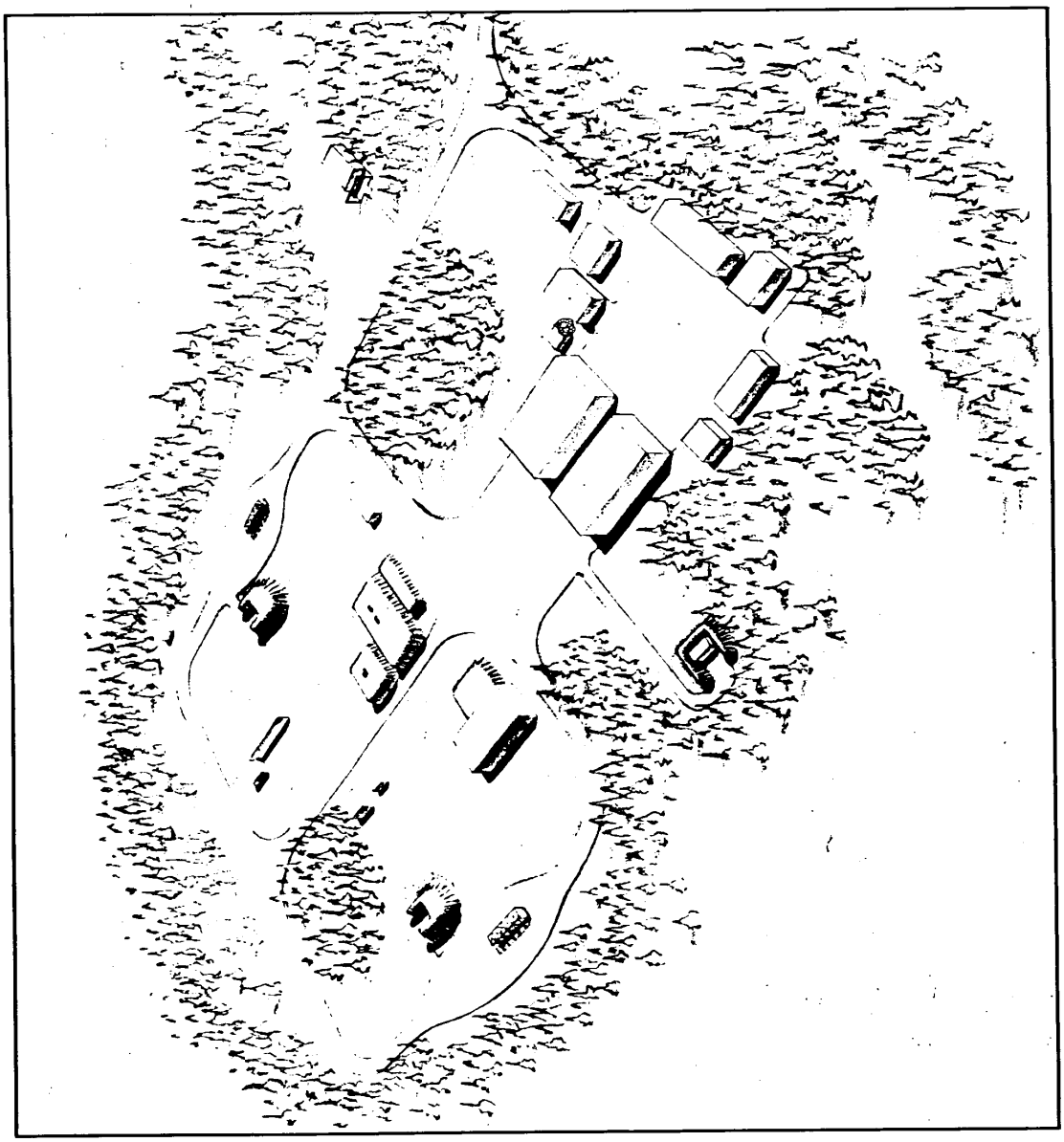


FIGURE 23. ARTIST'S CONCEPT OF TYPE IIA ICBM LAUNCH SITE.

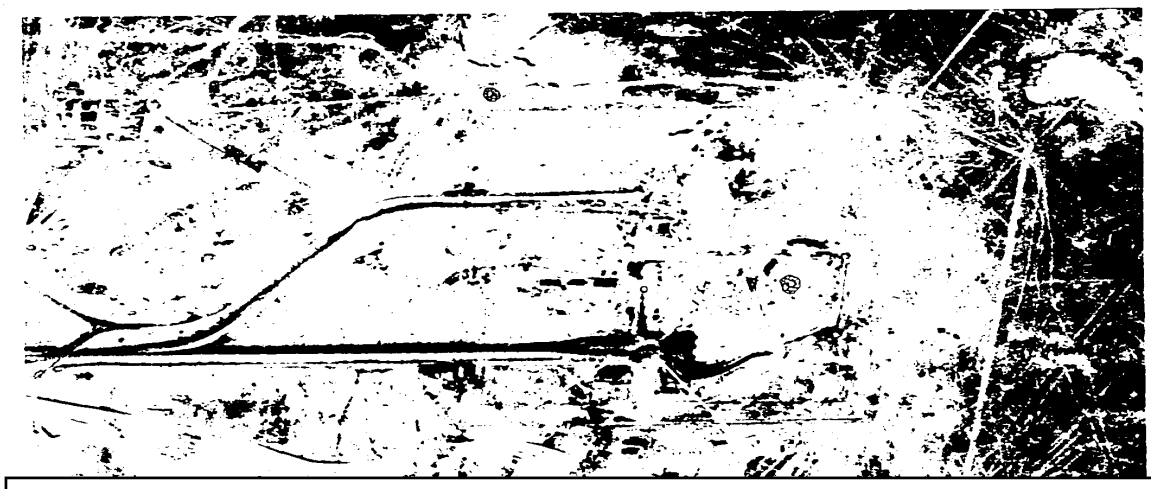


FIGURE 24. PAD A1(1), TYURATAM.

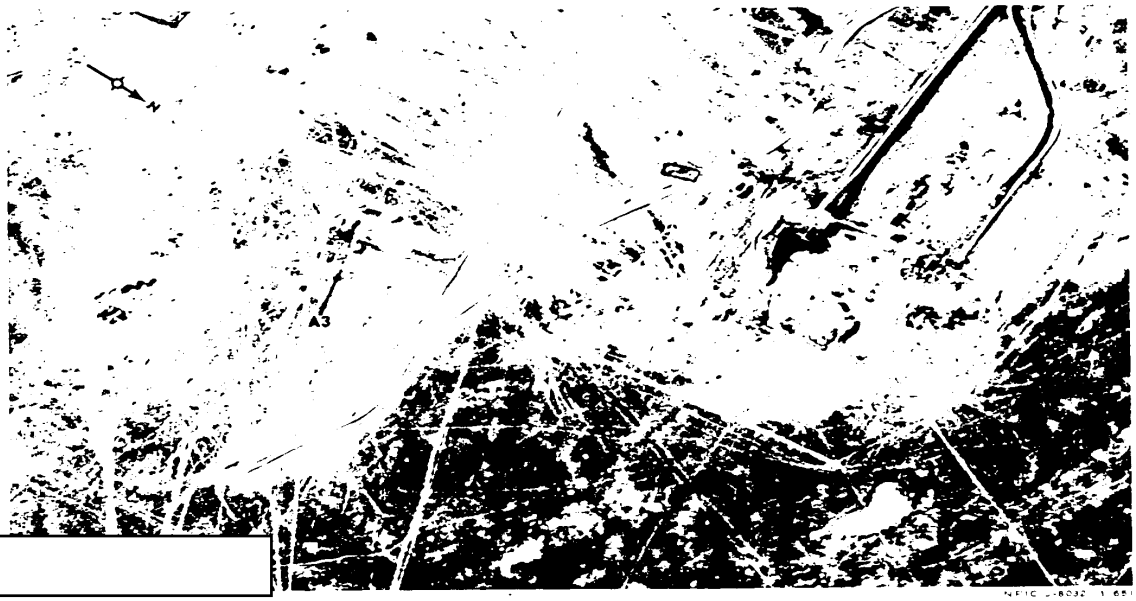


FIGURE 25. LAUNCH SITE A3(15), TYURATAM.

FIGURE 26. PROBABLE ERECTED MISSILE, PAD C1(3), TYURATAM.

25X1D

FIGURE 27. LAUNCH SITE D2(9), TYURATAM.

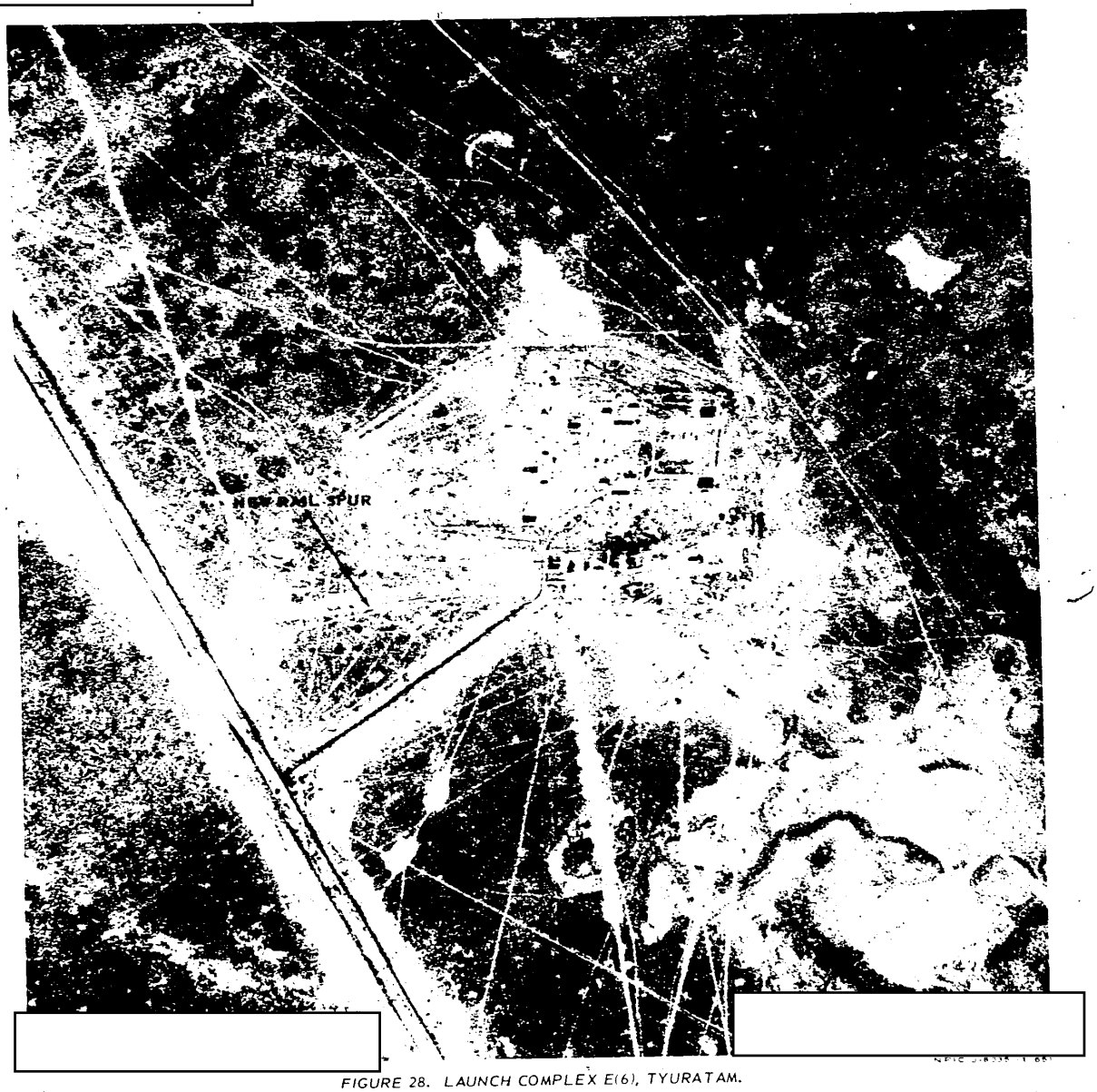


FIGURE 28. LAUNCH COMPLEX E(6), TYURATAM.

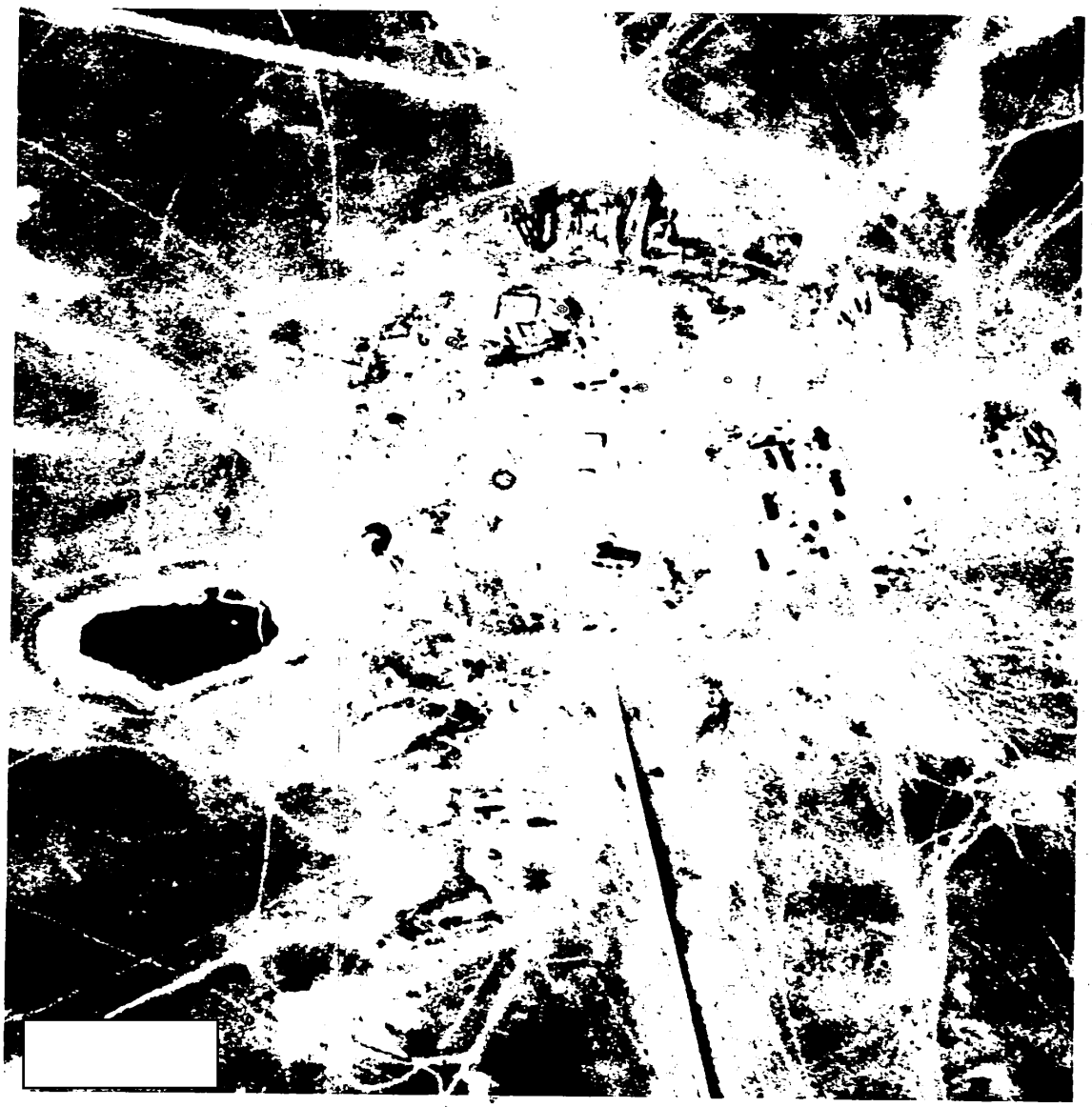


FIGURE 29. LAUNCH COMPLEX F(5), TYURATAM.

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25X1D

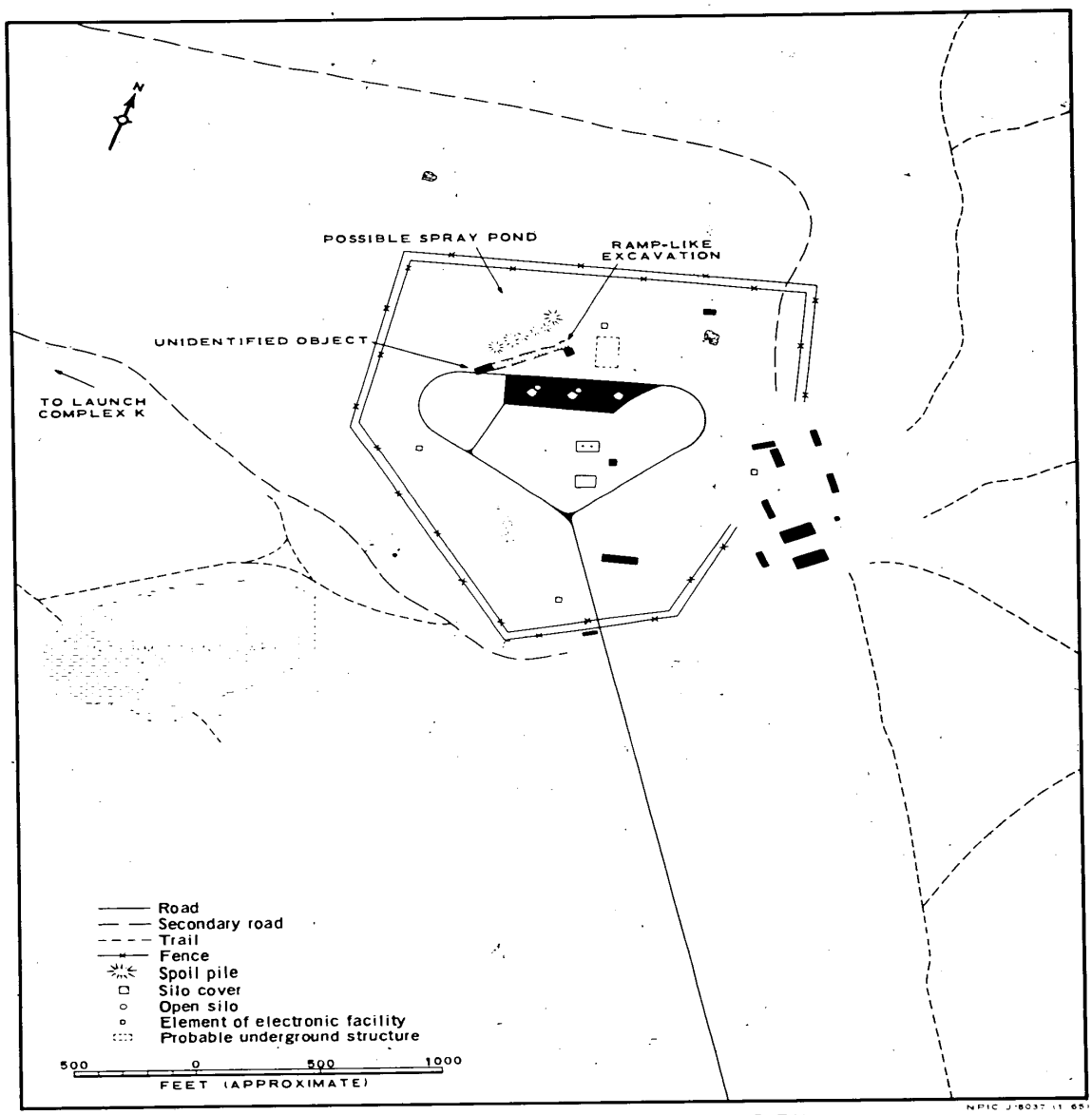


FIGURE 30. LAYOUT OF LAUNCH COMPLEX F(5), TYURATAM.

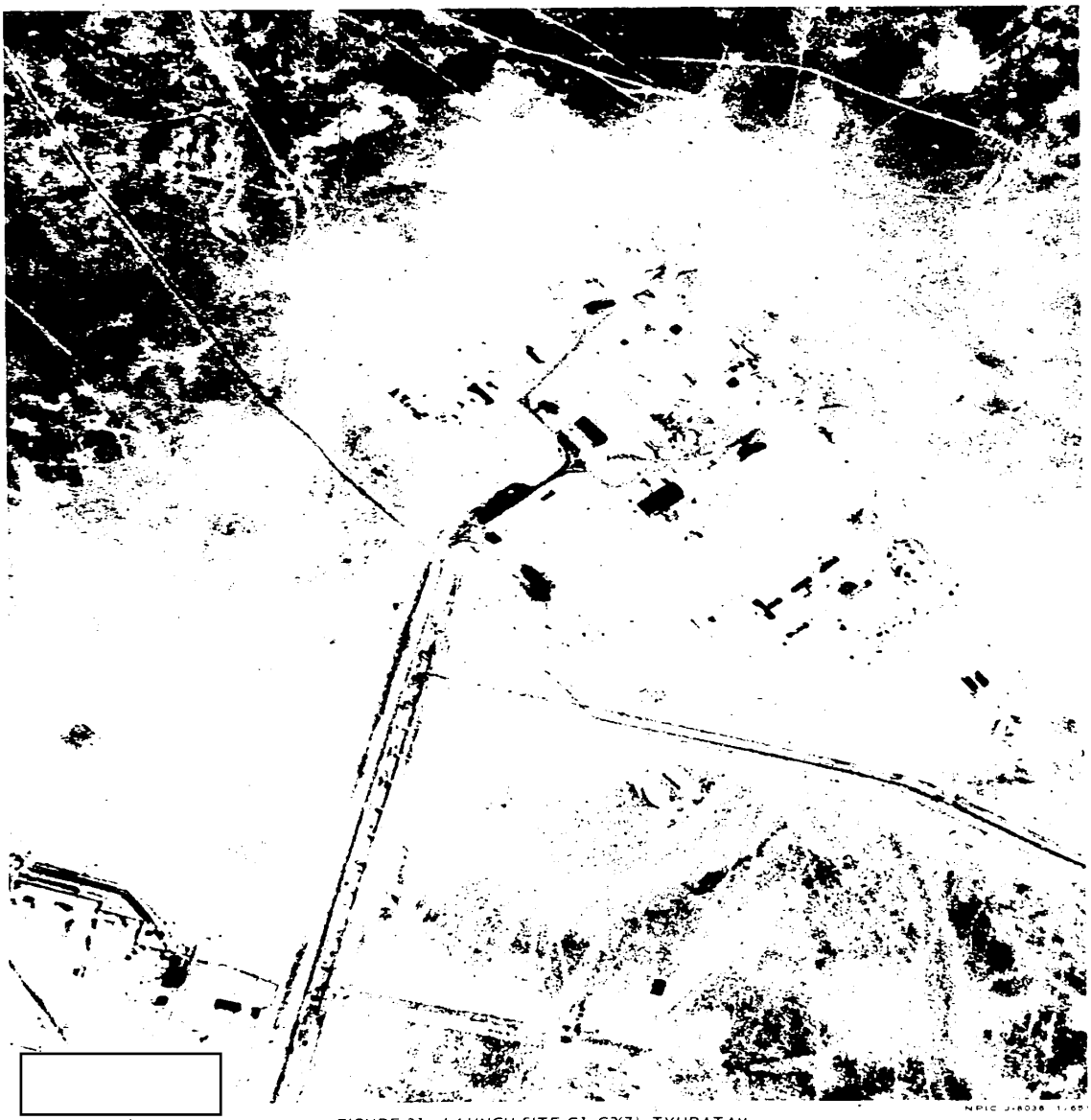


FIGURE 31. LAUNCH SITE G1 G2(7), TYURATAM.

25X1D

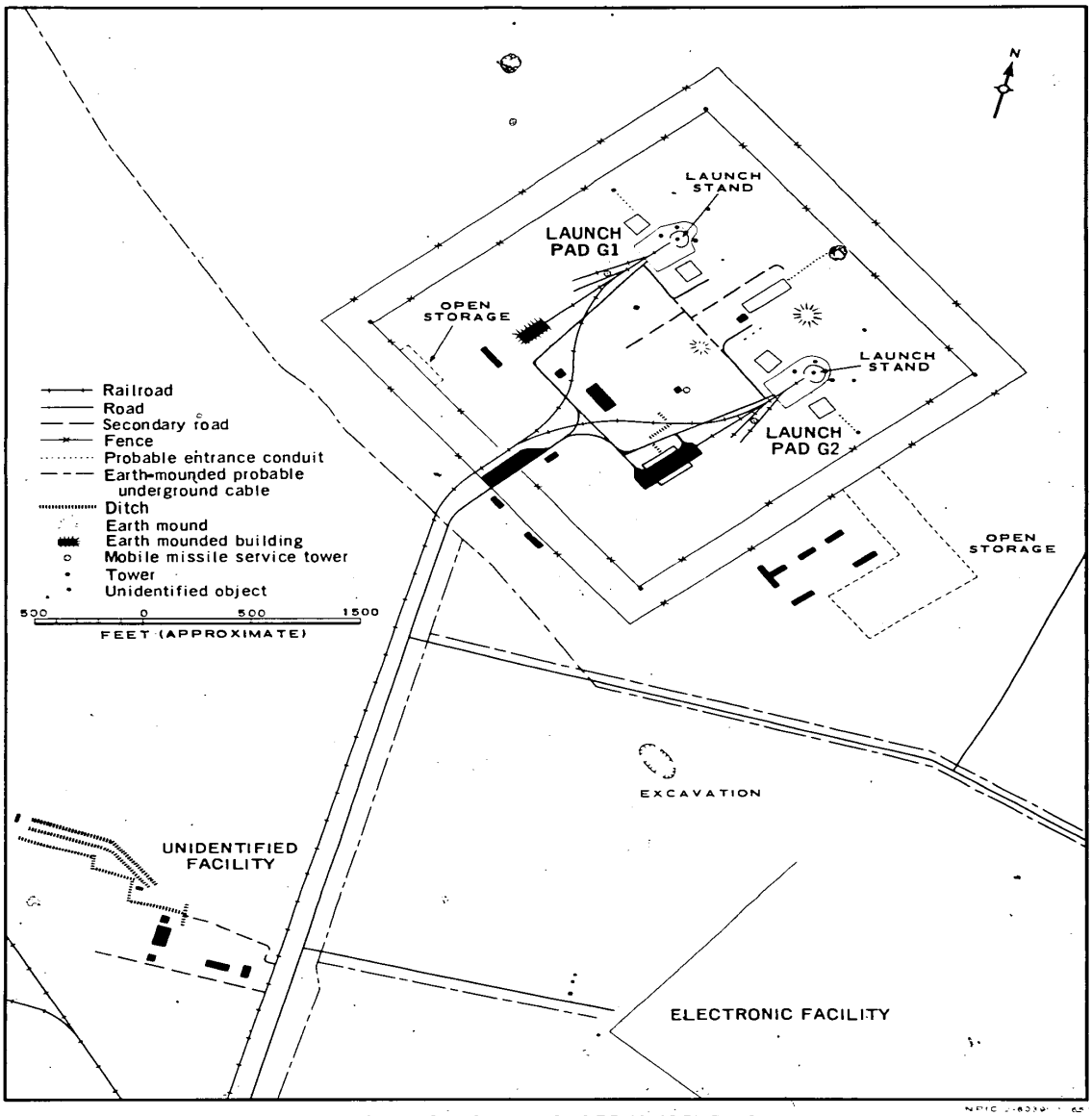


FIGURE 32. LAYOUT OF LAUNCH SITE G1 G2(?), TYURATAM.

FIGURE 33. LAUNCH SITE G3 G4(11), TYURATAM.

25X1D

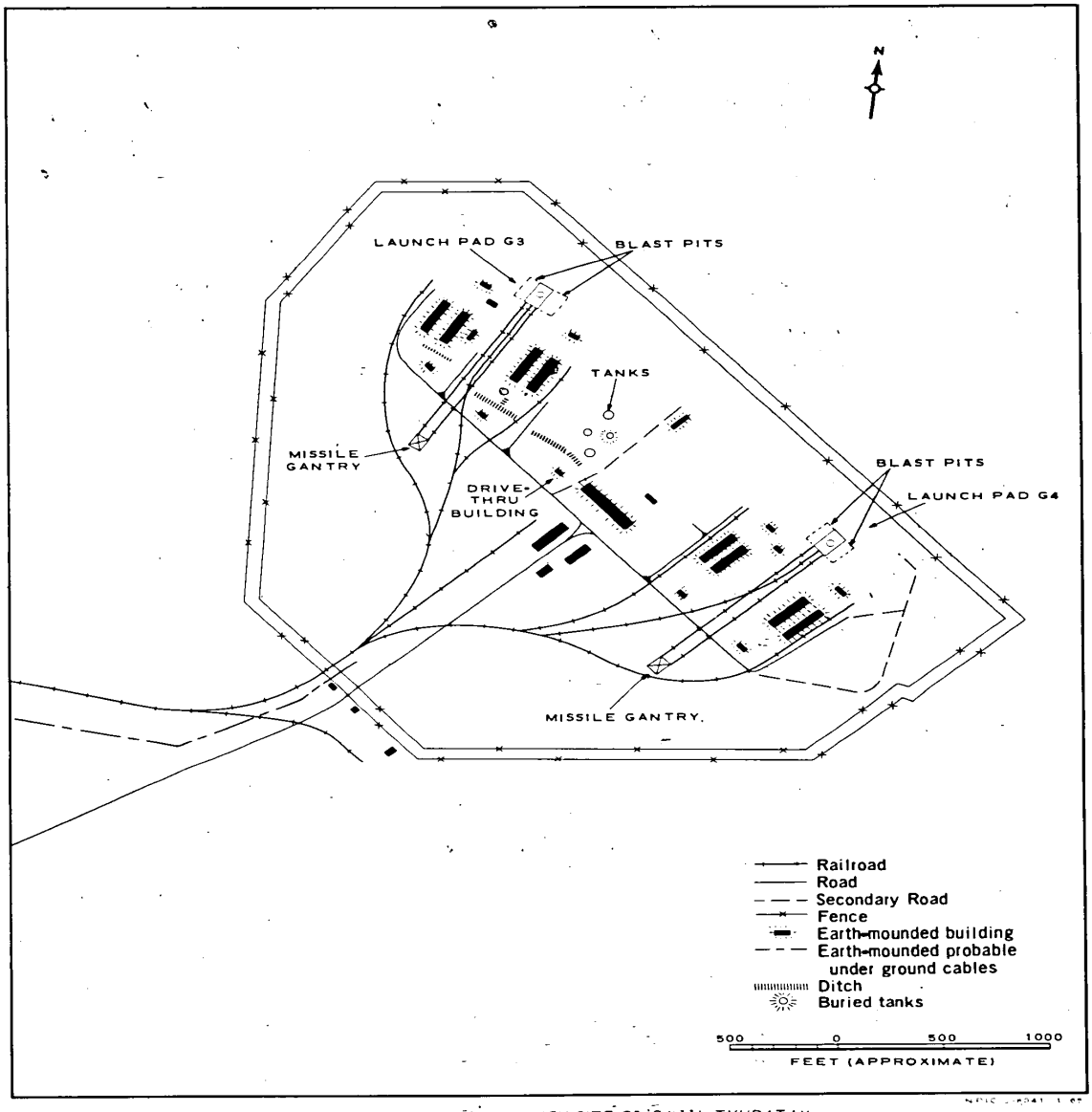
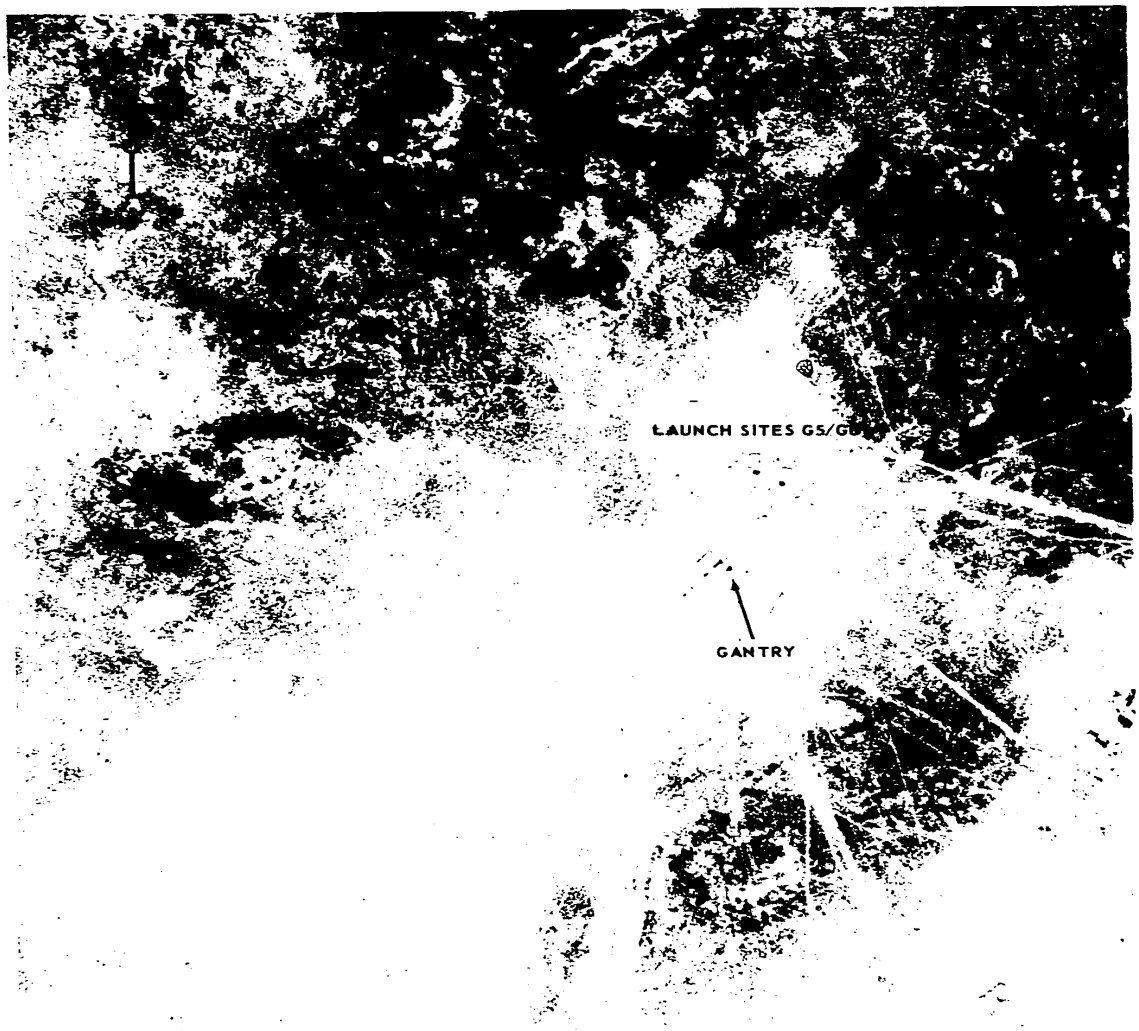


FIGURE 34. LAYOUT OF LAUNCH SITE G3 G4(11), TYURATAM.



25X1D

FIGURE 35. LAUNCH SITE G5, G6(12), TYURATAM.

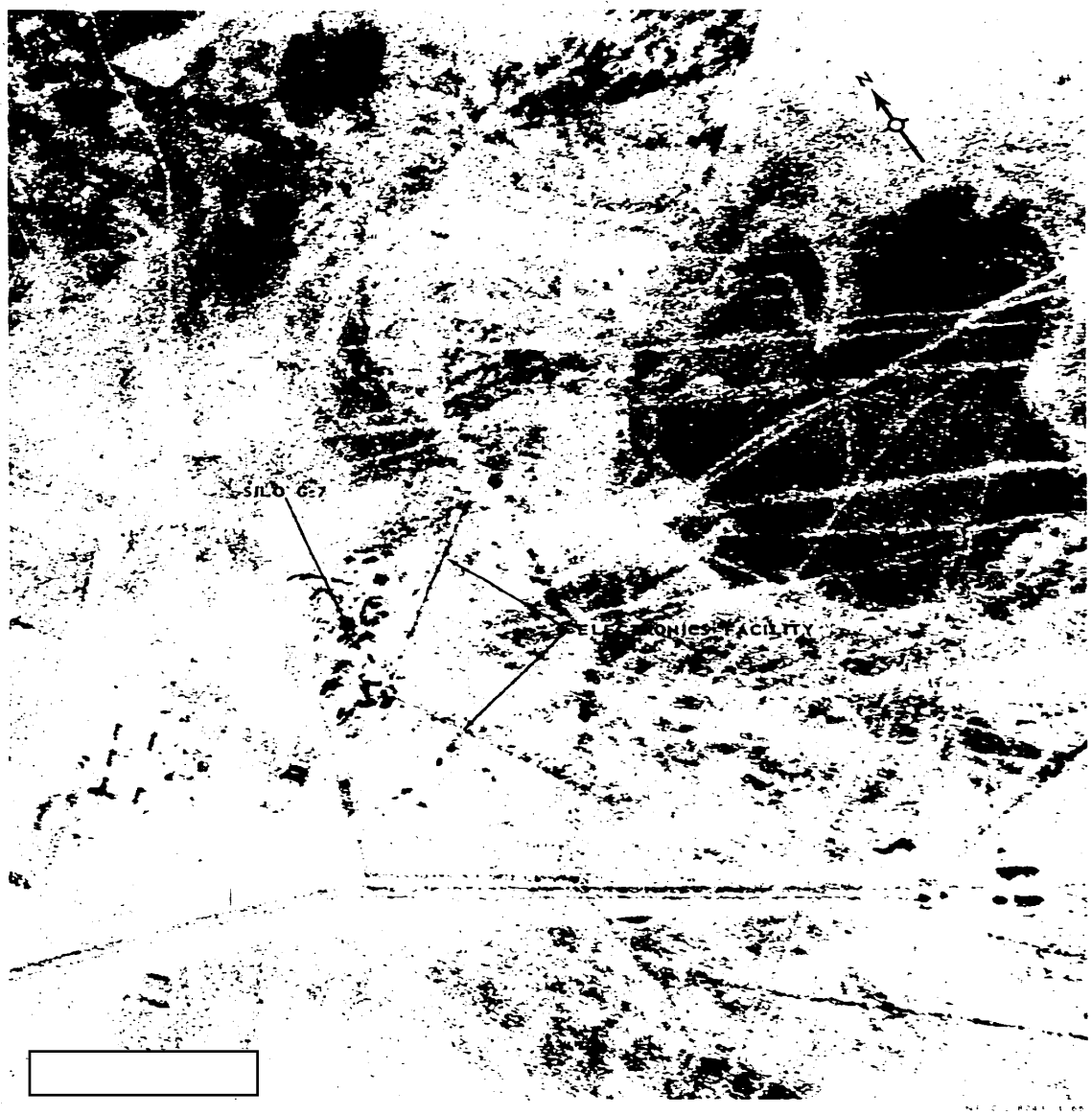
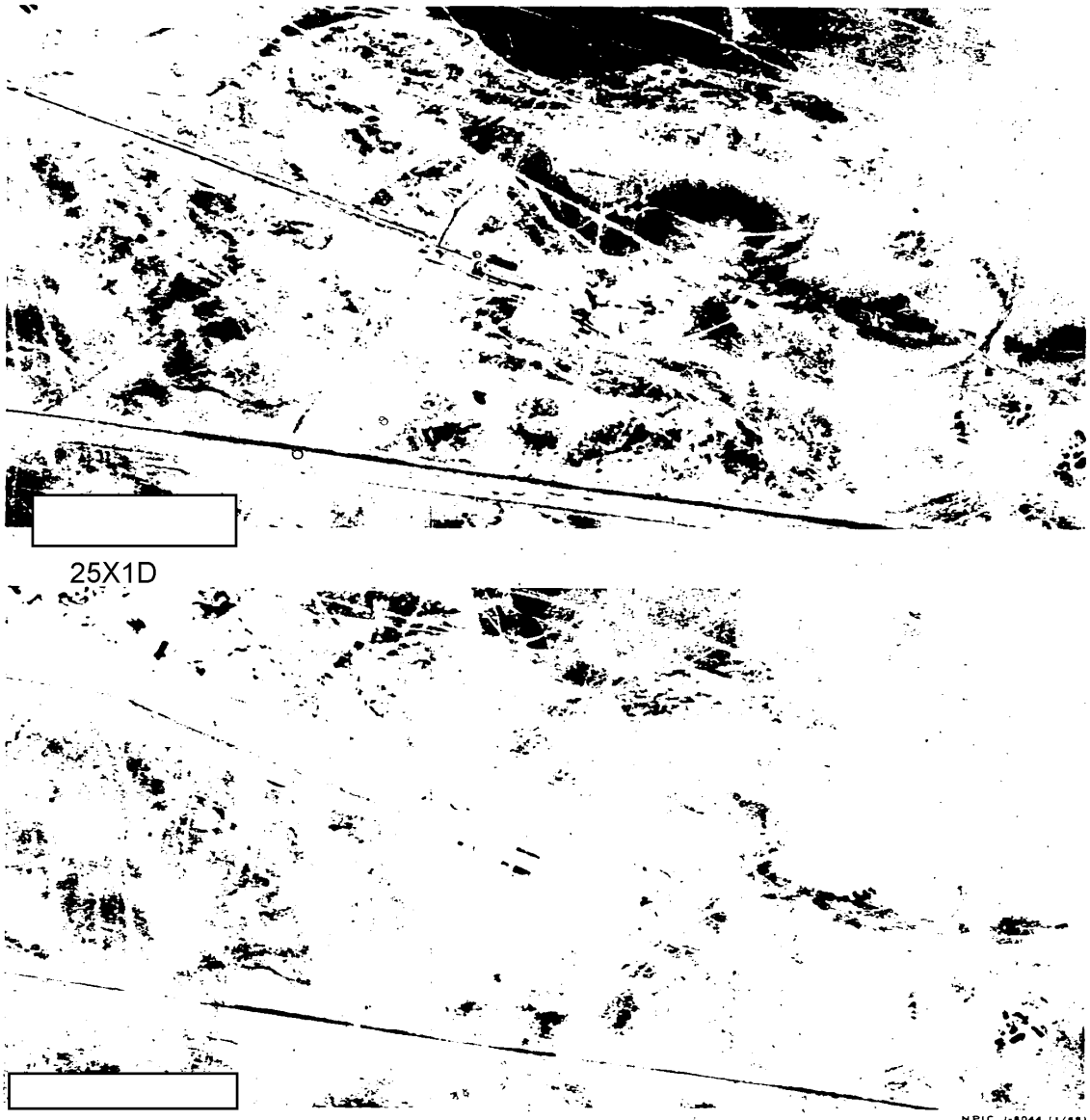


FIGURE 36. LAUNCH SITE G7(18), TYURATAM.

25X1D



25X1D

25X1D

NPIC J-8044 (1/65)

FIGURE 37. LAUNCH SITE G8/G9(19), TYURATAM, IN MID (TOP) AND LATE (BOTTOM) STAGES OF CONSTRUCTION.

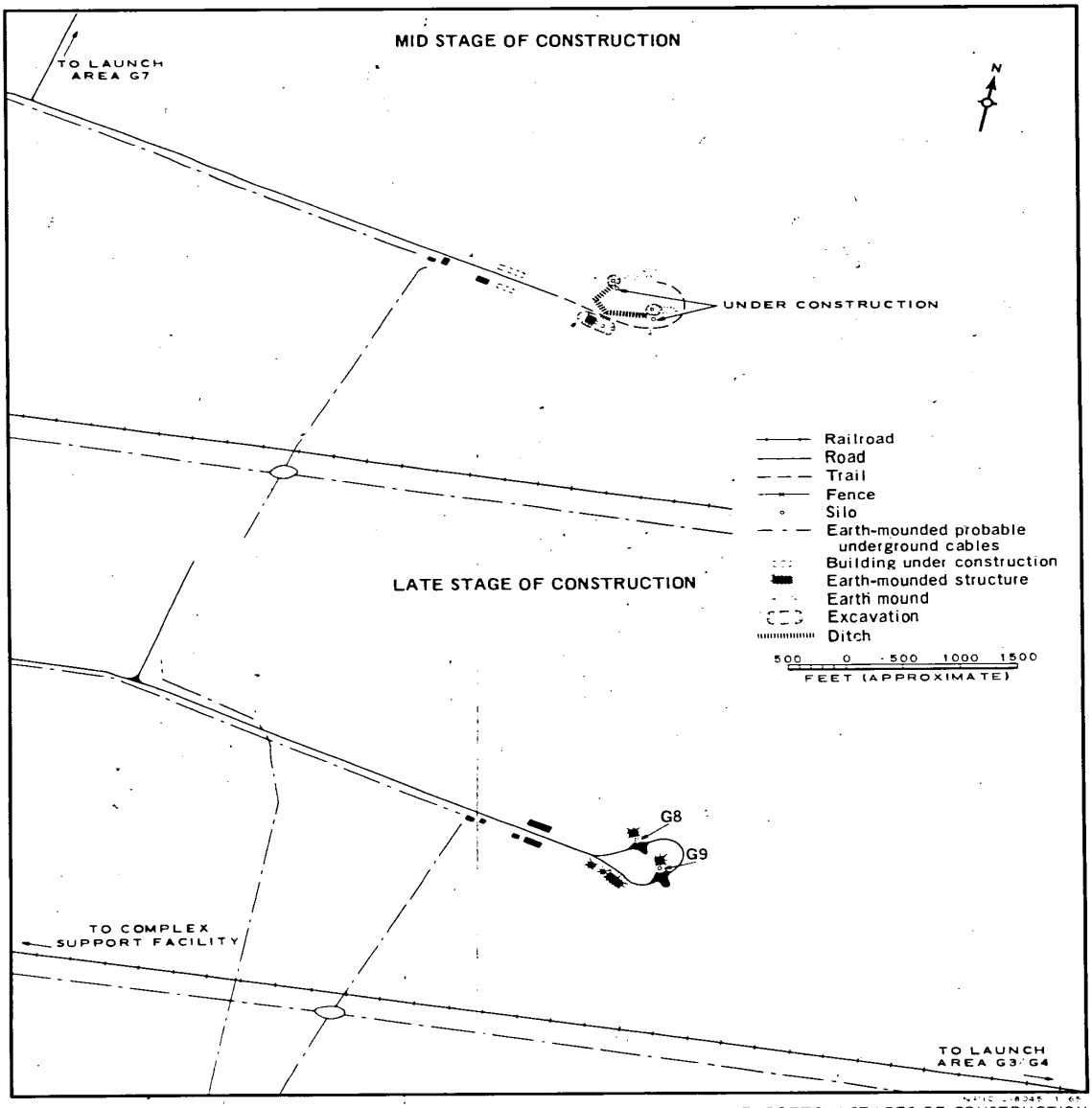


FIGURE 38. LAYOUT OF LAUNCH SITE G8 G9(19), TYURATAM, IN MID (TOP) AND LATE (BOTTOM) STAGES OF CONSTRUCTION.

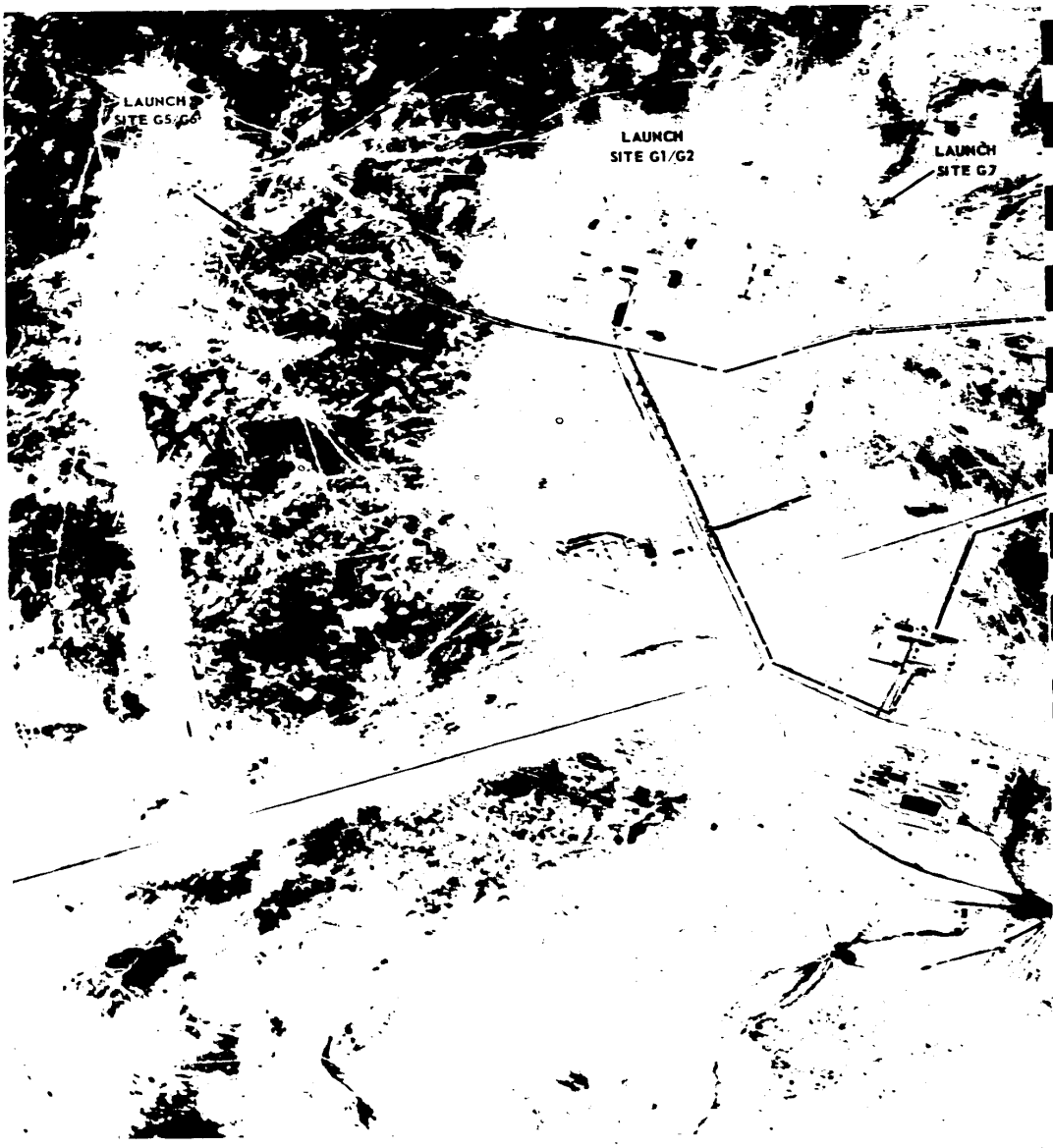
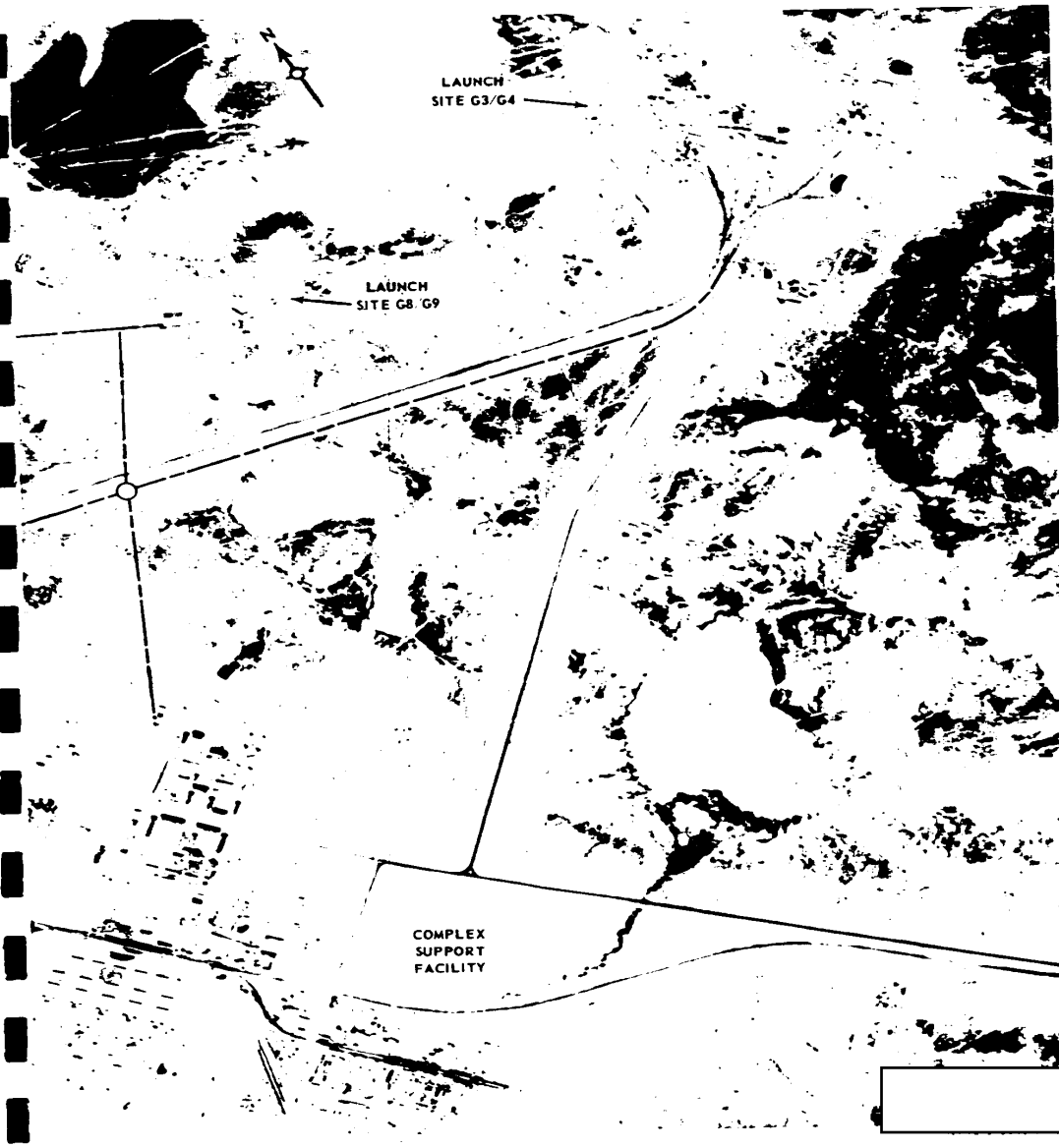


FIGURE 39. CABLE DITCHING,



25X1D

LAUNCH COMPLEX G, TYURATAM.

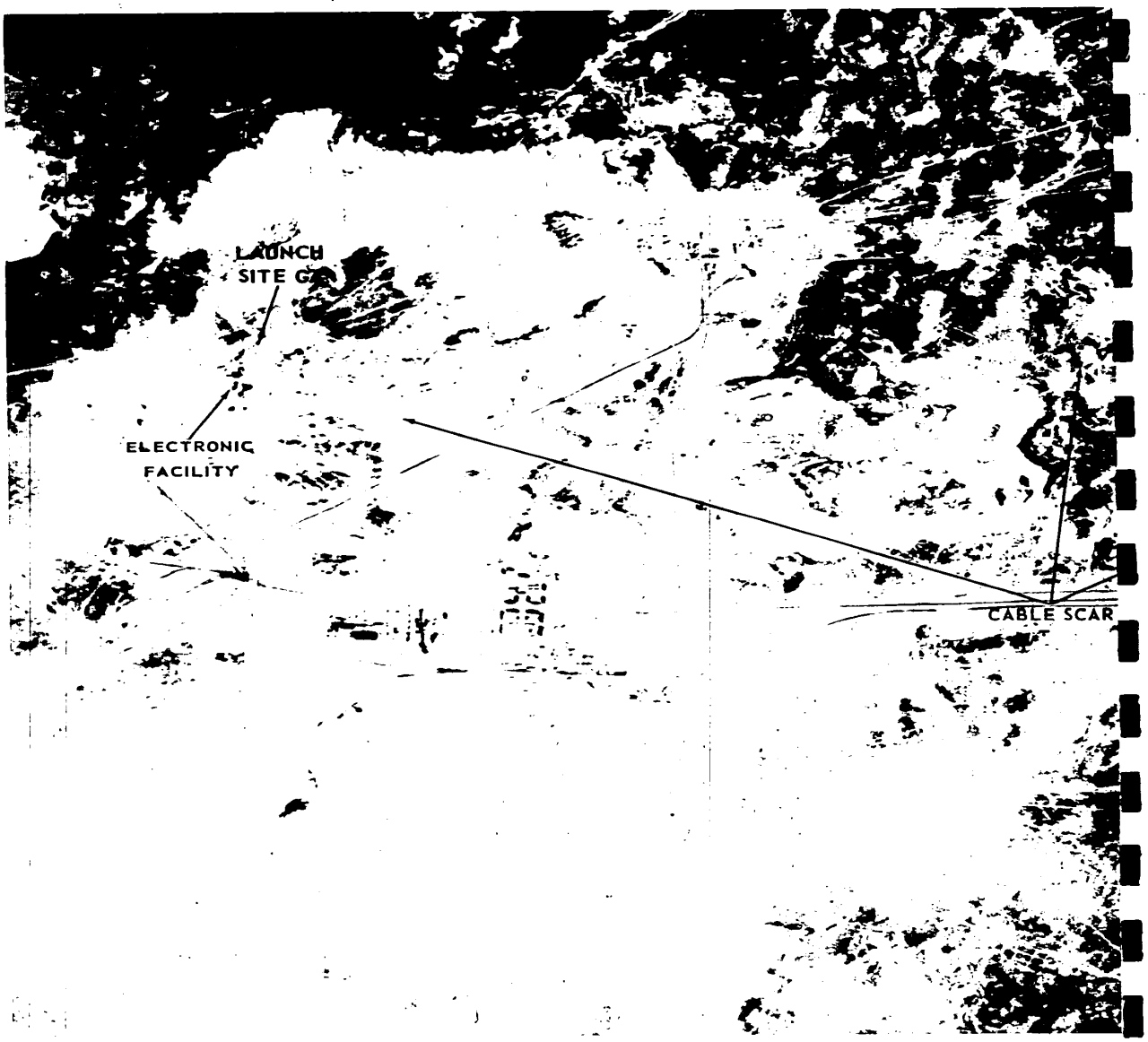
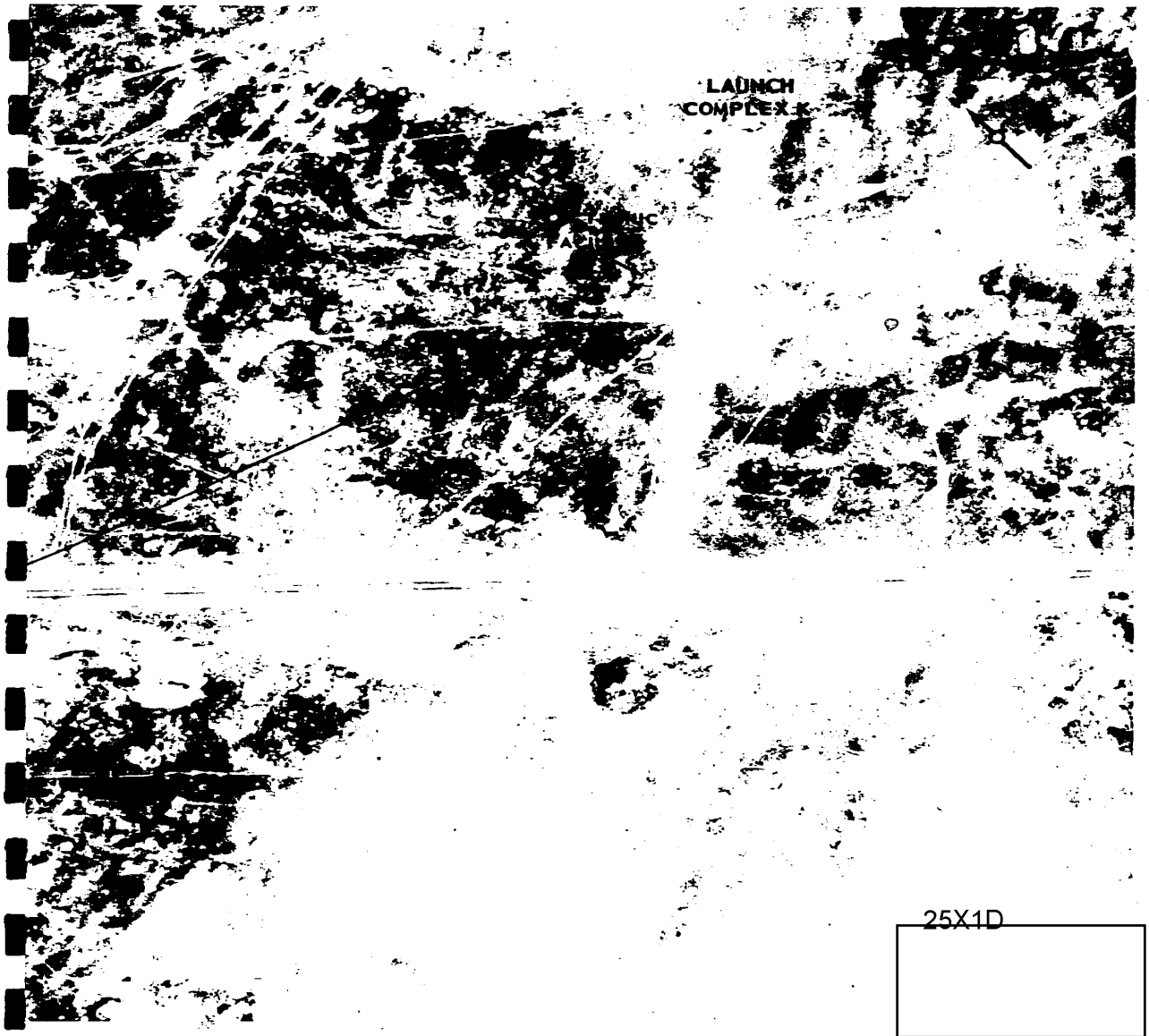


FIGURE 40. PROBABLE CABLE DITCHING UNDER CONSTRUCTION



25X1D

BETWEEN LAUNCH SITE G7(18) AND LAUNCH COMPLEX K(13), TYURATAM.

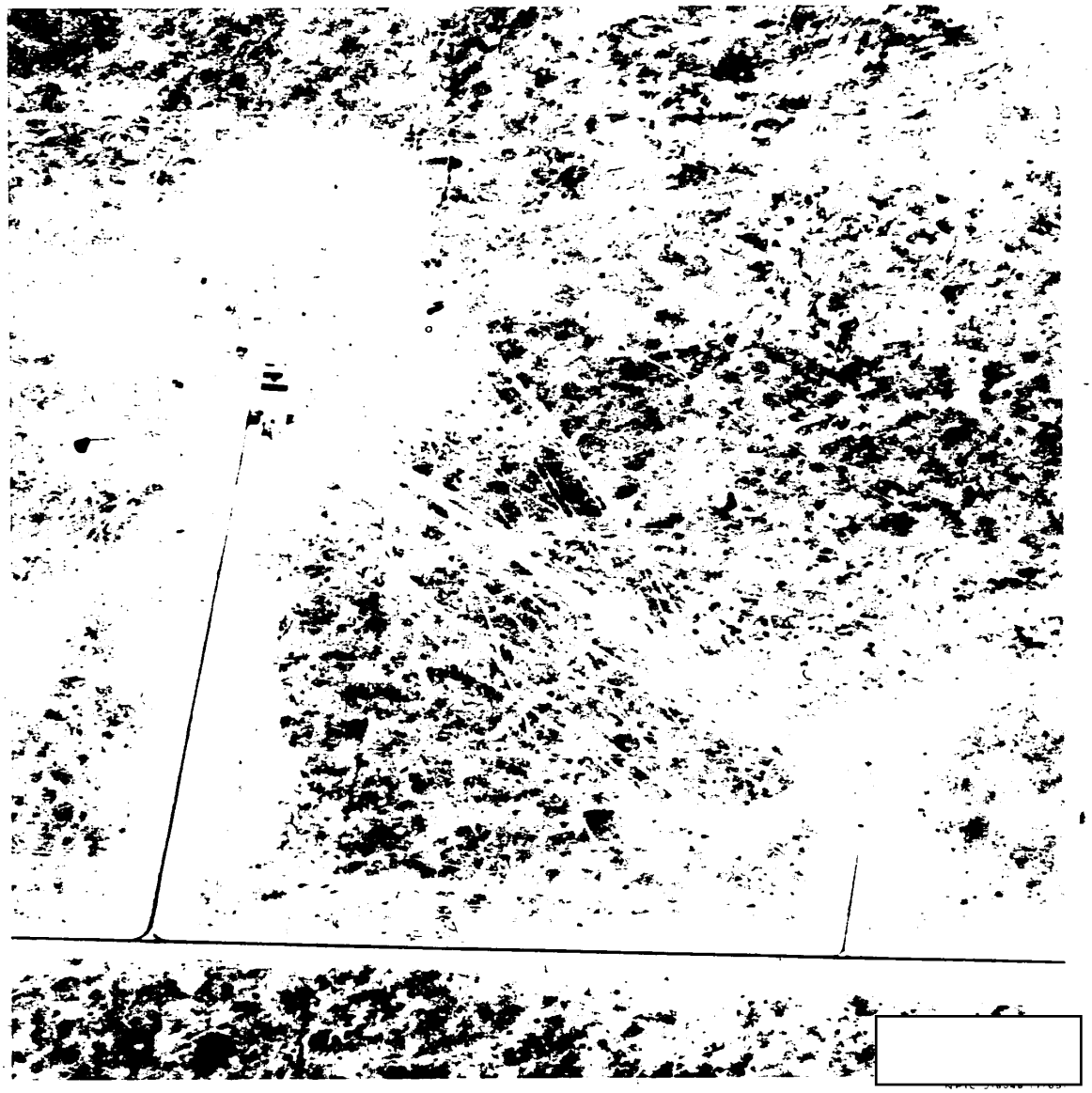


FIGURE 41. LAUNCH COMPLEX H(8), TYURATAM.

25X1D

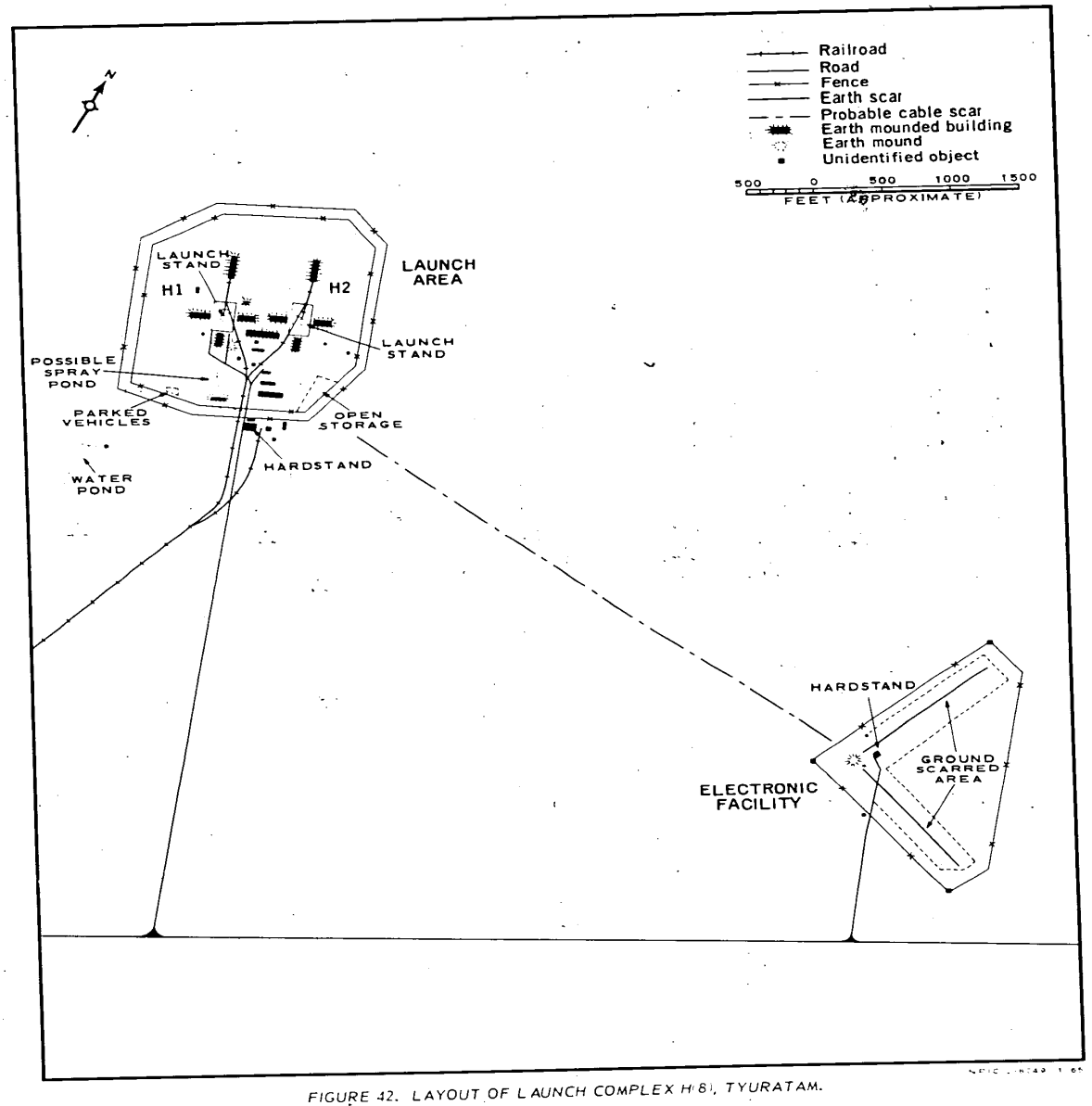


FIGURE 42. LAYOUT OF LAUNCH COMPLEX H(8), TYURATAM.

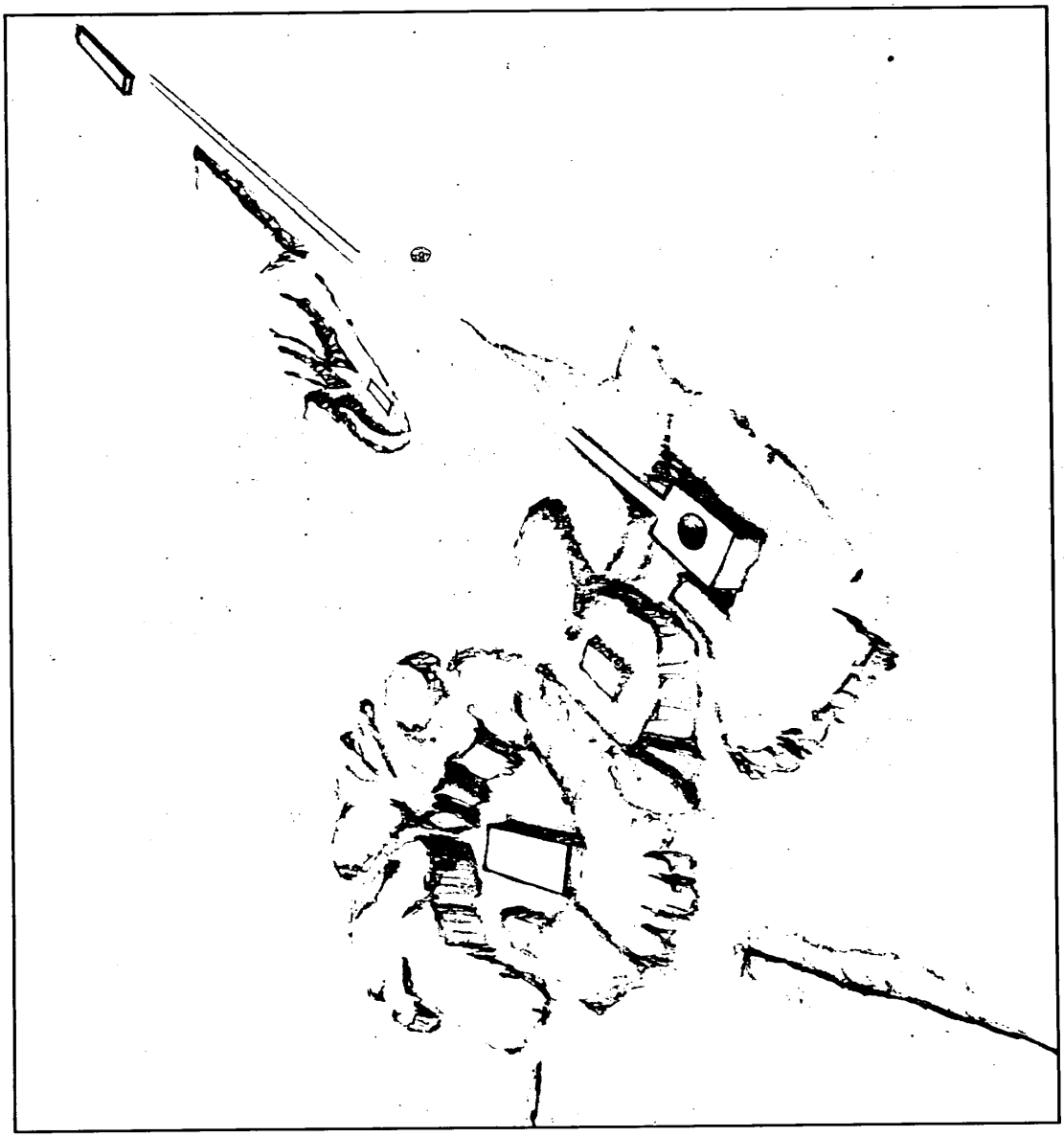


FIGURE 43. ARTIST'S CONCEPT OF LAUNCH COMPLEX II(14), TYURATAM.

FIGURE 44. LAUNCH COMPLEX J, TYURATAM.

TOP SECRET

NPIC J-8052 (1-65)

FIGURE 45. LAUNCH COMPLEX K(13), TYURATAM.

TOP SECRET

25X1D

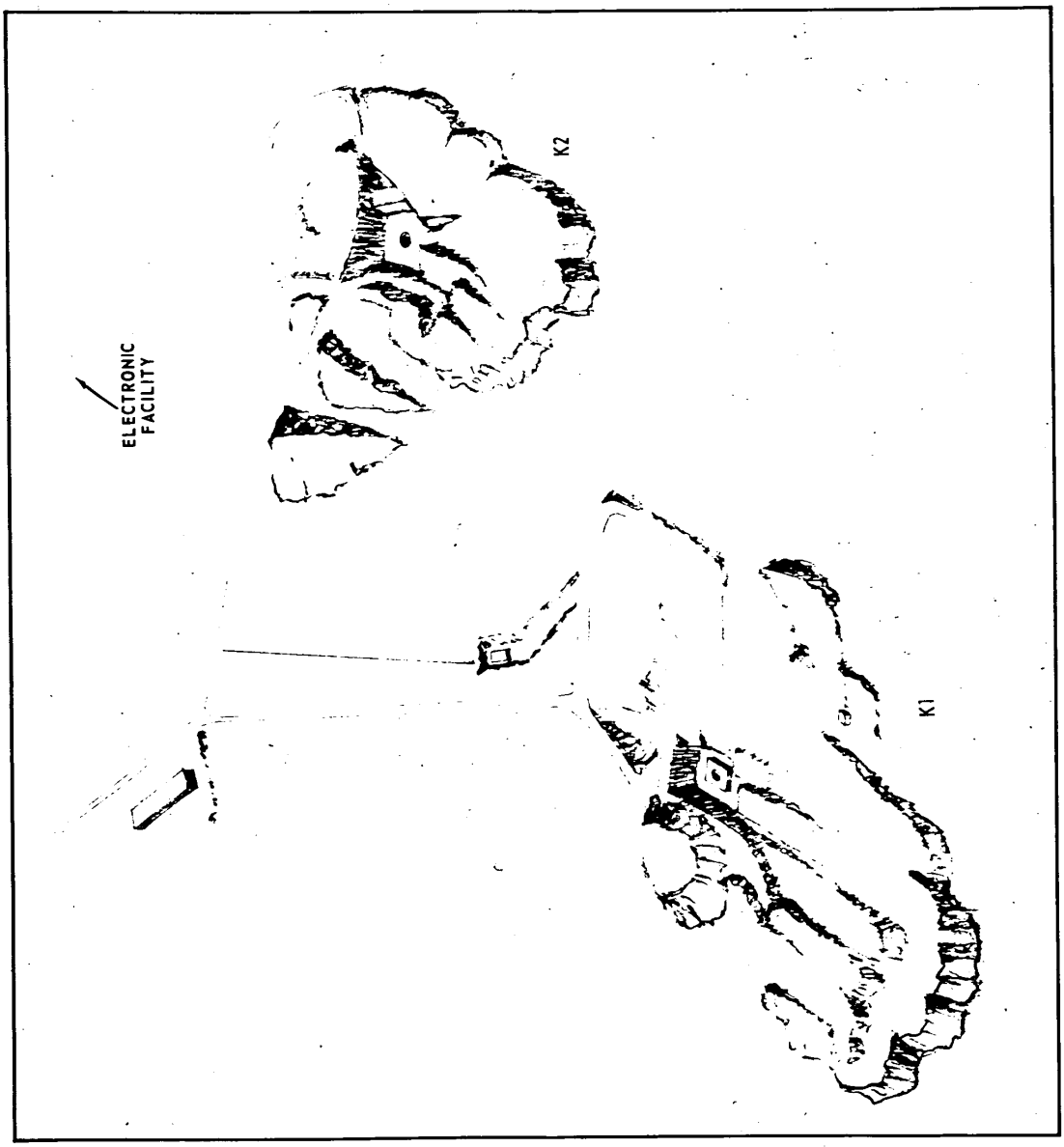


FIGURE 46. ARTIST'S CONCEPT OF LAUNCH COMPLEX K(13), TYURATAM.

25X1D

SOVIET IRBM/MRBM DEPLOYMENT

photography since our 15th Revision covers 12 of the 15 IRBM, and 30 of the 69 MRBM complexes. One IRBM soft site has been abandoned and 2 IRBM hard sites, carried in our tables as under construction, have been inactive for a considerable period of time. We are dropping these 3 sites from our tables. See Figure 47 for locations of deployed IRBM/MRBM complexes. Typical configurations of the launch sites and the weapons system associated with each are depicted in Figure 48. The composition of IRBM/MRBM complexes is given in Table 6.

IRBM DEPLOYMENT

Current Force Level

The Soviet IRBM force currently consists of 33 sites containing a total of 114 launchers, including 54 in a hard configuration. Of these launchers, 111, including 51 silos, are estimated to be operational. These figures represent an overall reduction of 10 launchers (including 4 operational soft pads) from those carried in our 15th Revision. This reduction is explained in succeeding paragraphs.

Sites Without Support Facilities

25X1D Mission revealed that the soft IRBM launch site at Bayram-Ali has been rendered inoperative (Figure 49). In retrospect, initial evidence that the site was being dismantled was apparent as early as Mission 25X1D when 3 buildings, including 2 barracks-type, were no longer visible. The latest coverage shows that the 4 missile-ready buildings, one control bunker,

25X9

The Bayram-Ali site was 1 of 9 singly deployed soft sites, all constructed during which are unique in that they lack the usual administration and support facilities. In addition to Bayram-Ali, this group includes IRBM sites at Ramoye, Traktovyy and Zhuravka; and MRBM launch facilities at Kraskino, Marina Gorka, Rozhdestvenka, Sledyuki, and Uzhgorod. We have been carrying these sites as operational, although we do not know their function or how they fit into the deployment program.

In light of the destruction of the Bayram-Ali launch site, we have examined available photography of the other 8 sites in this unique category. Recent coverage of 6 of the sites, including the 5 MRBM launch facilities, is either lacking or of poor quality and we cannot determine their current status. At 2 of the IRBM sites, however, dismantling operations may be underway. At Traktovyy, 2 barracks-type buildings identifiable on Mission 25X1D are no longer visible on Mission 25X1D (Figure 50). At Zhuravka, 1 of the 2 barracks-type buildings visible on 25X1D appears to be absent on in 25X1D (Figure 51). Pending further coverage, we are continuing to carry the Traktovyy and Zhuravka sites as operational.

Inactive Hard Sites

25X1D As early as our 12th Revision, we pointed out that construction activity at a number of hard sites, 9 IRBM and 2 MRBM, was not progressing normally. Since that time both MRBM sites and 5 of the IRBM sites have been completed. In addition, we dropped the Bolshaya Kamenka IRBM site at Saratov (see 15th Revision), since photographic coverage indicates that it has been inactive for a considerable period of time.

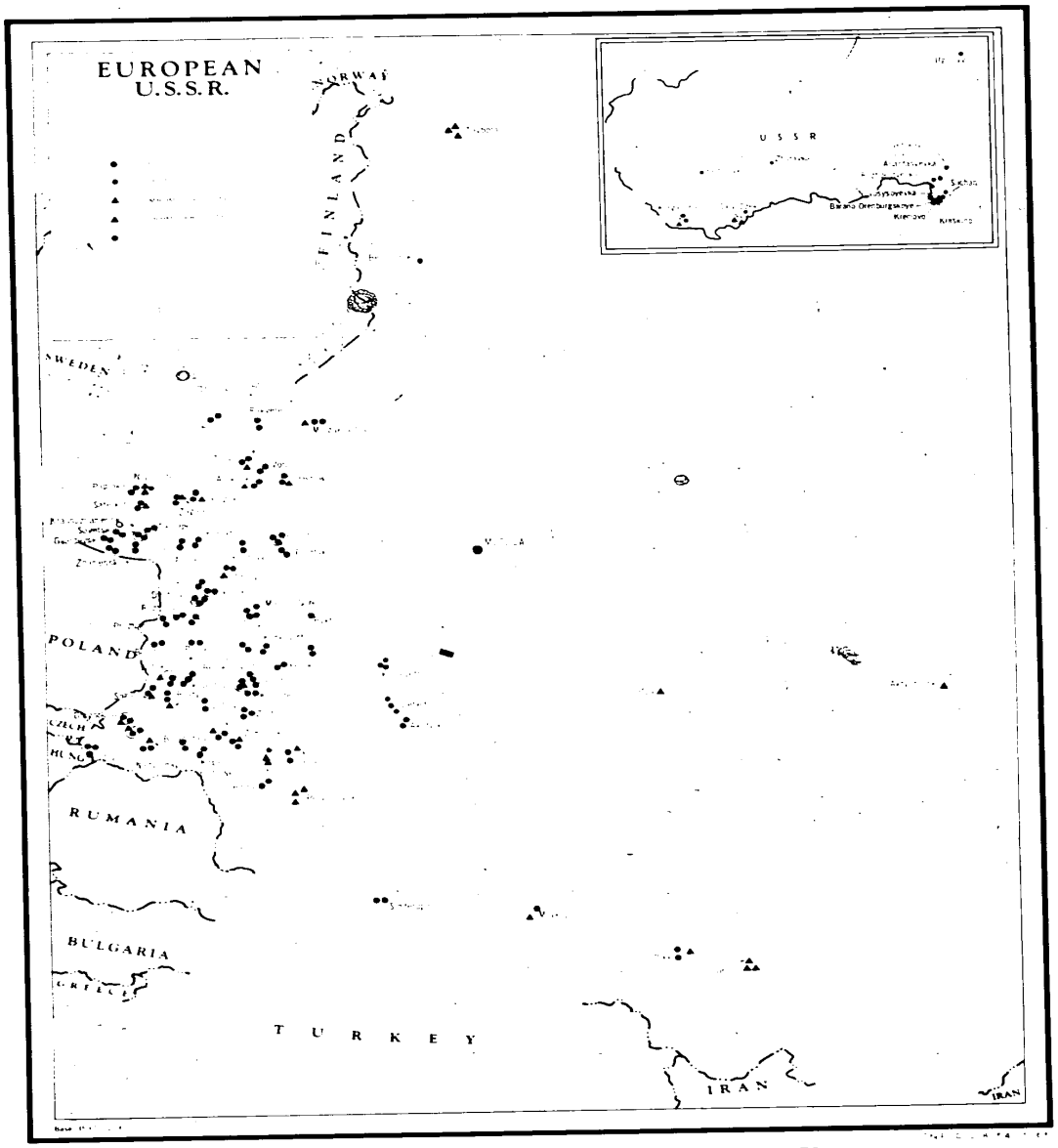


FIGURE 47. DEPLOYMENT OF SOVIET IRBM MRBM COMPLEXES.

Since our last revision we have re-examined available photography of the 3 remaining IRBM hard sites which have not been completed -- Karakhobda (Aktyubinsk Complex), Novosysoyevka 3, and Taybola 3.

25X1D
25X1D
25X1D

The Karakhobda site was first observed in an early stage of construction on Mission [redacted] Comparison of photography of this site on Mission [redacted] and Mission [redacted] shows that no construction progress occurred during a period of at least 9 months (Figure 52).

25X1D

Latest photographic coverage of this site on Mission [redacted] though not of good quality, fails to reveal any activity or evidence of construction progress. Accordingly, we are placing this site on the inactive list and dropping it from our tables.

Novosysoyevka 3 has also been inactive for a considerable period of time, and is dropped from our tables. This site was in an early construction stage when first observed on Mission [redacted]

25X1D
25X1D
25X1D

progress on [redacted] Excellent coverage on [redacted] confirms that this site is inactive (Figure 53).

Recent photographic coverage of Taybola 3 is of poor quality and we are unable to determine its current status. We suspect that it is inactive also, but will continue to carry it in our tables until better photography is available.

25X1D
25X1D
25X1D

This site was first observed in an early stage of construction on Mission [redacted] Comparison of coverage on Mission [redacted] in [redacted] shows that some progress has been made, though very little considering the year's interval between missions (Figure 54).

Saratov Complex

In our 15th revision we dropped the Bolshaya Kamenka IRBM hard site at Saratov because of lack of construction activity. This judgment was confirmed by subsequent coverage on Mission [redacted] However, we are watching with interest a suspect area located approximately 5.5 nm southwest of the inactive site (Figure 55). Here a rail spur branching north from the main Ryazano-Uralskaya rail line at Tatishchevo terminates in a wooded area. Two small rail spurs and 2 unidentified structures are newly identified at the rail line terminus on Mission [redacted] in [redacted] This construction has been accomplished since Mission [redacted] in [redacted]

25X1D
25X1D
25X1D
25X1D
25X1D
25X1D

MRBM DEPLOYMENT

Current Deployment

The Soviet MRBM force currently consists of 158 sites containing 632 launchers, including 84 in a hard configuration. All are operational. No new developments at permanent MRBM launch facilities have been observed since our last revision.

25X1D

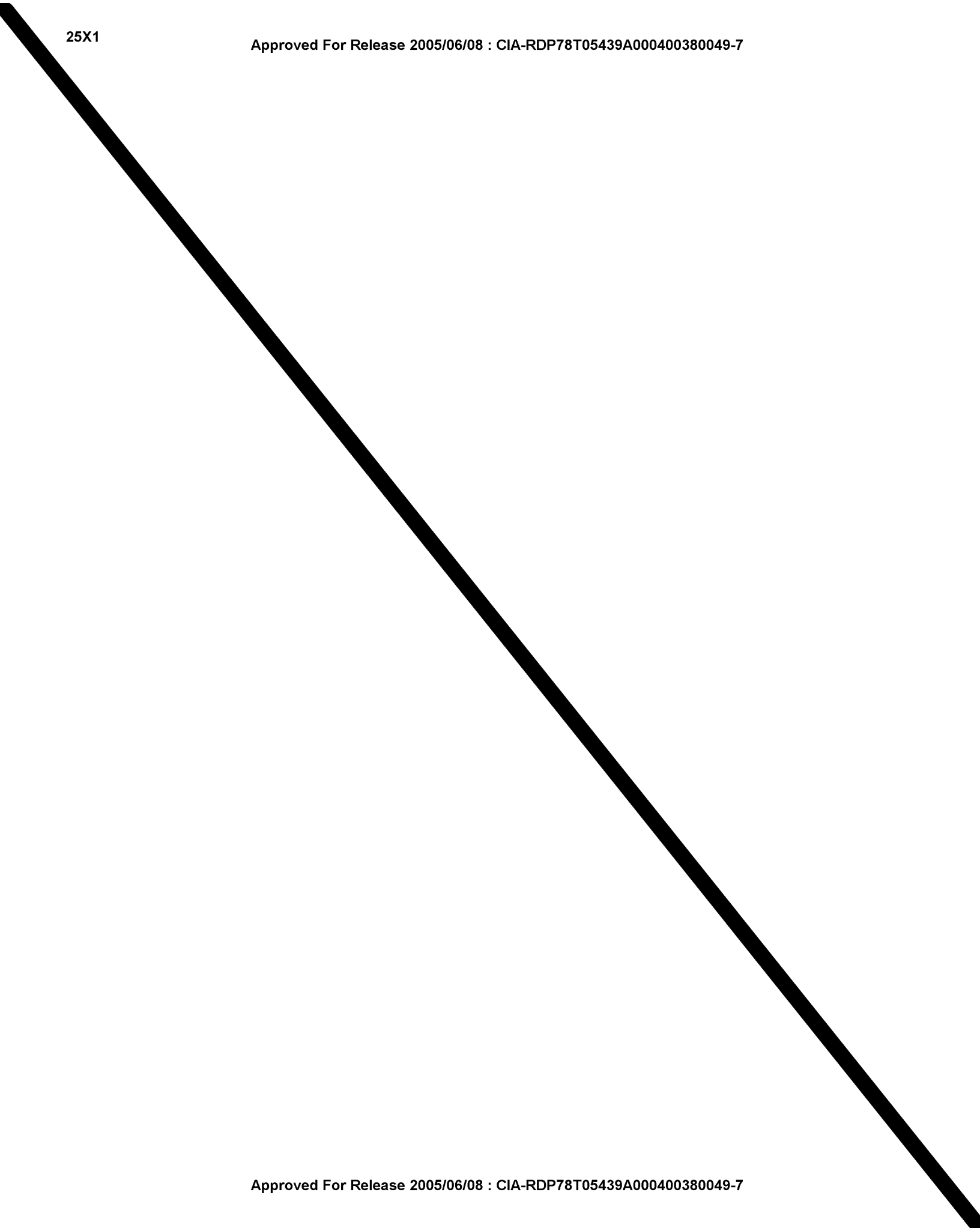
Fixed Field Sites

Five fixed field sites have been identified on [redacted] photography since the 15th Revision, bringing the total identified to date to 71. A list of these sites is given in Table 5.

Mission [redacted] revealed a 4-position field site at Zamshany near the Brest MRBM Complex (Figure 56). The site is 1.5 nm from the nearest permanent launch facility, and can be negated on Mission [redacted] in [redacted] It was first visible on Mission [redacted] This is the second fixed field site associated with the Brest Complex, which contains 2 permanent soft launch facilities.

25X1D
25X1D
25X1D

At the Dolina MRBM Complex, the second new fixed field site was identified near Rukuv



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25X1D

25X1D

on Mission [redacted]. This site contains 4 launch positions (Figure 57), and is located 5.5 nm from the nearest permanent soft site. No evidence of this fixed field launch point was visible on Mission [redacted] in [redacted]. The Dolina MRBM Complex contains 2 permanent soft sites and 1 hard launch facility.

25X1D

The third new fixed field site was identified at Yemilchino on Mission [redacted]

25X1D [redacted] This site is located adjacent to an earlier identified site of the same category (Figure 58) and is the fourth fixed field site observed in the vicinity of the Korosten MRBM Complex, which contains 2 permanent soft sites. The new site contains 4 launch positions, and can first be identified on Mission [redacted] It can be negated on Mission [redacted]. The Yemilchino sites are located approximately 16 nm from the nearest permanent site at the Korosten Complex.

25X1D
25X1D

The fourth new fixed field site is located at Manzovka, about 11 nm from the Kremovo MRBM Complex. It is the first such facility associated with this complex, which contains 2 permanent soft sites. The fixed field site consists of 4 launch positions (Figure 59), can be negated on Mission [redacted] and is first visible on Mission [redacted] It was identified on Mission [redacted]

25X1D
25X1D
25X1D
25X1D

Continued examination of [redacted] in [redacted] revealed the fifth new fixed field site at Kobylnik, approximately 16 nm from the nearest permanent soft site at the Postavy Complex. This complex contains 3 permanent sites, including 2 soft and 1 hard. The fixed field site contains clearings for 4 launch positions (Figure 60) and can be negated on Mission [redacted] It is first visible on Mission [redacted] This site is the third fixed field facility identified in the vicinity of the Postavy Complex, which contains 3 permanent sites, including 2 soft and 1 hard.

25X1D
25X1D

Fixed field sites have now been identified at or near 43 of the 69 MRBM complexes. At 18 of these complexes, there is 1 fixed field site for each permanent soft launch facility. At 20 other complexes, there is 1 associated fixed field site per complex, although each contains either 2 or 3 permanent soft sites. At 4 complexes, fixed field facilities equal the total hard and soft permanent sites. At 1 complex, Korosten, there are 4 fixed field positions and only 2 permanent sites, both soft. At the 26 MRBM complexes where no fixed field sites have been identified, 20 contain soft sites only, and 6 have both hard and soft sites.

We are still unable to determine the function(s) of these fixed field launch facilities. Details of prior analysis of these sites are contained in our 13th, 14th and 15th Revisions.

MODE OF OPERATION, TYPE IV IRBM/MRBM SITES

We are continuing our analysis of IRBM/MRBM hard sites in an attempt to determine their mode of operation, i.e., whether the missile flies out of the silo or is elevated prior to launch.

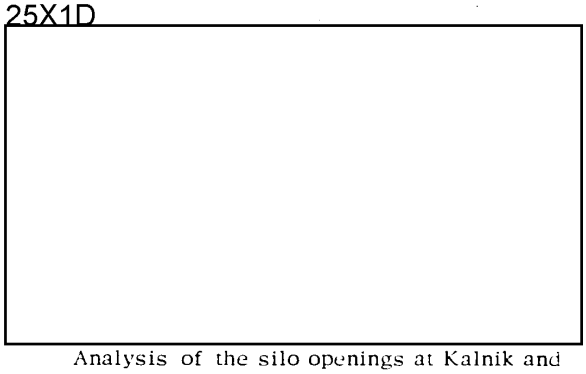
Currently available evidence upon which to base a judgment is limited to [redacted] photography of a very few launch facilities. We have also considered the fact that both the SS-4 and SS-5 are inertially guided, and therefore more compatible with a fly-out system than would be the case if a ground-based radio guidance link was required.

[redacted]

25X1D

[redacted]

25X1D



25X1D

Analysis of the silo openings at Kalnik and the 2 Kapustin Yar sites indicates that as the silo opening approaches the surface it flares out in a funnel shape. At Kalnik, the silo opening increases in diameter from approximately [redacted] feet at the throat to approximately [redacted] feet at the lip. The depth of the flared portion of the silo cannot be determined from photography, but is at least 5 feet.

25X1D

The net effect of the flange is almost certainly detrimental to the hardness of the sites, since it adds substantially to the diameter of the opening which must be covered by the silo door. (An additional 15 feet for IRBM sites, using Kalnik as an example.)

The flanged opening also would appear to mitigate against an elevator system, since loading and erection of the missile on the elevator would be considerably more difficult than would be the case if the surface diameter more closely approximated that of the opening at the throat of the funnel.

Examination of photography of the silo openings at Kalnik and the 2 Kapustin Yar prototype sites does not reveal any clue to the method utilized to vent exhaust gases if the missiles do fly out. On the Kalnik photography, however, a number of probable pre-fabricated steel rings of 3 different dimensions (1 approximately [redacted] feet, 7 approximately 20 feet, and 2 about [redacted]

25X1D 25X1D

feet in diameter) are visible in the vicinity of a silo. Based on this, and photography of other launch sites, we believe that these rings are inserted into the silos to form the inner silo walls. The utilization of rings of several sizes suggests the possibility of a silo-within-a-silo configuration.

Photography of the Paraul site at Gelli, while in some respects not of as good quality as that of the other launch facilities analyzed, appears to offer the best vertical view of a completed silo. A plan view (top) of a completed Type IV silo at the Paraul IRBM Launch Site is shown in Figure 62. It shows the surface aperture to be about [redacted] feet in diameter. Within the aperture, and at a lower level, there is an inner casing with an inside diameter of approximately [redacted] feet and a wall thickness of approximately 5 feet. A probable separation of approximately [redacted] feet exists between the outside circumference of the inner casing and the outside silo wall. This probable separation appears on the photograph as a dark band along the entire outside circumference of the inner casing. We believe it possible that this circular outer ring could represent a vent to permit the escape of exhaust gases during a fly-out launch.

25X1D 25X1D 25X1D

The sum of the evidence, while not conclusive, indicates a good possibility that both IRBM and MRBM hard sites are configured to employ a fly-out mode of operation. If so, a postulated configuration for IRBM hard sites, based on the sum of the evidence, can be depicted as illustrated in Figure 63. The MRBM configuration would be similar, except for somewhat smaller silo dimensions.

KAPUSTIN YAR MISSILE TEST CENTER

Test Range Facilities

Coverage of the Kapustin Yar Missile Test Center since our last revision has been sparse.

25X1D 25X1D

Portions of Launch Areas 2C, 3C, 4C, and 5C can be seen through the clouds on Mission in Exercises can be observed on the southern pad at Launch Area 2C, and at Launch Site 5C1. Cloud cover and poor image quality preclude a further readout of these exercises.

25X1D Mission provided interpretable coverage only of Launch Area 1C. The 2 new rail-served pads are now complete and an exercise is underway at the northwestern-most launch pad (Figure 64). A possible missile is erected in the center of the pad and at least 6 vehicles/pieces of equipment are positioned in the vicinity.

Test Range Activity

Flight test operations at Kapustin Yar were

25X1D 25X1D 25X1D

relatively light during the period with the majority of the firings of the KY-2 and KY-3 type.

25X1D

On a cruise missile, an SS-4, a KY-2, and a possible SS-3 were fired in that order over an 8.5-hour time span, probably as part of a demonstration. In addition to these 4 launches, 2 operations of undetermined results were also conducted.

25X1D

An SS-4 firing to the 1,100-nm impact area was detected on and an SS-5 was launched to full range on

25X1D

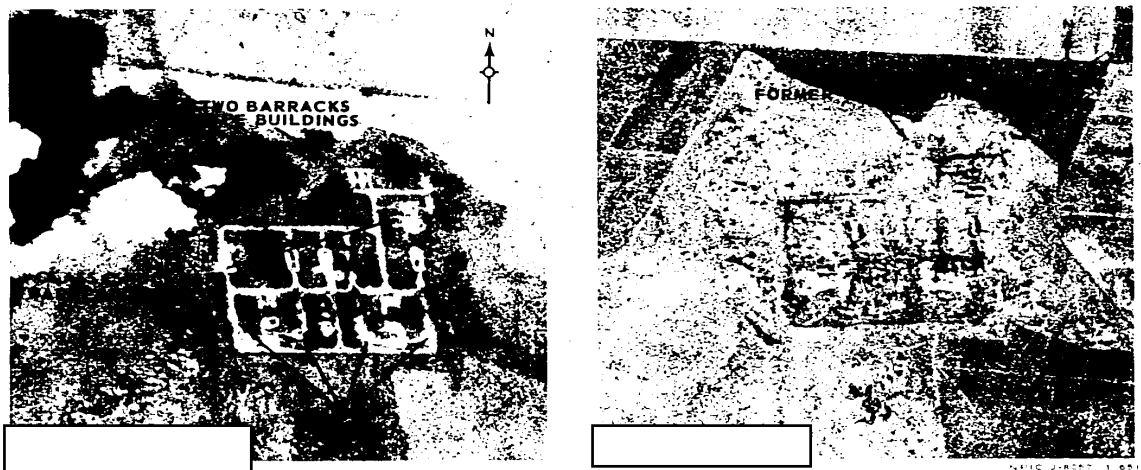
25X1

Probable KY-2 missiles were fired on and probable KY-3 launches took place on

25X1D

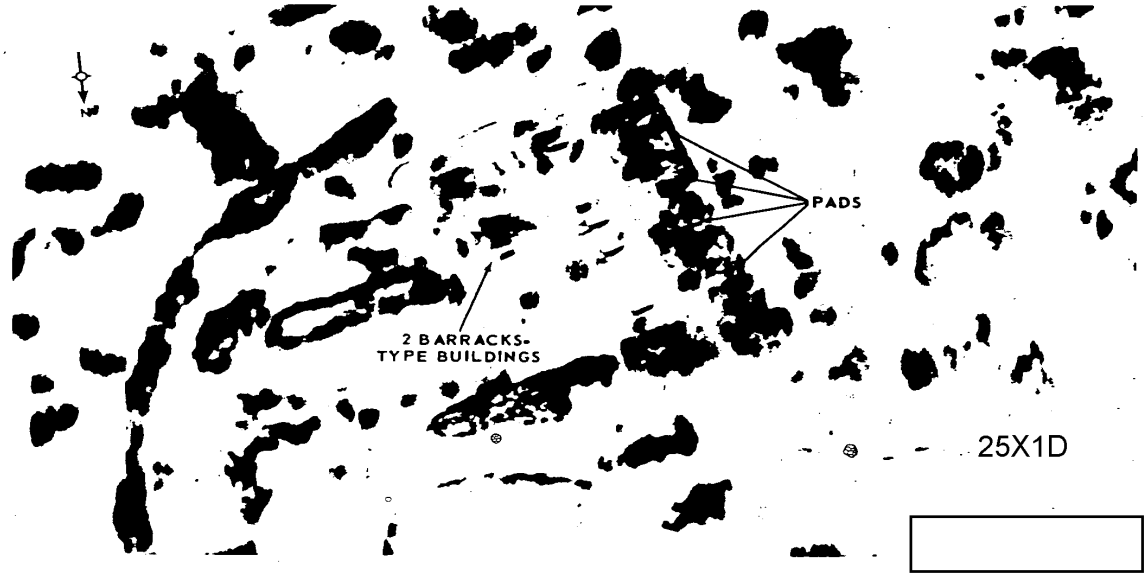
25X1D 25X1D

FIGURE 49. DESTROYED IRBM LAUNCH SITE, BAYRAM-ALI.

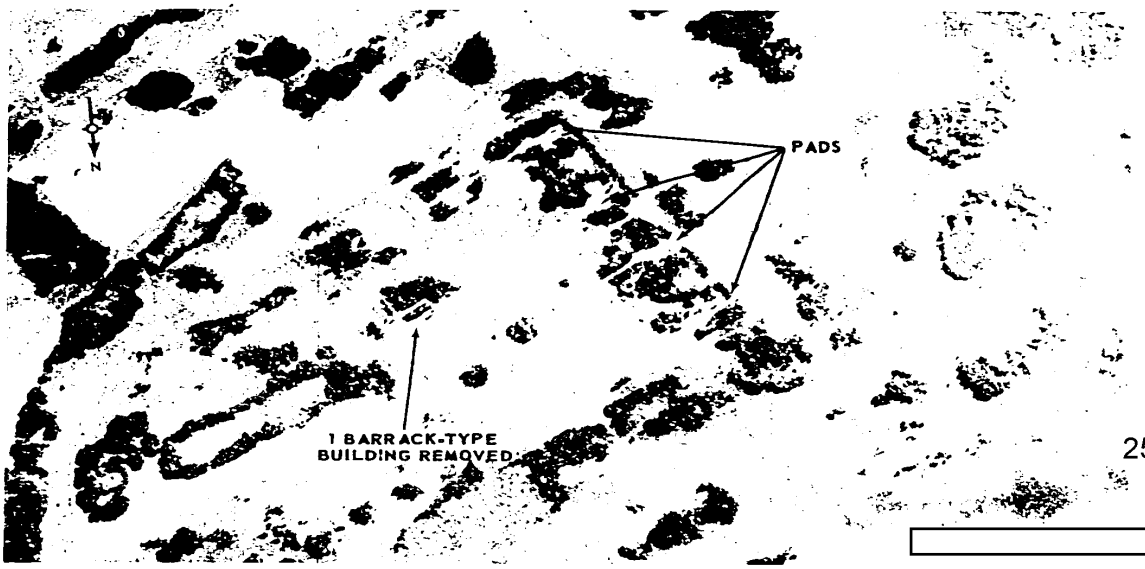


DISMANTLING OF BARRACKS-TYPE BUILDINGS, TRAKTOVYY IRBM LAUNCH SITE.

25X1D

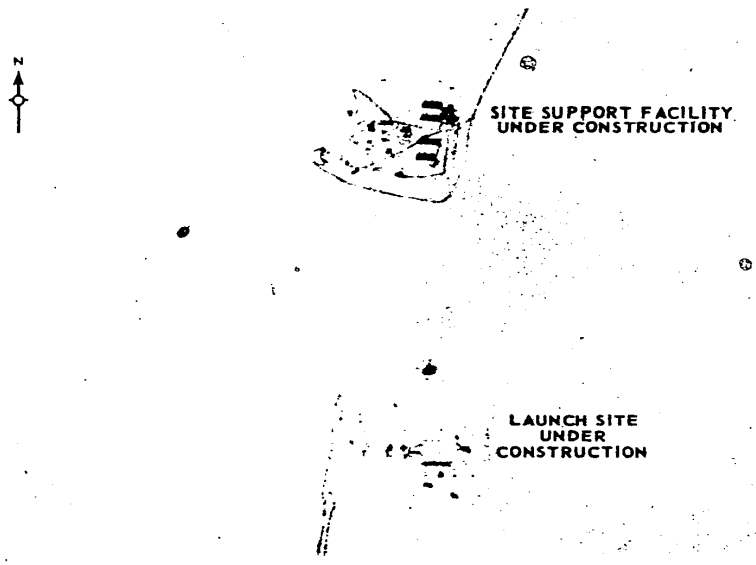


25X1D



25X1D

FIGURE 51. DISMANTLING OF BARRACKS-TYPE BUILDINGS, ZHURAVKA IRBM LAUNCH SITE.



25X1D

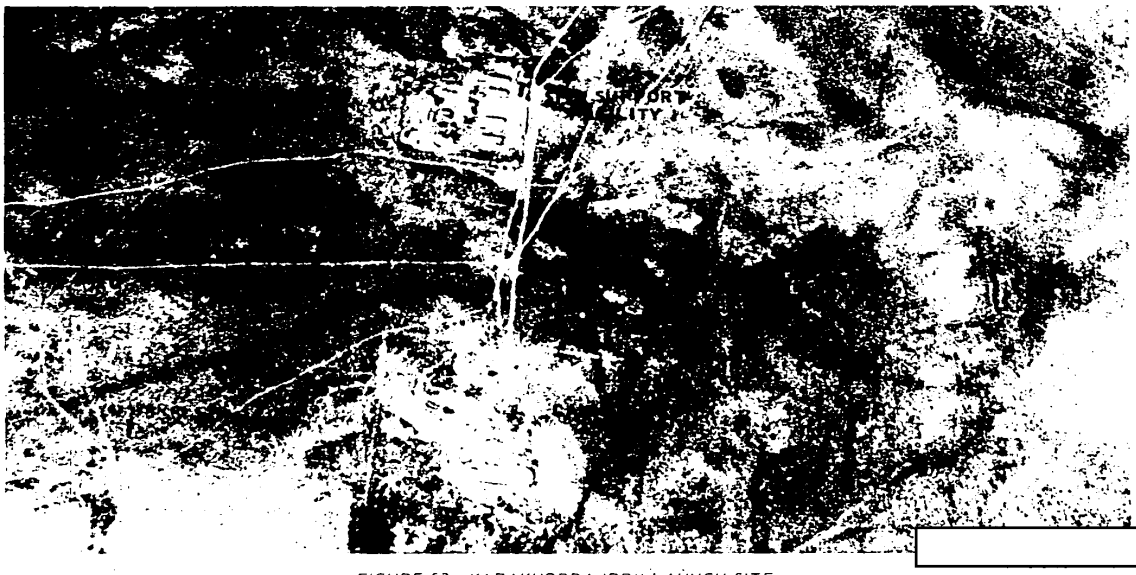
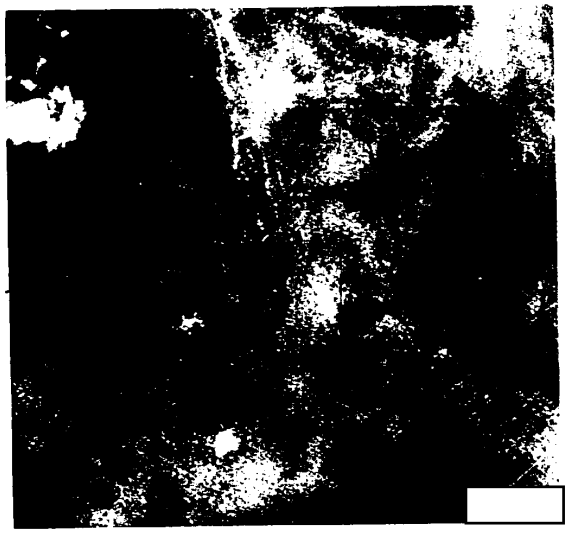
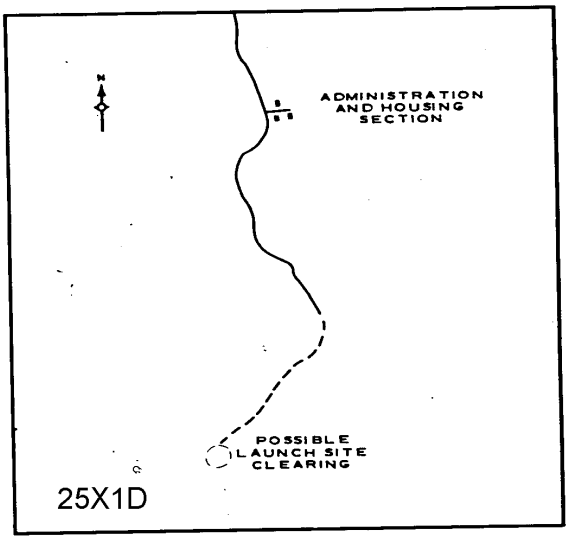


FIGURE 52. KARAKHOBDA IRBM LAUNCH SITE.

25X1D

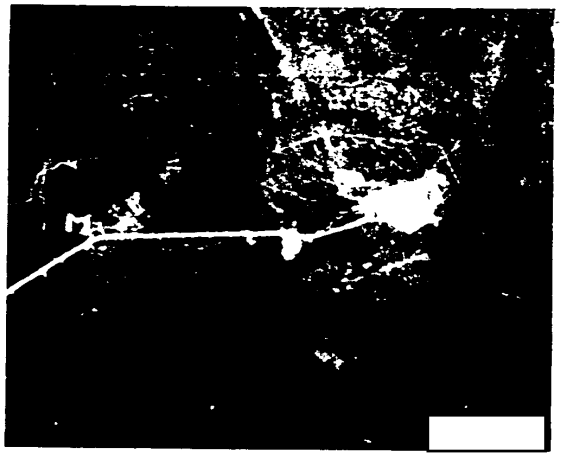


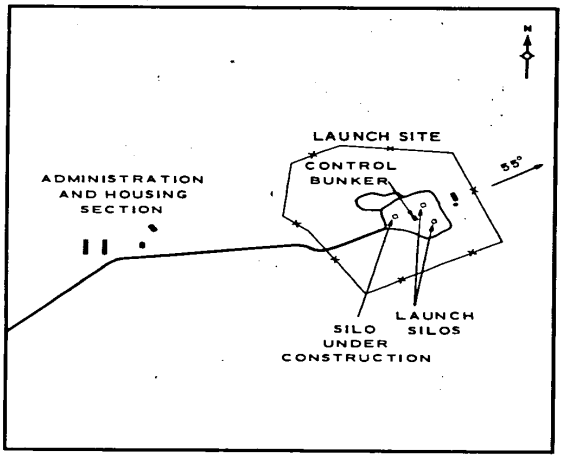


25X1D

FIGURE 53. ABANDONED NOVOSYSOYEVKA 3 IRBM LAUNCH SITE.

25X1D





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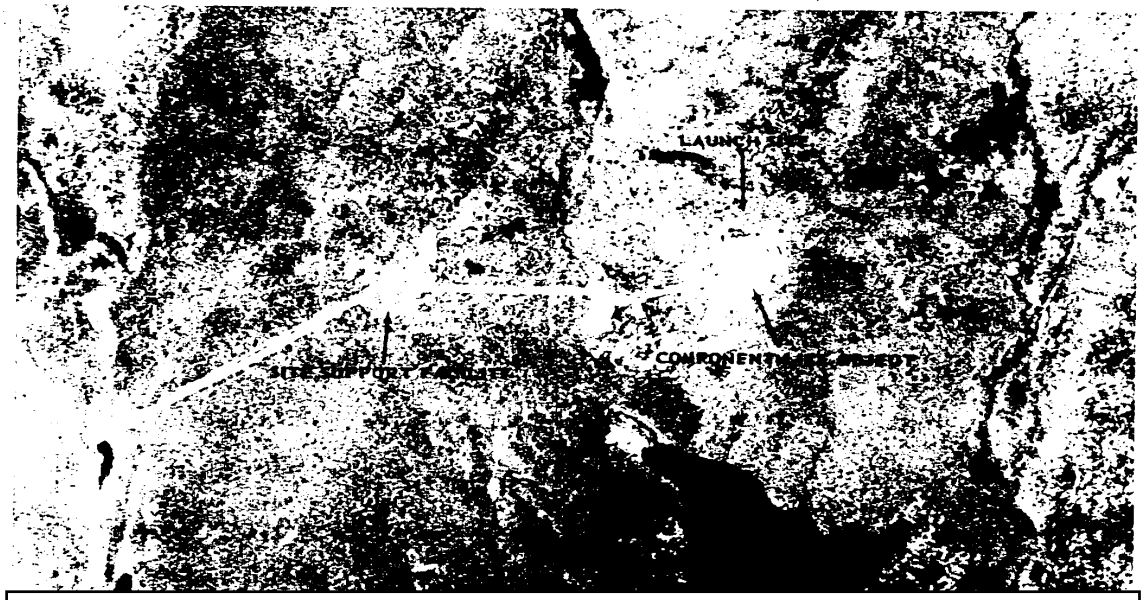

FIGURE 54. TAYBOLA 3 IRBM LAUNCH SITE.

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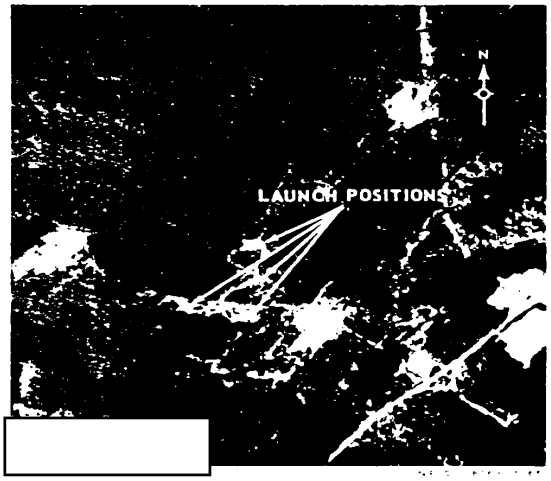


FIGURE 56. ZAMSHANY FIXED FIELD SITE, BREST MRBM COMPLEX.

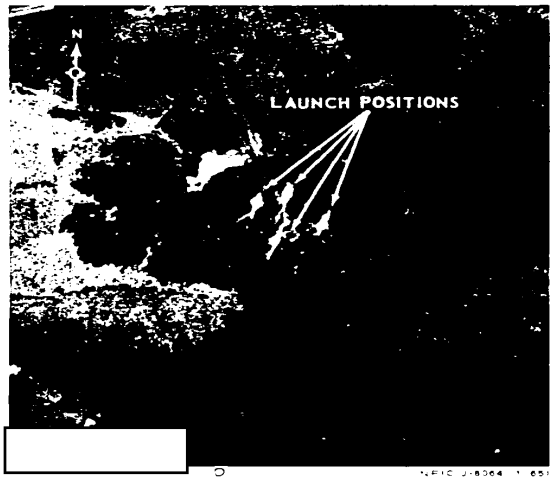


FIGURE 57. RUKUV FIXED FIELD SITE, DOLINA MRBM COMPLEX.

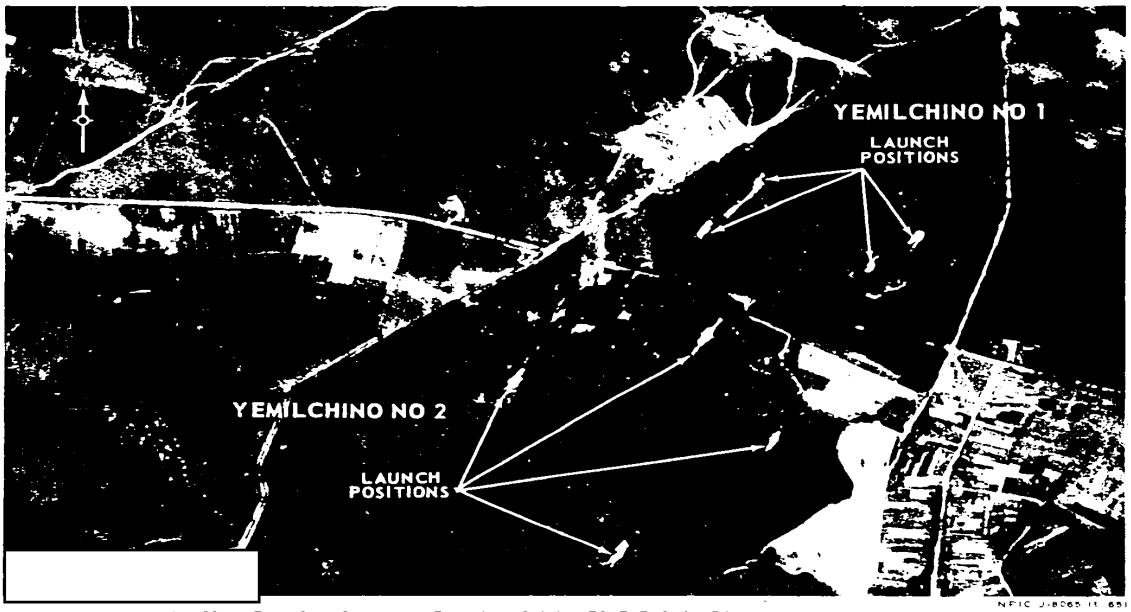


FIGURE 58. YEMILCHINO 1 AND YEMILCHINO 2 FIXED FIELD SITES, KOROSTEN MRBM COMPLEX.

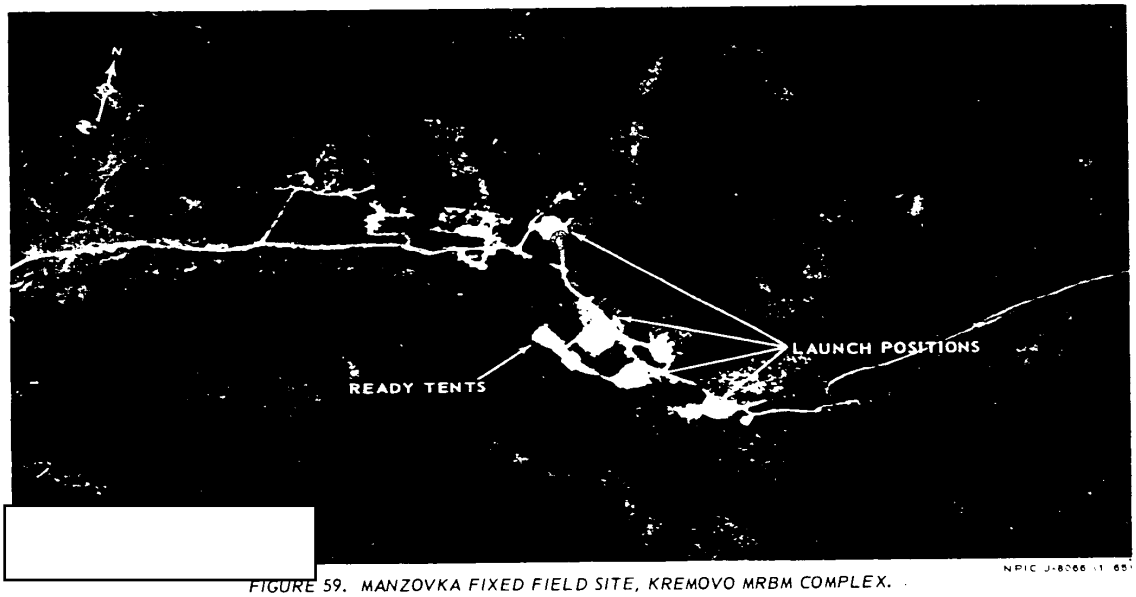


FIGURE 59. MANZOVKA FIXED FIELD SITE, KREMOVO MRBM COMPLEX.

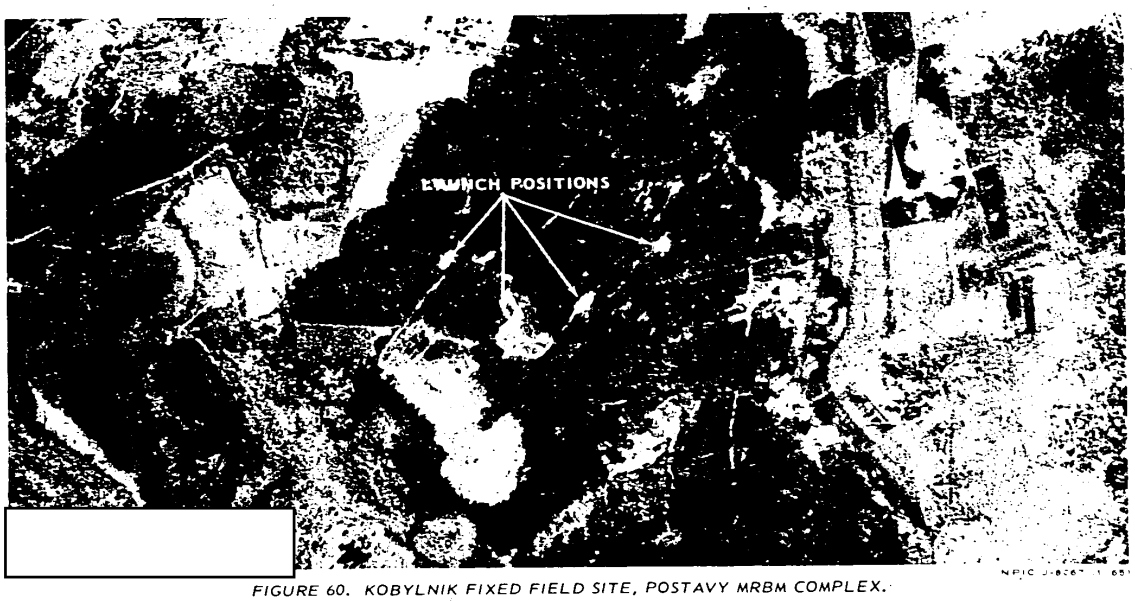
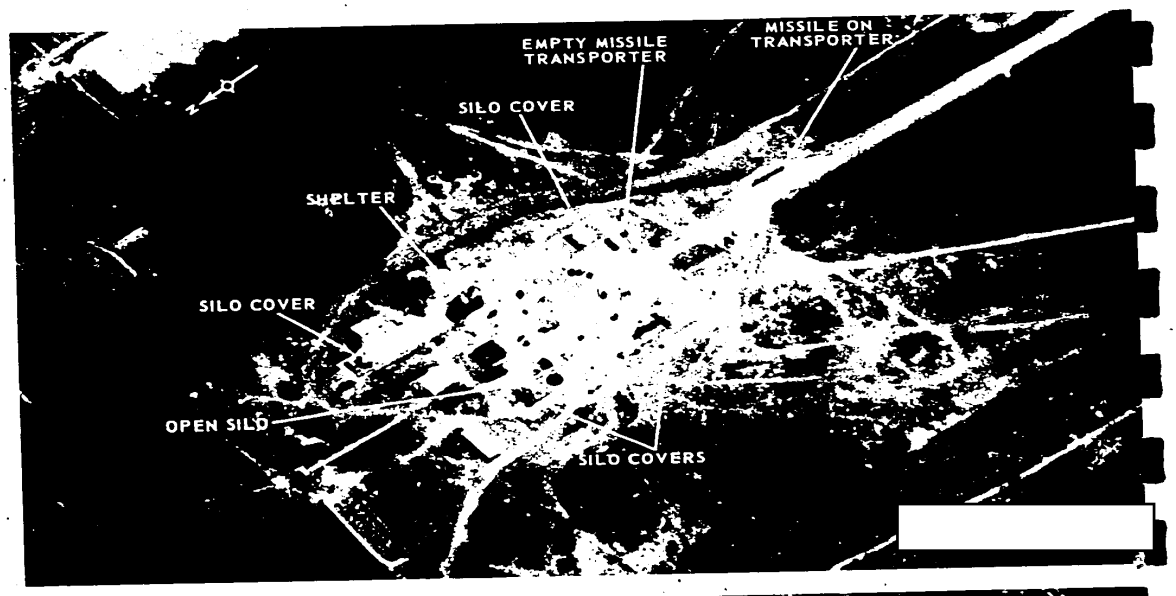


FIGURE 60. KOBYLNIK FIXED FIELD SITE, POSTAVY MRBM COMPLEX.

X1



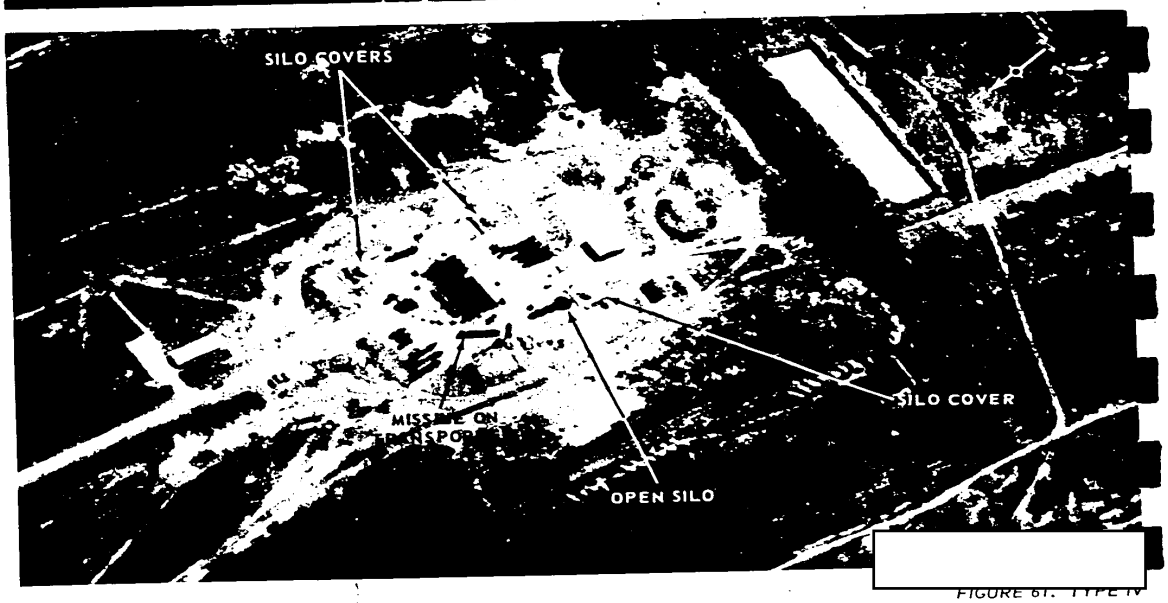
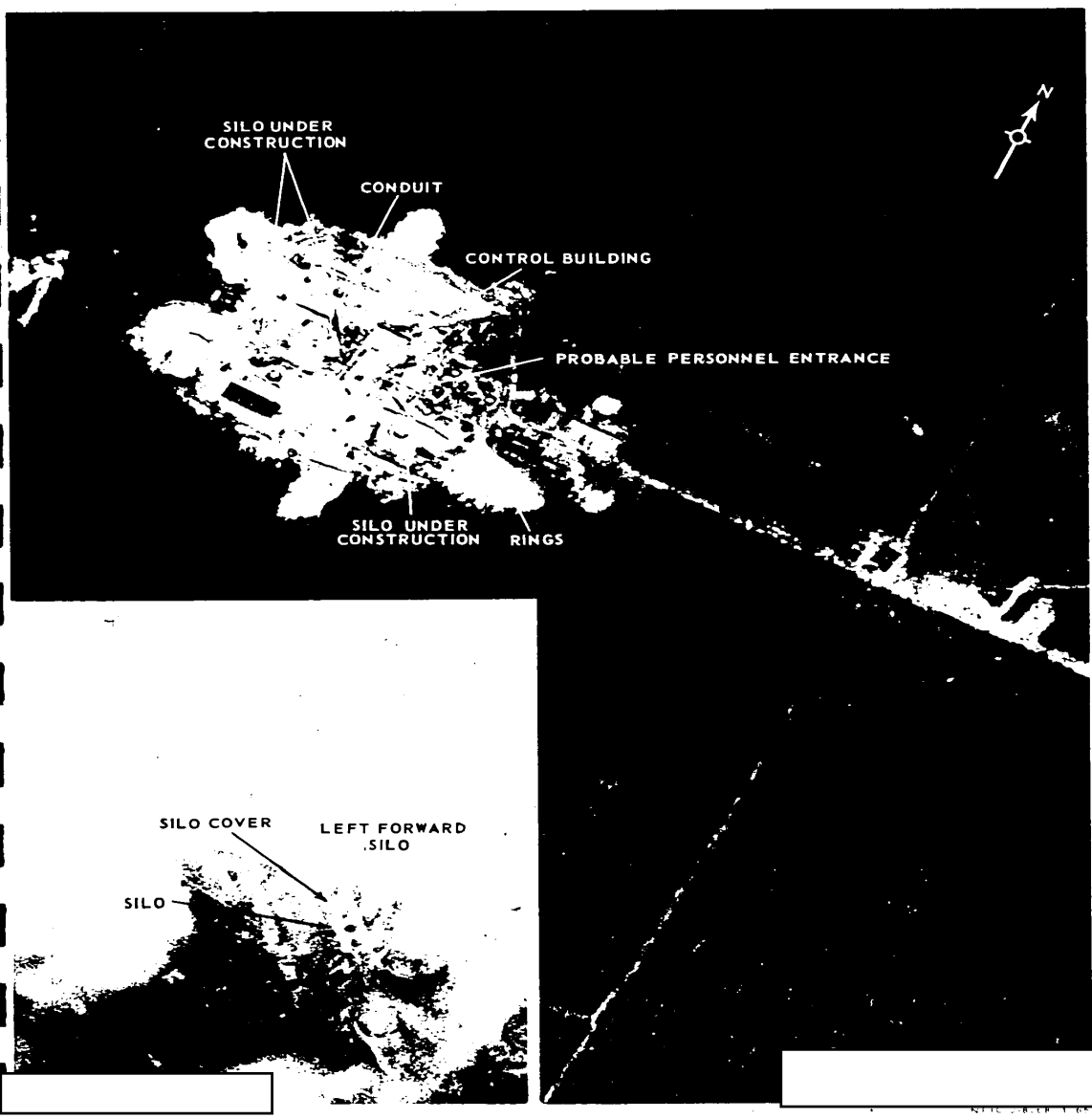
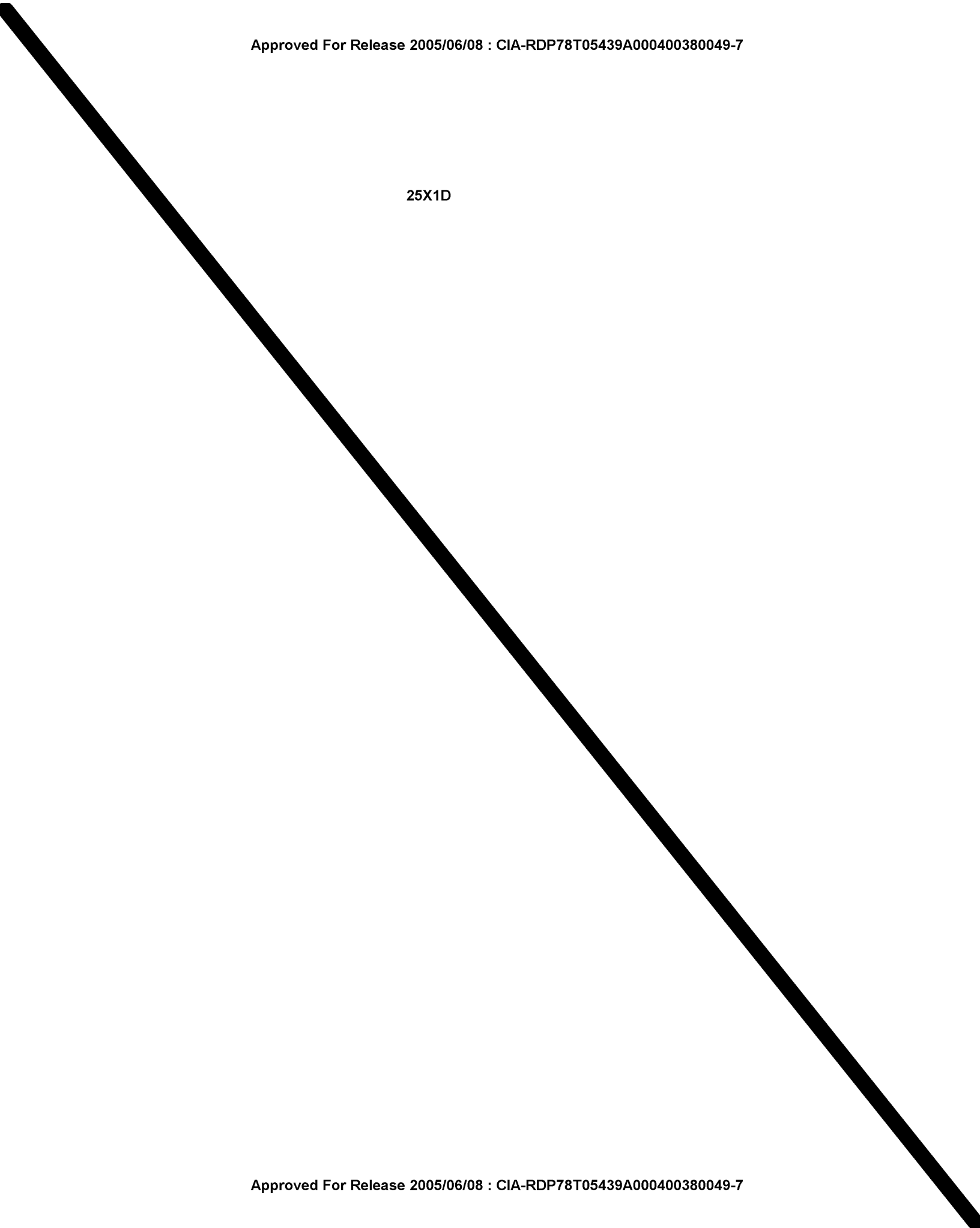


FIGURE 61. TYPE IV



IRBM MRBM LAUNCH SITES.

25X1D



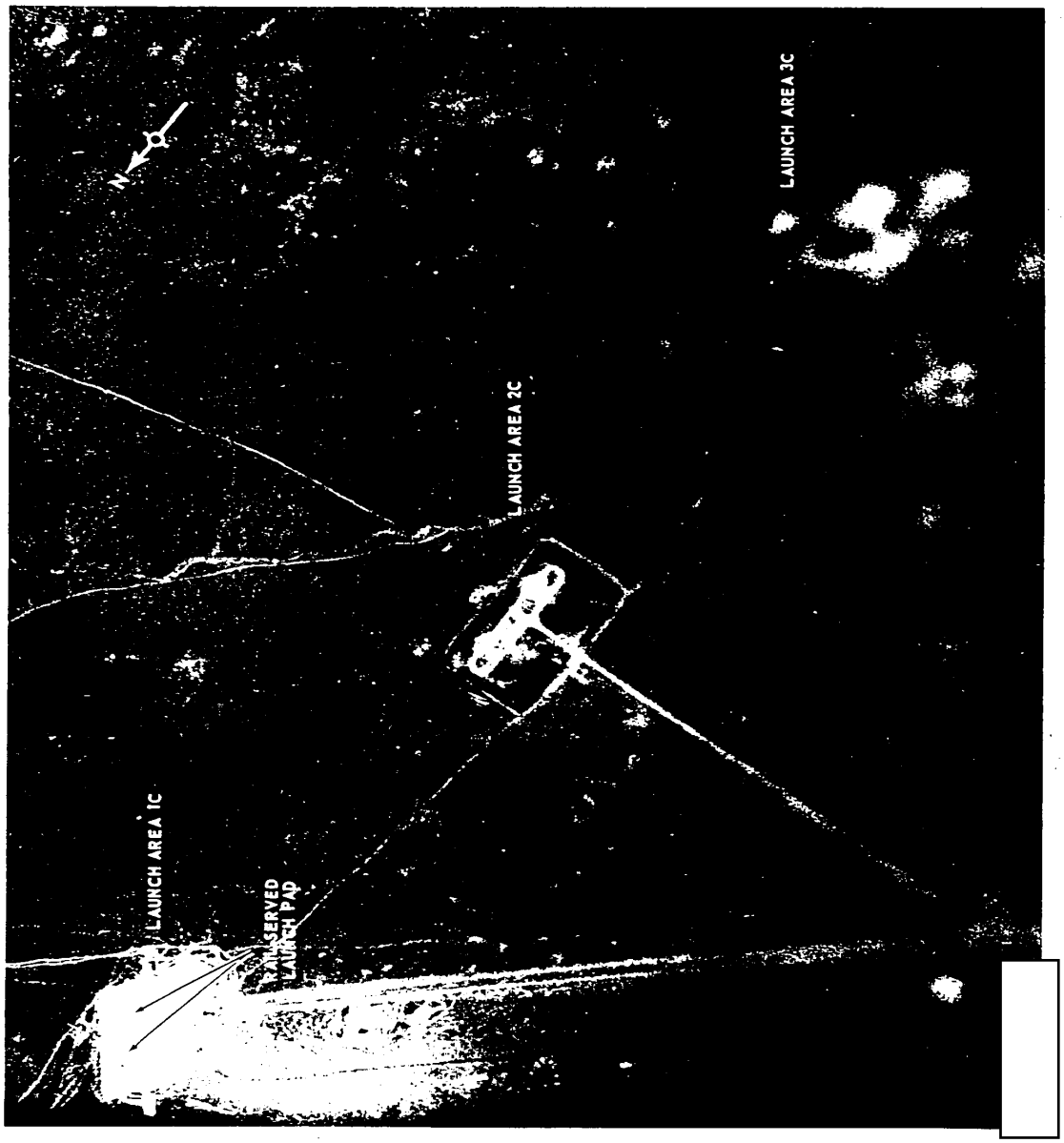


FIGURE 64. LAUNCH AREA 1C, KAPUSTIN YAR.

25X1D

*TABLE 1. SUMMARY OF ESTIMATED STATUS OF IDENTIFIED ICBM, IRBM, AND MRBM LAUNCHERS AT DEPLOYED COMPLEXES**

Type	Sites	Launchers	Operational	U C	Type	Sites	Launchers	Operational	U C
		ICBM					IRBM		
IA	3	4	4	0	III	15	60	60	0
IB	2	4	0	4	IV	18	54	51	3
IIA	5	10	10	0	TOTAL	33	114	111	3
IIB	29	58	58	0			MRBM		
IIC	7	14	14	0					
IID	30	60	60	0	I	84	336	336	0
IIIA	24	72	60	12	II	53	212	212	0
IIIB	3	9	9	0	IV	21	84	84	0
III (Single)	31	40	0	40	TOTAL	158	632	632	0
TOTAL	134	271	215	56	GRAND TOTAL	191	746	743	3

*See Tables 2, 3, and 4 for details. Figures include 3 launch silos at Type IIIA and IIIB ICBM and Type IV IRBM sites, and 4 launch silos at Type IV MRBM sites.

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