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basic imagery interpretation report

LAD Test Area at Pavlograd Solid Motor Test Facility, USSR (S)

STRATEGIC WEAPONS INDUSTRIAL FACILITIES

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USSR

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INSTALLATION OR ACTIVITY NAME					COUNTRY
LAD Test Area at Pavlograd Solid Motor Test Facility					UR
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NO	COMIREX NO	NIETB NO
NA	48-25-59N 035-58-23E				

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MAP REFERENCE

DMAAC. USATC, Series 200, Sheet FP 0234-22R, 6th ed, Sep 81, scale 1:200,000

LATEST IMAGERY USED	NEGATION DATE (if required)
	NA

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ABSTRACT

1. This is the first NPIC basic report on the launch assist device (LAD) test area at Pavlograd Solid Motor Test Facility, USSR. The LAD test area has been and continues to be used to support the development and testing of LADs for a variety of liquid- and solid-propellant ICBMs. This report provides an analysis of the LAD test area, of all significant test hardware, and of the probable test procedures utilized at the facility. It is provided to assist in the production of an engineering analysis of the LAD test equipment and test procedures. This report contains five annotated photographs, four conceptual drawings, and a location map. The information cutoff date is S/WN)

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INTRODUCTION

2. Pavlograd Solid Motor Test Facility (SMTF) is 6 nautical miles southeast of the city of Pavlograd in the Ukrainian S.S.R. (Figure 1). The LAD test area (LTA) was constructed in the early 1970s to support testing of LADs for the SS-17 and SS-18 ICBMs. Recent tests in the area, during the summer of 1983, were possibly associated with the SS-X-24 ICBM but could also have been associated with an SS-18 follow-on missile or even a new and as yet unidentified missile. A LAD is used to eject SS-17, -18, and -X-24 missiles from the canister in the silo prior to ignition of the first-stage engine. The LAD consists of a sabot and a solid-propellant gas generator. The sabot, a disc-like structure in the top of the LAD, provides a pressure seal with the canister and protects the base of the missile. (S/WN)

3. The design, research, and development of the LADs are believed to take place at Pavlograd Ordnance Research and Development Facility The LADs are produced at Pavlograd Solid Motor Production Plant placed in shipping containers, and transported by truck to the LTA to be tested. (S/WN)

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BASIC DESCRIPTION

4. Pavlograd SMTF is a rectangular, multiple-fence-secured facility situated on relatively flat terrain in a predominately agricultural area of the Ukrainian S.S.R. The facility is served by an all-weather, gravel road; a rail line; and the transloading facility at the nearby Pavlograd Solid Motor Production Plant. (S/WN)

5. The LTA consists of a LAD test position (LTP), a LAD-related test position (LRTP), and support facilities. The LTA also serves as a parking area for support vehicles and as a boneyard for an assortment of materials used at the Pavlograd Complex. (S/WN)

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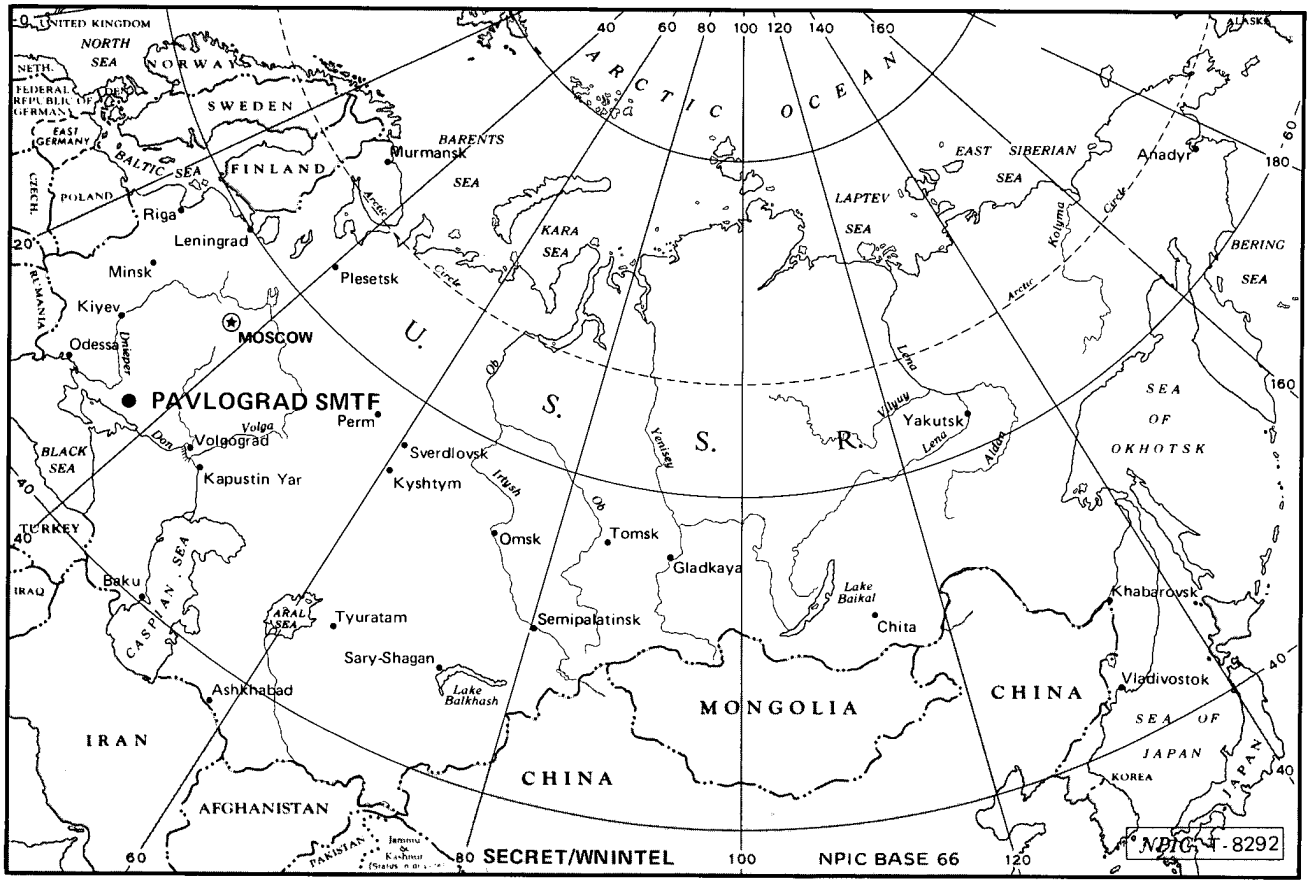

FIGURE 1. LOCATION OF PAVLOGRAD SOLID MOTOR TEST FACILITY, USSR

LAD Test Position

6. The LTP (Figure 2) consists of the following components (Figure 3):

- the subsurface position foundation,
- the base ring,
- the cylindrical tiedown structure,
- extension poles,
- the LAD test apparatus,
- the upper retaining ring,
- the weight simulator, and
- the dome top. (S/WN)

Subsurface Position Foundation

7. The LTP contains a subsurface position foundation, [redacted] in diameter and at least [redacted] meters deep. An underground conduit connects the foundation to the nearby control bunker. (S/WN)

Base Ring

8. The base ring appears to be a large segmented ring with 12 holes in the inside rim. This ring is placed directly on the subsurface foundation. (S/WN)

Cylindrical Tiedown Structure

9. The cylindrical tiedown structure is a cylindrical framework, containing 12 evenly spaced cylindrical sleeves, that is placed on the base ring. The tiedown structure, a major component of the LTP, secures and properly orients the test articles during testing. (S/WN)

Extension Poles

10. A set of 12 extension poles are inserted, one by one, through the sleeves in the tiedown structure and into the base ring. The extension poles align the LTP and secure the tiedown struc- 25X11

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ture to the foundation. An additional set of four extension poles supports and secures the dome top. (S/WN)

LAD Test Apparatus

11. The LAD test apparatus is a cylindrical test structure that is inserted into the cylindrical tiedown structure. This apparatus possibly simulates the missile canister. (S/WN)

Upper Retaining Ring

12. The upper retaining ring is a doughnut-shaped structure containing 12 cone-shaped retainers. This ring is fitted over the set of 12 extension poles and is attached to the top of the tiedown structure. (S/WN)

Weight Simulator

13. The weight simulator is a cylindrical object that simulates the weight of a missile during a test. (S/WN)

Dome Top

14. The top dome is a [redacted] metal structure that is [redacted] in diameter at the base and tapers to [redacted] at the top. The dome top appears to restrain test articles during a live test and is secured to the cylindrical tiedown structure by the set of four extension poles which extend through the upper retaining ring. The dome may also serve as an environmental shelter when the test position is fully assembled. (S/WN)

LAD Test Position Operations

15. The following sequence is probably followed to prepare the LTP for a test. The LAD is inserted into the subsurface position foundation. The LAD test apparatus, which possibly simulates the missile canister, is then removed from its pallet and inserted into the tiedown structure. The 12 cone-shaped retainers on the upper retaining ring are then fitted over the protruding extension poles, and the upper retaining ring is attached to the top of the tiedown structure. The weight simulator is attached to the dome top, and together the two are lowered onto the top of the tiedown structure. The base of the dome top is then attached to the set of four extension poles. (S/WN)

16. LADs are live test fired at the LTP under simulated launch conditions. During the test launch sequence, the LAD's solid-propellant gas generator is ignited, and the sabot is forced upward through the LAD test apparatus (Figures 4, 5, and 6). It is assumed that the resulting pressure drives the dome top, the weight simulator, and the set of four extension poles upward. It cannot be determined whether the expended LAD is retained in the LAD test apparatus or remains within the subsurface position foundation. Following a test, the LTP is disassembled, and the LAD test apparatus, the upper retaining ring, the extension poles, the weight simulator, and the dome top are removed from the LTP. (S/WN)

LAD-Related Test Position

17. A silo/canister compatability test position (Figure 7) supported SS-17 and -18 component testing until early 1979. During the SS-17 and -18 compatability test programs, this position consisted of a test pit composed of a subsurface circular foundation. Since no components used in operational silo liners were ever seen, the test pit was most likely only as deep enough as a small part of the length of the SS-17/-18 canister. An umbrella-like environmental cover was usually positioned atop the test pit when the erector mechanism was in the horizontal position. The cover is similar in appearance to the covers used at missile silos during maintenance and construction activity. Following the completion of the SS-17/-18 test programs, the position was slightly modified, probably to support component testing for a new missile system(s). (S/WN)

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18. This test position is now referred to as the LRTP and currently consists of the following (Figure 8):

- the erector mechanism,
- the test pit,
- the canister-transloading/-alignment ramp, and
- the probable visual/protective screen. (S/WN)

Erector Mechanism

19. The erector mechanism is a 24-meter-long, hollow, rectangular lattice structure that pivots from a horizontal to a vertical position. The mechanism is raised by a hydraulic in-pad erector

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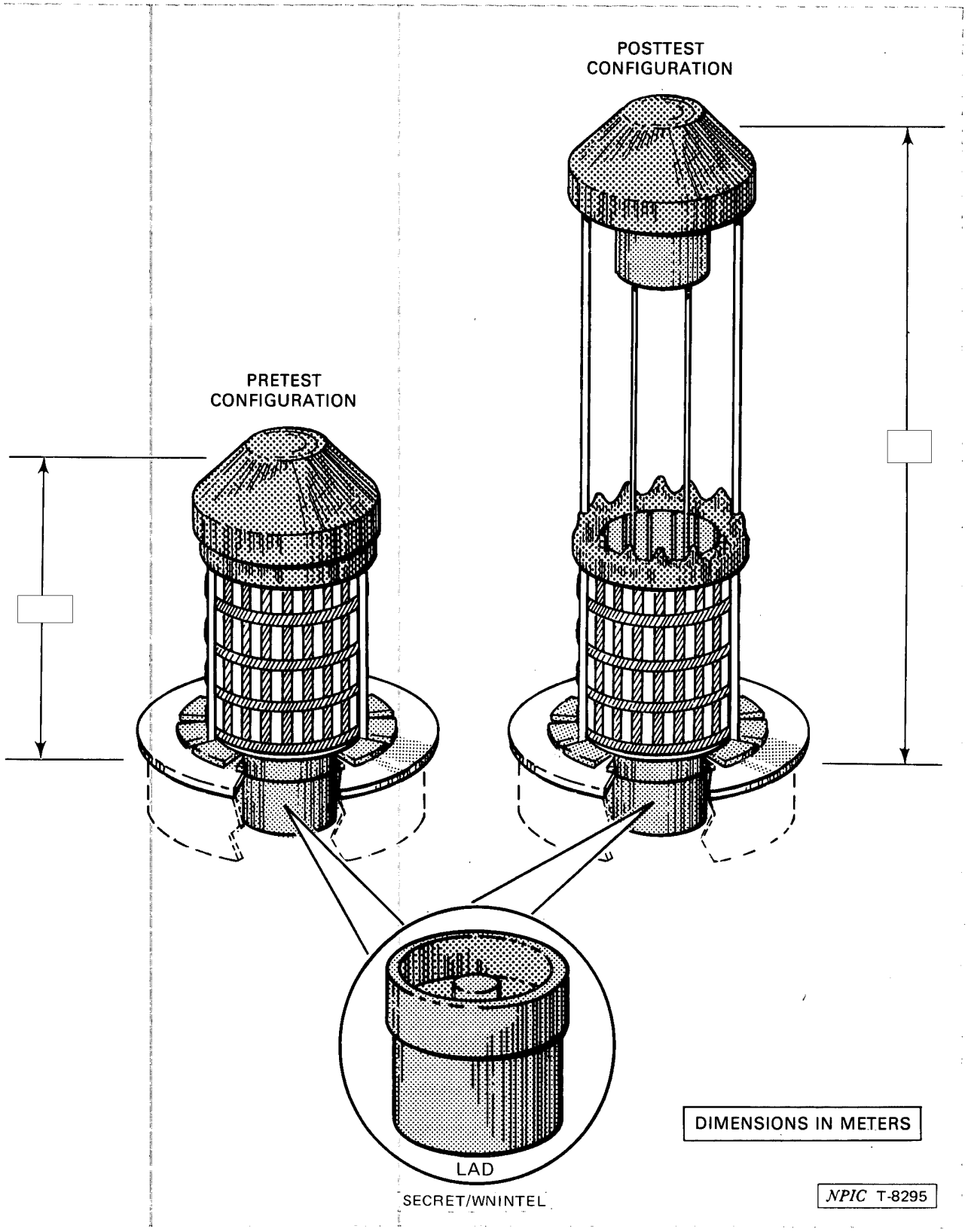

FIGURE 4. POSTULATED PRE- AND POSTTEST LTP CONFIGURATIONS USING AN SS-18 LAD

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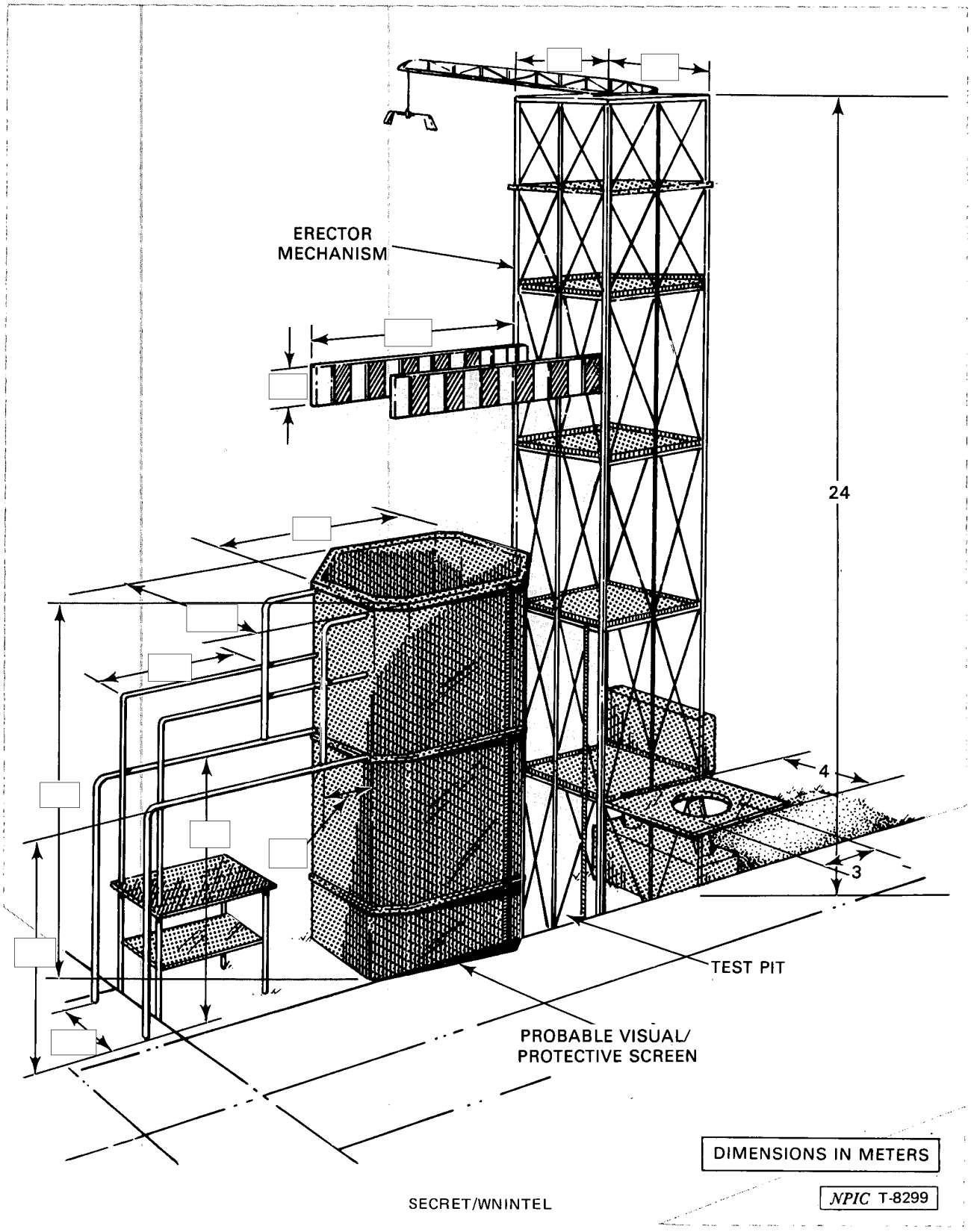

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FIGURE 8. CONCEPTUAL DRAWING OF LAD-RELATED TEST POSITION AFTER MODIFICATION

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which is housed in the hydraulic pit on the north side of the base of the erector. This pit is [redacted] Since February 1982, the erector has remained in the vertical position. A shelf, [redacted] square, is attached to the east side of the erector. This shelf has a [redacted] diameter aperture in the center and probably serves as a test article preparation stand. A fixed hoist beam/arm is attached to the top of the erector mechanism. (S/WN)

Test Pit

20. The test pit is a circular hole in the apron which is beneath the erector mechanism when the mechanism is in the vertical position. The test pit simulates at least the upper portion of a missile silo; however, it lacks the major headworks and silo wall components used in the construction of full-depth silos. (S/WN)

Canister-Transloading/-Alignment Ramp

21. This ramp is a ladderlike structure that is aligned with the erector mechanism when the mechanism is in the horizontal position. The ramp is used during the loading of a missile canister or canister sections into the erector mechanism. (S/WN)

Probable Visual/Protective Screen

22. The probable visual/protective screen abuts the south side of the erector mechanism. The screen is composed of a series of rectangular panels arranged on the apron to form an enclosure. Probable test articles have been seen in this enclosure, possibly for protection during test activity. The enclosure is [redacted] long, [redacted] wide, and [redacted] high. (S/WN)

LAD-Related Test Position Operations

23. Following the conclusion of the SS-17 and -18 programs, the test position remained unchanged until June 1979, when paving blocks next to the test pit were removed in preparation for modifications (Figure 9). By February 1982, the erector mechanism had been permanently placed in the vertical position. The test pit was probably then backfilled, thus eliminating its previous function. In addition, the environmental cover has been discarded and has remained in the boneyard since 1981. A scenario of test operations at this position has not been determined. (S/WN)

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Support Facilities

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24. The following facilities support both the LTA and the LRTP:

- the test article checkout building,
- two probable support buildings,
- the control bunker,
- two lighting towers, and
- one lightning arrester. (S/WN)

Test Article Checkout Building

25. This semiburied building, [redacted] meters, is probably used for the final checkout and preparation of LADs and other test articles. (S/WN)

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Probable Support Buildings

26. The precise function of these buildings near the checkout facility has not been determined. (S/WN)

Control Bunker

27. The buried control bunker is a [redacted] earth-covered structure. The bunker has a reinforced concrete entrance and faces the LTP. Two empty SS-18 missile canister sections, one on each side of the bunker, are probably used for storage. A probable camera/monitoring position is just northwest of the bunker. The time of construction and the proximity to the LTP indicate that LAD testing is controlled from the bunker. (S/WN)

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Lighting Towers

28. Two 22-meter-high lighting towers are along the eastern edge of the test area. (S/WN)

Lightning Arrester

29. A [redacted] -high lightning arrester, with possible lighting fixtures attached, is on the eastern edge of the test apron. (S/WN)

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Test-Associated Items and Ground Support Equipment

30. Since the LTA is also used as a boneyard and parking area for ground support equipment (GSE) at the Pavlograd Complex, it is difficult to accurately determine the function of a variety of items and pieces of GSE seen in the area. However, analysis of activity in the area reveals that certain items and pieces of GSE are directly associated with the tests conducted at this LTA. The following items and pieces of GSE have been seen on several occasions in the LTA:

- portable instrumentation towers,
- environmental shelters,
- a bullet-shaped test article,
- road transporters, and
- a mobile crane. (S/WN)

Portable Instrumentation Towers

31. Three towers are usually placed near either the LTP or the LRTP during testing. Each of these self-supporting towers is [redacted] meters, and each contains three instrumentation/work levels. (S/WN)

Environmental Shelters

32. Four, five-sided environmental shelters, delivered to the LTA in February 1983, have been used to cover/conceal test-related items during testing. (S/WN)

Bullet-Shaped Test Article

33. This article, first seen in the LTA in August 1981, was removed from the boneyard and placed on the test apron next to the LRTP during LAD testing in the summer of 1983. The function of this article is not known. (S/WN)

Road Transporters

34. Two road transporters (MAZ-537 prime movers with lowboy trailers) are used to transport items such as canister sections and LADs to and from the test area. The transporters are also used to support the nearby horizontal test position. (S/WN)

Mobile Crane

35. A mobile crane is usually on the test apron and is used for both the assembly/disassembly of the test positions and the handling of items such as LADs and test articles. (S/WN) 25X1

REFERENCES

IMAGERY

All applicable satellite imagery acquired from [redacted] was used in the preparation of this report. The imagery of [redacted] provided the most recent usable coverage. (S/WN) 25X1 25X1

MAPS OR CHARTS

DMAAC. US Air Target Chart, Series 200, Sheet FP 0234-22R, 6th ed, Sep 81, scale 1:200,000 (SECRET)

RELATED DOCUMENTS

NPIC. [redacted] PIR-064/79, *Launch Assist Device Test Programs, Pavlograd Solid Motor Test Facility, USSR (S)*, Sep 79 [redacted] 25X1 25X1

[redacted] 25X1

REQUIREMENT

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Project 544036J

Comments and queries regarding this report are welcome. They may be directed to [redacted] Soviet Strategic Forces Division, Imagery Exploitation Group, NPIC, [redacted] 25X1 25X1