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Joint Photographic Intelligence Report

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MISSILE LAUNCHING COMPLEX and TEST RANGE

TYURA TAM, U S S R

HTA/JR - 4/58

SEPTEMBER 1958

Coordinated, Published and Disseminated by CIA/PIC

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MISSILE LAUNCHING COMPLEX
and
TEST RANGE
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PREFACE

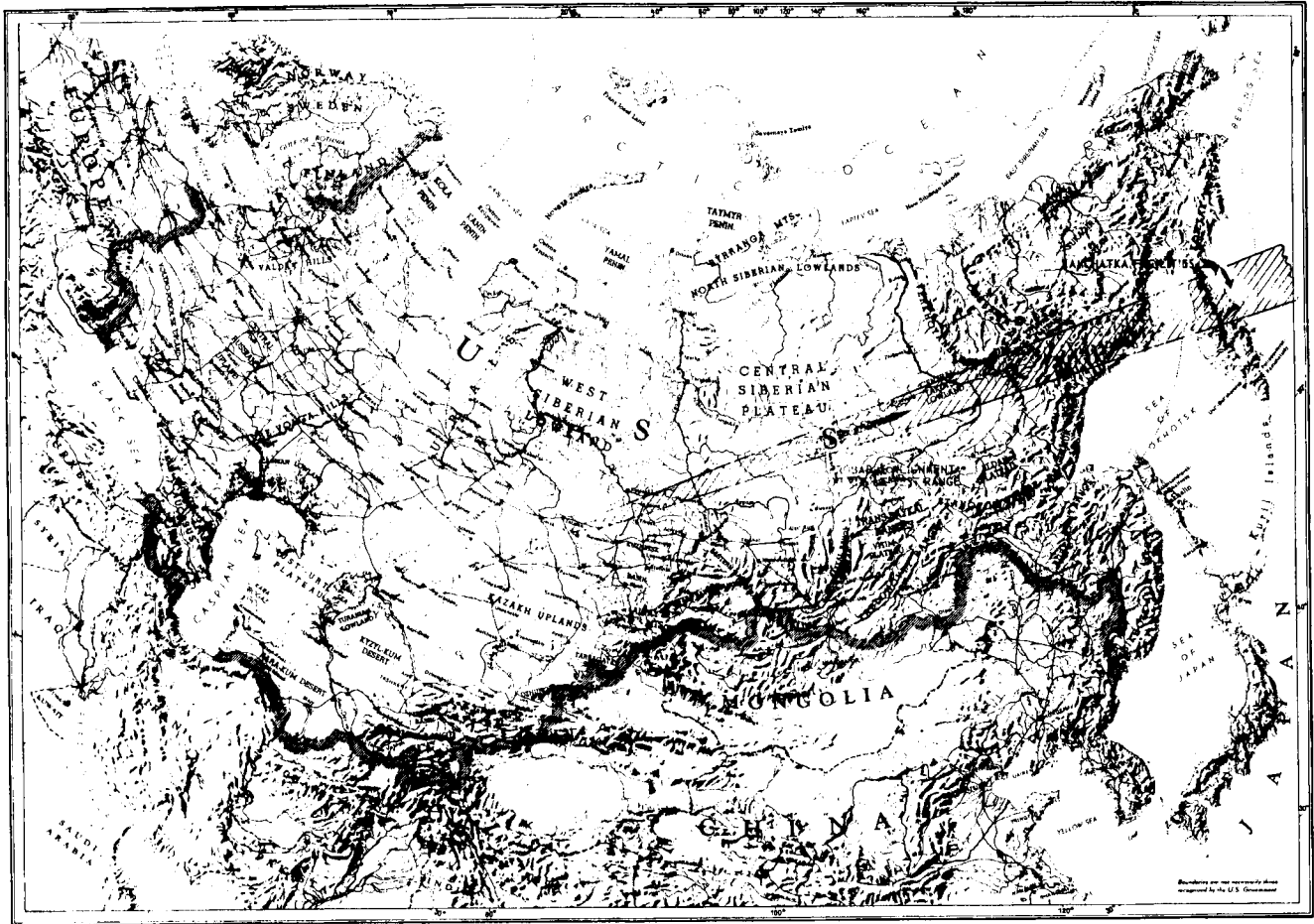
Joint Photographic Intelligence Report JR-4-58 has been prepared by the Army, Navy, and Central Intelligence Agency, under Army Chairmanship. Its scope is intended to fulfill the combined requirements of the intelligence community on the Tyura Tam Missile Launching Complex and the Tyura Tam Missile Test Range. Requirements have been detailed as follows: Army ACSI, ISO SRI-132-1, Navy OP922Hi project 17-57, and CIA SI/R-55/57, SI/R-77/57, SI/R-29/58, RR/E/R-31/57, and RR/E/R-45/57. In addition, much assistance was received from the Guided Missile Intelligence Committee (GMIC) in clarifying, amplifying, and coordinating the various intelligence requirements.

This report has been prepared primarily to provide a comprehensive photo intelligence treatment of these important installations, and secondly to facilitate future research and analysis by having under one cover as much information concerning them as was possible to glean from available photography. In many instances it reflects the counsel of leading authorities in the fields of guided missiles and electronics who were provided by the GMIC and the Department of the Army. Moreover, information from this report has already been used by GMIC in the preparation of their annual estimate presented to the Intelligence Advisory Committee.

Background geographic data were supplied mainly by the Geographic Division of the Office of Research and Reports, CIA. The term "miles" used throughout this report means nautical miles.

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INTRODUCTION

GENERAL

A missile launching installation, probably of key significance to the Soviet ballistic missile and space-flight development programs, has been identified at 45°55' N, 63°18' E, in the vicinity of Tyura Tam, USSR. The installation, covered by photography on [redacted] is characterized by unusual and complex construction activity, apparent operational status, relative isolation, and maximum security of key components. Its functional, structural, and organizational characteristics indicate development of a new and permanent Soviet missile installation for launching and static testing large ballistic missiles with (1) intercontinental, satellite, and space-flight capabilities, and (2) new or unusual propulsion systems. Moreover, the configuration of certain structures and facilities indicates that the Soviets are developing rail-supported and, probably, fully integrated rail-mobile missile systems.

The strategic location of this installation, hereinafter called the Tyura Tam Missile Launching Complex, in a barren and isolated semiarid area near the approximate center of the large Eurasian-African land mass further attests to its significance

and potential. It is situated in an area which presents opportunity for considerable expansion of facilities and permits several directions of fire. Specifically, it is located along the Aralsk/Tashkent railroad, between the towns of Ksyl Orda, 110 miles to the southeast, and Novo-Kazalinsk, 50 miles to the west. The installation has apparently developed around the small railroad town of Tyura Tam, which lies just north of the Syr Darya River.

A probable major new Soviet missile test range, hereinafter called the Tyura Tam Missile Test Range, extends northeastward from the Tyura Tam Missile Launching Complex. Range head and a portion of the down range instrumentation facilities are covered by the [redacted] photography. Probable terminal range instrumentation facilities, covered by [redacted] photography, have been identified on the Kamchatka Peninsula some 3,400 miles to the northeast.

METHODOLOGY

The obvious significance of this launching complex with its associated test range called

for analysis in a degree of depth and detail unique in the intelligence exploitation of aerial photography. Line drawings and perspective sketches were prepared for each significant component. Measurements of key structures and facilities were made with the [redacted] comparator. Azimuths, distances, and geographic coordinates were obtained from a controlled slotted template laydown and computed with the aid of an electronic digital computer. Stereogram transparencies and photomicrographic enlargements were employed to insure accurate description. In every instance measurements and descriptions were weighted, verified, and rechecked. All available information, including the counsel of leading authorities in the fields of guided missiles and electronics, were brought to bear on the problem of describing and identifying the numerous structures and facilities of the launching installation and test range.

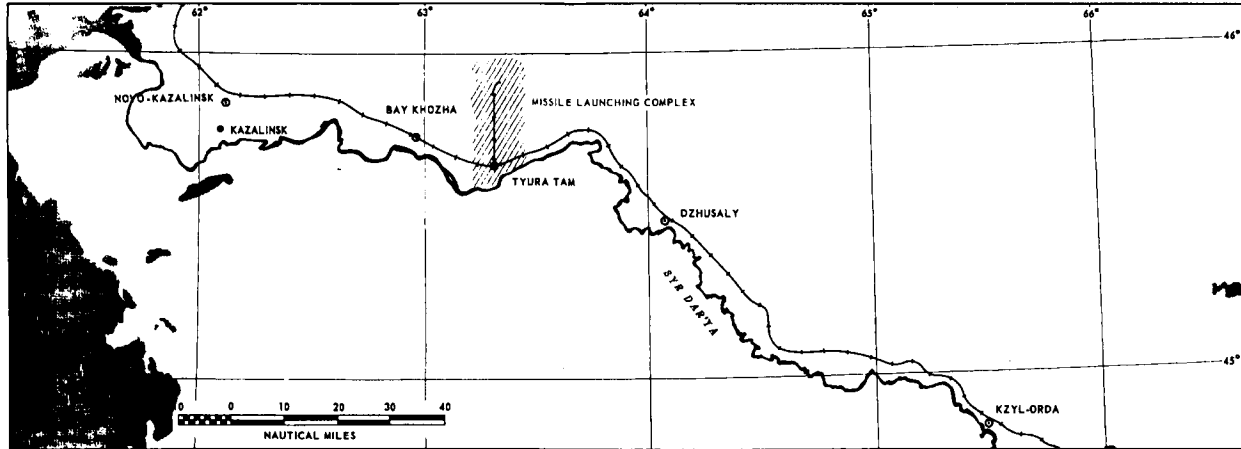
Quality of the photography used in this analysis ranged from good to excellent. Coverage of the Tyura Tam missile launching installation and the contiguous instrumentation facilities was more than adequate to provide the basis for detailed analysis by photo interpreters and a subsequent evaluation of Soviet capabilities by the intelligence community. Although the Kamchatka

facilities were covered by good quality photography, extensive cloud cover of several key areas precluded a complete evaluation of the nature and extent of instrumentation facilities on the peninsula.

ORGANIZATION

The Tyura Tam Missile Launching Complex and the Tyura Tam Missile Test Range are discussed as separate entities. The first part of this report consists of a detailed description and analysis of the Missile Launching Complex, including discussion of the main operational launching and support facilities, together with the transportation, water, power, and communication networks that serve them.

The Tyura Tam Missile Test Range is then treated in similar detail. Range head, down range, and the probable terminal range instrumentation facilities on the Kamchatka Peninsula are discussed in that order. In addition, a detailed discussion of guidance is also included. To facilitate clarity of presentation, those instrumentation and guidance facilities found within the Complex are discussed with the Test Range.



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TYURA TAM MISSILE LAUNCHING COMPLEX

GENERAL DESCRIPTION

The Tyura Tam Missile Launching Complex encompasses an area of approximately 40 square miles and is shaped somewhat like a "dumbbell", with a Range Head at the northern end and a large Support Base at the southern end. A narrow rail and road artery 14 miles long connects the Range Head and the Support Base. Propellant production and storage facilities are located along the connecting rail and road artery, approximately 11 miles south of the Range Head. In addition, an intricate network of communication, power, water, and cable lines connects key facilities of the Complex.

The Range Head, encompassing some nine square miles, is the prime area of interest in the Complex. Its most prominent feature is an unusually large ballistic missile launching and static firing structure situated at the eastern terminus of a multitrack rail spur. Moreover, a possible second launching area is located in the southwest quadrant of the Range Head, at the terminus of another multitrack rail spur. In addition, a large and diversified group of operational, logistical, and administrative support facilities are also evident. Included among these facilities is an impressive electronics complex of instrumentation, guidance, and communication facilities.

The Support Base contains the primary logistical and administrative support facilities for the Complex. It is situated 17 miles south of the Range Head and just north of the Syr Darya River, in the vicinity of the old village of Tyura Tam. It contains water treatment and storage facilities, power production and distribution facilities, communication facilities, personnel housing, headquarters and administration facilities, and rail transloading and storage facilities. Although the Support Base shows little direct evidence of missile-related activities, it is the primary supply and rail transloading point for the Complex.

Rail transportation, specifically the Aralok/Tashkent railroad, is the primary means for providing access from outside areas to the Tyura Tam Missile Launching Complex. This factor coupled with the presence within the Complex of classification yards and shops, railroad drive-through buildings, a rail turn-



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around, and over 33 miles of new trackage indicate the high degree of dependence on rail transportation. For example, on

at least 140 rail cars were present within the Complex, several of which were of unusual configuration.

Apparently, little or no dependence is placed upon water, highway, or air transportation. The only air facility in the Complex is a small natural-surface airstrip located at the Support Base. Otherwise, the nearest major airfield evident on the photography is at Dzhusaly, 34 miles to the southeast. An examination of photography covering the Syr Darya River in the vicinity of Tyura Tam revealed no significant barge traffic or other evidence of river transportation. The only roads serving the Complex from the outside are gravel surfaced and are irregular in alignment. They generally parallel the Aralok/Tashkent railroad and, at time of photography, were characterized by little if any vehicular traffic.

At least three separate water distribution systems and their related lines can be traced throughout the Complex. Lines from the main system originate at the Syr Darya River and parallel the rail and road artery leading north to the Range Head. Lines from the other two systems serve several smaller and in some instances key areas of the Complex.

Power facilities which serve the Complex include internal and external sources. Of primary interest is a new main power transmission line which leads north to the Range Head from a large power plant under construction at the Support Base.

Numerous communication and missile related electronic facilities are evident throughout the Complex. They vary in size from single masts or isolated instrumentation sites to large fenced installations. Of particular significance are two large communication areas. One is a probable receiving station located at the Support Base and the other is a probable transmitting station located along the rail line five miles south of the Range Head. The guidance and instrumentation facilities located within the Complex are generally associated with the Tyura Tam Missile Test Range and will be discussed separately in another section of this report.

Security of structures and facilities with-

in the Complex varies. The launching areas receive maximum protection. Multiple fencing, guard towers, and lights are used. Access through the road and rail entrances is controlled by gates, and a security building is situated near each road entrance. The electronic installations appear to be the next most heavily secured. They are usually enclosed by a single fence and are ringed by a patrol road. In this category are the communication areas and several of the instrumentation sites. The water storage, missile checkout, and several smaller unidentified areas are also single fenced. Otherwise most of the conventional logistical and administrative support areas are unfenced. Evidence of passive security, possibly to preclude ground observation, is indicated by location of the Range Head some 15 miles away from the heavily traveled Aralok/Tashkent railroad. It is perhaps important to note that there is no evidence of conventional anti-aircraft artillery or of surface-to-air missile sites protecting the installation. Moreover, no effort to camouflage facilities can be detected.

CONSTRUCTION ACTIVITY

At the time of photography, the Complex was characterized by considerable new construction activity. In almost every section, recently constructed facilities were already being expanded. Rail cars were evident along nearly every siding and spur. Vehicles were moving along the road arteries, and numerous preliminary excavations suggested still further enlargement. Power, water, and communication facilities were also undergoing expansion. The large housing facilities at the Support Base, estimated to accommodate at least 5,500 persons, were apparently being doubled in capacity. Most of the temporary structures, including tents and construction support areas, were being abandoned or moved to other sections of the Complex. The rapid tempo of activity was further emphasized by examination of comparative photographic cover which revealed completion in a short 23-day period of a major communication area, previously estimated to be several months away from completion.

Analysis of photography indicates a carefully planned, high priority construction pro-

gram at the Tyura Tam Missile Launching Complex. The type and nature of key construction projects indicate that the Complex possibly was begun not later than the summer of 1955, two years prior to overflight. In addition, the degree of completion of several key facilities and the rate of construction as evidenced on comparative photographic coverage indicate that the Complex should have been substantially complete within a year of overflight, i.e. by mid-1958.

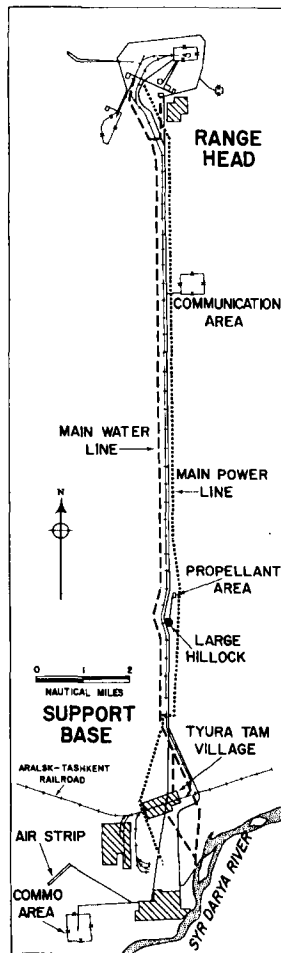
Detailed analysis reveals that many groups of facilities were completed at the same time, or were at the same stage of construction, suggesting the following possible timetable of construction.

Initial Phase (Mid-1955 to Mid-1957): During the initial phase of construction, highest priority was given to development and completion of those facilities necessary to conduct "live" missile firings. These included a launching structure, launch support and missile checkout facilities, range control and instrumentation, and an adequate supply of power and water. At the time of overflight these minimum requirements appear to have been satisfied and it is probable, therefore, that firing operations could have been conducted from the Tyura Tam Missile Launching Complex by

Second Phase (Mid-1956 to Late 1957): The second phase of construction, nearly complete by , was manifested in the expansion of the water storage facilities, construction of two large communication facilities, and an additional possible launching area. Of all facilities under construction at Tyura Tam, these facilities appear nearest to completion and probably were operational within 30 to 90 days after overflight.

Third Phase (Early 1957 to Mid 1958): A third and major phase of construction is also evident in the Complex. Included in this phase are water treatment facilities, a power plant, a new permanent housing area, and a large probable propellant production plant. These facilities are characterized by permanent-type buildings with well planned layouts. They probably represent the permanent support facilities for sustained future and possibly more sophisticated operational activities at Tyura Tam.

Future long-range expansion of the Complex is suggested by the arrangement of certain facilities at both the Range Head and the Support Base. The rail lines in the Range Head, for example, are aligned in such a way as to facilitate further northward expansion,



particularly of launching facilities oriented toward the east. The large, unused, and level expanses to the north, coupled with the discovery of a very short and incomplete rail spur pointed in that direction, support this hypothesis. In addition, future long-range expansion of the Support Base is

suggested by the numerous projected road systems and water lines near the new permanent housing facilities.

PHYSICAL ENVIRONMENT

Topography: The Tyura Tam Missile Launching Complex is a small part of the Turanaskaya Nizmennoot (Turan Lowland), the vast low plain east and south of the Aral Sea. Elevations average about 330 feet above sea level. Local relief is insignificant, with elevations above sea level varying from a minimum of 280 feet on the north bank of the Syr Darya River to a maximum of 445 feet on the hillock called Kilinchik, which is reported to be located 16 miles directly north of Tyura Tam Village.* However, only the narrow strip of land between the north bank of the Syr Darya River and the Aralask/Tashkent railroad is characterized by terrain of fairly uniform slope. North of the railroad, toward the Range Head, is a complex pattern of low ridges and shallow depressions. The depressions have patches of salt marsh or clayey, flat bottoms that are wet and sticky in spring. In summer they become hard and smooth, with numerous cracks dividing the surface into small polygons. Since slopes of the ridges and depressions are very gentle there are practically no natural obstructions to visibility.

Extensive use has been made of the depressions in and around the launching and propellant areas of the Complex. In particular, new drainage systems can be traced from these areas to several of the large saline depressions.

Climate: Climate of the Complex is continental, with hot dry summers and cold dry winters. Visibility is excellent and cloud cover at a minimum throughout the year. Precipitation is very low, ranging from one to three inches per year, with the majority falling in spring. In winter, northeast winds prevail as a result of the seasonal high pressure system over Central Asia. In summer the prevailing winds are more northerly, but local convection causes some variation in wind direction.

Vegetation: The vegetative cover is sparse except along the banks of the Syr Darya River and consists of desert forms, principally scattered low shrubs and short grasses. There are no trees, and a large part of the surface is completely bare except during the spring rains, when there is an extensive growth of short-lived vegetation. However, a belt of relatively dense vegetation, consisting of meadow grasses and thickets of reeds, generally parallels the Syr Darya River.

Soils: The soils are characteristically desert types. Gray soils predominate, but extensive patches of saline soils are scattered throughout the area in depressions. On the hillocks and ridges the soils are often poorly developed, especially where sand predominates. In general, the lighter textures--sandy loams and sands--appear to dominate, but heavier clayey soils are probably fairly common in the depressions. An area of gypsum-bearing soils is located in the northern part of the Complex, where there was probably limited mining activity prior to World War II.

Hydrography: Great quantities of water are available from the Syr Darya River. This river flows from east to west across the southern part of the area and eventually empties into the Aral Sea. At Kazalinak, a short distance downstream (see location map, page 7), the discharge averages 433 cubic meters per second for the year but fluctuates from a minimum of 76 cubic meters per second to a maximum of 1,080. The low-water period usually occurs in December and January. The river has two periods of high water. The first, which is associated with the spring thaws, occurs in March and April. The second follows shortly thereafter, beginning in May and reaching its maximum in July. The river is generally frozen over from the beginning of December to the beginning of April. At time of overflight, water treatment, distribution, and storage facilities for the Complex were undergoing expansion.

Aside from the Syr Darya River, which is the only perennial stream in the area, sources of water are meager. In spring, rain water collects in the depressions and at times may form shallow lakes, but these lakes generally dry up within a short time. Small scattered patches of marsh, however, may persist in the centers of the depressions. Eight or ten scattered wells have been reported in the vicinity of the Complex. Some of the wells are reported to be saline, and it is therefore probable that most of the drinking water for the Complex is obtained from the Syr Darya River.

RANGE HEAD

GENERAL DESCRIPTION

The Tyura Tam Range Head encompasses an area of some nine square miles and contains many unique structures as well as considerable evidence of operational and construction-type activities. The most significant part of the Range Head is Launch Area "A", with its massive rail-served missile launching structure. To the southwest there is an instrumentation control center and an interferometer-type instrumentation site. Sixty-six hundred feet west-southwest of Launch Area "A", launch support and missile checkout facilities are situated astride the main rail line. Additional range head facilities include a power substation, water storage tanks, a probable water treatment facility, personnel quarters, conventional storage facilities, and a vehicle park. In the southwest quadrant of the Range Head, at the terminus of another rail spur, construction is under way on a possible second missile launching area.

Rail, road, communication, power, and water lines which support the Range Head, lead north in a narrow artery from the Support Base near Tyura Tam village. At the Range Head, the rail line hooks first to the north-northwest and then to the north-northeast before heading east to Launch Area "A". The road from the Support Base generally parallels the rail line, although several departures are evident in the center of the Range Head. The power and water distribution systems appear to have connections with nearly all major facilities and structures.

A large communication installation, Communication Area "A", is located five miles south of the Range Head, along the east side of the rail line. Although located outside the Range Head, this area is included for discussion purposes because of its proximity and the intricate net of buried cable and overhead transmission lines that connect both areas. This facility, under construction at the time of photography, probably will be the transmitting station for the Complex. In this regard it is important to note that a probable wire communication system, main-

tained through buried cable lines, connects this area with Launch Area "A", Possible Launch Area "B", the Interferometer-Type Instrumentation Site, and the Instrumentation Control Center. Data from these facilities concerning preparation for firings probably are transmitted from Communication Area "A" to down range stations.

Rail facilities supporting the Range Head are complex, and in some instances unique. Numerous rail cars are situated along the tracks leading to Launch Area "A". Of particular interest are several cars of unusual shape, apparently designed specifically for missile handling. In addition, specially-designed railroad drive-through or service buildings are located at three different points. Moreover, it appears probable that missiles are (1) checked out in a horizontal position on rail cars, (2) transported to Launch Area "A" and erected from special missile transporter/erector cars, and (3) fueled directly from adjacent rail tank cars. All these factors seem to indicate the development of rail-supported and, probably, rail-mobile missile systems.

Although considerable new construction activity is evident throughout the Range Head, examination of photography reveals that several key operational and logistical support facilities were probably complete enough to initiate and sustain a launching and static testing program for large ballistic missiles by mid-summer 1957. It is probable that the Range Head, like the over-all Complex, is being developed according to a system of priorities. A serviceable launching structure and missile checkout area as well as instrumentation and control facilities were apparently completed first. Thereafter, at the time of photography, most efforts were being devoted to expansion or enlargement of already existing facilities, and to the construction of Possible Launch Area "B".

It should be noted that the Range Head can be expanded considerably by a northward extension of the rail line from the Launch Support Area and the addition of any number of rail spurs with launching facilities oriented to the east.

LAUNCH AREA "A"

Launch Area "A" is an extremely large and complex ballistic missile launching and static testing facility. It is roughly rectangular in shape and covers an area that measures [redacted] feet. The launch area as well as the launching structure and the

rail spurs which serve it are oriented to the east. The massive and complex launching structure, which is located at the eastern terminus of the rail spur, overhangs a vast pear-shaped pit. The area also contains several support structures, servicing and collimation towers, instrumentation stations, and bunkers.

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INSTRUMENTATION CONTROL CENTER

The Instrumentation Control Center, which has several instruments, radomes, and other unusual structures, is located 4,680 feet southwest of the launching platform, at a point generally in line with the probable primary direction of fire. A clear line-of-

sight exists between the Instrumentation Control Center and Launch Area "A". Buried cable lines, probably comprising a wire communication system, connect the two points. Other buried cable lines, roads, and trails, lead from the Instrumentation Control Center to the many instrumentation facilities in the Range Head as well as to those some

65 miles down range. The Instrumentation Control Center was complete and probably operational at time of overflight, in

INTERFEROMETER-TYPE INSTRUMENTATION SITE

The Interferometer-Type Instrumentation Site is located 1,140 feet west-northwest of the Instrumentation Control Center, and is characterized by a circular graded area which has an unusual "plus" configuration located approximately in the center. The site comprises several control bunkers, cable lines, and equally-spaced radomes. Buried cable lines connect the site with the Instrumentation Control Center.

A geometric relationship between this site and the servicing and two probable collimation towers at Launch Area "A" is such that a line extended northeastward from the center of the "plus" configuration passes through all three towers on an azimuth of in the probable primary direction of fire along the Iyura Tam Missile Test Range.

Possible Launch Area "B". It contains checkout and assembly facilities, personnel and storage installations, a probable water treatment facility, a steam/power plant, a power substation, and several unidentified structures. Moreover, it includes what is probably the main headquarters building for the Complex, and is a focal point for major power, water, and communication lines. The area is served by an excellent rail and road net and is characterized by considerable vehicle activity and rail traffic.

POSSIBLE LAUNCH AREA "B"

Possible Launch Area "B" is located in the southwest quadrant of the Range Head at the terminus of a rail spur. It is characterized by heavy security and in some instances appears to be similar to Launch Area "A". Two major fenced sections containing a large railroad drive-through building, a reverted concrete pad, and several smaller structures, comprise the area. Analysis suggests that this may be a prototype operational site for rail mobile missile systems.

PERSONNEL AND STORAGE AREA VEHICLE PARK

A Personnel and Storage Area, which probably functions as the primary billeting point for range head personnel, and a Vehicle Park, possibly used for mobile instrumentation equipment, are located in the southeast quadrant of the Range Head. Although both areas are characterized by considerable activity, their relative significance within the Range Head appears to be secondary.

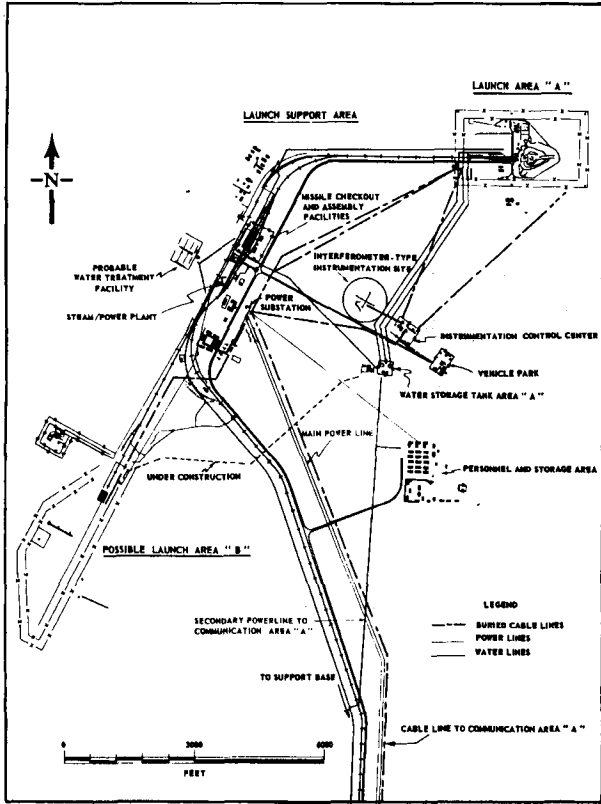
A detailed discussion and analysis of important range head components follows. Launch Area "A", the Launch Support Area, Possible Launch Area "B", the Personnel and Storage Area, and the Vehicle Park will be discussed as separate entities. Instrumentation, communication, power, and water facilities will be discussed in later sections dealing with these subjects.

WATER STORAGE TANK AREA "A"

Water Storage Tank Area "A" consisting of four earth-covered tanks and two tanks under construction, is located 600 feet southwest of the Instrumentation Control Center. Upon completion of the new tankage, the area probably will have a storage capacity of about four million gallons. Three large covered pipe lines which lead northward from this area provide the primary supply of water for firings at Launch Area "A". Another pipeline, under construction to the southwest, will connect new tankage of Water Storage Tank Area "A" with Possible Launch Area "B".

LAUNCH SUPPORT AREA

A major launch support area is located along the rail line, one mile west-southwest of Launch Area "A" and one mile north of



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LAUNCH AREA 'A'

Launch Area "A", an extremely large and complex ballistic missile launching and static testing facility, is characterized by some of the heaviest security in the Complex. It is enclosed by two parallel security fences situated 160 feet apart and measures

feet. Just inside the outer fence line and parallel to it is a series of light poles, spaced 120 feet apart and probably

used for night security. Guard towers are located at the four corners of the installation and at intervals along the outer fence. A security building is situated near the rail and road entrances.

The single-track rail line that leads into the launch area approaches the launching structure on a man-made embankment

feet high and branches into five separate spur lines, four of which terminate on the launching platform. A fifth leads into a building adjacent to the launching platform. Several long rail cars, some with unusual configurations, are visible in the area. Launch Area "A" is served by a large water distribution system and is criss-crossed by several major drainage systems. A probable communication

system serves the area by buried cable lines.

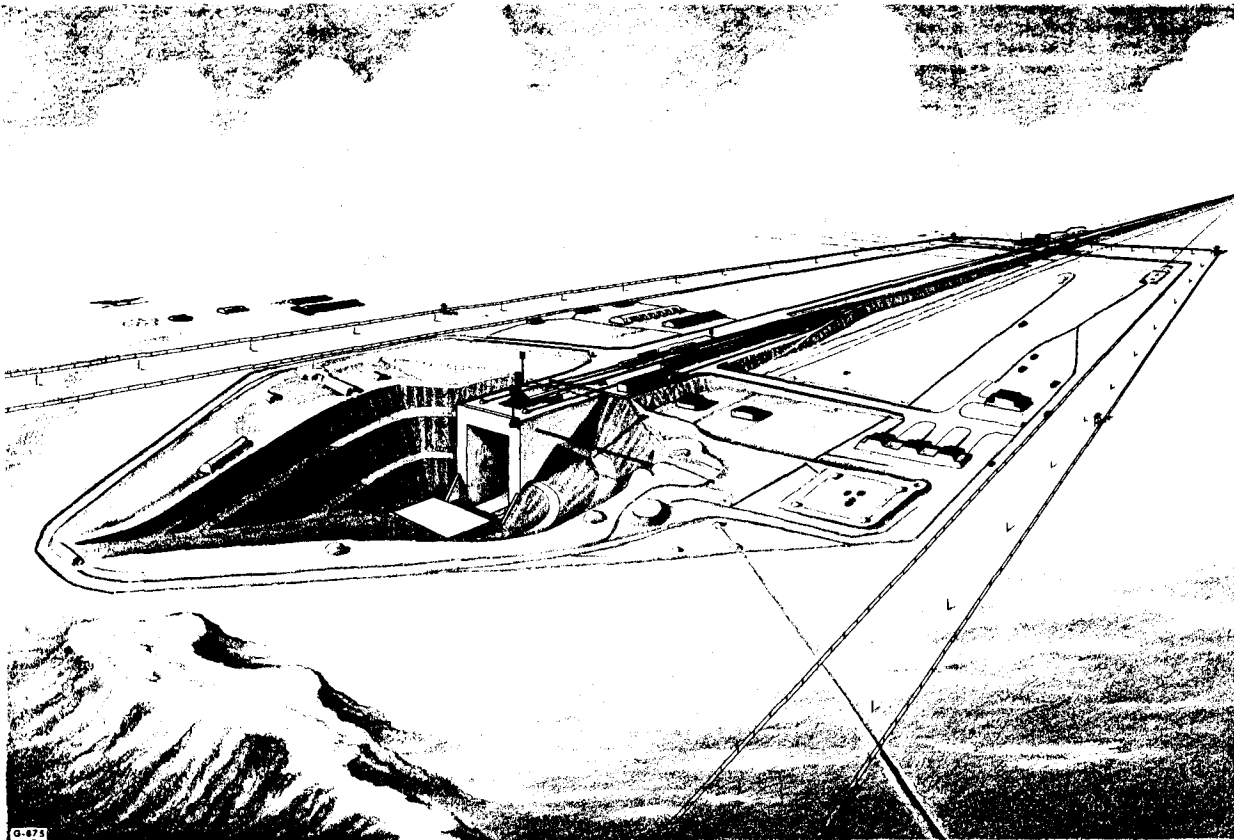
Analysis of photography covering Launch Area "A" reveals that all facilities were probably complete at the time of the [redacted] overflight, indicating that launching or static testing could have been conducted at that time and possibly for a limited period prior thereto.

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Pit: The pear-shaped pit measures 880 by 550 feet, and is oriented along a west-east axis. The pit has been excavated along two terrace levels and at its deepest point is feet below ground level. The lower terrace level is above the pit base. The upper terrace lies below the ground level, and above the lower terrace. The terraces and slopes bounding the western portion of the pit have been surfaced with a crude spray, possibly gunite.

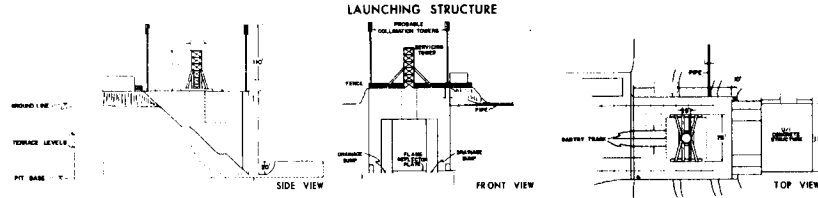
A road enters the pit from the raised eastern terminus and leads to the base of the pit near the foot of the launching structure, where there are two drainage sumps and a large unidentified concrete structure. It is probable that maintenance of the pit and of the launching structure base is accomplished from this road system.

Part of the great volume of earth excavated from the pit has been placed in a large pile some 800 feet to the northeast, within Launch Area "A". The remainder probably was used to construct the long rail embankment, leading up to the launching structure.

The reason for the unusually large pit in Launch Area "A" is difficult to ascertain, although it is probable that the large volume of water planned to be used during firings at Tyura Tam requires containment, and possibly treatment and isolation, prior to disposal. It is also possible that the toxic or dangerous nature of propellants used in firings may require a large pit for flooding the exhaust.

At least nine instrumentation and observation positions, annotated on the line drawing, page 14, can be identified around the rim of the pit. These positions face toward the launching structure and are generally heavily earth-covered. Six positions (items "a" through "f") are relatively small and probably house cameras or instruments. The remaining three are large observation-type bunkers. The largest (item g) is served by a covered personnel passageway from the road, and is located along the rim of the pit at a point 300 feet south of the launching structure. The others are a long linear bunker (item "h") situated southeast of the launching structure, and a smaller position (item "i") located at the eastern end of the pit. These positions provide ample close-in instrumentation to support static test firings at Launch Area "A".

Launching Structure: A rectangularly-shaped concrete launching structure, which overhangs the western portion of the pit,



measures above the level of the flame deflector plate. The top of the launching structure, hereinafter referred to as the launching platform, is supported by two vertical abutments which lead downward to the base of the pit and measure up to in thickness. The thickness of the launching platform is estimated to be at least 50 feet, and it is probable that it has several working levels. Moreover, it is possible that the structure is honey-combed with numerous compartments, and that sections or components of missiles are processed at these lower levels. Thus, the exterior face may extend much farther downward than is shown on the perspective drawing. The base of the launching structure is unusually complex. It includes a flame deflector plate 55 feet wide and flanking drainage sumps, each of which measures

Their depth cannot be determined, although analysis indicates that they probably extend some feet downward. Two small retaining walls, thick are located at either side of the base of the launching structure.

Facilities on the Launching Platform:

The launching platform supports several unique structures, some of which cannot be identified on available photography. Most of these are obscured by heavy shadow or are hidden in blackened areas. The most prominent of the structures are the servicing tower, located near the center of the platform, and the probable collimation towers, situated at opposite corners of the platform.

The launching platform itself is enclosed by a perimeter fence and/or wall, and is served by four rail spurs and several roads. One of the rail spurs is centered on the platform and leads into the blackened launching area. A second spur leads onto the northern section of the platform, and a third leads onto the southern section. Both of these lines flank the servicing tower and are possibly used by rail-mobile equipment performing a fueling or checkout function. A fourth spur, located between the center and the southern spurs, extends onto the platform for only a short distance.

Servicing Tower: A servicing and/or launching tower is situated near the center of the launching platform. The metal-framed tower appears to be tubular in shape and measures It is supported at the base by several diagonal struts. The base, including struts, measures

75 feet across. The exact tower configuration is difficult to determine because the area at the tower base is blackened and in shadow. A gantry-crane track with a separation, leads from the edge of the launching platform eastward toward the center of the servicing tower. This suggests that the servicing tower moves from the center of the launching area prior to firing. However, since the servicing tower and its support base are much larger than the gantry crane track, it appears that parts of the structure do not move but are fixed on the platform.

Probable Collimation Towers: Two towers are located on the launching platform, one at the northeast and the other at the southwest corner. These towers, possibly used with an inertial guidance system, are 110 feet high and have a large array on top at least 5 feet wide and 10 feet high. The tower at the northeast corner is supported on a concrete lip which protrudes 10 feet out over the large pit. A possible third collimation tower 60 feet high is situated approximately 400 feet west of the servicing tower.

The arrangement and geometry of the three tower positions with reference to other facilities in the Range Head are readily evident. A line drawn between the two collimation towers on the launching platform intersects the center of the servicing tower, and an extension of this line southwestward leads to the center of the large Interferometer-Type Instrumentation Site. A projection of this line extends northeastward and suggests the probable primary direction of the fire and alignment of the Tyura Tam Missile Test Range. Just as the collimation towers on the platform are colinear with the large instrumentation site, the single tower west of the launching platform appears to be colinear with the servicing tower and a major instrumentation site 15,050 feet to the west, along the azimuth of approximately 90°/270°. This alignment suggests a possible alternate direction of fire from Tyura Tam directly to the east.

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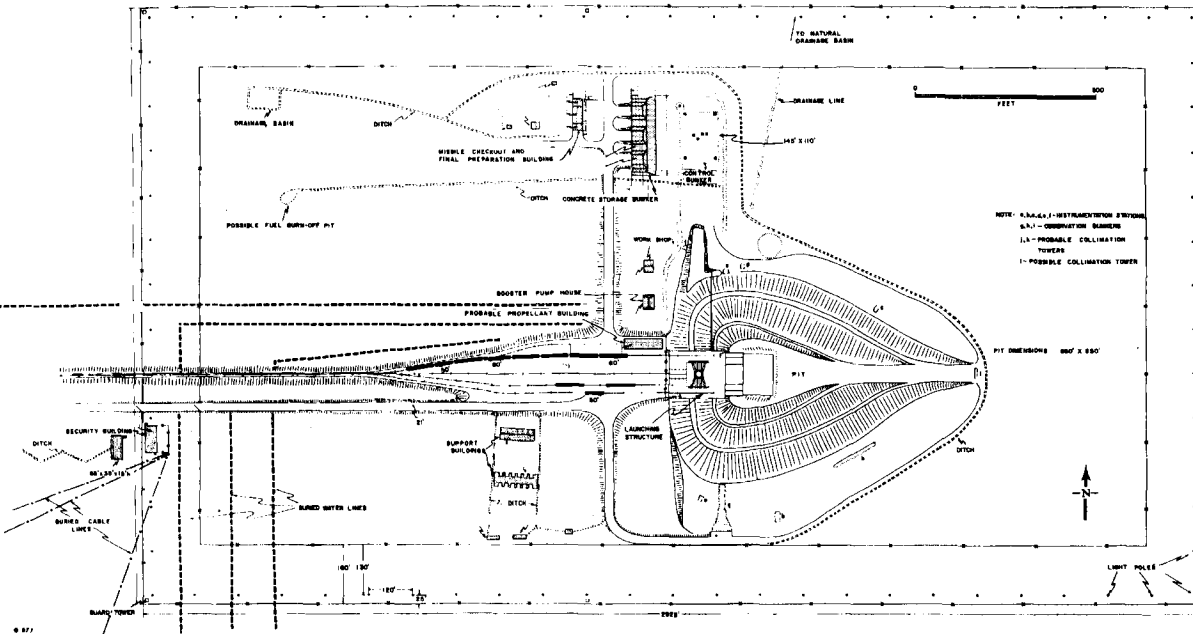
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Probable Propellant Building: A high, flat-roofed, rectangular, concrete building is located northwest of the launching platform. The fifth and northernmost rail spur terminates in this building, which is also served by an excellent road system. The building measures [redacted] and can accommodate one 80-foot or two 50-foot rail cars. Its hardness and its nearness to the launching platform indicate that it will function as a storage point for a special-type rail car required in the immediate vicinity of the launching platform prior to firing. Probably it serves one or both of the following functions:

- (1) **Propellant Storage:** Propellant tank cars would be kept in the building prior to the time of firing to effect "topping" or possibly fueling operations. This concept is further substantiated by the fact that a similar, if not identical building has been identified along the rail line in the Pro-

pellant Production and Storage Area, 11 miles south of the Range Head. Moreover, at least two liquid-propellant-type cars have been identified in the Range Head on the rail line leading to Launch Area "A". In addition, it is also possible that work with solid propellants, such as staging, might be conducted in this building.

- (2) **Missile Hold or Temporary Storage:** Missiles brought to Launch Area "A" for processing might be held on rail cars temporarily in the building during other firing operations. Moreover, it is possible that missiles or components may be transferred underground from this building to the lower levels of the launching structure.

Special Rail Cars: Eleven rail cars are located on the multitrack rail spur leading to the launching platform. Nine cars measure

80 feet in length and two are 50 feet in length. The larger cars have tapered or beveled ends and measure [redacted]

Although most are similar in appearance several vary in details of configuration. In particular, the car closest to the launching platform has an irregularly-shaped front end or it is transporting a covered object. Although the cars have the appearance of standard Soviet passenger coaches, it is more likely that they are specially designed cars used in direct logistical support of firings from the rail-served launching platform.

Control Bunker: An earth-covered control bunker, 145 by 110 feet, is located approximately 600 feet north of the launching platform. It is the probable fire control point for Launch Area "A". A line-of-sight has been cleared from this bunker to the launching platform, and a connecting cable tray or personnel passageway, feet in diameter and extending some 200 feet across the open pit, joins the two structures. The bunker is in line with the servicing tower and appears to have some instruments or objects, possibly periscopes, situated on the roof. One unidentified object or vent appears at each corner of the bunker. A possible covered personnel passageway or cable line leads from the bunker southward to the rail embankment near the probable propellant building.

Concrete Storage Bunker: A concrete storage bunker measuring [redacted] and served by an excellent road is located

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approximately 100 feet west of the control bunker. The structure, which appears to be a temporary storage point for something toxic or explosive, is divided into three separate bays or chambers, each square at the top. Ramps lead down into each of the three bays and, although the depth of the structure cannot be determined, the tops of the bays are above ground level.

The most significant features of this structure are its sloping walls and unusual hardness. At some points, walls are estimated to be 10 feet thick. The supporting road, which was apparently built to connect this bunker with facilities in the immediate vicinity of the launching structure, is probably the best in the Complex. It is well graded and aligned, apparently to insure the safe handling and movement of some critical item stored in the bunker, probably one of the following:

(1) Solid Propellants: Each of the bays may be used to store solid propellant grains, possibly for the upper stages of a multistage ballistic missile. If so, the maximum grain length which could be accommodated would be less than 30 feet.

(2) Liquid Propellants: Liquid propellants might be stored in each of the three bays in fixed tanks. Under this concept, trailers would back down the ramps, be filled, and then move along the roadway to the launching platform. It is probable that whatever is stored in the bunker is brought to Launch Area "A" by rail, and transloaded at a point next to the probable propellant building. It would then be moved by truck along the road to one of the three bays for possible checkout or protective storage. When needed the item would again be brought by truck to a point along the rail line or taken directly to the launching platform.

Missile Checkout and Final Preparation Building: A large drive-in checkout-type building is located 125 feet west of the concrete storage bunker. This building, which measures [redacted] has a center section [redacted] and two lower end sections [redacted] feet high. It is served by the same road system that serves the concrete storage bunker to the east. At least three vehicles or trailers, probably the ones used to transport items stored in the bunker, are parked along the west side of the building. Several smaller buildings are also visible in the area.

It should be noted that a drainage line leads westward from a point adjacent to this building and near a terminus of the supporting road system. It appears probable that toxic liquids of some type are brought along the road, dumped at this point, and drained into a newly constructed basin located approximately 750 feet to the west.

The precise purpose of this building is uncertain, but some type of missile or component checkout and final preparation is probably accomplished here. From this point, the components are moved by road to the vicinity of the launching platform.

Support Buildings: A small group of support buildings is located along the south side of the rail line. One is a gable-roofed structure [redacted] and another is a storage-type, prefab building [redacted]. It is probable that these support buildings are used for temporary personnel quarters and storage, and house other non-operational-type support activities. Several smaller buildings are also visible in this area.

Security Building: A security building, measuring 75 by 35 feet, is located along the fence line near the main rail and road entrances to Launch Area "A". Buildings of this type are of standard Soviet design and have been identified at similar positions in the Kapustin Yar Missile Launching Complex. Several buried cable lines from other areas in the Range Head converge adjacent to this building at the corner of a small fenced area. One of these lines leads from the Instrumentation Control Center and probably constitutes a wire communication link between Launch Area "A" and the Control Center. Another, possibly a power line, leads from the power substation. Another building, 65 by 35 feet, is located outside the fence line, near a personnel trench or ditch.

Water Supply: Four large buried water lines serve Launch Area "A". The three largest lead from Water Storage Tank Area "A" and enter Launch Area "A" from the south, passing under the rail line, and then extend eastward through a booster pump house and probably to the launching structure. Although the trace of one of these lines becomes obscure when it passes into the rail embankment, it probably follows a course between the other two. The fourth line enters Launch Area "A" from the west and parallels the other lines leading to the booster pump house. It probably provides the normal daily water requirements, while the three lines from the south provide water for firings. It is estimated that these earth-mounded lines, the

scars of which measure [redacted] across, are capable of quickly providing up to three to four million gallons from Water Storage Tank Area "A" during operational periods.

Drainage Systems: The elaborate drainage facilities in Launch Area "A" provide some indication of the enormous amounts of liquid residues that will be handled. Already discussed in this regard are the large pit, the drainage sump paralleling the deflector plate, and the concrete structure in the pit which may be an underground bunker for collecting toxic exhaust residues. In addition to these facilities, there are three separate drainage systems. The first and largest is a covered line which leads from a point near the pit 1,360 feet north to a natural drainage basin outside the fence line. This basin has a large darkened center indicating that some liquids were probably drained into it prior to overflight. The second system, utilizing open ditches, rims the pit and leads northward to the fence line behind the control bunker, and then westward to the large man-made drainage basin west of the missile checkout and final preparation building. Another line in this system, previously discussed, leads into this basin from a point near the road terminus near the missile checkout and final preparation building. The third and smallest drainage system, also utilizing open ditches, begins at a point between the control bunker and the launching structure, and leads 1,230 feet westward to a possible fuel burn-off pit.

The two open-ditch drainage systems are located within the fenced section of Launch Area "A", and it is probable that they are enclosed for necessary "cooling off" or safety purposes. The largest system, which empties into the natural basin outside and north of the fence line, is probably for the large amounts of uncontaminated or treated water pumped from the pit following a firing.

Power Supply: Power for Launch Area "A" is transmitted through either of two facilities. The primary supply probably is transmitted through two secondary power lines which follow the rail line north and east toward the launch area. Although the trace of these lines, which may also serve as light poles, is lost in shadow just after they swing eastward (page 18), they probably continue, either aboveground or underground, to Launch Area "A". Less likely is the other possibility that power is transmitted from the power substation to Launch Area "A" through buried cable lines. If so, these lines might be used for power transmission in the event

of the failure or destruction of aboveground facilities. Earth scar and ground clutter preclude determination of the power distribution system within Launch Area "A".

Communication Facilities: Although no major radio communication facilities are visible in Launch Area "A", a probable wire communication system serves the area and connects with other key facilities in the Range Head. This system, as discussed on page 10, consists of a buried cable line which originates at Communication Area "A", leads to the Launch Support Area, then to the Instrumentation Control Center, and finally terminates in Launch Area "A". Earth scar precludes tracing this line within Launch Area "A".

FUNCTIONS OF LAUNCH AREA 'A'

The location, orientation, size, and configuration of Launch Area "A" suggest that it is designed to accomplish one or more of the following missions:

Launch Facility for an ICBM Test Vehicle: The size of handling facilities and ground support equipment at Launch Area "A" coupled with a missile test range probably extending some 3400 miles suggests development of large ballistic missiles probably with intercontinental capabilities. Further, the type, permanent nature, and organizational arrangement of structures and facilities in the Support Base and the Range Head indicate that the Tyura Tam Missile Launching Complex is primarily a missile test firing facility. However, operational launchings should not be excluded as a possibility.

Static Test Facility for Large Ballistic Missiles: The size of the employed concrete launching structure and the large volume of available water indicate that static testing is at least one of the functions of Launch Area "A". Moreover, close-in instrumentation and observation points are sufficient in number to support static test firings.

Test Facility for New or Unusual Propulsion Systems: The magnitude and complexity of the launching structure and of the water-handling facilities at Launch Area "A" reflect unusual and elaborate preparation possibly for the handling of extremely hazardous exhaust residues. For example, the large water storage and distribution

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capacity evident at the Range Head indicates that Launch Area "A" literally could be flooded during firings. In addition, the vast pit, drainage sumps and lines, and water disposal and handling systems further indicate a requirement for special facilities, possibly necessary to handle one or more of the following:

(1) Nuclear Propulsion Systems: Several factors suggest this future possibility. Among them are the location of the Complex, in a barren, sparsely settled area, away from large centers of population and other possible Soviet missile test ranges; the separation of the main Support Base from the test launching area by a distance of 17 to 20 miles; the massiveness of the concrete launching and static testing structure; the elaborate provisions for supplying and disposing of large amounts of water; the special efforts to construct facilities for handling contaminated or toxic materials; and the relative isolation of Launch Area "A" within the Range Head. It should be noted, however, that the location of support facilities with reference to the prevailing northeasterly winds may be a factor which would seriously limit or preclude testing of nuclear propulsion systems.

(2) High-Energy Propulsion Systems: The factors cited above, such as isolation and provision of massive test facilities, coupled with construction of an unusual probable propellant production plant in the Complex, are considerations which suggest that Launch Area "A" may be used to test high-energy (exotic) propulsion systems. The enormous amounts of water apparently required during firing operations at Launch Area "A" is the most important factor supporting this possibility.

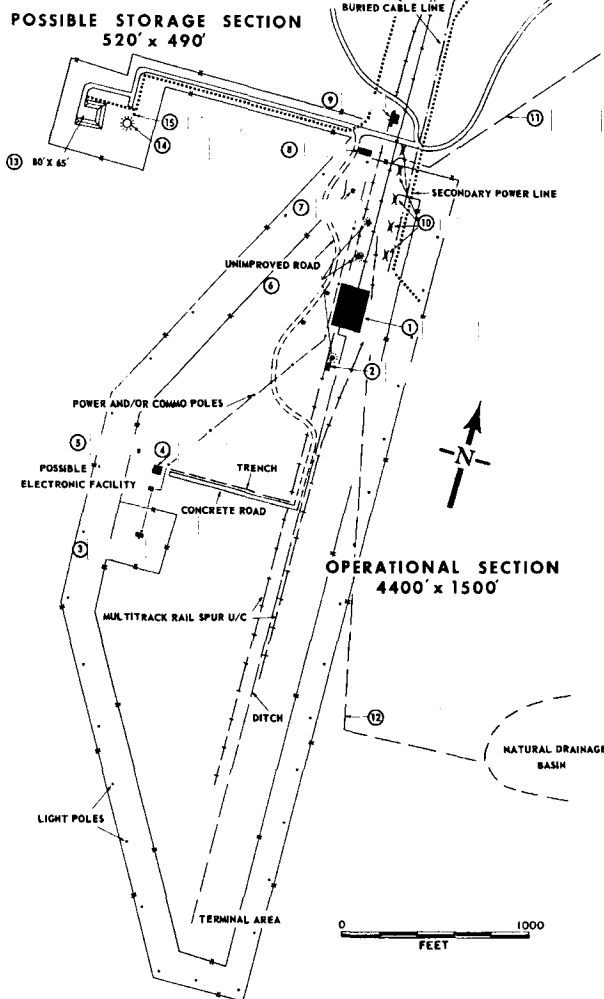
Launch Facility for Space Vehicles and Earth Satellites: The magnitude and permanent aspect of the Complex indicate the probable initiation of a program for testing vehicles of a new and possibly unusual type, probably including space vehicles and earth satellites. In this regard, the west-east orientation of Launch Area "A" and of certain other instrumentation, as noted earlier, suggests a possible alternate direction of fire directly to the east.

POSSIBLE LAUNCH AREA 'B'

A possible second launch area is located in the southwest quadrant of the Range Head and consists of two unusual-shaped sections, both of which are fenced, plus a few nearby facilities. The operational section, under construction at the time of photography, measures 4,400 by 1,500 feet over-all and tapers to 520 feet at either end. It is enclosed by two parallel security fences, 165 feet apart. Just inside the outer fence is a line of light poles, probably for night security. This section is served by rail, road, and power and water lines. Cable lines connect it with other key areas of the Range Head. The possible storage section, which measures 520 by 490 feet, is located approximately 2,400 feet to the northwest and consists of a large revetted concrete pad, an earth-mounded structure, and several small unidentified structures. This section is served by an excellent concrete road, the length of which is fenced, and by a line of power or light poles.

Area "B" has been called a possible second launch area because of several significant similarities with Launch Area "A". These two areas have the heaviest security found in the Complex and both are provided with major power and water supplies. In addition, a large water disposal system is under construction in Possible Launch Area "B", indicating that, like Launch Area "A", large amounts of water will be required during operations. In this regard, however, the most obvious and significant dissimilarity is the apparent absence at Possible Launch Area "B" of any large fixed launching structure or pit like those found at Launch Area "A". Whereas the latter area is characterized by deep, heavy, and hard construction, Possible Launch Area "B" is characterized by relatively simple above-ground construction.

Railroad Drive-through Building: The largest structure in Possible Launch Area "B" (item 1) is a monitor-roofed railroad drive-through building measuring feet, and nearly completed at the time of photography. It will probably serve as a missile checkout or assembly facility. One completed rail line, probably used to support construction, leads into the building from the north. The embankments for two additional lines, one of which bypasses the building around the east side, also enter the area from



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the north. These lines converge south of the building in an area of considerable construction activity, and continue southward some 2,500 feet. The southern terminus of the lines, under construction at the time of photography, probably will be a multitrack rail spur consisting of four or more separate tracks. Embankments for these are under construction and it is probable that no major structures will be added in this vicinity as there are no apparent footings or foundations. When completed, therefore, this terminal area probably will contain several isolated rail spurs located in a heavily secured area with few, if any, adjacent structures.

Gable-Roofed Building: This small structure (item 2) is situated adjacent to the rail lines that lead south from the drive-through building, and is a probable servicing or storage structure.

Possible Electronic Facility: A possible electronic facility (items 3, 4, and 5) is located 800 feet west of the rail lines, near the center of the operational section. It consists of several small buildings of relatively simple design and construction, which are the focal point of a road and a power and/or communication line. The buildings comprising this facility were apparently complete at the time of photography, and at least one of them is characterized by the heaviest security in the Complex. This facility is of special interest in that it has been purposely separated from the rail lines and drive-through building, and the course of the perimeter fence has been deflected to include it.

The most important building in the facility is an individually-fenced gable-roofed structure which measures [redacted] This building, the long axis of which is perpendicular to the rail line under construction, is situated at the terminus of a line of power and/or communication poles which lead from a point near the entrance to Possible Launch Area "B". Its position coupled with the fact that it has the heaviest security in the Complex indicate that it may perform a guidance or control function.

The largest building in the facility is a gable-roofed structure which measures [redacted] and is situated at the terminus of a concrete road leading directly from a point adjacent to the rail lines. An open trench, which parallels the road, may be a cable line under construction. In addition, the line of power and/or communication poles leading through the facility may connect with this building. Several smaller buildings or ob-

jects, the largest of which measures [redacted] square, are also visible in the area.

Storage Tanks: Three tanks (item 6), each [redacted] are being emplaced along the rail lines north and south of the drive-through building. Water lines under construction lead into the general area, but photographic evidence is insufficient to determine that the tanks are used for water storage.

Support Buildings: Three administrative and/or storage-type buildings (items 7, 8, and 9) are located near the entrance to Possible Launch Area "B". The smallest, a [redacted] square gable-roofed structure (item 7), is situated inside the fence, between the rail line and the unimproved road. The second, a gable-roofed possible security building measuring [redacted] (item 8), is located outside the perimeter fence, between the rail and road entrances. The third, a possible rail transloading building measuring [redacted] (item 9), is located adjacent to the rail line, 200 feet north of the entrance to Possible Launch Area "B".

Unidentified Structures: Five unidentified structures (item 10), each [redacted] are located in line north of the drive-through building. Although precise identification of these structures is not possible because of earth scar and construction activity, they may be buried storage bunkers.

Water Supply: A large water supply for Possible Launch Area "B" will be provided through a new line (item 11) from Water Storage Tank Area "A" in the Range Head. The ditch for this new line, with pipe emplaced at some points, measures [redacted] Although its alignment can be traced to Possible Launch Area "B", earth scar and construction activity preclude tracing the lines within the operational section.

Drainage System: An elaborate drainage system is under construction in Possible Launch Area "B". It is evidenced primarily by a drainage line under construction (item 12) from the operational section to a large natural drainage basin located to the southeast. The ditch which has been excavated to carry this line is [redacted] It is probable that water used in the operational section will be disposed through this system.

Possible Storage Section: The most conspicuous feature of the possible storage section is a large road-served concrete pad measuring 80 by 65 feet (item 13). It is enclosed on three sides by an enormous earthen revetment, with the open side facing

to the west. Just to the rear of the reverted pad is an earth-mounded structure (item 14), possibly a bunker or storage tank. The exact configuration of this structure, whether circular or square, is difficult to determine, but it measures approximately [redacted] across. It is served by the concrete road which also serves the pad. A small shack-like building or object [redacted] (item 15), is situated next to the earth-mounded structure, and appears to be related to the line of power or light poles which lead into the area.

The function of this smaller fenced section, which includes items 13, 14, and 15, is probably related to the handling of a toxic or explosive material. The excellent road, the revetment, and the earth-mounded bunker or buried tank support this contention. If the earth-mounded structure behind the revetment is a water tank or bunker, possibly for storage or control, the reverted pad may be a storage point for solid propellants. The possibility of temporary nuclear storage or handling, however, cannot be dismissed. Whatever the mission of the possible storage section, the configuration of the fence lines and alignment of the road systems suggest a direct functional relationship with the operational section of Possible Launch Area "B".

FUNCTIONS OF POSSIBLE LAUNCH AREA 'B'

The location of this installation within the Range Head and the arrangement of its facilities suggest that Possible Launch Area "B" will perform one or more of the following functions:

Prototype Operational Site for Rail-Mobile IRBM or ICBM: Under this concept, Possible Launch Area "B" would represent the actual layout of an operational site, and would be the prototype where the development of equipment, training of crews, and test firing of missiles would be conducted. Missiles would be checked out horizontally on flat cars in the railroad drive-through building and moved onto the multitrack rail spur. Further checkout and the addition of other components brought by road and possibly stored at the reverted concrete pad would occur where the road comes closest to the rail line, at a point 750 feet south of the drive-through building. From this point the missile would be moved to the terminal area of the multitrack rail spur, where servicing

and fueling probably would be effected from cars along paralleling lines. Guidance and control might be accomplished from the possible electronics facility located 800 feet to the west, or from mobile rail cars. In this regard, it is perhaps relevant to note that a colinear relationship exists between Launch Area "A", the Interferometer-Type Instrumentation Site, and this installation. Specifically, the line which passes through the servicing and probable collimation towers and the center of the "plus" configuration intersects the terminal area of the multitrack spur. One argument against the hypothesis that this is a second launching facility is that missiles fired from Area "B" along the Tyura Tam Missile Test Range to the northeast would pass over the center of the Range Head. In addition, distances between key facilities are relatively short.

One advantage of this type of launching installation is that it requires relatively simple construction and only minor modification of the landscape. Therefore, positions of this type could be easily constructed at hundreds of points along the extensive Soviet rail system.

Missile Checkout and Hold Area: Under this assumption, missiles intended for firing from Launch Area "A" would be checked out at Possible Launch Area "B". Those finished and ready for firing would be stored on the multitrack rail spur until required. The heavily-revetted concrete pad would possibly store solid propellants or HE components in a protected area prior to final assembly in the operational section.

Propulsion Test Area: According to this hypothesis, missiles being prepared for launching from Launch Area "A" could be static tested in a horizontal position in the terminal area of the multitrack rail spur. Preliminary checkout and post-firing servicing would take place in the drive-through building. At the time of overflight, however, there were no apparent provisions for exhaust handling facilities which would be necessary to conduct such static tests. In addition, the short distances between key facilities and the proximity of the fence line seem to preclude this possibility.

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LAUNCH SUPPORT AREA

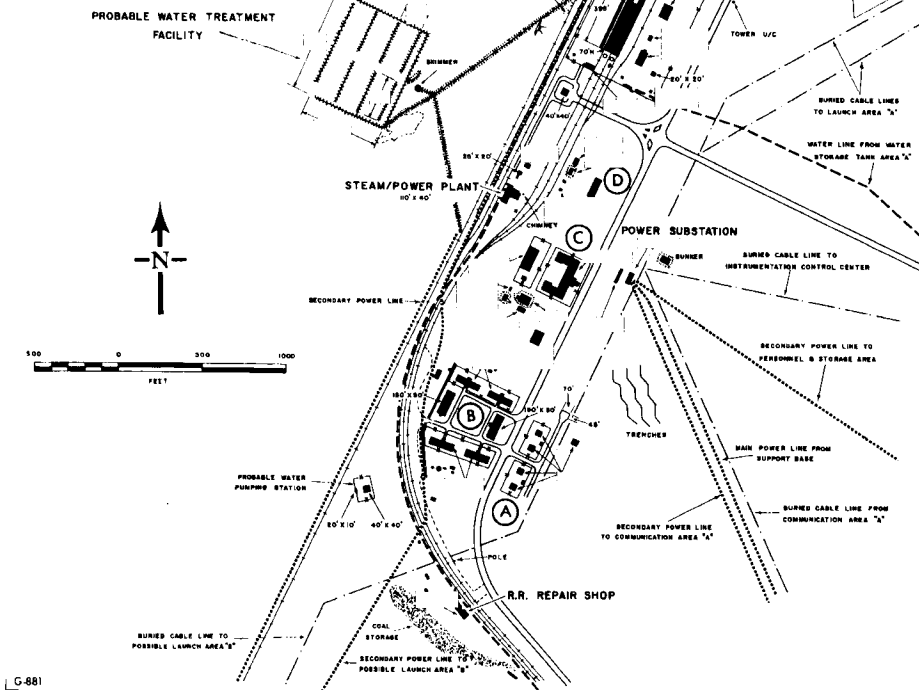
The Launch Support Area contains many of the operational, logistical, and administrative support facilities for the Range Head. These facilities, which extend for some 6,500 feet along the rail line leading to Launch Area "A", are characterized by considerable activity. There are about 53 rail cars in the area, several of which have unusual configurations probably relating to missile transportation, erection, and fueling.

Missile Checkout and Assembly Facilities: These facilities are located within a fenced area situated astride the rail line leading to Launch Area "A". Enclosed by a board fence with a tower at each corner, the area measures [redacted] and is characterized by considerable activity. A rail line, which divides into four separate lines, passes through the area. Three of the lines lead through a large building, which probably functions as a checkout and possible assembly point for missiles in a horizontal position on rail cars. This building, which is the largest one in the area, measures 395 by 95 feet, and is 70 feet high. A narrow shed parallels the entire west side of this gable-roofed structure. A small flat-roofed section, probably a monitor for ventilation, is situated near the north end. The building is served by water and power lines and a good road system. The fourth rail line into the area leads around the east side of the building and connects with the other three lines outside the fenced area.

Considerable activity is found in the northern section of the area on the rail lines and the concrete aprons that straddle the tracks outside the drive-through building. The most significant item is an unusual-shaped rail car, probably a missile transporter-erector, located along the rail line that bypasses the drive-through building. This car measures [redacted] and appears to be a flat car with a lattice steel framework superimposed on top. One end of the frame is raised much higher than the other, and the car resembles a German "meillerwagon" used to transport and erect missiles in the "TMS guided missile trains". Another item of interest is a linear object situated at the northern entrance to a shop-type building which measures [redacted] and is located 150 feet east of the drive-through building. The object, which measures [redacted] in length and [redacted] feet across, is a possible missile or missile stage, or a transporter.

Several other support and shop-type structures, including a security building measuring [redacted] are located in the southern and eastern portions of the missile checkout area. Of particular interest is a relatively tall tower [redacted] which is apparently connected with the water line from Water Storage Tank Area "A" in the Range Head. In the northwest corner is a long, narrow building [redacted] beside which a tower is under construction.

Power Substation: The power substation is located near the approximate center of the Range Head, at the terminus of the main power transmission line under construction from the [redacted]



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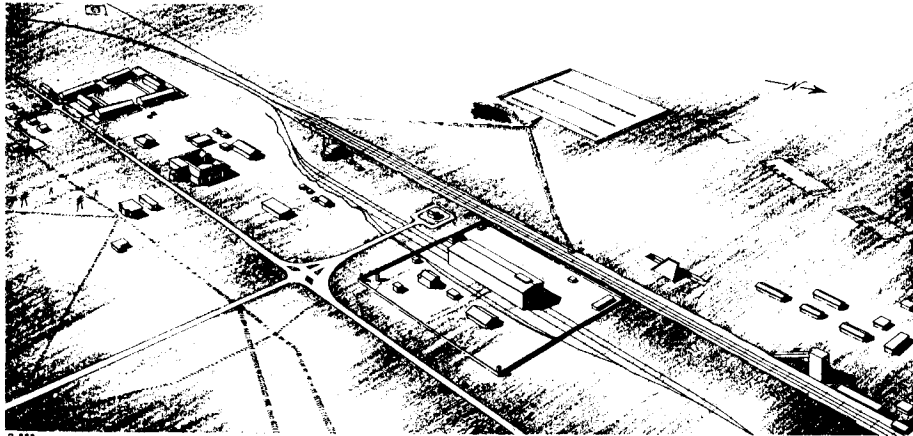
Support Base. Two buildings comprise the power substation. One is a probable transformer station, and the other is a probable control house.

A secondary line radiates from the substation to Water Storage Tank Area "A" and the Personnel and Storage Area. Traces of other secondary lines leading to key facilities in the Range Head are evident on the photography, but the probable connection between these lines and the substation cannot be determined because of considerable earth scar and construction activity in the Launch Support Area.

Steam/Power Plant: A medium-size steam/power plant is located along the rail line, approximately 800 feet west of the power substation. It is situated south of the missile checkout and assembly facilities, and is probably served by the main water line from the Support Base. The plant measures 110 by 60 feet over-all, and has a tall stack located on the east side. Just north of the main building is a smaller structure 25 by 20 feet, with a conveyor leading to the top. Small amounts of coal are visible between these buildings, but the primary supply of coal is stored approximately 2,500 feet to the south along the main rail line at a point west of the railroad repair shop. Although basically designed as a steam or heating plant, its location relative to the power substation and the main power distribution nets of the Range Head indicate that this facility possibly fulfilled some of the power requirements for the Range Head during the initial construction phase.

Probable Barracks: A well-planned area containing five small gable-roofed buildings (item A), six large barracks-type buildings (item B), and a black-top pad are located approximately 2,700 feet south of the missile checkout area. Both sections, (items A and B), are served by an excellent black-top road. The buildings appear well-kept and may be living quarters for top technical personnel. The pad, 70 by 45 feet, may be used for a meteorological station, a helicopter landing point, or an instrumentation or personnel observation point. A clear line-of-sight exists between the pad and Launch Area "A".

Probable Headquarters and Laboratory Facilities: Located approximately 1,500 feet south of the missile checkout area is a small group of buildings (item C), each of a different type, which probably constitutes the headquarters and laboratory area for the Complex. This area is adjacent to the primary focal



point for power and communications, located 350 feet to the east. The largest and most complex structure in the area is a headquarters or administration-type building over-all, facing the main road which leads through the Range Head. Several smaller structures, some of which probably house laboratory facilities, are grouped in the south and west part of the area. Two are earth-mounded bunkers which appear to have a function related to propellant or high explosives (HE) storage. The larger one, has several vents and a possible entrance facing west. The other is a rectangular earth-mounded structure, with several smaller buildings adjacent to it.

Possible Transloading and Storage Facilities: A group of buildings (item D) is located adjacent to the rail line south of the missile checkout and assembly facilities. The largest building is an unidentified flat-roofed structure that measures Four other smaller and possibly more significant structures located along the rail line may perform a storage or transloading function. One of these is an earth-mounded bunker measuring , and probably used for HE or other hazardous-type storage.

Rail Transloading Point: A bulk-materials transloading point (item E), is located along the rail line approximately 1,400 feet north of the missile checkout and assembly facilities. A tall tower with a conveyor is the most prominent structure in the area. Nearby there is a long transloading building and several small sheds.

Initial Construction Camp: The original construction effort for the Range Head was centered in the section 1,500 feet northwest of the missile checkout and assembly facilities (item G). At the time of photography, earth scar and hundreds of former tent bases were still visible indicating that open storage and numerous tent sections were formerly scattered throughout the area. The only permanent facilities remaining are those near the rail line, which consist of storage and barracks-type buildings that probably are still in use.

Other Support Buildings: Several other small buildings are located in the Launch Support Area. The most significant appears to be a small structure 40 feet square, situated between the rail lines just south of

the missile checkout and assembly facilities. This single building is strategically located and is reached by an excellent road system. It may serve an administrative function or provide storage for some critical item. In the southern section of the Launch Support Area is a railroad repair shop, and a probable water pumping station.

Probable Water Treatment Facility: A large probable water treatment facility is under development west of the missile checkout and assembly facilities. It is characterized by a rectangular-shaped clearing containing at least six probable settlement basins. The basins appear to be rimmed with excavated earth. Two large earth-covered water lines lead into the area, one from the northeast and another from the southeast. They merge and extend westward for 100 feet to a probable skimmer. From this point the single line is obscure, but appears to lead into the central part of the probable water treatment facility. These water lines appear to have vents or openings along the upper surface for their entire length. Although the exact purpose of the facility cannot be determined, it is probable that water used in range head operations, which requires disposal or reclamation, will be processed in these basins. In any case, water processed in this area apparently cannot be discharged through the normal drainage system or dumped into the outlying saline basins.

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PERSONNEL & STORAGE AREA

The Personnel and Storage Area is located in the southern section of the Range Head and is served by an excellent road, a secondary power line, and a water line. The area encompasses some 137 acres and contains at least 10 separately-fenced subareas and some 80 structures, including 17 barracks-type buildings, 21 earth-covered bunkers or pre-fab storage buildings, and 12 warehouse-type buildings. Several smaller unidentified buildings and a large amount of open storage

are scattered throughout the area. A large fenced section located in the northeast is a combined motor pool and maintenance facility. Approximately 40 vehicles and two maintenance-type, drive-through buildings are visible.

The area probably functions as the primary billeting point for range head personnel. In addition, conventional storage, vehicles, and equipment are located in the various fenced subsections.

VEHICLE PARK

The Vehicle Park, which is fenced and measures 1,000 feet by 600 feet, is located about 600 feet southeast of the Instrumentation Control Center. The park is carefully laid out and unusually well-kept compared with other vehicle areas in the Complex. It contains five major buildings, three of which are probable vehicle sheds, two earth mounds, and 33 vehicles.

The purpose of this installation is possibly related to the storage and maintenance of mobile instrumentation equipment. The installation is served by an excellent road and is connected with the Instrumentation Control Center by a buried cable line. It is also relevant to note that the park is located in the same vicinity and served by the same roads as the Interferometer-Type Instrumentation Site and the Instrumentation Control Center.

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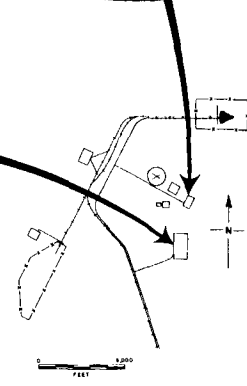
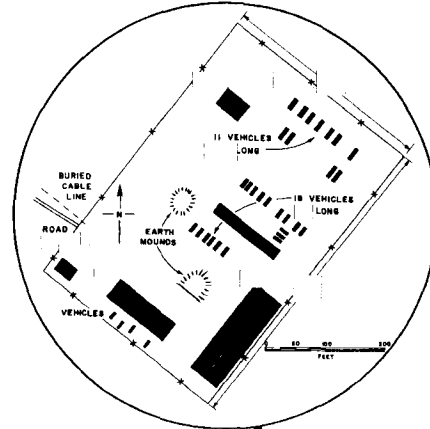
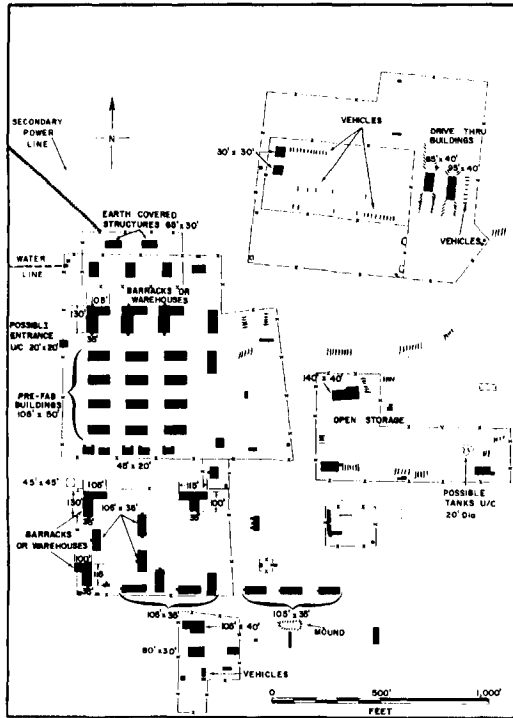
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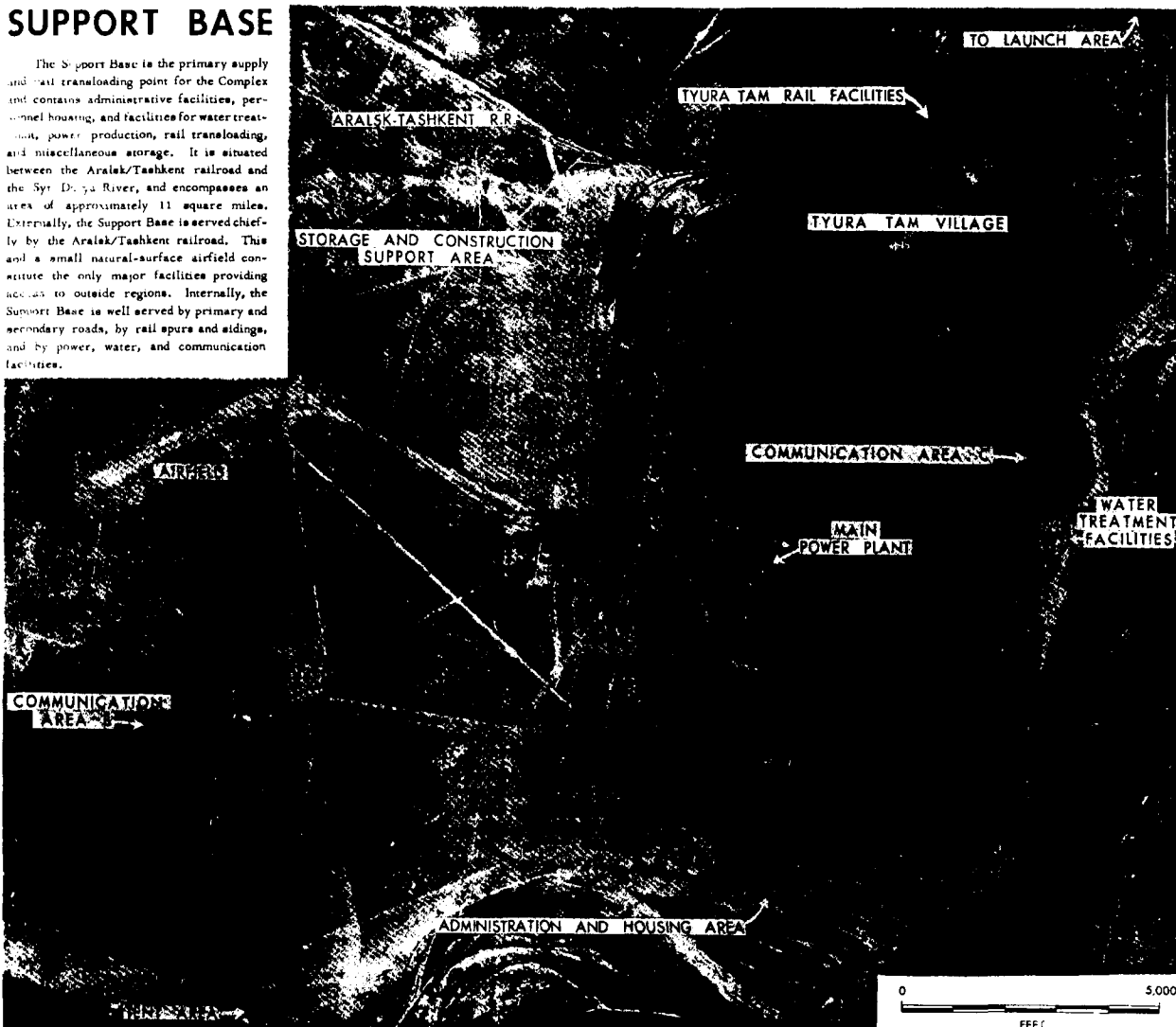


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SUPPORT BASE

The Support Base is the primary supply and rail transloading point for the Complex and contains administrative facilities, personnel housing, and facilities for water treatment, power production, rail transloading, and miscellaneous storage. It is situated between the Aralsk/Tashkent railroad and the Syr Darya River, and encompasses an area of approximately 11 square miles. Externally, the Support Base is served chiefly by the Aralsk/Tashkent railroad. This and a small natural-surface airfield constitute the only major facilities providing access to outside regions. Internally, the Support Base is well served by primary and secondary roads, by rail spurs and sidings, and by power, water, and communication facilities.



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TOP SECRET -

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ADMINISTRATION AND HOUSING AREA

The Administration and Housing Area is located in the Support Base near the Syr Darya River, at a point approximately two miles south of the Aralsh/Tashkent railroad (see page 21). It contains a large permanent housing section with associated administration and storage or shop-type buildings. In addition, a motor pool is located to the west, and a possible laboratory or public utility section is located to the east. The presence of new pipelines and evidence of new street patterns indicate that a major expansion program is projected or underway in the northeast section of the area. A detailed description of individual components in the Administration and Housing Area follows.

Permanent Housing Section: The permanent housing section with its associated administration and support buildings, is laid out in a regular pattern which covers some 430 acres and contains as many as 225 major structures. Numbers and types of buildings and floor space, in square feet, are as follows:

28 Administration-type
129 Personnel Housing-type
68 Storage and Shop-type
Total Floor Space

It is estimated that the Administration and Housing Area could have accommodated at least 5,500 persons in considering the expansion capability, based on undeveloped street patterns and utility systems, the area when completed probably will house in excess of 10,000 persons.

Motor Pool: A motor pool is located just west of the main part of the Administration and Housing Area. Approximately 85 vehicles were parked in the area at the time of each overflight.

Possible Laboratory or Public Utility Section: A section containing a large and complex building 145 by 85 feet and a considerable number of linear earth areas is under development approximately 1,500 feet east of the permanent housing section. It will possibly perform a laboratory or public utility function.

Tent Area: In addition to the permanent-type housing facilities, a tent area is located adjacent to the Syr Darya River, south of Communication Area "B". The

area contains 63 pyramidal tents, each 20 feet square, a large T-shaped mess-hall-type building with 7,800 square feet of floor space, and several smaller storage buildings. Examination of comparative photo coverage reveals that the tent area is being abandoned, and that between 15 of the tents were removed. Moreover, ground scars indicate that at least 135 similar-type tents had previously been located in the area. This reduction in the number of tents and the apparent evacuation of the tent area indicates that the construction workers are being phased into the newly-developed permanent housing areas or have left the Support Base.

TYURA TAM AIRFIELD

The only air facility within the Complex is a natural-surface airstrip located two miles northwest of the Administration and Housing Area (see page 21). It is oriented in a northeast/southwest direction and measures 4,200 by 260 feet. Features associated with the strip include a long row of probable storage crates, a fenced probable maintenance building, an unidentified building, and several probable vehicles.

Earth-moving activity on the airfield at the time of photography indicates that it is being improved. The field is in operational use; aircraft observed include two CABS and 4 CABS and one COLT.

COMMUNICATION AREAS "B" AND "C"

Two communication installations are located within the Support Base (see page 21). Communication Area "B", which is located approximately two miles west of the Administration and Housing Area, covers 250 acres, exclusive of an associated communication control center to the north. Communication Area "C", which is located in the eastern part of the Support Base, covers 2.4 acres.

Both installations are characterized by considerable new construction activity and, coupled with Communication Area "A" five miles south of the Range Head, constitute the primary communication facilities for the Complex. A detailed description of these facilities is given on pages 30 to 32.

WATER TREATMENT AND DISTRIBUTION FACILITIES

Extensive water treatment and distribution facilities are located in the Support Base. The chief supply of water for the Complex is provided from facilities along the Syr Darya River, one mile northeast of the Administration and Housing Area (see page 21). Old and new distribution systems can be traced to various points in the Support Base as well as northward to the Range Head. A detailed analysis of water treatment, storage, and distribution facilities is given on pages 28 and 29.

Possible Crate Storage Section: This rail-served open storage section (item B) contains 24 possible crates, each 75 by 15 feet, as well as other material.

Warehouse Section: This section (item C) includes 13 prefab-type buildings, 160 by 50 feet each, and two others the same size under construction. Five probable vents are evenly spaced along the center roof line of each building. One of these buildings has a concrete abutment at one end. A fenced area within the section measures 640 by 540 feet and contains four of the prefab buildings, 20 possible crates each 50 by 10 feet, numerous vehicles, one unidentified building, three probable earth-covered buildings, and other unidentified objects and activity. The entire warehouse section is served by a network of light poles, and a rail spur passes through the center.

Bulk Fuel Storage Section: The bulk fuel storage section (item D) contains two large earth-mounded structures and several smaller facilities. These structures, which are probably earth-mounded fuel storage tanks, are shaped like truncated cones. They measure 110 feet across at the base and 55 feet across at the top, the latter figure suggesting the probable diameter of the tanks. In addition, there are three possible excavations for future tanks, two completed fuel tanks, a large earth mound measuring 660 by 45 feet, and four miscellaneous buildings.

Unidentified Building: An L-shaped building (item E), located 700 feet northwest of the possible crate storage section, may be of significance because of at least eight sphere-shaped objects, in diameter, clustered nearby.

Motor Pool: The motor pool (item F) consists of two areas, one of which contains four shop and maintenance-type buildings. Approximately 80 vehicles are visible in the two areas.

Large Shop-Type Building: A large monitor-roofed building (item G), 165 by 85 feet, probably is the only building in the Storage and Construction Support Area capable of handling heavy machine equipment and material.

Rail-served facilities at the Support Base constitute the primary logistical support and supply points for the Complex. They are shown on the facing line drawing and discussed in detail below.

STORAGE AND CONSTRUCTION SUPPORT AREA

The Storage and Construction Support Area is characterized by a large amount of rail-served open and covered storage. Fuel and construction materials are the only items which can definitely be identified. The presence of 14 separately-fenced areas containing varied storage facilities and numerous unidentified objects indicates that this is the main construction support and storage area and bulk materials transloading point for the Complex. In addition to numerous other smaller sections of warehouses, shops, and open storage, the Storage and Construction Support Area includes the following more important components.

Probable Fuel Storage Section: A probable fuel storage section (item A), which covers an area approximately 540 by 410 feet, is fenced and rail served. It consists of 36 probable fuel tanks, placed horizontally in nine sections of four each. Five of these sections are earth-covered. The individual tanks measure in length and in diameter.

TOP SECRET -

TYURA TAM RAIL FACILITIES

Railroad shops, a classification yard, a water tower, and a passenger station comprise the main Tyura Tam rail facilities located along the Araluk/Tashkent railroad in the northern portion of the Support Base. These, coupled with rail facilities in the Storage and Construction Support Area, constitute the primary rail head and transloading point for the Complex. The classification yard (item H), approximately 3,200 feet long and 12 tracks wide, is located north of the village of Tyura Tam and approximately 2,500 feet west of the junction of the main rail line and the rail line which leads north to the Range Head. A single-track "wee" turn-around, two car repair shops, and an unidentified building under construction are located 4,000 feet west of the classification yard (item J).

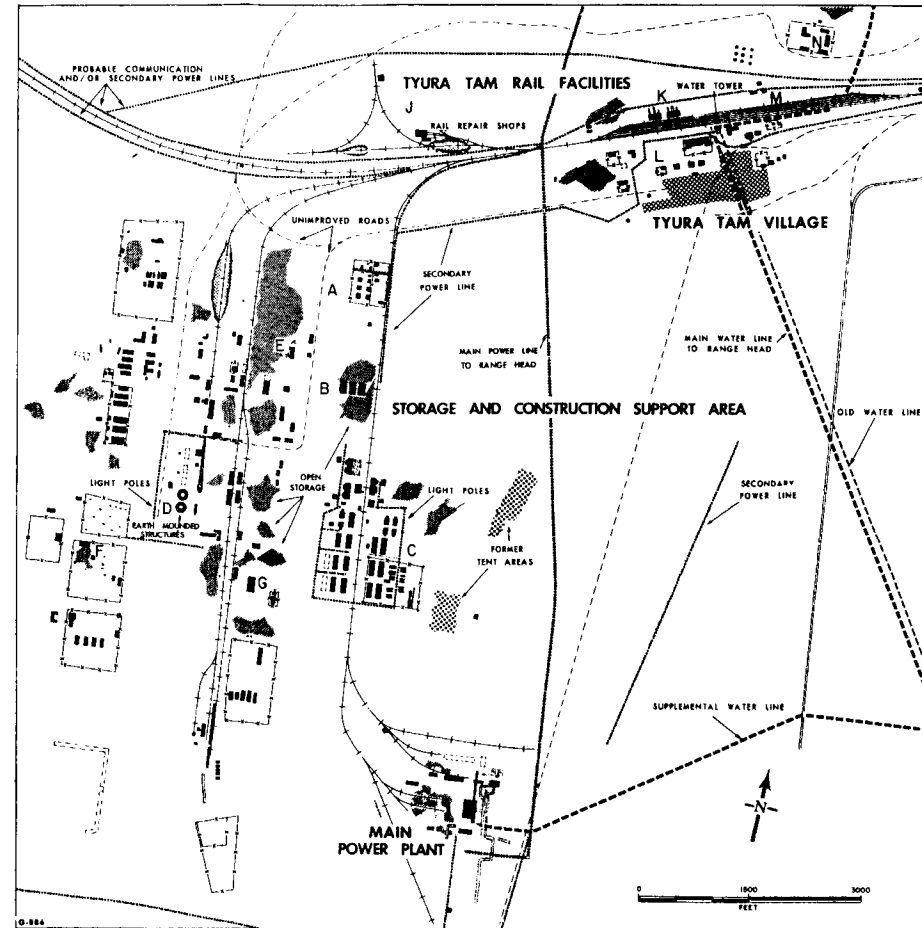
Transloading probably is accomplished in two large buildings measuring 160 by 45 feet each (item K), located along the north side of the classification yard. Three access roads lead under each building, probably for transloading bulk materials from rail cars to trucks.

MAIN POWER PLANT

A new power plant, under construction in is located at the terminus of a multitrack rail spur near the center of the Support Base. The plant, nearing completion at time of photography, will be the primary source of electric power for the Complex. New transmission lines radiate to key areas in the Support Base, and a large line leads northward to the power substation in the Range Head. A detailed discussion of this plant and other power facilities is given on pages 26 and 27.

TYURA TAM VILLAGE AND ADJACENT FACILITIES

Tyura Tam Village: The new section of Tyura Tam (item L) is located just south of the classification yard. It consists of seven small fenced areas and approximately 20 modern-type buildings. The old village of Tyura Tam is located adjacent to the new section and consists primarily of old, mud-hut-type structures.



Possible Crushing Plant: A possible crushing plant (item M) is located on the north side of the classification yard, and consists of what appears to be a multi-story primary crusher building measuring 55 by 25 feet, a secondary crusher building measuring 55 by 20 feet, and a screening building 65 by 30 feet. This plant, possibly

built in connection with the reported former mining activity in the area, may now be used to process crushed stone for concrete or fill. An old road, now in disuse, leads northward from the plant toward the reported mineral deposits.

Unidentified Fenced Area: An unidentified fenced area (item N) lies 900 feet

northeast of the possible crushing plant. The area measures 640 by 340 feet and contains 11 buildings, one of which is under construction. There are five major buildings. Three measure [redacted] one measures 140 by 35 feet, and one L-shaped building measures 110 by 35 feet, with a wing 85 by 35 feet.

to this one, is located in a large surface-to-surface ballistic missile launching area of the Kapustin Yar Missile Testing Complex.

WATER STORAGE TANK AREA "C"

Water Storage Tank Area "C" (item C) is part of the Supplemental Water System serving the Complex. It is fenced and consists of two earth-covered tanks, each 35 feet in diameter, situated on top of a hill. In addition, several possibly related structures are located approximately 375 feet to the northwest. The primary supply of water for the Propellant Production and Storage Area will be provided by the supplemental water line which leads northward from the new treatment plant under construction at the Support Base. This line cuts into the hillside at a point between the two tanks. From this point two lines lead northward. The larger, which is being laid in a ditch [redacted] leads to the Probable Propellant Production Plant under construction. The second, earth-covered and apparently completed, leads northwestward to the Probable Propellant Tank Car Servicing Area (item B). This line passes through the area containing the several possibly related structures, one of which is a small earth-covered bunker somewhat similar to the ones identified in the Administration and Storage Area (item A).

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In summary, it is important to note that the only line leading north from the new water treatment plant under construction at the Support Base terminates in the Propellant Production and Storage Area, and that in all probability large amounts of treated water, stored in and distributed from the two water storage tanks, will be required for operation of the new Probable Propellant Production Plant.

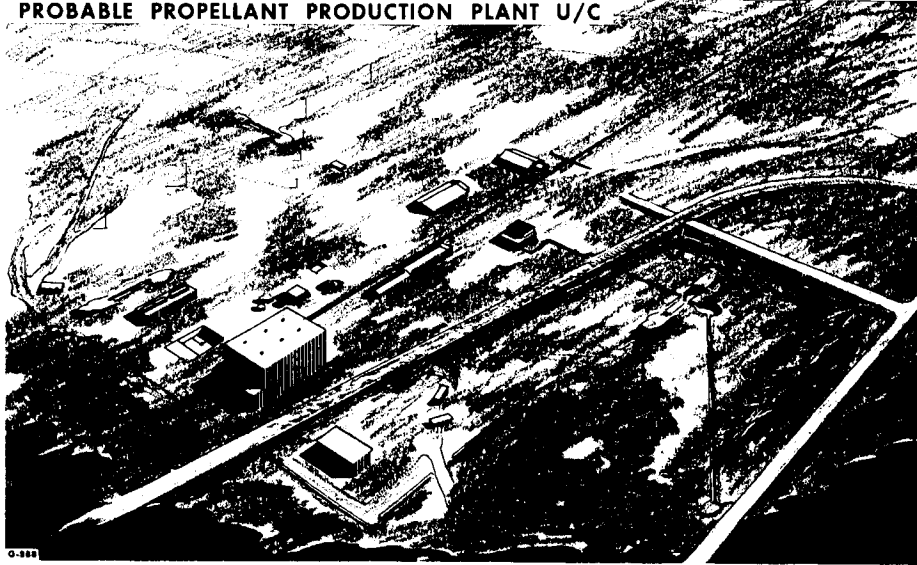
PROBABLE PROPELLANT PRODUCTION PLANT*

A Probable Propellant Production Plant (item D) is under construction in the north-

* Serious consideration was given to the possibility that this installation was some type of missile handling area, possibly for "dry" tests. The apparently large water and power requirements, however, coupled with the fact that the rail-served buildings were in no way similar to other rail-served missile handling buildings at Tyura Tam and Kapustin Yar tended to preclude this possibility.

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PROBABLE PROPELLANT PRODUCTION PLANT U/C



ern section of the Propellant Production and Storage Area. The plant encompasses 35 acres and contains nine major buildings, some of which are unique and have configurations which indicate a function relating to propellant production, handling, or storage. It should be noted that several buildings are of a permanent type, some apparently with steel-frame construction and others with a notably hard appearance. The plant, when complete, will be served by a rail line, a secondary power line, and a major water line.

Possible Rail Transfer or Storage Building: A rectangular building (item D-1), [redacted] is located along the rail line under construction, and will possibly be used for transfer of materials from rail cars or for storage.

Main Production Building: The main production building (item D-2), which is situated near the terminus of the large water distribution line under construction and the secondary power line, measures [redacted]. It has two sections, the higher of which is [redacted]. The high-bay section appears to be divided into six or more separate structural sub-

divisions, and this factor coupled with the provision for relatively large amounts of water and a reliable power supply are primary indicators of propellant production activity. Moreover, the configuration of this building is somewhat similar to that of propellant-type production buildings, primarily LOX, in the United States.

Possible Propellant Storage Building Under Construction: A deep excavation (item D-3), [redacted] is located east of the main production building. It appears to be a foundation for a bunker or a building, and the location and appearance indicate it possibly will be a storage facility for propellant products. The depth of construction may be required for temperature control.

Possible Generator Building: This building (item D-4), which measures [redacted] feet and is divided into two sections, will possibly house the primary generating units and/or compressors for the plant. It is located adjacent to the main production building and may be one of the primary facilities to be served by the secondary power transmission lines under construction into the plant area.

Storage Bunker: A truncated, pyramid-shaped, earth-mounded storage bunker (item D-5), 45 by 35 feet, is located 100 feet south-southeast of the main production building. Two emplaced tanks, [redacted] in diameter, are located adjacent to the bunker. A possible building under construction, which measures [redacted] is located to the southeast.

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Unidentified Building Under Construction: A long narrow building (item D-6), measuring [redacted] is located 200 feet south of the main production building. It is approximately 50 percent complete, and has a possible connection with the large water line leading northward from Water Storage Tank Area "C".

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Water Effluent Line Under Construction: It is probable that the large amount of water required at the main production building will be disposed of through this line (item D-7) which leads from a possible cooling tower or water treatment building (item D-8), westward through a 30-foot-diameter skimmer, and then northward under the road and railroad. From the latter point, the line either leads to Unidentified Area F

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or reconnects with the main water line to the Range Head.

Possible Cooling Tower or Water Treatment Building: This structure (item D-8), which measures 60 by 40 feet and has a rectangularly-shaped, open-top section, appears to be the point of origin for the water effluent line under construction (item D-7). It is possible that this building has a function relative to water cooling or treatment.

Possible Administration and Security Buildings: A possible administration building (item D-9), measuring [redacted] is located in the southern section of the plant area. It is situated near the security building (item D-10), and probably will be served by the main road into the area.

FUNCTION AND SIGNIFICANCE OF THE PROBABLE PROPELLANT PRODUCTION PLANT

In summary, it is important to note that the Probable Propellant Production Plant, together with the water treatment and power facilities under construction at the Support Base, probably will be completed in the period between [redacted].

It is possible that this facility will then fulfill the basic propellant requirements for the Complex. Under this assumption, rail tank cars would probably move in along the rail line to the main production building (item D-2) to receive propellants piped from either the rail transfer building (item D-1) or the possible propellant storage building (item D-3), and then move northward along the rail line to the Range Head.

Assuming that this facility is a propellant production plant, preliminary examination suggests that liquid oxygen is one of the products. However, more careful analysis indicates that provision has been made for an amount of water well in excess of that normally needed for LOX production. More-

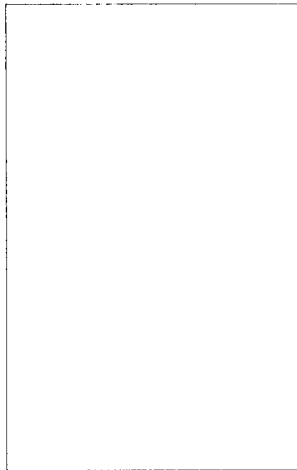
over, the design of the massive facilities at Launch Area "A" indicates possible provision for use of new high energy propellants, which logically would be produced at the Probable Propellant Production Plant under construction.**

PROBABLE PROPELLANT TANK CAR SERVICING AREA

This area (item E) consists of a three-track railroad siding approximately 2,000 feet long, a flat-roofed rail-served concrete building just west of which there is an excavation, and two smaller buildings. The rail-served building, which measures [redacted] is situated at the southern end of the siding and is similar, if not identical, to the rail-served probable propellant building in Launch Area "A". The excavation just west of this building lies near the terminus of a water line and may be a drainage pit or an underground liquid propellant storage point.

A new rail line under construction from the vicinity of this building to the Probable Propellant Production Plant indicates that propellant tank cars will be serviced at both areas. Assuming such a relationship, the rail-served building at the southern end of the siding would be used for temporary storage and/or loading or unloading of propellants.

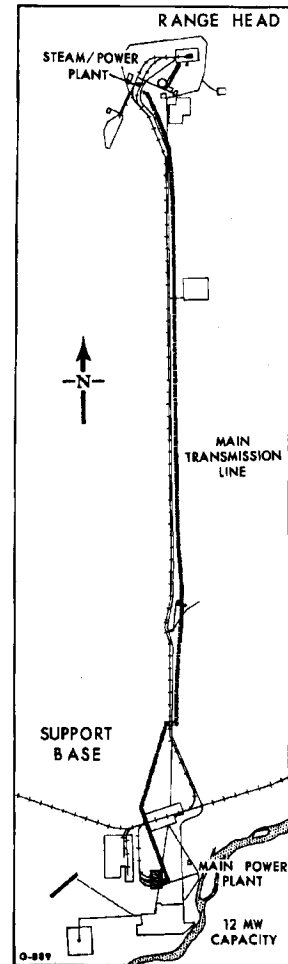
POWER PRODUCTION AND DISTRIBUTION FACILITIES



FIXED POWER PRODUCTION FACILITIES IN THE COMPLEX

Main Power Plant: A thermal-electric power plant was under construction at the time of photography in the Support Base, between the railroad and the river. Upon completion, this plant will be the primary source of local power for the Complex, particularly the Range Head. It appears that construction of this plant is included in the third and final stage of development in the Complex, which was under way in [redacted] and included such other facilities as the Probable Propellant Production Plant, the Supplemental Water System, including treatment and distribution facilities, and the Administration and Housing Area.

The power building, which was nearly complete, consists of a boilerhouse 140 by 95 feet and 85 feet high, a generator hall 140 by 75 feet and 50 feet high, and a roofed transformer section 140 by 30 feet over-all. A longitudinal section extends the length of the power building and measures [redacted]



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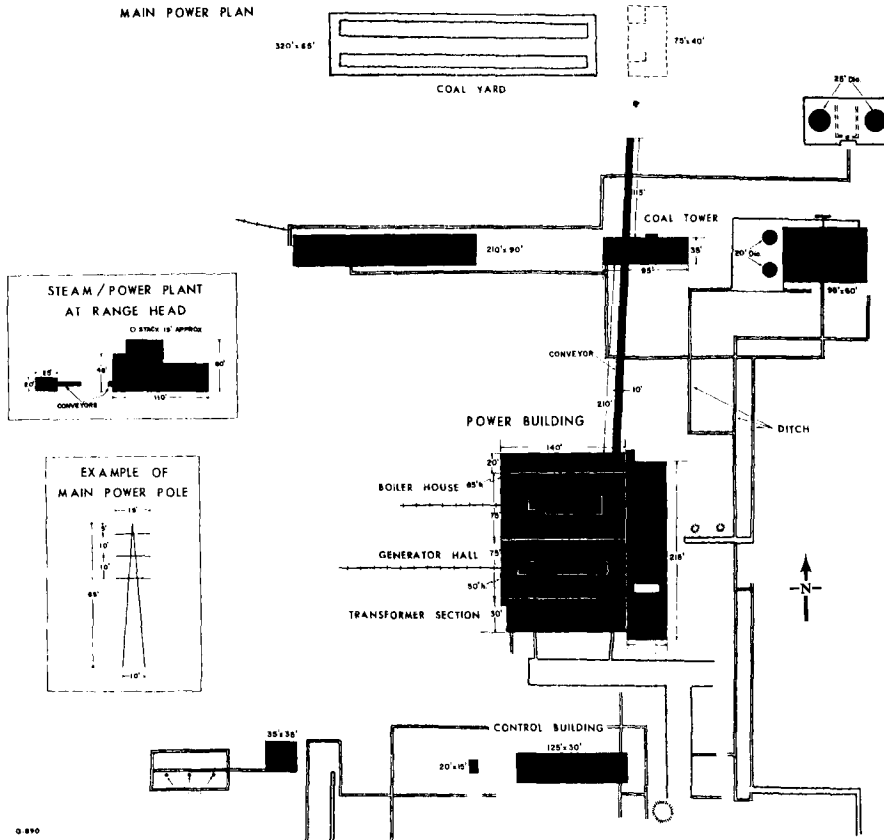
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Based on the size of the building and the amount of cooling water to be provided from the Supplemental Water System under construction, it appears that the generator hall will house two generators, each capable of delivering six megawatts of power. Allowing for line loss and for the probable coefficient of efficiency of the plant, there should be about 10 megawatts of dependable power available from this plant.

Other power plant facilities are:

- Control building 125 by 30 feet.
- One coal tower 95 by 35 feet, and conveyor 325 by 10 feet.
- One 320- by 65-foot coal yard.
- Two semiburied tanks 20 feet in diameter.
- Two semiburied tanks 25 feet in diameter.
- Three tanks 10 feet in diameter and

The plant area also contains several

unidentified buildings, some under construction at the time of photography. Several passenger-type rail cars, possibly housing construction workers, were located along at least one of the several rail spurs serving the plant area. In addition, considerable construction activity, earth scars, and ditching were also evident.

Steam/Power Plant: The steam/power plant in the Range Head is illustrated above and described in detail on page 19.

POSSIBLE SUPPLEMENTARY SOURCES OF POWER

Aralak/Tashkent Power Grid: Probable secondary lines, possibly of the Aralok/Tashkent power grid, parallel the main rail line that passes through the Support Base. Although positive connection between these lines and lines within the Complex cannot be determined, their apparent orientation and alignment strongly suggest that they also serve the area.

Mobile Power Units: Mobile or semi-permanent supplementary power units may serve the Complex. In particular, some of the unusual rail cars observed in the Range Head appear to have vents in the roof and may function as mobile power units. Moreover, several of the small unidentified buildings situated in key areas of the Complex may house generators.

POWER TRANSMISSION LINES

The main power transmission line connects the Main Power Plant under construction at the Support Base with the substation located 17 miles to the north, in the Range Head. In addition, this line also serves the Probable Propellant Production Plant under construction. Poles carrying the main power transmission line to the Range Head are of the A-frame type and support three arms, each of which carries two wires. At the time of photography this line was complete, except in the vicinity of the Probable Propellant Production Plant under construction. In addition to the main transmission line, the Complex is crisscrossed by a relatively dense network of secondary power lines which serve major components.

POWER SUBSTATION

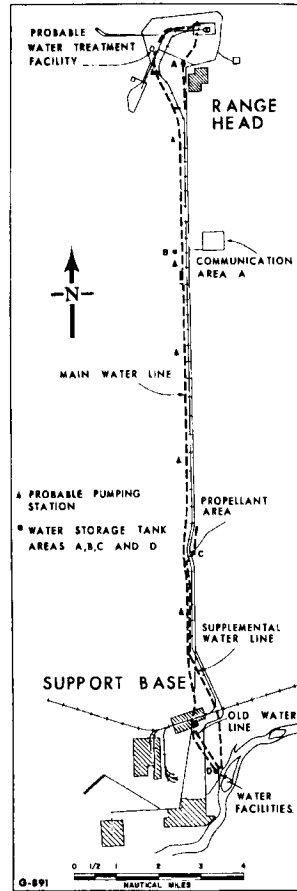
The power substation, situated at the terminus of the main power transmission line to the Range Head, is located 1,500 feet south of the missile checkout and assembly facilities. It consists of a transformer building and a control house.

It is supplied by the main transmission line from the south, and distributes power through aboveground secondary lines and possibly through buried cables (see page 10).

WATER TREATMENT, DISTRIBUTION, AND STORAGE FACILITIES

one of the most unusual features of the Range Head is the huge capacity and diversity of water storage and distribution facilities. This capacity, including a booster pumping station, large-diameter water lines, and Water Storage Tank Area "A", coupled with the water handling and disposal facilities at the base of the launching structure indicate that present or future firing operations will require enormous amounts of water and elaborate disposal or treatment facilities. In addition, the Propellant Production and Storage Area is also characterized by a complex network of water distribution and handling facilities. Finally, the permanence and the size of water treatment facilities under development along the Syr Darya River coupled with the large volume of water available from the river suggest the magnitude of water requirements

At least three major water distribution systems, each consisting of separate treatment facilities, pipelines, pumping stations, and storage tanks, can be identified in the Complex. The three systems are: the Old Water System, which serves the rail station and the village of Tyura Tam; the Main Water System, which provides the primary supply of water to the Range Head; and a large Supplemental Water System, under construction at the time of photography, which will provide treated water to the Probable Propellant Production Plant and the Main Power Plant, both of which were also under construction.



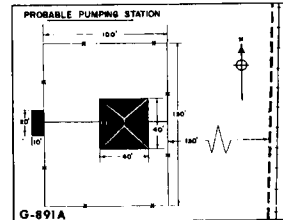
OLD WATER SYSTEM

The Old Water System consists of a short buried line which connects an old probable water treatment facility situated along the Syr Darya River with a water tower adjacent to the railroad classification yard. This water line, which can be traced from a point contiguous to the river, leads through a 40-foot-diameter tank, under river embankment, and terminates at Tyura Tam village. The associated water treatment facility consists of two probable precipitation tanks, each 85 feet in diameter, and several nearby buildings, one of which is a possible pumping station. This system, presumably built to serve the rail line and the old village, probably serves many of the newer sections in the vicinity of Tyura Tam village.

MAIN WATER SYSTEM

The Main Water System for the Complex includes a high-capacity conduit which extends 17 miles north to the Range Head from any of several possible intake points along the Syr Darya River. It is further characterized by at least three large water storage tank areas, seven pumping stations, and several water treatment facilities. This system, probably operational at the time of photography, provides the main supply of water for Launch Area "A", and the normal daily requirements for other Range Head facilities.

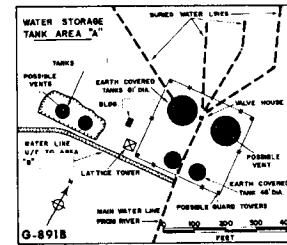
Main Water Line: The main water line which may consist of more than one conduit, parallels the old water line as far as the water tower at Tyura Tam village. It then continues east several hundred feet to a pumping station, veers north under the railroad classification yard, and generally parallels the rail line to the Range Head. The gradient (along the line) to the Range Head is very gentle, and seven probable pumping stations



are situated at intervals varying from 1.5 to 3.5 miles. All the pumping stations are identical and consist of two buildings, one of which is fenced. Though sections of this particular line cannot be measured, the size of the overlying earth scar suggests a diameter from

Water Treatment Facilities: Though the extent or nature of the water treatment facilities for the Main Water System cannot be determined, the numerous unidentified structures and buildings adjacent to the Syr Darya River could easily perform this function. Moreover, it is possible that much of the water pumped to the Range Head for firing operations may receive little, if any, treatment. This supposition is further supported by the possibility that more than one conduit leads to the Range Head and the fact that some lines leading directly from the river have few or no facilities along their length.

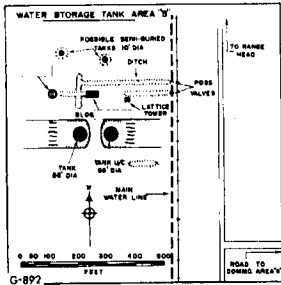
Water Storage Tanks: There are 12 large water storage tanks, grouped in three separate areas, associated with the Main Water System. The largest group, Area "A", is located in the center of the Range Head and provides the primary water supply for Launch Area "A". The second group, Area "B", consists of two tanks along the rail line opposite Communication Area "A". The third group, Area "D", is located along the Syr Darya River and is possibly a source of supply for the Support Base.



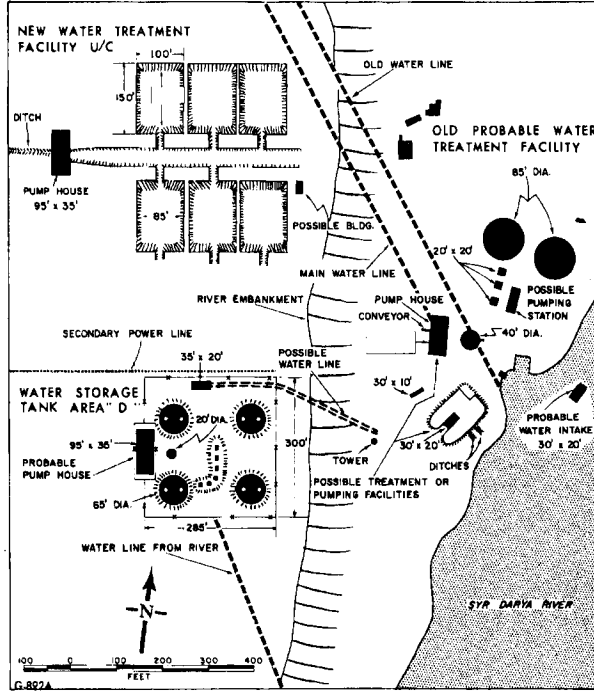
(1) Water Storage Tank Area "A": Water Storage Tank Area "A" consists of four completed earth-covered tanks, two tanks under construction, a probable microwave relay tower, and several other facilities located about 5,600 feet southwest of Launch Area "A". The completed tanks are fenced and are fed by the main water line which brings water northward directly from the Syr Darya River. Two of the tanks are 50 feet in diameter; the other two are 45 feet in

diameter. Depth of the tanks cannot be determined, but assuming that the height is equal to the radius, the completed tanks would hold a total of 3.5 million gallons. For each foot of height, the

gallons; for the 45-foot-diameter tanks the comparable figure would be 11,800 gallons. At a valve house between the two larger tanks, three lines lead northward and terminate at Launch Area "A". A fourth line leads northward from the area and appears to serve the Launch Support Area. Water Storage Tank Area "A" is being expanded by the addition of at least two tanks which were not earth-covered at the time of photography. The new tankage lies just west of the two smaller tanks in the completed area, and is connected to Possible Launch Area "B" by a new water line under construction in a ditch. It is possible that when completed the new tank area will be a mirror image of the completed area and, if so, would double the water storage capacity of the Range Head.



(2) Water Storage Tank Area "B": Water Storage Tank Area "B", under construction at the time of photography, is located along the rail line 2,500 feet west of Communication Area "A". It contains two 55-foot-diameter water storage tanks under construction, two possible semi-buried tanks 10 feet in diameter, a probable microwave relay tower, and several other facilities. Assuming that the height of the tanks is roughly equal to the radius, the total storage capacity of the two 55-foot-diameter tanks would be about one million gallons. These tanks will be fed by the main water line from the Syr Darya River, and when completed



will serve Communication Area "A" and possibly as a reserve for the Range Head. (3) Water Storage Tank Area "D": Water Storage Tank Area "D" is located along the Syr Darya River, approximately 700 feet south of the new water treatment facility under construction at the Support Base. It consists of four earth-mounded storage tanks, each 65 feet in diameter, a small 20-foot-diameter tank, a probable pump house 95 by 35 feet, and several other facilities. The area, which measures 300 by 285 feet, is fenced. It is served primarily by a water line that leads northwest from the river and enters the area from the south. In addition, a possible water line leads west from the river and terminates at a small building 35 by 20 feet inside the fenced area. Power for the area is provided by a secondary line, possibly from the

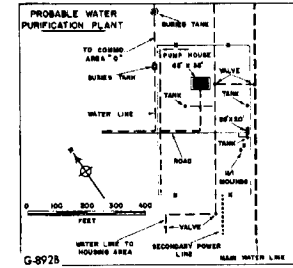
Aralsk/Tashkent grid. The area appears complete, as distinguished from the supplemental water facilities under construction, and probably serves as a storage point for the Support Base. It may also provide water to the Range Head via the main water line.

SUPPLEMENTAL WATER SYSTEM

The Supplemental Water System, under construction at the time of photography, will provide treated water for the Propellant Production and Storage Area and the Main Power Plant, both of which are also under construction. This system consists of a new water treatment facility under construction near the Syr Darya River and two major distribution lines. One line, under construc-

tion at the time of photography and characterized by exposed conduits measuring [redacted] leads from the new water treatment facility to the Main Power Plant (see page 21). The other, apparently complete and probably the more significant, leads from the new water treatment facility five miles northward to the Propellant Production and Storage Area. The width of the overlying earth scar, [redacted] again suggests a large diameter conduit. Within the Propellant Production and Storage Area an open-trench extension of this line, [redacted] across, leads to the Probable Propellant Production Plant under construction. The latter area is characterized by complex water storage, distribution, and disposal facilities. A detailed discussion of these facilities, including Water Storage Tank Area "C", is given on pages 25 and 26.

New Water Treatment Facility Under Construction: The new water treatment facility under construction near the Syr Darya River consists of six filter and/or sedimentation basins, with bottom dimensions [redacted]. A large open ditch, located between the basins, leads to a pump house which measures 95 by 35 feet. This ditch extends to a point near the pump house with the line leading north to the Propellant Production and Storage Area.



Probable Water Purification Plant: A small probable water purification plant, which appears to be structurally complete, is located just northwest of the new water treatment facility under construction near the Syr Darya River. It consists of three small tanks, several small underground pipelines, and a pump house, all within a fenced area. Since one of the lines can be traced to the Administration and Housing Area, it is probable that this facility purifies water for drinking purposes.

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COMMUNICATION FACILITIES

Three separate communication systems appear to serve the Complex. The largest and by far the most important is the radio communication system, which includes numerous facilities grouped in three separate areas. In addition, the Complex is served by a possible microwave relay communication system and by a wire communication system which probably includes a multi-channel carrier circuit.

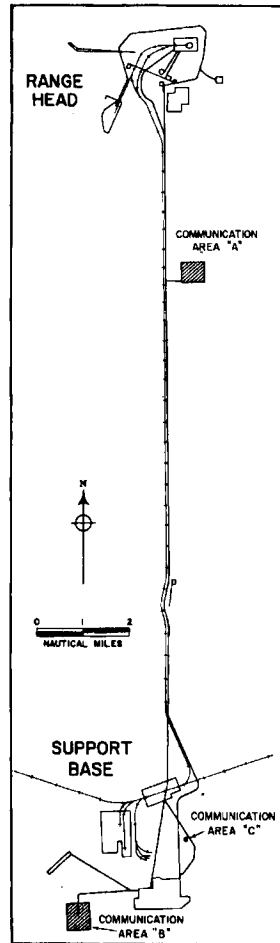
RADIO COMMUNICATION FACILITIES

Three installations, two large and one small, comprise the primary radio communication facilities serving the Complex. The large installations are Communication Area "A", located five miles south of the Range Head, and Communication Area "B", at the Support Base. The small installation, Communication Area "C", is also at the Support Base, near the new water treatment facility under construction. In total, these installations contain 14 completed rhombic antenna arrays, eight probable rhombics under construction, two probable rhombics under construction or abandoned, four two-bay fishbone antenna arrays, and at least 31 additional masts, some of which are lying on the ground. Several of the arrays are oriented in the probable primary direction of fire, while the others appear oriented toward key areas of the Soviet Union. At the time of photography, considerable construction activity was evident at the two large installations. A comparison of [redacted] photography shows that the rate of construction at Communication Area "B" was unusually rapid. For example, 92 new masts, representing 75 percent of the total number in the installation, were erected during that period.

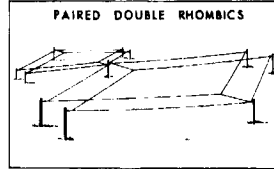
COMMUNICATION AREA "A"

Communication Area "A", located near the Range Head at 45° 50' N/63° 18' E, is a probable transmitting station and contains four completed rhombic antenna arrays, at least eight probable rhombic antenna arrays under construction, two probable rhombics

under construction or abandoned, two linear stick-mast arrays, and four single masts, three of which were still lying on the ground.



The fourteen rhombic arrays are double rhombics, a type designed to reduce side lobes and increase forward gain. In nearly every case, excepting arrays 1 and 4, a larger double rhombic has been paired with a smaller double rhombic and, as a system, probably work alternately to facilitate day and night communications. In addition, rhombic arrays 5-8 comprise two large and two small double rhombics placed side-by-side, which further increases the efficiency of propagation.



The area covers approximately 225 acres and is partly enclosed by a perimeter clearing, possibly a former fence line, measuring 2,970 by 2,680 feet. Photography of

shows construction activity within and outside the perimeter clearing consisting primarily of excavations and foundations for the ten probable rhombic arrays. As noted above, however, two of the arrays, Nos. 13 and 14, are either under construction or have been partially constructed and then abandoned. Moreover, the alignment of array No. 14 overlaps completed array No. 1 and suggests that one or the other probably will be abandoned. Half of the completed rhombics and half of those under construction are oriented in the probable primary direction of fire and are probably used to maintain contact with down range instrumentation facilities.

Communication Area "A" is served by a secondary power line which leads from the power substation in the Range Head. In addition, a buried cable line (the probable wire communication system discussed on page 10) connects this area with key areas of the Range Head.

Numerous buildings, structures, and tents are evident in the area. The most important of these is a probable transmitter building, 85 by 55 feet, situated in the southern part of the area. From this building, several unidentified ground scars radiate to most of the completed antenna arrays.

Considerable activity is evident in the area. Six trucks, probably used in construction work, are located in the southwest part, near the entrance. Several stick masts lying

on the ground and several pieces of unidentified equipment, possibly including an excavating machine, are visible at various points throughout the area. South of the probable transmitter building, just outside the perimeter clearing, earth scars indicate that at least 16 tents have been removed.

Structures: The following is a list of structures identified in Communication Area "A".

- (1) One two-story gable-roofed transmitter building, with dormers, 85 by 55 feet (item a).
- (2) Three probable buried tanks 30 feet in diameter (item b).
- (3) One single-story gable-roofed building, with dormers, 150 by 50 feet (item c).
- (4) One single-story flat-roofed building square (item d).
- (5) One T-shaped bunker; cross 30 by 15 feet, stem 15 feet square (item e).
- (6) One bunker 40 feet square (item f).
- (7) One single-story gable-roofed building square (item g).
- (8) One single-story hip-roofed security building with a wing 15 feet square (item h).
- (9) One single-story flat-roofed building (item i).

Antennas: Communication Area "A" contains the following antennas. Details of rhombic arrays are given in table 2.

- (1) Four completed rhombic antenna arrays, each consisting of six stick masts (items 1-4).
- (2) Eight probable rhombic antenna arrays under construction (items 5-12). Two stick masts, 80 feet long, are lying on the ground at the northwest end of the major axis of array No. 11.
- (3) Two probable rhombic antenna arrays, which are either under construction or have been partially constructed and abandoned (items 13 and 14).
- (4) One linear array of four stick masts 130 feet high and about 225 feet apart (item 15). A perpendicular to the line formed by these masts has an azimuth of [redacted].
- (5) One linear array of seven stick masts 85 feet high and about 180 feet apart (item 16). A perpendicular to the line formed by these masts has an azimuth of [redacted].
- (6) One stick mast [redacted] end of undetermined use (item 17).
- (7) Three stick masts 80 feet long, lying on the ground adjacent to foundations (item 18).

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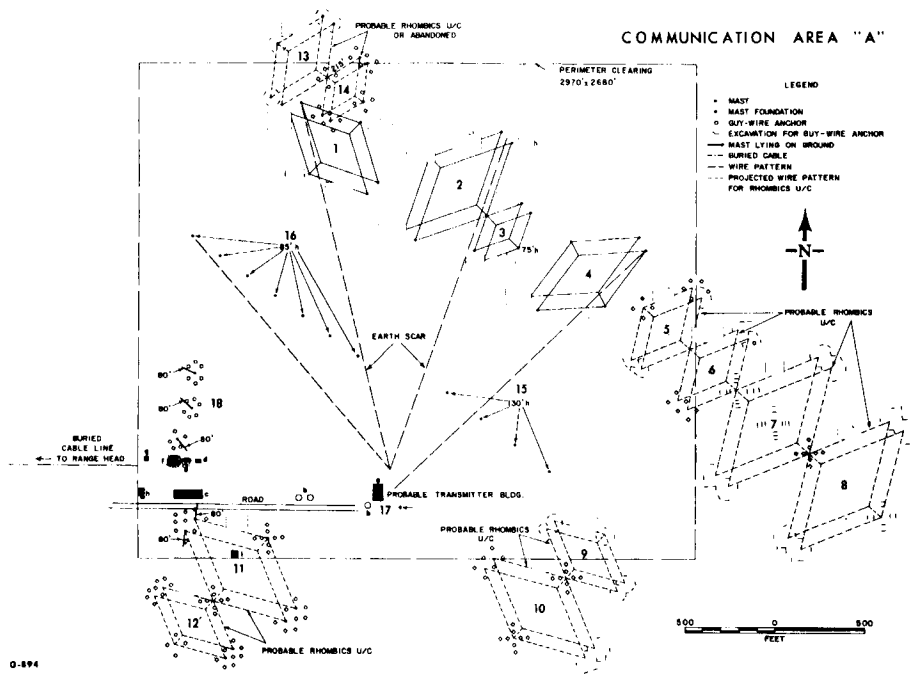
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COMMUNICATION AREA "B"

Communication Area "B", which is fenced and located in the southwest corner of the Support Base at 45°38'N/63°18'E, measures 3,300 by 3,280 feet and contains numerous masts arranged in various arrays, two buildings, one of which is a probable receiver building, and two possible tanks. In addition, an associated probable communication control center for the Complex is located just to the north. As previously noted, Area "B" contains a total of 123 masts arranged in 10 rhombic antenna arrays, four two-bay fishbone-type antenna arrays, two three-mast antenna arrays, one four-mast antenna array, and three single masts. Location of Communication Area "B" at the Support Base, coupled with the fact that it contains receiving-type antennas, indicates that this is primarily a receiving station.

The rapid rate of construction evident at Communication Area "B" in comparative photography of the apparent high priority placed on completion of these key communication facilities within the Complex. For example, on

Communication Area "B" contained one rhombic antenna array (item 7), one two-bay fishbone-type antenna array (item A), six masts of another two-bay fishbone-type antenna array (item B), and one row of three stick masts. By nine rhombic antenna arrays, two fishbone-type antenna arrays, one three-mast antenna array, one four-mast antenna array, and three single masts had been added. In addition, another fishbone-type antenna array (item B), partially complete on the first overflight, was completed by

Although the erection of masts appears to have been completed, the fact that 92 masts were erected in such a short period suggests the probability that not all antennas were operational at the time of overflight.

Communication Area "B" is served by an overhead power line which leads from the main power plant under construction in the Support Base. Although this line apparently is not complete, other power sources, possibly including the Aralok-Tashkent grid, serve the area.

Structures and Antennas: Communication Area "B" contains the following structures and antennas. Details concerning the antennas are given in table 3.

TOP SECRET-

HTA/JR - 4/58

(1) One single-story modified deck-roofed probable receiver building.

Feed lines and unidentified ground scars can be traced from this building to several of the antenna arrays. In addition a possible buried cable line leads northeastward for several thousand feet, where its trace is lost in an area of considerable ground scar near the center of the Support Base.

(2) One single-story gable-roofed possible security building situated near the northern entrance.

(3) Two possible tanks located just southwest of the possible security building.

(4) Ten completed rhombic antenna arrays, each consisting of from four to six stick masts (items 1-10).

(5) Four two-bay fishbone-type antenna arrays, each consisting of 16 stick masts arranged in a 5-3-3-5 pattern (items A-D).

(6) One linear array of three stick masts and 175 feet apart. A perpendicular to the line formed by these masts has an azimuth

(7) One linear array of three stick masts 100 feet high and 175 feet apart. A perpendicular to the line formed by these

masts has an azimuth (item 12).

(8) One linear array of four stick-masts and 175 feet apart. A perpendicular to the line formed by these masts has an azimuth (item 13).

(9) One stick mast (item 14).
(10) Two stick masts and 220 feet apart (item 15).

Probable Communication Control Center: The probable communication control center for the Complex is located approximately 1,200 feet north of Communication Area "B" and is enclosed by a fence that measures 470 by 320 feet. It contains six buildings and several small unidentified structures or objects. An overhead power line connects this installation with Communication Area "B" and the main power plant.

The probable communication control center contains the following buildings and objects.

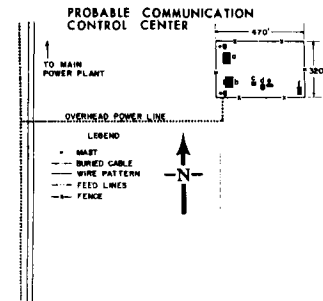
(1) One two-story gable-roofed building (item a).

(2) One single-story gable-roofed building (item b).

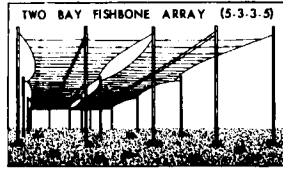
(3) One single-story building 20 feet square (item c).

(4) One single-story building feet (item d).

- (5) One single-story building feet (item e).
(6) One single-story gable-roofed building (item f).
(7) Two circular objects (item g).
(8) Several other small unidentified structures or objects (not shown on graphic).

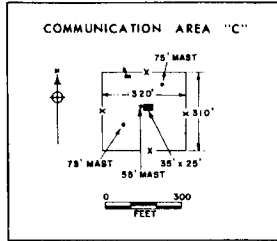


TOP SECRET-



COMMUNICATION AREA "C"

Communication Area "C", also located in the Support Base, consists of three stick masts and two buildings surrounded by a fence measuring 320 by 310 feet. Both buildings



are single story. One has a gable roof and measures 35 by 25 feet; the other is flat-roofed and measures 35 by 25 feet. One of the stick masts is 55 feet high and the

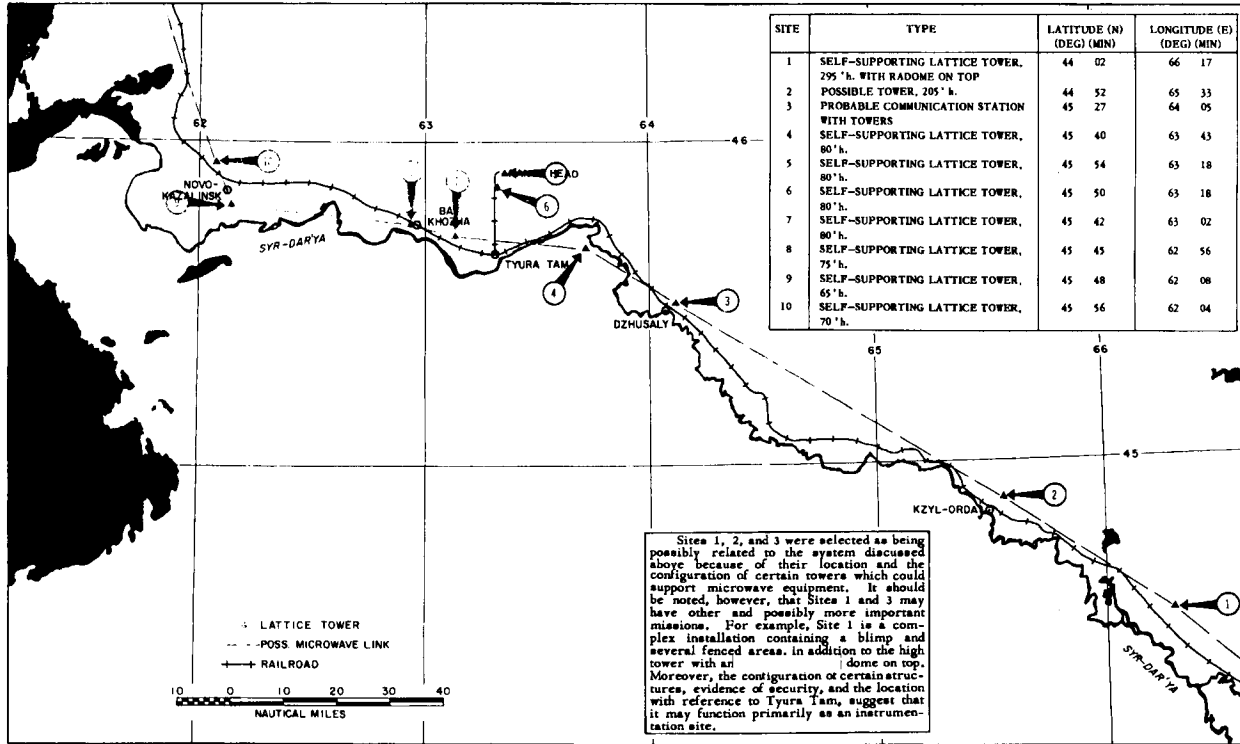
other two are 75 feet high. This area may serve as a local communication facility.

WIRE COMMUNICATION FACILITIES (LAND LINES)

Probable wire communication lines parallel the Araluk/Tashkent railroad. As noted in the discussion of the Support Base on page 22 two lines of poles parallel the railroad and appear to have possible connections with other lines in the Complex. One of these probably carries the reported multichannel carrier circuit as well as normal railroad communications. 4/

POSSIBLE MICROWAVE RELAY COMMUNICATION FACILITIES

A series of self-supporting lattice towers, spaced at intervals of 10 to 50 miles apart along the railroad between Novo Kazalinsk and Kzyl Orda, indicates a possible microwave relay communication system. Other towers within the Complex, such as the tower described at Water Storage Tank "A" and the one at Water Storage Tank Area "B", may function as part of this system. The diagram below shows the areal relationship of those possible microwave relay towers which have been identified in and near the Complex.



TYURA TAM MISSILE TEST RANGE

Guidance and instrumentation* facilities found in the Tyura Tam Missile Test Range represent one of the largest and most sophisticated networks of missile-related electronic activities yet seen on photography. Literally hundreds of items, including masts, associated buildings, and other structures of electronic significance have been identified. Numerous ground patterns, rhombic orientations, and communication lines have been plotted, probable guidance facilities have been identified, and the probable orientation of the Tyura Tam Missile Test Range has been determined. It should be understood, however, that in spite of good quality photography, scale and resolution are factors which seriously limit the capability of identifying many specific items of electronic equipment.

Range instrumentation facilities in the vicinity of Tyura Tam are covered by photography for a distance of approximately 70 miles north and northeast of Launch Area

* The term "instrumentation", as used herein, refers to that equipment primarily involved in systems for the collection of structural and functional data of vehicles in flight.

"A". Moreover, instrumentation facilities in and south of the Range Head are covered by excellent quality photography. In addition, an unidentified ground pattern, possibly related to missile instrumentation is located north of the town of Kayl-Orda in an area 140 miles east of Launch Area "A". Analysis of the location, arrangement, configuration, and geometry of these numerous facilities suggests at least two possible directions of fire from Tyura Tam:

- (1) Probable primary direction of fire to the northeast (40°).
- (2) Possible alternate direction of fire to the east (90°).

The direction of fire toward the northeast (40°) is considered to be the probable primary direction of fire, and therefore the probable alignment of the Tyura Tam Missile Test Range, because the largest down-range instrumentation stations appear to be arranged geometrically with reference to this direction. Moreover, the Instrumentation Control Center, the Interferometer-Type Instrumentation Site, and the probable collimation towers at Launch Area "A" appear to be

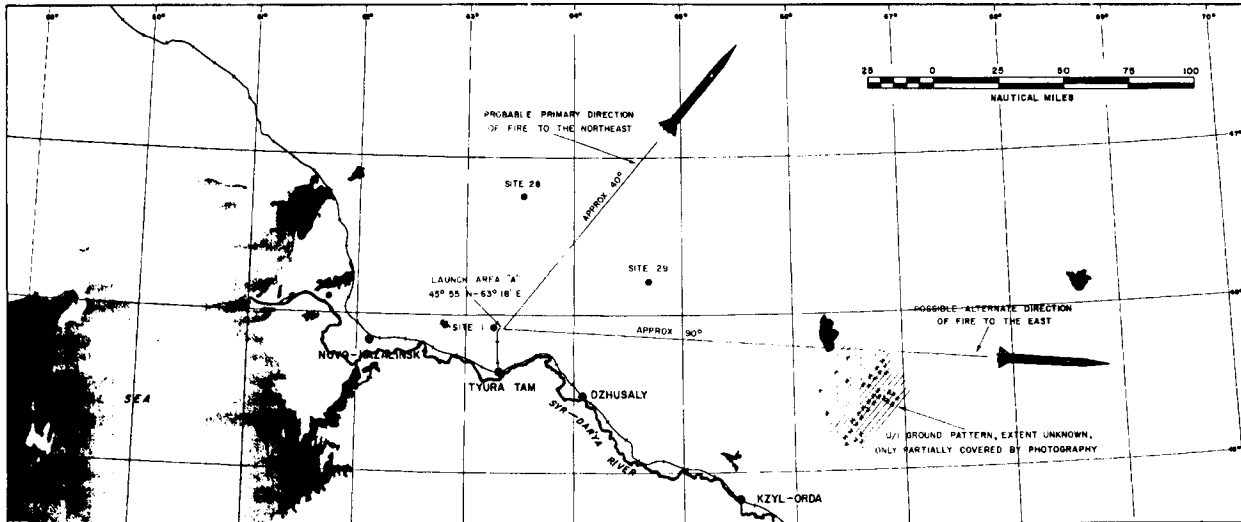
located primarily with reference to this direction of fire. In addition, a projection of a 40° azimuth from Tyura Tam passes through missile instrumentation facilities located on the Kamchatka Peninsula some 3,400 miles to the northeast. These facilities are similar to and in some instances identical to those found at Tyura Tam, and probably constitute a portion of the terminal range instrumentation facilities for the Tyura Tam Missile Test Range. 5/

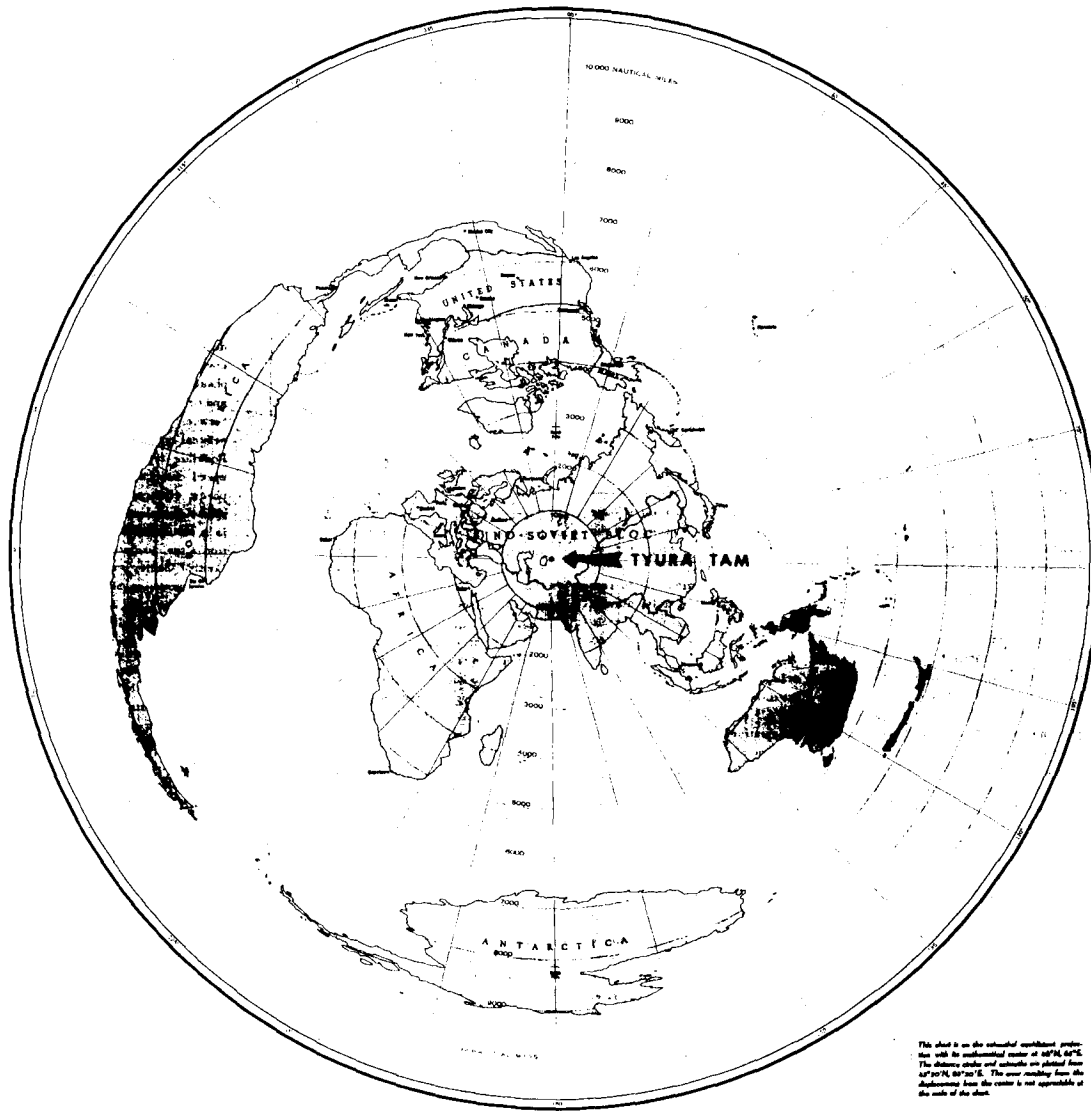
* An extension of the 40-degree azimuth along a great circle path from Tyura Tam would pass through the following geographic reference points at specified intervals of 500 nautical miles.

Distance from Tyura Tam (nm)	Reference Latitude	Reference Longitude
500	52° 00'	72° 00'
1000	57° 15'	83° 13'
1500	61° 12'	97° 37'
2000	63° 15'	115° 00'
2500	62° 54'	133° 02'
3000	60° 27'	150° 06'
3500	56° 10'	164° 00'
4000	50° 42'	174° 34'

The possible alternate direction of fire to the east is indicated by the fact that Launch Area "A" and the rail line which serves it are oriented to the east. In addition, a possible collimation tower and a major instrumentation site appear to be colinear along a west/east line with the servicing tower at Launch Area "A". The large unidentified ground pattern located 140 miles east of Launch Area "A" may also be located with reference to this direction of fire. It is possible that this direction of fire, which would take advantage of earth rotation, may be used in conjunction with the launching of space or satellite vehicles.

The facing map of the world, which has been drawn on an azimuthal equidistant projection, is centered on Tyura Tam and may be used to project the two possible firing directions established on the basis of photography. Moreover, this map may also be used to project other possible directions of fire from Tyura Tam and to determine the range and azimuth of various points on the earth from Tyura Tam. For example, it is apparent that points in continental United States, exclusive of Alaska, are located 4,700 to 6,500 miles from Tyura Tam and lie between the azimuths of





This chart is an isobathal projection projection with its mathematical center at 88°N, 60°E. The distance scale and contours are plotted from 88°00'N, 60°00'E. The area outside from the equator to the center is not applicable at the scale of this chart.

GUIDANCE AND INSTRUMENTATION FACILITIES

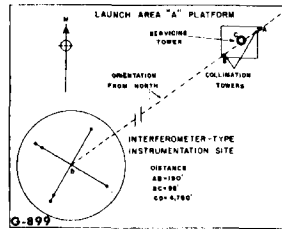
GUIDANCE FACILITIES

Photography reveals that the Soviets are possibly using an inertial-type guidance system at Launch Area "A", and that they also possibly employ a radio-command guidance system, with facilities in the Range Head and immediate down range area. Positive identification, however, of specific components or sites associated with either system is difficult because of the limitations of the photography. Since external features associated with an all-inertial guidance system would be few and relatively inconspicuous, and since a radio-command guidance system used as a missile test range would probably employ fixed rather than mobile installations, it is difficult on photography of this scale to distinguish between such facilities and conventional range instrumentation sites. It is possible only to describe in detail certain installations that indicate with varying degrees of certainty the existence of the two guidance systems.

Evidence of an Inertial Guidance System:
The two probable collimation towers on the launching platform indicate that an inertial-type guidance system is possibly used at Launch Area "A". Whether it is an all-inertial-type or is radio assisted cannot be determined from the photography.

The two probable collimation towers (page 13) located at the northeast and southwest corners of the launching platform, are 110 feet high, with an array on top which measures at least five feet wide and 10 feet high. The height of these towers, which may indicate the height of an inertial guidance component within an erect missile, suggests a single or multistage vehicle of considerable length. Each tower is positioned approximately 95 feet from the center of the servicing tower. The mounting of the northeast tower is of note because of the lip which is constructed out over the pit so as to establish a precise linear relationship between the servicing tower and the probable collimation towers. The orientation of these two probable collimation towers is colinear with the servicing tower and the Interferometer-Type Instrumentation Site located 4,780 feet south-

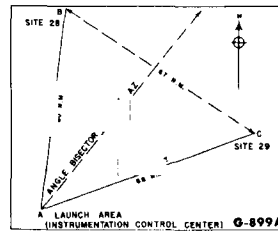
west of the launching platform. This orientation is on an azimuth of _____ which is consistent with the probable primary direction of fire toward the northeast.



A possible third collimation tower (page 14, item 1) is located 400 feet west of the servicing tower. It is 60 feet high and has an object on top which might be an array measuring about five feet wide and 10 feet high. This tower is approximately colinear with the launching platform and an electronic installation (page 37, item 1) located 13,950 feet west of the launching platform. This west/east relationship of facilities, coupled with the approximately west/east alignment of Launch Area "A" and the rail line leading to the launching platform, suggests a possible alternate direction of fire to the east.

Evidence of a Radio Guidance System:
As has already been pointed out, a radio guidance system would probably employ fixed installations which could consist of three separate radars positioned on long baselines. In this regard, an examination of electronic facilities at the Range Head and in the immediate down range area reveals three sites which might include components of a fixed guidance system. One such site containing a radar could be located within the Instrumentation Control Center in the Range Head, while the other two radars could be positioned at two large instrumentation sites in the down range area. One of the latter possibilities is Site 28 (page 40), located about 60 miles north of the Instrumentation Control Center, and the other is Site 29, located 68 miles east-northeast of the Instrumentation Control Center.

If missiles fired from Launch Area "A" utilized a radio guidance system employing radars situated at these three suggested points, the approximate direction of fire probably would be along the bisector of angle BAC, which has an azimuth of _____ along the probable primary direction of fire.



INSTRUMENTATION FACILITIES

Instrumentation facilities comprising the Tyura Tam Missile Test Range can be grouped in three major categories: range head, down range, and probable terminal range facilities. Range head facilities are those located within five miles of Launch Area "A" and consist of an Instrumentation Control Center, an Interferometer-Type Instrumentation Site, and at least 13 other instrumentation sites. Down range facilities are covered by photography up to 70 miles from the Range Head and, including an area south of the Range Head, can be grouped in approximately 30 instrumentation sites. Probable terminal range instrumentation facilities have been identified in the Uka/Yelovka area of the Kamchatka Peninsula some 3,400 miles to the northeast. These missile instrumentation facilities are found at five isolated installations whose configuration and position suggest a relationship with Tyura Tam.

Because of difficulties inherent in any attempt to identify and interpret instrumentation sites or equipment on photography of this scale, the description and analysis presented herein are based on assumptions concerning the types of instrumentation which should be expected at an installation of this type. The method used is to attempt to correlate the location, orientation, and general pattern of possible instrumentation sites imaged on the photography with those expected. This analysis is complicated by the fact that some of the sites may also be used in conjunction with the Kapustin Yar Missile Test Range.

RANGE HEAD INSTRUMENTATION

At least 15 instrumentation sites, including the Instrumentation Control Center and the Interferometer-Type Instrumentation Site, are located within the Range Head. The pattern and arrangement of these sites is consistent with that of an instrumentation layout designed to provide both optical and electronic coverage of the launching and powered flight phases of a missile firing. The size, shape, and orientation of facilities vary considerably between sites, indicating that there are several types of instrumentation in the area. Possible types of equipment include high-speed cameras covering the powered flight phase, electronic velocity measurement devices, and telemetry receivers. The following is a tabulation of the range head instrumentation sites, exclusive of the Instrumentation Control Center and the Interferometer-Type Instrumentation Site which are discussed in detail after the tabulation. Numbers used to identify the following items correspond to the numbered insets on the facing graphic.

- (1) Major instrumentation site consisting of two buildings, one bunker, three 30-foot masts, and several unidentified objects. This site, which is located 15,050 feet west of the launching platform, appears to be colinear with the servicing tower and the probable collimation tower (page 14, item 1) in Launch Area "A". Buried cable lines, appear to connect this site with other key areas of the Range Head.
- (2) Six camera stations located within 450 feet of the launching platform (see also pages 12 and 14).
- (3) Instrumentation site consisting of one pit, two mounds, and three unidentified objects.
- (4) Instrumentation site consisting of one circular object | two mounds, and one unidentified object |
- (5) Possible instrumentation site consisting of one possible building | feet, and two unidentified objects 5 feet in diameter. Buried cable lines appear

to connect this site with facilities near the center of the Range Head.

(6) Possible mast with counterpoise.

(7) Instrumentation site consisting of one large mound and three unidentified objects which are probably instruments.

(8) Instrumentation site consisting of one probable building and three unidentified objects.

(9) Instrumentation site consisting of one object, possibly a van.

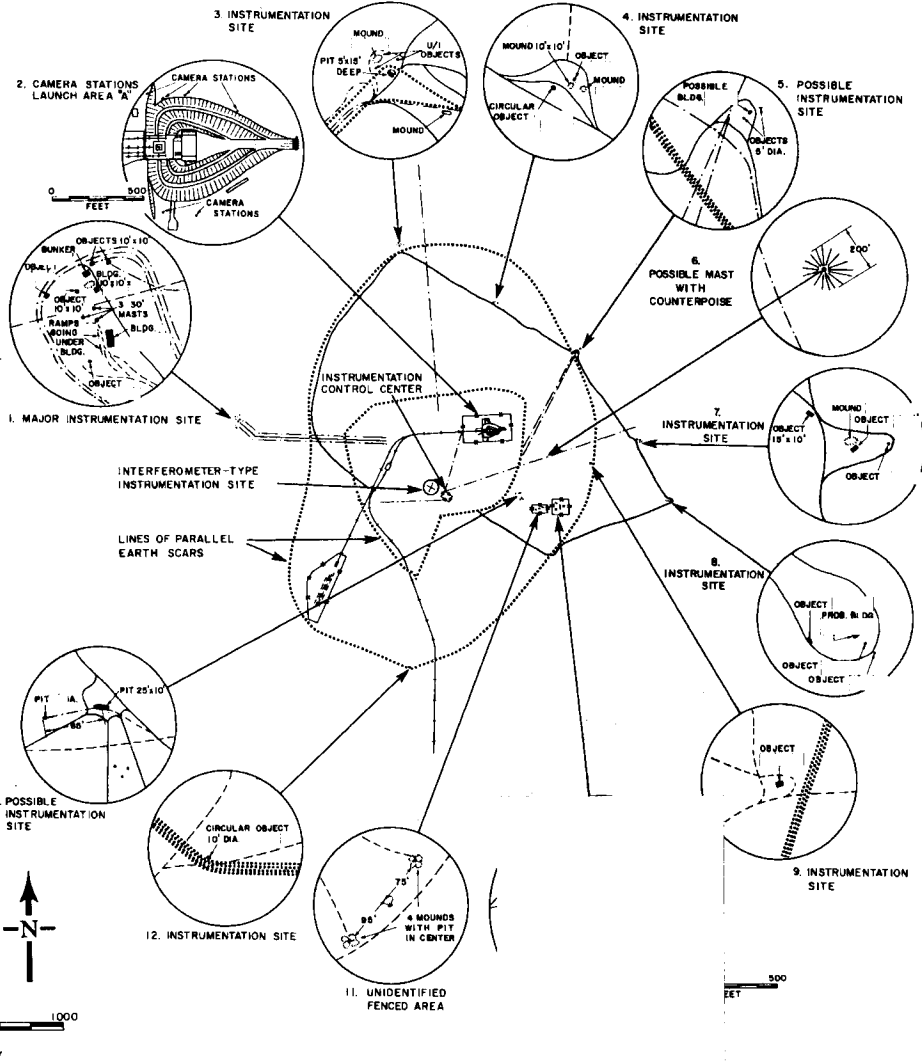
(10) Unidentified fenced installation characterized by construction activity, several unidentified structures, and at least three large possible semiburied bunkers under construction. A linear relationship appears to exist between this installation and the Interferometer-Type Instrumentation Site.

(11) Unidentified fenced area containing possible instrument positions which are apparently in a straight line. A perpendicular bisector of this line appears to intersect the launching platform.

(12) Instrumentation site consisting of one circular-shaped object, which is a possible instrument 10 feet in diameter.

(13) Possible instrumentation site characterized by two pits which are possible instrument positions.

Unidentified lines of parallel earth scars appear to enclose the Range Head (see facing graphic) and pass near several of the sites described above (Sites 3, 5, 9, and 12). Although the purpose of these earth scars cannot be determined, they possibly serve one or both of the following missions: (1) a perimeter net of cable lines carrying power and/or communications, or (2) a perimeter patrol or access road.



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INSTRUMENTATION CONTROL CENTER

The Instrumentation Control Center, located approximately 4,680 feet southwest of the launching platform, consists of five major buildings, one probable bunker, several instruments, and miscellaneous objects, all within a fenced rectangular area measuring 1000 feet by 1000 feet. Cables connect this installation with the nearby Interferometer-Type Instrumentation Site, as well as with Launch Area "A", down range instrumentation sites, a point near the power substation, and the Vehicle Park. A description of the more important components in the Instrumentation Control Center follows:

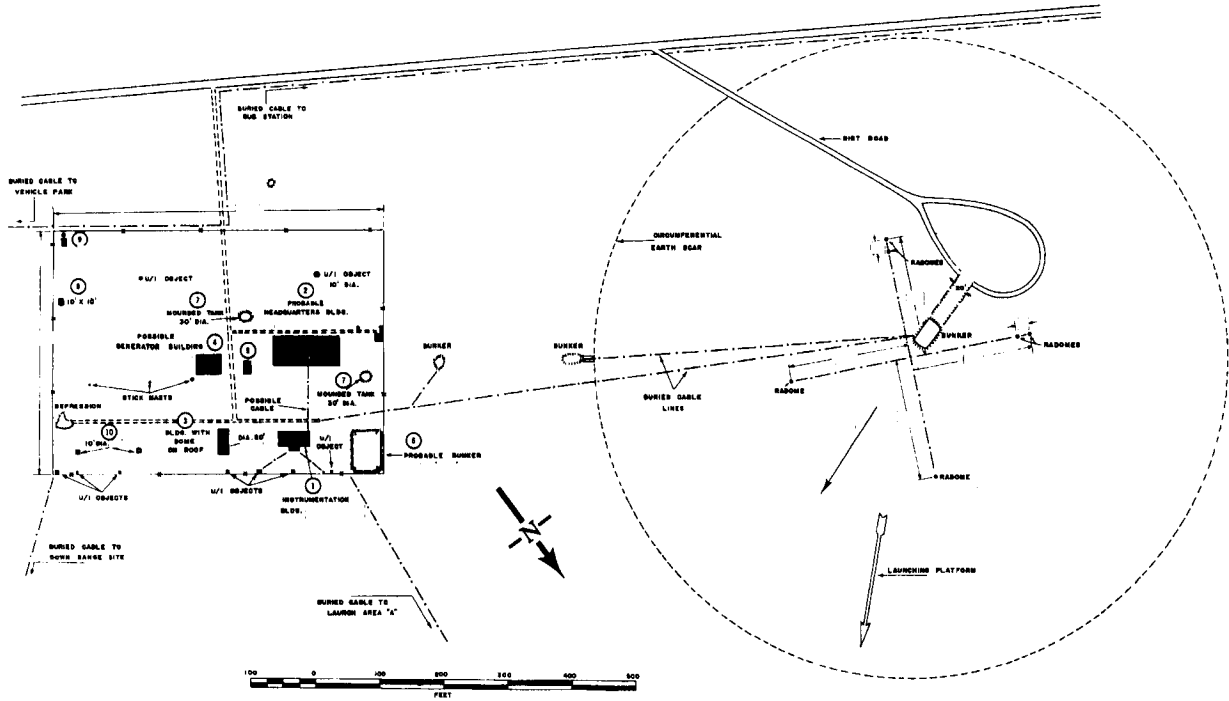
- (1) One large, flat-roofed, T-shaped

instrumentation building oriented toward the launching platform. This building, which measures 100 feet high, has a raised center wing. The center wing has a flat observation-type roof surrounded by a narrow wall. On the roof are several probable instruments. Cables appear to connect this building with the probable headquarters building, the Interferometer-Type Instrumentation Site, and Launch Area "A". In addition, two other cables lead downward from the top of the center wing and intersect the ground near the fence line.

- (2) One gable-roofed probable headquarters building, 20 feet high.
- (3) One building, 20 feet high. A dome, 20 feet in diameter and above ground level, is emplaced on the roof on the end facing the launching platform. This dome may be either a radome or a protective cover for a tracking telescope.
- (4) One flat-roofed possible generator building, 10 feet high.
- (5) One building, probably flat-roofed, 10 feet high.

- (6) One building, 10 feet square, located in the south corner of the fenced enclosure. A possible instrument is adjacent to the building.
- (7) Two probable mounded tanks, 30 feet in diameter.
- (8) One building, 10 feet square.
- (9) One probable building, located in the south corner of the fenced enclosure. A possible instrument is adjacent to the building.
- (10) Two cylindrical-shaped raised structures 10 feet in diameter and 10 feet high. These structures are located adjacent to the fence facing Launch Area "A" and probably contain instruments.
- (11) Several unidentified objects, structures, and masts.

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INTERFEROMETER-TYPE INSTRUMENTATION SITE

The Interferometer-Type Instrumentation Site, located 1,140 feet west-northwest of the Instrumentation Control Center, contains six radomes positioned in a "plus" configuration within a cleared circular area in diameter. The cleared area is surrounded by a circumferential earth scar varying between a trench and a mound, and possibly formed when the area within was graded to make what appears to be a level earth platform. The function of the trench/mound may be to restrict vehicle traffic across the graded area.

The radomes are approximately feet in diameter and are connected by buried cables. One radome is located at the end

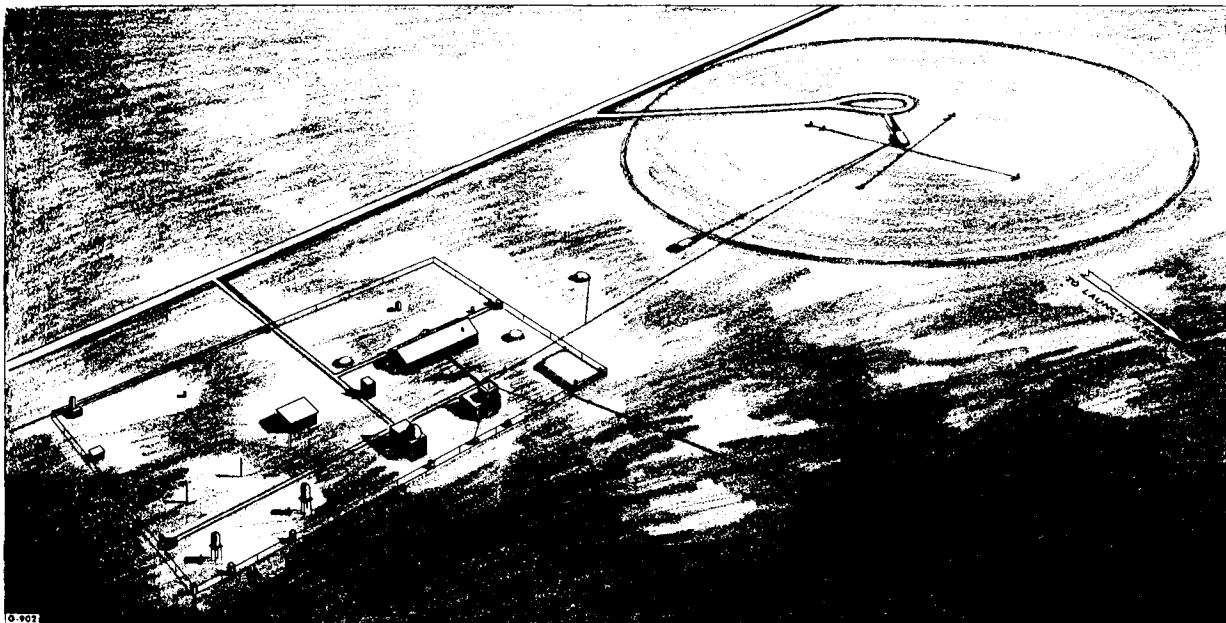
of each of the four legs of the "plus" configuration, at a point from the center. In addition, there is another radome located approximately in from the ends of the northwest and southwest legs. A line bisecting the angle formed by the two legs with only one radome at the end extends along an azimuth of and a line projected from the center of the "plus" configuration through the center of the launching platform has an azimuth of. Whereas the former azimuth has no apparent significance, the latter is consistent with the probable primary direction of fire to the northeast.

This site is probably an instrumentation rather than a guidance facility for the following reasons:

- (1) The baseline distance of between the radomes is probably too short for a large ballistic missile guidance
- (2) No special security measures are evident. If this were a guidance facility, and therefore a critical component of a missile system, elaborate provisions for security might be expected.
- (3) The azimuth of the bisector of the

angle formed by the two legs with single radomes at the ends does not appear to have any relationship to the probable primary direction of fire (40°). It is possible, therefore, that this interferometer-type instrumentation facility is used primarily to provide trajectory data and flight safety information and is oriented so as to optimize resolution with respect to a "cone of safety" rather than along the direction of fire.

(4) Finally, one and possibly two nearly identical configurations, probably terminal range instrumentation facilities for the Tyura Tam Missile Test Range, have been identified on the Kamchatka Peninsula. Moreover, the fact that no missile launching sites are evident in the vicinity of these Kamchatka facilities, coupled with the fact that their location and configuration suggest a relationship with the Tyura Tam Missile Test Range, indicates that they are instrumentation facilities.



DOWN RANGE INSTRUMENTATION

Approximately 30 instrumentation sites have been identified in the down range area and in the area south of the Range Head*. An

intricate network of buried cable lines, roads, and trails leads between these sites and connects with key areas of the Range Head.

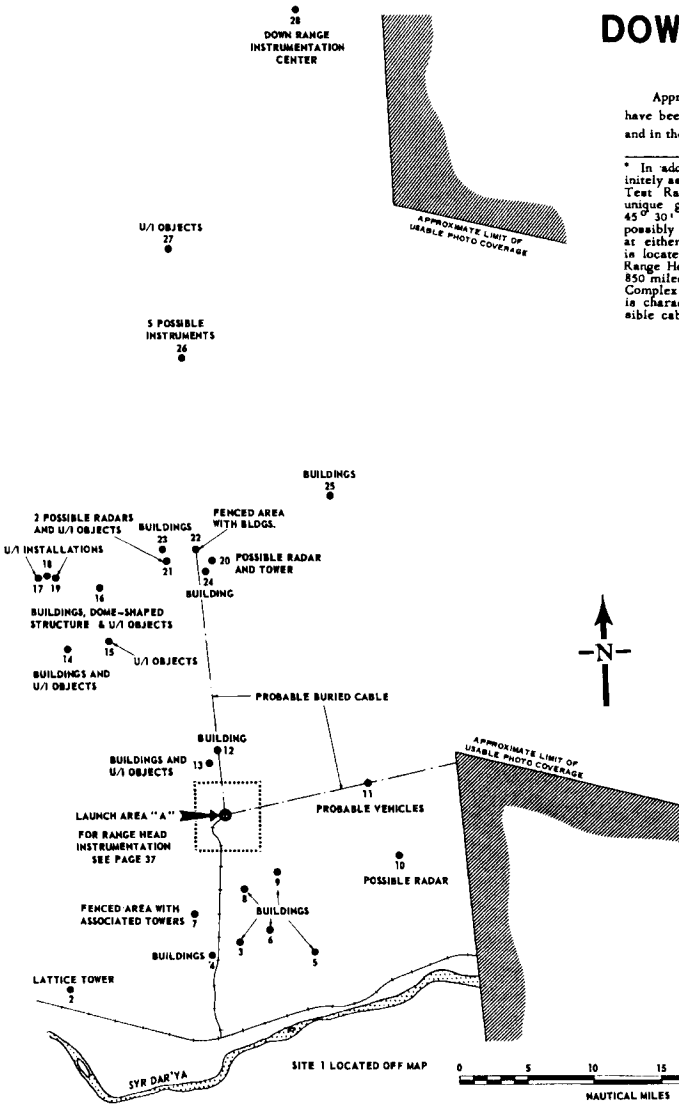
* In addition to down range facilities definitely associated with the Tyura Tam Missile Test Range, there is an unidentified and unique ground pattern in the vicinity of 45° 10' N/66° 40' E (page 34) which is possibly related to missile testing activities at either Tyura Tam or Kapustin Yar. It is located 140 miles east of the Tyura Tam Range Head on an azimuth of 95°, and 850 miles east of the Kapustin Yar Launching Complex on an azimuth of 95°. The pattern is characterized by at least 17 rows of possible cable scars arranged in parallel lines.

approximately two miles apart. At intervals of 2.25 miles, ground scars forming "plus" configurations are located along each of the possible cable scars. The angular relationship between the "plus" configurations and the possible cable scars is a constant.

Each leg of the "plus" configurations measures approximately 1,750 feet. No associated buildings or objects are evident in this desert area. A detailed description of this ground pattern is given in HTA/JM-19-58.

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SITE NO.	DISTANCE*		LATITUDE (N) (DEG) (MIN)	LONGITUDE (E) (DEG) (MIN)
	N. MILES	METERS		
1	25.7	47,600	45 29	63 15
2	17.3	32,008	45 42	63 02
3	9.6	17,749	45 45	63 19
4	10.6	19,630	45 44	63 16
5	12.1	22,407	45 45	63 27
6	9.2	17,108	45 46	63 23
7	8.1	15,002	45 47	63 14
8	5.9	10,867	45 49	63 20
9	5.7	10,524	45 51	63 23
10	13.1	24,195	45 52	63 36
11	10.7	19,854	45 57	63 33
12	4.8	8,908	46 00	63 17
13	3.9	7,248	45 59	63 16
14	17.0	31,452	46 07	63 01
15	15.5	28,763	46 08	63 05
16	19.2	35,552	46 12	63 05
17	22.5	41,202	46 12	62 58
18	22.2	40,840	46 13	62 59
19	21.9	40,524	46 12	63 00
20	18.9	35,024	46 14	63 16
21	19.4	36,010	46 14	63 12
22	19.7	36,551	46 15	63 15
23	20.4	37,760	46 15	63 11
24	18.2	33,618	46 13	63 16
25	25.0	46,497	46 19	63 29
26	34.3	63,601	46 29	63 13
27	42.3	78,426	46 37	63 12
28	60.3	111,749	46 55	63 25
29	67.9	125,805	46 20	64 48
30	68.0	125,954	46 20	64 48

* DISTANCES AND AZIMUTHS ARE COMPUTED FROM LAUNCH AREA "A"

25X1

Sites 1 through 9 are located south of the Range Head, and for discussion purposes are included in this section. Sites 10, 11, 29, and 30 are located east and east-northeast of the Range Head. The remainder, Sites 12 through 28, are located north and northwest of Launch Area "A". The two largest and apparently most significant, Sites 28 and 29, are probably major down range instrumentation centers. They are nearly equal in size and appear to be geometrically located with reference to the probable primary direction of fire to the northeast. It has already been pointed out that a line bisecting the angle formed by the Instrumentation Control Center and Sites 28 and 29 is oriented on an azimuth of [redacted] and indicates the probable direction of the Missile Test Range. Sites 28 and 29 are discussed in the guidance section, page 36, as possible components of a long-baseline radio-command guidance system. If these sites were major components of a triangular guidance system some similarity in structures should be expected, but none is apparent. It is believed, therefore, that they are primarily or exclusively instrumentation sites. Moreover, they are large enough to accommodate a wide variety of instrumentation equipment, and to house and support operating personnel. Their location is appropriate for telemetry, radio, and optical instrumentation for large ballistic missiles fired from Launch Area "A".

The following is a tabulation of the smaller instrumentation sites located down range and south of the Range Head. The two large ones, Sites 28 and 29, coupled with an unusual pattern of earth scars, Site 30, are considered to be the most important down range facilities and are discussed in detail following the tabulation. Item numbers below correspond to site numbers on the facing graphic.

- (1) Three probable buildings and three unidentified objects, located 25.7 miles south of the launching platform (not shown on facing graphic).
- (2) Lattice tower, 85 feet high.
- (3) One small building.
- (4) Two small buildings.
- (5) Two small probable buildings.
- (6) One small building.
- (7) Irregularly-shaped fenced area enclosing one small building and one small unidentified object. Approximately 2,550 feet south of this site is an area containing a lattice tower and two possible observation towers.

- (8) Two small buildings, 1,800 feet apart.
- (9) One small building.
- (10) One possible radar and three small unidentified objects.
- (11) Two probable vehicles located along a cable line extending from the Instrumentation Control Center. Although the terminus of this line is not covered by photography, it is possibly similar to Site 22.
- (12) One small building.
- (13) Three small buildings and two small unidentified objects.
- (14) Four possible buildings, two small unidentified objects, and one small cross-shaped unidentified object.
- (15) Three unidentified objects.
- (16) Two large buildings, three probable smaller buildings, one dome-shaped structure, and two small unidentified objects.
- (17) Installation containing four probable buildings.
- (18) Installation containing three probable buildings.
- (19) Installation containing three probable buildings.
- (20) A possible radar and associated tower, along with one small building, a small earth mound, and two small unidentified objects.
- (21) Two possible radars, a small building, and two small unidentified objects.
- (22) A fenced area, probably one of the more significant instrumentation sites. It measures 435 by 325 feet and encloses one [redacted] building with a possible antenna on the roof, [redacted] foot building, one earth-covered bunker approximately 35 by 30 feet, three vehicles, and two unidentified objects. A probable instrument is located 435 feet northwest of the enclosure. A buried cable line connects the fenced area with the Instrumentation Control Center in the Range Head. It should be noted that a similar buried cable line leads by the probable vehicles at Site 11, and a bisector of the angle formed by these two cable lines approximates the probable primary direction of fire to the northeast.
- (23) At least six small probable buildings.
- (24) One small building.
- (25) Four small buildings.
- (26) Five possible instruments, each possibly with associated generators, and numerous vehicles.
- (27) Five small unidentified objects.

SITE 28

A major down range instrumentation center is located approximately 60 miles north of Launch Area "A". It is situated within a fenced enclosure which measures [redacted] and contains 17 buildings of various sizes. The most significant structures within the enclosure are two domes (items 20 and 21), which are placed either on the roofs of buildings or on structural supports. The height of these domes, including the buildings or supports, is 60 feet. In addition, another structure with a possible dome on the roof (item 4) is situated in the northern section of the fenced enclosure. The enclosure also contains several unidentified objects which are probably instruments.

Located about 1,000 feet north of the center, at the terminus of a short dirt road, is an associated instrumentation station consisting of a building (item 25) with a possible dome on the roof. Adjacent to it are four probable instruments which are apparently arranged in a semicircle. More than 2,000 feet north-northwest of the center are two isolated instruments (not shown on graphic), each at the terminus of a dirt road. A natural surface landing strip, which is situated several hundred feet east of the center, measures approximately 740 by 100 feet.

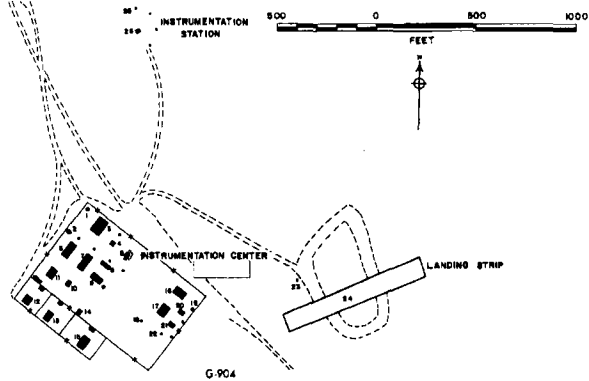
The following is a tabulation of structures found at Site 28. Item numbers correspond to those on the accompanying graphic.

- (1) Unidentified object.
- (2) Unidentified object.

- (3) Gable-roofed building, [redacted] 25X1
- (4) Probable building, [redacted] 25X1
- with possible dome on roof. 25X1
- (5) Gable-roofed reverted building, [redacted] 25X1
- (6) Gable-roofed building, [redacted] 25X1
- (7) Gable-roofed building, [redacted] 25X1
- (8) Shed-roofed building, [redacted] 25X1
- (9) Gable-roofed building, [redacted] 25X1
- with mast on roof. 25X1
- (10) Building or bunker, [redacted] 25X1
- (11) Gable-roofed building, [redacted] 25X1
- (12) Gable-roofed building, [redacted] 25X1
- (13) Gable-roofed building, [redacted] 25X1
- (14) Gable-roofed building, [redacted] 25X1
- (15) Gable-roofed building, 40 by 30 feet and [redacted] 25X1
- (16) Shed-roofed building, [redacted] 25X1
- (17) Gable-roofed building, [redacted] 25X1
- (18) Mast, [redacted] 25X1
- (19) Unidentified object. 25X1
- (20) Building with dome on roof, total height 60 feet. 25X1
- (21) Building with dome on roof, total height 60 feet. 25X1
- (22) Instrument, 15 feet in diameter. 25X1
- (23) Possible instrumentation for range or airfield. 25X1
- (24) Landing strip, approximately 740 by 100 feet. 25X1
- (25) Building with possible dome on roof. 25X1
- (26) Probable instruments. 25X1

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SITES 29 AND 30

Sites 29 and 30, less than a mile apart, are situated approximately 68 miles east-northeast of Launch Area "A". Site 29 consists of two fenced enclosures and several unfenced buildings with associated instruments. Site 30 consists of several linear earth scars, two of which form an X-like configuration. A network of roads and trails connects the two sites.

The larger of the two enclosures at Site 29 measures feet over-all . It contains several buildings, one building or bunker, and a number of unidentified objects. The smaller enclosure, which measures feet over-all , has seven unidentified objects.

Outside the fenced enclosures, and grouped together, are two identical buildings or possible dome-covered instruments and three possible instruments, meter.

Site 30 is situated 2,800 feet south-south-east of Site 29. It is possible only to determine that the pattern of earth scars evident at Site 30 consists primarily of two X-shaped legs, at the ends of which there are very small cleared areas. The west-north-west/east-southeast leg measures 45 feet, and the west-southwest/east-northeast leg measures feet . The west-southwest/east-northeast leg of the configuration has an azimuth of $70^\circ/250^\circ$. This azimuth compares favorably with the azimuth of the Interferometer-Type Instrumentation Site in the Range Head (page 38). Other less prominent earth scars are also evident in the area.

Eighteen hundred feet northeast of the X-like configuration, and approximately in line with the orientation of the west-southwest/east-northeast leg, are two possible vehicles with instruments and five unidentified objects, two of which measure square (not shown on graphic).

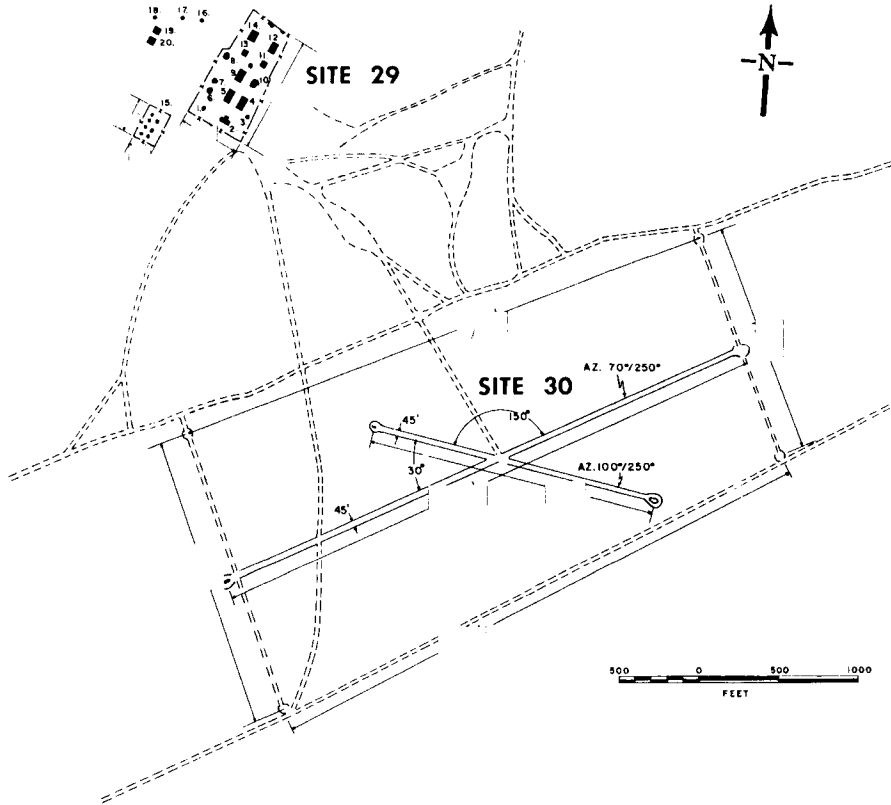
The following is a tabulation of structures found at Site 29. Item numbers correspond to those on the accompanying graphic.

- (1) Unidentified object,
- (2) Building or bunker,
- (3) Unidentified object,
- (4) Gable-roofed building and 20 feet high.
- (5) Gable-roofed building and 20 feet high.
- (6) Unidentified object,

- (7) Unidentified object,
- (8) Unidentified object,
- (9) Gable-roofed building,
- (10) Unidentified object, and 15 feet high.
- (11) Building,
- (12) Building,
- (13) Building,

- (14) Building,
- (15) Seven unidentified objects, inside the smaller fenced enclosure.
- (16) Possible instrument, meter.
- (17) Possible instrument, meter.

- (18) Possible instrument, meter.
- (19) Building or possible dome,
- (20) Building or possible dome,



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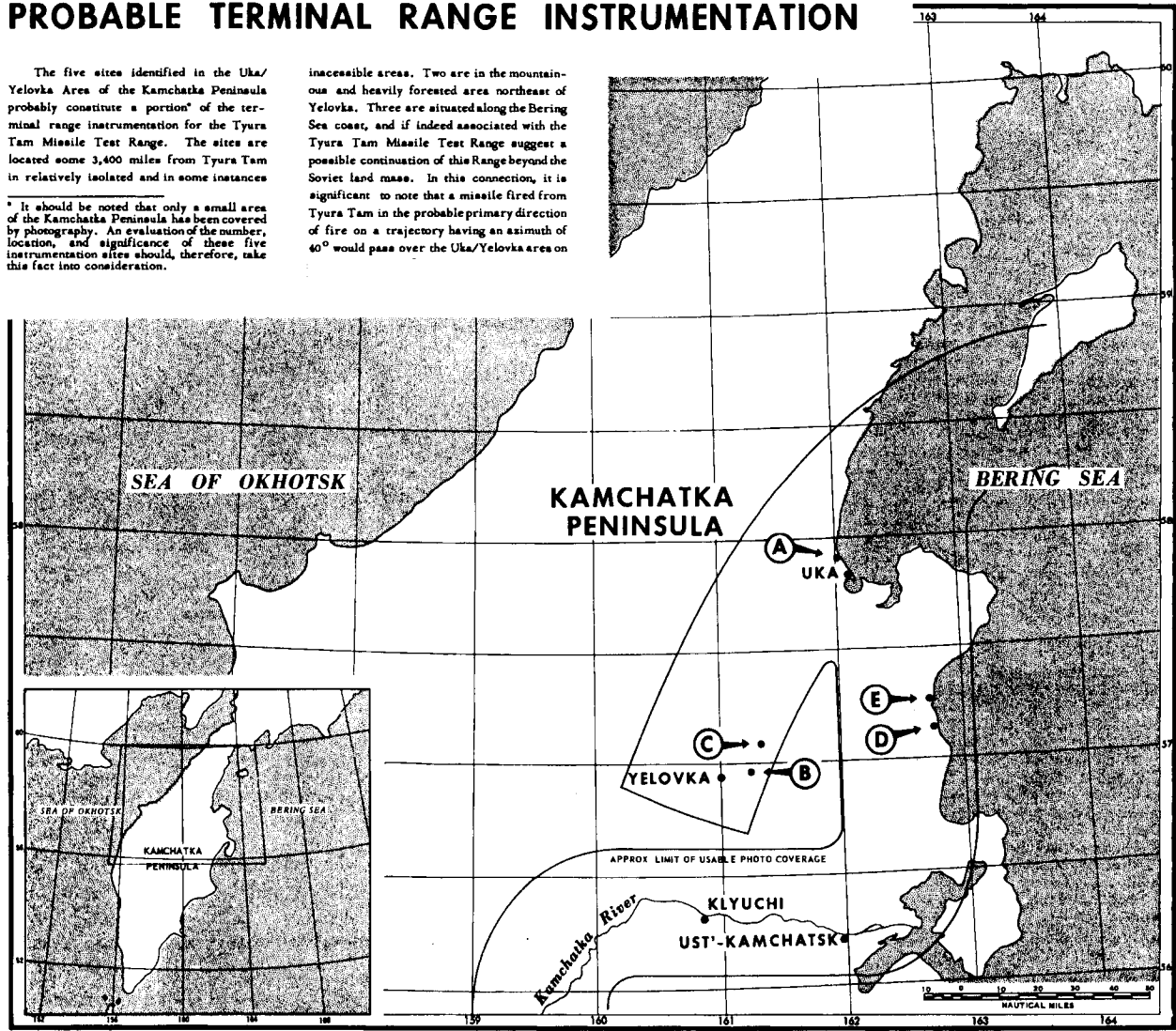
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PROBABLE TERMINAL RANGE INSTRUMENTATION

The five sites identified in the Uka/Yelovka Area of the Kamchatka Peninsula probably constitute a portion* of the terminal range instrumentation for the Tyura Tam Missile Test Range. The sites are located some 3,400 miles from Tyura Tam in relatively isolated and in some instances

* It should be noted that only a small area of the Kamchatka Peninsula has been covered by photography. An evaluation of the number, location, and significance of these five instrumentation sites should, therefore, take this fact into consideration.

inaccessible areas. Two are in the mountainous and heavily forested area northeast of Yelovka. Three are situated along the Bering Sea coast, and if indeed associated with the Tyura Tam Missile Test Range suggest a possible continuation of this Range beyond the Soviet land mass. In this connection, it is significant to note that a missile fired from Tyura Tam in the probable primary direction of fire on a trajectory having an azimuth of 40° would pass over the Uka/Yelovka area on



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INSTRUMENTATION SITE 'A'

Instrumentation Site "A" is located at 57°51' N/162°05' E, on the coast of the Bering Sea eight miles northwest of Uka. It consists of an interferometer-type instrumentation site, a fenced instrumentation and support area, and a small fenced communication area.

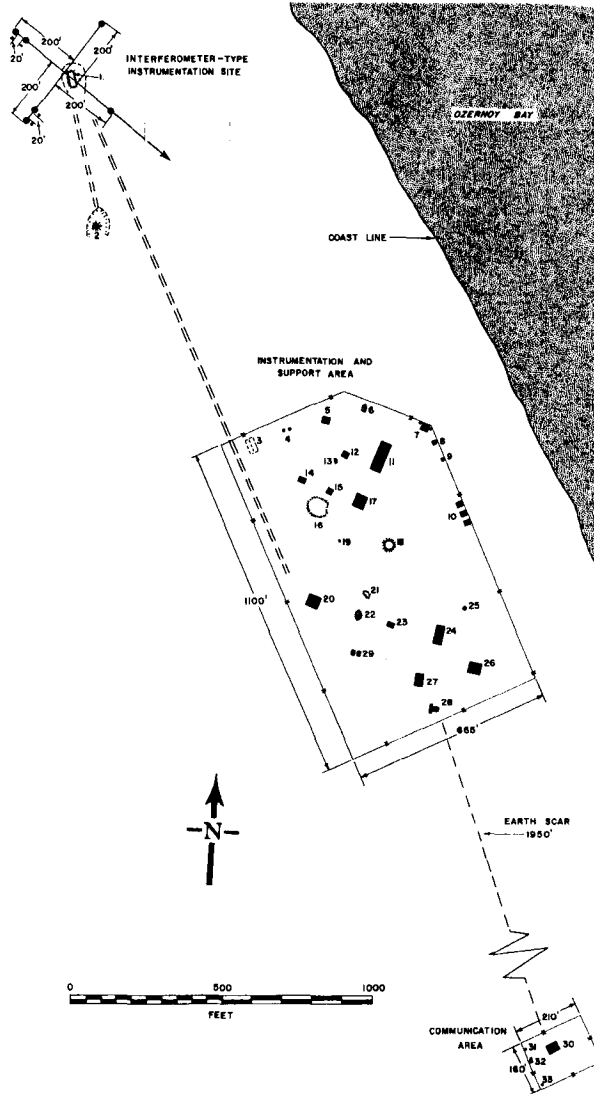
The interferometer-type instrumentation site is almost identical with the "plus" configuration in the Range Head. It has six similarly-positioned radomes, each approximately 200 feet in diameter, and two bunkers under construction (items 1 and 2). The length of each leg in the configuration is approximately 200 feet, and the minor differences in dimensions between this site and the one at the Range Head, the legs of which are probably result from mensural limitations rather than from actual differences in length. The bunker (item 1) located near the center of the "plus" configuration measures and was not completely earth covered at the time of photography. The other bunker (item 2) was under construction 500 feet to the south. Both bunkers are in approximately the same position relative to the "plus" configuration as the ones at the Interferometer-Type Instrumentation Site in the Range Head.

The instrumentation and support area (items 3-29), which is enclosed by a fence measuring 1,100 by 665 feet, contains 13 buildings as well as various probable instruments and unidentified objects. The most noteworthy single object is a dome on the roof of a building (item 27), similar to the one on the building in the Instrumentation Control Center in the Range Head.

The small communication area (items 30-33) is enclosed by a fence measuring 210 by 160 feet. The most important structure in the enclosure is a building (item 30), measuring with one or two small masts on the roof or adjacent to the building. A linear earth scar extends 1,950 feet from this fenced enclosure northwestward to the instrumentation and support area. The following is a tabulation of structures found at Instrumentation Site "A". Item numbers correspond to those on the accompanying graphic.

- (1) Bunker, under construction, feet.
- (2) Bunker under construction, feet.
- (3) Building under construction, feet.

- (4) Two possible dome-shaped instruments, each approximately 10 feet in diameter.
- (5) Single-story, flat-roofed building, with possible antenna long on the roof.
- (6) Unidentified object.
- (7) Single-story, gable-roofed building, 25 feet square. Adjacent to the building are two unidentified objects, each approximately 20 feet in diameter.
- (8) Unidentified object.
- (9) Unidentified object.
- (10) Three pyramidal tents, square.
- (11) Single-story, gable-roofed building, 95 by 40 feet.
- (12) Single-story, gable-roofed building, 30 by 25 feet.
- (13) Possible shed, with unidentified object on roof.
- (14) Single-story, gable-roofed building.
- (15) Single-story, gable-roofed building, 30 by 25 feet.
- (16) Large earthen or gravel mound, 90 feet in diameter.
- (17) Single-story, gable-roofed building, with two possible vents.
- (18) Possible underground storage tank, approximately in diameter.
- (19) Probable shed, 10 feet square.
- (20) Single-story, monitor-roofed building, 50 by 45 feet.
- (21) Excavation.
- (22) Bunker, 30 feet square.
- (23) Single-story, gable-roofed building.
- (24) Single-story, gable-roofed building.
- (25) Unidentified object.
- (26) Single-story shed-roofed building.
- (27) Single-story, gable-roofed building, with 10-foot-diameter dome on roof.
- (28) Unidentified object.
- (29) Two vehicles: one
- (30) Single-story, gable-roofed building, with masts on roof.
- (31) Unidentified object.
- (32) Possible generator shed, square.
- (33) Unidentified object.



INSTRUMENTATION SITE 'B'

Instrumentation Site "B" is located at 56°57'N/161°15'E, nine miles east-northeast of the town of Yelovka and 60 miles southwest of Instrumentation Site "A". It consists of a probable interferometer-type instrumentation site under construction and an instrumentation and support area. The "plus" configuration, when completed, probably will be similar to the one at Instrumentation Site "A" and the one in the Range Head. It consists of six similarly-positioned possible radomes and two bunkers under construction. As at the other sites, one bunker is located near the center of the "plus" configuration, and another is located more than 400 feet out from the center.

Although there are some dimensional differences between this site and the other two, they probably result from the inherent difficulties of making precise measurements on oblique photography. For example, the length of the legs appears to range from 190 to 225 feet, and the two possible radomes, which are positioned on the northeast and northwest legs, seem to be spaced unequally,

The instrumentation and support area consists of 16 buildings in addition to numerous instruments and unidentified objects. One building with a dome on the roof (item 3) is similar to the ones in the Instrumentation Control Center at the Range Head and at Instrumentation Site "A".

The following is a tabulation of structures found at Instrumentation Site "B". Item numbers correspond to those on the accompanying graphic.

- (1) Bunker under construction with ramp leading downward into one side.
- (2) Bunker under construction, feet, and one unidentified object west-northwest from the bunker.
- (3) Single-story building, 30 by 25 feet, with dome on roof.
- (4) Excavation, 40 by 35 feet.
- (5) Single-story building, 50 by 30 feet, with large dome on roof.
- (6) Single-story building, 30 feet square.
- (7) Single-story building, 55 by 30 feet.
- (8) Probable mound, 30 feet in diameter.
- (9) Probable mound, 30 feet in diameter.
- (10) Single-story building, 30 feet square.
- (11) Single-story, gable-roofed building, 110 by 35 feet.
- (12) Unidentified object.

G 908

- (13) Single-story, gable-roofed building, 110 by 35 feet.
- (14) Single-story probable building, 50 by 35 feet.
- (15) Unidentified object.
- (16) Single-story, flat-roofed building, 40 by 35 feet.
- (17) Unidentified object.
- (18) Single-story, gable-roofed building, 30 by 25 feet.
- (19) Two-story building, 45 by 35 feet.
- (20) Two-story, gable-roofed building, 55 by 45 feet.
- (21) Single-story building, 45 by 30 feet.
- (22) Unidentified object.
- (23) Three unidentified objects, feet, spaced at 50-foot intervals.

- (24) Possible bunker, 25 feet square.
- (25) Unidentified object.
- (26) Three unidentified objects.
- (27) Single-story building, 65 by 30 feet.
- (28) Probable mound.
- (29) Single-story possible building, 50 by 35 feet.
- (30) Single-story building, 35 by 25 feet.

POSSIBLE FUNCTIONS OF INSTRUMENTATION SITES 'A' AND 'B'

The "plus" configurations at Instrumentation Sites "A" and "B" serve as some type of missile instrumentation and, in this role, may be used for the dual purpose of ac-

quiring a target and providing trajectory data. In turn, these data then could be used to orient high-gain telemetry antennas, other electronic tracking equipment, or optical instruments which may be located at any one of the numerous facilities and structures evident in the area. It is important to note that the southeast leg of the "plus" configuration at Instrumentation Site "A" has an azimuth of [] and the southeast leg of the "plus" configuration under construction at Instrumentation Site "B" has a similar orientation, i.e., an azimuth of []. Moreover, as previously indicated, the trajectory of a missile fired from Tyura Tam along an azimuth of 40°, in the probable primary direction of fire, would pass over this area on an azimuth of []

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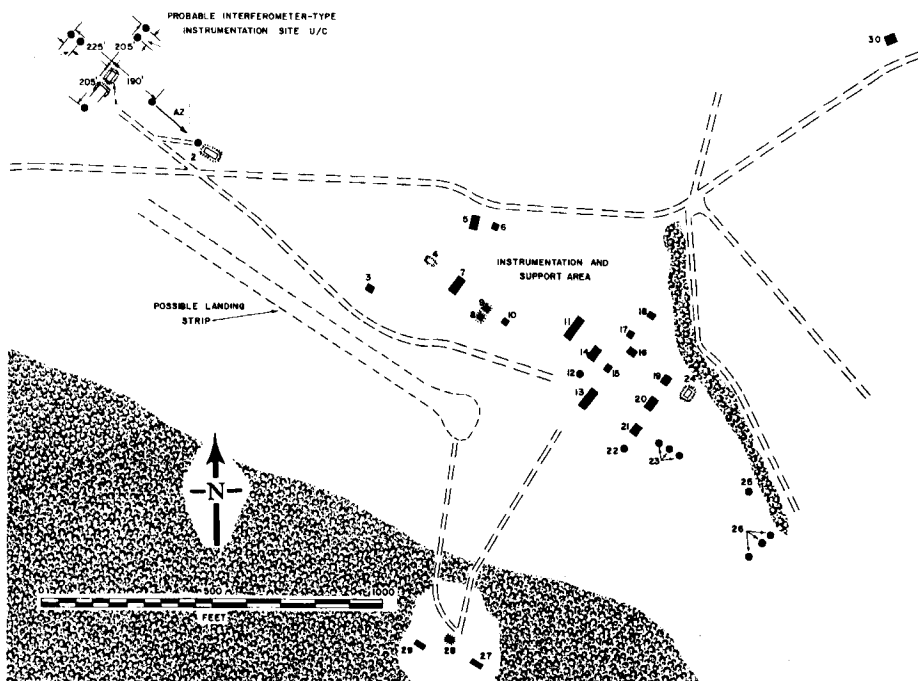
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POSSIBLE INSTRUMENTATION SITE 'C'

Possible Instrumentation Site "C" is located at 57°04'N/161°20'B, 15 miles northeast of Yelovka and approximately 10 miles north-northeast of Instrumentation Site "B" in what appears to be an extremely isolated and forested area. The installation appears to be of relatively recent construction and contains four gable-roofed buildings and numerous unidentified objects. Five dome-shaped objects in line (item 12) possibly contain

instruments. A road leads to the top of a high hill on which there is one flat-roofed building (item 1) and four possible vans (item 2).

The following is a tabulation of the components of Possible Instrumentation Site "C". Item numbers correspond to those on the accompanying graphic.

- (1) Flat-roofed building,
- (2) Four possible vans: two

- (3) Single-story, gable-roofed building,
- (4) Unidentified object,
- (5) Cleared area, in diameter,
- (6) Five unidentified objects in cleared area,
- (7) Single-story, gable-roofed building,
- (8) Single-story, gable-roofed building,

- (9) Two unidentified objects,
- (10) Unidentified object,
- (11) Single-story, gable-roofed building,
- (12) Five dome-shaped objects, which possibly contain instruments, approximately
- (13) Unidentified object, meter.

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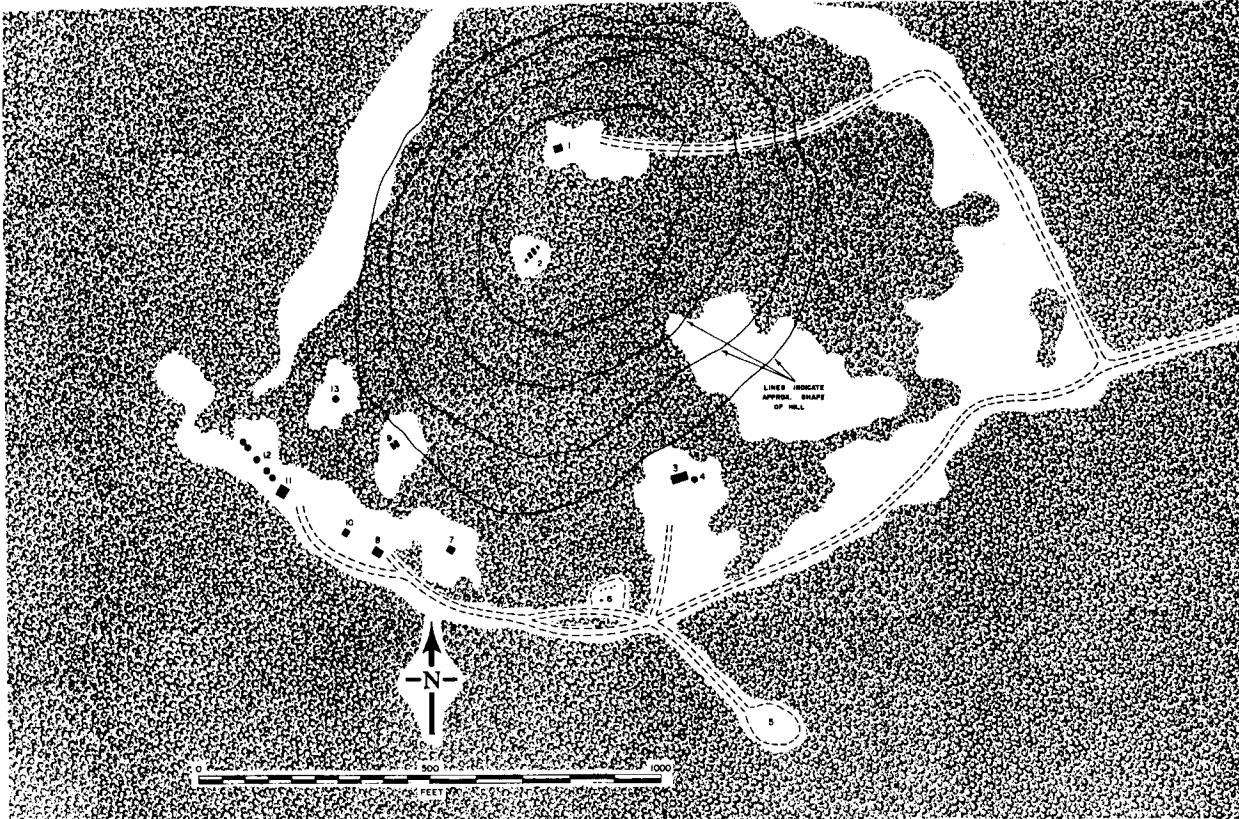
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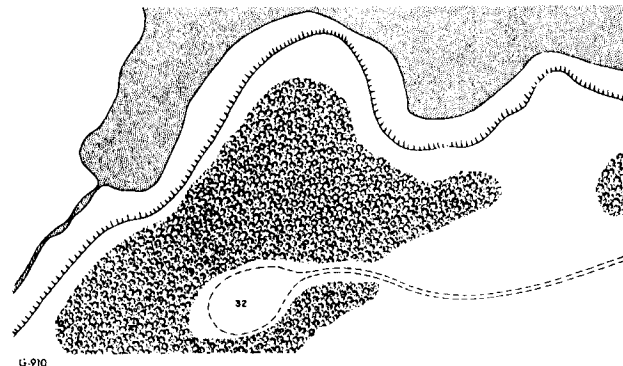
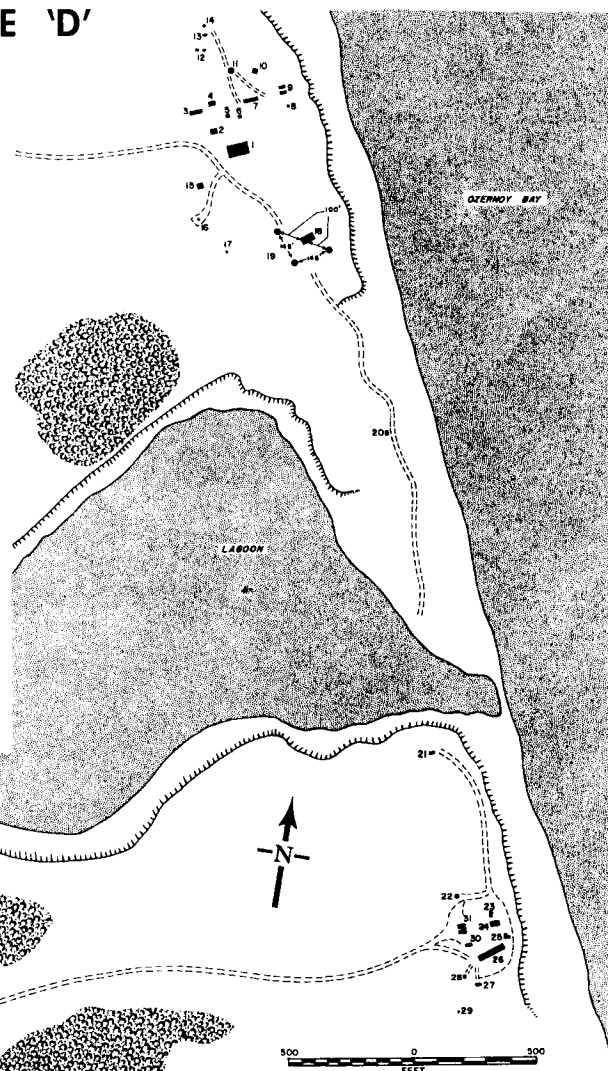
PROBABLE INSTRUMENTATION SITE 'D'

Probable Instrumentation Site "D" is located at 57°09' N/162°48' E, on the coast of Ozernoy Bay about 45 miles southeast of Uka. It consists of two areas about 3,000 feet apart, which contain a total of 14 buildings, several possible instruments, and several unidentified objects. Approximately 3,500 feet west of the southern area is an unidentified irregularly-shaped clearing, which measures 300 by 230 feet and is connected by road with the coastal area.

The following is a tabulation of the components of Probable Instrumentation Site "D". Item numbers correspond to those on the accompanying graphic.

- (1) One and one-half story, modified gable-roofed building.
- (2) Single-story, gable-roofed building, with an unidentified object on the roof.
- (3) Unidentified object.
- (4) Single-story, gable-roofed building.
- (5) One possible instrument, approximately
- (6) One possible instrument, approximately
- (7) Unidentified object.
- (8) Possible instrument in diameter.
- (9) Two unidentified objects, 25 by 10 feet.
- (10) Possible bunker.
- (11) Possible instrument.

- (12) Two unidentified objects, feet.
- (13) Possible instrument
- (14) Possible instrument, meter.
- (15) Possible shed, 20 feet square.
- (16) Possible mast.
- (17) Unidentified object, 10 feet in diameter, in the center of a cleared area 30 feet in diameter.
- (18) Single-story, gable-roofed building.
- (19) Three probable instruments.
- (20) Possible shed,
- (21) Possible building,
- (22) Unidentified object.
- (23) Single-story building, 20 by 15 feet.
- (24) Single-story, gable-roofed building, 35 by 20 feet.
- (25) L-shaped, single-story, gable-roofed building, 25 by 15 feet, with a wing 10 feet square.
- (26) Two-story, gable-roofed building, 115 by 25 feet.
- (27) Unidentified object,
- (28) Possible shed,
- (29) Unidentified object, meter in center of an earth scarred area.
- (30) Two-story, possible building, 25 by 15 feet.
- (31) Single-story, gable-roofed building, 35 by 25 feet, with two attached sheds, 10 feet square.
- (32) Cleared area, 300 by 230 feet.



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PROBABLE INSTRUMENTATION SITE 'E'

Probable Instrumentation Site "E" is located on the coast of Ozerney Bay at 57°16' N/162°45' E, nine miles north of Probable Instrumentation Site "D". It contains 19 buildings, four vehicles, and several unidentified objects. A dome, 20 feet in diameter, located on the roof of a building (item 5), probably covers a large instrument.

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Of undetermined significance is the presence at the time of photography of two ships 1.5 miles offshore at 57°20' N/162°44' E, five miles north-northeast of Probable Instrumentation Site "E". The larger one, a cargo type, is 300 feet long while the smaller one, situated alongside, is 60 feet long. Although it is possible that these vessels bring supplies to the isolated coastal area, they may, on the other hand, possibly serve as range "picket" ships.

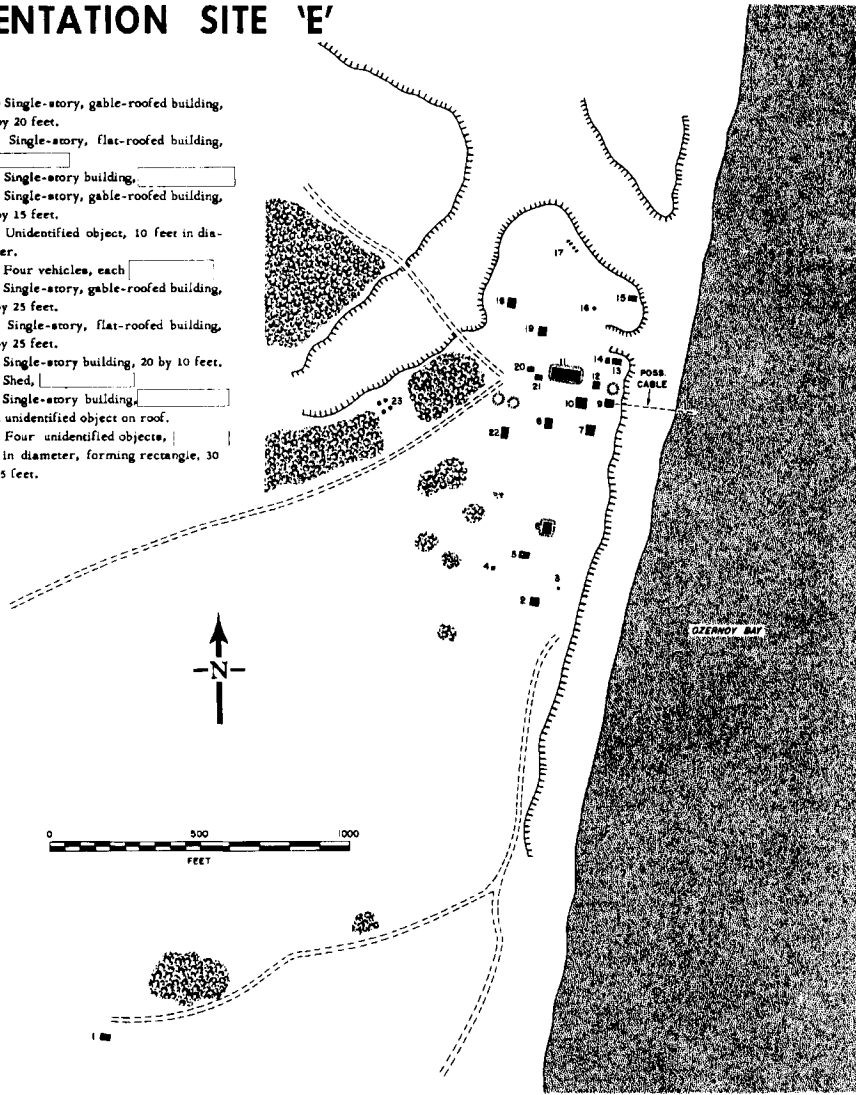
The following is a tabulation of the components of Probable Instrumentation Site "E". Item numbers correspond to those on the accompanying graphic.

- (1) Single-story, gable-roofed building, 30 by 25 feet.
- (2) Single-story building with curved roof, 30 feet square.
- (3) Unidentified object, 10 feet in diameter.
- (4) Possible shed, [redacted]
- (5) Single-story, gable-roofed building, 35 by 20 feet, with dome approximately 20 feet in diameter on roof.
- (6) Single-story, gable-roofed reverted building, 45 by 30 feet.
- (7) Single-story, gable-roofed building, 35 by 30 feet.
- (8) Single-story, gable-roofed building, 30 by 20 feet.
- (9) Single-story, gable-roofed building, 20 feet square with possible cable line extending to water.
- (10) Single-story, gable-roofed building, 35 by 30 feet.
- (11) Single-story, gable-roofed, reverted building, 95 by 30 feet.

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G-911

- (12) Single-story, gable-roofed building, 30 by 20 feet.
- (13) Single-story, flat-roofed building, [redacted]
- (14) Single-story building, [redacted]
- (15) Single-story, gable-roofed building, 25 by 15 feet.
- (16) Unidentified object, 10 feet in diameter.
- (17) Four vehicles, each [redacted]
- (18) Single-story, gable-roofed building, 30 by 25 feet.
- (19) Single-story, flat-roofed building, 30 by 25 feet.
- (20) Single-story building, 20 by 10 feet.
- (21) Shed, [redacted]
- (22) Single-story building, [redacted] with unidentified object on roof.
- (23) Four unidentified objects, 10 feet in diameter, forming rectangle, 30 by 15 feet.



CONCLUSIONS

The Tyura Tam Missile Launching Complex constitutes a major permanent Soviet missile test center of unusual significance. When completed, the Complex probably will be capable of locally fulfilling requirements for propellants, electric power, and water, and of supporting in excess of 5,500 persons.

* * *

The Range Head, with one launching facility completed, can be expanded by the northward extension of the rail line and the addition of any number of launching facilities.

* * *

The apparent emphasis placed upon the railroad in almost every phase of operation within the Complex indicates that the Soviets are developing rail-supported and, probably, fully integrated rail-mobile missile systems.

* * *

The missile launching structure at Tyura Tam is apparently designed to support the launching and static testing of large ballistic missiles with intercontinental, satellite, and space-flight capabilities.

* * *

Launching or static testing of large ballistic missiles at Tyura Tam probably could have been conducted by midsummer 1957 and possibly for a limited period prior thereto.

* * *

Use at Tyura Tam of new or unusual propulsion systems is suggested by the magnitude and complexity of the launching structure and its support facilities.

* * *

A new major Soviet overland missile test range, oriented to the northeast along an azimuth of approximately 40° from Tyura Tam, probably extends at least 3,400 miles to the Kamchatka Peninsula.

* * *

Two directions of fire from Tyura Tam are apparent -- the probable primary direction (40°) to the northeast, and the possible alternate direction (90°) to the east.

* * *

The magnitude and complexity of instrumentation facilities in the Tyura Tam Missile Test Range, particularly those in the Range Head and those just down range, indicate that the Soviets have developed numerous and sophisticated procedures for the volume collection of flight and static test data.

* * *

Probable terminal range instrumentation facilities for the Tyura Tam Missile Test Range are grouped in the Uka/Yelovka area of the Kamchatka Peninsula and along the coast of the Bering Sea, south-southeast of Uka.

* * *

The Soviets possibly employ an inertial-type guidance system at Tyura Tam.

* * *

The Missile Launching Complex and Test Range are supported by an elaborate network of communication facilities that includes an extensive high-frequency, long-distance, point-to-point communication system incorporating the use of rhombic antennas.

SOURCE MATERIALS AND BIBLIOGRAPHY

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MAP DATA:

WAC 132, 246, Pilorage Charts 132C, 246C

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2. Army, Moscow. DA IN 67497 (Joint Army Navy Air Msg.), 21 Oct 57. (S)
3. Air, Moscow. (Trip Report Moscow-Alma Ata and Return) 31 Oct 57. (S)

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5. CIA. RR-CR-148, "Possible Guided Missile Testing Ranges in the USSR", Jun 57. (S)

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- ACSI Air Force, SPIR T-57-10, Tyura Tam Missile Test Launching Range, Sep 57.
- HTA/JB-1/57, Azusa Guided Missile Facility, Kamchatka Peninsula, Oct 57. (
- SAC DPIR SP-9-57, Tyura Tam Guided Missile Test Center, Dec 57.
- HTA/B-11/58, Unidentified Ground Scar Configuration Near Ksyl Orda, Feb 58.

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KLYUCHI COMMUNICATION CENTER

A high-frequency, long-range radio Communication Center was under construction in near the town of Klyuchi on the Kamchatka Peninsula. The Center, located at 56°19'N/160°51'E, measures 4,500 by 1,700 feet over-all and is composed of two separate areas. The larger, a headquarters and support area, encompasses some 25 acres and, when complete, will contain at least 39 major buildings and structures. The smaller, a communication area, is characterized by two double rhombic antenna arrays under construction and by extensive clearing of wooded areas for construction of at least two possible additional rhombic arrays. A large control building, a cooling tower, and three small buildings are also situated in the area.

The Center is located adjacent to a densely wooded area 3,500 feet south of Klyuchi and is served by several unimproved roads. Overhead power and/or communication lines and a large water line also serve the Center. An intricate network of ditches, probably part of a water or central heating system, and linear ground scars, probably cable lines, connect various buildings and structures. Vehicle revetments, earth-mounded structures, and several unidentified objects are also evident. A relatively large heliport with seven Hound helicopters present is located approximately one mile to the west.

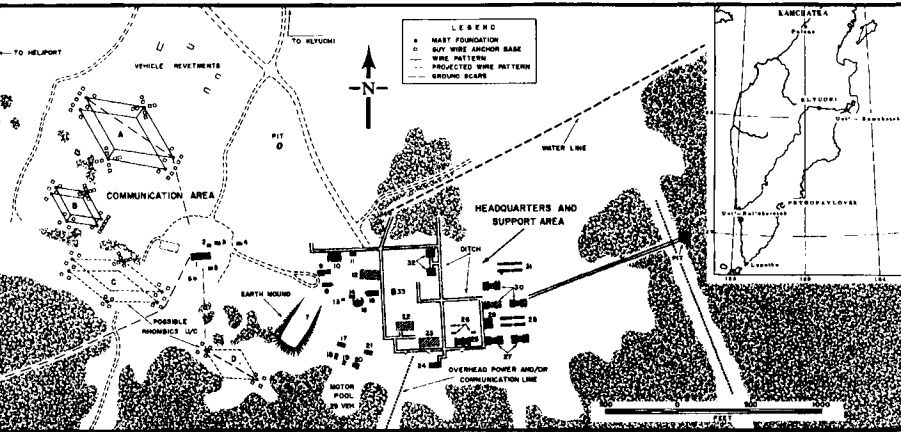
The size and configuration of rhombic antenna arrays A and B, under construction at the Klyuchi Communication Center, are nearly identical to several rhombic arrays found at Communication Area "A" in the Tyura Tam Missile Launching Complex (see page 31). In addition to being double rhombics, they have an orientation of north, which defines a great circle azimuth toward Tyura Tam. It is possible, therefore, that these antenna facilities, coupled with the contiguous headquarters and support area, constitute a key component of the Tyura Tam Missile Test Range.

The following is a tabulation of the components of the Communication Center. Item numbers correspond to those on the accompanying graphic.

Communication Area

Antennas

- (A) Large double rhombic, under construction.
 - Length of one side 410'
 - Separation of end masts 85'
 - Length of major axis 740'
 - Length of minor axis 340'



Asimuth of major axis

- (B) Small double rhombic, under construction.
 - Length of one side 220'
 - Separation of end masts 60'
 - Length of major axis 390'
 - Length of minor axis 160'
 - Asimuth of major axis
- (C) Possible double rhombic, under construction.
 - Length of one side 350'
 - Separation of end masts 80'
 - Length of major axis 660'
 - Length of minor axis 215'
 - Asimuth of major axis
- (D) Possible single rhombic under construction.
 - Length of major axis 400'
 - Asimuth of major axis

Structures

- (1) Control building, multistory, hip-roofed, 105 by 45 feet, with a single-story flat-roofed extension, 45 by 25 feet.
- (2) Building, single-story, flat-roofed, 30 by 15 feet.
- (3) Three van-type trucks.
- (4) Building, single-story, flat-roofed.
- (5) Cooling tower, 15 feet square.
- (6) Shed, 15 by 10 feet.
- (7) Large U-shaped earthen structure.

Headquarters and Support Area

Structures

- (8) Building, single-story, gable-roofed with a shed-type extension, on the east side.
- (9) Building, single-story, gable-roofed, with a small shed on the south side.
- (10) Building, single-story, gable-roofed. Appears to be reverted.
- (11) Building under construction, 50 by 25 feet.
- (12) Possible building construction site.
- (13) Building, single-story, flat-roofed.
- (14) Building, single-story, flat-roofed.
- (15) Building, single-story, gable-roofed.
- (16) Reverted "cross-shaped" building. Main part is with a wing, on each side.
- (17) Building, single-story, gable-roofed, with shed-type extension, on the east end.
- (18) Building, single-story flat-roofed.
- (19) Building, single-story flat-roofed, 25 feet square.
- (20) Building, single-story, flat-roofed, "L" shaped, feet.
- (21) Building, single-story, with modi-

- fied gable roof,
- (22) Building, under construction, 120 feet square. Framework for one story is complete.
- (23) Building under construction, multistory.
- (24) Building, single-story, flat-roofed.
- (25) Building, two-story administration-type, with six dormers on the roof.
- (26) Buildings, single-story, flat-roofed, 40 by 15 feet.
- (27) Buildings, multistory, with modified hipped roof. Center portion is.
- (28) Four buildings, each single-story, flat-roofed.
- (29) Building, multistory, gable-roofed.
- (30) Three buildings under construction. Will probably be similar to building 27.
- (31) Four buildings, each single-story, flat-roofed, one with a 15-foot-square addition.
- (32) Two buildings, each multistoried, gable-roofed.
- (33) Building, single-story gable-roofed, 40 by 25 feet.
- (34) Pump house, 20 feet square.

* The Klyuchi Communication Center was identified too late to be included as an integrated portion of this report. Because of its apparent significance, particularly with reference to the Tyura Tam Missile Test Range, an analysis was prepared and added to this report just prior to distribution. It supplements the section on the Missile Test Range, specifically pages 34 through 48.

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