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CHRONOLOGY OF MOSKVA MISSILE AND SPACE PROPULSION DEVELOPMENT CENTER KHIMKI 456, USSR

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PHOTOGRAPHIC INTERPRETATION REPORT

CHRONOLOGY OF MOSKVA MISSILE AND SPACE PROPULSION DEVELOPMENT CENTER KHIMKI 456, USSR

FEBRUARY 1968

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

INTRODUCTION

This report is concerned primarily with the chronological development of the Moskva Missile and Space Propulsion Development Center Khimiki 456, USSR. Also included in this report are detailed descriptions and illustrations of several of the more significant structures in the center and of a suspect fluorine production facility under construction.

The Moskva Missile and Space Propulsion Development Center Khimki 456 is located at 55-54N, 037-26E on the northwest outskirts of Moskva (Figure 1). The installation is believed to be the principal ballistic missile propulsion research center in the USSR. 1/ The center consists of a plant area and a test area, both of which are described in this report (Figure 2). A brief description of the Test Area was included in an earlier report. 2/

Khimki 456 was established late in 1944 and occupied facilities left vacant by the evacuation of Aircraft Plant 84 to Tashkent in 1941. The buildings were largely empty shells with only a few internal walls left standing. However, by the end of 1946 internal reconstruction and rehabilitation were sufficiently advanced to permit the resumption of some activities. Khimki 456 was one of the initial centers exploiting captured German technology and personnel. The Khimki 456 Test Area (Figures 3 and 4) was initially equipped with a V-2 engine test stand This static test stand was installed in 1946 and was located at the present site of Test Stand No 2. Test Stand No 1, the first of Soviet design, was reportedly complete by the fall of 1956, and Test Stand No 4 was supposed to be operational by March 1957. 1/

Installations associated with the center include the Moskva Aircraft Experimental Plant Khimki 293 located at 55-54N and 037-27E (Figure 2); it is situated adjacent to and east-southeast of Khimki 456. Plant 293 consists of both a plant and a static test area. Another facility associated with the center is the Moskva Guided Missile Research and Development Plant Khimki 301 located at 55-54N 037-25E. It also consists of a plant area and a static test area. Both the plant and test areas at Khimki 456 are secured by a single fence and are rail served.

Chronological data and other information presented in this report have been derived from that have covered the Khimki 456 installation during a time period extending from A study of all the photography covering the center has resulted in interpretations of functions of most of the structures. Highlights of the construction chronology of the Khimki 456 Test Area are presented in narrative form in the first part of the report and a line drawing of the layout of the Test Area (Figure 4) is color coded to illustrate the sequence of construction. The photographic coverage, although relatively frequent, was often of small scale and poor interpretability, particularly during the period from These factors account for those items which are reported as first observed and complete on the same date. On the coverages of poorer interpretability it is not possible to determine with certainty whether or not any structure is complete, nor whether it is operational.

Descriptions and illustrations of selected structures in the Test Area, namely the 4 test stands, the exhaust scrubber system, and the suspect fluorine production facility follow the chronological description of the Test Area. The Khimki 456 Plant Area is described in the final section of the report. Highlights of the construction chronology for the Plant Area are not presented, but the chronology and mensural data of structures in the Plant Area are shown in tabular form, and a line drawing of the area is color coded to show the sequence of construction.

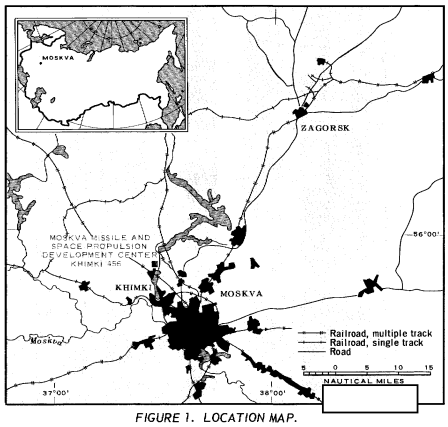


FIGURE 1. LOCATION MAP.

HIGHLIGHTS OF CHRONOLOGY TEST AREA

Chronological and functional information along with mensural data presented in this section of the report are summarized in Table 1. Numbered items of Table 1 are keyed to the items shown on the layout of the Test Area (Figure 4).

1944 - 1961

The Test Facility was not present on photography of the site (Figure 9). It was first observed on The Test Area in general can be identified on the photography; however, it is not possible to describe the construction status of the various buildings.

1962

The first interpretable photography was obtained in Significant items first observed in included Test Stands Nos 1, 2, 3, and 4 (annotated on Figure 4) although their exact configuration could not not be determined at this time. A possible blast mark may have been present northwest of Test Stand No 2 (item 29). The original air liquefaction plant (item 43) 1/ and the newer air liquefaction plant (item 66) were both present at this time as well as several support buildings. Construction activity at the future site of the large circular toxic exhaust scrubber can be negated at this time.

1963

Photographic coverage of although of poor interpretability, afforded the first observation of construc-

tion activity at the site of the toxic exhaust scrubber system (item 31). Future photographic coverage was to show that this early construction was centered in the large circular exhaust scrubber itself. No new signs of test activity were observed because of the construction activity in front of Test Stands No 1 and No 2.

1964

The first photographic coverage of fair interpretability was obtained in [redacted] It revealed details of the test stands and other support structures not previously observed. Photographic coverage of good interpretability was obtained [redacted] It showed additional structural details and evidence of continuing construction activity in the area of the new toxic exhaust scrubber. No new indications of test activity were observed during this time period.

1965

The most significant construction during this period was again observed in the area of the new toxic exhaust scrubber system. The first indication of construction activity at the site of the 300-foot exhaust stack was observed for the first time in [redacted] The stack itself and the construction crane used to erect it were first observed in [redacted] The supporting works/diffuser now serving Test Stand No 2 was first observed under construction at this time. Once again, no indications of test activity were observed apparently due to the continuing construction activity.

1966

The exhaust stack appeared externally complete in [redacted] A very light stream of vapor/smoke was observed from the top of the stack at this time. The diffuser systems serving Test Stands No 1 and No 2 also appeared externally complete. Other significant construction was centered in the newly identified suspect fluorine production area. A pipe gallery, later identified as a probable exhaust system serving the suspect fluorine production buildings, was observed under construction. Althouth the [redacted] photography coverage was of poor interpretability, the circular toxic exhaust scrubber was apparently externally complete, having been covered with a reflective metallic material. The first medium-scale [redacted] coverage, obtained in [redacted] was of good interpretability. This coverage allowed better correlation of the facility with collateral reports and ground photography and the recognition of previously unreported features. A more precise idea of the configuration of the 4 static test stands was apparent for the first time.

Test Stand No 1 is apparently a modification of the original Soviet-designed test stand. Test Stand No 2 is an apparent modification of the original [redacted] Test Stand No 3 is a horizontal test stand equipped with a diffuser to give the stand an altitude simulation capability. Test Stand No 4, reportedly a five-position vertical test stand, 1/ is also equipped with a diffuser. The toxic exhaust scrubber appeared externally complete at this time. However, as is the case in most new systems of this type, it was probably undergoing tests to determine its efficiency for neutralizing toxic exhaust gases.

1967

Photography of good interpretability was obtained [redacted] revealing additional details and new construction not previously observed. Six vertical pressure tanks were located at the base of the toxic exhaust stack, all of which are connected by a manifold system that connects to a single pipe that extends to the top of the exhaust stack.

Additional scrubber support buildings and tanks were newly observed under construction at this time. Probably the most significant construction observed at this time was in the suspect fluorine production facility. The new exhaust system now appears in the late stages of construction. It is presently serving 4 buildings, and it appears likely it will serve 5 buildings when the new structure (item 5) is complete.

DESCRIPTIONS OF SELECTED STRUCTURES

Table 1 provides an interpretation of the function of each significant structure at the Test Area. The following items are considered to be of sufficient importance to warrant a more detailed discussion. Item numbers are keyed to Figure 4.

TEST STAND NO 1

Test Stand No 1 (item 26) was the first static test stand of original Soviet design. It was reportedly complete by the fall of 1956. 1/ The stand was probably modified between 1960 and 1962. A photograph of a scale model of Test Stands No 1 and No 2 and the exhaust scrubber (with dimensions indicated) is shown in Figure 5. The superstructure of Test Stand No 1 measures [redacted] and rises 100 feet above ground level. It is apparently open in the center from front to rear as evidenced by the ground photography presented in Figure 6. A diffuser measuring 210 feet in length [redacted] connects the engine-firing position to the outer ring of the exhaust scrubber. Two probable chokepoints or coolant rings are located on the diffuser as well as a tie-down point where the diffuser intersects the roof of the scrubber. It would seem likely that coolant rings are employed at the chokepoints. It is possible that the final 80 feet of the diffuser connecting the second visible chokepoint and the roof of the scrubber is merely a duct for the hot toxic exhaust gases. Apparently this stand is now designed to test upper stage liquid propellant rocket engines at a simulated altitude condition. The diffuser connection to the exhaust scrubber indicates the need for neutralizing the exhaust gases before venting them to the atmosphere. The Test Area's location, on the outskirts of Moskva, would necessitate a system of this type if toxic propellant research and development (R & D) is to be carried out. High specific impulse (Isp) ratings (lbs thrust/lb propellant/sec) have been obtained from toxic fuel-oxidizer combinations such as hydrogen and fluorine. Fluorine as a high-energy oxidizer is discussed further in a later section of this report.

TEST STAND NO 2

Test Stand No 2 (item 29) is apparently one of the first static test stands built in the Soviet Union. It was originally brought to Khimki from the area of [redacted] Originally it was designed to test [redacted] liquid propellant rocket engines. Certain modifications and redesign of the V-2 were made between 1946 and 1955. At this time the program was apparently phased out. 1/ A significant point of difference between Test Stand No 1 and No 2 is in their

Table 1. Data on Test Area, Moskva Missile and Space Propulsion Development Center Khimki 456
(Item numbers are keyed to Figure 4)

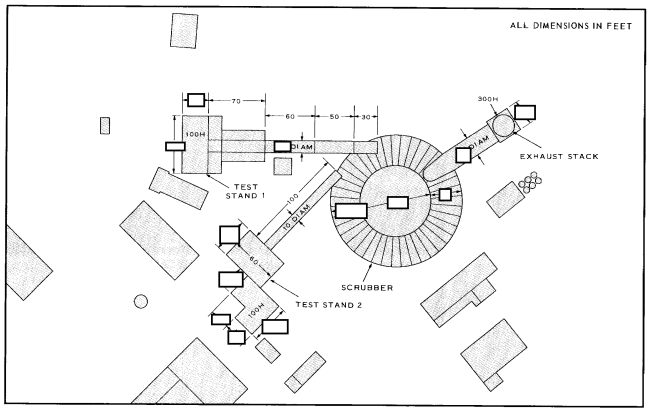
Item	Function/ Description	Dimensions (ft) L	W	H	Roof Cover (sq ft)	Date First Observed & Apparently Complete (unless otherwise noted)	Comments
1	Main exhaust bldg						Complete, connected by duct-work/pipe gallery to items 7, 12, 18, & 19
2	Sensitive storage bldg						Complete, protected by earthen barricade
3	Sensitive storage bldg						Complete, protected by earthen barricade
4	Sensitive storage bldg						Complete, protected by earthen barricade
5	Production support bldg						Still u/c; will eventually be associated with suspect fluorine production
6	Receiving & storage bldg						Six horizontal storage tanks 30 x , located adjacent to rail spur
7	Support bldg						Complete, support bldg for item 6
8	Poss vehicle storage bldg						Complete, concrete hardstand located between bldg & pipe gallery
9	Storage bldg						
10	Support bldg						
11	Test support bldg						
12	Suspect fluorine production (electrolysis) bldg						Associated with poss hydrocarbon burn stack which is 100 ft high
							NW portion of bldg complete, connected by elaborate ductwork to the multiple pipe gallery; poss fenced rectifier unit located at NW end of bldg indicates a suspect electrolysis function
13	Production support bldg						Complete
14	Support bldg						Complete
15	Test support bldg						Complete
16	Test support bldg						NW portion of bldg complete, associated with poss hydrocarbon burn stack
17	Test support bldg						Complete, associated with large vented buried tank
18	Receiving & storage bldg						Two low bays measure high
19	Receiving & storage bldg						Rail served; poss associated with hydrofluoric acid storage for use in electrolytic production of fluorine
20	Test support bldg						
21	Test support bldg						Partially a shed; connected to Test Stand No 1 by pipeline; may contain purging or pressurizing tanks
22	Vertical tanks (48)						Prob contain liquid nitrogen or helium
23	Test support bldg						
24	Support bldg						
25	Support bldg						
26	Test Stand No 1						Height measured on , diffuser completed
27	Test support bldg						Supports Test Stand No 1; multiple pipe gallery extends through bldg and serves Test Stand No 1
28	Control bldg						Controls static testing at Test Stands No 1 and No 2
29	Test Stand No 2						Diffuser tube completed in
30	Poss tank						
31	Toxic exhaust scrubber						Complete
32	Toxic exhaust stack						Complete, framework of stack measures
33	Vertical tanks (6)						Approx capacity 15,700 cu ft
34	Scrubber support bldg						Connected by pipeline to main scrubber support bldg and by pipeline to outside edge of annulus
35	Main scrubber support bldg						
36	Test support bldg						Complete
37	Test support bldg						Complete
38	Tank						Remains in early stages of construction
							Still u/c; may be earth mounded when complete
39	Tank						U/C; may be auxiliary dump tank for scrubber system when complete
40	Test support bldg						
41	Pumphouse						Serves Test Stand No 2
42	Pressure tanks						Small horizontal tanks prob containing pressurizing gas
43	Original LOX plant						May have been converted to propellant storage/handling; has direct pipeline connection to Test Stand No 2
44	Receiving & storage bldg						Rail served; has its own offloading dock
45	Support bldg						
46	Admin bldg						
47	Poss pumphouse						Connected by multiple overhead pipelines to items 27 & 43
48	Support bldg						
49	Test support bldg						
50	Control bldg						Supports Test Stand No 4
51	Test Stand No 4						Diffuser first observed complete in
52	Prob test observation bldg						May also serve as remote control camera station
53	Storage/observation bldg						
54	Test support bldg						Complete, prob an expansion of item 55
55	Test support bldg						
56	Test Stand No 3						Diffuser first observed complete in
57	Test support bldg						May house pressure tanks for Test Stand No 3
58	Poss exhaust/compressor bldg						Connected by pipeline to Test Stand No 3; vent/exhaust stack located adjacent to bldg
59	Test support bldg						
60	Support bldg						
61	Support bldg						
62	Support bldg						
63	Test support bldg						Prob connected by pipeline to item 56 and poss to other structures by u/g pipelines; bldg still u/c
64	Prob cooling rack						Function may have changed since original construction
65	Support bldg						
66	Air liquefaction plant						Measuration only partial because of heavy shadows
66a	Pumphouse						Complete
67	Support bldg						
68	Storage/support bldg						NW portion of bldg complete, contains separate area secured by a wall collocated with bldg
69	Support bldg						Bldg still u/c
70	Poss pumphouse						
71	Poss pumphouse						Bldg still u/c
72	Poss pumphouse						Pipeline u/c to area of this structure
73	Poss pumphouse						
74	Prob warehouse						
75	Prob warehouses						Three similar bldgs adjacent to each other; each measures , they are about
76	Prob guardhouse						

*Greatest overall dimensions of an irregularly shaped bldg; height is to highest bay.
NOTE: Dimensions are accurate within ± 5 ft or 3 percent, whichever is greater, on all horizontal measurements and ± 5 ft on all vertical measurements.

Table 2. Requirements for Production and Handling of Fluorine and Observation of Features at Khimki 456 Test Area
(Item numbers are keyed to Figure 4)

Requirements	Observations
Electric power (direct current) for electrolysis; amount needed equivalent to 16,000 kw/ton of fluorine*	Large substation located between Khimki 456 Plant and Test Areas; rectification unit poss u/c at NW end of suspect fluorine production bldg (item 12)
Raw material: acid grade fluorspar (calcium fluoride)	Should be readily available in Moskva area; unrefined calcium fluoride might be available as a precipitate from the toxic exhaust scrubber, should it be required, but this seems unlikely because of problems in purifying it
Special rail cars to transport both hydrofluoric and sulfuric acids	Triple-domed rail tank cars measuring observed in suspect production facility during
Liquid nitrogen to reduce boiloff during storage of liquid fluorine	Liquid nitrogen produced at the air liquefaction plant (item 66); liquid nitrogen therefore available for use both in storage and in heat absorption during liquefaction process
Waste disposal system for disposing of concentrated potassium fluoride	Construction activity on 1 side of item 12 poss associated with construction of such a system
Hydrocarbon burner to dispose of waste fluorine	100-ft-high stack adjacent to item 11 poss used for this purpose
Storage of fluorine under pressure	Numerous pressure tanks measuring ft located adjacent to item 6
Closed handling system to prevent liquid and/or gaseous fluorine from venting to atmosphere	Elaborate exhaust system and ductwork constructed between 5 bldgs in suspect fluorine production facility

*1,000 tons/year satisfies the entire US requirement for fluorine.



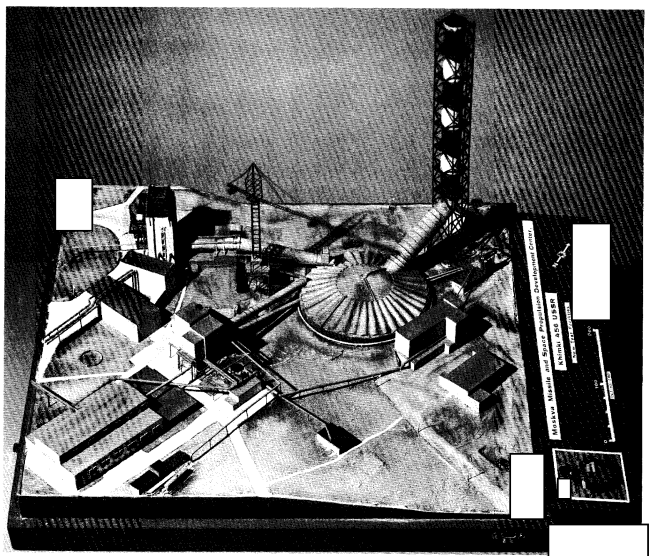


FIGURE 5. PHOTOGRAPH OF SCALE MODEL OF TEST STANDS NO 1 AND NO 2 AND TOXIC EXHAUST SCRUBBER (BOTTOM) AND DIMENSIONAL DETAILS OF THESE STRUCTURES (TOP).

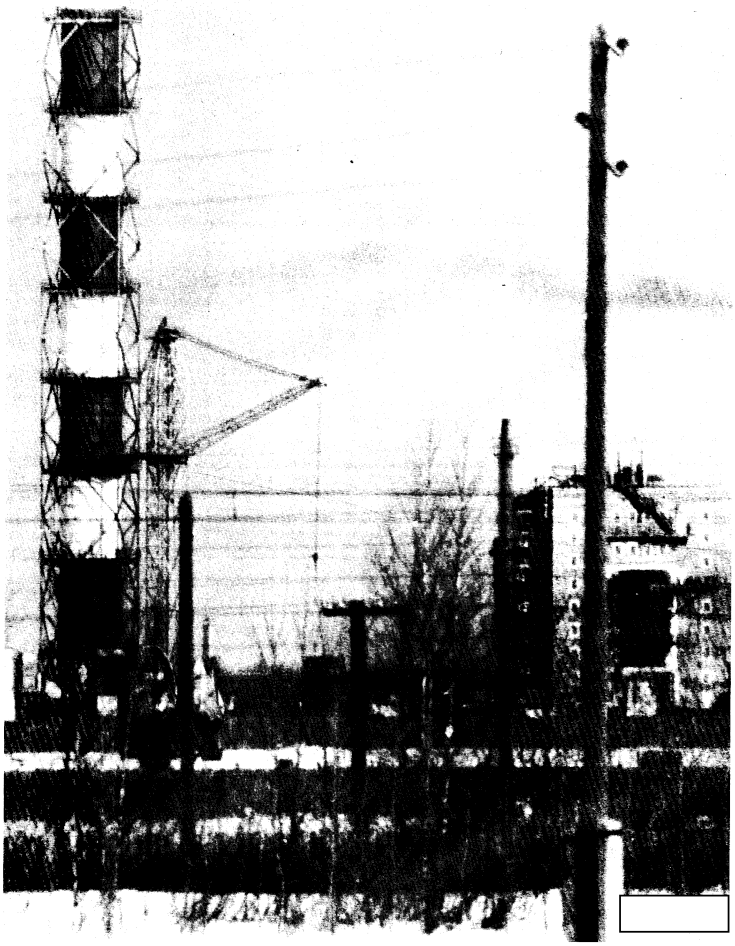


FIGURE 6. GROUND PHOTOGRAPH OF TEST STAND NO 1 (RIGHT BACKGROUND) AND TOXIC EXHAUST STACK (LEFT FOREGROUND).

physical construction. Test Stand No 2 is constructed partly of concrete whereas Test No 1 appears to be steel framework with probable metal panels to protect test stand personnel from the environment.

Test Stand No 2 consists of an older and a newer part. The older part is a high, towerlike structure, measuring [redacted] feet and rising approximately 100 feet above ground level. The newer portion measures [redacted] and is approximately 50 feet high (Figure 5).

The newer portion was probably constructed after the last evidence of a test firing observed in [redacted] and before the first evidence of construction at the exhaust scrubber (item 31) in [redacted]. The newer portion of the stand was probably complete by [redacted] the first evidence of a diffuser from the stand to the new exhaust scrubber was observed. The diffuser is approximately 100 feet long and 10 feet in diameter at the widest point. Although dark shadows covered most of the diffuser at Test Stand No 2 on the [redacted] photographic coverage, the type of construction is apparently similar to that observed at Test Stand No 1; two chokepoints or coolant rings are visible with the final portion of the diffuser acting as a ductwork for the toxic exhaust gases. This stand appears to be capable of testing liquid propellant rocket engines at altitude simulation. The relative size differential between Test Stands No 1 and No 2 tends to suggest that single engines are tested at Test Stand No 2 whereas more than one engine or larger engines may be tested at Test Stand No 1. The different sizes of the diffusers support this assumption.

TOXIC EXHAUST SCRUBBER SYSTEM

The toxic exhaust scrubber system consists of the large circular scrubber and its associated exhaust stack (items 31 and 32, respectively). Three completed buildings (items 34-36) and one building still under construction (item 37) as well as 2 tanks (items 38 and 39) and a group of horizontal tanks (item 33) act as support units for the scrubber system. The scrubber itself is a large circular structure 170 feet in diameter (Figure 5). A center tanklike structure measures [redacted] in diameter and has a minimum height above ground level of [redacted] This height is probably much greater since early photographic coverage showed that part of the tank is below ground level. The center tanklike structure has a minimum capacity of approximately 1.4 million gallons; this figure has been calculated from the minimum dimensions. An earth-mounded semiburied tank located adjacent to item 17 might serve as a "catch tank" for this system. A "catch tank" would be used to settle out solid matter [redacted] ting conditions, the scrubber may receive the hot toxic exhaust gases in the outer ring of the scrubber. The exhaust gas would then circulate around the ring while being sprayed and neutralized with a water-soluble neutralizer such as calcium hydroxide. The exhaust gas would then be changed mostly to steam and vented by means of the 300-foot exhaust stack. The pipeline connecting the 6 vertical tanks (with a capacity of 15,700 cubic feet) to the top of the stack could then act as a supplementary burnoff for those remaining combustible and toxic gases/vapor not neutralized by the scrubber. Meteorological conditions are probably taken into account when testing is anticipated.

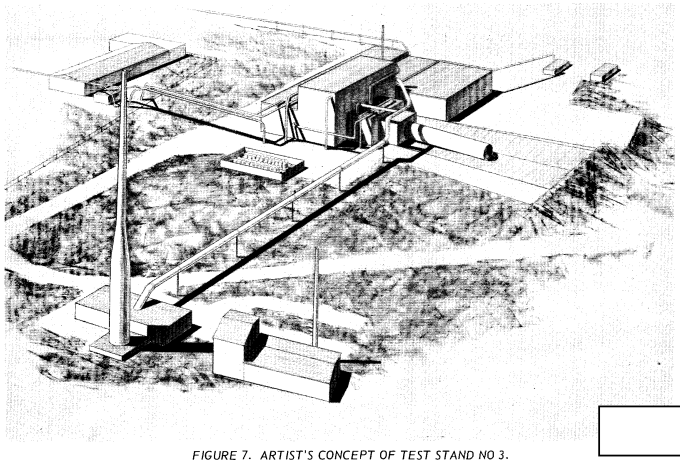


FIGURE 7. ARTIST'S CONCEPT OF TEST STAND NO 3.

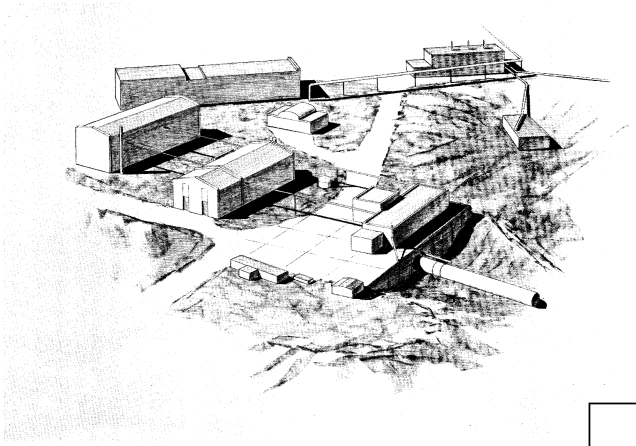


FIGURE 8. ARTIST'S CONCEPT OF TEST STAND NO 4.

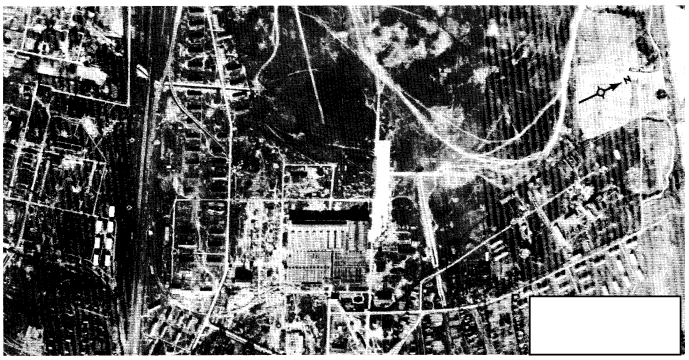


FIGURE 9. PLANT AREA,

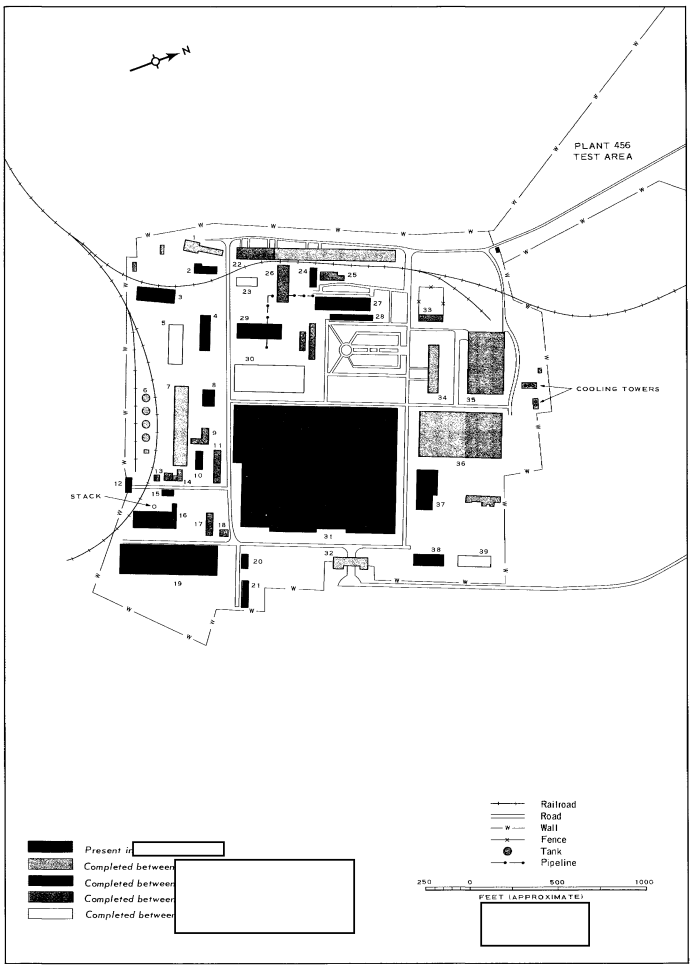


FIGURE 11. LAYOUT OF PLANT AREA.

Table 3. Data on Plant Area, Moskva Missile and Space Propulsion Development Center Khimki 456
(Item numbers are keyed to Figure 11)

Item	Function/ Description	Dimensions (ft) L	W	Roof Cover (sq ft)	Date First Observed & Apparently Complete (unless otherwise noted)	Comments
1	Storage bldg					Apparently complete in
2	Shop bldg					Apparently complete in
3	Storage bldg					Apparently complete in
4	Support bldg					Appeared in the late stage of construction in
5	Shop bldg					Prob used to store POL
6	Tanks (4)					
7	Shop bldg					
8	Shop bldg					Apparently complete in
9	Support bldg					
10	Poss compressor bldg					Apparently complete in
11	Support bldg					
12	Guardhouse					Apparently complete in
13	Support bldg					Apparently complete in
14	Maintenance bldg					Prob supports steamplant (item 16)
15	Support bldg					
16	Steamplant					Apparently complete in
17	Support bldg					Apparently complete in
18	Support bldg					Completed by
19	Assembly/fabrication bldg					
20	Shop bldg					
21	Storage bldg					
22	Receiving/storage bldg					Final section (SW part) apparently complete in
23	Support bldg					Completed by
24	Support bldg					
25	Shop bldg					Apparently complete in
26	Prob systems checkout bldg					Apparently complete in
27	Shop bldg					
28	Shop support bldg					
29	Poss engineering bldg					
30	Poss checkout bldg					Apparently in late stage of construction
31	Main assembly/fabrication bldg					
32	Admin bldg					
33	Substation					Associated with fenced transformer yard; complete in
34	Engineering/laboratory bldg					
35	Assembly/fabrication bldg					
36	Assembly/fabrication bldg					
37	Shop bldg					
38	Support bldg					
39	Support bldg					Apparently complete in

*Greatest overall dimensions of an irregularly shaped bldg; height is to highest bay.
NOTE: Dimensions are accurate within ± 5 ft or 3 percent, whichever is greater, on all horizontal measurements and ± 5 ft on all vertical measurements.

TEST STAND NO 3

Test Stand No 3 (item 56) was reportedly complete in 1957. 1/ It is a low probable horizontal-type test building apparently comprising 2 or 3 test positions. An artist's concept of the stand is presented in Figure 7. A diffuser, which extends from the northeast side of the stand, probably provides the stand with an altitude simulation capability. The diffuser is in diameter. No chokepoints have been observed to date; they are probably housed internally. The stand is apparently capable of testing small liquid propellant rocket engines in an altitude simulation environment. A pipeline which extends from the stand to the base of a high exhaust stack suggests that some early R & D work was done on toxic propellants prior to the completion of the new toxic exhaust scrubber system.

TEST STAND NO 4

Test Stand No 4 (item 51) is a low multiposition test stand. It reportedly dates from around 1956-1957. 1/ An artist's concept of the stand is presented in Figure 8. One of the test positions is equipped with a diffuser measuring feet long and in diameter. The superstructure which measures feet is situated on a small bluff. The rear of the stand appears to be close to ground level, but the ground in front of the stand slopes toward the main access road to the scrubber support buildings. The stand's function has apparently been modified since the stand was originally constructed. The diffuser was first observed in but may have been present earlier. The stand appears capable of testing small liquid propellant rocket engines or components with at least one position equipped for altitude simulation work. This test stand as well as Test Stand No 3 may have been involved with R & D work for Test Stand No 1 and 2 while construction proceeded at the exhaust scrubber between 1963 and 1966. No apparent signs of toxic propellant tests are in evidence at this stand.

SUSPECT FLUORINE PRODUCTION FACILITY

The suspect fluorine production facility was under construction when first observed in Three buildings (items 6, 18, and 19, Figure 4) appeared complete at that time. The large suspect electrolysis building (item 12) which was observed under construction in 1962 was not externally complete until Two additional buildings (items 1 and 5) were built between During this same time period an elaborate pipe gallery was constructed to connect these buildings beginning or ending at item 1 and serving items 18, 19, 6 and/or 7 and probably eventually item 5 when it is complete. The facility is road and rail served by the main road and rail networks serving the Test Area.

Commercially there is only one practical method of producing fluorine. Finely ground acid grade fluorspar (calcium fluoride) is heated with concentrated sulfuric acid to make an intermediate hydrogen fluoride. Hydrogen fluoride is decomposed by means of electrolysis. (Electrolytic cells are used for this purpose). The electrolyte is potassium fluoride in hydrofluoric acid. Gaseous fluorine is produced and then liquefied utilizing the Joule-Thompson effect (the absorption of heat during the expansion of a gas). Liquid nitrogen is generally used as a coolant in this process. Liquid fluorine, with a nominal boiloff rate of 0.7 percent in 24 hours,

is stored under a blanket of liquid nitrogen. Table 2 presents the requirements for production and handling of fluorine and observations of features at Khimki 456 Test Area that would satisfy such requirements.

The Soviets have shown an interest in fluorine for use as an oxidizer in rocket propellants. 4/ At the same time, they have been taken essentially 5 years for the construction of a highly sophisticated exhaust scrubber/altitude simulation system. During this time, for all practical purposes, they inactivated one of their largest static test facilities and the main test area in their largest space propulsion development complex. Admittedly, Test Stands No 1 and No 2 were probably obsolete and testing could have been switched to Dnepropetrovsk or Zagorsk Rocket Engine Test Facilities. It was, nonetheless, somewhat of a sacrifice. To make this sacrifice and to expend this amount of labor and resources, it would only be realistic to conclude that the Soviets wish to employ the ultimate fuel-oxidizer combination. The combination presently available with the highest specific impulse (Isp) is a liquid hydrogen and liquid fluorine combination.

Khimki 456 is suspected of producing its own liquid fluorine for use as an oxidizer. Although this capability cannot be completely confirmed or denied at this time, it is nevertheless apparent that the Soviets are preparing to test rocket engines utilizing toxic propellants in an altitude simulation environment.

DESCRIPTION OF PLANT AREA

The Plant Area of the Moskva Missile and Space Propulsion Development Center Khimki 456 was present on photography of [ ] (Figure 9). Considerable additional expansion took place during the 1950s when several large assembly/fabrication buildings were completed. 1/ Numerous support, shop, and additional assembly/fabrication buildings have been completed since 1962 when the plant was first observed on [ ] photography. A recent photograph [ ] of the Plant Area is shown in Figure 10. The line drawing of the layout of the area (Figure 11) is color coded to show the chronology of construction. Table 3 presents the function/description and mensural and chronological data of structures in the Plant Area; item numbers in the table are keyed to Figure 11.

Since very little usable land remains within the fenced plant area, it may be assumed that the Khimki 456 Plant Area is close to completion. It presently includes [ ] feet of roof cover. It is road and rail served and is secured by a single fence. The plant apparently supplies its own logistical support i.e., an electric substation (item 33) and the heating plant (item 16). The extremely large main assembly/fabrication building (item 31) and its numerous support, shop, and subassembly buildings provide this plant with the capability to produce liquid propellant rocket engines as well as their associated tankage.

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REQUIREMENT

CIA. C-DI5-82,973

NPIC PROJECT

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