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basic imagery interpretation report

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Submarine Launch Procedures at Leningrad Shipyards Sudomekh 196 and Admiralty 194 (S)

STRATEGIC WEAPONS INDUSTRIAL FACILITIES

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ABSTRACT

1. This is the second in a series of reports that summarize submarine launch procedures at Soviet shipyards. These reports describe imagery-derived, step-by-step launch procedures, from the first indication that a submarine will be removed from a construction hall through the departure of the submarine from the shipyard, and give examples of the launch-related activities. This report is intended to provide the reader with a basic understanding of the launch procedures at Leningrad Shipyard Sudomekh 196 and Leningrad Shipyard Admiralty 194. All applicable satellite imagery acquired through was used in the preparation of this report. (TSR)

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2. A location map, 15 annotated photographs depicting the procedures observed before and during the launch and transfer of submarines, and a glossary of significant terminology related to submarine launch procedures are included in this report. (S/WN)

INTRODUCTION

3. The Leningrad Shipyards Sudomekh 196 and Admiralty 194 (Figures 1 and 2), located side-by-side on the south bank of the Neva River in the west-central section of Leningrad, reportedly operate under a combined administrative authority.¹ They are involved in the construction of nuclear- and diesel-powered attack submarines, naval auxiliaries, and space-event support ships. (TSR)

4. Leningrad Shipyard Sudomekh 196 is currently engaged in the construction of an unknown class of submarine. Past construction at the shipyard has included Alfa-class nuclear-powered attack submarines (SSNs), Foxtrot-class attack submarines (SSs), the Uniform- and X-Ray-class nuclear-powered auxiliary submarines (SSANs), and the Lima-class auxiliary submarine (SSA). The shipyard is also engaged in research and development and in the construction of military and civilian submersibles and submarine models. (TSR)

5. Leningrad Shipyard Admiralty 194 is currently engaged in the construction of Victor-III-class SSNs, Marshal Nedelin-class space-event support ships (SESSs), a possible missile support ship (NPIC interim designator 194E), and probably an unknown class of submarine. Past construction at the shipyard has included Victor-I- and Victor-II-class SSNs, Ivan Susanin-class patrol gunboats, Ingul-class salvage and rescue ships, Posyet-class fish factory ships, and panel tunnel concealment devices. (TSR)

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FIGURE 1. LOCATION OF LENINGRAD SHIPYARDS SUDOMEKH 196 AND ADMIRALTY 194, USSR

BASIC DESCRIPTION

Leningrad Shipyard Sudomekh 196

Overview

6. One two-bay construction hall at Sudomekh is used for the construction of nuclear-powered submarines. This construction hall is an integral part of the submarine assembly and hull section fabrication complex, which consists of

three buildings: the construction hall, the hull section fabrication and subassembly hall, and the transfer hall (Figure 3). The construction hall contains two inclined building ways (inclined 15 to 20 degrees) enclosed by a caisson gate (Figures 3 and 4). The hull section fabrication and subassembly hall is divided into plate rolling/fabrication and subassembly areas. In addition to the construction of submarine pressure hull sections, which are transferred to the construction hall for the assem-

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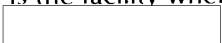
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bly of submarines, small submarines and submersibles are constructed in this hall. Four doorway openings, designated S3 through S6 (Figure 4), provide access to the transverser for the rollout of small submarines and submersibles directly from the fabrication and subassembly hall. The transfer hall serves as a paint shop and is the facility where anechoic coating is applied.² 

7. A number of machine shops and plate cutting/shaping and component assembly buildings support the Sudomekh shipyard. To augment the construction capacity of the yard, a *medium floating drydock (YFDM)**, which is referred to as the "*Admiralty FDD*" (Figure 5), has been used as an open building dock for construction of Foxtrot SSs and the Lima SSA (Figure 5). (S/WN)

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²Italicized terms are defined in the glossary at the end of this report. This glossary provides a description of significant terminology related to submarine launch procedures and is intended to provide the reader with a consistent set of terminology. (U)



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8. Submarines are moved from the construction hall by *launching* them directly into the water from the inclined building ways—the usual procedure—or they are *rolled out* from the subassembly hall into the Admiralty FDD and then launched—the procedure used with the X-Ray SSAN. After launch, the submarines are positioned at the quay for initial *fitting out*. Nuclear-powered submarines are then transferred to Severodvinsk Shipyard 402  on the White Sea (Figure 1), for

final fitting out and *sea trials*. Diesel-powered submarines are completely fitted out at the shipyard and undergo sea trials in the Baltic Sea or are transferred to the Black Sea for sea trials. (S/WN)

Roll-Out Procedures

9. The only rollout of a submarine at the Sudomekh shipyard occurred in October 1983, when the X-Ray SSAN was rolled out of the hull

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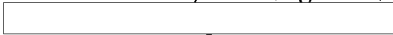
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section fabrication and subassembly hall. The Admiralty FDD, with a new *panel tunnel* in its well, was aligned with the subassembly hall (Figure 6).

The panel tunnel  ters between flotation supports) had been draped with canvas on all four sides. Two floating cranes (YDs), positioned on either side of the Admiralty FDD, were probably used to lift the panel tunnel into position and assist with the rollout. (S/WN)

Launch Procedures

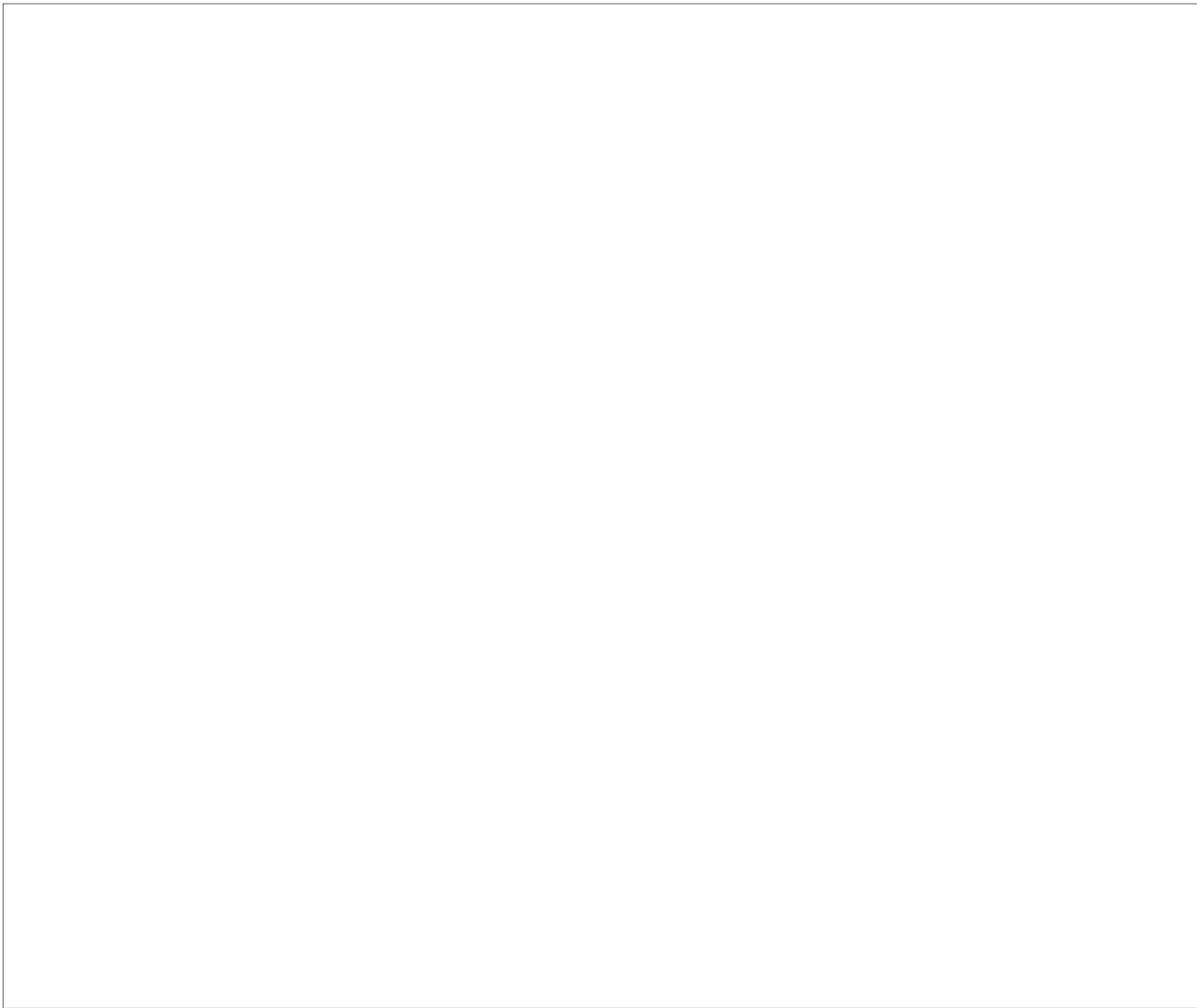
10. After the X-Ray SSAN was rolled out, the panel tunnel (with the submarine underneath), was launched into the channel and moored between a 975-class radiological repair barge (YRRN) and a radiological support barge (RSB) for initial fitting out (Figure 7). (S/WN)

11. Some or all of the following sequence of activity may be observed before the launch of a submarine:

- The appearance/disappearance of *launch devices* (Figure 8);
- Movement of the floating security screens and panel tunnels used to conceal the submarine during fitting out, and movement of the auxiliary vessels used during fitting out and for concealment of the submarine (Figure 9);
- Installation of the *bridging rails* (Figure 4);
- Removal of the caisson gate; and
- Opening of the doors of the construction hall. (TSR)

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12. Although the actual launch of a submarine has not been observed, it is believed that anchors and/or drag chains are attached to the submarine to maintain control of it and prevent it from running aground as it moves, stern first, down the launch rail. (S/WN)

Fitting-Out Procedures

13. Once launched, the submarine is posi-

tioned at the quay for fitting out. Various auxiliary ships (used to support fitting out), floating security screens, and panel tunnels are used to conceal the submarine during the fitting-out process. Auxiliary ships that have been used during the fitting-out process include auxiliary repair docks (YRDs), a Zeya YRRN, a 975-class YRRN, and RSBs (Figure 9). After initial fitting out, nuclear-powered submarines are placed in a YRD and transported via the inland waterway system to Severodvinsk Shipyard

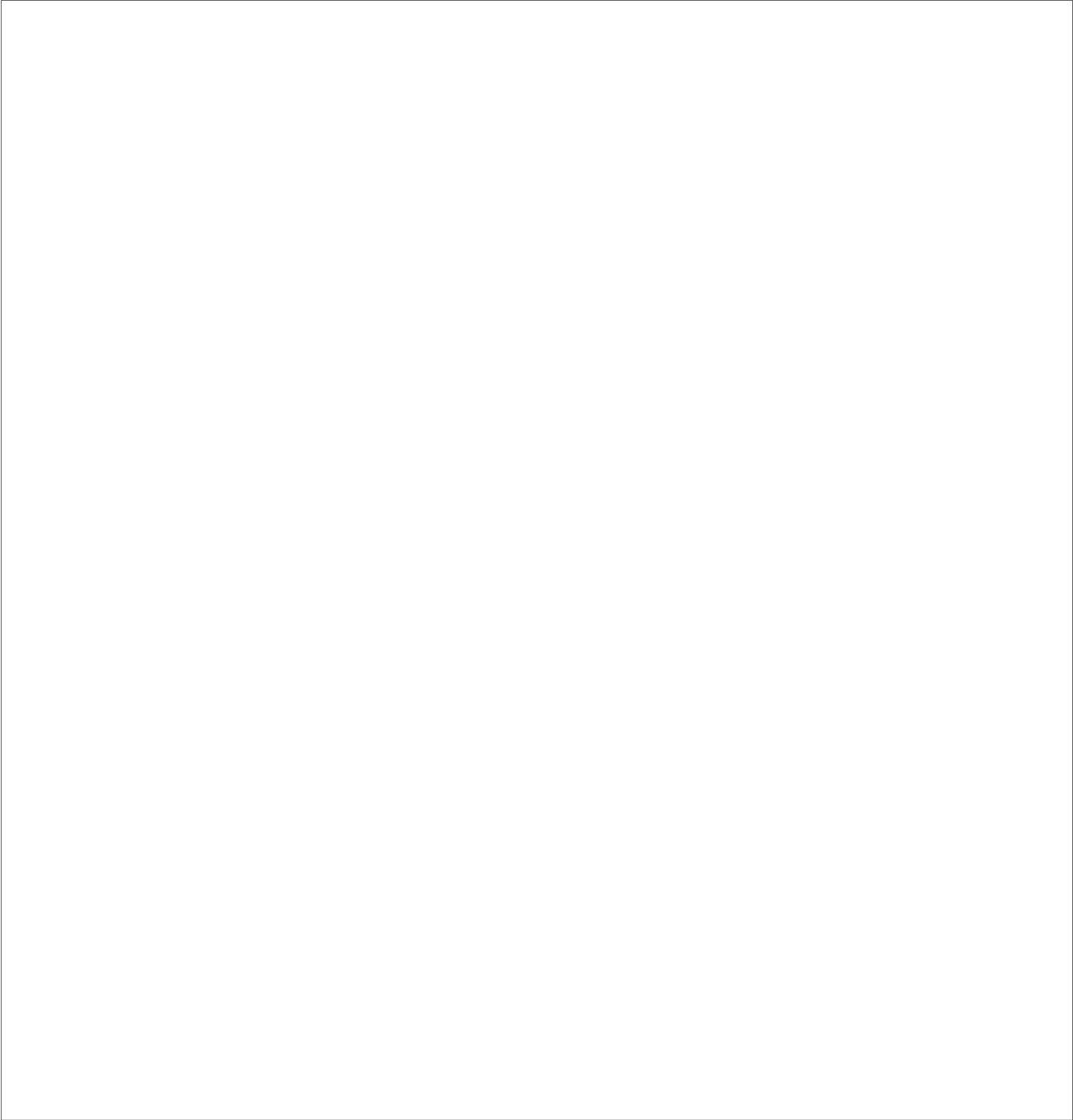


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for final fitting out and sea trials. Diesel-powered submarines (Foxtrot SSs and the Lima SSA) and submersibles are completely fitted out at the quay and undergo sea trials in the Baltic Sea (in the case of Foxtrot SSs and some submersibles) or the Black Sea (in the case of the Lima SSA and some submersibles). (S/WN)

14. Preparation of the YRD for transfer of the submarine, because of the concealment of the submarine during launch and fitting out, may be the first indication of a submarine's overall length and function. The Uniform SSAN was transported to Severodvinsk in the Alfa SSN-associated YRD (Figure 10), which had previously been used for the

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transfer of four Alfa SSNs to Severodvinsk. Keel blocks, in a distinctive four-row, "low-block" pattern at the stern, were positioned along and to the sides of the centerline of the YRD (Figure 10). The keel-block pattern was [redacted] meters wide. The X-Ray SSAN was transported to Severodvinsk in the Spoonbill YRD. The keel-block pattern along the centerline of the YRD was approximately [redacted] long and [redacted] wide (Figure 11). Both submarines were completely concealed before and during transit. The Alfa and Spoonbill YRDs have been used in a "mothership" role since the deployment of the Uniform and X-Ray SSANs to the Northern Fleet; their future use at Leningrad is unknown. (S/WN)

15. Diesel submarines (Foxtrot SSs and the Lima SSA) constructed in the Admiralty FDD (Figure 5) were removed from the Admiralty FDD and moored at the quay for fitting out, where auxilia-

ries and/or security screens were used for concealment. Foxtrot SSs were then transferred to an operational base under their own power for sea trials and crew training. The Lima SSA, after fitting out had been completed, was loaded into the Rectangular House YRD and transferred to Sevastopol Naval Base [redacted] in the Black Sea, for sea trials. (S/WN)

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Leningrad Shipyard Admiralty 194

Overview

16. Submarine construction facilities at Admiralty (Figure 2), on the south shore of the Fontanka Canal, consist of a construction hall, a fabrication/subassembly hall, and a transverser system (Figure 12). The construction hall contains six multistory bays and an administration/engineering

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wing on each end. The original construction hall contained bays 3, 4, and 5; bays 1, 2, and 6 were added between late 1962 and July 1966 to support the Victor-class SSN construction program. Submarines are constructed on five building ways: building ways 1 and 2 in bay 2, building ways 3 and 4 in bay 3, and building way 5 in bay 4. Bays 1, 5, and 6 are used as subassembly areas. (S/WN)

17. Before 1975, pressure hull and outer hull sections were fabricated at the numerous fabrication/subassembly halls and shops on the north shore of the Fontanka Canal, where surface ships are also built on the two open building ways. Hull

components were staged, transported by floating crane to the hall, and loaded into the subassembly areas. Although some components, including most of the outer hull sections, are still moved into the hall this way, the five-story fabrication/subassembly hall and transverser system completed in 1975 (Figure 12) facilitates the flow of components, including most of the pressure hull sections, directly into the construction hall. (S/WN)

18. Submarines are rolled out of building ways 1 through 5 under the panel tunnels in the Admiralty FDD (Figure 13). The Admiralty FDD (with the submarine in its well) is moved into the



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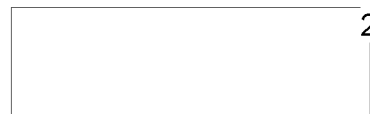
Neva River, where the submarine and panel tunnel are launched and positioned at the quay for initial fitting out. After initial fitting out is completed, the submarine is transported via the inland waterway to Severodvinsk for final fitting out and sea trials. (TSR)

Roll-Out Procedures

19. Some or all of the following sequence of activity may be observed before the rollout of a submarine:

- Movement of the Admiralty FDD (routinely moored at Sudomekh) to Admiralty;
- Placement of the *launch rail platforms* (Fig-

- ure 14) in the well of the Admiralty FDD;
- Placement of the *panel tunnel support pedestals* (Figures 8 [inset] and 15) in the well of the Admiralty FDD;
- Placement of the panel tunnels on the support pedestals (Figures 8 [inset] and 15);
- Movement of the Admiralty FDD into alignment with one of the building ways (Figure 13); and
- Draping the panel tunnels with a canvas and/or net covering. The submarine, on *transfer dollies*, is then winched out of the construction hall and into the Admiralty FDD. (TSR)



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20. The launch rail platform components have been seen stored opposite the construction hall, on the north bank of the Fontanka Canal, and on the quay at Sudomekh. The panel tunnel support pedestals have been stored opposite the construction hall, on the north bank of the canal, and in the open area next to the administration/engineering wing on the northeast corner of the construction hall. The platforms and pedestals have also been left in the well of the Admiralty FDD for significant periods. Two panel tunnels, one [redacted] meters and one [redacted] long and both [redacted] meters between the flotation supports, and eight pedestals were used during rollout and fitting out of the Victor-III SSNs. The launch rail platform, four pedestals, and one of the new panel tunnels, [redacted] long and [redacted] wide (between the flotation supports), were used during rollout and fitting out of the X-Ray SSAN. (S/WN)

Launch Procedures

21. After a submarine is rolled out into the Admiralty FDD, the FDD is maneuvered into the Neva River, and the submarine is launched. The submarine is immediately placed between the 925- and 975-class YRRNs for fitting out (Figure 16). Attache reporting indicated that the launch sequence of a Victor-II SSN (from rolling the submarine into the Admiralty FDD to positioning the Victor-II and panel tunnel between the YRRNs) took approximately 13 hours.³ The Admiralty FDD, after the submarine has been launched, may be seen moved back to the construction hall and aligned with the building ways for the return of the transfer dollies. [redacted]

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Fitting-Out Procedures

22. The fitting-out procedures at Admiralty

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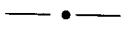


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are similar to those at Sudomekh. Once launched, the submarine is positioned at the quay for fitting out. Various auxiliary ships (used to support fitting out), floating security screens, and panel tunnels are used to conceal the submarine during the fitting-out process. Auxiliary ships that have been used during the fitting-out process include the 975- and 925-class YRRNs. After initial fitting out, the submarines are placed in a YRD and transported via the inland waterway system to Severodvinsk for final fitting out and sea trials. (S/WN)

23. As at Sudomekh, because of concealment activity during submarine launch and fitting out, preparation of the YRD for the transfer of the submarine may be the first indication of a submarine's overall length and function. The Victor SSNs were transported to Severodvinsk in the Blunt Bow YRD. Keel blocks were positioned along and to the sides of centerline of the YRD (Figures 10 and 16) in a pattern that was approximately  long and  wide. The submarines were completely concealed before and during transit. (S/WN)

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GLOSSARY

**Significant Terminology Related to Submarine Launch Procedures at
Leningrad Shipyards Sudomekh 196 and Admiralty 194**

Admiralty FDD The medium floating drydock (YFDM), constructed on the open building ways at Admiralty, which is currently used for launching submarines at Sudomekh and Admiralty (Figure 5).

bridging rails A small section of the launch rail used to bridge the gap between the building ways inside the construction hall and the caisson gate (Figure 4).

fitting out The period following the launch of a unit when the major construction process is completed. The submarine is made habitable and is prepared for the operational testing of all functional components.

launch The process of moving the submarine into the water, either from a floating drydock or directly from a fabrication or construction hall. This activity should not be confused with rollout, which is the transfer of a submarine from the construction hall.

launch devices Devices placed under the bow of the submarine to prevent excessive torque and stress from being applied to the hull during launch (Figure 8).

launch rail platforms Structures in the well of the Admiralty FDD that form a rail on which a submarine on transfer dollies can be rolled out of the construction hall (Figures 14 and 15).

medium floating drydock (YFDM) A YFDM is any floating, open-ended drydock with a lift capacity between 5,000 and 20,000 metric tons. Two YFDMs are used at these shipyards. The most recently built YFDM has been designated the Admiralty FDD by the Intelligence Community (Figure 5).

panel tunnel A concealment device used during rollout, launch, and fitting out of submarines at both shipyards (Figures 6 and 13).

panel tunnel support pedestals Structures positioned in the well of the Admiralty FDD to support a panel tunnel (Figure 15) at a height sufficient for the submarine to be rolled out beneath it.

roll out The transfer of a submarine by rail from the construction hall to the well of the Admiralty FDD. This activity should not be confused with launch, which is the process of moving a submarine from the launch dock or construction hall into the water.

sea trials The checkout period conducted at sea when all systems and subsystems are exercised to their design limits. For intelligence reporting purposes, sea trials are considered to have commenced when the unit has departed the complex where fitting out occurred.

transfer dollies Structural crossmembers, contoured to the hull of the submarine, with two sets of wheels (referred to as trucks). Transfer dollies are used to roll a submarine from the building ways into the Admiralty FDD.

This glossary is classified TOP SECRET RUFF.

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REFERENCES

IMAGERY

All applicable satellite imagery acquired through [redacted] was used in the preparation of this report. (TSR)

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SMALL-FORMAT IMAGERY

Figure No	Source	Accession No	Date	Classification
5 (inset)	DIA	6 901 0717 78/C/GDS84	21 Aug 78	CONFIDENTIAL
7 (inset)	DIA	6901 0779 82	16 Jul 82	CONFIDENTIAL
8 (inset)	[redacted]	[redacted]	19-20 Mar 84	CONFIDENTIAL
15 (inset)	DIA	6901 0480 84	9 Jul 84	CONFIDENTIAL

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MAPS OR CHARTS

DMAAC. USATC, Series 200, Sheet FP0153-04R, 6th ed, Jan 84, scale 1:200,000 (SECRET, [redacted])

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DOCUMENTS

1. NISC. [redacted] RNG-23/0003/77, *Submarine Components, Leningrad Shipyard Admiralty 194, Leningrad Shipyard Sudomekh 196 (S)*, Apr 77 (TOP SECRET RUFF [redacted])
2. DoD. IIR 5 300 0125 81, *Titanium Submarine Construction at the Leningrad Sudomekh Shipyard, additional information (U)*, 18 Aug 81 (CONFIDENTIAL [redacted])
3. USDAO/Moscow. (U) "Victor Launch" in Leningrad, 111318Z Sep 79 (SECRET, [redacted])

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RELATED DOCUMENT

NPIC. 7-14085/84, RCA-09/0018/84, *Submarine Launch Procedures at Komsomolsk Shipyard Amur 199 (S)*, Nov 84 (SECRET, [redacted])

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REQUIREMENT

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Comments and queries regarding this report are welcome. They may be directed to [redacted] Soviet Air, Navy, Nuclear Division; Imagery Exploitation Group, NPIC, [redacted]


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