Top Secret

[redacted]

DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Volgograd Petroleum Refinery

Volgograd, USSR

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME		COUNTRY
Volgograd Petroleum Refinery		UR
UTM COORDINATES	GEOGRAPHIC COORDINATES	25X1
38UMU711728	48-29-29N 44-37-26E	
MAP REFERENCE		
2nd RTS. USATC, Series 200, Sheet M0235-21HL, 5th ed, Feb 68, Scale 1:200,000		
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LATEST IMAGERY USED	NEGATION DATE (If required)	
	NA	25X1

ABSTRACT

The major production components present at the Volgograd Petroleum Refinery include four crude oil distillation units, two thermal cracking units, two delayed coking units, and a probable catalytic reforming-hydrotreating unit. The refinery also contains a lubricating oil plant with deasphalting, dewaxing, solvent extraction, and clay treatment units. Three or four new processing units were under construction in April 1970, the date of latest good-quality photography used in this report.

This refinery has the capability of producing a wide variety of lubricating oil products, straight-run, cracked, and blended gasolines, kerosene, diesel and fuel oils, coke, various gaseous hydrocarbons, and possibly petrochemical feedstocks.

The refinery appeared operational on all photography studied, from December 1959 to April 1971.

This report includes a detailed line drawing, a photograph of the refinery, mensuration of storage tanks, and a discussion of construction chronology and operational status of facilities.

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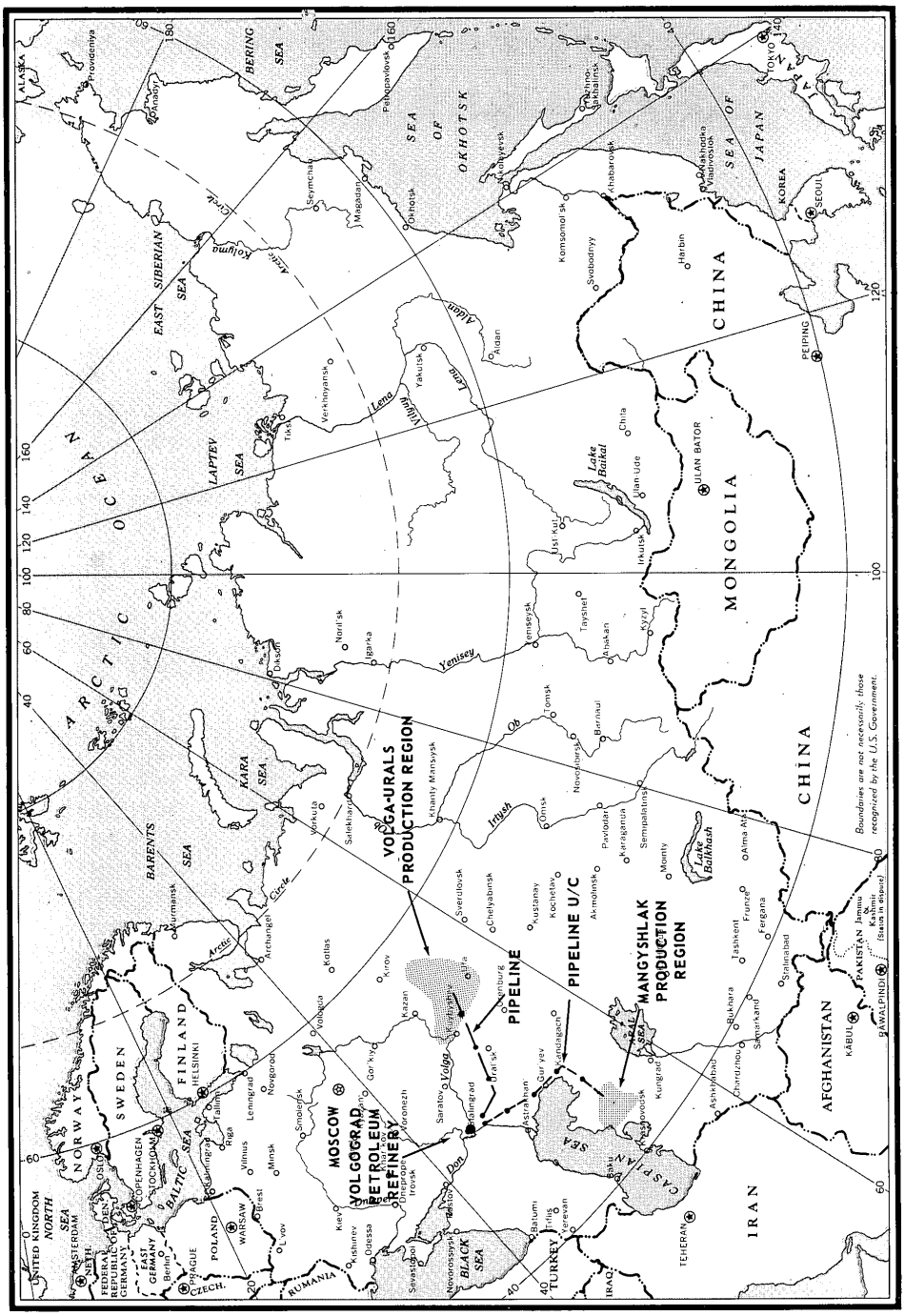

FIGURE 1. LOCATION MAP.

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INTRODUCTION

The Volgograd Petroleum Refinery is located 15 nautical miles (nm) south-southwest of the center of Volgograd, in the lower Volga region of the USSR (see Figure 1). It is one of 13 large Soviet refineries begun during the late 1950s. Construction of this refinery reportedly began in 1955 and the initial units came on stream in 1957. 1,2/

The majority of the crude oil processed at the refinery is reportedly received by pipeline from the Volga-Ural Basin. A new pipeline is under construction which will connect the refinery and the rapidly expanding Mangyshlak oil field. 3,4/ Crude oil and finished products could also be shipped by railroad and water transport. The refinery contains numerous rail car transshipment facilities, and it is served by a branch line from the Volgograd-Kharkov rail line. A pipeline extends from the refinery 1 nm northeast to a six-pier transshipment facility of the Volga River which is used for transloading of barges and small tankers. The Volga-Donskoy Canal, 2.7 nm west of the refinery, connects the Volga and Don rivers.

Electric power for the refinery is produced at the Volgograd Heat and Thermal Power Plant TETS 2 [redacted] A new petrochemical plant is under construction immediately southeast of the refinery. They are connected by a pipe gallery. A petroleum products storage area, located 4.5 nm east-southeast of the refinery, could provide additional product storage. 25X1

BASIC DESCRIPTION

Physical Features

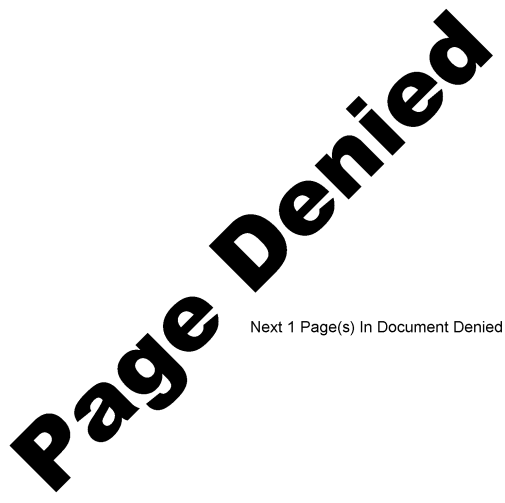
The Volgograd Refinery is comprised of two areas. The main area, covering approximately 2,700 acres, contains all the processing units and some of the storage and shipping facilities. The second area, covering approximately 370 acres, contains facilities for crude oil receiving and storage and products shipping and storage (see Figures 2 and 3).

Operational Functions

The two primary products of the Volgograd Refinery are fuels and lubricating oils. Major identifiable refining units now complete and in operation include four crude oil distillation units, two thermal cracking units (each with a vapor recovery unit), two delayed coking units, and a probable catalytic reforming-hydrotreating unit (CR-HT).

The lubricating oil processing facilities include five dewaxing units, two deasphalting units, three solvent extraction units, and two clay treatment units.

The refinery has the capacity to produce a wide variety of lubricating oil products, straight-run, cracked, and blended gasolines, kerosene, diesel and fuel oils, coke, gaseous hydrocarbons, and possibly petrochemical feedstocks.



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Construction and Operational Status

The completed portions of the refinery were operational in December 1959, the date of the earliest available photography. Units constructed since that time are presumed to be operational upon their completion. The following facilities were complete and operating in December 1959: the two small crude oil distillation units and their associated desalting units; the two thermal cracking and recovery units; the above ground tankage in Area B; the heat and thermal power plant; most of the water treatment facilities in Areas N (2) and I; some support facilities in Areas A, E, and L; and scattered tankage. The lubricating oil facilities in Area H were in various stages of construction.

In April 1962 a third crude oil distillation unit had been added and the lubricating oil units in Area H were completed. Also complete were the major part of the blending, treating, storage, and shipping facilities in Area L; the administration and support facilities in Areas A and J; the gas processing unit in Area M (1); one dewaxing unit in Area M (2); the pipeline to the Volga River; and three of the piers at the transshipment facility. Under construction at this time were a delayed coking unit, one unidentified secondary processing unit, one dewaxing unit, one dewaxing unit, tankage, and reservoirs.

In September 1963, all previously reported construction and one additional unidentified secondary processing unit were complete. The fourth crude oil distillation unit in Area C was in the early stages of construction. Also under construction were the probable CR-HT unit and the northern shipping area in Area F.

By March 1968, all previously reported construction was complete. The second delayed coking unit, a dewaxing unit in Area M (1) and the processing units in Areas Q and R were also completed. The loading/unloading facilities in Area T were under construction.

Photography of April 1969 showed a possible sulfuric acid plant in Area T and additional tankage in Area B were under construction.

The possible sulfuric acid plant was complete in April 1970, the latest good-quality photography used in this report. At that time there were 11 areas under construction, three or possibly four of which will contain processing units.

The small scale and poor quality of the latest coverage, dated April 1971, precluded further analysis of the facilities.

Facilities and Equipment

Table 1 lists the functional areas, facilities, and equipment within the refinery. Measurements are given to the nearest half-meter.

Table I. Equipment and Facilities at the Volgograd Petroleum Refinery
(Keyed to Figure 3)

Area	Functional Description	Equipment and Facilities
A	Support	3 Administration buildings 8 Storage buildings 1 Support building
B	Crude Oil and Products Storage	4 Pump buildings 2 Control houses 9 Support buildings 9 Miscellaneous buildings 2 Induced-draft cooling towers, with 4 cells each 8 Buried storage reservoirs 153 Cylindrical storage tanks 6 25-meter-diameter 11 21-meter-diameter 6 [redacted] 25X1 23 38 12-meter-diameter 16 [redacted] 25X1 42 9-meter-diameter 11 [redacted] 25X1 15 Buried cylindrical storage tanks (not measured) 1 Tank base U/C 2 Water basins
C	Crude Oil Distillation (1) Distillation	2 Units, each with 1 atmospheric column 1 vacuum column 2 stripper/redistillation columns 1 bank of cooling coils/heat exchangers/accumulators 2 pipe furnaces 1 treatment building with covered bank of settling tanks/accumulators 2 pump buildings 2 Desalting units with a single control house, each with 2 horizontal desalting drums 1 bank of settling tanks 1 processing building 2 horizontal storage tanks, 12 meters long 2 Cylindrical storage tanks, 12 meters in diameter 2 Support buildings
	(2) Distillation	2 Units, each with 1 atmospheric column 1 vacuum column 1 stripping column 2 redistillation columns 1 processing column 2 banks cooling coils/ heat exchangers/ accumulators 2 pipe furnaces 1 treatment building with covered banks of settling tanks/accumulators 1 possible treatment building 2 pump buildings One of the units has 9 cylindrical storage tanks and the other has 10 One of the units has a support building and a compressor building

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Area	Functional Description	Equipment and Facilities
C (Cont)		2 Desalting units, each with 3 spherical desalting drums 1 support building One of the units has 2 horizontal storage tanks, 12 meters long 3 Support buildings
D	Thermal Cracking and Vapor Recovery	2 Units, each with 1 bank of processing equipment including 1 reactor column, 1 fractionating column, and 1 flash chamber 1 bank cooling coils/heat exchangers/accumulators 2 pipe furnaces 1 pump building 2 Vapor recovery units, each with 4 columns 1 bank cooling coils/heat exchangers/accumulators 1 compressor building 1 horizontal storage tank, 12 meters long 3 Cylindrical storage tanks, 5 meters in diameter
E	Administration and Support	4 Pump houses 8 Administration buildings 36 Support buildings 4 Cylindrical storage tanks (not measured) 6 Horizontal storage tanks, 12 meters long
F	Crude Oil Receiving, Products Shipping, and Storage	4 Pump buildings 36 Support buildings 7 Loading racks 14 Semi-buried storage reservoirs 130 Cylindrical storage tanks 1 48-meters-diameter 14 36-meters-diameter 50 24-meters-diameter 6 [redacted] 25X1 20 12 9-meters-diameter 1 [redacted] 25X1 26 5-meters-diameter 2 Cylindrical storage tanks U/C 16 Semi-buried cylindrical storage tanks 7 Horizontal storage tanks, 27 meters long
G	Delayed Coking (1) Delayed Coking	1 Unit with 3 coking drums 1 bank cooling coils/heat exchangers/accumulators 3 pipe furnaces 1 shipping building 1 pump building 1 overhead crane 1 cylindrical storage tank, 3 meters in diameter

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Area	Functional Description	Equipment and Facilities
G (Cont)		1 Probable fractionating unit with 4 fractionating columns 1 bank cooling coils/heat exchangers/accumulators 1 pump building with a group horizontal tanks on its roof 1 possible control house 1 support building 3 cylindrical storage tanks (not measured) 1 Pump building 1 Storage/shipping building 3 Miscellaneous buildings 11 Cylindrical storage tanks 5 12-meters-diameter 6 [redacted] 25X1
	(2) Delayed Coking, Blending, and Shipping	1 Delayed coking unit with 3 coking drums 1 fractionating column 2 banks processing equipment 1 bank cooling coils/heat exchangers/accumulators 1 pipe furnace 1 possible processing building 2 pump buildings 1 shipping building 1 control house 1 loading tower 1 overhead crane 3 cylindrical storage tanks (not measured) 1 Blending, treating, packing and shipping unit with 5 probable batch agitators/ blending tanks 1 pipe furnace 1 processing/blending building with 6 probable batch agitators/ blending tanks 2 probable treatment buildings 1 pump building 1 shipping building 4 miscellaneous buildings 2 cylindrical storage tanks, 6 meters in diameter 1 Storage area with 1 support building 14 cylindrical storage tanks 6 12-meters-diameter 4 [redacted] 25X1 4 6-meters-diameter
H	Lubricating Oil Plant (1) Deasphalting	2 Units, each with 1 deasphalting column 1 stripping column 1 flash tower 1 bank processing equipment 1 bank cooling coils/heat exchangers/accumulators 1 pipe furnace 1 pump building 4 cylindrical storage tanks (not measured)

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Area	Functional Description	Equipment and Facilities
H (Cont)		1 Storage area with 1 pump building 2 miscellaneous buildings 12 cylindrical storage tanks, 12 meters in diameter
	(2) Dewaxing and Solvent Recovery	1 Dewaxing unit with 1 solvent regeneration section with 3 columns 6 settling tanks/intermediate storage tanks 1 bank cooling coils/heat exchangers/accumulators 1 chiller building with 4 crystallizer drums and attached bank of processing equipment 1 filter building with overhead crane 1 gasholder (not measured) 1 Dewaxing unit with 1 solvent regeneration section with 3 columns 1 bank cooling coils/heat exchangers/accumulators 1 chiller building with attached bank of processing equipment 1 filter building with overhead crane 2 processing buildings 1 gasholder (not measured) 1 Solvent recovery unit with 1 bank processing equipment including at least 2 columns 1 pipe furnace 1 pump building 2 cylindrical storage tanks (not measured) 1 Storage area with 7 support buildings 19 cylindrical storage tanks 3 12-meters-diameter 6 [redacted] 25X1 4 9-meters-diameter 6 [redacted] 25X1
	(3) Solvent Extraction	3 Units, each with 2 flash towers 2 stripping columns 1 treating tower 1 bank of processing equipment 2 banks of cooling coils/heat exchangers/accumulators 3 pipe furnaces 1 pump building 2 cylindrical solvent storage tanks (not measured) 2 units with 2 horizontal probable solvent storage tanks (not measured) 3 cylindrical storage tanks, 12 meters in diameter (1 unit has 4) Two of the units have 1 control house each 1 Possible treating building with 2 tanks

Area	Functional Description	Equipment and Facilities
H (Cont)	(4) Clay Treatment and Products Storage	1 Clay treatment unit with 6 possible treating towers 9 possible batch agitators 3 pipe furnaces 1 filter building with 2 probable clay treating towers 1 clay receiving building 5 cylindrical tanks (not measured) 1 Clay treatment unit with 2 clay treating towers 1 group possible treating towers 12 possible batch agitators 3 pipe furnaces 1 filter building 1 clay receiving building 2 cylindrical tanks (not measured) 36 Cylindrical storage tanks 34 12-meters-diameter 2 9-meters-diameter
I	Water Cooling and Treatment	3 Water treatment/pump buildings (2 with 16 water treatment basins) 6 Support buildings 5 Induced-draft cooling towers with 8 cells each 28 Induced-draft cooling towers with 5 cells each 1 Possible water treatment tank 7 Water treatment basins
J	Waste Gas Disposal	2 Compressor buildings 1 Control house 2 Support buildings 4 Horizontal tanks 1 15-meters-long 3 [redacted] 25X1 1 Gasholder, 24 meters in diameter 2 Flare towers
K	Probable Catalytic Reforming-Hydrotreating	1 Probable catalytic reforming section with 4 reactors 3 columns 1 bank processing equipment 2 banks cooling coils/heat exchangers/accumulators 1 pipe furnace 1 possible preheater/precipitator 1 pump building 1 Probable hydrotreating section with 3 columns 1 bank processing equipment 2 pipe furnaces 1 possible preheater/precipitator 1 pump building 2 cylindrical storage tanks 1 Pump building 4 Cylindrical storage tanks, 12 meters in diameter
L	Products Shipping and Storage	2 Possible processing/packaging buildings 5 Pump buildings 5 Shipping buildings 10 Storage buildings 9 Support buildings 1 Loading rack

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Area	Functional Description	Equipment and Facilities
L (Cont)		104 Cylindrical storage tanks 4 [redacted] 25X1 21 12-meters-diameter 4 [redacted] 25X1 19 9-meters-diameter 32 [redacted] 25X1 24 6-meters-diameter 18 Cylindrical storage tanks U/C 16 Buried cylindrical storage tanks (not measured) 1 Group semi-buried cylindrical storage tanks 34 Horizontal storage tanks 2 18-meters-long 11 15-meters-long 8 12-meters-long 13 [redacted] 25X1
M	Gas Processing and Dewaxing (1) Gas Processing	1 Unit with 3 possible gas fractionators 1 bank processing equipment 1 compressor building 1 gasholder, 18 meters in diameter 2 Support buildings
	(2) Dewaxing	3 Units, each with 2 solvent regeneration sections with 4 columns each 2 chiller buildings, each with 4 crystallizer drums and attached bank of processing equipment 1 filter building with 4 hoppers and 2 overhead cranes 1 pump/processing building 1 control house 2 horizontal storage tanks, 15 meters long 1 gasholder, 9 meters in diameter Two of the units have 6 cylindrical storage tanks, 9 meters in diameter 1 U/I secondary processing unit with 6 columns 2 banks of processing equipment 6 pipe furnaces 2 processing buildings with attached bank of accumulators/ settling tanks 3 pump buildings 1 overhead crane 10 cylindrical storage tanks, 9 meters in diameter 5 horizontal storage tanks 4 21-meters-long 1 [redacted] 25X1 2 Support buildings 16 Cylindrical storage tanks 8 [redacted] 25X1 8 9-meters-diameter

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Area	Functional Description	Equipment and Facilities
N	Water Treatment	4 Pumphouses 1 Control house 5 Support buildings 15 Cylindrical storage tanks 6 12-meters-diameter 4 9-meters-diameter 5 6-meters-diameter 22 Water basins 4 Possible water basins U/C
O	Gas and Unidentified Secondary Processing	1 Gas processing unit with 2 columns 1 bank processing equipment 1 compressor building 6 cylindrical storage tanks 2 18-meters-diameter 4 12-meters-diameter 1 gasholder, 18 meters in diameter 1 U/I secondary processing unit with 4 columns 1 bank processing equipment 1 bank accumulators/settling tanks 1 pipe furnace 2 compressor buildings 1 control house 1 support building 8 cylindrical storage tanks, 12 meters in diameter 1 Support building 1 Flare tower
P	Water Cooling	1 Water treatment building/pumphouse with connected water treatment basins 1 Pump house 3 Induced-draft water cooling towers with 5 cells each 1 Cylindrical storage tank, 12 meters in diameter 1 Cylindrical storage tank U/C 2 Water basins
Q	Unidentifed Secondary Processing	1 Unit with 2 possible processing buildings 2 compressor buildings 2 storage buildings 10 cylindrical storage tanks, 6 meters in diameter 2 horizontal storage tanks, 12 meters long 1 Unit with 3 possible processing buildings 2 pumphouses 1 support building 12 cylindrical storage tanks, 6 meters in diameter 3 horizontal storage tanks 1 15-meters-long 2 12-meters-long 1 Loading rack

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Area	Functional Description	Equipment and Facilities
R	Unidentified Secondary Processing	2 Units, each with 1 bank processing equipment 1 processing building 6 cylindrical storage/treating tanks 1 Unit with 4 columns 1 bank processing equipment 1 bank cooling coils/heat exchangers/accumulators 2 pipe furnaces 1 probable processing building 1 pumphouse with attached bank of accumulators/settling tanks 1 pumphouse 1 control house 1 cylindrical storage tank (not measured) 1 Unit with 2 fractionating columns 1 bank cooling coils/heat exchangers/accumulators 1 pipe furnace 1 pump building 1 Probable processing building 15 Cylindrical storage tanks, 9 meters in diameter 1 Substation with 1 transformer 1 position for a second transformer 1 control house
S	Administration and Support	1 Administration building 5 Support buildings 1 Square tower 3 Storage buildings
T	Possible Sufuric Acid Plant	Shown on Figure 3 but no detailed listing of equipment given.

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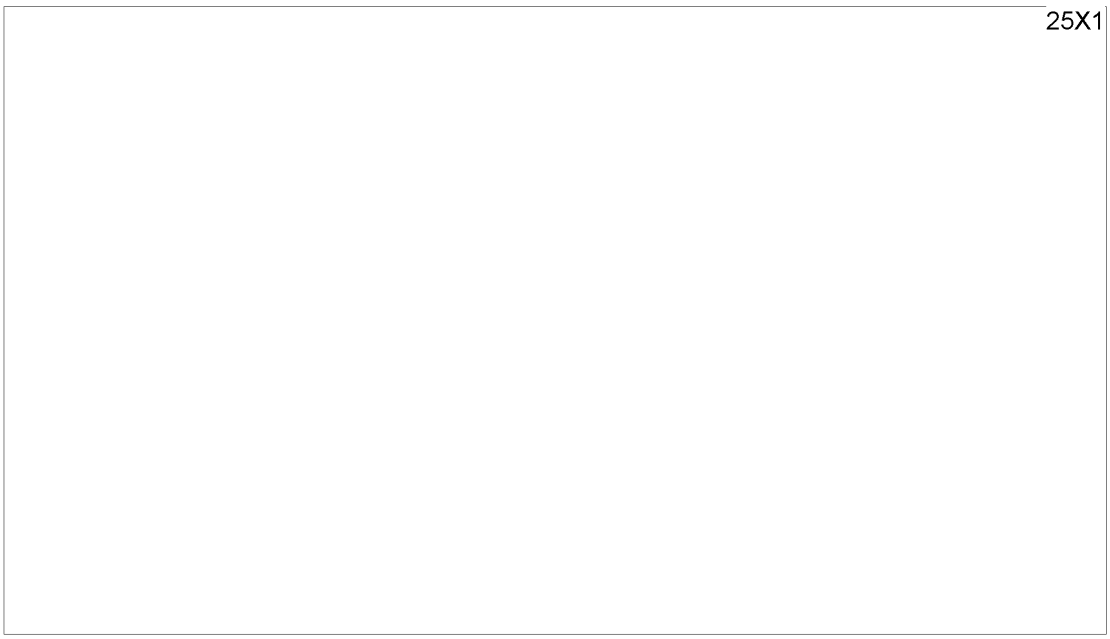

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Map

2nd RTS. US Air Target Chart, Series 200, Sheet M0235-21HL, 5th edition, February 1968, Scale 1:200,000 (SECRET [redacted] 25X1
[redacted] 25X1

Documents

1. CIA. CRS/[redacted], Plant Summary, September 1962 (SECRET) 25X1

2. [redacted] Intelligence Information Report [redacted] 25X1
4 October 1963, "Volgograd Oil Refinery at Volgograd," (SECRET/[redacted] 25X1

3. International Petroleum Encyclopedia, pp. 94-95, 1969 edition, The Petroleum Publishing Co., Tulsa, Oklahoma (UNCLASSIFED)

4. CIA. CRS [redacted] "Review of Sino-Soviet Oil," Vol. V, No. 3, June 1969 (UNCLASSIFIED) 25X1

Requirement

COMIREX NO2
Support Number 429224

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