Top Secret

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DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Nan-ching Petroleum Refinery

Nan-ching, China

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RCS 13/0182/69

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

RCS - 13/0182/69

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INSTALLATION OR ACTIVITY NAME			COUNTRY
Nan-ching Petroleum Refinery			CH
UTM COORDINATES	GEOGRAPHIC COORDINATES		WAC-PIC NC 25X1
50SPL806604	32-10-00N 118-54-40E		0386-17K

MAP REFERENCE

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USATC 200, Sheet 0386-23HL, 3rd ed, Jan 64, Scale 1:200,000 (SECRET)

LATEST IMAGERY USED	NEGATION DATE (If required)
	None Required

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ABSTRACT

This report provides an imagery-derived analysis of the Nan-ching Petroleum Refinery. This refinery is one of China's newest and probably ranks high among the country's refineries with respect to annual charge capacity. The major refinery components consist of multistage distillation equipment for the simple fractionation of crude oil and a delayed coking unit for the further refining of the reduced crude and residual products from the crude oil distillation. The products of the refinery include straight-run and cracked gasolines, diesel and fuel oils, kerosene, gas-oil, coke and probably gaseous hydrocarbons.

When first covered by photography in March 1962, construction was in the very early stages. The facilities appeared to be complete in October 1965 and were probably in full operation by March 1966.

This report includes a detailed line drawing, a photograph of the area, mensuration of storage tanks and a discussion of the status of facilities.

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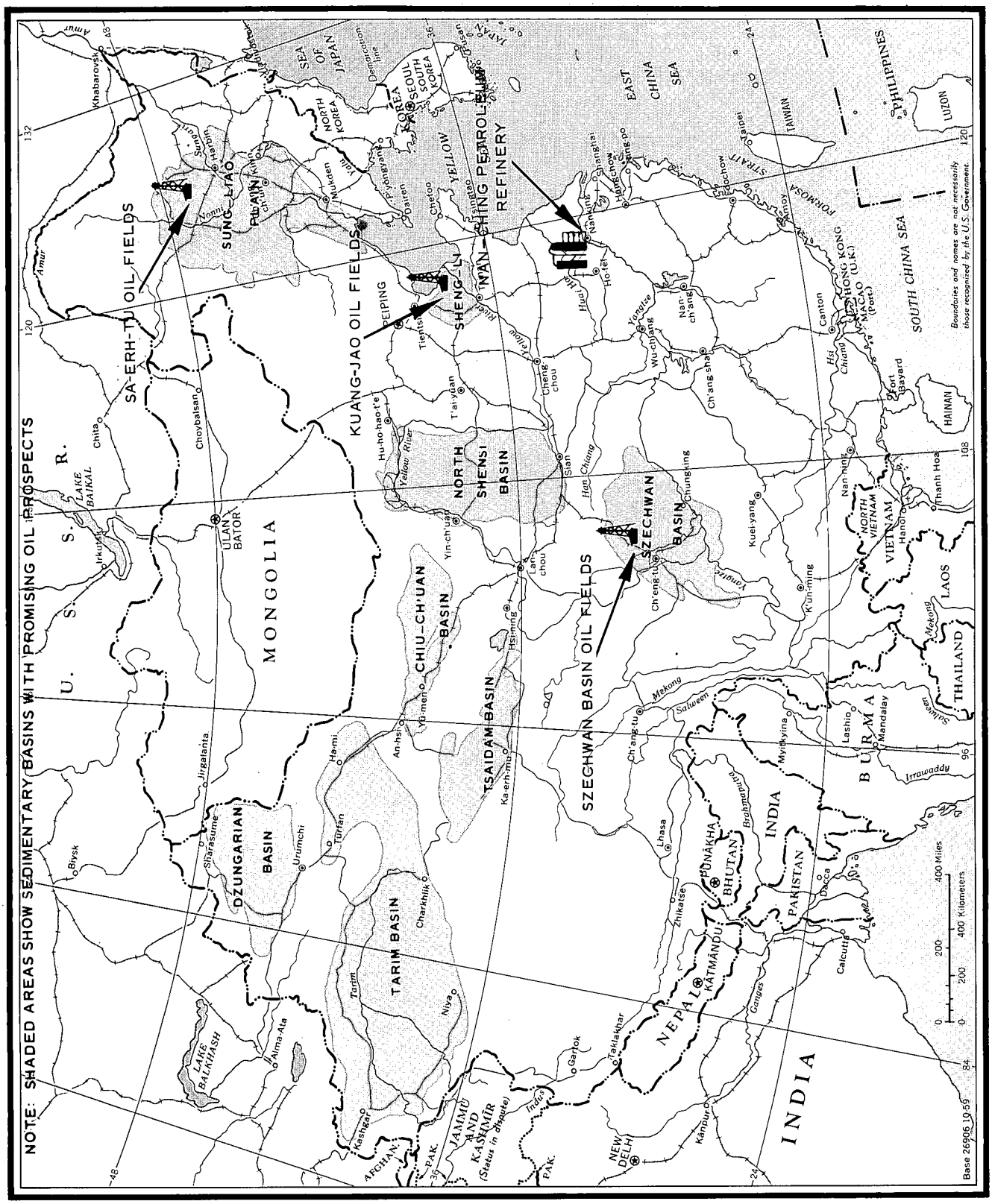

FIGURE 1. LOCATION MAP.

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INTRODUCTION

The Nan-ching Petroleum Refinery is located on the south bank of the Chang-chiang (Yangtze River), approximately 10.5 nautical miles (nm) northeast of Nan-ching, Kiangsu Province, China. This refinery is one of the most recently built in China, and probably ranks high among the Chinese refineries with respect to annual capacity.

The refinery area is served by a rail spur from the main line between Nan-ching and Shang-hai. Facilities for loading and unloading small coastal or river tankers and barges are located on the Yangtze River adjacent to the refinery. Electric power used in the operation of the plant is obtained through a small substation located within the refinery.

The principal sources of crude oil for charging this refinery are probably the Sheng-li Basin (Kuang-jao Oil Field) and several small oil pools reported to be along the border between Shantung and Kiangsu Provinces. 1,2/ The existence of these smaller pools has not been confirmed by photography. Also, crude oil produced in the Szechwan Basin in excess of that which is refined locally could be shipped down the Yangtze River to the Nan-ching refinery. 3/ Another possible source of crude oil for this refinery could be the Sa-erh-tu oil field, through port facilities at Lu-ta (Dairen) by tanker to Nan-ching. 1/

No associated plants or installations were found in the immediate vicinity of this refinery. However, it has been reported that this plant supplies raw materials for petrochemical plants in the Nan-ching area. 3/

BASIC DESCRIPTION

Physical Features

The layout and irregular outline of the refinery have been determined to a great extent by the topography of the dissected river bank. Most of the processing equipment and storage facilities are located in flat-lying areas among hills which afford a certain amount of protection against overhead attack. The plant area presently covers 220 acres and measures approximately 4,800 by 2,400 feet. No security fence or wall around the refinery was observed on the small-scale imagery.

Operational Functions

The only major refinery components presently found at this plant are multistage distillation equipment for the simple fractionation of crude oil and a delayed coking unit for the further refining of the reduced crude and residual products from the crude oil distillation. The coking

unit is a type of thermal cracker which significantly increases the refinery's output of gasoline. Another of the products of a coking unit is gas-oil which is used as a charge stock for catalytic cracking; therefore, the presence of the delayed coking unit at this refinery might indicate that future expansion of facilities would include the construction of a catalytic cracking unit.

The products of this refinery now include straight-run and cracked gasolines, diesel and fuel oils, kerosene, gas-oil, and coke. Gaseous hydrocarbons would also normally be produced, but the equipment for recovering these products could not be definitely identified on the available photography.

Construction Status and Activity

The earliest photography covering the refinery area was in March 1962. At that time, preliminary grading of the refinery area had been started near an existing POL storage area. Construction on the shipping facilities, the housing and support area, and the road bed for the rail spur into the refinery had also begun. By April 1963, grading of the refining areas was completed and construction had started on the storage tanks. Also, the rail spur appeared complete. The latest large-scale photography over the refinery was in July 1964, at which time the crude oil distillation unit was nearly complete and construction was in early stages on the probable crude oil distillation unit and the coking unit. The intermediates storage facilities were complete except for two small storage tanks, and the products and crude oil storage tanks were approximately 20 percent complete. Numerous buildings had been constructed throughout the refinery in both the support and operational areas of the plant. In the old POL storage site, dismantling of the tanks had been started.

Analysis of the construction status of the refinery after July 1964 was greatly limited by the lack of large-scale imagery. The distillation and coking units appeared to be complete by October 1965. The intermediates storage tanks and the essential loading facilities at the rail spur and the river were complete. Ninety percent of the storage tanks in the crude oil and products storage area were also complete. Additional construction was noted in the housing and support area and in a new storage area, but none appeared to be of much significance. By March 1966, all essential processing, handling and storage facilities were complete, and the refinery appeared to be operational. Minor changes continued to be made in several of the support areas, and all of the tanks in the original POL storage site had been removed. By the end of 1966, several small, probable tanks had been built in the loading and shipping area near the rail spur. There have been no significant changes in facilities noted since January 1967. Slight ground scarring in the area adjacent to the probable crude distillation unit, plus the continuing presence of a large number of construction support buildings, could be indicative of plans to build additional refining units.

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Operational Status

The refining equipment appeared to be complete and probably operational by October 1965; however, the only indication of production was the partially raised position of the roofs on two of the floating roof storage tanks in the crude oil and products storage area. By March 1966, signatures of operation were more conspicuous with the roofs raised on several of the floating roof tanks, dark staining in the coke production area, and tankers at the loading piers. Indicators of production activity have been observed on all imagery subsequent to March 1966.

Facilities and Equipment

The following table lists the functional areas and the facilities and equipment within the refinery. All items are shown on Figure 3.

Equipment and Facilities at the
Nan-ching Petroleum Refinery

Area	Functional Description	Equipment and Facilities*
A	Storage	4 Miscellaneous buildings 1 Finger pier. Probable construction material in open storage
B	Crude Oil and Products Storage	13 Miscellaneous buildings 10 Cylindrical, floating-roof storage tanks, 7 diam. 85 ft. 1 diam. 75 ft. 2 diam. 70 ft. 39 Cylindrical, fixed-roof storage tanks, 4 diam. 70 ft. 10 diam. 55 ft. 4 diam. 45 ft. 2 diam. 40 ft. 1 diam. 35 ft. 14 diam. 30 ft. 4 very small, diam. not measured 1 Tank base u/c
C	Shipping	8 Miscellaneous buildings 1 Surge tank/basin 4 Cylindrical storage tanks, 2 diam. 45 ft. 2 diam. 30 ft.

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Area	Functional Description	Equipment and Facilities*
		2 Possible cylindrical storage tanks, not measured 1 Finger pier with mooring dolphins 1 Probable pontoon wharf with dolphins 1 Finger pier
D	Storage (U/C)	27 Storage and support buildings 4 Cylindrical storage tanks, 2 diam. 65 ft. 2 diam. 30 ft. 4 Tank bases u/c. Probable construction material in open storage
E	Loading and Shipping	5 Warehouses 13 Storage/support buildings 12 Probable cylindrical storage tanks, very small, diam. not measured 5 Possible horizontal tanks/ buildings, length 50 ft.
F	Coke Production	1 Delayed coking unit with 2 coking drums, 1 fractionating column 2 coke handling structures, 1 control building 3 Possible extractors 8 Support buildings 8 Cylindrical process tanks 4 diam. 40 ft. 4 diam. 30 ft.
G	Intermediates Storage	14 Cylindrical, fixed-roof storage tanks, 8 diam. 60 ft. 2 diam. 50 ft. 2 diam. 40 ft. 2 diam. not measured
H	Steam Plant and Substation	1 Boiler house 5 Support buildings 3 Cylindrical fuel storage tanks

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Area	Functional Description	Equipment and Facilities*
I	Crude Oil Distillation	1 Multistage fractionating unit with 5 columns (includes at least 1 atmospheric and 1 vacuum fractionating column) 2 pipe furnaces 1 compressor/pump building 1 bank cooling coils/heat exchangers 1 Probable light ends unit with 3 extractors and 1 building 3 Support buildings 3 Possible small storage tanks/ pieces of equipment
J	Probable Crude Oil Distillation	2 Large, probable fractionating columns 1 Probable compressor/pump building 5 Support buildings
K	Housing and Support	109 Housing, storage, administration and support type buildings
L	Probable Processing U/C	41 Possible processing, storage, support and administrative type buildings. Some ground scarring and possible excavation for new facilities
M	Support	27 Miscellaneous buildings

*NOTE: Small scale and quality of photography hindered the identification of some of the facilities and the measurement of the storage tanks. All measurements are only approximate.

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FIGURE 2. NAN-CHING PETROLEUM REFINERY, CHINA,

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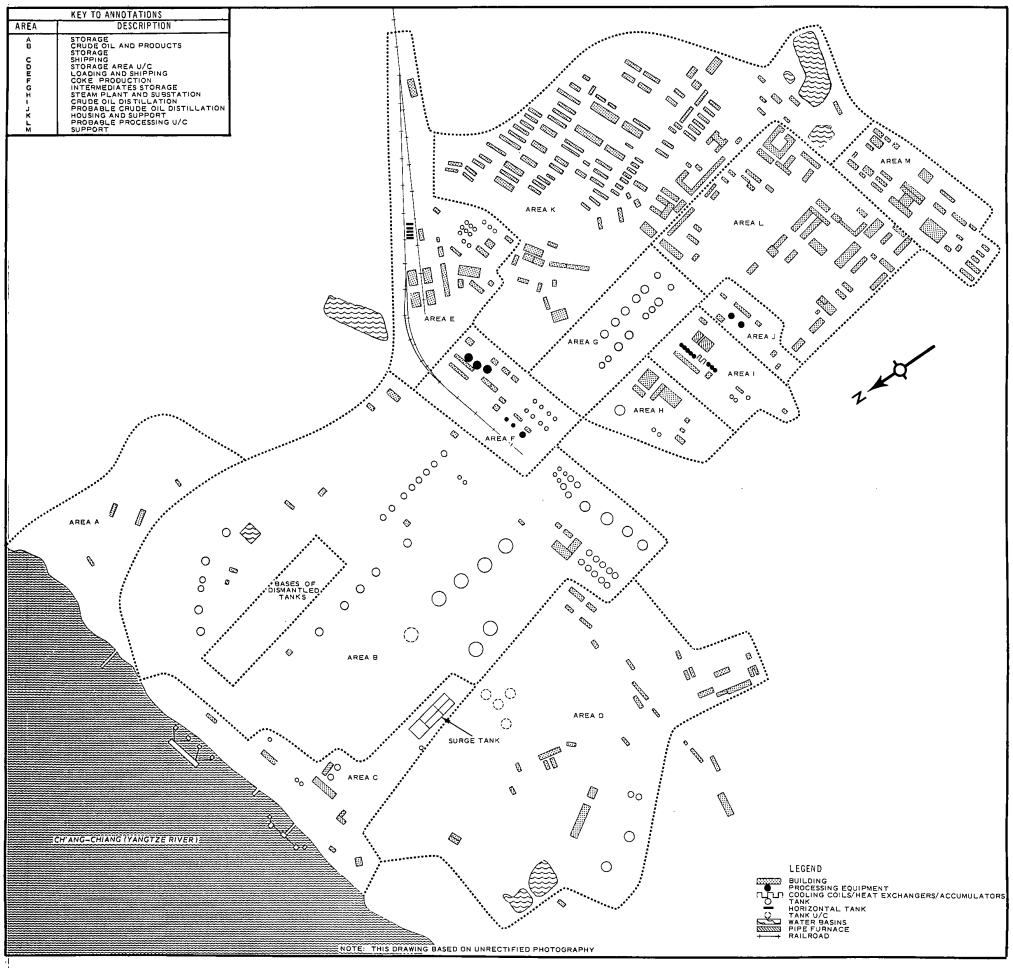

FIGURE 3. NAN-CHING PETROLEUM REFINERY, CHINA

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REFERENCES

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Map

US Air Target Chart 200, Sheet 0386-23HL, 3rd edition, Jan 64, Scale 1:200,000 (SECRET) 25X1

Documents

1. DOD. 6 May 1968 (CONFIDENTIAL) 25X1

2. DOD. 24 November 1967 (CONFIDENTIAL)

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Documents

3. Air Intelligence Information Report [redacted] 3 August 1958 25X1
(UNCLASSIFIED)

Requirement

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