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DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Sa-erh-tu Petroleum Refinery and Storage

Sa-erh-tu, China

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME	COUNTRY
Sa-erh-tu Petroleum Refinery and Storage	CH

UTM COORDINATES	GEOGRAPHIC COORDINATES
51TXM614532	46-31-30N 125-06-00E

MAP REFERENCE
2nd RTS. USATC, Series 200, Sheet M0283-7HL, 2nd ed, Apr 68, Scale 1:200,000
(SECRET)

LATEST IMAGERY USED | NEGATION DATE (If required)

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ABSTRACT

The Sa-erh-tu Petroleum Refinery was built to process crude oil produced at the adjacent Sa-erh-tu Oilfield. The major completed refinery units are two crude oil distillation units, catalytic and thermal cracking units, a delayed coking unit, a gas fractionation unit, one or more blending/treating units, and a probable catalytic reforming unit. Additional processing units are under construction. Based on the identification of the completed refinery units, the products include straight-run, cracked, blended, and probably reformed gasolines in a wide range of octane ratings, kerosene, diesel and fuel oils, petroleum coke, and gaseous hydrocarbons.

In November 1961, when the refinery area was first seen on photography, only a few support buildings were present. By November 1964, one crude oil distillation unit and several secondary processing units were completed and the refinery was seen in operation for the first time. Construction continued at a fairly rapid rate until September 1967, then progressed little through December 1969. By December 1970 new construction was again observed. On the latest coverage in June 1971, two processing units were under construction.

The refinery has been seen operating on all coverage from November 1964 to June 1971.

This report includes a location map, a photograph of the refinery, a line drawing, a detailed listing of completed buildings and processing equipment, dimensions of storage tanks, and a discussion of the status of the facilities.

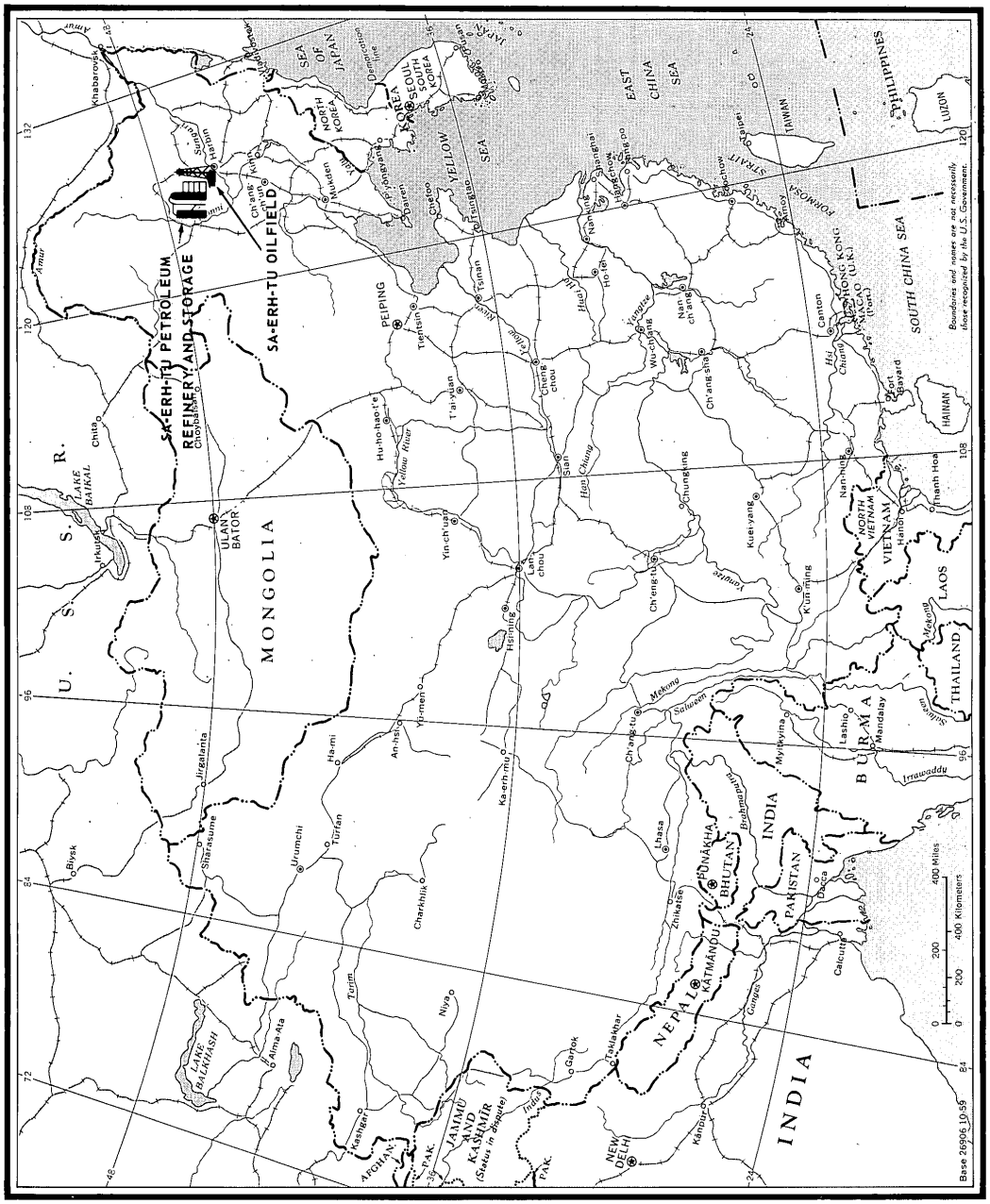

FIGURE 1. LOCATION MAP.

INTRODUCTION

Sa-erh-tu Petroleum Refinery and Storage is located in the southeastern section of Heilungkiang Province, approximately 5 nautical miles (nm) southeast of the town of Sa-erh-tu (see Figure 1).

The refinery is charged with crude oil brought by pipeline from the adjacent Sa-erh-tu Oilfield. Rail service to the refinery is provided by a spur from the main line between Harbin and Chi-chi-ha-erh. Steam and electricity for the refinery are produced at the collocated Sa-erh-tu Heat and Thermal Power Plant 25X1

BASIC DESCRIPTION

The refinery measures approximately 5,600 by 4,400 feet and occupies about 560 acres (see Figures 2 and 3). The refining and storage areas are secured by a wall. The heat and thermal power plant and some of the support facilities are not secured.

Operational Functions

The units presently completed at the refinery include two crude oil distillation units, a catalytic cracking unit, a thermal cracking unit, a delayed coking unit, a gas fractionation unit, one and possibly two blending/treating units, a probable catalytic reforming unit, two possible desalting units, and several unidentified processing units.

Based on the identification of the completed units, the refinery products include straight-run, cracked, blended and probably reformed gasolines in a wide range of octane ratings, kerosene, diesel and fuel oils, petroleum coke, and gaseous hydrocarbons.

A chemical processing unit nearing completion in Area X is different in design from any other chemical processing unit seen in China. It consists of two processing columns, a lattice-type tower (possibly a waste gas tower), cooling towers, and a conveyor system leading to a shipping building. The unit will probably use refinery waste gas as feedstock. The finished product will probably be in solid form.

Four unidentified secondary processing units (Area G) are also different in design from any other units seen at a Chinese refinery. The four units are connected by pipeline to a centralized processing building. Since oil from the Sa-erh-tu Oilfield has a high wax content, it is possible that at least part of this facility is involved in processing or removing wax from the crude oil.

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Construction and Operational Status

When the refinery area was first observed, on photography of November 1961, only a few support buildings had been built. By September 1962, one of the crude oil distillation units was in the early-to-mid stages of construction, the steam plant and water cooling facilities (Area H) were under construction, and several storage tanks had been completed. In December 1962, the crude oil distillation unit was in the midstages of construction, site preparation for the thermal cracking unit was observed, and the possible blending/treating unit was in the early stages of construction.

On photography of November 1964 the refinery was observed in operation. One crude oil distillation unit, the thermal cracking unit, the delayed coking unit, the possible blending/treating unit, the steam plant, and the thermal power plant were all in operation. Most of the present storage tanks were complete. A second crude oil distillation unit and the catalytic cracking unit were in the early-to-mid stages of construction. The probable catalytic reforming unit and the unidentified secondary processing units in Areas M, N, and T were in the midstages of construction. One possible desalting unit appeared to be complete and another was in the midstages of construction.

By November 1965, the second possible desalting unit, the second crude oil distillation unit, the catalytic cracking unit, the probable catalytic reforming unit, and the unidentified secondary processing units in Areas M, N, and T were complete. The large building associated with the unidentified secondary processing units in Area G was complete, but the processing units had not been started. Site preparation for the blending/treating unit was observed.

By March 1966 two of the processing units in Area G were in the early stages of construction. Site preparation was seen for the chemical processing unit in Area X. In September 1967, all four of the processing units in Area G and the blending/treating unit were complete. The chemical processing unit in Area X was in the early-to-mid stages of construction.

Little construction was observed between September 1967 and December 1969. By December 1970, a gas fractionation unit had been added. Construction was in the early stages on the processing unit in Area W. Little progress was noted on the chemical processing unit in Area X.

In June 1971, the processing unit in Area W was in the early-to-mid stages of construction and the chemical processing unit in Area X was nearing completion.

The refinery was seen operating on all coverage from November 1964 through June 1971.

Facilities and Equipment

Table 1 lists the functional areas and equipment within the refinery. In areas which are still under construction and whose function is undetermined, the buildings and processing equipment are not included in the table or shown in Figure 3. All measurements are rounded to the nearest 5 feet.

Table 1. Equipment and Facilities at Sa-erh-tu Petroleum Refinery
(Keyed to Figure 3)

Area	Functional Description	Equipment and Facilities
A	Storage and Shipping	1 Loading rack 23 Storage buildings 18 Cylindrical storage tanks 10 55-foot-diameter 8 35-foot-diameter 13 Tanks under construction 3 Semiburied tanks (not measured)
B	Support, Storage, and Shipping	3 Loading racks 90 Miscellaneous buildings
C	Storage	11 Storage/support buildings 91 Cylindrical storage tanks 2 120-foot-diameter 3 95-foot-diameter 26 80-foot-diameter 6 55-foot-diameter 12 35-foot-diameter 38 30-foot-diameter 4 20-foot-diameter 7 Tanks under construction 1 Water storage/treatment basin
D	Blending/Treating and Shipping	1 Blending/treating unit with 66 blending/treating tanks 3 processing buildings 1 large shipping building 22 Miscellaneous buildings
E	Support	38 Support buildings (two are under construction)
F	Possible Desalting	2 Units, each with 1 cluster of processing equipment 1 processing building 5 Support buildings
G	Unidentified Secondary Processing	1 Unit with 4 columns 1 cluster of processing equipment 1 bank of heat exchangers/ cooling coils/accumulators 2 furnaces 4 cylindrical storage tanks, 25X1 1 Unit with 4 columns 3 clusters of processing equipment 1 furnace 2 processing buildings 3 cylindrical storage tanks, 25X1 diameter

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Area	Functional Description	Equipment and Facilities
G (Cont)		1 Unit with 3 columns 2 banks of heat exchangers/ cooling coils/accumulators 3 furnaces 3 processing buildings 6 cylindrical processing tanks 7 horizontal processing tanks 1 Unit with 3 columns 4 banks of heat exchangers/ cooling coils/accumulators 3 furnaces 1 Processing building serving all four units 7 Miscellaneous buildings 7 Cylindrical storage tanks 1 80-foot-diameter 6 30-foot-diameter 2 Spherical storage tanks, 30 feet in diameter
H	Water Cooling	10 Cooling towers 17 Miscellaneous buildings 4 Cylindrical storage tanks 2 30-foot-diameter 2 15-foot-diameter 2 Water storage/treatment basins
I	Storage and Shipping	1 Loading rack 9 Miscellaneous buildings (one with 4 horizontal tanks) 7 Cylindrical storage tanks 2 25-foot-diameter 5 20-foot-diameter
J	Storage	5 Support buildings 37 Cylindrical storage tanks 6 60-foot-diameter 12 55-foot-diameter 5 50-foot-diameter 6 40-foot-diameter 4 35-foot-diameter 4 30-foot-diameter 2 Tanks under construction
K	Support	4 Support buildings
L	Probable Catalytic Reforming	1 Unit with 9 columns 5 clusters of processing equipment (one probably contains reactors) 7 small furnaces 1 processing building 1 large pump/compressor building 10 processing/storage tanks 3 support buildings

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Area	Functional Description	Equipment and Facilities
M	Unidentified Secondary Processing	1 Unit with 1 cluster of processing equipment 2 processing buildings 4 processing/storage tanks 6 Miscellaneous buildings 12 Horizontal storage tanks, 25 feet long
N	Unidentified Secondary Processing	1 Unit with 2 columns 1 cluster of processing equipment 1 bank of heat exchangers/ cooling coils/accumulators 1 furnace 3 processing buildings (one with 5 horizontal tanks) 2 cylindrical storage tanks, 20 feet in diameter 1 Support building
O	Coking	1 Delayed coking unit with 4 coking drums 1 fractionating column 4 other columns (three are for vapor recovery) 1 bank of heat exchangers/ cooling coils/accumulators 3 furnaces 1 pump building 6 buildings connected by conveyor 3 support/control buildings 4 processing/storage tanks 1 Loading rack 5 Support buildings 4 Cylindrical storage tanks, 55 feet in diameter
P	Thermal Cracking	1 Unit with 1 cracking section containing 8 columns (includes a fractionator, a flash tower, and a reactor) 3 banks of heat exchangers/cooling coils/accumulators 2 furnaces 1 pump building 1 vapor recovery section containing 3 columns 1 bank of heat exchangers/cooling coils/accumulators 2 processing buildings 1 compressor building 2 cylindrical storage tanks, [redacted] 25X1 diameter

Area	Functional Description	Equipment and Facilities
Q	Crude Oil Distillation	1 Unit with 1 atmospheric column 1 vacuum column 8 other columns (includes two recycle columns) 2 banks of heat exchangers/ cooling coils/accumulators 3 furnaces 1 pump building 3 other buildings (one has one horizontal tank) 5 cylindrical storage tanks, [redacted] 25X1 1 Unit with 1 atmospheric column 1 vacuum column 4 other columns 2 clusters of processing equipment 3 furnaces 1 pump building 2 support buildings
R	Catalytic Cracking and Possible Blending/Treating (1) Catalytic Cracking	1 Unit with 1 cracking section containing 1 fractionating column 1 reactor 1 flash tower 1 regenerator 2 catalyst hoppers 2 banks of heat exchangers/cooling coils/accumulators 1 furnace 1 pump building 1 vapor recovery section containing 2 columns 1 bank of heat exchangers/cooling coils/accumulators 1 compressor building 1 processing building serving both sections 2 Support buildings
	(2) Possible Blending/Treating	1 Unit with 4 possible horizontal blending/treating tanks 1 processing building 2 cylindrical storage tanks, 30 feet in diameter
S	Water Treatment and Storage	3 Cooling towers 24 Miscellaneous buildings 6 Cylindrical storage tanks 4 30-foot-diameter 2 [redacted] 25X1 3 Tanks under construction 6 Semiburied storage tanks (not measured) 6 Water storage/treatment basins

Area	Functional Description	Equipment and Facilities
T	Unidentified Secondary Processing	1 Unit with 1 column 1 cluster of processing equipment 2 processing buildings 2 horizontal processing/storage tanks 1 Support building
U	Gas Fractionation	1 Unit with 3 columns 1 cluster of processing equipment 2 processing/pump buildings 6 Support buildings 2 Cylindrical storage tanks, 20 feet in diameter 4 Horizontal storage tanks 2 35-foot-long 2 25-foot-long 1 Gasholder, 55 feet in diameter 1 Flare tower
V	Storage and Support	17 Miscellaneous buildings (one under construction)
W	Processing Unit Under Construction	Equipment not listed.
X	Chemical Processing Unit Under Construction	Equipment not listed.

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REFERENCES

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Map

2nd RTS. US Air Target Chart, Series 200, Sheet M0283-7HL, 2nd edition, April 1968, Scale 1:200,000 (SECRET

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Requirement

COMIREX NO6
Support Number 422984

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