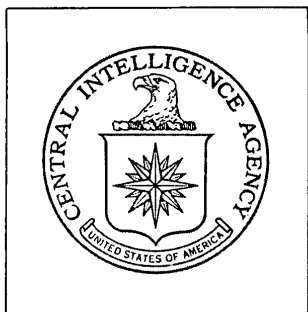


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DIRECTORATE OF
INTELLIGENCE

**Industrial Facilities
(Non-Military)**

Basic Imagery Interpretation Report

Lan-chou Petrochemical Plant

Lan-chou, China



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CENTRAL INTELLIGENCE AGENCY
 Directorate of Intelligence
 Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME		COUNTRY	
Lan-chou Petrochemical Plant		CH	
UTM COORDINATES	GEOGRAPHIC COORDINATES	COMREX NO.	NIETB NO.
NA	36-07-10N 103-36-30E	None	None
MAP REFERENCE			
ACIC. USATC, Series 200, Sheet M0383-22HL, 3rd ed, Dec 68, Scale 1:200,000			
(SECRET/			
LATEST IMAGERY USED		NEGATION DATE (If required)	
		NA	

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ABSTRACT

Lan-chou Petrochemical Plant consists of three production components: an alcohol-based synthetic rubber plant, a butane/butylene-based synthetic rubber plant, and a crude-oil based synthetic fiber and plastics plant. The main products are synthetic rubber, the plastics polyethylene and polypropylene, and acrylic fibers.

In September 1959, when the area was first seen on photography, the alcohol-based synthetic rubber plant was in the mid-to-late stages of construction. The butane/butylene-based synthetic rubber plant was in the early stages of construction. The alcohol-based synthetic rubber plant was first seen in operation in September 1963 and the butane/butylene-based synthetic rubber plant in January 1967. The synthetic fiber and plastics plant was first seen under construction in August 1965. It was in partial operation by December 1969 and in full operation in July 1971.

This report includes a location map, a photograph and line drawing of the petrochemical plant, a construction chronology of the plant, and a discussion of the status of the facilities.

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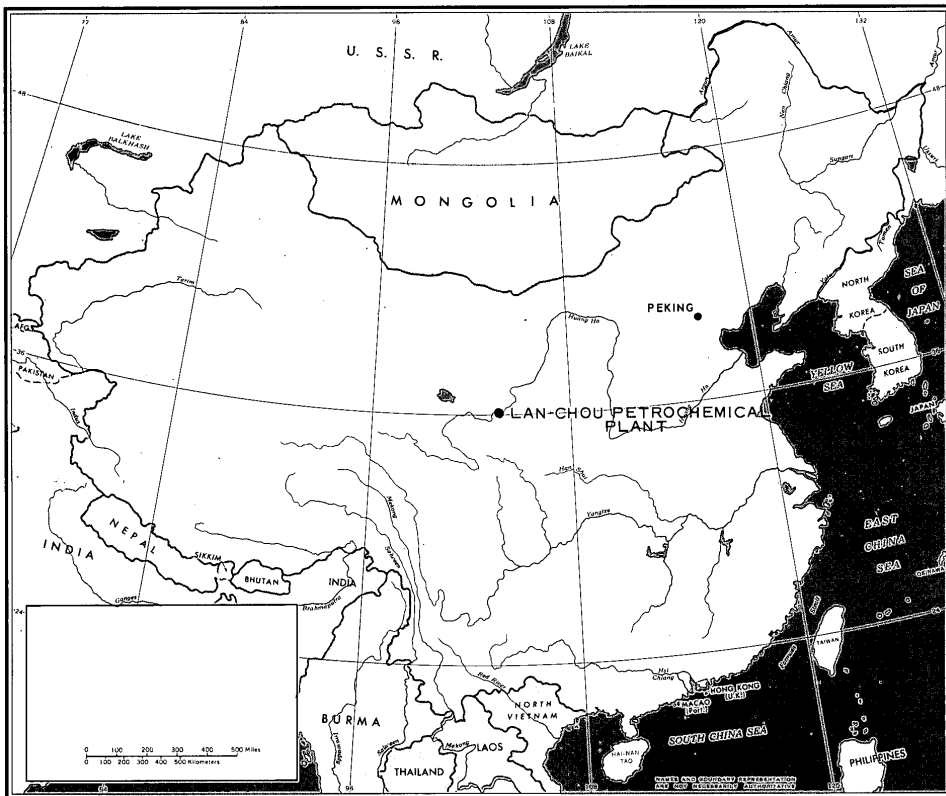


FIGURE 1. LOCATION MAP.

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INTRODUCTION

Lan-chou Petrochemical Plant is located on the south bank of the Huang Ho (Yellow River), 11 nautical miles (nm) west-northwest of Lan-chou, Kansu Province (see Figure 1). It is part of a large industrial complex which includes the Lan-chou Chemical Fertilizer Plant [redacted] the Lan-chou Aluminum Plant Hsi-ku [redacted], and the Lan-chou Petroleum Refinery [redacted]

[redacted] Electric power and steam are provided by the adjacent Lan-chou Thermal Power Plant Hsi-ku [redacted]

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BASIC DESCRIPTION

The petrochemical plant occupies an area of about 275 acres, which measures approximately 5,225 by 3,050 feet (see Figures 2 and 3). Rail service is provided by spurs from the line extending west-northwest from Lan-chou.

Operational Functions

The petrochemical plant consists of three production components: a synthetic rubber plant using alcohol as a feedstock, a synthetic rubber plant using butane/butylene as a feedstock, and a synthetic fiber and plastics plant using crude oil as a feedstock. The alcohol is shipped into the plant by rail. The butane/butylene comes from the petroleum refinery by pipeline. Crude oil could come by pipeline from the nearby refinery or by rail line directly from an oilfield.

The first step in both synthetic rubber plants is the production of butadiene. In the alcohol-based plant, the alcohol is vaporized and passed over a catalyst to form acetaldehyde. Acetaldehyde plus additional alcohol is passed over a catalyst and then fractionated to yield butadiene. When butane/butylene is used it is heated and passed through a reactor and dehydrogenated to form butadiene. At both plants the butadiene is then copolymerized with styrene or acrylonitrile in a polymerization kettle to yield synthetic rubber in latex form. The latex is stored and blended in tanks for uniformity. Before shipping it is purified, dried and bailed.

Prior to completion of the acrylonitrile unit in the synthetic fiber and plastics plant, the synthetic rubber plants probably used styrene in the copolymerization process. The styrene could have been produced from by-product ethylene from the alcohol-based synthetic rubber plant or from the catalytic cracking unit of the refinery. Alkylation of the ethylene with benzene yields ethylbenzene which is dehydrogenated to styrene. With the completion of the acrylonitrile plant any acrylonitrile not used in making acrylic fibers could be copolymerized into synthetic rubber.

Crude oil for the synthetic fiber and plastics plant is cracked in the sand cracker. The products of this cracking are pumped to the gas separation and aromatics extraction unit for further processing. Here the ethylene, propylene and by-products are separated. The ethylene is mixed with oxygen, fed into a reactor, and polymerized into polyethylene in the polyethylene unit. The liquid polyethylene is chilled until solid and run through a chopper to yield polyethylene flakes. In the polypropylene unit, propylene is polymerized in a reactor in the presence of a catalyst. The polypropylene is purified and chopped into pellets. Propylene is also reacted with ammonia (probably from the adjacent fertilizer plant), air and steam to produce acrylonitrile. The acrylonitrile is dissolved in a solvent, converted, and spun into acrylic fibers.

The main products of the petrochemical plant are synthetic rubber, plastics, and acrylic fibers. By-products of the sand cracker and gas separation and aromatics extraction unit include ethane, propane, methane, gasoline, fuel oil, toluene, and xylene. Ethyl ether, butene, ethyl acetate, and butyl alcohol are by-products of the production of butadiene from alcohol.

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Construction and Operational Status

The petrochemical plant was built in three stages. On the first available photography of the area, in September 1959, the alcohol-based synthetic rubber plant was in the mid-to-late stages of construction. When the synthetic rubber plant was next observed, in September 1963, it appeared complete and in operation.

The butane/butylene-based synthetic rubber plant was in the early stages of construction in September 1959. It was in the midstages of construction in September 1963, and in the late stages in October 1964. On small-scale photography of August 1966 most of the equipment appeared to be in place but there was no evidence of operation. The plant was operating in January 1967.

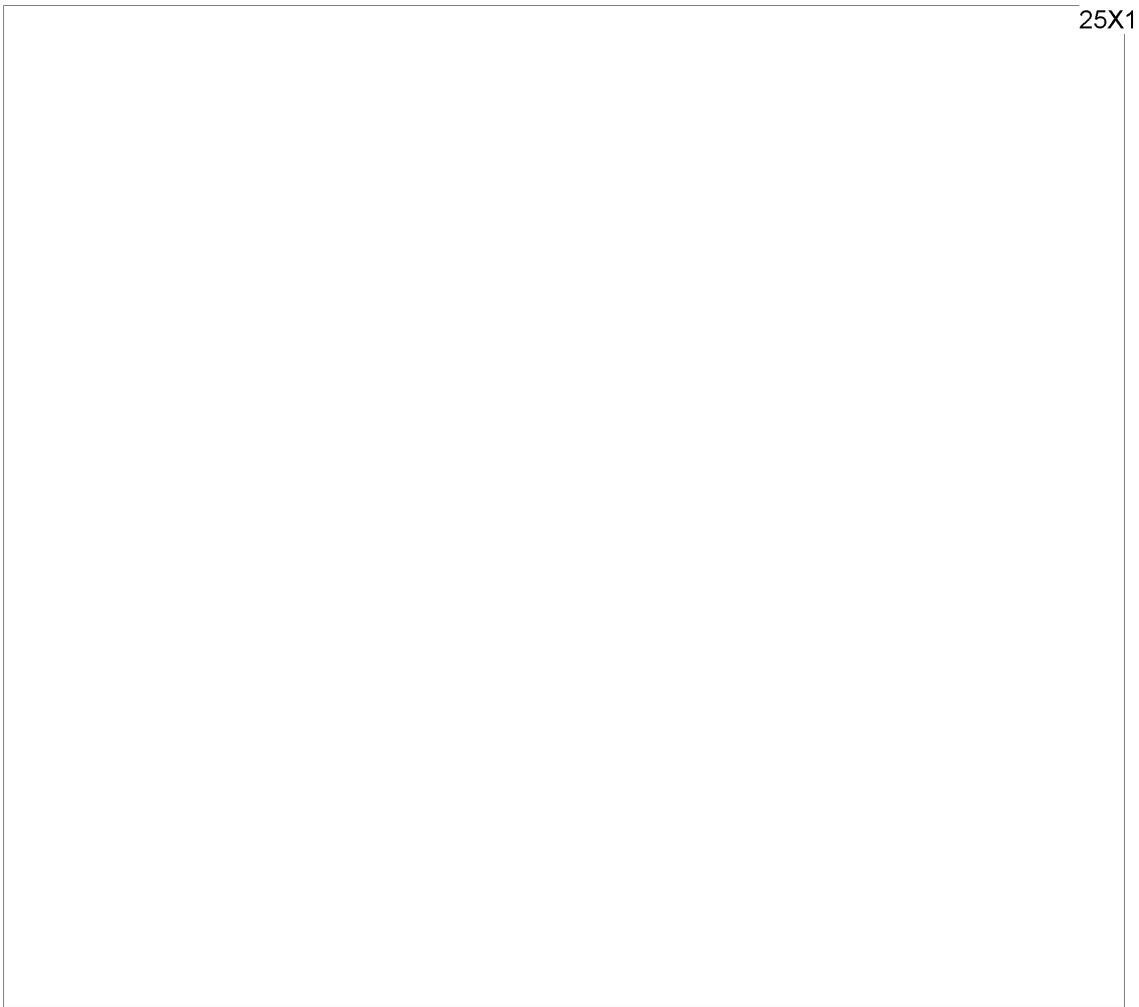
Ground scarring for the synthetic fiber and plastics plant was observed on photography of August 1965. By May 1967, the sand cracker, the gas separation and aromatics extraction unit, the polyethylene unit, and the polypropylene unit were in the late stages of construction. The acrylic fibers plant was in the midstages of construction, and the acrylonitrile unit was in the early stages of construction. By December 1969, the sand cracker, gas separation and aromatics extraction unit, polyethylene, and polypropylene units were operating. The acrylic fibers plant was in the late stages of construction and the acrylonitrile unit was in the midstage of construction. Partial coverage of April 1970 showed the acrylonitrile unit was nearing completion. The acrylic fibers unit and the acrylonitrile unit were both complete on July 1971 photography.

The construction chronology of the entire plant from October 1964 to July 1971 is shown in Figure 3.

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Map

ACIC. US Air Target Chart, Series 200, Sheet M0383-22HL, 3rd edition, December 1968, Scale 1:200,000 (SECRET)

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Requirement

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Support Number 428923

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