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PIR

PHOTOGRAPHIC INTELLIGENCE REPORT

[REDACTED]
SEARCH FOR SUSPECT NUCLEAR
POWERED CHICOM PASSENGER VESSEL,
TIENTSIN, T'ANG-KU, CHINA COMPLEX

[REDACTED]

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Declass Review by NIMA/DOD

CIA/PIR 67260

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DATE APRIL 1966

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GROUP 1
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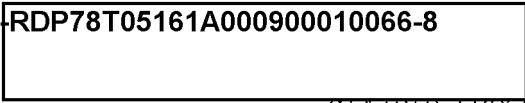
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SEARCH FOR SUSPECT NUCLEAR
POWERED CHICOM PASSENGER VESSEL,
TIENTSIN, T'ANG-KU, CHINA COMPLEX

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SUMMARY OF ANALYSIS

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An analysis of recent [redacted] photography covering the Tientsin - T'ang-Ku Complex (38-59N 117-44E) has been performed for evidence of the reported construction of a large nuclear powered passenger ship. An article appearing in the January-February 1966 issue of Energie Nucleair stated that construction of a 20,000 GRT nuclear powered ship was begun at the Tientsin Shipyard during [redacted]. No evidence was revealed from this analysis to substantiate that such a vessel was in fact under construction during the period [redacted].

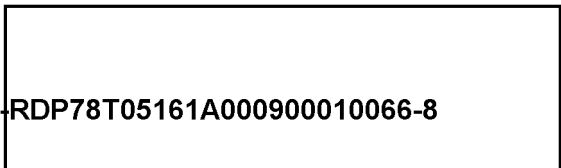
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The basic search effort was an attempt to locate a large vessel of this type under construction or fitting-out in the Tientsin area and to determine if a shipyard facility was available to build a ship having a LOA of 600 to 650 feet. In addition to not locating the suspect nuclear ship, no facility capable of building a unit this large was observed during the search. Of the numerous small facilities located along the Hai Ho between Tientsin and the sea, only three repair facilities (Hsin Kiang Shipyard, Figure 3; Ta-Ku Naval Base, Figure 4; and Hai Ho Conservancy Board Dockyard, Figure 5) can be considered significant. Of these, only the Hsin Kiang Shipyard possesses significant repair and construction capabilities. Currently, a possible passenger ship having an approximate LOA of 400 feet is being built at the Hsin Kiang Shipyard. See annotation 3, Figure 3.

Of interest is the fact that the Japanese presented to the 1958 International Conference on the Peaceful Uses of Atomic Energy, a design for a nuclear powered passenger ship that is nearly identical to the design described in Energie Nucleair. Selected paragraphs from both articles are presented in Appendix I and II to illustrate the similarities in specifications and terminology.

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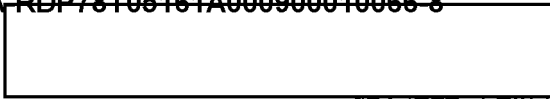
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LOCATION : T'ANG-KU PORT FACILITIES
GEO COORDS: 38-59N 117-44E



KEY TO ANNOTATIONS ON FIGURE 2

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- A. Tiang-ku Port Facility
This port facility is the principle seaport for Peiching and the surrounding region.
- B. Hsin Kiang Shipyard.
See detailed annotation, Figure 3.
- C. Hai Ho (river) lock east (length of lock approx 590').
- D. Water level control gates.
These gates are used to maintain navigable water depths for ocean going vessels on the river as far inland as Tientsin.

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- E. Hai Ho (river) lock west (length of lock approx 420').

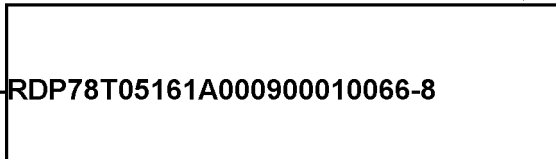
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- 1. (LOA approx 510').
Appendix III contains selected photography of the which was transferred to the Nationalist government in 1948 and subsequently captured by the Chinese Communists in 1949. This unit, apparently a stripped hull, was towed from Shanghai to T'ang-ku during mid-1965 and now appears to be undergoing a modest effort at being refurbished. (by the Communists) is presently moored just off the T'ang-ku Port Facility.

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T'ANG-KU PORT FACILITIES
T'ANG-KU, CHINA
38-59N 117-44E

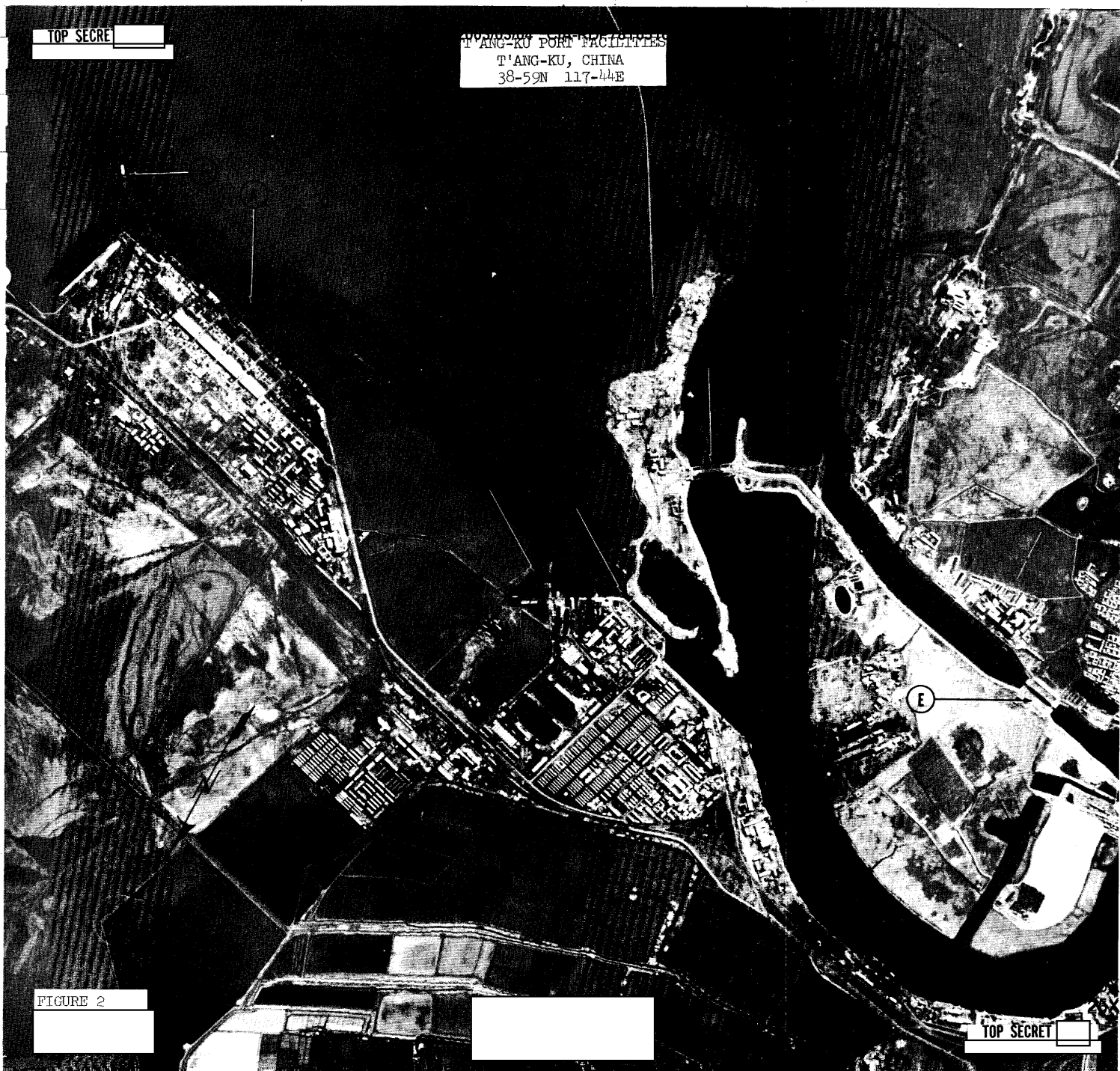


FIGURE 2
[redacted]

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SHIPYARD : HSIN KIANG SHIPYARD
LOCATION : T'ANG-KU, CHINA
GEO COORDS: 39-00N 117-43E



KEY TO VESSEL ANNOTATIONS ON FIGURE 3

1. Unidentified vessel at fitting-out wharf (LOA approx 360'). 25X1

2. Two small unidentified vessels (LOA of each approx 100'). 25X1

3. Possible passenger ship under construction (LOA approx 400').
The building way that this vessel occupies was observed to be clear of
all activity on [redacted] Activity of an undetermined
nature (probably the initial stages of construction on this vessel) could
be seen on [redacted] The
shape of the hull could be discerned on [redacted]

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[redacted] showed that the superstructure was complete
and that the vessel could be identified as a possible passenger ship. This
determination was based on the fact that a relatively short foredeck and
a long block superstructure was visible. Little external construction
appears to have been undertaken during the period [redacted]

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4. Two possible small barges alongside building way (not measured). 25X1

KEY TO FACILITY ANNOTATIONS ON FIGURE 3

A. Graving dock (length approx 360').
This dock appears to have caisson gates, a feature that is lacking on
other graving docks in this area.

B. Unoccupied building way (length approx 560').

C. Occupied building way (length approx 540'). 25X1

D. Fitting-out wharf (length approx 520').

E. Probable wharf under construction (length of completed portion as of [redacted])

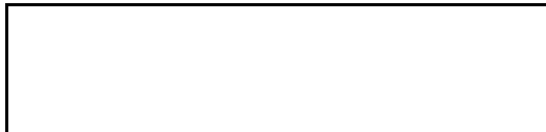
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F. Possible fabrication building.
This three bay structure is evaluated as a fabrication building on the
basis of its size and proximity to the building ways.

NOTE: All measurements were made by the CIA/IAD project analyst.

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HSHIN KIANG SHIPYARD
T'ANG-KU, CHINA
39-00N 117-43E



FIGURE 3

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TAKU NAVAL BASE
T'ANG-KU, CHINA
38-59N 117-41E

--- APPROXIMATE FACILITY BOUNDARIES

FIGURE 4

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T'ANG-KU SHIPYARD
HAI-HO CONSERVANCY BOARD DOCKYARD
T'ANG-KU, CHINA
39-01N 117-37E

--- APPROXIMATE FACILITY BOUNDRIES

FIGURE 5

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APPENDICES

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APPENDIX I

FRENCH ARTICLE DISCUSSING "NEW CONSTRUCTION CHICOM NUCLEAR
POWERED PASSENGER VESSEL" (CIRCA 1966)

CPYRGT

Extracts from Energie Nucleair, January-February 1966 - pages 40-43.

"... Work on a first vessel of this type, that is a nuclear powered one which began in April 1964 at the Tientsin Shipyard, will shortly be fully completed. The vessel will soon be used in coastal shipping in the China Sea, especially between Tientsin and Shanghai.

This ship will have a gross tonnage of 20,000 tons and will be able to transport 3,400 passengers at a cruising speed of 23.5 knots. It is a ship with sheltered bridge, bulbous bow and a cruiser stern. It has four complete decks. The hull is divided by 10 transversal water-tight bulkheads and includes three holds forward and two holds aft. The engine and reactor compartments are slightly aft....

The ship named Zan Than (Voice of the People), will have a main engine made up of two 22,000 HP turbines having two parallel sections connecting a 2-stage reducer by two shafts. The propellers are five-bladed and turn at a rate of 160 revolutions a minute.

The reactor will be of the pressurized water type of 180 megawatts. The two main steam generators will be capable of 120 tons an hour. They, together with the auxiliary equipment of the reactor installation, will be housed in a pressure-tight enclosure in order to protect the surrounding area of the reactor compartment from mechanical damage which could result from the projection of objects or against contamination by radioactive vapors or gas in case of a break in the high-pressure equipment....

The reactor core will consist of 98 fuel rods and 27 cruciform control rods. It will be surrounded by 4 stainless steel concentric and cylindrical thermal shields. The core tank which will contain the core will be cylindrical, with a hemispheric bottom and with a top cover. The cooling water will penetrate at the bottom of this tank through four nozzles located in the middle. The reactor core will contain about 8,380 kilograms of 1.7% enriched uranium in the form of uranium oxide. This uranium fuel will be placed in capsule-form in a zirconium alloy tube, and each rod will be tested to avoid difficulties resulting from deformations and vibrations of the fuel pellets, and yet possessing the required nuclear and thermal characteristics.

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CPYRGH

This ship will not include fuel replenishment installations because the Tientsin Nuclear Committee has felt that this is not a usual type of project; instead, this will be carried out in special installations equipped with all the necessary means. Nevertheless, the Committee has given great stress to obtaining the maximum of security and facility of refueling in the equipping and construction of the reactor installation....

The control of this reactor will consist in maintaining a constant average temperature; this principle will be the one best adapted to the conditions imposed on the reactor. The preliminary study carried out by the Tientsin Nuclear Committee on the dynamic characteristics of this reactor has shown that a great intrinsic stability could be counted on, and that its response to load variations would very well sustain a comparison with conventional boilers. The committee also expected that sudden load variations (fluctuations from full load to no load) would occur for short periods while the vessel was getting under way or on its arrival in a port. In such cases, the quality of excess steam in the turbines circuit will be small; it will be discharged in the atmosphere when the steam will reach the pressure limit. According to the Committee, there is therefore no need to make provision for a discharge condenser...."

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APPENDIX II

JAPANESE PROPOSAL FOR A NUCLEAR POWERED
EMIGRANT PASSENGER VESSEL (CIRCA 1958)

Extracts from session G-6 of the 1958 International Conference on the Peaceful Uses of Atomic Energy.

A Nuclear Powered Emigrant Ship, by Seuchi Takeuchi, Takashi Okamura, and Sootoo Murakami.

"... Of 20,100 tons gross, this nuclear powered emigrant ship would be a passenger cargo vessel, to carry 2300 emigrants with a service speed of 23.5 knots. As shown in the general arrangement, the ship is a shade deck vessel with raked stem, bulbous bow and cruiser stern. There are four complete decks "A", "B", "C" and "D", Compass Bridge, Navigation Bridge Deck, Bridge Deck and Boat Deck. The hull should be divided by 10 water-tight transverse bulkheads, with three fore and two aft cargo holds. The engine and reactor rooms are located slightly aft. The main propulsion machinery is two sets of cross compound, double reduction geared steam turbines each of 22,000 shp. Compatible with this engine output and the ship's form, five-bladed propellers of 160 rpm are used.

The reactor is of the pressurized water type with a thermal output of 180 MW, and the main steam generators are two sets each of 120 tons per hour capacity. These, with other associated reactor plant auxiliaries, are contained in a pressure-tight containment vessel to fully protect the areas adjacent to the reactor compartment from mechanical damage by the release of missiles (fragment of disintegrating rotors, etc), or from contamination of radioactive vapours or gas in case of a rupture in the high pressure equipment.

The reactor core consists of 88 fuel assemblies and 17 cruciform control rods, and is surrounded by three concentric, cylindrical thermal shields of stainless steel. The reactor pressure vessel containing the core, is a right cylindrical vessel with a hemispherical bottom and is enclosed by a top enclosure. The coolant enters the vessel through four inlet nozzles at the bottom, flows upward through the core and then is discharged through four outlet nozzles at the middle of the body. The reactor core contains about 7270 kilograms of uranium with an enrichment of 1.7% in the form of uranium oxide, and is designed to produce 1.55×10^{12} kcal of heat energy, which corresponds to 10,000 hr of full load operation, or an average fuel burn-up of 9200 Mwd per ton of uranium oxide. The initial nuclear and mechanical

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core design data is shown in tables 3 and 4. The uranium fuel is inserted in a zircalov tube in the form of pellets, and the fuel assembly is so designed as to avoid problems of fuel rod buckling or vibration, and arranged to satisfy the nuclear and thermal characteristics.

No refueling equipment has been considered in this design, because it is thought that refueling is not routine work and should be conducted at a special location where all the necessary facilities have been fully installed. However, in the arrangement and construction of the reactor plant, attention has been fully given to what is considered to be the most safe and easy refueling procedure.

The control scheme of this reactor will be that of a constant average temperature most appropriate for meeting the requirements of the reactor. A preliminary analysis of the dynamic characteristics of the reactor indicated that an adequate inherent stability can be expected, and that the response to load changes would compare quite well with conventional boilers. A sudden load change such as "full load" "no load" - "full load" can be expected to occur for short periods when arriving and departing. The excessive steam in the turbine cycle on such occasions will be small in quantity; it will be discharged into the atmosphere when the steam pressure rises over the limited value. Therefore, no dump condenser will be required...."

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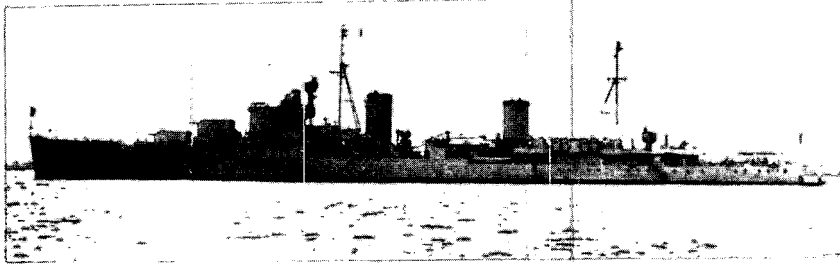
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APPENDIX III

EX-BRITISH CRUISER AURORA

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PHOTOGRAPH OF [REDACTED] BE-
FORE BEING DISMANTLED BY
THE COMMUNIST CHINESE (CIA

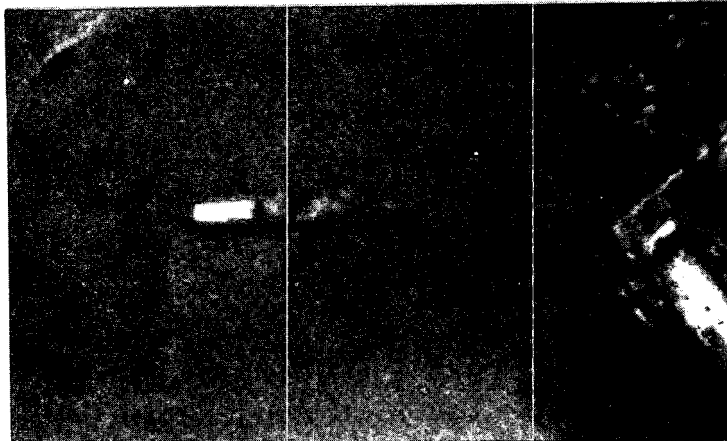
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PHOTOGRAPHED [REDACTED]
[REDACTED] MOORED IN
HUANG-PU RIVER OFF KIANGNAN
SHIPYARD (31-12N 121-29E)
SHANGHAI, CHINA.

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[REDACTED]
IMAGED THE CRUISER MOORED NEAR
THE T'ANG-KU-PORT FACILITY QUAY.

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[REDACTED] MOORED OFF T'ANG-KU
PORT ([REDACTED])

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FIGURE 6

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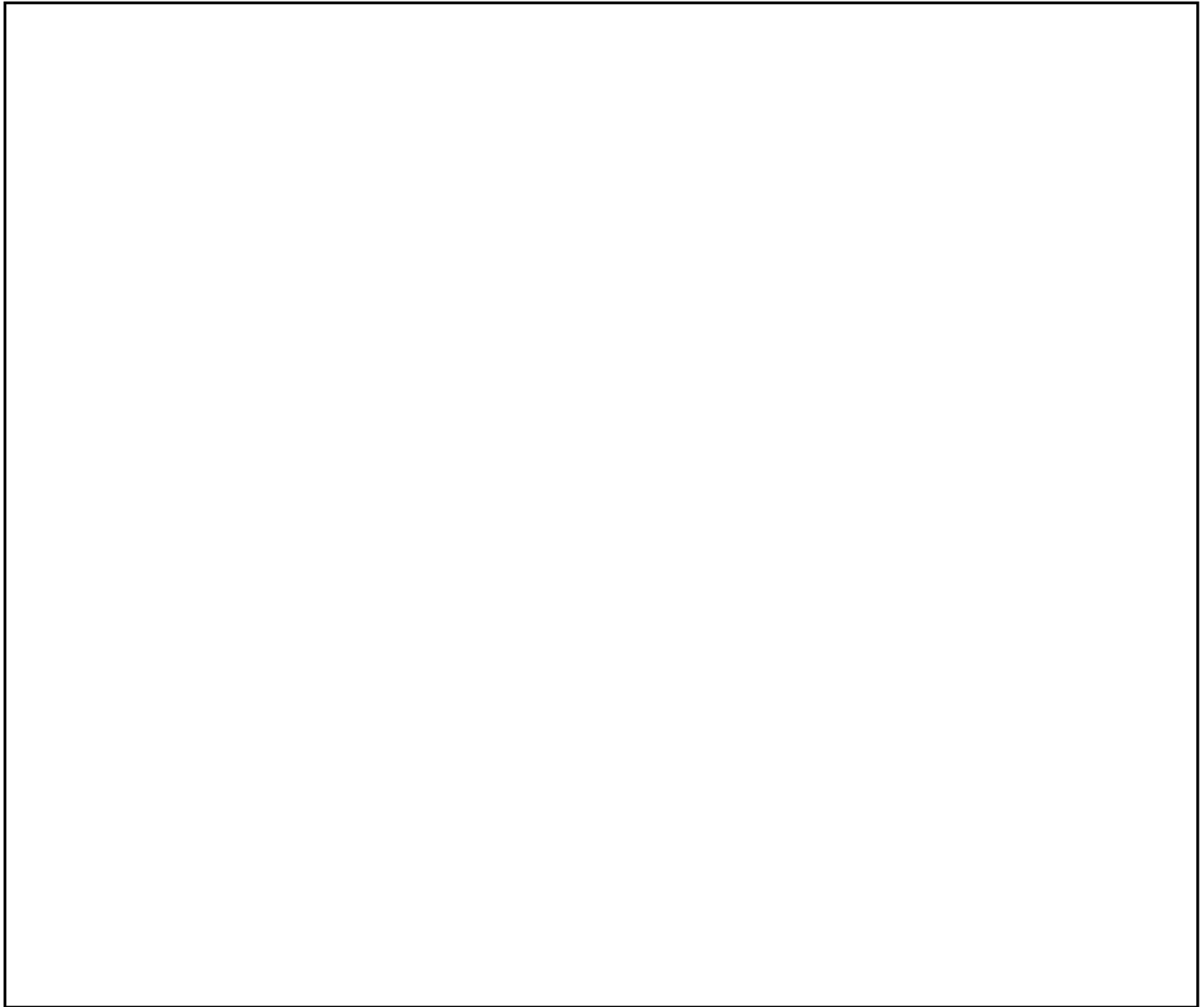
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