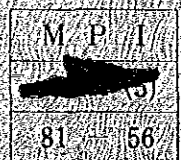
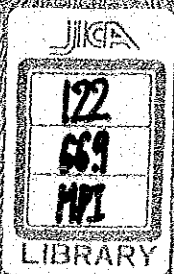


No. 10

SUMMARY
EVALUATION STUDY REPORT
FOR
ASEAN ROCK SALT-SODA ASH PROJECT
IN
THE KINGDOM OF THAILAND

MARCH 1981

JAPAN INTERNATIONAL COOPERATION AGENCY



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THE PROVINCE OF ONTARIO



THE TORONTO

THE TORONTO AND AGRICULTURE SOCIETY

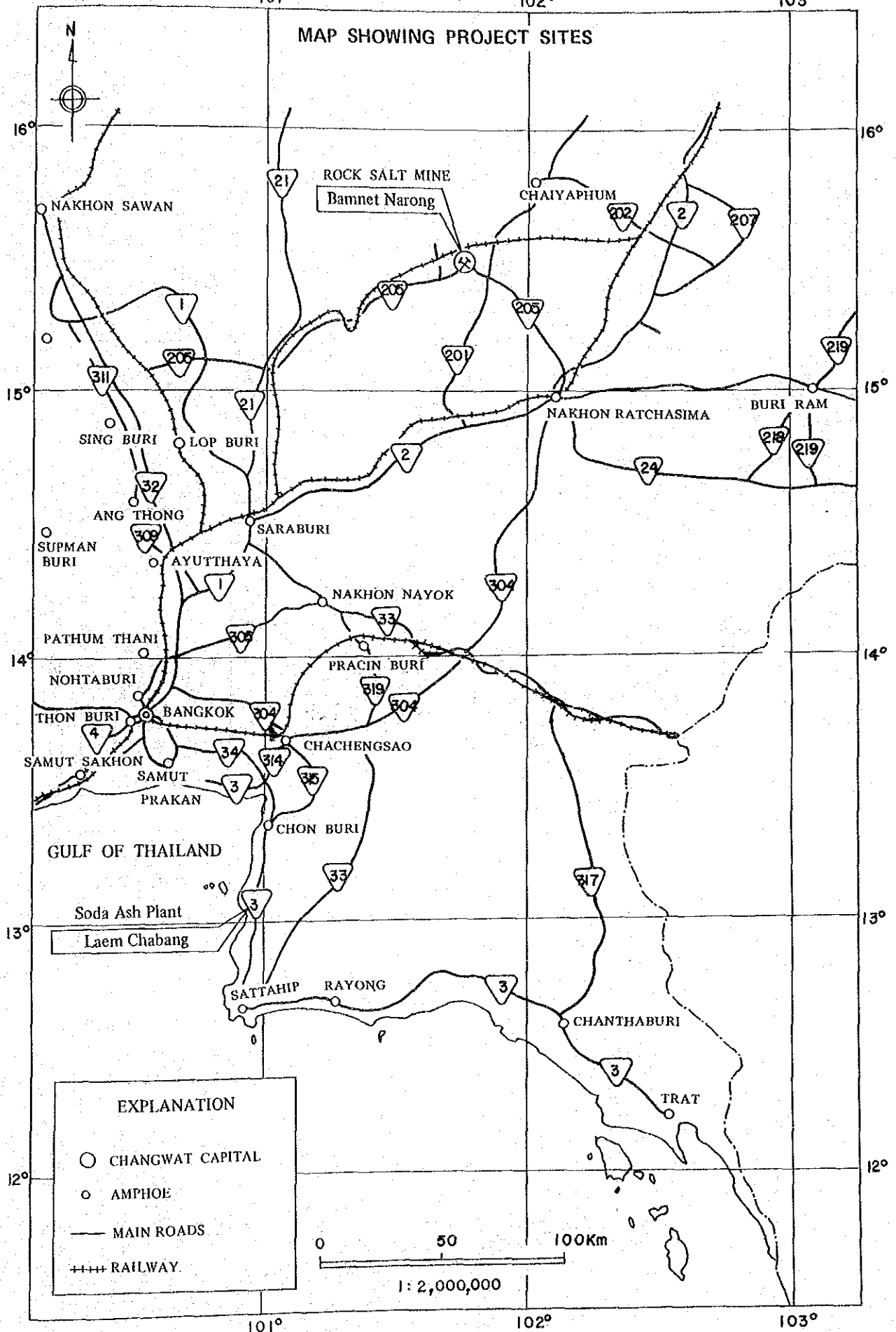
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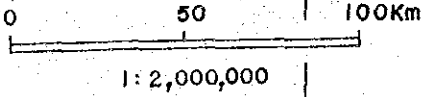
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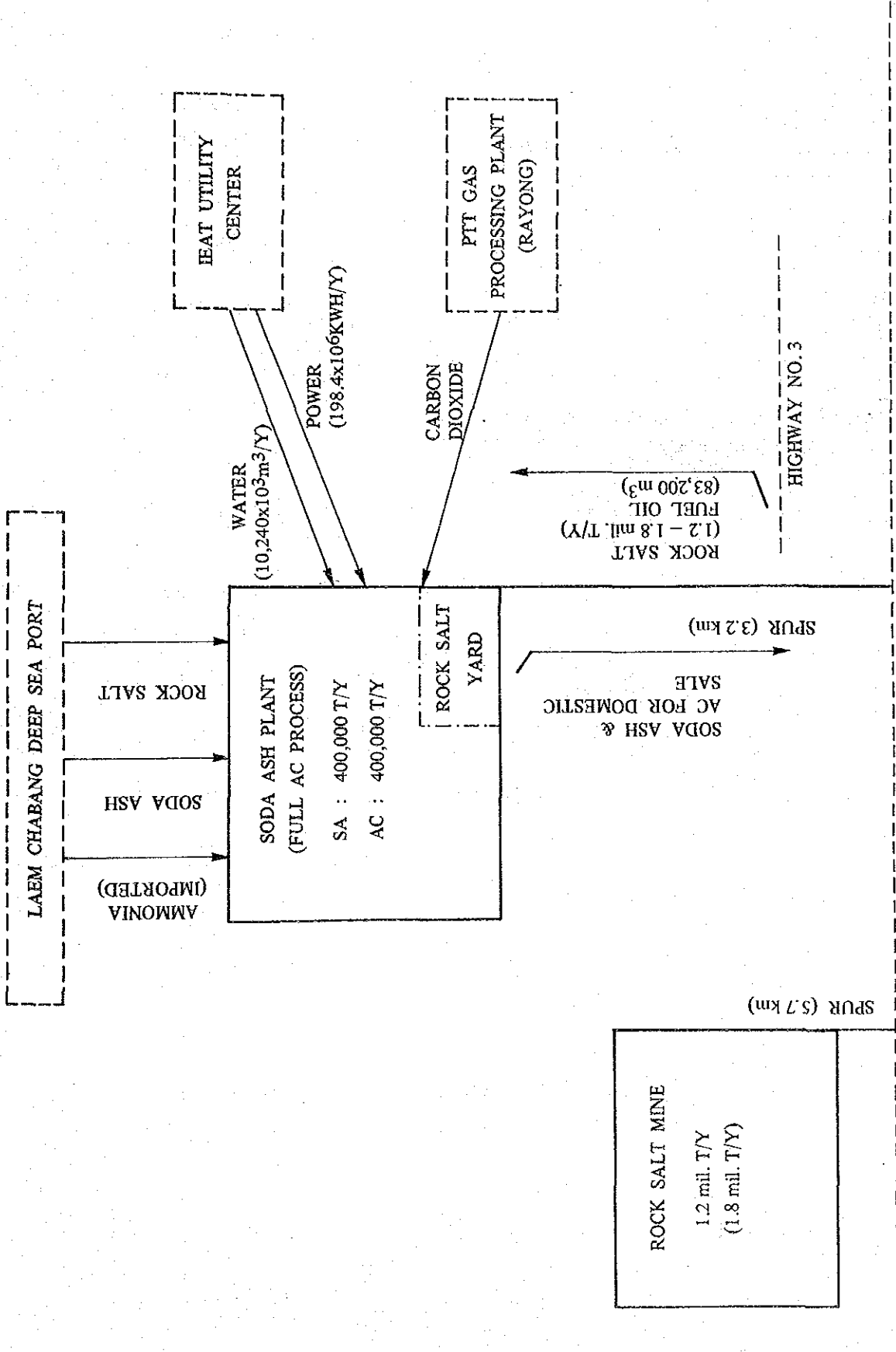
MAP SHOWING PROJECT SITES



EXPLANATION

- CHANGWAT CAPITAL
- AMPHOE
- MAIN ROADS
- ++++ RAILWAY





RSR CHACHENGSAO - SATTAPHIP LINE (UNDER CONSTRUCTION)

1. OUTLINE OF THE PROJECT

As the result of examination and evaluation of the project plans originally prepared by the Thailand Government, the Evaluation Study Team presents revised plans as summarized below.

(1) Rock Salt Mine

- | | |
|-------------------------------|--|
| 1) Mining method | Room and pillar method |
| 2) Scale of mine production | 1.2 million t/y (by two-shift operation)
(It is possible to produce up to 1.8 million t/y by means of three-shift operation.) |
| 3) Location of rock salt mine | Bamnet Narong, northeastern Thailand |

(2) Soda Ash Plant

1) Manufacturing process

Full Ammonium Chloride Co-production Process

2) Products to be produced and plant capacity

Soda ash	400,000 t/y
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Ammonium Chloride (by product)	400,000 t/y
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3) Plant site

Laem Chabang (as proposed by the Thailand Government)

4) Raw materials and utilities

- | | |
|-------------|--|
| — Rock salt | To be supplied from the rock salt mine |
| — Ammonia | To be met by imports |

— Carbon dioxide	Carbon dioxide separated from natural gas at the PTT's gas processing plant at Rayong, which is to be supplied by a pipeline.
— Quicklime	To be purchased from local carbide makers
— Soda ash	To use soda ash produced at the soda ash plant of this Project
— Electric power	To use public power
— Water	To be supplied by IEAT
— Fuel	Fuel oil is to be used

2. SALES PLANS

(1) Rock Salt

A part of the produced rock salt is supplied to the Soda Ash Plant for use as a raw material (approximately 560,000 t/y), and the remainder is sold to ASEAN countries (including Thailand) and other surrounding countries. (There is no guarantee on the off-taking of the product by ASEAN member states.)

(2) Soda Ash

To be sold to ASEAN markets (including Thailand) under guaranteed arrangements among the ASEAN member states.

(3) Ammonium Chloride

To be sold primarily to the Thailand domestic market.

3. ANTICIPATED TIME OF COMMERCIAL PRODUCTION

It is assumed that the commercial production will be commenced in mid-1985.

4. ESTIMATED CAPITAL REQUIREMENTS

(million U.S. dollars)

	Foreign Exchange Portion	Local Currency Portion	Total
Rock salt mine	23.4	30.3	53.7
Soda ash plant	246.9	104.1	351.0
Entire Project	270.3	134.4	404.7

(Note) 1) Including rail spurs

2) Including the initial working capital and preoperation expenses, but excluding interest during construction

5. REQUIREMENTS FOR INFRASTRUCTURE (OUTSIDE THIS PROJECT)

It is the prerequisite that the Laem Chabang Deep Sea Port as well as the extension of railway to Sattahip is available in time for services.

6. CONSIDERATION OF ENVIRONMENTAL PROTECTION

(1) Rock Salt Mine

It is planned that crushing and screening are performed in the underground mine and further that the produced rock salt is stored in closed storages for loading. Such arrangements prevent any environmental problems.

(2) Soda Ash Plant

In the selection of manufacturing process and raw materials and also by means of establishing effluent treatment facilities, consideration was given to controlling and preventing any environmental problems which may be caused by effluents.

7. PROJECTED SALES PRICE (1985 PRICES)

(1) Rock Salt

- Supply to Soda Ash Plant: US\$26/t at plant gate
- Sale to ASEAN countries: US\$24~30/t FOB
- Sale to non-ASEAN countries: US\$16-17/t FOB

(2) Soda Ash (Shipment Prices) ;

— Thailand domestic market : US\$225/t

— Other ASEAN markets : US\$202 ~ 214/t

(3) Ammonium chloride

US\$150/t (Thai domestic markets)

8. ESTIMATED PRODUCTION COST (1985 PRICE)

(1) Rock salt : US\$10.30/t

(2) Soda ash : US\$176.25/t

(3) Ammonium chloride : US\$150.00/t

9. PROFITABILITY (IRR AFTER TAX)

(1) Rock salt mine 12.03%

(2) Soda ash plant 6.46%

(3) Entire project 6.71%

(Project life: 15 years)

10. MAJOR PROBLEMS OF THIS PROJECT

The major problem of this Project is low profitability, and the main cause of such low profitability is high cost of ammonia and fuel. If it is possible to obtain economical ammonia (either from abroad or domestic sources), however, it is likely that the IRR after tax may rise to over 8%. Also, consideration is required so as to reduce rail freight charges applicable to the transport of rock salt. It is recommended that these measures be conceived by the Thailand Government.

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