



Summary of Major Projects

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THE COMMERCIAL UNIT OF
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MAJOR PROJECTS - STATUS REPORT

SUMMARY OF MAJOR PROJECTS

I. AVIATION PROJECTS

AIR ASIA'S BOEING 747 REPAIR FACILITY (Page 5)

AVIATION TRAFFIC CONTROL PROJECT (Page 6)

CHIANG KAI-SHEK INTERNATIONAL AIRPORT; SECOND PHASE EXPANSION PROJECT (Page 7)

KAOHSIUNG INTERNATIONAL AIRPORT; SECOND PHASE EXPANSION PROJECT (Page 9)

TAIWAN'S AIRPORT EXPANSIONS FOR ORCHID ISLAND, GREEN ISLAND, HENGCHUN, KINMEN AND THE PESCADORES (Page 10)

II. COMPUTERIZATION PROJECTS

NATIONAL POLICE TELECOMMUNICATION SYSTEM UPGRADE (Page 14)

POLICE COMMAND, CONTROL, COMMUNICATION & INFORMATION SYSTEM (3C&I) (Page 14)

TAIWAN RESIDENTIAL INFORMATION SYSTEM (TRIS) (Page 17)

III. CONSTRUCTION PROJECTS

CONSTRUCTION PROJECTS IN KAOHSIUNG (Page 20)

ROYAL COUNTRY CLUB IN MIAOLI (Page 22)

IV. PETROLEUM & PETROCHEMICAL PROJECTS

CHINESE PETROLEUM CORPORATION PROJECTS (Page 24)

- . CPC THIRD OIL REFINERY (Page 24)
- . EXPANSION OF CHINESE PETROLEUM CORPORATION'S LIQUEFIED NATURAL GAS RECEIVING STATION (Page 24)
- . NOISE ABATEMENT PROJECT(S) (Page 25)
- . TREATMENT OF POLLUTED UNDERGROUND WATER (Page 25)
- . FOUR 40-KILOMETER UNDERSEA OIL PIPELINES (Page 25)
- . FIFTH NAPHTHA CRACKER (Page 26)

FORMOSA PLASTICS PETROCHEMICAL COMPLEX (SIXTH NAPHTHA CRACKER) (Page 27)

V. POLLUTION CONTROL PROJECTS

CONSULTANT SERVICES FOR TWELVE TAIWAN EPA PROJECTS (Page 30)

INDUSTRIAL WASTE DISPOSAL CENTERS (Page 32)

INITIAL CONSTRUCTION OF TAMSUI RIVER CLEAN-UP PROJECT (Page 33)

TAIWAN'S SEWAGE PROJECTS/TAIPEI SUBURBAN AREA SEWAGE SYSTEMS PLAN/KAOHSIUNG SEWAGE PROJECT (Pages 34 & 37)

TAIWAN POWER COMPANY POLLUTION CONTROL PROJECTS (See POWER PROJECTS, Page 59)

VI. INCINERATOR PROJECTS

CHIAYI INCINERATION PLANT (Page 40)

KEELONG INCINERATION PLANT (Page 41)

MUCHA REFUSE INCINERATION PLANT (Page 42)

SHIH-LIN INCINERATION PLANT & HOSPITAL WASTE INCINERATOR (Pages 43 & 44)

TAICHUNG INCINERATION PLANT (Page 45)

TAINAN CHENG-HSI-LI REFUSE INCINERATOR TURNKEY PROJECT (Page 46)

TAIWAN EPA'S TWO INCINERATOR PROJECTS (Page 47)

VII. SANITARY LANDFILLS

TAIWAN SANITARY LANDFILL PROJECTS (Page 55)

VIII. POWER PROJECTS

POWER GENERATION ADDITIONS FROM 1989 to 2000 (Page 57)

TAIPOWER POLLUTION CONTROL PROJECTS (Page 59)

TAIPOWER PROCUREMENT FOR FISCAL YEAR 1990 & 1991 (Page 60)

FOURTH NUCLEAR POWER PLANT (Page 61)

TAICHUNG THERMAL POWER PLANTS NOS. 1, 2, 3 & 4 (Page 63)

CONVERSION OF COAL-BURNING POWER PLANTS TO NATURAL GAS FUELED POWER PLANTS
(Page 64)

IX. TAIWAN TOBACCO AND WINE MONOPOLY BUREAU (TIWMB)

TIWMB'S TEN CONSTRUCTION PROJECTS (Page 65)

X. TELECOMMUNICATIONS PROJECT

DGT MODERNIZATION OF TELECOMMUNICATIONS SYSTEM (Page 67)

XI. TRANSPORTATION PROJECTS

A SECOND FREEWAY IN CENTRAL AND SOUTHERN TAIWAN (Page 72)

FIFTH CONTAINER TERMINAL PROJECT IN KAOHSIUNG (Page 74)

MEDIUM RAPID TRANSIT SYSTEM IN TAINAN, SOUTHERN TAIWAN (Page 75)

TAICHUNG MASS RAPID TRANSIT PROJECT AND OTHER FUTURE MRT PROJECTS IN TAINAN,
TAOYUAN, HSINCHU AND CHAIYI (Page 77)

TAIPEI MASS RAPID TRANSIT PROJECT (MRT & MCT SYSTEMS) (Page 78)

TAIPEI HWASHAN-SUNGSHAN UNDERGROUND RAILWAY EXTENSION (Page 83)

KAOHSIUNG MASS RAPID TRANSIT SYSTEM (Page 83)

TAIPEI-ILAN NATIONAL FREEWAY (Page 89)

NEW DEEP-WATER HARBOR IN TAIWAN (Page 90)

WEST COAST CORRIDOR HIGH-SPEED RAILWAY (Page 91)

XII. OTHER PROJECTS

CHINA STEEL CORPORATION FOURTH PHASE EXPANSION PROJECT (Page 94)

DEVELOPMENT OF KUANYIN MOUNTAIN SCENIC AREA (Page 95)

DEVELOPMENT OF THE COASTAL SCENIC AREA OF EASTERN TAIWAN (Page 95)

FEASIBILITY AND PROJECT STUDIES FOR THE HSINCHU SCIENCE CITY PROJECT (Page 96)

MARINE SCIENCE TECHNOLOGY MUSEUM AND MARINE BIOLOGY MUSEUM (Page 96)

NATIONAL SCIENCE & TECHNOLOGY MUSEUM (Page 98)

PESCADORE AQUARIUM/MUSEUM PROJECT IN TAIWAN (Page 99)

TAIPEI ZOO EXPANSION (Page 101)

REPORT ON MAJOR PROJECTS

Implementation of Taiwan's major projects is handled by the Executive Yuan and the Control Yuan. Procurement procedures for the state-run enterprises and the state-owned hospitals or military hospitals are normally processed through the Central Trust of China (CTC). All equipment and supplies purchases above NT\$7.5 million (US\$289,000) for the agencies of the central authorities, and NT\$15 million (US\$580,000) for a government owned enterprise, must be purchased through the CTC tender system.

-- Purchases by state-run enterprises or agencies which fall below the above prescribed amounts may be handled directly by the end user.

-- In some cases the central authorities grant special permission to certain end-users to handle overseas procurement by themselves or through a foreign consulting firm. Crude oil, complete refining units and petroleum cracking units of the Chinese Petroleum Corporation, mass rapid transit systems of the Taipei Municipal authorities, and nuclear power plants and the Taichung thermal power plant of the Taiwan Power Company fall under this exception.

-- China Steel Corporation and China Shipbuilding Corporation are also permitted to handle their own overseas procurement.

More detailed information can be found in a booklet entitled "ROC Government's Procurement Procedure" issued by the Taiwan Board of Foreign Trade.

I. AVIATION PROJECTS

AIR ASIA'S BOEING 747 REPAIR FACILITY

Estimated Total Cost:	US\$24 million (Repair Facility)
Projected Construction Time:	Phase I : 1988 - 1990 Phase II : 1992 - 1996 Phase III: 1997 - 2000
Source of Finance:	Air Asia Company

Current Developments:

Air Asia plans to begin constructing a Boeing 747 Repair Facility in southern Taiwan before the end of 1990. U.S. trade opportunities exist for 747 test equipment, avionics repair equipment, hoists cranes, tow trucks, ground power units and other aircraft maintenance and repair equipment.

Air Asia received initial approval from the Chinese military authorities to build a Boeing 747 repair hangar, but was requested to submit a detailed design for a final approval. Air Asia has already requested several U.S. and foreign firms to submit the repair hangar proposals. Air Asia is reviewing

the proposals. Air Asia will begin construction of its 747 repair facility by the end of 1990 beside the Tainan Airfield 11,000-foot runway pending final approval from the Chinese military authorities.

Air Asia will issue requests for quotations for a variety of equipment for a Boeing 747 repair hangar as soon as a final approval is granted by the Chinese military authorities. Several foreign firms have already contacted Air Asia. Air Asia will hire Taiwan construction firms to build two new large aircraft repair hangars in Tainan.

Background Information:

Air Asia has outlined plans for reorganization and expansion over the next twelve years. In addition to rebuilding its historical base in aircraft maintenance, overhaul, and refitting, Air Asia plans to form an international passenger airline and eventually become a high-tech manufacturer of aircraft parts.

In its second four-year phase of business expansion, roughly 1992 to 1996, Air Asia hopes to establish an international passenger airline.

Contacts:

C. K. Kuo, President, or Berlin Au, General Manager, Air Asia Company, Ltd., Tainan, Taiwan 70205; Phone: 886-6-267-5071; Telex: 71192 AIRASIA; FAX: 886-6-267-3424

AVIATION TRAFFIC CONTROL PROJECT

Estimated Total Cost:	NT\$4.417 billion (US\$164 million)
Projected Construction Time:	July 1989 - June 1993
Source of Finance:	Civil Aeronautic Administration Ministry of Communications

Current Developments:

The Civil Aeronautic Administration (CAA) of the Ministry of Communications extended the Aviation Traffic Control Project (July 1979-June 1989) for an additional four years. This extended project is scheduled to be completed by June 30, 1993. This project covers the original planning of an Air Traffic Control Automation System, and an Automatic Message Switch Information System. Approximately NT\$960 million (US\$35.6 million) will be expended from the original budget of US\$133 to upgrade air communications, monitoring and warning systems, and other related equipment.

Bidding for the US\$50 million Air Traffic Control Automation System was opened on April 30, 1990, by the Central Trust of China. IBM (U.S.), Signaal (Holland), and Thomson (France) participated in the bidding. IBM was given the first right of negotiation, but a final decision has not been made. Sodeteg (France) won the US\$2.47 million Automatic Message Switch Information System contract on March 31, 1990. A US\$4.8 million terminal radar unit was awarded to Thomson (France) in March 1988. CAA is procuring two terminal radar units with an option to procure one additional unit. The Central Trust of China (CTC) recently cancelled the bid twice for these US\$120 million radar units because only two firms, Westinghouse (U.S.) and Selenia (Italy) participated in the bidding. CTC will re-open price bidding as soon as the Ministry of Audit approves this purchase with only two firms participating the bidding. CAA plans to purchase an additional two radar units in approximately two years.

Background Information:

In 1979, CAA commenced the initial Ten-Year Aviation Traffic Control Project planning with assistance provided by Mitre Corporation (U.S.). The Executive Yuan approved the project in 1980 and project construction began in July 1981. The project was scheduled to be completed in June 1989, but the contract was withdrawn when the contractor was unable to complete the contracted works of the Air Traffic Control Automation, and the Automatic Message Switch Information System according to the time schedule.

Contacts:

Carl C. K. Lee, Director, Air Traffic Services Division, Civil Aeronautic Administration (CAA), Ministry of Communications, CAA Building, Sungshan Airport, Taipei, Taiwan; Phone: (02) 712-4154

CHIANG KAI-SHEK INTERNATIONAL AIRPORT; SECOND PHASE EXPANSION PROJECT

Estimated Total Cost: NT\$18.62 billion
(US\$690 million)
Projected Construction Time: July 1989 - June 1994
Source of Finance: Civil Aeronautic Administration
Ministry of Communications

Current Developments:

The Civil Aeronautic Administration (CAA) of the Ministry of Communications (MOC) is planning the Chiang Kai-Shek International Airport Second Phase Expansion Project with a budget of NT\$18.62 billion (US\$690 million). The project will be completed by June 1994. The Executive Yuan approved the project and project planning began in July 1989. With the completion of the project, CKS International Airport will be capable

of receiving 20,000,000 airline passengers annually and will be able to handle 1,400,000 MT of cargo yearly by 2010. In addition, the completed facility will handle 29 airplane takeoffs and landings per hour and will serve 3,800 arriving and departing passengers per hour at peak hours by the year 2010.

A U.S. firm, Parsons Overseas Company along with China Engineering Consultant, Inc. (CECI) has completed the feasibility study on CKS Airport expansion plan. CECI and its sub-contractors (Burns & McDonald, Parsons Overseas, and Parson Brinckerhoff) completed the preliminary design in March 1990. A detailed design is being prepared by CECI and the same group of U.S. consultants. The detailed design is expected to be completed in October 1990. Construction will begin in early 1991. Construction tender will be opened only to local firms, but most of the equipment will be imported from abroad.

This airport expansion project will contain the following facilities:

Terminal Building (Space: 138,000 square feet):

- International Pax Terminal
- Domestic Pax Terminal
- Commuter Line Offices
- Domestic Cargo Terminal
- International Cargo Terminal

Apron:

- International Pax Terminal Apron
- Domestic Pax Terminal Apron
- Two Commuter Aprons
- International Cargo Terminal Apron and Aircraft Maintenance Area Apron
- Long Term Apron
- Helipad

Road System and Parking Lot:

- Pax Terminal Area Road System
- Pax Terminal Parking Lot
- Taxi Stand Parking Lot
- Parking Lot for 3,000 cars
- International Cargo Terminal Parking Lot
- International Cargo Terminal Service Road

Support Facilities:

- Airport Fuel Pump Station
- Air Police Area
- Fire and Rescue Station
- Airport Operations Center (Control Tower)
- Proposed Solid Waste Treatment Plants (Incinerators)
- Proposed Wastewater Treatment Plant
- Aircraft Maintenance Hangar

Recommend interested U.S. firms send their promotional literature to the following contact persons:

Mr. Chih-tsao Jen, Deputy Director
Air Traffic Services Division, Civil Aeronautic Administration (CAA)
Ministry of Communications
Sungshan Airport, Taipei, Taiwan
Phone: (02) 712-1212 Ext. 711

Hsu Ping-ping, Project Manager
Architectural Department, China Engineering Consultants, Inc.
25/F, 185 Hsin-hai Road, Sec. 2, Taipei, Taiwan 10637
Phone: (02) 736-3567 Ext. 2605
FAX: (02) 736-3692

KAOHSIUNG INTERNATIONAL AIRPORT; SECOND PHASE EXPANSION PROJECT

Estimated Total Cost: NT\$14.5 billion
(US\$537 million)
Projected Construction Time: July 1989 - June 1995
Source of Finance: Civil Aeronautic
Administration, Ministry of
Communications

Current Developments:

The Civil Aeronautic Administration (CAA) of the Ministry of Communications (MOC) is planning the Kaohsiung International Airport Second Phase Expansion Project with a budget of NT\$14.5 billion (US\$537 million). The project is expected to be completed by June 1995.

Major project construction will include the following:

Terminal Building (Expected completion: July 1994):
International Passenger Terminal
Domestic Passenger Terminal
Commuter Line Offices
Domestic Cargo Terminal
International Cargo Terminal

Apron (Expected completion: June 1995):
International Passenger Terminal Apron
Domestic Passenger Terminal Apron
Two Commuter Aprons
International Cargo Terminal Apron and Aircraft
- Maintenance Area Apron
Long Term Apron
Helipad

Road System and Parking Lot:

Passenger Terminal Area Road System

Passenger Terminal Parking Lot

Taxi Stand Parking Lot (International Pax Terminal, 220 cars & Domestic Pax Terminal, 125 cars)

Parking Lot for 1,300 sedans and 32 trucks

International Cargo Terminal Parking Lot

International Cargo Terminal Service Road

Support Facilities:

Airport Fuel Pump Station

Air Police Area

Fire and Rescue Station

Airport Operations Center (Control Tower)

Proposed Solid Waste Treatment Plants (Incinerators)

Proposed Wastewater Treatment Plant

Aircraft Maintenance Hangar

The China Engineering Consultant, Inc. (CECI) with the assistance of Parsons Overseas Company (U.S.) has completed the feasibility study, the preliminary design, and the detailed design of the Kaohsiung International Airport Second Phase Expansion Project. The detailed design is being reviewed by CAA and MOC. Construction tenders will be open to local firms, but most of the equipment will be imported from abroad. CAA plans to issue public tenders for equipment purchases. Construction is targeted for completion by June 1995.

Recommend interested U.S. firms send their appropriate literature to the following contact persons:

Mr. Chih-tsao Jen, Deputy Director

Air Traffic Services Division, Civil Aeronautic Administration (CAA)

Ministry of Communications

Sungshan Airport, Taipei, Taiwan

Phone: (02) 712-1212 Ext. 711

Shao Chien-chi, Project Manager

Transportation and Civil Department, China Engineering Consultants, Inc.

28/F, 185 Hsin-hai Road, Sec. 2, Taipei, Taiwan 10637

Phone: (02) 736-3567 Ext. 2605; FAX: (02) 736-3692

TAIWAN'S AIRPORT EXPANSIONS FOR ORCHID ISLAND, GREEN ISLAND, HENGCHUN, KINMEN AND THE PESCADORES

The Civil Aeronautic Administration (CAA) of the Ministry of Communications (MOC) will budget US\$1.1 billion to launch a series of Taiwan airport

expansion projects for off-shore and on-land airports. The US\$1.1 billion airport expansion projects will include airport construction for Orchid Island, Green Island, Hengchun, Kinmen & the Pescadores.

Orchid Island Airport Expansion Project

Estimated Total Cost: NT\$854 million
(US\$31.6 million)
Projected Dates: July 1990 - October 1993
Source of Finance: Civil Aeronautic Administration
Ministry of Communications

The CAA will budget approximately US\$31.6 million for the expansion of the Orchid Island Airport Expansion Project, including foreign equipment purchases of runway end identifying lightings (REIL), non-direction beacons (NDB), precision approach pass indicators (PAPI), automatic meteorological monitoring systems and other related equipment with a budget of US\$93,000. The China Engineering Consultant, Inc. (CECI) is preparing the detailed design on this expansion plan. CECI will be the project general consultant while the BES Engineering Corporation will be responsible for project construction.

Listed below is the present status of the Orchid Island Airport facilities:

<u>Item</u>	<u>Present Status</u>	<u>Expanded Status</u>
Airport Space	5.07 hectares	9.73 hectares
Runway	916 m x 20 m	1400 m x 23.5 m
Apron	2812 square meters Parking space for two BN-2 (10-seater plane) and one DO-228 (20-seater plane)	6880 square meters Parking space for three DO-228 (20-seater plane) or two ATR-42 (40-50 seater plane)
Passenger Terminal	Two story building with 395 square meter building space Control tower is on the 2nd floor.	Four story building with 1824 square meter building space Air-traffic control tower will be on the 3rd and 4th floors.
Parking Lot	600 square meters	1650 square meters
Navigation equipment	VOR/TAC navigation equipment, non-direction beacons (NDB), & VHF telecommunication systems	Runway end identifying lightings (REIL), Precision approach pass indicators (PAPI), & automatic meteorological monitoring systems

Green Island Airport Expansion Project

Estimated Total Cost: Over NT\$200 million
(US\$7.4 million)
Projected Construction Dates: July 1990 - February 1992
Source of Finance: Civil Aeronautic Administration
Ministry of Communications

The CAA will spend approximately USD200 million for the expansion of the Green Island Airport Expansion Project, including foreign equipment purchases of runway end identifying lightings (REIL), non-direction beacons (NDB), precision approach pass indicators (PAPI), an automatic meteorological monitoring system and other related equipment with a budget of USD370,000. The China Engineering Consultant, Inc. (CECI) is preparing the detailed design on this expansion plan. CECI will be the project general consultant while the BES Engineering Corporation will be responsible for project construction.

Listed below is the present status of the Green Island Airport facilities:

<u>Item</u>	<u>Present Status</u>	<u>Expanded Status</u>
Airport Space	3.88 hectares	7.45 hectares
Runway	824 m x 15 m	1010 m x 18.5 m
Apron	672 square meters Parking space for Two BN-2 (10-seater plane) and one DO-228 (20-seater plane)	5620 square meters Parking space for Two BN-2 (10-seater plane) and two DO-228 (20-seater plane)
Passenger Terminal	One story building with 75 square meter building space	Preliminary design to be provided by CECI.
Parking Lot	400 square meters	Preliminary design to be provided by CECI.
Navigation equipment	None (having a telecommunication system)	Runway end identifying lightings (REIL), Precision approach pass indicators (PAPI), & automatic meteorological monitoring system

Hengchun Airport Expansion Project

The CAA has requested the China Engineering Consultant, Inc. (CECI) to prepare a feasibility study for the Hengchun Airport Expansion Project. This airport expansion will include a terminal, an apron, a runway, and an air traffic control tower. The budget for this project has not been announced.

Kinmen Airport Expansion Project

The CAA is preparing the detailed design for the Kinmen Airport Expansion Project. Construction for the Kinmen Airport will begin in September and will be completed within three years. According to CAA, an apron, a runway, and a two-story passenger terminal building will be constructed for this project. The apron will have space to park two Boeing 737 aircraft and one A-300 aircraft.

Currently, the Kinmen Airport is a military airport. CAA plans to lengthen the runway and modernize the airport for commercial use.

The Pescadores Airport Expansion Project

The CAA will prepare a preliminary study for the Pescadores Airport Expansion Project. The project construction will be completed within four years. The total budget for this project has not been announced.

Contact persons for the above projects:

Mr. Chen Chia-ju, Director General
Civil Aeronautics Administration
CAA Building
Taipei Sung Shan Airport, Taiwan
Phone: 886-2-713-3902
FAX: 886-2-717-5852

Mr. Dah-yung Shieh, Project Manager
Traffic and Transportation
China Engineering Consultants, Inc.
185 Hsin-hai Road, Section 2
Taipei, Taiwan

Equipment purchases for these airport projects are expected to begin about one year before the completion date of each airport project listed above. Firms in the U.S. aeronautics industry are encouraged to participate in marketing their products for the aforementioned airport expansion projects.

II. COMPUTERIZATION PROJECTS

NATIONAL POLICE TELECOMMUNICATION SYSTEM UPGRADE

Estimated Total Cost: US\$200 million
Starting Date (Planning): June 1990
Expected Specification
Completion Date: Early 1991
Expected Project
Completion Date: 1993/1994

Current Developments:

The National Police Telecommunication Bureau plans to up-grade the present National Police Telecommunication System with a total budget of US\$200 million. The National Police Telecommunication Bureau representatives will plan in the near future to visit the United States and European countries to acquaint themselves with state-of-the-art police telecommunication technology. The specifications to upgrade the National Police Telecommunication System are scheduled to be completed in early 1991. The radio portion of the Police Command, Control, Communication & Information System (3C&I) will be combined with this system, according to Premier Hau Pei-tsun's direction.

Firms interested in this project are: GE-Ericsson AB, Motorola-British Telecom, and Mitsubishi.

The contact person is:

Mr. H. T. Chuang
Director General
National Police Administration
7 Chung-hsiao E. Road, Sec. 1, Taipei, Taiwan
Phone: (02)321-9011
FAX: 886-2-396-9781

POLICE COMMAND, CONTROL, COMMUNICATION & INFORMATION SYSTEM (3C&I)

Estimated Total Cost: US\$50 million (NT\$1.9 billion)
Starting Date (Planning): June 1986
Expected Completion Date: Delayed
Expected Date of Award: Delayed

Current Developments:

There are four firms or consortia interested in this US\$50 million turn-key project: 1) Electrocom Automation, Inc., 2) British Telecom, 3) a consortium formed by Mitsubishi and NEC, and 4) Seel (Singapore). The Central Trust of China (CTC) cancelled the tender on February 15, 1990, because the Taipei

Municipal Police Headquarters (TMPH) had not received full project budget from the Taipei Municipal authorities. CTC returned the bid participants' proposals un-opened.

Currently, the Taipei City authorities requested its Research, Development & Evaluation Commission to review and re-evaluate the system engineering design for this project. Date for completion of the assessment has not been released.

Since the radio portion of the Police Command, Control, Communication & Information System (3C&I) will be combined with the National Police Telecommunication System according to Premier Hau Pei-tsun's direction, the status of the remaining portion of the project is unclear at this time.

Background Information:

The Taipei Municipal Police Headquarters (TMPH) budgeted US\$50 million to modernize and expand their existing command, control, communication and information (3C&I) system. The project's foreign purchases, for both software and hardware, are estimated at US\$50 million. TMPH requires engineering consulting services for the project. TMPH had planned to purchase the system through an international tender.

In June 1986, TMPH invited the Electronic Research and Service Organization (ERSO), a local non-profit organization, to prepare a system engineering design study for this project. The report was completed in November 1986. AIT has been informed that with the support of several Japanese firms, a Japanese Retired Policemen's Association offered TMPH free system engineering design. We understand that Mitsubishi, Matsushita, NEC, Fuji Denki and other Japanese firms jointly completed a preliminary design in the first quarter of 1987.

The 3C&I system originally included major functions as follows:

- a. Establishing a 24-hour/day, 7-day/week reliable computer system to receive and process all incoming 110 (911 in the USA) emergency calls
- b. Reducing overall police response time through a speedier dispatch process
- c. Accurately monitoring patrol car location
- d. Patrol car dispatching
- e. Effectively using computer data, files and other reference materials

The 3C&I System should contain the following components and specifications:

- a. Computerized event Reporting/Recording System
 - (1) Emergency call receipt positions in outlying stations

(2) Emergency call receipt positions in outlying sub-stations
(3) Incoming telephone line automatic call distribution system --
incoming telephone number and location identification

- (a) Telephone Number Prefix
- (b) Telephone area identification
- (c) Telephone exchange
- (4) Call handling system

b. Radio Communications System

- (1) Radio operator positions
 - (a) Command and Control Center
 - (b) Command and Control Sub-Center
 - (c) Command and Control Center Supervisor
 - (d) Special Command and Control Center
- (2) Handwritten data transmission system
- (3) Logging recorders
- (4) Communication control system
- (5) Radio network communications equipment

c. Non-radio Communication System

- (1) Command and Control Center
 - (a) Dispatch Control System
 - (b) Terminal Control System
 - (c) Fax Machine System
 - (d) Loud Speaker/Paging System

d. Patrol Car Location Monitoring System

- (1) Patrol Car automatic location system
 - (a) Fixed location stations
 - (b) Mobile location identification terminals
- (2) Data Handling System

e. Map Index System

- (1) Map Input System
- (2) Map Indexing System
 - (a) Zoom/Enlargement
 - (b) Screen display

f. Patrol Car Chinese Terminal System

- (1) Terminal Control System
- (2) Data Encoding/Decoding System
- (3) Chinese Terminals
- (4) Data Handling System

g. Closed Circuit TV System

- (1) Helicopter Camera Image
- (2) Television Signal Receiver
- (3) Large Screen Display
- (4) Signal/Image Control

- h. Data Processing System
 (1) Main Computer System
 (2) Chinese Terminals

TMPH officials previously visited the police offices in Phoenix, Dallas, Miami and Houston and were reportedly impressed with the U.S. information systems.

Contact: Mr. Nathan Lin, Program Manager of Police C3I Taipei Municipal Police Headquarters, 86 Yen Ping South Road, Taipei, Taiwan: phone: (02) 383-1566

TAIWAN RESIDENTIAL INFORMATION SYSTEM (TRIS)

Estimated Total Cost:	NT\$7.3 billion (USD270 million)
Starting Date:	March 1985 (Planning)
RP Issuance Date:	February 1990
Expected Date of Contract:	April 1990
Expected Completion Date:	First Phase: January 1992 (NT\$3 million) Second Phase: January 1994 (NT\$7 billion)

Current Developments:

The Central Trust of China (CTC) recently short-listed four pre-qualified firms -- Unisys (U.S.), Acer Sertek (representing AT&T), Mitac Inc. (IBM compatible), & NEC (Japan) for the Taiwan Residential Information System (TRIS) on behalf of the Management Information System Department (MISD) of the Institute for Information Industry. MISD is reviewing the actual system operations of these four short-listed firms. A list of qualified firm(s) will be selected by the end of October 1990. Date for price bid has not yet been announced. We understand that multi-vendors will be selected for a pilot study that will last two years. We were told that the project's equipment will be supplied by the vendors who are selected for this study.

Background Information:

Taiwan authorities have currently approved an investment of NT\$7.3 billion (US\$270 million) for the Taiwan Residential Information System (TRIS). TRIS will be installed in two phases. The first phase will be implemented in 1990 and the second phase in 1992. The first phase will be a two-year pilot study with a budget of NT\$300 million. The second phase will have a budget of NT\$7 billion. The project will be completed by 1994. A total of roughly US\$65 million in hardware will be purchased from abroad. We are told that TRIS will require Chinese character capability. The project's workstations, terminals and laser printers will be procured locally. The Ministry of Interior has jurisdiction over the project.

TRIS is currently the largest island-wide computerization network project being undertaken in Taiwan, which covers one (1) central government site, twenty-three (23) local government sites and three-hundred and sixty-one (361) ward offices. It will be implemented as an X.25 network with approximately 250 computer nodes and 2500 PCs island-wide and will handle over 300,000 on-line transactions every day.

The near term objective of the TRIS is to computerize the current manual compilation and archiving of household/personal data in Taiwan. The long term objective is to provide an information base for population structure analysis, various statistical requirements and other government-level decision support.

It is important to note that TRIS will eventually form the backbone of an integrated network of eleven (11) systems in Taiwan:

- a) Tax Processing System (implemented by Data Point & Digital)
- b) Security and Intelligence System (implemented by IBM & Digital)
- c) Police Information System (implemented by NEC)
- d) Immigration Control System (implemented by WANG)
- e) Civil Administration for Taiwan Authorities (planned)
- f) Land Information System (planned)
- g) Social Welfare (planned)
- h) Health Services (planned)
- i) Urban Planning (planned)
- j) Education Planning (planned)
- k) Decision support system (planned)

These systems may be supplied by different vendors. However, they must all be compatible and allow users to communicate with each other and exchange data between systems.

Local agencies involved and their roles and responsibilities are:

Ministry of the Interior (MOI) -- will prepare the appropriation plan for the Executive Yuan, and nominate a director for "the Preparatory Office"

National Police Administration -- security and intelligence areas

Research Development & Evaluation Commission, Executive Yuan (RDEC) -- will be active in R&D and in evaluation of TRIS solutions

Institute for Information Industry -- will be involved in preparation of benchmark procedures and formulation of the A/P specifications

Project's key players are:

Hau Pei-tsum, premier, Executive Yuan, 1 Chunghsiao E. Road, Sec. 1, Taipei, Taiwan; phone: (02)321-7057

Chow Hong-tao, Minister Without Portfolio, Executive Yuan, 1 Chunghsiao E. Road, Sec. 1, Taipei, Taiwan; phone: (02)393-7977

Hsu Shui-teh, Minister, MOI, 107 Roosevelt Road, Sec. 4, Taipei, Taiwan; phone: (02)341-5241

Contact:

Mr. Tai-Lang Chien, Director of Population Administration, Ministry of Interior, 107 Roosevelt Rd., Sec. 4, Taipei, Taiwan. Tel: (02) 363-2784.

III. CONSTRUCTION PROJECTS

CONSTRUCTION PROJECTS IN KAOHSIUNG

Current Developments:

There are several projects with potential markets in southern Taiwan for U.S. suppliers of building materials, construction technology and allied products and services. Mr. Wu Ho-tang, the president of the Kaohsiung Construction Investment Association has offered to assist U.S. companies present their products and services to association members. Wu may be contacted at the following address:

Mr. Wu Ho-tang, President
Kaohsiung Construction Investment Association
3/F-2, 301 Chi Hsien 1st Road, Kaohsiung
Phone: (07)261-2723, 281-1761
Fax: (07)272-2967

Recent developments in the construction industry are outlined below, followed by descriptions of major players in the construction industry who are interested in American services and products.

The Chang-ku Building Co., Ltd. of Kaohsiung has engaged Turner International Industries, Inc. of New York as engineering consultant for a 55-story office building project in Kaohsiung. Turner becomes the first U.S. firm to take advantage of trade opportunities in southern Taiwan's highrise construction market. This project is budgeted at NT\$3 billion (about US\$109 million) and scheduled for completion by December 1992. AIT believes Turner's success should spur additional U.S. firms to examine opportunities in southern Taiwan.

The I Hsin Yuan Enterprise Group will begin a 50-story office building on Hsinkuang Road, Kaohsiung this year. The area has been designated by local authorities as a new financial district. The Group will also construct two to three office buildings of 20 stories or more in other parts of Kaohsiung. The group's chairman, Wu Ho-Tang, was recently elected president of the Kaohsiung Construction Investment Association. The association is very well organized. Wu told AIT/K staff that his association is willing to assist U.S. companies in holding seminars and exhibitions of high-quality American products for the association's members. Wu may be contacted through his aide at the following address:

Mr. Hong Kwang-Zong, Chief Planner (surname: Hong)
I Hsin Yuan Enterprise Group
15/F, 182, Chung Cheng 2nd Road
Kaohsiung, Taiwan
Fax: 886-7-3116094
Phone: 886-7-313-3100

The Yungshin Construction and Development Co., Ltd. plans to build 24 residential, office and commercial buildings worth NT\$15 billion (about US\$550 million) in the next five years. Yungshin is interested in importing U.S. construction materials and equipment such as cranes, hoisting and loading machines, building and office automation systems, security systems, curtain walls, generators, elevators, pumps, main frames of air conditioning systems, and drainage systems. Construction technologies such as curtain wall building techniques, construction scheduling control, techniques for design and construction of highrise buildings, and office building management techniques are needed. In addition, Yungshin has expressed interest in serving as a local agent for U.S. firms. Yungshin contact information follows:

Mr. Calvin C. Hu, Vice President
Ms. Maggie Hsu, Special Assistant
Yungshin Construction and Development Co., Ltd.
13/F, 2, Chung Cheng 3rd Road,
Kaohsiung, Taiwan
Fax: 886-7-725-0788
Phone: 886-7-281-9460

The Pacific Construction Co., Ltd. (PCC) informs us it plans to build ten residential and office buildings worth some NT\$29.96 billion (about US\$1.1 billion) this year. PCC claims that the site is located at one of the planned Kaohsiung Mass Rapid Transit System stations. Four of the planned buildings are 20- to 30-story residential complexes, while the remainder are 30 to 40-story office buildings. A Japanese business group (owner of the Sogo Department Store chain) is negotiating with PCC about possible financial, material and technological assistance for the project. While PCC will send a fact-finding delegation to Japan, company officials tell us that PCC has not yet decided to cooperate with the Japanese. They would welcome contact with U.S. firms, at the following address:

Mr. Muh-Sheng Tsai, Assistant Manager (surname: Tsai)
Pacific Construction Co., Ltd.
3/F, 101, Chung Shan 2nd Road
Kaohsiung, Taiwan
Phone: 886-7-2718458
Fax: 886-7-2813664

The Pearly Group plans seven or eight residential and office buildings in Kaohsiung over the next three to five years. Two or three will be 10- to 20-story residential buildings, four will be combined residential/office buildings of 20 stories or more, and one will be a 41-story office building. Pearly officials state that Japanese, Australian and European suppliers have contacted the group about these projects. Pearly hopes that American firms will furnish them information on U.S. building materials and technologies. Pearl has limited experience in computing the cost of highrise buildings, and seeks this expertise and an understanding of new construction technologies. Interested U.S. firms may contact the Pearly Group at the following address:

Mr. Chue Yue-Shion, President (surname: Chue)
Pearly Group
18/F, 2, Chung Cheng 3rd Road,
Kaohsiung, Taiwan
Fax: 886-7-241-1641
Phone: 886-7-2824208

The Kao Wu Land Development Co., Ltd. plans to build eight residential and office buildings this year and next. Plans are for a 22-story, two 16-story and two 12-story office buildings, and three residential buildings of twelve to fourteen stories. Cost of the project is estimated at NT\$1.35 billion (about US\$50 million). Interested U.S. suppliers of building materials, equipment and technologies are urged to contact the company at the following address:

Mr. Shih Chiu-Kuang, Vice President (surname: Shih)
Kao Wu Land Development Co., Ltd.
3/F, 218, Chung Cheng 2nd Road,
Kaohsiung, Taiwan
Fax: 886-7-241-3780
Phone: 886-7-281-1141

American firms may wish to consider mailing their promotional literature to the two following Kaohsiung offices:

American Institute in Taiwan, Kaohsiung Branch Office
Attn: Commercial Library
3/F, 2, Chung Cheng 3rd Road, Kaohsiung, Taiwan

China Productivity Center, Kaohsiung Branch Office
Attn: Mr. Wang Ren-Yu
6/F, 21, Wu Fu 3rd Road, Kaohsiung, Taiwan

ROYAL COUNTRY CLUB IN MIAOLI

Current Developments:

A Taipei firm, Yao-teh International Development Company, Ltd., is developing a USD200-million American-style country club in Miaoli County, about 16 kilometers from Miaoli City in north central Taiwan. The project will comprise a 250 to 500-room hotel, two 18-hole golf courses, tennis courts, and various athletic facilities. Parsons Overseas Company (Pasadena, CA) has been selected as the overall designer for the project and William A. Peterson of Parsons is the Project Director. U.S. firm, URS International, Inc., has been chosen as the project architect and Robert Trent Jones Jr. (U.S.) is designing

the golf courses. Baker.3D/I of Wahnchai (Hong Kong) will provide interior design services for the hotel; the Ta-Han Consulting Engineering Company (Taiwan) has been chosen as the site infrastructure engineer, and the Catering Equipment Company, Ltd.(Hong Kong) has been designated as the kitchen consultant. Hotel construction began in December 1989 and is scheduled to be completed in December 1992.

According to Project Director Peterson, about 150 golf carts, various types of golf equipment, hotel equipment, and kitchen equipment will be purchased from the United States. The aforementioned equipment procurement value has not yet been determined, but purchases will begin in the second quarter of 1991.

Contact: Mr. William A. Peterson, Project Director, Royal Country Club, c/o Yao-teh International Development Company, Ltd., 29/F1, No. 333, Sec 1, Keelung Road, Taipei, Taiwan; FAX: 886-2-7576489; phone: (02)722-2127.

IV. PETROLEUM & PETROCHEMICAL PROJECTS

CHINESE PETROLEUM CORPORATION PROJECTS

. CPC THIRD OIL REFINERY

Chinese Petroleum Corporation (CPC) is actively considering the construction of a NT\$20.4 billion (US\$785 million) third oil refinery in Taiwan. The project would most likely be constructed off the west coast of Taiwan near Chiayi county on a man-made island and will require substantial landfill and either a seabed pipeline or new harbor construction for the delivery of crude oil for refining. Bechtel International recently completed a feasibility study on the construction of a man-made island near Chia-yi. CPC is capable of doing the project preliminary design, which will start, at the earliest, in August 1993 with construction to begin in 2001. In accordance with CPC desires, this project will likely be a turn-key project.

U.S. engineering and construction firms and U.S. suppliers of refinery equipment, pollution control equipment, etc. are recommended to contact:

Mr. C. M. Yang, Director, Manufacturing Division, Chinese Petroleum Corporation, 83, Chung Hwa Road, Section 1, Taipei, Taiwan 10031
Telex: 11215 CHINOL; Fax: 882-2-331-9645

Dr. Wenent P. Pan, Director, Corporate Planning, Chinese Petroleum Corporation, 83, Chung Hwa Road, Section 1, Taipei, Taiwan 10031
Telex: 11215 CHINOL; Fax: 886-2-3319645

. EXPANSION OF THE CHINESE PETROLEUM CORPORATION'S LIQUEFIED NATURAL GAS RECEIVING STATION IN SOUTHERN TAIWAN

Estimated Total Cost: NT\$19 billion (US\$704 million)
Expected Completion Date: December 1994
Source of Finance: Chinese Petroleum Corporation

The Taiwan authorities approved on January 6, 1990, the expansion of the Chinese Petroleum Corporation's (CPC) liquefied natural gas receiving station in southern Taiwan. CPC will expand its existing LNG receiving terminal from a 150-ton capacity to a 450-ton capacity station. CPC stated that they have completed a preliminary and detailed design of this expansion project. CPC is negotiating with the CICI Corporation for a general consultant contract to supervise this project construction, according to CPC. Tenders for equipment purchases for LNG underground tanks and the LNG evaporation plant will be issued to international firms very soon. This US\$704-million project will offer specialized equipment export opportunities to U.S. firms.

Contacts:

Y. S. Chen, Chairman of the Board, Chinese Petroleum Corporation, P.O. Box 135, Taipei, Taiwan; Telex: TP 11215; Phone: (02)361-0221

Mr. Y. T. Chiu, Vice President, Chinese Petroleum Corporation, 83, Chung Hwa Road, Section 1, Taipei, Taiwan 10031; Phone: (02)383-5612; Telex: 11215 CHINOL; Fax: 882-2-331-9645

. NOISE ABATEMENT PROJECT(S)

CPC expects to allocate NT\$2.0 billion (about US\$62 million) over three years for noise abatement efforts at their various facilities outside Kaohsiung. A West Germany firm, G Plus H, has been assigned as consultant for this project. Two U.S. firms contacted CPC showing interests in supplying equipment for this project.

. TREATMENT OF POLLUTED UNDERGROUND WATER

CPC contracted with the U.S. firm Insitu to conduct a study of the sources and extent of underground water pollution around its Kaohsiung facilities and a feasibility study on treatment of these waters. The Insitu contract is valued at US\$300 thousand. U.S. firms Roy Weston and Riedel have been contracted to conduct studies of polluted underground water at Lin-Ya-Liao and another area around CPC Kaohsiung facilities. The Roy Weston and the Riedel contracts are valued at US\$1 million each. These subsurface waters may be affecting drinking or irrigation water supplies in Kaohsiung and the surrounding area. CPC officials anticipate a future project for the treatment of these waters.

. FOUR 40-KILOMETER UNDERSEA OIL PIPELINES

U.S. firm Intec completed a feasibility study, and the China Engineering Consultants, Inc. with the assistance of Intec, conducted a preliminary and detailed design for construction of four forty-kilometer undersea oil pipelines to replace part of a 20-year-old underground pipeline system. CPC will budget approximately NT\$1.6 billion (US\$59 million) for piping and one buoy for this project. Invitations to bid are expected to be issued in early October 1990.

U.S. firms interested in further pursuing these projects are encouraged to contact:

Mr. S. F. Shih, Director, Department of Projects and Construction,
CPC-Kaohsiung Refinery, telex 81960 CHINKOR OR FAX 886-7-583-4228

. FIFTH NAPHTHA CRACKER

Estimated Total Cost: US\$385 million, including foreign equipment purchases of US\$250 million
Expected Completion Date: December 1993
Source of Finance: Chinese Petroleum Corporation

Current Developments:

CPC awarded the contract for the construction of the Fifth Naphtha Cracker to M. W. Kellogg, Inc. in 1986. Taiwan environmentalists had effectively blocked the project construction for the past several years. CPC met frequently in the past with the local environmental opposition but only with marginal success. Most recently in August 1990, Premier Hou Pei-tsun and MOEA Minister Vincent Siew placed the Fifth Naphtha Cracker high on their priority list. MOEA promised funds to finance local development and welfare projects in the area of the Fifth Naphtha Cracker. The environmental opposition was satisfied and the project finally began construction on September 22, 1990.

U.S. firm M.W. Kellogg has already completed the engineering design for this project and CPC discloses that Kellogg has already sourced about one-half of the critical equipment.

Background Information:

In January 1986, the Council for Economic Planning and Development (CEPD) approved the construction of Chinese Petroleum Corporation's (CPC) Fifth Naphtha Cracking Plant in Kaohsiung. The budget for the Naphtha Cracker was cut from US\$400 million to US\$385 million in response to earlier criticisms of the project's return on investment by the Commission of National Corporations.

The project was scheduled to be completed by the end of 1990. An increasing demand for ethylene has caused CPC to change their decision about closing down No. 2 Cracker after No. 5 Cracker begins operation. CPC plans to install automated equipment in the new plant to cut down on its operating costs.

M. W. Kellogg will procure all critical equipment. CPC has limited purchases of major equipment, such as compressors and instrumentation, to U.S. suppliers with the remaining equipment purchases open to both U.S. and European suppliers. CPC will procure 10 units of U.S.-made cracking furnaces costing approximately US\$50 million.

Contact: Mr. S. F. Shih, Director, Department of Projects and Construction, CPC-Kaohsiung Refinery, telex 81960 CHINKOR or FAX 886-7-583-4228

FORMOSA PLASTICS PETROCHEMICAL COMPLEX (SIXTH NAPHTHA CRACKER)

Estimated Total Cost: US\$240 million, including 100 million foreign equipment purchases
Starting Date: January 1987 (for planning)
Expected Completion Date: December 1993
Date of Award: Not yet known
Source of Finance: Formosa Plastics Corporation

Current Developments:

Because of environmentalists' opposition and difficulties in finding a suitable location, the construction of the Sixth Naphtha Cracker has been delayed for several years. The long controversy over construction of Taiwan's Sixth Naphtha Cracker heated up in May 1990 when FPC Y. C. Wang announced that his sixth naphtha cracker would be built in mainland China. This decision caused the Taiwan authorities to offer greater assistance to Formosa Plastics Corporation (FPC) in its efforts to build a Sixth Naphtha Cracker.

The Ministry of Economic Affairs (MOEA) is requesting FPC to present a detailed plan on the proposed sixth naphtha cracker project. The Industrial Development Bureau (IDB) has completed the drafting of a conclusive report on this new cracker project which MOEA will submit to the Executive Yuan for review shortly.

According to the IDB report, FPC will find no difficulty in acquiring ownership of land in the proposed industrial port adjacent to the prospective cracker. To help FPC solve the land shortage problem, IDB has developed the needed land in the Kuanyin Industrial Zone in Taoyuan County to allow FPC to move forward with construction.

To counter opposition faced by FPC, finance and economic officials have suggested that local taxes paid by FPC on this project be used for public construction and development in the Taoyuan county.

Mr. Jack Chao-chuen Jen, Special Assistant to the President of Formosa Plastics, disclosed that Formosa plastics has selected the local China Port and Harbor Engineering Consultants to do the planning and design for its petrochemical harbor. We are told that the consulting firm is capable of doing the detailed harbor design without foreign assistance. The consulting firm has completed a test model and the final detailed design has been reportedly submitted to the Taiwan authorities for approval.

Background Information:

In July 1988, the Environmental Protection Administration (EPA), approved the Formosa Plastics Corporation's environmental impact report for its planned Sixth Naphtha Cracking Plant with the following conditions:

a. The FPC should map out a detailed plan describing how it can obtain 41,000 tons of water for the plant's operation and ways to dispose of the facilities' waste water.

b. The EPA suggested that FPC and the Economics Ministry strengthen communication with environmentally conscious residents to avoid public protests against the plant. The FPC should respect opinions of residents in Kuanyin Village, Taoyuan County, the planned construction site.

Formosa Plastics, Taiwan's leading business group, has contracted the U.S. engineering firm Stone and Webster to design its proposed US\$240 million naphtha cracker. FPC has expressed a decided "quality preference" for U.S. naphtha cracker engineering and equipment. The FPC will handle all equipment procurement.

Over seventy-five percent of the US\$100 million foreign equipment purchases will be made from U.S. firms, according to the FPC. U.S. firms Elliott Corporation and Dresser Industries have shown interest in supplying the compressors, turbine, and refrigerator unit. Westinghouse, Foxboro, and Honeywell are under consideration for the instrumentation, and Xomox is one of several U.S. firms pursuing the contract for valves.

The Chinese Petroleum Corporation naphtha crackers cannot keep pace with Taiwan's increasing demand for petrochemical feed stocks. This inability of the state-run enterprise to meet demand ultimately moved the Ministry of Economic Affairs to grant privately owned FPC permission to construct its own naphtha cracker which will produce 450,000 tons of ethylene annually. The plant is scheduled to be completed in approximately three years.

It is predicted that without the new cracker, Taiwan will lose international petrochemical competitiveness within the next three years due to a shortage of raw materials.

Taiwan local press reports indicate that Formosa Plastics executives foresee fierce competition in the world petrochemical market in the near future because several other Asian nations, including South Korea, are vigorously developing their own petrochemical industries.

There are four naphtha cracking plants in Taiwan, all belonging to the state-owned Chinese Petroleum Corporation (CPC). CPC is also constructing a fifth plant with an annual capacity of 400,000 metric tons of ethylene and other petrochemical intermediaries.

With the completion of the fifth and sixth naphtha cracking plants by 1993, Taiwan will become one of the world's top 10 petrochemical producers.

A high ranking Formosa Plastics Group official reported to AIT that the demand for petrochemicals in Taiwan will exceed the supply even after the sixth naphtha cracker is completed.

Contact: Mr. Y. T. Wang, President, Formosa Plastics Corporation, 201 Tung Hwa N. Road, Taipei, Taiwan; Phone: (02)712-2211; FAX: 886-2-7129211; Telex: 11246, 22260 TAIPEI

V. POLLUTION CONTROL PROJECTS

CONSULTANT SERVICES FOR TWELVE TAIWAN EPA PROJECTS

Current Developments:

The Taiwan Environmental Protection Administration (EPA) issued tenders for three (3) projects which will require engineering consultant services totaling approximately 650 thousand U.S. dollars. The three projects include both planning and implementation, and involve hazardous substances control, prevention and analysis. Bidding documents for the following projects are written in both Chinese and English and are available at EPA. Either domestic or foreign consultants are eligible to be the primary contractor for all project proposals. Submission deadline was September 15, 1990. Details are as follows:

- The planning of hazardous chemicals management project
Contact: Mr. Chung-I Liu, Phone: 886-2-3117722 ext. 544
- The expansion, application and planning of chemicals information system
Contact: Mr. Chung-I Liu, Phone: 886-2-3117722 ext. 544
- The survey and planning of hazardous chemicals emergency prevention and response measures for demonstration
Contact: Miss Li-Jen Yang, Phone: 886-2-3117722 ext. 534

Remarks: Tax included in all project fees, foreign consulting company (not registered in Taiwan) is subject to a 20 percent tax rate. Project scope, bidder qualification and proposal deadline are all specified in the bidding documents. For details, contact the specified person above and send a self-addressed envelope with project name of interest to: Environmental Protection Administration, Bureau of Environmental Sanitation and Toxic Substances Control, No. 1, Hsiang Yang Rd., Taipei, Taiwan. (Phone: 886-2-3117722, Fax: 886-2-381-0562)

The Taiwan EPA has also budgeted approximately US\$5 million in FY 1991 for nine projects including both planning and implementation of pollution control prevention and analysis proposal. Submission deadline was August 15, 1990, for the following five projects:

For the following five projects, either domestic or foreign consultants are eligible to be the primary contractor. The bidding documents are in Chinese and English.

-- Quality Assurance Project of Air Quality Monitoring Network
Contact: Mr. Kuo-Ding Jou, Bureau of Environmental Monitoring and Data Processing, Phone: (02) 311-7722 ext. 716

-- Hualien River, Mei-Lun River, Chian River - Water Pollution Control Planning
Contact: Mr. Shin-Tai Yung, Bureau of Water quality protection, Phone: (02) 311-7722 ext. 734

-- Improvement, Evaluation, and Management Manual of Industrial Wastewater Treatment
Contact: Mr. Ei-Harnng Lei, Bureau of Water quality protection, Phone: (02) 311-7722 ext. 736

-- Marine Pollutants Investigation and Assimilative Capacity Evaluation for the Southwestern Coastal Area of Taiwan
Contact: Mr. Tzi-Chin Chang, Bureau of Water quality protection, Phone: (02) 311-7722 ext. 737

-- Industry Waste Minimization Demonstration and Promotion
Contact: Mr. Jay Shih, Bureau of Solid Waste Management, Phone: (02) 311-7722 ext. 624

For the following four projects, only domestic consultants are eligible to be the primary contractor; foreign consultants are eligible only to be the secondary contractor. The bidding documents are in Chinese language only.

-- Environmental Impact Assessment Follow-up Project
Contact: Mr. Shui-Ping Chang, Bureau of Comprehensive Planning, Phone: (02) 311-7722 ext. 236

-- Proposals for Evaluating the Clean Up Proposal and the Facilities of Storing, Handling, and Treating Industrial Waste
Contact: Mr. Ching-Her Guo, Bureau of Solid Waste Management, Phone: (02) 311-7722 ext. 615

-- Criteria of Air Pollution Control for Brick Kiln Plant, Surface Coating Operation, Plastic and Manufacture Plants
Contact: Mr. Fung-Luh Yeh, Bureau of Air Quality Protection, Phone: (02) 311-7722 ext. 503

-- Environmental Dispute Appeal Mediation Handling System Planning and Design, the Design and Execution of Inspection Dispute Appeal Handling technique training program
Contact: Mr. Hsu-Hao Chen, Bureau of Performance Evaluation and Dispute Settlement, Phone: (02) 311-7722 ext. 637

Remarks: Tax included in all project fees, foreign consulting companies (not registered in Taiwan) are subject to a 20 percent tax rate. Project scope, bidder qualification and proposal deadline, etc. are all specified in the bidding documents. For details, contact the specific person above and send a self-addressed envelope with project names of interest to: Environmental Protection Administration, No. 1, Hsiang Yang Rd., Taipei, Taiwan (Phone: 886-2-311-7722, Fax: 886-2-311-6071).

Contacts: The individual project person listed above or Dr. Joseph Yang, Advisor, Environmental Protection Administration, 1 Hsiang-yang Road, Taipei, Taiwan; phone: 886-2-311-7722 Ext. 224; FAX: 886-2-331-6071

INDUSTRIAL WASTE DISPOSAL CENTERS

Estimated Total Cost: NT\$2.6 billion (US\$96.3 million, including equipment purchases of about US\$30 million)
Construction Time: January 1991 - January 1994
Source of Finance: Chinese Petroleum Corporation

Current Developments:

The Ret-Ser Engineering Agency has been selected by the Industrial Development Bureau (IDB) as a turn-key contractor for the project. The Executive Yuan is reviewing the project plan submitted by Ret-Ser. As soon as the Executive Yuan approves, Ret-Ser will begin the project basic design. According to Ms. Lin Yeh-jiuan, Chief of First Section, Environmental Engineering Project, Ret-Ser will evaluate and select a foreign engineering consultant to assist Ret-Ser in preparation of the project basic design and detailed design.

Incineration capacity will be approximately 200-250 TPD. Imported equipment will be necessary. Foreign equipment tenders will be opened to international firms.

Background Information:

The Industrial Development Bureau (IDB) of the Ministry of Economic Affairs plans to build three industrial waste disposal centers. IDB has been given a NT\$1 billion budget (US\$37 million) to build one hazardous waste incineration facility in the Tafa Industrial District, Kaohsiung, in southern Taiwan. IDB plans to build the other two in northern and central Taiwan later. The project budget is mostly from the Chinese Petroleum Corporation's surplus profits.

Originally, IDB entrusted the project planning to the Industrial Technology Research Institute (ITRI). ITRI awarded, in July 1988, the preliminary design contract to Chem Control, a Danish firm, and Chem Control completed the preliminary design study in May 1989. U.S. firm, Four-Nines, was selected to review the preliminary design study.

As a first option, the Taiwan authorities prefer to have a private group or company handle construction, operation and maintenance of the center.

Contacts:

Mr. Lin Tsu-sen, Chief, or Mr. Shih Tai-an, Industrial Pollution Prevention Section, Industrial Development Bureau, Ministry of Economic Affairs, 41-3 Hsin-yi Road, Sec. 3, Taipei, Taiwan; Phone: (02)754-1255

Ms. Lin Yueh-Jiuan, Chief of First Section, Environmental Engineering Project, Ret-Ser Engineering Agency, 829 Pei-an Road, Taipei; Phone: (02)508-4310; FAX: 504-1264

INITIAL CONSTRUCTION OF TAMSUI RIVER CLEAN-UP PROJECT

Estimated Total Cost: NT\$28.3 billion
(US\$1.1 billion)
Projected Construction Time: July 1988 - June 1993

Current Developments:

The Executive Yuan approved the project which was implemented in July 1988. Major tasks of the project are: (a) construct a sewage, interceptor, and ocean outfall system, and (b) improve solid waste management along riverbanks. Parsons Brinckerhoff Consulting Engineers, a U.S. firm, is the project general consultant. The Pali Ocean Outfall construction tenders for technical proposals were issued in December 1989. Four local prime bidders submitted the project technical proposals. On September 22, 1990, the Tang Eng Iron Works Company, Ltd. in a joint venture with Morrison-Kundsen Corporation (U.S.) and the Chu Chiang Company in a joint venture with Brown & Root (U.S.) were selected as qualified firms for the Pali Ocean Outfall construction while two other local firms, the Ya Tong Construction Company and Far East Construction Corporation were disqualified. The Pali Ocean Outfall construction contract will be awarded to one of the prequalified firms by the end of October 1990.

Contacts:

Wu Chun-hsiu, Chief Engineer, Sewerage Engineering Division. Department of Public Works, Taipei Municipal Government, 200 Yenping N. Road, Sec. 4, Taipei, Taiwan; Phone: (02)592-7022

Kuo Lung-lang, Director, Environmental Department, Taiwan Housing and Urban Development Bureau, 342 Pa-teh Road, Sec. 2., Taipei, Taiwan; Phone: (02) 773-1212

Edward M. Y. Wu, Director General, Bureau of Water Quality Protection, Environmental Protection Administration, 1 Hsiang Yang Road, Taipei, Taiwan; phone: (02)311-7722

Tsai Jaw-yang, Director General, Construction and Planning Administration, Ministry of the Interior, 194 Peihsin Road, Sec. 3, Hsintien City, Taipei County, Taiwan; (02)915-7601

Roger Clifford, Vice President, Parsons Brinckerhoff Consulting Engineers, 8/F, 320 Chung Hsiao E. Road, Sec. 4, Taipei, Taiwan; Phone: (02)781-2106; FAX: (02)771-0322

TAIWAN'S SEWAGE PROJECTS/TAIPEI SUBURBAN AREA SEWAGE SYSTEMS PLAN/KAOHSIUNG SEWAGE PROJECT

Estimated Total Cost: US\$5 billion
Starting Date (Planning): July 1987
Expected Completion Date: June 2007
Date of Award: In process
Source of Finance: Central authorities, Taipei, Kaohsiung, & Provincial authorities.

Background Information:

The Council for Economic Planning and Development passed a resolution to carry out a 20-year sewage project in Taiwan beginning in July 1987. The project calls for a total budget of NT\$128.4 billion (approx. US\$5 billion).

The sewage system project covers two phases:

Phase I: The short-range program or the first phase began in July 1987 and will be completed in June 1993. After the completion of the US\$1.5 billion six-year sewage system program, 15 percent of the target will have been accomplished.

Phase II: The long-range program will begin from fiscal year 1993 through fiscal year 2007. We have been informed by the Council for Economic Planning and Development that the long-range program is still in the planning stage. The 14-year long-range program will extend the sewage network in Taipei to 90 percent of all households and institutions, 80 percent in Kaohsiung, and 30 percent in provincial areas across the island.

By 1993, the new Kaohsiung sewage network, with an investment of US\$348 million, will be 48 percent complete and other provincial areas in Taiwan, with a budget of US\$504 million, will be 8 percent complete.

a. TAIPEI SUBURBAN AREA SEWAGE SYSTEM PLAN

Estimated Total Cost: US\$968 million
Phase I: US\$323 million (including foreign equipment purchases of approximately US\$147 million)
Phase II: US\$408 million
Phase III: US\$348 million

Starting Date: 1972
Expected Construction Date: Phase I: July 1986-June 1990
Phase II: July 1991-June 1995
Phase III: July 1996-June 2000
Source of Finance: The project will be financed jointly by the Taipei City and the Taiwan Provincial authorities

Current Developments:

Parsons-Brinckerhoff International won in March 1989 a NT\$48 million (US\$1.8 million) consulting service contract for the Pali Outfall Project Management Control Plan. The Pali Ocean Outfall is a portion of the Taipei Suburban Area Sewerage System Plan. This phase of the project includes the installation of a submarine pipeline for sewage disposal. This turnkey project will consist of engineering, procurement and construction of a 6.5-km long, 3.6-m diameter pipeline. The estimated cost is over US\$150 million. The Pali Ocean Outfall construction tenders for technical proposals were issued in December 1989. Four local prime bidders submitted the project technical proposals. On September 22, 1990, the Tang Eng Iron Works Company, Ltd. in a joint venture with Morrison-Knudsen Corporation (U.S.) and the Chu Chiang Company in a joint venture with Brown Root (U.S.) were selected as qualified firms for the Pali Ocean Outfall construction while two other local firms, the Ya Tong Construction Company and Far East Construction Corporation were disqualified. The Pali Ocean Outfall construction contract will be awarded to one of the prequalified firms by the end of October 1990. The project is to be completed by December 1994.

The Taipei area onland portion of the sewerage system civil construction contract was awarded to the New Asia Construction & Development Corporation, a local firm, in August 1989. This portion of sewerage system civil construction is scheduled to be completed by December 1993. Equipment purchases for this sewerage system will be reviewed by Mr. J. K. Hu, Deputy Director, Sewage Engineering Department, Public Works Department, Taipei Municipal Government, 200 Yenping N. Road, Section 4, Taipei, Taiwan; phone: (02) 595-1691.

Background Information:

The Taiwan Housing and Urban Development Bureau (THUDB) has completed the project's basic and detailed engineering design with the assistance of Engineering-Science, Inc., Dodson and Young (Walnut Creek, CA) and Camp, Dresser & McKee (Boston, MA). The Shitzutou pump station detailed engineering design, also prepared by THUDB, with Dodson and Young's technical assistance, was completed in May 1987.

The planning area for the Taipei suburban area sewage system plan covers the lower Tamsui river basin located in the northern part of Taiwan. The planning area (excluding the municipality of Taipei) consists of sixteen administrative entities in Taipei Hsien (county) and Keelung city. The project is a regional sewage system, consisting of separate sanitary sewer systems along the Keelung

river, Hsintien creek, and Tahan creek. The sewage collected from the planning area will be conveyed to the Shitzutou pump station. From the pumping station the sewage will be combined with Taipei city's excess wastewater and pumped to the Pali wastewater treatment plant. After processing, the treated effluent will be discharged into the Taiwan Straits through an ocean outfall.

The planning area encircles the municipality of Taipei from three sides: the East, the West and the South; and constitutes the Taipei metropolitan area. The planning area comprises approximately 69,700 hectares, of which about 16,700 hectares are covered under Taiwan's urban planning land use regulations

The major components of the regional sewage system (including the city/province joint outfall system) consists of 80 km of primary sewers, 129 km of secondary sewers, 1150 km of tertiary sewers, 5 pumping stations, 14 km of land outfalls, a primary sewage treatment plant, and a 7 km ocean outfall.

The total cost of the project is estimated to be US\$1.1 billion. This cost is based on a 1983 cost index and includes engineering, construction and construction supervision. The cost of the joint city/province facilities is approx. US\$562 million and the cost for the provincial facilities is US\$515 million. The estimated annual cost of operation and maintenance for the complete regional system, including the city/province joint outfall system is US\$38.5 million.

The project will be constructed in three separate phases. Following is an estimated breakdown of cost and construction for each phase of the program, but the Phase I construction schedule will be delayed for three years.

Phase I (July 1986-June 1990, budget of US\$323 million):- Phase I project consists of the construction of first stage Shitzutou (Lion Head) pump station, land outfall, preliminary treatment plant and first ocean outfall. The main purpose is to solve Taipei city's urgent wastewater discharge problem, and to improve environmental conditions in Shanchung, Luchou, and Hsinchuang. THUDB completed the detailed engineering design with the assistance of Dodson and Young and Camp, Dresser & McKee, Inc. The Shitzutou pump station involves building two new outfall pump stations plus a new head works. The 6 large wastewater pumps will each have the capacity to handle 72,000 GPM of raw sewage. In addition to the pumps, the contract will also include the supply of electric motors (3000 HP each) and electric and mechanical equipment. Foreign equipment purchases are estimated at US\$3-4 million. Imported equipment for the Pali wastewater treatment plant comprises sludge scrapers, barscreens, sludge pumps, environmental control laboratory equipment and penstocks. Total foreign equipment procurement is estimated to be approximately US\$132 million. The engineering design was completed in May 1987.

Phase II (July 1991-June 1995, estimated budget of US\$408 million):- Phase II project includes the upgrade of Pali wastewater treatment plant to primary treatment, the enlargement of the Shitzutou pump station and construction of

collection systems in Panchiao, Yungho, Chungho, Hsintien. The sewage of Hsinchih and Chitu will be collected and conveyed by Taipei city trunk line to the joint outfall system.

Phase III (July 1996-June 2000, estimated budget of US\$348 million):- Phase III project comprises the construction of the final stage of the Shitzutou pump station, land outfall, Pali treatment plant and the second ocean outfall, and the completion of the whole sewage collection and treatment system within the planning area.

b. KAOHSIUNG SEWAGE PROJECT

Estimated Total Cost: Over US\$690 million
(Phase I: US\$307 million, including equipment budget of US\$11.7 million)
(Phase II: US\$383 million)

Starting Date: Phase I - Short Range: July 1979-June 1998
Phase II - Long Range: July 1993-June 2007

Expected Completion Date: June 2007

Current Developments:

In 1988, the Taiwan Environmental Protection Administration (TEPA) began cleanup projects for the Hochin and Tienpao creeks in Southern Taiwan.

The polluted Hochin River was causing losses to local fishermen. Over 70 factories along the river are producing air and waste-water pollution. Hochin residents have staged frequent protests. The issue has become an extremely sensitive one in the area. The Tienpao River, north of Hochin, is changing from an agricultural zone into an industrial and commercial zone, with an accompanying increase in pollutants.

TEPA entrusted planning for the Hoching and Tienpao creeks to the CTCI Corporation who teamed with URS International Inc. of the U.S. They are scheduled to finish the planning within 18 months. The planning contract amounted to NT\$20,000,000 (approximately US\$740,000).

Background Information:

A twenty-year Sewage System Project will be initiated in Kaohsiung city (Estimated budget: Over US\$690 million. The entire project covers two phases:

Phase I: Short-range program (July 1987-June 1993, estimated budget: US\$307 million)

(1) Kaohsiung Sewage Area Plan -- The Kaohsiung City authority began installation of its sewage network in July 1979. Sinotech Engineering Consultants, Inc. (local) completed the stage 1 detailed design for the Love River clean-up work. Ret-Ser Engineering Agency, Vocational Assistance

Commission for Retired Servicemen has undertaken construction of a 12-kilometer trunk line, 3-kilometer ocean outfall pipelines, wastewater treatment plant, and outfall pump station on turnkey basis. Equipment budget for stage 1 is US\$12 million). A local sub-contractor imported a major portion of wastewater treatment equipment from Envirex, Cleaver Brooks, and Ralph B. Carter of the United States. The stage 2 detailed engineering design was completed in April 1988 by Sinotech. The six-year stage 3 project consists of the construction plan which began in July 1987. It is an expansion of stage 1. With an investment of approximately US\$297 million, the new Kaohsiung sewage network will be 48 percent accomplished. Imported equipment for the expansion of wastewater treatment plant was procured in July 1989.

(2) Linhai Sewage Area Plan -- Industrial Development Bureau, Ministry of Economic Affairs has completed the wastewater treatment plant and ocean outfall pipelines for the Linhai Industrial zone.

(3) Nantze Sewage Area Plan -- Sinotech is working on the detailed engineering design for this area. No foreign consulting service is required.

Phase II: Long-range Sewage System Program (July 1993-June 2007, estimated budget of US\$383 million

(1) After completion of the first six-year sewage system program, the expansion of the wastewater treatment plant, ocean outfall, and a portion of the stage 3 sewage network will be installed in the Kaohsiung Sewage Area. China Engineering Consultants, Inc. prepared the detailed engineering design for this project.

(2) In the Linhai Sewage Area, an expansion of the Talinpu Wastewater treatment plant, a new sewage plant for the Nantze Sewage Area will be built.

Contacts for the project governing Taipei, Kaohsiung and Taiwan Provincial areas are:

Mr. J. K. Hu, Deputy Director, Sewerage Engineering Division, Public Works Department, Taipei Municipal Government, 200 Yenping S. Road, Taipei, Taiwan; phone: (02)592-7022.

Mr. Chen Chi-tze, Director, Sewerage Engineering Department, Public Works Bureau, Kaohsiung Municipal Government, 60 Minshen 2nd Road, Chienchin District, Kaohsiung, Taiwan; Phone: (07)282-9633

Mr. H. C. Liu, Engineer, Environmental Engineering Department, Sinotech Engineering Consultants, Inc., 15/F 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 2815, Cable: SINOTECH TIPEI
TELEX: 11701 SINOTECH

Mr. An-i Lin, Vice Manager, Water & Environmental Engineering Department,
China Engineering Consultants, Inc., 7/F, 280 Chunghsiao E. Road, Sec. 4,
Taipei, Taiwan; PHONE: (02)781-4151, Cable: CONSULTS TAIPEI, TELEX: 22435
CECI, FAX: (2)751-4907

Roger Clifford, Vice President, Parsons Brinckerhoff Consulting Engineers,
8/F, 320 Chung Hsiao E. Road, Sec. 4, Taipei, Taiwan; Phone: (02)781-2106;
FAX: (02)771-0322

T. K. Tsou, General Manager, New Asia Construction & Development Corporation,
3/F, 210-221, Chung Hsiao E. Road, Sec. 4, Ta-an District, Taipei, Taiwan;
phone: (02)771-5970; FAX: 886-2-777-5751.

VI. INCINERATOR PROJECTS

CHIAYI INCINERATOR PLANT

Estimated Total Cost: NT\$700-900 million (US\$25-32 million), including equipment purchases of NT\$280-360 million (US\$10-12.9 million)

Date for Price Bid: Pending

Capacity: 360 TPD (Two 120-TPD incinerators, with a third 120-TPD incinerator to be installed in the future.)

Expected Completion Date: 36 months

Source of Finance: Central & Provincial Authorities

Current Developments:

Mitsubishi Industrial Ltd., Nihon Koka, Takuma Co., Ltd., and Marubeni Corporation, four Japanese firms, were selected as prequalified firms. These four Japanese firms re-bid in April 1990 for this project, but their bids were over the ceiling price (between US\$69 million and US\$88.5 million) and the tender was cancelled for the second time. CTC will issue a price bid for the third time as soon as an increased budget is approved.

Background Information:

Sinotech Engineering Consultants, Inc. was chosen to work on the initial planning and detailed design for the Chiayi project. This study is limited to local firms only. We understand that land has been purchased by the Provincial authorities. International tenders for the turnkey contracts to supply, install and test all mechanical and electrical equipment were originally issued on April 8, 1989 by the Central Trust of China. Construction of this project has been delayed for two and a half years.

Bechtel and Westinghouse attempted to bid but were told they did not meet pre-qualification requirements.

This incinerator plant will have a total capacity of 360 TPD. Taiwan Provincial Department of Environmental Protection will begin construction of two 120-TPD incinerators first. A third 120 TPD incinerator will be installed in the future, but no date has been determined. These incinerators will be a mass-burn (mechanical grate) type, each will be provided with a heat recovery boiler. These plants will be computerized control plants.

Contacts:

Mr. Jiin-song Hsieh, Deputy Director, Department of Environmental Protection, Taiwan Provincial Authorities, 91, 6th Floor, Ming-chen Road, 40301 Taichung, phone: (04)222-9126.

Mr. Ling Hong-chie, Manager, Environmental Engineering Department II and Incineration Plant Project Office, Sinotech Engineering Consultants, Inc., 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 2800; FAX: 886-2-765-5010.

KEELUNG INCINERATION PLANT

Estimated Total Cost: NT\$1.25 billion (US\$48 million), including equipment purchase of NT\$500 million (US\$19 million)
Request for PQ Date: Delayed until July 1991
Expected Completion: 36 months
Capacity: 400 MT per 24 hours (Two 200-TPD incinerators)
Source of Finance: Central Authorities 50 percent and Provincial Authorities 50 percent

Current Developments:

This project will be delayed for one year as the Taiwan Provincial authorities look for new land for the Keelung Incinerator.

Originally, The Taiwan Provincial authorities are planned to issue a turn-key tender for construction of the Keelung Incineration Plant in August/September 1990. The local Sinotech Engineering Consultants, Inc. completed the initial planning for the Keelung Incinerator Plant. And the Provincial authorities have purchased the land for this facility. International tenders for the turnkey contract to supply, install and test all mechanical and electrical equipment are expected to be announced in September 1990 by the Central Trust of China. The Provincial authorities are considering having the turn-key contractor provide operation/maintenance services for the project. This decision will be an advantage to U.S. firms.

The Keelung incineration facility will have a total capacity of 400 TPD with two 200-TPD incinerators to be installed. These incinerators will be the mass-burn (mechanical grate) type, and each will be provided with a heat recovery boiler.

According to Taiwan's previous incineration project bidding procedures, interested U.S. firms should submit bidding documents to the Procurement Department, Central Trust of China (CTC), 45, Wu Chang St., Sec. 1, Taipei, TAIWAN 10006, TELEX: 11377 TRUSTPRO, FAX: 382-2010. Bidders must have their own copy of the invitation documents. Bidding documents have to be purchased in person from CTC. A bid bond of one percent is required at the time of submission and will be refunded if the bid is unsuccessful.

Prequalifications have not yet been issued but AIT is here providing the following qualification requirements for a previous incineration project: Tenders required applicants to have completed and put into commercial operation in the previous ten years at least two contracts for the supply and installation, or mechanically-operated refuse incineration plants having a total capacity of not less than 300/600 metric tons every 24 hours. Only those incinerators of the plants named each having a capacity not less than 300 metric tons per 24 hours may be counted as part of the total capacity. Each of the plants named must have completed two years commercial operation.

Contacts for Project:

Mr. Jiin-song Hsieh, Deputy Director, Department of Environmental Protection, Taiwan Provincial Authorities, 91, 6th Floor, Ming-chen Road, 40301 Taichung, phone: (04)222-9126.

Mr. Su Shih-chi, Director, Keelung City Environmental Protection Bureau, 253 Tung-kuan Road, Hsin-yi District, Keelung City 20109; Phone: (032)230-146

Mr. Ling Hong-chie, Manager, Environmental Engineering Department II and Incineration Plant Project Office, Sinotech Engineering Consultants, Inc., 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 2800; FAX: 886-2-765-5010.

MUCHA REFUSE INCINERATION PLANT

Estimated Total Cost:	NT\$4.1 billion (US\$152 million), including equipment purchases of NT\$3 billion (approx. US\$110 million)
Construction Starting Date:	January 1990
Expected Completion:	December 1993 (for construction)
Capacity:	1,500 MT per 24 hours
Source of Finance:	Taipei Municipal Government

Current Developments:

Japanese firms, Mitsubishi Industrial Ltd., Nihon Koka, Takuma Company, Ltd., and Marubeni Corporation, offered bid prices between US\$120 million and US\$125 million. Takuma Company, Ltd. won this incinerator contract and construction is underway. American and European firms did not submit tenders for this contract because they could not meet the tender experience requirements. This project is scheduled for completion in December 1993.

Contacts:

Mr. Teh-lung Liu, Engineer, Fourth Section, Bureau of Environmental Protection, Taipei Municipal Government, 4 Hsi-ning S. Road, Taipei, Taiwan, phone: (02) 381-6617/381-7523

Mr. Jui-yeen Chung, Acting Manager, Mucha Refuse Incineration Plant, Bureau of Environmental Protection, Taipei Municipal Government, 4 Hsi-ning S. Road, Taipei, Taiwan, phone: (02) 230-6825

SHIH-LIN INCINERATION PLANT

Estimated Total Cost: NT\$5.6-6 billion (US\$186.7-200 million), including equipment purchases of NT\$4.2-4.4 billion (US\$140-146.7 million)
Request for PQ Date:: August 1990
Expected Completion: September 1995 (for construction)
Capacity: 1,800 MT per 24 hours (Four 450-TPD incinerators)
Source of Finance: Taipei Municipal Government

Current Developments:

Japanese firms, Mitsubishi Industrial Ltd., Nihon Koka, Takuma Co., Ltd., Marubeni Corporation, and a Swiss company, W & E Co., submitted prequalification documents. CTC is now reviewing those documents.

The 1,800-T/D-capacity Shihlin Refuse Incineration Plant will have two separate contracts: An equipment turnkey contract and a civil construction contract. This equipment turnkey contract is different from the previous Taiwan turnkey incineration contracts which included supply of equipment and civil construction.

Background Information:

The local Sinotech Engineering Consultants, Inc. was chosen to work on the initial planning and detailed design for the Shihlin Incinerator Plant. We understand that land has been purchased by the Taipei City authorities.

The Shih-Lin Incineration Plant will have a total capacity of 1,800 metric tons per 24 hours. Sinotech recommends that four 450-TPD incinerators be installed. These incinerators will be a mass-burn (mechanical grate) type, each will be provided with a heat recovery boiler. This plant will have a ESP plus wet scrubber air pollution control system.

Contact:

Mr. Jui-yeen Chung, Chief of Technical Division, Bureau of Environmental Protection, Taipei Municipal Government, 4 Hsi-ning S. Road, Taipei, Taiwan, phone: (02) 312-2057/381-7523 (Mr. Liu or Mr. Lai)

Mr. Ling Hong-chie, Manager, Environmental Engineering Department II and Incineration Plant Project Office, Sinotech Engineering Consultants, Inc., 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 2800; FAX: 886-2-765-5010.

SHIHLIN HOSPITAL WASTE INCINERATORS

Estimated Total Cost:	NT\$500 million (USD17.9 million), including equipment purchases of NT\$2 million (USD7 million)
Request for PQ Date:	Has not been determined
Contract Award Date:	Has not been determined
Capacity:	90 TPD (Three 30-TPD incinerators)
Expected Completion Date:	Delayed
Source of Finance:	Taipei City Authorities

Current Developments:

The Taipei City Environmental Department plans to build a 90-TPD hospital waste incinerator at the Shihlin incinerator site. Foreign consulting services will be required for the initial planning and detailed design of this project. The hospital waste incinerator plant will have three 30-TPD incinerators. The project budget was disapproved by the Taipei City Council in 1990. The Taipei Municipal authorities will submit budget proposal to the Taipei City Council again next year.

Contact:

Mr. Jui-yeen Chung, Chief of Technical Division, Bureau of Environmental Protection, Taipei Municipal Government, 4 Hsi-ning S. Road, Taipei, Taiwan, phone: (02) 312-2057/381-7523 (Mr. Liu or Mr. Lai)

Mr. Ling Hong-chie, Manager, Environmental Engineering Department II and Incineration Plant Project Office, Sinotech Engineering Consultants, Inc., 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 1330; FAX: 886-2-765-5010.

TAICHUNG INCINERATOR PLANT

Estimated Total Cost: NT\$1.5-1.8 billion (US\$53.6-64.3 million), including equipment purchases of NT\$600-720 million (US\$21.4-25.7 million)

Request for PQ Date: Pending

Submission/Review of Bid
Proposals: Pending

Date for Price Bid: Pending

Capacity: 600 TPD (two 300-TPD incinerators)

Expected Completion Date: July 1993 (Will be delayed)

Source of Finance: Central & Provincial Authorities

Current Developments:

Mitsubishi Industrial Ltd., Nihon Koka, Takuma Co., Ltd., and Marubeni Corporation, four Japanese firms, offered bidding prices between US\$123 million and US\$146 million. The bid was cancelled twice since none of the bidders got below the ceiling price. Central Trust of China will issue a price bid for the third time as soon as the increased budget is approved.

Background Information:

Sinotech Engineering Consultants, Inc. has been chosen to work on the initial planning and detailed design for the Taichung incinerator. This study is limited to local firms only. We understand that land has been purchased by the Provincial authorities. International tenders for the turnkey contracts to supply, install and test all mechanical and electrical equipment have been delayed.

The Taichung facility will have a total capacity of 600 TPD with two 300-TPD incinerators to be installed. These incinerators will be a mass-burn (mechanical grate) type, each will be provided with a heat recovery boiler. These plants will be computerized control plants applying either an analog or digital system.

Contacts:

Mr. Jiin-song Hsieh, Deputy Director, Department of Environmental Protection, Taiwan Provincial Authorities, 91, 6th Floor, Ming-chen Road, 40301 Taichung, phone: (04)222-9126.

Mr. Ling Hong-chie, Manager, Environmental Engineering Department II and Incineration Plant Project Office, Sinotech Engineering Consultants, Inc., 171 Nanking E. Road, Sec. 5, Taipei, Taiwan; Phone: (02)769-2131 Ext. 2800; FAX: 886-2-765-5010.

TAINAN CHENG-HSI-LI REFUSE INCINERATOR TURNKEY PROJECT

Estimated Total Cost: NT\$1.125 billion (US\$42 million), including equipment purchases of NT\$450 million (US\$17 million)

Date for Submission of Specification Bids: Pending

Price Bid Opening Date: Pending

Capacity: 400 TPD (Two 200-TPD incinerators)

Expected Completion Date: December 1993/1994

Source of Finance: Central & Provincial Authorities

Current Developments:

The Central Trust of China (CTC) selected, on May 15, 1989, four prequalified firms, Mitsubishi Industrial Ltd., Nihon Koka, Takuma Company, Ltd., and Marubeni Corporation. The Tainan County Environmental Protection Bureau is reclaiming a site for this incineration facility. Dates for the submission of specification and price bids will be announced as soon as the increased budget is approved.

Background Information:

Listed below is a brief description of the project:

The Department of Environmental Protection, Taiwan Provincial Government, intends to construct one refuse incineration plant to be located at Tainan Cheng-hsi-li, a suburban district of Tainan City.

The plant will have a total capacity of 400 metric tons per 24 hours and will consist of two incinerators, each with a capacity of 200 metric tons per 24 hours. These incinerators will be a mass-burn (mechanical grate) type, each will be provided with a heat recovery boiler. The steam produced in the boilers will generate electricity.

The turnkey contract includes civil/architectural works, supply of mechanical, electrical, control and other plant equipment, associated shipping, inland transportation, clearance of customs, and storage before installation, complete installation of contract equipment, preliminary operation of equipment components or functional systems, test operation of the entire plant for refuse incineration, conduct of performance tests, the fulfillment of guarantees and warranties for contract equipment, training of client's operators, and transfer of technology of operation and maintenance to the client.

It is understood that by nature of the turnkey arrangement the performance of the equipment components and the performance of the entire plant is the responsibility of the contractor. The contractor's scope of work includes the functional design of individual plant systems, process design of the entire

plant, coordination of performance of equipment components, schedule control of equipment manufacture, delivery, transportation, installation and testing, plus the supply of engineering design data and construction of the civil and architectural works of the plant building and stack. The contractor shall apply in due time for all necessary permits and licenses required for his works and shall coordinate the activities among all his manufacturers and subcontractors for the works of the project.

Contacts:

Mr. Yu-cheun Wu, Project Engineer, Water and Environmental Department, China Engineering Consultants, Inc., 21 Floor 185 Hsing-hai Road, Section 2, Taipei, Taiwan; Tel: (02) 736-3567 Ext. 2115, FAX: (02) 736-3692

Mr. Kuo Chih-nan, Director, Tainan County Environmental Protection Bureau, 72 Shan Ming Road, Tahung Li Hsinying City 73010, Taiwan; Phone: (06) 633-5422

TAIWAN EPA'S TWO INCINERATOR PROJECTS

Estimated Total Cost:	US\$193 million
Pre-qualification & Technical Bid Issuance Date:	December 4, 1989 (Re-issued)
Tender Opening Date:	Pending
Date for Contract award:	Pending
Expected Completion Date:	January 1994
Capacity & Budget:	Shulin Plant - 1,200 TPD Approx. NT\$3 billion (US\$115 million) Hsientien Plant - 900 TPD Estimated at NT\$2.25 billion (US\$86.5 million)
Source of Finance:	Chinese Petroleum Corporation

Current Developments:

On April 27, 1990 CTC re-issued pre-qualification tenders on behalf of the Taiwan EPA for the Hsientien and Shulin incinerator projects. The four consortia headed by Japanese firms were the only bidders and since their bids were more than double the ceiling price, the tender was cancelled. On September 24, 1990, CTC cancelled the tender for the second time because the prices offered were still above the ceiling price. The date for a third tender has not yet been announced. The firms which were pre-qualified by the EPA are:

- Hitachi Consortium; composed of Hitachi Zosen Corp., Von Roll Inc. (U.S.A.), and Marubeni Corp.
- NKK Consortium; composed of NKK Corp., Kumagai Gumi Co., Ltd., Toshiba Corp., and Volund USA Ltd.
- Takuma Consortium composed of Takuma Co., Ltd., Asea Brown Boverly AG (ABB), and Riley Stoker Corp. (U.S.A.)
- Mitsubishi Heavy Industries Ltd.

Background Information:

Fichtner of West Germany has been selected as general consultant for Taiwan EPA's three incinerator projects. Taiwan EPA originally planned to build three municipal solid waste resource recovery plants, one each of 1,200 T/P/D, 900 T/P/D and 300 T/P/D will be built in Shulin, Hsientien and Fongshan. Currently, the Taiwan EPA will call for construction of only two incineration plants instead of the original three, due to non-availability of land for the third incineration facility initially scheduled to be built in Fongshan. Sinotech Engineering Consultants, Inc. (local) has prepared preliminary engineering design for the project.

Eight firms initially submitted pre-qualification documents for the three Taiwan EPA incinerator projects, reported. The PQ document submissions were all consortium efforts: (a) Bechtel (U.S.) lined up Deutsche Babcock of West Germany, (b) J. A. Jones Construction Company (U.S.) teamed with Steinmuller of West Germany, (c) Riley Stoker Engineering (U.S.) formed a consortium with Takuma of Japan and ABB, (d) Volund U.S.A. teamed with NKK, Kumagai Gumi Co., Ltd., and Toshiba of Japan, (e) Mutsubishi grouped with Yokohama Backyard Machinery Works of Japan, (f) Hitachi grouped with Von Roll Inc. (U.S.A.), Zosen Corp. and Marubeni, (g) Sogea of France teamed with Stein (a European firm), and (h) Nobel lined up Chamtur of Sweden.

Contact: Mr. Shen I-fu, Specialist, Bureau of Solid Waste Control, Taiwan Environmental Administration (EPA), 1 Hsiang Yang Road, Taipei, Taiwan; phone: (02) 3117722 Ext. 605

Updated Information on Incineration Projects:

A. The Taiwan authorities informed AIT in June 1990 that they are considering inviting only U.S. and European bidders to bid on future Taiwan Provincial authority incinerators. Taiwan authorities plan to construct 16 incinerators between July 1990 and June 1996. In the past three years, the Taiwan authorities called for pre-qualification proposal submissions and construction bids for incinerators in Neihu, Mucha, Taichung, Chiayi, Tainan and the two Taiwan EPA municipal solid waste resource recovery plants.

Currently, the Taiwan authorities plan to finance the turn-key construction of the incineration plants and provide operation/maintenance services for the facilities in Taipei and Kaohsiung cities. The Provincial authorities are considering financing the refuse incinerator plant construction but having the turn-key contractors provide operation/maintenance services for 20 years.

Both CECI and the Sinotech Engineering Consultants, Inc. were chosen by the local authorities to work on the initial planning and detailed design for Taiwan's incineration projects. CECI is conducting a feasibility study in the hope of speeding up the implementation of refuse incineration plants in Taiwan.

B. Project Engineer Yu-cheun Wu of the Water and Environmental Department, China Engineering Consultants, Inc. (CECI), is seeking AIT's assistance in obtaining the following information about the U.S. incinerator industry:

Company, name, position, phone, and FAX:--

-- List of major U.S. firms which manufacture incinerator with a capacity of at least 100 ton/day.

-- Cost analysis of current U.S. municipal solid waste incinerator projects including a description of the flue gas cleaning processes as well as power generation capabilities. Interested U.S. incinerator firms are urged to contact Mr. Wu Yu-Cheun, Project Engineer, Water and Environmental Department, China Engineering Consultants, Inc., 21 Floor 185 Hsing-hai Road, Section 2, Taipei, Taiwan; Tel: (02) 736-3567 Ext. 2115, FAX: (02) 736-3692

C. Taiwan EPA is talking about future privatizing the operation/maintenance of its refuse incineration plants. AIT recommends the following strategy for foreign firms to market their incineration products:

1. Consider forming joint venture with any Taiwan firm, organization, or individual who owns land such as the state-owned Taiwan Sugar Corporation (TSC) for construction of incineration facilities. AIT has been told that the Taiwan authorities will give favorable consideration to whoever acquires appropriate sites for incinerators and will provide funds to assist construction of the facilities. Contact for TSC: How-lan Wei, President, Taiwan Sugar Corporation, 25, Paoching Road, Taipei 10002; phone: (02)311-0521; telex: 11270 Taipei.

2. Indirect participation by associating with a local private firm or public enterprise which is interested in playing the role of general contractor. A list of engineering and consulting firms who are interested in co-operating with U.S. consultants on a project by project basis and a list of environmental protection agents in Taiwan who may be interested in associating with foreign firms are given below:

D. Following is a summary list of Taiwan refuse incineration facilities either in operation, under construction, in bidding process or in initial planning stages under the jurisdiction of the Taiwan EPA, the Taipei City Department of Environmental Protection, the Kaohsiung City Department of Environmental Protection or the Taiwan Provincial Department of Environmental Protection:

<u>Incineration Plant Name City</u>	<u>Capacity Unit x MTPD/units</u>	<u>Air Pollution Control System</u>	<u>Project Status</u>	<u>(Expected) Commissioning Year</u>
An-kang Taipei County	2 x 112.5	NH3 injection plus ESP	In operation	Sep 1980
Neihu Taipei City	3 x 300	ESP plus wet scrubber	Under construction	Mar 1991
Mucha Taipei City	4 x 375	ESP plus wet scrubber	Site preparation M/E equipment awarded	Dec 1993
Shihlin Taipei City	4 x 450	ESP plus wet scrubber	M/E equipment bidding	Sep 1995
Taichung City	2 x 300	Semi-dry scrubber plus ESP	Site preparation M/E equipment bidding	Jul 1993
Chiayi City	3 x 120	Semi-dry scrubber plus ESP	Site preparation M/E equipment bidding	Apr 1993
Tainan City	2 x 200	Semi-dry scrubber plus ESP	Site preparation M/E equipment bidding	Jul 1993
Hsintien Taipei County	3 x 300	Dry/Semi-dry scrubber* (system will be decided by equipment supplier) plus bag filter	M/E equipment bidding	Dec 1992
Shulin Taipei County	4 x 300	Dry/Semi-dry scrubber* (system will be decided by equipment supplier) plus bag filter	M/E equipment bidding	Feb 1993

Keelung City	2 x 200	ESP plus wet scrubber	Initial planning completed	Jun 1994
Hsinchu District	500 MTPD	-	Preliminary Study	Jul 1991- Jun 1996
Taichung District	300 MTPD	-	Preliminary Study	Jul 1991- Jun 1996
Taichung District	300 MTPD	-	Preliminary Study	Jul 1992- Jun 1996
Changhwa City	400 MTPD	-	Preliminary Study	Jul 1991- Jun 1996
Yunlin District	1 x 200 1 x 100		Preliminary Study	Jul 1990- Jun 1996
Tainan District	1 x 200 1 x 100		Preliminary Study	Jul 1991- Jun 1996
Kaohsiung District	1 x 200 1 x 100		Preliminary Study	Jul 1990- Jun 1996
Fongshan, Kaohsiung District	1 x 300	Dry/Semi-dry scrubber* (system will be decided by equipment supplier) plus bag filter	Initial planning Completed Site has not been located	Jul 1990- Jun 1996
Pingtung District	300 MTPD		Preliminary Study	Jun 1991- Jun 1996

* System will be decided by equipment supplier.

Local Engineering and Consulting Firms Concerned with Incinerator Projects

CTCI Corporation, Engineers & Constructors
695 Tung Hwa S. Road, Taipei, Taiwan
Phone: (02) 700-9659
Cable: CHITECH TAIPEI
Telex: 11734 CHITECH
Fax: 011-886-2-709-9303
011-886-2-700-7146
Attn: Mr. Y. M. Dong, President

Sinotech Engineering Consultant, Inc.
15/F, 171 Nanking E. Road, Sec. 5, Taipei, Taiwan
Phone: (02) 769-2131
Cable: SINOTECH TAIPEI
Telex: 11701 SINOTECH
Fax: 011-886-2-765-5010
Attn: Mr. Y. Cheng, General Manager

China Engineering Consultant, Inc.
7/F, 280 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 781-4151
Cable: CONSULTS TAIPEI
Telex: 22435 CECI
Fax: 011-886-2-751-4907
Attn: Mr. C. S. Chang, General Manager

Ret-Ser Engineering Agency
Vocational Assistance Commission for Retired Servicemen (VACRS)
207 Sungchiang Road, Taipei, Taiwan
Phone: (02) 503-2233
Cable: RSEA TAIPEI
Telex: 21531 RSEA TAIPEI
Fax: 011-886-2-503-2968
Attn: Mr. Arther Chen, General Manager

BES Engineering Corporation
3F-7F, 320 Chunghsiao E. Road, Sec. 1, Taipei, Taiwan
Phone: (02) 752-1111
Cable: BESCO TAIPEI
Telex: 21985 BESCO
Fax: 011-886-2-731-4901
Attn: Mr. T. S. Ho, General Manager

Continental Engineering Corporation
11/F, Continental Building
280 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 751-2233
Cable: "CONTIENGN" TAIPEI
Telex: 23480 CONTICOM
Fax: 011-886-731-4189
Attn: Mr. Glyn T. H. Ing, President

HAIGO SHEN & ASSOCIATES

P. O. Box 829

9F, 550 Chung-hsiao E. Road, Sec. 4, Taipei 10516, Taiwan

Phone: (02)755-6777

Fax: 011-886-2-701-2578

Attn: Mr. Haigo T. H. Shen, Principal

New Asia Construction & Development Corporation

Hwa Hsin Building

3/F, 219-224 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan

Phone: (02)771-5970

Cable: NEWASIACON TAIPEI

Telex: 23265 NACDC TAIPEI

Fax: 011-886-2-777-5751

Attn: MR. T. K. Tzou, General Manager

Condor Construction Engineering Corp.

11F, 374 Pa Teh Rd., Sec. 2, Taipei, Taiwan

Phone: (02)772-3356

Fax: 011-886-2-711-4687

Attn: Mr. James Tao, General Manager

Pan Asia Corporation

7F, 219 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan

Phone: (02)771-7417

Fax: 011-886-2-721-9148

Attn: Mr. K. C. Wang, General Manager

Taiwan Cement Engineering Corporation

11F, 61 Chung Shan N. Road, Sec. 2, Taipei, Taiwan

Phone: (02)551-6091

Fax: 011-886-2-571-3624

Attn: MR. Koo Chen-fu, Chairman

Fu Tsu Construction Company, Ltd.

95 Nanking E. Road, Sec. 2, Taipei, Taiwan

Phone: (02)551-7559

Telex: 20318 HAVAD

Fax: 011-886-2-561-6146

Attn: MR. C. P. Lin, President

Potential Agents

Hwa Tech Industrial & Development Corporation

7F, 305 Min Sheng E. Rd., Taipei, Taiwan

Cable: HTID

Telex: 23506

Phone: (02)509-0509

Fax: 011-886-2-505-9875

Attn: Dr. Lester T. C. Lee, Chairman of Board

Uehmou Company, Ltd.
29, Alley 4, Lane 345, Jen Ai Road, Sec. 4, Taipei
Phone: (02)772-5221
Fax: 011-886-2-721-2601
Attn: Mr. T. C. Huang, President

Kailay International Company, Ltd.
17F, 695 Tun Hua S. Road, Taipei, Taiwan
Phone: (02)706-7259
Telex: 11675 KAILAY
Cable: KAILAY TAIPEI
Fax: 011-886-2-706-7124
Attn: Mr. William Z. Lidicker P.E.

Rich Star Enterprise Corporation
12F, 501 Kuang Fu S. Road, Taipei, Taiwan
Phone: (02)709-4202
Fax: 011-886-2-709-6508
Attn: Mr. Ho-cheng Yang, President

Enrich Engineering Company, Ltd.
Suite 6, 7F, 415 Hsin Yi Rd., Sec. 4, Taipei, Taiwan
Phone: (02)709-1127
Telex: 26931ENRENGCO
Fax: 011-886-2-703-4537
Attn: Mr. John G. Young

Scientek Corporation
P. O. BOX 26-137, Taipei, Taiwan
10-1/F, 180 SEC. 4, Nanking E. Road, Taipei, Taiwan
Phone: (02)731-2911-3
Telex: 27598 SCIENIEK
Fax: 011-886-2-752-9793
Attn: Mr. H. C. Cheng, Director, Computer Division

Quanta Engineering and Consulting Corporation
8F-6 NO. 626 Kuang-fu S. Road, Taipei, Taiwan
Phone: (02)754-8136, 754-9674
Fax: 011-886-2-700-5382
Attn: Mr. Teh-Pei Lin, General Manager

Flying Cloud
P. O. BOX 1-22 LUNG-TAIN TAIWAN 32548
Phone: (02)314-5384 Ext. 4604
Fax: 011-886-2-392-1082
Attn: Mr. Chin Cheng, M.S. in safety USC

VII. SANITARY LANDFILLS

TAIWAN SANITARY LANDFILL PROJECTS

Between July 1990 and June 1996, the Taiwan authorities will construct 75 sanitary landfills in various cities throughout Taiwan including 69 district sanitary landfills and 6 slag-ash sanitary landfills. According to local authorities, no foreign engineering services are required for these landfill projects. Taiwan authorities are considering having the private sector handle garbage transportation and sanitary landfill management. If this policy is approved, U.S. firms will have good opportunities to offer management expertise. These landfills also offer trade opportunities for U.S. suppliers to supply liner, wastewater treatment equipment, methane gas recovery equipment, bulldozers, excavators, and odor prevention spraying systems.

Following is a complete list of sanitary landfills to be constructed:

<u>City/District</u>	<u>No. of Landfills</u>	<u>Cost (US\$000)</u>	<u>Construction date</u>
Keelung City	1	13,000	1993 - 1994
Hsinchu District (City)	2	6,100	1994 - 1996
Chaiyi District (City)	5	15,000	1991 - 1994
I Lan District (City)	4	8,100	1992 - 1996
Taipei District	2	11,100	1993 - 1995
Taoyuan District	5	8,500	1992 - 1996
Miaoli District (City)	7	22,700	1992 - 1996
Taichung District	6	30,700	1992 - 1996
Changhwa District	6	16,000	1992 - 1995
Nantou District (City)	3	25,400	1991 - 1996
Yunlin District	4	17,100	1992 - 1996
Tainan District	9	29,800	1991 - 1996
Kaohsiung District	6	12,600	1991 - 1996
Pingtung District (City)	6	20,300	1991 - 1995
Hwalien District	5	8,800	1991 - 1995
Taitung District	2	3,500	1992 - 1993
Penghu District	2	5,500	1992 - 1995
Total:	75	254,200	

The following contact persons can provide more complete information concerning the above landfill projects:

Bureau of Solid Waste Control
Environmental Protection Administration
1 Hsiang-yang Road, Taipei, Taiwan
Phone: 011-886-2-381-8904
FAX: 011-886-2-311-6071
Attn: Shean-rong Cheng, Director General

Department of Environmental Protection
Taiwan Provincial Government
91, 6th Floor, Ming-chen Road
40301 Taichung, Taiwan
Phone: 011-886-4-222-9126.
Attn: Jiin-song Hsieh, Deputy Director

Department of Environmental Protection
Kaohsiung Municipal Government
102 San Duo 2nd Road, Kaohsiung, Taiwan
Phone: 011-886-7-721-9025
Fax: 011-886-7-721-2416
Attn: Chia-nan Liu, Chief Secretary

Department of Environmental Protection
Taipei Municipal Government
3/F, 4 Hsi-ning South Road, Taipei, Taiwan
Phone: 011-886-2-381-7523
Fax: 011-886-2-312-2057
Attn: Joe L. Hsieh, Chief, Division 4
(Planning and Design of Solid Waste Treatment)

Sinotech Engineering Consultants, Inc.
171 Nanking E. Road, Sec. 5, Taipei, Taiwan
Phone: 886-2-769-2131 Ext. 2800
Fax: 886-2-765-5010
Attn: Ling Hong-chie, Manager
Environmental Engineering Department II and
Incineration Plant Project Office

U.S. firms interested in pursuing the above landfill opportunities are encouraged to contact the individuals mentioned above.

VIII. POWER PROJECTS

The state-run Taiwan Power Company (TPC) is the sole supplier of electrical power in Taiwan. In 1989, TPC generated 16,589 MW of electrical power. Of this total, 8,887 MW (53.6 percent) was generated by thermal power plants, 5,144 MW (31.0 percent) by nuclear power plants, and 2,558 MW (15.4 percent) by hydro electric power plants. The average annual growth of power demand from 1960 to 1988 was 11.6 percent. The estimated annual growth of power demand from 1990 to 2000 is 5.9 percent. TPC estimates that the annual growth of power supply from 1990 to 2000 will also reach 5.9 percent.

TPC expects that by the end of the year 2000 its power generating capacity will reach 30,472.7 MW, consisting of 4,633.0 MW (15.2 percent) of hydro power, 7,144 MW (23.4 percent) of nuclear power, 11,425.0 MW (37.5 percent) of coal-fuel thermal power, 3,536 MW (11.6 percent) of oil-fuel thermal power, and 3,735 MW (12.3 percent) LNG-fuel thermal power. The net increase of 13,883.9 MW during the 1989-2000 period will be the result of the addition of 2,075.0 MW of hydro power, 10,820.9 MW of fossil-fuel power, 2,000 MW of nuclear power, and the subtraction of 1,012 MW through scheduled retirement. A brief summary of these power generating additions is shown in the following table. Some of these major projects were previously reported in AITGRAM A-002 or AIT cables which are given as reference with each project listing.

TPC's long range power development program (1989-2000) will generally follow the Taiwan authorities' energy diversification policy to reduce system production costs. The bulk of energy will be derived from a series of coal fired and nuclear units whereas oil-fired units will be used as supplementary sources. Thus coal importation will increase rapidly in the future. To improve environmental conditions and also to attain energy diversification, increased generation in LNG power generation is also being considered. The amount of required LNG is expected to be increased from zero at present to 3.0 million tons in the year 2000.

POWER GENERATION ADDITIONS FROM 1989 to 2000

<u>Project Title</u>	<u>Capacity (MW)</u>	<u>Scheduled Operation</u>	<u>Budget (US\$)</u>	<u>Present Status</u>
Hydro Power Projects:				
Peishan Renewal	4.3	Jul 1989	11 million	Completed
Chukeng Renewal	5.0	Dec 1990	13 million	Under Construction
Mingtan Pumped- Storage Nos. 1-6	6x266.7	Mar 1992-) Sep 1993)	1.88	Under Construction
Shuili (Ref: AITGRAM A-002 & 90 TAIPEI 0888 & 8262)	12.9	Mar 1992)	billion	Under Construction
New Tienlun (Ref: 90 TAIPEI 0888 & previous)	105.5	Jun 1992	319 million	Under Construction
Maan (Ref: 90 TAIPEI 0888 & previous)	2x66.75	1995	422 million	Taiwan Authorities Reviewing

(Continued)

<u>Project Title</u>	<u>Capacity (MW)</u>	<u>Scheduled Operation</u>	<u>Budget (US\$)</u>	<u>Present Status</u>
Bihai	56.0	1998	-	Feasibility Studying
Choshui Diversion	120.0	1999	-	Feasibility Studying
Wusheh Enlargement	8.3	2000	-	Planning
Chunping	29.3	2000	-	Planning
Subtotal	2,075.0			

Fossil-fired Power Projects:

Penghu 3 Islets	0.9	1989	-	Completed
Penghu Diesel Nos. 9,10	2x10	1992	70.4 million	Taiwan Authorities Reviewing
Tungshiao Combined Cycle No. 4,5 (Ref: 90 TAIPEI 0888)	2x350	May 1990- May 1992	666.7 million	Under Construction
Taichung Coal Nos. 1-4	4x550	Jun 1991- Jun 1993	3.34 billion	Under Construction
Taichung Coal Nos.5-8 (Ref: AITGRAM A-002, 90 TAIPEI 0888 & previous)	4x550	1995-1997	3.34 billion	Planning
Nanpu Combined Cycle Nos.1,2,3	3x350	1993-1996	1.19 billion	Feasibility Studying
Talin LNG No.6	550	1994	466.7 million	Taiwan Authorities Reviewing
Hsinta LNG Nos.5,6,7,8	4x350	1994	-	Feasibility Studying
Suao Coal Nos.1,2 (Ref: AITGRAM A-002 & 90 TAIPEI 0888)	2x550	1995-1996	-	Feasibility Studying
Penghu Diesel Nos.11,12	2x10	1995	-	Planning
Suao Coal Nos.3,4	2x750	1998-1999	-	Planning
Penghu Diesel Nos.13-15	3x10	1999	-	Planning
Subtotal	10,820.9			

Nuclear Power Project:

Fourth Nuclear (Ref: AITGRAM A-002) Nos.1,2	2x1,000	1998-1999	5.83 billion	Taiwan Authorities Reviewing
Subtotal	2,000			

Total Addition 14,895.9

Scheduled Retirement 1,012

Net Addition to
System 13,883.9

TAIPOWER POLLUTION CONTROL PROJECTS

The following pollution control projects are scheduled to be completed between December 1991 and June 1993. (Ref: AITGRAM A-002 & 89 TAIPEI 1792)

- Installation of Flue Gas Desulfurization Systems and Accompanying Electrostatic Precipitators (EP) Improvement at Hsinta Thermal Units 1 and 2 (Estimated US\$17 million, turn-key basis) -- Korea Cottrell (Korea) & Flakt Inc. (U.S.) are competing.
- EP Improvement at Hsinta Thermal Units 3 and 4 (Estimated US\$19 million, turn-key basis) -- Walther & CEI AG (West Germany), Flakt (Sweden), Lurgi (West Germany), Korea Cottrell (Korea), and Western Joy (U.S.) are bidding. Contract will be awarded in October 1990.
- Injection NH₃ improvement at Shenao Thermal Units 1 - 3 (Capacity 75 MW) -- Tenders will be issued in 1992, estimated US\$1.2 million, turn-key.
- EP Improvement at Shenao Thermal Units 2 and 3 (No. 2 capacity is 125 MW and No. 3 capacity, 300 MW) -- Tenders issuance date will be in 1992/1993, turn-key basis, value has not been determined.
- Installation of Flue Gas Desulfurization (FGD) Systems at Taichung Thermal Unit Nos. 1 - 4 (Capacity 550MW each) -- Tender issuance date will be in December 1990, estimated US\$210 million, a portion of contract will be in turnkey basis.
- Installation of EP's at Taichung Thermal Unit Nos. 5 - 8 (Capacity 550MW each) -- Tender issuance date will be in March 1992, estimated US\$35 million for equipment supply only.
- Installation of Flue Gas Desulfurization (FGD) Systems at Taichung Thermal Unit Nos. 5 - 8 (Capacity 550MW each) -- Tender issuance date will be in October 1992, estimated US\$240 million, a portion of contract will be on turnkey basis.
- Rebuilding of Stack at Linkou Thermal Unit 1 and 2
- Installation of EP's and Incinerators at Talin Thermal Units 3 and 4.
- Installation of EP's and Incinerators at Hsieh-Ho Thermal Units 2, 3, & 4
- Improving the Control of NOX Combustion at Existing Power Plants
- Heightening of Stacks at Tunghsiao Units 1 - 3
- Installation of Coal Blending and Coal Dust Control Equipment at Hsinta and Talin Coal Yards.

- Coal Ash Handling Retrofitting System and Coal Ash Ponds for Talin and Hsinta

TAIPOWER PROCUREMENT FOR FISCAL YEAR 1990 & 1991

Provided below is a list of TPC procurements and estimated budget for Fiscal Year 1990 and 1991:

<u>Description</u>	<u>Estimated Budget</u>
. Power Distribution, Transmission & Maintenance Equipment	USD130,976,004
. Tunghsiao Combined Cycle No. 4, 5 Gas Turbines (Balance of Plant Equipment)	20,000,000
. Environmental Protection Equipment	479,785,607
. Taichung Nos. 1-4 Thermal Project (Balance of Plant Equipment)	6,930,000
. Taichung Nos. 5-8 Thermal Project	228,000,000
. Talin No. 6 LNG Project (Boiler, bidding (US\$50 million), High Pressure & High Temperature Piping and Hanger Support, May 1991 (US\$4.8 million), Turbine, (US\$40 million, will be negotiated with United Asia Electric Company), and Balance of Plant Equipment (US\$15 million))	109,800,000
<hr/>	
Total:.....	USD975,691,611

U.S. firms interested in supplying power generation and pollution control equipment to TPC are encouraged to contact:

Mr. Shih-chi Hsi, Vice President
Taiwan Power Company
242 Roosevelt Road, Sec. 3, Taipei, Taiwan
Phone: (02)397-6253

Mr. Y. H. Chang, Director
Supply Department
Taiwan Power Company
242 Roosevelt Road, Sec. 3, Taipei, Taiwan
Phone: (02)396-8951

Mr. Hsi-ching Cheng, Deputy Director
Environmental Protection Department
Taiwan Power Company
242 Roosevelt Road, Sec. 3, Taipei, Taiwan
Phone: (02)397-7202
FAX: 011-886-2-396-8593.

FOURTH NUCLEAR POWER PLANT

Estimated Total Cost: US\$5.82 billion, US\$4.2 billion for foreign
equipment procurement
Estimated Starting Date: January 1993
Expected Completion Date: June 1999
Date of Award: Deferred
Source of Finance: Taiwan Power Company/U.S. Export-Import Bank

Current Developments:

The Central authorities have deferred the plan to build the Fourth Nuclear Plant. Taipower originally planned to build a fourth nuclear power plant in 1985, but protests from local residents concerned about safety and environmental pollution forced Taipower and the Central authorities to delay the project.

Construction of the plant, which was originally scheduled to be completed in 1996, was repeatedly delayed due to protests from local residents at Kungliao in Ilan County concerned about safety and environmental pollution. Taipower officials continue negotiating with the residents to overcome their resistance.

In August 1990, Premier Hou and MOEA Minister Vincent Siew both placed the Fourth Nuclear Power Plant high on their priority lists and stated that the project would get underway soon after work on the Fifth Naphtha Cracker is begun.

Taipower prepared a major equipment procurement list in June 1990. Foreign equipment purchases will amount to 70 percent of the US\$5.82 billion estimated total cost. Foreign equipment procurement will mainly consist of one US\$630-million reactor and one US\$630-million turbine system. Taipower submitted on June 30, 1989, a feasibility study and an environmental assessment report to the Ministry of Economic Affairs for evaluation and approval. The Ministry of Economic Affairs is evaluating the reports. According to a Taipower official, the Ministry of Economic Affairs expects to submit these reports, at the earliest, by December 31, 1990, to the Executive Yuan for approval.

Taipower estimates that it will take nine years to build the nuclear plant. Taipower hopes to begin construction of the plant in January 1993 and expects the project to be completed in 1999. Taipower hopes to issue tenders for engineering consulting services and capital equipment purchases starting on June 1, 1991, pending project approval.

Background Information:

The proposed Fourth Nuclear Plant would have two generators of one million KW capacity each. Pacific Engineers & Constructors, Ltd. (PECL), a joint venture between Sinotech Engineering Consultants, Ltd. (Taiwan) and the Bechtel Corp. (U.S.), are interested in providing plant design and engineering, and consulting services for procurement of the turbine generators (TG) and nuclear steam supply systems (NSSS) or reactors. The TG and NSSS will be obtained from foreign suppliers. Taipower officials say that negotiations with potential suppliers will be opened once the project receives final approval from the Executive Yuan. Westinghouse, G.E., Combustion Engineering, Bechtel, and other U.S. firms are following this project very closely. The construction of the nuclear power plant is projected to cost US\$5.82 billion and will take 108 months to complete. Financial support for the project may be sought from the U.S. Export-Import Bank.

However, increased public concern and uncertainty resulted in a lengthy suspension of the project. Members of both the Control and Legislative Yuans have debated the necessity of the plant, and raised questions of cost and safety. The Atomic Energy Council and specialists of other related agencies re-examined the project and studied existing safety problems and the potential impact which nuclear plants could have on Taiwan's environment. Study results provided a basis for the decision on whether or not to go ahead with the plant's construction.

After many years of postponement, the present crisis in the Mid-East and concern for economic stability seem to be weakening opposition to the Fourth Nuclear Plant. Local sources indicate that both President Lee Tong-hui and Premier Hau Pei-tsun are backing construction of the Fourth Nuclear Plant.

A Fourth Nuclear Plant feasibility study and an environmental impact assessment submitted to the Ministry of Economic Affairs by Taipower must be further approved by the Executive Yuan and the Legislation Yuan. If these approvals are given and a budget is approved by the Legislation Yuan, then invitation to bid will be sent out. Local sources indicate that the very earliest date for invitation to bid will be Spring 1991.

Contact: Mr. Eng Lin, Vice President, Taiwan Power Company, 242 Roosevelt Road, Sec. 3, Taipei, Taiwan; Phone: (02)397-6251, Telex: 25264 TPCAPD

TAICHUNG THERMAL POWER PLANTS NOS. 1, 2, 3 & 4

Estimated Total Cost: US\$3.34 billion (including US\$510 million for foreign equipment purchases)
Starting Date: June 1985
Expected Completion Date: June 1993
Source of Finance: Taiwan Power Company and U.S. Export-Import Bank

Current Developments:

In June 1986, the Council for Economic Planning and Development (CEPD) approved the first phase funding of US\$503 million (NT\$19 billion) to prepare the land.

The environmental impact assessment (EIA) for the power plants, prepared in accordance with the Air Pollution Control Standard of 1992 established by the Bureau of Environmental Protection, was approved in December 1986 by the Executive Yuan.

Foster Wheeler won the US\$180 million four-unit boiler contracts in December 1987. Two other U.S. firms (Combustion Engineering and Babcock & Wilcox) and one each from Canada (Combustion Engineering-Canada) and France (Stein Industries) were in the competition. Four turbine generators for the coal-fired units are being supplied by the United Asia Electric Company. This firm is a joint venture between Taipower, the Central Investment Holding Company and the General Electric Company of the United States. Content ratio for turbine generators is approximately 30 percent local and 70 percent from the United States.

Completion of plants Nos. 1, 2, 3, and 4 is now expected in June 1991, December 1991, June 1992 and December 1992 respectively.

Background Information:

The state-run Taiwan Power Company (Taipower) plans to invest around NT\$90.20 billion (US\$3.34 billion) for construction of the Taichung Thermal Power Plants Nos. 1, 2, 3, and 4. The foreign currency portion of approximately US\$1.5 billion is expected to be borrowed mainly from the U.S. Export-Import Bank and the balance from other foreign banks. The local currency portion is to be borrowed from local banks in addition to Taipower's self-provided fund. Four 550 MW coal-fired units are planned for the project at the newly developed Taichung Harbor Industrial District.

The feasibility study for this project was completed by the Gibsin Engineers, Ltd., a joint venture between Gibbs and Hill, Inc. of the United States and the Sinotech Engineering Consultants, Inc. of Taiwan.

Contact:

Mr. J. J. Hsieh, Site Manager, Taichung Construction Office, Taiwan Power Company, Taichung Harbor; Phone: (046)396-002 Ext. 257

Mr. M. S. Hsu, Director, Procurement and Contract, Gibsin Engineers, Ltd. 6th Floor, Sinotech Building, 171, Nanking E. Road, Sec. 5, Taipei, 10572 Taiwan; telex: 26350 GIBSIN, FAX: 886-2-7648658

CONVERSION OF COAL-BURNING POWER PLANTS TO NATURAL GAS FUELED POWER PLANTS

Project Study Cost: NT\$5 million (US\$185,000)

Current Developments:

A project study on expansion of natural gas-driven power plants by the Taiwan Power Company began in August 1989. The study is now under going evaluation. Those firms which want the latest information on this study may contact:

Chang Si-min, President, Taiwan Power Company, 242 Roosevelt Road, Sec., Taipei, Taiwan; Phone: 393-8004; FAX: (02)396-8593; Telex: 11520

IX. TAIWAN TOBACCO AND WINE MONOPOLY BUREAU (TTWMB)

TTWMB'S TEN CONSTRUCTION PROJECTS

The AIT Commercial Unit has recently learned that the Taiwan Tobacco and Wine Monopoly Bureau (TTWMB) plans to build, expand and/or relocate some of their breweries and wineries. The TTWMB's construction plan includes ten brewery/winery projects with a total budget of approximately USD2.05 billion. Following is a list of these approved or proposed construction/expansion projects:

Project	Construction Dates	Budget (USD Million)	Annual Production Capacity
Fushing Brewery First Phase Construction	Jul 1990 - Jun 1995	461	30,000-metric-ton of malt & 360-million bottles of beer

Note: The Fushing Brewery project has been approved by the Central authorities. The installation will cost more than USD460 million for the first phase of construction, including approximately USD300 million in foreign equipment purchases. Preliminary design has been completed. TTWMB will issue bidding documents in September 1990.

Chengkung Brewery Expansion	Jul 1989 - Apr 1991	46.3	72-million bottles of beer
Puli Winery (Moving)	Jul 1992 - Jun 1997	444.5	84-million bottles of Shao-hsing wine
Pingtung Winery Expansion	Jul 1990 - Dec 1992	7.8	6-million bottles of Shao-hsing Wine
Taichung Winery (Moving)	Jul 1990 - Jun 1996	242.6	2.28-million bottles of Yellow Wine, 12-million bottles of Hwa-tiao Wine, & 72-million bottles of Rice Wine

Note: This project has been approved by the Central authorities. Preliminary design has been completed.

Nantou Winery	Jul 1990 - Jun 1994	17	4.8 million bottles of brandy
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(Continued)

<u>Project</u>	<u>Construction Dates</u>	<u>Budget (USD Million)</u>	<u>Annual Production Capacity</u>
New Winery (Proposed)	Jul 1992 - Jun 1998	333.4	7.56-million bottles of brandy
Chiayi Winery Second Phase Expansion	Jul 1990 - Dec 1995	373.3	110.74-million bottles of Shen-erl Wine (medicated wine) & 209,000-hectoliters of Kao Liang Wine
Note: This winery moving project has been approved by the Central authorities. Preliminary design has been completed.			
Lungtien Winery (Proposed)	Jul 1995 - Jun 2000	74.1	24-million bottles of Shen-erl Wine (medicated wine)
Whole Rice Wine Winery Project	Jun 1989 - Jun 1993	47	120-million bottles of Whole Rice Wine
Total:		2,047	

U.S. brewing industry firms are encouraged to contact TTWMB concerning these trade opportunities.

Director General: Shih-chin Cheng
Taiwan Tobacco & Wine Monopoly Bureau
4 Nan-chang Street, Sec. 1, Taipei
Phone: (02) 321-4567

X. TELECOMMUNICATIONS PROJECT

DGT MODERNIZATION OF TELECOMMUNICATIONS SYSTEM

Estimated Total Cost: NT\$144.8 billion
(US\$5.4 billion)
Project Dates: July 1989 - June 1993
Source of Finance: Directorate General of
Telecommunications
Ministry of Communications

Current Developments:

The Directorate General of Telecommunications (DGT) plans to gradually liberalize its monopoly on telecommunication services in Taiwan. DGT submitted a privatization plan to the Ministry of Economic Affairs (MOEA) and the proposed plan will be reviewed by the Legislators in the spring session of 1991.

Although an official approval for privatization of DGT has not yet been granted, a local firm, Taiwan Telecommunication Network Services Company (TTN), recently began providing electronic transaction, remote file, and other network services in Taiwan.

DGT budgeted US\$5.4 billion to complete a modernization of telecommunications system. The Taiwan telecommunications expansion project includes the following:

— DGT's 10th 4-year telecommunications development plan (1990-1993)

- Expansion of the Integrated Service Digital Network (ISDN)
- an increase of digital local switches 3.2 million lines
 - an increase of digital toll switches 0.27 million lines
 - an increase of digital toll trunk 0.12 million circuits

Switching & Operation Supporting System Construction Plan

Item	FY1990	FY1991	FY1992	FY1993	FY1990-FY1993 Total
Switching Systems:					
Plan	904,000	772,250	772,000	774,700	3,222,950
Emergency Measures	935,000	1,309,960	1,270,2100	1,234,810	4,749,980
Increase rate (%)	3.4	69.6	64.5	59.3	47.3
Operation Supporting System:					
Plan	369,200	343,500	325,500	300,500	1,338,700
Emergency Measures	729,500	884,100	895,400	836,200	3,345,200
Increase rate (%)	97.6	157.4	175.1	178.3	149.9

(Continued)

Item	FY1990	FY1991	FY1992	FY1993	FY1990-FY1993 Total
No. of Subscribers Increased					
plan	294,000	272,900	261,300	246,400	1,074,600
Emergency Measures	399,500	364,400	337,900	314,300	1,416,100
Increase rate (%)	35.8	33.5	29.3	27.5	31.7

This expansion of digital network will increase telephone penetration of 30.7 main lines per 100 persons. 92.1 percent of Taiwan households will have telephone service, and will have 5.5 pay stations per 1,000 persons. DGT hopes that the toll switches and toll circuits will be fully digitalized by 1998 and the inter-office trunks, local switches, and 50 percent of the subscriber loops will become digital by 2000. DGT annual investment will reach approximately US\$1.3 billion for the next three years.

— Radio Paging Service

Status (As of October 1989) (Unit Pager)

Region	No. of Pager	Pending Applications
North	135,483	102,390
Central	86,500	49,000
South	102,307	33,091
Total	324,290	184,481

Note: Packet Switching Service was opened on October 31, 1984.

Radio Paging Service Construction Plan (Unit: Line)

Item	FY1989 (Base Year)	FY1990	FY1991	FY1992	FY1993
Original Plan:					
Construction		400,000	100,000	100,000	200,000
Cumulated	300,000	700,000	800,000	900,000	1,100,000
Modified Plan:					
Construction		550,000	200,000	pending	pending
Cumulated	300,000	850,000	1,050,000	pending	pending

— Mobile Telephone Service

Status (As of October 1989)

Region	No. of Application	Paid for Registration	Connected	Capacity
North	16,827	11,685	9,788	20,000
Central	5,721	4,277	3,650	10,000
South	4,534	3,548	2,699	10,000
Total	27,082	19,510	16,137	40,000

Demand Forecasting (Unit: Subscriber)

Region	Year End 1989	Year End 1990
North	18,500	40,500
Central	6,700	14,500
South	5,500	12,100
Total	30,700	67,100

Mobile Telephone Service Construction Plan (Unit: Line)

Item	FY1989 (Base Year)	FY1990	FY1991	FY1992	FY1993
Original Plan:					
New Construction		20,000	10,000	10,000	10,000
Cumulated	40,000	60,000	70,000	80,000	90,000
Modified Plan:					
New Construction		30,000	40,000	pending	pending
Cumulated	40,000	70,000	110,000	pending	pending

— Data Communication Services Expansion

- Packet Switching Service

Growth of Packet Switching Service

Year	1985	1986	1987	1988	1989
No. of Subscribers	117	431	679	1,051	1,621
Growth Rate (%)	-	268	57.5	54.8	54.2

Note: Packet Switching Service was opened on October 31, 1984.

Tzu-jung Cheng, Chief
Transportation Planning Department
Institute of Transportation
240 Tung Hwa N. Road, Taipei, Taiwan.
Phone: (02) 712-3121
FAX: (02) 717-6381

TAIPEI MASS RAPID TRANSIT PROJECT (MRT & MCT SYSTEMS)

Estimated Total Cost: US\$15 billion
Foreign Equipment Purchases: US\$415 million (For Red Line)
Expected Completion Date: End of 1999
Source of Financing: The Taiwan Central authorities will contribute 40% of the total project cost, the Taiwan Provincial authority 10.5%, and the Taipei City authority 29.5%. Sources of funding for the remaining 20% of project cost are undetermined.

Current Developments:

A. MEDIUM CAPACITY TRANSIT SYSTEM (MCTS)

(New Zoo - Chung Hsiao E. Rd. - Sung Shan Airport)

Estimated Total Cost: US\$271 million
Expected Completion Date: December 1993 (Chung Hsiao E. Rd. - Sung Shan Airport): July 1991 - Dec 1993
Source of Financing: The Taiwan Central authorities will contribute 40% of the total project cost, the Taiwan Provincial authority 10.5%, and the Taipei City authority 29.5%. Sources of funding for the remaining 20% are being considered.

The Taipei City authorities decided in June 1988 to purchase NT\$7.8 billion (US\$271 million) worth of MCTS equipment and services from the Matra Transport Company of France. The contract covers the purchase of 70 cars, operating systems, construction and a transfer of technology for a 12-kilometer (7.7-mile) transit system that will link the Taipei Zoo in suburban Mucha and the Sungshan airport. The system will be able to transport up to 20,000 passengers an hour. Detailed design and construction began in September 1988 and the project is targeted for completion in December 1991.

begin building relations with the Tainan project offices which will be important players and contract makers in the mid-1990s as they come to Taiwan to pursue project opportunities on the Taipei subway project (under construction), Kaohsiung subway project (feasibility study completed; selection of general engineering consultant imminent), or Taichung rapid transit project (feasibility study now underway).

TAICHUNG MASS RAPID TRANSIT PROJECT AND OTHER FUTURE MRT PROJECTS IN,
TAOYUAN, HSINCHU AND CHIAYI

The Taiwan Housing and Urban Development Bureau (THUDB) Road Department Director Chou Tsao-sheng and Assistant Engineer Kuo Yann-liang informed AIT Commercial Unit that in March 1990, THUDB awarded the Taichung Mass Rapid Transit Project preliminary study contract to the China Engineering Consultants, Inc. (CECI). CECI will complete the Taichung MRT preliminary study by June 1992 with the assistance of Gannett Fleming West, Inc. of Los Angeles, CA.

AIT also learned from Dr. Hou Ho-shong, Chief, Transportation Engineering Department, Institute of Transportation (IOT), Ministry of Communications, that IOT have prepared outlines for preliminary studies of the municipal MRT systems in Chiayi, Taoyuan and Hsinchu cities. These municipal MRT preliminary studies are scheduled to be completed by September 1992.

Contacts for the Taichung Mass Rapid Transit Project:

Chou Tsao-sheng, Director
or
Assistant Engineer Kuo Yann-liang
Road Department
Taiwan Housing and Urban Development Bureau (THUDB)
4/F, 342 Pa-teh Road, Section 2, Taipei, Taiwan
Phone: (02) 781-9462
FAX: (02) 771-9220

Shieh Dah-yung, Project Manager
Traffic and Transportation
China Engineering Consultants, Inc.
185 Hsin-hai Road, Section 2
Taipei, Taiwan
Phone: (02) 736-3567
FAX: (02) 736-3692

The Taoyuan, Hsinchu, and Chiayi MRT projects are still in the conceptual stage. Contact for Taoyuan, Hsinchu and Chiayi MRT projects:

In order to match the planned start-up of a west coast high-speed railway system in the year 2000, the Tainan MRT project is scheduled to complete some short-term construction by the year 2000. The proposed time schedule is indicated below:

1990	Completion of feasibility study
1991	General design work performed by the Taiwan Provincial Housing and Urban Development Department
1992-1994	Urban planning and joining adjustments
1993	Establishment of Tainan MRT preparatory office to oversee the project
1994-1995	Basic design work
1994-1996	Detailed design work
1994-1997	Allocate project funds
1995-1999	Necessary land acquisitions
1996-2000	Evaluating long-term construction
2000	Begin operation of short-term routes
2000	Begin long-term construction

For further information, interested U.S. firms are encouraged to contact the following individuals:

Mr. Wu Cher-Yuan, Director (or Mr. Wang Chao-sheng, Section Chief)
Taiwan Provincial Housing and Urban Development Department
342, Pa Teh Road, Section 2
Taipei, Taiwan
Tel: 886-2-773-1212
Fax: 886-2-772-8503

Mr. Cheng Tzu-Jung
Chief, Transportation Planning Division
Institute of Transportation
Ministry of Communications
240, Tun Hua N. Road
Taipei, Taiwan
Tel: 886-2-712-3121
Fax: 886-2-717-6381

AIT/Kaohsiung has obtained single copies of the April 1990 "Tainan Metropolitan Mass Rapid Transit Feasibility Research Preliminary Report" (70 pages) and the June 1990 "Tainan Metropolitan Mass Rapid Transit Feasibility Research Final Report" (250 pages). Both reports are entirely in Chinese. American firms and their representatives are welcome to examine these reports at the AIT/Kaohsiung office. Call the AIT/Kaohsiung economic/commercial section (886-7-224-0154) for an appointment.

The Tainan project may seem years away, but indeed there are more transportation projects planned for Taiwan than just the Taipei subway construction now under construction. American business persons may wish to

VADM (Ret) Chu Re-ching
Director
Kaohsiung Harbor Bureau
62, Lin Hai 2nd Road
Kaohsiung, Taiwan
TEL: (07) 562-2400
FAX: (07) 561-1694

Mr. Chuang Ming-Tze (surname: Chuang)
Engineering Section Chief
Kaohsiung Harbor Bureau
62, Lin Hai 2nd rd.,
Kaohsiung, Taiwan
TEL: 886-7-561-2311
FAX: 886-7-561-1694

MEDIUM RAPID TRANSIT SYSTEM IN TAINAN, SOUTHERN TAIWAN

Taiwan's Ministry of Communications (MOC) and the Taiwan Provincial Housing and Urban Development Department recently have concluded that Tainan City should follow Taipei, Kaohsiung and Taichung in priority to establish a rapid transit system. National Cheng Kung University (NCKU) and the Institute of Transportation (IOT) of the MOC have completed a feasibility study. The envisioned USD 2.7 billion project may offer long-term services and specialized equipment export opportunities to U.S. firms.

Tainan city is southern Taiwan's second largest city with a population of approximately 680,000. Tainan is located about 40 kilometers north of Kaohsiung. In a preliminary plan, completed in April 1990 and submitted to the MOC in May 1990, NCKU and the IOT proposed that the Tainan Mass Rapid Transit (MRT) System be constructed to serve the Tainan metropolitan area, which includes Tainan city; six villages, Yungkang, Jente, Anding, Hsikang, Chiku, and Hsinshi in Tainan County; and two villages, Chiading and Hunei, in Kaohsiung county. The population of the Tainan metropolitan area in 1989 was over 1 million, and is projected to reach 1.57 million by the year 2020.

The feasibility study indicated that the Tainan MRT should start with three lines with a total length of 30 kilometers in order to meet basic demands by the year 2020. Long term design will construct a loop route in downtown Tainan city to connect the city with the eight villages in Tainan county and Kaohsiung county. The study also recommended that the Tainan MRT adopt either the Advanced Light Rail Transit System or the Light Rail Rapid Transit System.

The two yellow lines, totaling 19.26 kilometers, are designed along north to south routes. The yellow lines consist of 12.9 kilometers of elevated system and 6.36 kilometers of underground system. The 10.74-kilometer green route runs from east to west and will be constructed entirely underground. Among the three lines, there will be 28 stations, including 2 transfer stations.

The initial estimated project cost is NT\$72.5 billion, or US\$2.7 billion (US\$ 1:NT\$27 in August 1990). Budget costs are expected to be shared by central authorities, the Tainan city government, and the Tainan county and Kaohsiung county governments.

Tang Eng Iron Works, Company, Ltd.
458 Hsinhsing Road, Hukou, Hsinchu
Phone: (035) 981-721
Telex: 31475 TEMACH
Fax: 886-35-981-646

Contacts:

Mr. Ou Chin-der, Director General, Taiwan Area National Freeway Engineering Bureau, Ministry of Communications, 285 Chien Kuo S. Road, Sec. 1, Taipei, Taiwan; Phone: (02) 784-9548

Dr. Ho-shong Hou, Chief, Transportation Engineering Department, Institute of Transportation, Ministry of Communication, 240 Tunhua N. Road, Taipei, Taiwan; Phone: (02) 712-3121; FAX: 886-2-717-6381

FIFTH CONTAINER TERMINAL PROJECT IN KAOHSIUNG

Estimated total Cost:	NT\$10.6 billion (US\$392.6 million)
Construction Date:	October, 1990
Source of Finance:	Taiwan Provincial Department of Communications and Kaohsiung Harbor Bureau

Current Development:

The Taiwan Provincial Department of Communications and Kaohsiung Harbor Bureau (KHB) have agreed to allocate NT\$10.6 billion (US\$392.6 million) for construction of the fifth container terminal in the Ta Jen Commercial Harbor area of Kaohsiung Harbor, southern Taiwan. A local engineering consultant is conducting detailed planning. The fifth container terminal, with a total quay length of 2,640 meters, is designed for eight berths. Annual handling capacity is estimated to be 1,500,000 containers. The 2-hectare container yard will be capable of storing 25,000-TEU containers.

Construction is scheduled to start in October 1990 with completion in 1998. Approximately USD 111 million will be spent for purchasing equipment including 15 gantry cranes, 28 transtainers, forklifts and containers.

Through the assistance of Taiwan's Central Trust Corporation, KHB in the third quarter of 1991 will arrange for either local or international bidding to procure these items. KHB welcomes qualified American firms which have experience in manufacturing 15 or more gantry cranes to participate in the bidding.

Interested U.S. firms are encouraged to contact directly the following KHB official for further information:

Sinotech Engineering Consultant, Inc.
15/F, 171 Nanking E. Road, Sec. 5, Taipei, Taiwan
Phone: (02) 769-2131
Cable: SINOTECH TAIPEI
Telex: 11701 SINOTECH
Fax: 886-2-765-5010

China Engineering Consultant, Inc.
7/F, 280 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 781-4151
Cable: CONSULTS TAIPEI
Telex: 22435 CECI
Fax: 886-2-751-4907

Ret-Ser Engineering Agency
Vocational Assistance Commission for Retired Servicemen (VACRS)
207 Sungchiang Road, Taipei, Taiwan
Phone: (02) 503-2233
Cable: RSEA TAIPEI
Telex: 21531 RSEA TAIPEI
Fax: 886-2-503-2968

BES Engineering Corporation
3F-7F, 320 Chunghsiao E. Road, Sec. 1, Taipei, Taiwan
Phone: (02) 752-1111
Cable: BESCO TAIPEI
Telex: 21985 BESCO
Fax: 886-2-731-4901

Continental Engineering Corporation
11/F, Continental Building
280 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 751-2233
Cable: "CONTIENG" TAIPEI
Telex: 23480 CONTICOM
Fax: 886-2-731-4189

New Asia Construction & Development Corporation
Hwa Hsin Building
3/F, 219-224 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 771-5970
Cable: NEWASIACON TAIPEI
Telex: 23265 NACDC TAIPEI
Fax: 886-2-777-5751

Pan Asia Corporation
7F, 219 Chunghsiao E. Road, Sec. 4, Taipei, Taiwan
Phone: (02) 771-7417
Fax: 886-2-721-9148

XI. TRANSPORTATION PROJECTS

A SECOND FREEWAY IN CENTRAL AND SOUTHERN TAIWAN

Estimated Total Cost: NT\$445.5 billion
 (US\$16.5 billion)
Project Study Cost: NT\$100 million
 (US\$3.7 million)
Projected Construction Time: July 1989 - June 1998

Current Developments:

The Executive Yuan approved the implementation of the project in July 1989. The Taiwan Area National Freeway Engineering Bureau (TANEEB) with the assistance of the China Engineering Consultant, Inc. is conducting a detailed design for the Second Freeway in Central and Southern Taiwan. The 410-kilometer freeway will begin from Chunan and end at Linpien in Southern Taiwan. According to TANEEB, the project detailed design will be completed in March 1991 and no foreign consultant service will be required. Construction tenders will be issued in July 1991 to local contractors.

There will be limited foreign equipment procurement for construction of roads and tunnels, signaling and communication and control systems. These purchases will be made by the contractors. The value of these foreign equipment procurements have not been released. American equipment manufacturers who are interested in this opportunity should present relevant information, including catalogs and literature to the Taiwan Area National Freeway Bureau (TANFB), who will then pass this information to the local contractors.

Background Information:

This project is an extension of the 129-kilometer Second Freeway in Northern Taiwan Project. A 129-kilometer Second Freeway in Northern Taiwan started construction in July 1986 and is scheduled for completion in December 1994. Delay in completion of the 129-kilometer Second Freeway in Northern Taiwan is due to a problem of land acquisition.

The Taiwan Area National Freeway Engineering Bureau, Ministry of Communications, with the assistance of U.S. firm T. Y. Lin Engineering Company; the Sinotech Engineering Consultants, Inc.; the China Engineering Consultants, Inc.; and Moh & Associates, Inc. completed a preliminary and detailed design for the 129-kilometer Second Freeway in Northern Taiwan. The 129-kilometer freeway begins at Keelung and ends at the Hsinchu Science Park. There are about ten local firms involved in construction of the Second Freeway in Northern Taiwan. These major civil construction firms are:

- AT&T Taiwan Telecommunications, Inc. is a joint venture of AT&T (U.S.) and three Taiwan organizations -- the Directorate General of Telecommunications (DGT), the Bank of Communications and the Yao-hua Glass Company;

- Taiwan International Standard Electronics Ltd. (TAISEL) is a 60-40 joint venture between Alcatel/ITT and DGT; and

- GTE Taiwan Communications Systems Ltd. is a joint venture of Siemens/GTE with 55 percent, DGT with 15 percent, and two local firms with shares of 25 percent and 5 percent respectively. This firm is known as TAICOM.

Currently, DGT's policy is to have only three systems in its digital network project, namely AT&T, TAISEL & TAICOM.

In addition to the purchase of 900,000 lines of digital switching systems in 1990, DGT plans to procure another 2,300,000 lines of trailer-type digital switching systems through the year 2000.

Under DGT's Integrated Service Digital Network (ISDN) project, toll switches, telephones, circuits, and inter-city exchange equipment will all become digital by the end of the century. Following is a timetable for the ISDN project:

-- By 1995, 92 percent of the toll telephone exchange equipment will be digitalized. Digitalization of the entire toll system will be completed by 1998.

-- By 1995, 75 percent of the inter-toll circuits will be digitalized, and complete digitalization is set for the year 2000.

-- Intra-city exchange equipment will be 100 percent digitalized 2000.

-- About 43 percent of subscriber telephone networks will be digitalized by June 1992..

-- Digital telephone services were offered in 1989.

Contact: Mr. Lee Ping-yao, Director General, Directorate General of Telecommunications, 31 Aikuo E. Road, Taipei; Phone: (02)344-3601; FAX: 886-2-397-2254

Supply & Demand Forecast of Packet Switching Service

Year	1990	1991	1992	1993	1994
No. of Subscribers	3,200	4,500	6,000	7,800	10,000
Growth Rate (%)	97.4	40.6	33.3	30.0	28.2
No. of Ports in Total	3,200	5,220	7,220	9,220	11,2120

Note: 1. No pending application currently
 2. Second Packet Switching System in service since January 1988

- Videotex Service

Fiscal Year	Status		Total
	Dial Up	Leased Line	
1988	2,282	--	2,282
1989	8,493	1,299	9,792

Note: 1. Service opened on August 1, 1987
 2. Leased line access opened on July, 1988

Forecast and Construction Plan of Videotex Service

Fiscal Year	Dial Up Demand	Leased Line Demand	Total No. of Sub	Total Growth Rate (%)	Construction Plan No. of Ports
FY1990	18,500	4,000	22,500	130	7,500
FY1991	378,000	8,000	45,000	100	150,000
FY1992	67,000	13,000	80,000	78	25,000
FY1993	130,000	20,000	150,000	88	40,000
FY1994	270,000	30,000	300,000	100	60,000

Note: Dial up subscriber : port = 3:1
 It will be 6:1 in October 1991

Background Information:

In the past, DGT purchases of digital telecommunication equipment were split into north, central, and south districts of Taiwan and divided among three U.S. firms, GTE, IIT and AT&T, respectively. IIT formed a joint venture with French firm Alcatel and GTE was joint ventured with German firm Siemens. The three U.S. firms also have joint investments with local firms in Taiwan:

B. TAIPEI MRT SYSTEMS:

The Taipei MRT involves the design and construction of an urban and suburban subway system with a total route length of 95.7 kilometers (73.4 kilometers for three city lines, and a 22.3 kilometer suburban line). In March 1986, the Taiwan Cabinet approved the main portion of the Taipei MRT Phase Two project, including four lines with a length of 70.3 kilometers at an estimated cost of NT\$154,862 million (US\$4,075 million). The Cabinet has approved and budgeted over NT\$55.4 billion (US\$2.05 billion) for construction of the Tamsui-Taipei-Hsintien route (red line), including civil engineering costs of NT\$28 billion (US\$1.04 billion). Approximately NT\$16.6 billion (US\$615 million) has been budgeted for procurement of rapid transit or light rail rolling stock, car chassis, maintenance machinery, rapid transit signalling and communication equipment, power systems equipment, ventilation and air conditioning equipment, automatic ticketing machines, elevators and escalators, as well as tunneling and other heavy construction equipment. Funding for the project is expected to come from a variety of sources including export credits (US\$521 million) and government bond issues (US\$633 million) with the remainder provided by the budgets of various Taiwan authorities -- Central authorities (50 percent), Taipei city (40 percent), and provincial (10 percent).

In November 1986, a general consultancy for the medium capacity transit system (MCTS) was awarded to Daniel, Mann, Johnson & Mendenhall. System specification proposals were completed in April 1987.

BMTA completed specifications for a test line from Peitou to New Peitou as well as key work yards. In November 1986, the Taipei City authorities announced their decision to start building the Tamsui to Taipei Central Station segment (a part of the red line) and the medium capacity transit portion (the MCT brown line) from the New Zoo to Chung-hsiao E. Road. Work began in July 1987. Construction work will separately begin from the outskirts of Tamsui and the New Zoo towards the center of the city. As the construction nears completion at Chung-hsiao E. Road, the blue line from Taipei Central Station to Hsin-yi Planning District will be connected to the red and brown lines. This project will connect with the underground portion of Phase One at the Central Station.

On March 23, 1989, DORTS renewed their contract with American Transit Consultant (ATC), general engineering consultant, for the Taipei MRT Project. The amount of the new two-year contract is NT\$3 billion or approximately US\$108.7 million. DORTS has expressed great satisfaction with the services and cooperation which ATC provided under their first two-year contract. If ATC continues their excellent performance, DORTS may employ their services for ten or more years.

U.S. firms have won many sizeable contracts for design of sections of the MRT routes. DeLeuw-Cather and D.M.J.M. won two of the four engineering contracts for the Taipei-Hsintien MRT Route. The budget for Project No. 159, assigned to DeLeuw-Cather, is reported to be US\$12.2 million and the budget for Project No. 161, awarded to DMJM, is reported to be US\$5 million. The Swiss firm

Electrowatt and the French firm Sofretu were assigned contracts as well but they are reported to be smaller than those assigned to DeLeuw-Cather and DMJM.

With the award of the first 132 MRT railcars to United Railcar Partnership, DORTS is now turning its attention to subsequent MRT railcar purchases. AIT has heard from local sources that DORTS is not favorably disposed to continue the policy of reserving future MRT railcar purchases for U.S. firms. DORTS still needs over 500 railcars to complete its program with each rail car budgeted at between US\$1 to 1.5 million. DORTS' present plans call for 66 railcars in 1990.

There is a strong sentiment in DORTS to award contracts for the Chung-ho and Panchiao MRT lines on a turnkey basis. This decision was made in order to cut cost and construction time. The turnkey contracts for the 8 kilometer Chung-ho Line and the 5.4 kilometer Panchiao line will include design and construction, but will not include rolling stock, signalling equipment, traction power supply, or automatic fare collection equipment. DORTS plans to release the tender for the Chung-ho line in the near future. However, the tender issuance date has not yet been determined. The budget for this turnkey contract will be approximately US\$1 billion. If the turnkey contracts for the Chung-ho and Panchiao lines are awarded to a non-U.S. firm, there will be little chance for U.S. firms to participate in detailed design or to supply communication systems, depot equipment, station and tunnelling services, etc. U.S. firms DeLeuw Cather, DMJM, and T. Y. Lin won several detailed design contracts on the Tamsui and Hsintien lines.

The date for detailed design bid of the blue-line submission is scheduled for July 1991. Construction is expected to begin in January 1994 and to be completed in June 1999 for the Sungshan to Panchiao (blue line) route. Detailed design for the Roosevelt - Chung-ho (orange line) segment is expected to start in March 1992 and is scheduled to be finished in September 1994. Construction for the orange line is expected to start in May 1994. The projected completion date is in June 1999.

The following is an estimated bidding timetable and contract awards for the Taipei MRT-equipment contracts:

<u>Contract</u>	<u>Tender Issuance</u>	<u>Receive Proposals</u>	<u>Award Contract</u>	<u>Expected Participants</u>	<u>Budget</u>
301 Vehicles	11/25/88	3/2/89 Selection of PQ firms: 5/6/89	9/15/89 **	URC USTTG Breda-Hitachi	132 cars, *NT\$5,891 million (Sole source from U.S.)
** This contract awarded to URC (US\$170 million)					
302 Signalling	9/5/89	10/11/89	10/01/90 **	GRS Safe Tran Transcontrol Union Switch	*NT\$2,103 million (Sole source from U.S.)
** This contract awarded to GRS (US\$104 million).					

(Continued)

<u>Contract</u>	<u>Tender Issuance</u>	<u>Receive Proposals</u>	<u>Award Contract</u>	<u>Expected Participants</u>	<u>Budget</u>
C303 Traction Power Supply Systems for Tamsui & Hsintien	10/11/89	2/9/90	7/30/90 **	Prime contractor must be a local firm. U.S. firms, Westinghouse, General Electric, & Babcock-Wilcox can supply rectifiers and transformers.	*NT\$1,489 million
** C303 contract was awarded to Siemens and the BES Engineering Corporation (US\$78.5 million (NT\$2.12 billion)).					
304 (Number Voided)					
305 Communication System	5/15/89	9/1/89	11/02/89 **	U.S. firms: GTE-Hawaii Tel French firms: Jeumonr-Schneider W. German: Siemens Hong Kong: Cable and Wireless	*NT\$832 million
** Cable and Wireless won this contract with a bid of NT\$679 million					
306 A-B Escalators/Elevators	2/13/89	5/23/89	7/15/89 **	U.S. firms: Otis & Montgomery West German: Thyssum & O&K Japanese: Mitsubishi Hitachi	*NT\$1,303 million (for escalators) *NT\$381 million (for elevators)
** 306A (escalators) awarded to a French firm - CNIM (NT\$558 million)					
** 306B (elevators) awarded to a Korean firm - Goldstar (NT\$119.3 Million)					
307 Automatic Fare Collection (AFC)	1/5/89	4/13/89	6/14/89 **	U.S. firms: Cubic Western General Farebox CGA (French) British: Thorne EMI French: Crouze	*NT\$562 million (for Tamsui-Main Station Line) *NT\$300 million (for MCTS Main Station-Hsintien Line) *NT\$287 million (for MCTS Mucha-Sungshan Line)
** French firm CGA-HBS won this bid at US\$27.4 million. Cubic Western placed second at US\$35 million and General Farebox was third at US\$43.9 million.					

(Continued)

<u>Contract</u>	<u>Tender Issuance</u>	<u>Receive Proposals</u>	<u>Award Contract</u>	<u>Expected Participants</u>	<u>Budget</u>
308 Environmental Control Systems	11/9/90			Local contractor is prime.	
309A Depot Equipment	10/1990			Siemens (W. Germany) Thyssum (W. Germany) Vickers (U.K.)	*NT\$907 million
309B Locomotives (Service locomotives)	3/1991			GE (U.S.) Other European & Japanese firms	*NT\$296 million
309C Flat Cars	8/1991			Local contractor will be prime	*NT\$170 million
309D Support Equipment	1/1991				
310 Station and Tunneling Services	1990 or 1991			Prime contractor must be a local contractor. U.S. firm: Commercial Intertech & Delco interested	
501 Trackwork Contract	9/5/89	10/20/89	12/31/89	Tang Eng Iron Works is prime contractor.	

** A French firm, Travaux Du Sud-Ouest, won this bid at NT\$ 2.99 billion.

Notes:

* Conversion rate for US\$1 equals NT\$27.

** Contract awards.

Background Information:

The Taipei Mass Rapid Transit (MRT) Project consists of two phases. The first phase of the project involves upgrading and submerging a portion of the existing railroad trunkline from Hwa Shan to Wan Hwa, and rebuilding the Taipei Railroad Station, with four stories underground and six stories above ground. The new station will become the central point of the future rapid transit network. Work on the first phase began in 1983 and was completed in August 1989. A West German firm was awarded the final design contract for part of MRT Phase One -- the placing of a segment of the existing railroad trunk line underground. Bechtel

Corporation won the contract for the final design of the most complicated part of the four-story underground segment of the new central station. Ericsson Signal, A.B. of Sweden as awarded the contract for the central terminal's signaling equipment. In December 1986, Otis won the bid for 44 escalators and a Swiss firm was awarded the bid for 21 elevators. Seven automatic ticketing machines were purchased from Japan. Equipment purchases for the new station's telecommunications systems, environmental control systems and MRT workshop machinery were sourced abroad.

Contact: Mr. George S. Y. Chen, Deputy Director General, Department of Rapid Transit Systems (DORTS), City of Taipei, 10/F, 746 Ming-shen E. Road, Taipei, Taiwan; Phone: (02) 713-6724

TAIPEI HwasHAN-SUNGSHAN UNDERGROUND RAILWAY EXTENSION

Estimated Total Cost: NT\$21,489 million
-- (US\$826.5 million)
Projected Construction Time: July 1988 - June 1993

Current Developments:

Deutsche Eisenbahn Corporation (DEC) prepared the project study. DEC will also review the project's electric mechanical system design. Project detailed design was completed by the China Engineering Consultants, Inc. The tunnel will have two sets of double rails. The BES Engineering Corporation and the Ret-Ser Engineering Agency, Vocational Assistance Commission for Retired Servicemen, are responsible for construction of the 5.33 kilometers tunnel from HwasHan to Sungshan. The imported equipment for this project will be compatible to the existing system of the underground portion from Wanhwa to HwasHan. The imported equipment budget has not been released. The purchase value will be much smaller than the previous purchases.

Contact: Mr. Chuen-ming Hsueh, Section Chief, Taipei Railway Underground Project Office, Ministry of Communications; Phone: (02) 314-8513

KAOHSIUNG MASS RAPID TRANSIT SYSTEM

Estimated Total Cost: US\$7.1 billion
Project Study Cost: NT\$91.5 million
(US\$3.5 million)
Projected Selection of
General Consultant: Pending
Projected Construction Time: Pending
Source of Finance: Central & Kaohsiung City Authorities

Current Developments:

Establishment of the Kaohsiung Municipal authorities' new Department of Mass Rapid Transit was approved by the Executive Yuan on March 5, 1990. Public Works Bureau Deputy Director S. C. Huang has been appointed as the director of the new department. The KMRT project will likely be funded in stages, with only two of the proposed four lines being approved in the first stage. Local and central authority officials are still discussing the apportionment of project expenses among Kaohsiung city, Taiwan Province, and Central authorities. Some foreign financing may be sought.

The Department of Kaohsiung Mass Rapid Transit, Preparatory Office announced on May 29 the short-listing of the following three international consortia, all with US participants, to present technical proposals for consideration as general engineering consultants for the US\$7 billion Kaohsiung Mass Rapid Transit (KMRT) project in southern Taiwan:

- Bechtel (US); Deutsche Eisenbahn Consult (West Germany) and associated West German companies; ILE Consulting Engineers - Geoconsult (Austria); and Overup and Partners and Associated companies (UK)
- De Leuw, Cather (US); Parsons Brinckerhoff (US); Electrowatt (Switzerland); Dames & Moore (US); KOOT (US); and Transurb (Belgium); and
- Louis Berger International/ABAM Engineers (US); T.K. DYER/HNTB (US); and LS Transit Systems/SOFRETU (France) - doing business as Transit Engineering Associates

The new KMRT office name and contact information are:
Kaohsiung Municipal Government
Department of Kaohsiung Mass Rapid Transit, Preparatory Office
4th Fl., 235, Chung Cheng 4th Road,
Kaohsiung, Taiwan
Phone: 886-7-211-9009
FAX: 886-7-272-3661
Attn: S. C. Huang

Background Information:

Louis Berger International, T. K. Dyer, and LS Transit Systems were commissioned by the Kaohsiung City authorities to do a Kaohsiung Mass Rapid Transit (KMRT) study in August 1988 that was completed in November 1989. The six-volume draft set of project final reports proposed the US\$7.1 billion KMRT system. A summary of the set of the KMRT final reports and explanation on how interested U.S. firms may examine these reports are provided below. Significant trade opportunities for U.S. services and equipment will occur if the project receives final approval by Taiwan's Central Authorities.

KMRT: The Final Kaohsiung MRT Report (Six Volumes)

Summary Fact Sheet

Basic Network: A modern, state-of-the-art, 77.7 km MRT system consisting of four independent lines and 71 stations. The MRT system will be fully integrated with the local bus systems and TRA Railway services. The design of the system will incorporate access facilities for pedestrians, automobiles, motor scooters, and bicycles.

Line Descriptions:

Red Line: Chiao Tou - Ta Ping Ting
Orange Line: Yen Chen - Feng Shan City
Blue Line: Tso Ying - [Kaohsiung] Export Processing Zone
Brown Line: Yen Chen - Chen Ching Lake

System Configuration:	<u>Length of line (km)</u>	<u>Number of stations</u>
Red Line:	30.9	23
Orange Line:	10.8	14
Blue Line:	21.6	19
Brown Line:	14.4	15
Total	<u>77.7</u>	<u>71</u>

Basic Construction:	<u>Lines</u>		<u>Stations</u>	
	<u>km</u>	<u>pct</u>	<u>no</u>	<u>pct</u>
Above Ground	15.1	22	14	20
Below Ground	49.2	78	57	80

Major Support Facilities: The recommended system includes a central vehicle storage and maintenance facility, three satellite storage and inspection facilities, and an administration/control center building.

Daily MRT	2000:	1,098,000
Passenger Volumes:	2010:	1,481,000
	2020:	1,855,000

Vehicles: The vehicle fleet will consist of 382 vehicles, including 15 pct spares. Vehicles will be either married pairs (2-car sets) or triplets (3-car sets). Each car will have a design capacity of 200-250 passengers. All vehicles will be air-conditioned. Each train will have an attendant on-board, although the technology makes this optional.

Stations: All station platforms will be 150 meters in length to accommodate future requirements of up to 8-car train sets. Center platform stations will be used wherever possible. Passenger amenities will include automatic fare collection equipment, escalators, elevators, and air-conditioning in the below ground stations. A station attendant will be available in each station.

Project Schedule: Phase I: Opens all of the Orange Line and nearly all of the Red Line between 1995-1997.

Phase II: Opens all of the Blue Line and nearly all of Brown Line between 1998-2000.

Phase III: Extensions to the Red and Brown Lines after the year 2000.

MRT Capital Cost: NT\$ Billions (1989 \$)

Phase I:	97.029
Phase II:	68.360
Phase III:	18.166
Total	183.555

MRT Operating/Maintenance Costs: NT\$ Millions (1989 \$)

1996	1,140
1998	2,616
2000	3,606
2010	5,026
2020	5,827

Project Financing: It was assumed that the Central Government will fund 70 pct of the initial capital costs for the project, with the balance coming from local government sources. A local government subsidy will be required to fund a portion of the operating and maintenance costs, and depreciated capital costs.

Management of the System: Operation of the MRT System and the Kaohsiung (City) Bus System should be managed by a new semi-autonomous public agency governed by an appointed Board of Directors.

The remaining five draft volumes of the feasibility study phase final report are summarized below.

Volume One: Planning and Feasibility

Subjects Covered:

- Introduction
- Land Use and Development
- Socio-Economic Characteristics
- Environmental Description and Considerations
- Alternative Networks
- Travel Demand Forecasts and MRT Ridership
- Available Technologies
- Estimation of Capital and Operating Costs
- Economic and Financial Analysis
- Evaluation of Alternatives
- Conclusions and Recommendations
- Description of Recommended MRT System

Volume Two: Engineering and Operations (Length: 254 Pages)

Subjects Covered:

- Introduction
- Route Location and Track Alignments
- Geotechnical Analysis
- Civil Works
- Stations and Intermodal Transfer Infrastructure
- MRT Operations

Volume Three: Implementation and Management

Subjects Covered:

- Introduction
- MRT Policies and Legal Authority
- MRT Internal Organization and Management
- MRT Project Implementation
- Joint Development Planning
- Financial Plan

Volume Four: Integrated Bus/MRT System

Subjects Covered:

- Introduction
- Existing Conditions
- Bus-MRT Service Goals
- Short Term Measures
- Medium and Long Term Networks
- Medium and Long Term Recommendations
- Financial Analysis

Volume Five: Engineering Drawings

Subjects Covered:

Alignment and Profile
Stations
General Engineering
Geotechnical

Availability of Final Reports for Inspection by U.S. Firms

Full sets of the feasibility study phase final reports may be examined by U.S. firms and their representatives at the American Institute in Taiwan's Kaohsiung Branch Office in Kaohsiung and at the American Trade Center in Taipei. Calling ahead for an appointment is strongly suggested. Addresses, telephone and fax numbers are:

American Institute in Taiwan
Kaohsiung Branch Office
3rd Floor, Number 2,
Chung Cheng 3rd Road
Kaohsiung, Taiwan
Phone: 886-7-224-0154
FAX: 886-7-223-8237
(ask for commercial section)

American Institute in Taiwan
American Trade Center
Room 3207, 32nd Floor
333, Keelung Road, Section 1
Taipei, Taiwan 10548
Phone: 886-2-720-1550
FAX: 886-2-757-7162
(ask for Major Projects
Group)

AIT/Kaohsiung has forwarded complete photocopies of the 60-page final report summary volume to the following two Washington-area addressees:

U.S. Department of Commerce
ATTN: Mr. Jay L. Smith
International Trade Specialist
Office of International Major Projects
HCHB Room 2011
Washington, D.C. 20230
Phone: 202-377-4642
FAX: 202-377-3954

American Institute in Taiwan
Washington Office
ATTN: Mr. Raymond J. Sander
Director, Trade and Commercial Programs
Room 1705, 1700 North Moore Street
Arlington, VA 22209
Phone: 703-525-8474
FAX: 703-841-1385

Contacts:

Kaohsiung Municipal Government
Department of Kaohsiung Mass Rapid Transit, Preparatory Office
4th Fl., 235, Chung Cheng 4th Road,
Kaohsiung, Taiwan
Phone: 886-7-211-9009
FAX: 886-7-272-3661
(Mr. Sun Chia-Yang is the Chief Engineer on the KMRT Planning Project team;
his deputy is Mr. Alex Cheng.)

Transit Engineering Associatesc.
ATTN: Mr. Rudy DeMarteleare, Project Manager
6/F, 1025 Yu Cheng Road
Kaohsiung, Taiwan
Phone: 886-7-585-2865
FAX: 886-7-581-1679

Ref: 90 AITGRAM A-002, 89 TAIPEI 7921 and previous

TAIPEI--ILAN NATIONAL FREEWAY

Estimated Total Cost:	NT\$50 billion (US\$1.85 billion)
Project Study Cost:	NT\$42 million (US\$1.6 million)
Project Construction Dates:	December 1990 - June 1998
Source of Finance:	Ministry of Communications

Current Developments:

The Executive Yuan approved the Taipei-Ilan National Freeway linking Nankang in eastern Taipei and Suao in Ilan County, northeastern Taiwan. DeLeuw Cather International Limited, an American firm, completed the feasibility study and basic design for the project. Parsons Brinckerhoff Consulting Engineers along with Electro Watt (a Swiss firm) are conducting the basic design which is scheduled to be completed in June 1991. Tenders for detailed design will be issued in July 1991 to local consultants associated with experienced foreign

engineering consulting firms. Ret-Ser Engineering Agency, Vocational Assistance Commission for Retired Servicemen (VACRS) will be prime for civil construction. Construction will commence in July 1992 and will be scheduled for completion in June 1998. A limited opportunity for U.S. engineering firms will be available for tunnel construction and foreign equipment purchases.

The recommended route measures 40 kilometers, including a total length of 18-kilometer tunnels. The estimated US\$1.4 billion tunnel freeway will reduce commuting time between Taipei and Ilan from two hours to forty-five minutes when it is completed. Traffic experts suggest that the Taiwan authorities should install an automatic ventilation system in the tunnel to prevent an accumulation of carbon monoxide. They also suggested that the Taiwan authorities set up automatic traffic signals outside the tunnel and television monitors inside to track the traffic flow.

Contacts:

Shih Chung-kuang, Director, Taiwan Area National Freeway Bureau, P. O. Box 75, Hsinchuang, Taipei, Taiwan; Phone: (02)909-6141

Chia-juch Chang, Director, Institute of Transportation, Ministry of Communications, 240 Tung-hwa North Road, Taipei, Taiwan; Phone: (02)715-5367

NEW DEEP-WATER HARBOR IN TAIWAN

Estimated Total Cost:	NT\$320 billion (US\$11.9 billion)
Project Study Cost:	NT\$9.5 million (US\$352,000)
Request for detailed Design:	July 1991
Projected Construction Dates:	Phase I: July 1993 - June 2003 Phase II: July 2003 - June 2011

Current Developments:

In June 1990, Sogreah and Becom (France) completed a deep-water port feasibility study for the ports of Keelung, Taichung, Tamsui, Wai-san-ting, and Kaohsiung. The feasibility study recommended the new deep-water harbor to be built in Kaohsiung. A basic design had also been completed by the China Engineering Consultants, Inc. (CECI). The Ministry of Economic Affairs is reviewing the project study. CECI may be selected to do the preliminary design after the design is approved by the Taiwan authorities. Tenders for the project detailed design are expected to be issued in July 1991 to international firms. The selected firm will have six months to conduct the project detailed design. Construction of the new deep water harbor will be in two stages: Phase I construction will begin in July 1993 and Phase II construction will commence in July 2003.

U.S. firms are encouraged to contact Dr. Ho-shong Hou, Chief, Transportation Engineering Department, Institute of Transportation, Ministry of Communications. U.S. firms stand a good chance to win some of the detailed engineering service, harbor construction, and foreign equipment purchase contracts.

A deep water harbor construction committee and a deep water harbor engineering department will be established by the Ministry of Communications when the project is approved, according to the Institute of Transportation (IOT).

Contacts:

Ho-shong Hou, Chief, Transportation Engineering Department, Institute of Transportation, Ministry of Communications, 240 Tung-hwa North Road, Taipei, Taiwan; Phone: (02) 712-3121

Y. S. Hsu, Harbor Project Manager, China Engineering Consultants, Inc. (CECI), 7/F, 280 Chunghsiao E. Road, Taipei, Taiwan; Phone: (02) 736-3567

WEST COAST CORRIDOR HIGH-SPEED RAILWAY

Estimated Total Cost: NT\$279.2 billion (US\$10.3 billion), including US\$2 billion foreign equipment purchases
Preliminary Design: October 1990 - September 1992
Request for Detailed Design: 1993
Projected Construction Time: 1994 - 2000
Source of Finance: Institute of Transportation

Current Development:

French firm, Sofrerail, won a contract for preliminary design of the Taiwan High Speed Rail Project on September 6, 1990. Also competing for this contract were Deutsche Eisenbahn Consulting GMBH from Germany teamed with U.S. firm Parsons Brinckerhoff International and the Japan Railway Technical Services (JARTS) in a joint venture with U.S. firm Deleuw Cather.

U.S. firm, Rail Transportation Systems (RTS) Inc., of Atlanta, GA, is affiliated with Sofrerail and will play a role in the preliminary design. RTS representative, Nicholas Brand has been named deputy director for the preliminary design phase. The high speed rail project is budgeted at US\$10 billion, of which US\$8 billion will be spent on civil construction and US\$2 billion on equipment procurement.

The preliminary design will be broad enough to permit French, German, and Japanese high speed rail systems to qualify for the bid. There are high speed rail opportunities for U.S. engineering firms. RTS plans to bid on the detailed design which will be tendered in approximately one year.

The High Speed Rail Project falls under the Ministry of Communications' jurisdiction. Presently Sofrerail is using offices provided by the Taipei Underground Railway Project (TURPO) in the Taipei Train Terminal. The overall project director is General Ping Tong.

There is wide spread talk in Taiwan that French high speed trains (300 kph) are preferable to Japanese high speed trains (250 kph). Some say that the French technology is more advanced than the Japanese. There seems to be less enthusiasm for a German high speed rail system. French hopes for supplying the rolling stock were raised by a recent visit to France by the Taiwan Minister of Communications. Local television showed the Minister riding on a French high speed train.

According to the Provisional Engineering Office of High-Speed Rail Project, the three high-speed railways -- West Germany's Inter City Express (ICE), Japan's Sinkansen or bullet train, and the France's Train a Grande Vitesse (TGV) -- are being considered as models for Taiwan's own system.

U.S. firms stand a good chance to win some of the high speed rail contracts. Some local firms are interested in working with U.S. firms.

The scope of work of the high speed rail project will be released in October 1990. We foresee that the scope of work will include engineering services, civil construction, rolling stock, signalling, traction power supply systems, communication systems, depot equipment, station services and design, track work, etc. It does not appear that the high speed rail will be a turnkey project. Contracts will be let out individually. U.S. firms will be competitive in many of the above areas of the scope of work.

Interested firms may contact:

AIT Commercial Unit
Room 3207, 333 Keelung Road, Section 1, Taipei, Taiwan
Phone: 886-2-720-1550
Fax: 886-2-757-7162
Attn: Robert Strotman, Commercial Officer

The proposed high-speed railways will bring passengers from Taipei to Kaohsiung in less than two hours. Regular trains currently take nearly five hours to reach Kaohsiung. There will be eight stops on the route of 365 kilometers. The high-speed train will stop in Sungshan, Taipei, Taoyuan, Hsinchu, Taichung, Chiayi, Tainan and Kaohsiung.

Background Information:

Parsons Brinckerhoff International (joint venture with Deutsche Eisenbahn Consulting GMBH) completed the project's US\$2.6-million feasibility study in January 1990.

Contacts:

Mr. Tong Ping (Surname Tong), Director, Provisional Engineering Office of High-Speed Rail Project, Ministry of Communications, 3rd Floor, 3 Peiping W. Road, Taipei, Taiwan; Phone: (02)361-1443; FAX: 886-2-331-2294 (for High-Speed Rail Project)

Dr. Ho-hsiung Hou, Chief, Transportation Department, Institute of Transportation, Ministry of Communications, 240 Tung-hwa North Road, Taipei, Taiwan; phone: (02) 712-3121

XII. OTHER PROJECTS

CHINA STEEL CORPORATION FOURTH PHASE EXPANSION

Current Developments:

China Steel Corporation plans a fourth phase expansion for an additional 2.4 million tons of capacity. CSC would prefer to expand at their existing site on the Kaohsiung harborfront, but concerns about an adequate supply of fresh water for cooling turbo-condensers and other equipment have so far resulted in a reluctance to construct the project at the existing Kaohsiung site. CSC currently consumes about 110,000 metric tons of fresh water per day, roughly ten percent of the entire city's daily consumption. CSC is waiting to see how plans for new reservoirs in southern Taiwan are finalized before making a final decision on expanding in Kaohsiung. Conceivably, with water rights obtained from planned and possible new reservoir projects in the south, CSC could proceed with its fourth phase expansion at its Kaohsiung site.

CSC is finding it difficult to locate qualified design and equipment firms in the U.S. for such projects; Japanese and German firms are more plentiful in this field. U.S. firms that can supply drive systems and control systems may be the most competitive bidders for parts of this future expansion.

With no specified timeframe or location, CSC estimates the fourth phase expansion project cost at US\$2 billion. The major product will be hot-rolled steel. CSC identified six issues which need to be adequately addressed before embarking on the fourth phase expansion: (a) changes in the steel market; (b) additional land for berths for handling and transporting raw materials; (c) selection of the most modern technology for steel making (one of the Chinese language press in Kaohsiung article noted that SMS Schloemann-Siemag Aktengesellschaft of West Germany is under consideration); (d) security of water resources; (e) additional land for storage and pollution control facilities; and (f) overcoming local resistance to expansion due to environmental concerns.

Background Information:

China Steel Corporation's (CSC) fourth phase expansion basically is the building of its No. 4 blast furnace. CSC was originally designed to have an annual production of 6 million tons. The first blast furnace was built in December 1977 with an annual production capacity of 1.5 million tons. The market demand increased since the building of the first blast furnace. The projected annual production was raised to 8 million tons. The second blast furnace was built in October 1982 with an annual production capacity of 1.75 million tons. The third furnace was completed in June 1988 with an annual production capacity of 2.4 million tons, and the fourth furnace will also be built with a capacity of 2.4 million tons.

CSC faces the following problems with the fourth phase expansion: Since the plant was originally designed to produce 6 million tons annually, the plant's dock is not equipped to handle the amount of raw material needed for 8 million tons annual production. It was estimated that there will be a shortage of 5 million tons of raw material (ore and coking coal) if the No. 4 furnace were built and put in operation. For the same reason, there will also be a shortage of cooling water and power supply. Secondly, the cost for environmental protection is rapidly increasing. Therefore, CSC is hesitant to start the fourth phase expansion. CSC is considering two alternatives: 1) Find another location at Wai-san-ting in Taiwan, to build a new steel mill; and 2) To invest abroad in Australia, Brazil, South Africa or the United States.

Contacts: Mr. R. J. Hung, Vice President, China Steel Corporation, Lin Hai Industrial District, P. O. Box 47-29, Hsiao Kang, Kaohsiung, Taiwan; Phone: (07)802-1111 Ext. 2356; Telex: 71108, 71283, 71284, 71415 STIMILL; FAX: 886-7-802-2511

DEVELOPMENT OF KUANYIN MOUNTAIN SCENIC AREA

Project Study Cost: NT\$5 million (US\$192,000)

Current Developments:

The Taiwan Tourism Bureau of the Ministry of Communications completed the project study in house. The project study was approved by the Executive Yuan in 1989. Between FY 1989 and FY 1992, a total budget of US\$14 million was allocated for construction of the Kuanyin Mountain scenic area. No foreign consulting services are required, according to the Taiwan Tourism Bureau.

Contacts:

Chiu Chang-kuang, Chief, First Division, Tourism Administration, 8/F, 216 Mingchuan Road, Taichung, Taiwan; Phone: (04)224-5889

Lin Chi-wang, Director, Tourist Bureau, Department of Communications, Taiwan Provincial Government, 8/F, 216, Mingchuan Road, Taichung, Taiwan; (04)224-1397

DEVELOPMENT OF THE COASTAL SCENIC AREA OF EASTERN TAIWAN

Project Study Cost: NT\$25.5 million (US\$981,000)

Current Developments:

Foot Hill Consulting firm, an American company, assisted the Taiwan Tourism Bureau of the Department of Communications with a portion of the project study of eastern coastal scenic spots completed in mid-1989. The project study along with an eastern coastal recreation and development plan were submitted to the Executive Yuan in December 1989 and were approved. No further foreign consulting services are required for construction of this project, according to the Taiwan Tourism Bureau.

Contacts:

Lin Chi-wang, Director, Tourist Bureau, Department of Communications, Taiwan Provincial Government, 8/F, 216, Mingchuan Road, Taichung, Taiwan; (04)224-1397

FEASIBILITY AND PROJECT STUDIES FOR THE HSINCHU SCIENCE CITY PROJECT

Project Study Cost: NT\$9.6 million (US\$370,000)

Current Development:

The project includes feasibility and project studies for the Hsinchu Science City and its residential area plan. The Council of Economic Planning and Development is reviewing the project. The Executive Yuan will give final approval to the project.

Contacts:

Choh H. Li, Director General, Hsinchu Science-based Industrial Park, National Science Council, 2 Hsin Ann Road, Hsinchu, Taiwan; Phone: (035)773-365, telex: 32188 NSCHSIP

S. L. Tu, Director, Performance Evaluation Department, Council for Economic Planning and Development, 9th Fl., 87 Nanking E. Road, Section 2, Taipei, Taiwan; Phone: (02)562-4732

MARINE SCIENCE TECHNOLOGY MUSEUM AND MARINE BIOLOGY MUSEUM

Estimated Total Cost: US\$231 million (NT\$1 billion)
Construction Date: Pending
Expected Completion Date: In five years
Source of Finance: Ministry of Education

Current Developments:

Dr. Bonnie Sun Pan, Professor, National Taiwan College of Marine Science & Technology informed AIT that there are plans to construct a Marine Science Technology Museum in Keelung and a Marine Biology Museum in Pingtung. These projects are under the jurisdiction of the Social Education Department, Ministry of Education. The NT\$6 billion (US\$231 million) Marine Science Museum project budget which includes the Marine Science Technology Museum and the Marine Biology Museum was approved by the Ministry of Education.

Land has been acquired at Keelung Pa-tou-tze (in northern Taiwan) for construction of the Marine Science Technology Museum. Location of the Marine Biology Museum in Pingtung (in southern Taiwan) has not yet been determined. Dr. Bonnie Sun Pan, professor at the National Taiwan College of Marine Science & Technology, will be chairperson of the Marine Science Museum Planning Committee. This planning committee will be formed soon and will be located in the National Taiwan College of Marine Science & Technology. No word has been given on when the project is expected to begin, but it is targeted for completion in five years.

Dr. Pan disclosed that she was impressed with the large aquariums in Hawaii, Chicago, Seattle and Boston that she visited. She suggested that U.S. architectural firms and U.S. firms with experience in large aquarium design and exhibit design are encouraged to contact her at the following address:

National Taiwan College of Marine Science & Technology
2 Pei Nein Road
Keelung, Taiwan
Phone: 462-9781

Background Information:

In 1986, The Social Education Department, Ministry of Education (MOE), started the project plan for a marine science museum in Taiwan. In October 1986, MOE sent specialists to visit marine science museums in Baltimore, Washington, Monterey, Miami, San Diego and several places in Europe and Japan. A report on the survey trip, a location selection assessment among 25 areas in Taiwan, and a preliminary study was submitted to Mr. Chou Tso-min, director of the Social Education Department, MOE, in January 1988. There have been no recent developments on this project.

Contact:

Professor Bonnie Sun Pan, National Taiwan College of Marine Science & Technology, 2 Pei Ning Road, Keelung, Taiwan; Phone: 462-9781

NATIONAL SCIENCE & TECHNOLOGY MUSEUM

Estimated Total Cost: US\$37 million (NT\$1 billion)
(Including construction segment of US\$11 million (NT\$300 million))
Expected Completion Date: December 1993
Source of Finance: Ministry of Education

Current Developments:

Construction of the National Science & Technology Museum will take place in two stages. The first stage design works were awarded as stated in the background information below. For the second stage construction plan, ten exhibition halls will be installed with ten major subjects:

- The Utilization of Water Resources
- Biological Technology
- Metal Industry
- Plastic & Rubber
- Measurement & Technology Development
- Air Navigation & Aerospace
- Clothing & Technology
- Transportation and Civilization
- Prevention & Treatment of Disaster
- Computer & Communication

Six U.S consultants and one Japanese consultant submitted design proposals for the project. The name list has not been released. The National Science & Technology Museum is reviewing these proposals and contract award will be announced by the end of October 1990. Fabrication contracts will be awarded to the firms recommended by the consultants selected for these ten subjects.

Background Information:

The Ministry of Education plans to build a 10-story science museum in Kaohsiung. The overall project is estimated at NT\$1 billion (about US\$37 million), with the construction segment likely to be budgeted at NT\$300 million (US\$11 million). A Taipei architect, Bai Hsing-san, has been selected and design work began in April 1987.

Mr. Chou Chao-chi, former chairman of Department of Engineering, National Sun Yat-sen University, is the museum director. He is responsible for all decision-making.

Dr. Chou Chao-chi, Director of the National Science & Technology Museum informed AIT that the first stage plan of eight major design contracts for the National Science & Technology Museum was awarded in April 1988 to three U.S. firms and one Japanese consultant. The three U.S. firms are De Martin, Marona, Carnastous and Downes, Inc. (subject: The Wonderful World of

Electronics); Newhart, Donges, Newhart, Inc. (two subjects: a) Computerization, and b) Energy Utilization); and Lepeg-Sabrega, Inc. (subject: Power & Machines). Cost for each subject is about US\$400,000-US\$600,000. The Japanese firm, Nomura, won four contracts. They are: a) Chinese Science Achievement, b) Children's Science Center, c) Building & Environment, and d) Chinese Food Industry. The total value of the Japanese contracts is US\$2 million. All designated contractors completed the above design work in April 1990. According to Dr. Chou, the fabrication contracts were awarded to the firms recommended by the aforementioned consultants and construction is slated for completion in September 1992.

Mr. Daniel N. MacMaster, a former director of the Chicago Science Museum, is an advisor to the National Science & Technology Museum Planning Council. Names and addresses of U.S. firms which won the major design contracts are:

Carnastous and Downes, Inc.
630 3rd Ave., N.Y., NY 10017
Attn: Mr. Robert Marona
De Martin, Marona
Phone: (212) 682-9044

Newhart, Donges, Newhart, Inc.
138 Sierra St., El Segundo, CA 90245
Attn: Ms. Marilyn Newhart
Phone: (213) 322-4532

Lepeg-Sabrega, Inc.
17 Wakerobin Road, Norwalk, CT 06851
Phone: (203) 847-4886

Contact: Dr. Chou Chao-chi, Director of the National Science & Technology Museum Planning Council, 4/F-1, 95 Ping-teng Road, Shan-ming District, Kaohsiung; phone: (07) 384-6471; fax: (07) 386-9024.

PESCADORE ISLANDS AQUARIUM/MUSEUM PROJECT

Estimated Total Cost:	US\$10 million
Construction Date:	April 1991
Source of Finance:	Taiwan Provincial Authorities

Current Developments:

To accelerate the pace of the Penghu (Pescadore Islands) tourism industry, the Taiwan Fisheries Institute (TFI), in conjunction with the Taiwan provincial authorities, is developing plans for the construction of an aquarium on the grounds of TFI's Peng Hu Bai Sha Administrative District Office. The

provincial authorities have allocated US\$11,111 (NT4300,000) for Fiscal Year 1991 for the design and estimated cost study of the proposed aquarium. U.S. Seattle based consulting firm Kramer, Chin & Mayo (KCM), Inc. has been selected to perform the study.

In a preliminary plan submitted in December, 1989, KCM proposed that a US\$10 million, 40,400 square foot facility be constructed. The proposed facility would include:

- An outdoor exhibit area, including shore, sea turtle and shore bird exhibits
- A public service area, coffee shop and gift shop
- A main aquarium structure
- Rocky shore tanks
- A reef tank
- Pelagic tank and underwater observation area
- A shark tank
- A wind power generator
- A theater and auditorium
- A sea/fresh water tank
- A shell exhibit
- Administrative offices
- Various support facilities

Upon completion of KCM's current study, additional details should become available.

KCM will complete a master plan in November 1990. Construction for the project will begin in April 1991.

U.S. firms are encouraged to pursue project related opportunities. For further information interested parties may wish to contact the following individuals:

Mr. Chun-hui Chen, Director
Taiwan Fisheries Institute (TFI)
Taiwan Provincial Government
8 Hsin Kang N. Street, Makung, Peng Hu, Taiwan
Phone: 011-886-6-927-7101
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Vice President
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1917 First Avenue
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TAIPEI ZOO EXPANSION

Estimated Total Cost: US\$100 million (including a masterplan contract amounting to US\$350,000)
Starting Date: October 1987 (Planning)
Expected Completion Date: June 1996
Date of Award: After July 1990 (Phase I detailed design)
Source of Finance: Taipei Zoo

Current Developments:

Tenders for the Taipei Zoo detailed design are awaiting project budget approval by the Legislative Yuan. Foreign engineering consultants will be required for the first phase detailed design of the zoo transportation systems and tenders for this phase may be issued pending budget approval by the end of 1990. Mr. Wang plans to complete the zoo transportation systems in three years pending budget approval. Construction for other phases of the zoo are under planning and the entire project is scheduled for completion in June 1996.

Mr. Wang Kuan-ping, Director of the Taipei Zoo welcomes detailed engineering consultants specialized in zoo transportation systems to submit their descriptive materials and contact him directly.

Background Information:

Mr. J. Thomas Atkins of Jones & Jones, a Seattle architecture and planning company, signed a contract for US\$350,000 on June 14, 1988, to design a masterplan for the US\$100 million Taipei Zoo Expansion Project. This is the first contract to be let on the project. The masterplan was completed in May 1989.

Contact: Mr. Wang Kuan-ping, Director, Taipei Zoo, 30 Shih-kuang Road, Section 2, Taipei, Taiwan 11628; phone: (02)938-2312 or Mr. Chou Hsien-kuan, Senior Specialist, phone: (02)938-2300