Methanol Project in Brunei Darussalam

September 20, 2004
Mitsubishi Gas Chemical Co., Inc.
ITOCHU Corporation

1, Corporate Profile
2, What is Methanol?
3, Outline of Project
4, Contribution
5, Environment
Mitsubishi Gas Chemical Co., Inc. (As of March 31, 2004)

- Established: 1951
- Employees: 2,363
- Paid-in capital: US$ 397 million
- Total trading transactions in FY2003: US$ 3,224 million
- 4 Internal Companies:
  - Natural Gas Chemicals
  - Aromatic Chemicals
  - Specialty Chemicals
  - Information & Advanced Materials

MGC is based on original technology.

Challenge
Create
Expand
Preserve
**ITOCHU Corporation**
(As of March 31, 2004)

- Founded: 1858
- Incorporated: 1949
- Employees: 4,163
- Paid-in capital: US$ 1.84 billion
- Total trading transactions in FY2003: US$86.52 billion

7 Division Companies:
- Textile
- Machinery
- Aerospace, Electronics & Multimedia
- Energy, Metals & Minerals
- Chemicals, Forest Products & General Merchandise
- Food
- Finance, Realty, Insurance & Logistics

**ITOCHU’s Global Network**

<table>
<thead>
<tr>
<th>Region</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>N America</td>
<td>15</td>
</tr>
<tr>
<td>C/S America</td>
<td>13</td>
</tr>
<tr>
<td>Europe</td>
<td>19</td>
</tr>
<tr>
<td>Middle East</td>
<td>17</td>
</tr>
<tr>
<td>Africa</td>
<td>10</td>
</tr>
<tr>
<td>CIS</td>
<td>8</td>
</tr>
<tr>
<td>Asia</td>
<td>46</td>
</tr>
<tr>
<td>(China)</td>
<td>(16)</td>
</tr>
<tr>
<td>Oceania</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
</tr>
<tr>
<td>Domestic</td>
<td>19</td>
</tr>
<tr>
<td>Subsidiaries</td>
<td>645</td>
</tr>
<tr>
<td>and Affiliates</td>
<td></td>
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</tbody>
</table>
Expansion of MGC ‘s Methanol Business

Methanol Project at Sungai Liang Industrial Site

AR-RAZI

KOHZAN MARU

Kinoe Terminal in Japan

KOHZAN Ⅱ

KOHZAN Ⅲ

MGC’s Key Roles in Methanol Business

Development of Natural Gas

Methanol Production Technology

Logistics

Marketing

Methanol Derivatives

Ubidecarenone

Catalase

Dimethyl Ether

Saudi Arabia

Methacrylic Acid

Acetone

Methylmethacrylate

import Intermediates for MMA

Formamide

Methyl 2-Hydroxyisobutyrate

Methanol

Paraformaldehyde

Formaldehyde

Hexamethylenetetramine

Natural Gas

Methylamine

Dimethylformamide

Dimethylacetamide

Methyl Formate

Dimethylaminoethanol

Acetaldehyde

Ethylamine

Ammonia

Liquefied Carbon Dioxide

Dry Ice

m-Xylene

m-Xylenediamine

Nylon-MXD6
Methanol Project at Sungai Liang Industrial Site

MGC—one of the Largest Methanol Producers and Suppliers

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity</th>
<th>Start</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>700,000 t/y</td>
<td>1983</td>
<td>J/V with SABIC</td>
</tr>
<tr>
<td></td>
<td>700,000 t/y</td>
<td>1991</td>
<td></td>
</tr>
<tr>
<td></td>
<td>850,000 t/y</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td></td>
<td>850,000 t/y</td>
<td>1999</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,100,000 t/y</strong></td>
<td></td>
<td>(1,700,000 t/y) (Under Planning)</td>
</tr>
<tr>
<td>Venezuela</td>
<td>730,000 t/y</td>
<td>1994</td>
<td>J/V with Pequiven</td>
</tr>
<tr>
<td></td>
<td>(850,000 t/y)</td>
<td></td>
<td>(Under Planning)</td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td><strong>3,830,000 t/y</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AR-RAZI No.1 Plant (1983)
AR-RAZI No.2 Plant (1991)

AR-RAZI No.3 Plant (1997)
Methanol Project at Sungai Liang Industrial Site

AR-RAZI No.4 Plant (1999)

METOR Plant (1994)
MGC’s Networks for Methanol Business

MGC’s Logistics Networks - Dedicated tankers

Flexibility to deliver product – 10,000DWT ~ 45,000DWT

KOHZAN MARU, KOHZAN MARU 2,
KOHZAN MARU3, K.K.NO.3, K.K.NO.5,
JOSE BREEZE, JOSE STREAM, COA CONTRACTS
What is Methanol?

Clear liquid chemical

Methanol

\[
\begin{align*}
\text{H} & \quad \text{H} \\
\text{H} & \quad \text{– C – O} \\
\text{H} & \quad \text{H}
\end{align*}
\]

Features of Methanol

- Essential raw material
- Produced from natural gas mainly
- Wide variety of derivatives
- Growth of demand worldwide
- International trading actively
- Production shift to vast natural gas area
Methanol Production & Demand in the world

Production & Demand by Region
(32 million tons in 2003)
Regional Production Trend of Methanol

Growth of Methanol Demand by Region
Raw Materials for Industry & Life

Applications
Resin, Adhesive, Plastics, Paint, Sheet, Solvent, Gasoline additive

Derivatives
Formaldehyde
Acetic Acid
MTBE, etc.

Methanol

Growth of Methanol Demand by Use

<table>
<thead>
<tr>
<th>MT/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>45,000</td>
</tr>
<tr>
<td>40,000</td>
</tr>
<tr>
<td>35,000</td>
</tr>
<tr>
<td>30,000</td>
</tr>
<tr>
<td>26,000</td>
</tr>
<tr>
<td>21,000</td>
</tr>
<tr>
<td>16,000</td>
</tr>
<tr>
<td>11,000</td>
</tr>
<tr>
<td>6,000</td>
</tr>
<tr>
<td>1,000</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

1993 2003 2013

[Color codes: Formaldehyde, Acetic Acid, MTBE, Other Chemicals]
Outline of Methanol Project in Brunei Darussalam

1. Capacity: 2,500 ton/day

2. Investment: US$288 million


5. Employment: Operation stage 120-130 persons
Joint Project of Methanol

Project Company of Methanol

Brunei Darussalam

Collaboration

MGC&Itochu

Sungai Liang industrial site

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Project Implementation Schedule

<table>
<thead>
<tr>
<th>Calendar</th>
<th>Project months</th>
<th>Target</th>
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</thead>
<tbody>
<tr>
<td>26-August-2004</td>
<td>Selection for further negotiations by BEDB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negotiations for key issues</td>
<td></td>
</tr>
<tr>
<td>1-April-2005</td>
<td>0 Final Investment Decision (FID)</td>
<td></td>
</tr>
<tr>
<td>January-2006</td>
<td>10 Start of construction work</td>
<td></td>
</tr>
<tr>
<td>July-2007</td>
<td>28 Mechanical completion of the plant</td>
<td></td>
</tr>
<tr>
<td>September-2007</td>
<td>30 Start of commercial production of the plant</td>
<td></td>
</tr>
</tbody>
</table>
Methanol Project at Sungai Liang Industrial Site

Image of Methanol Plant

Marketing

Strategic location

Methanol Project

Utilization of MGC/Itochu's networks

Target market
MGC ‘s Marketing Networks

Supply Base

Brunei Methanol Project

Logistics

Dedicated Vessels
Tank Terminal

Networks

MGC and Itochu

Dealing

Market

Customers in Asia

MGC ‘s Captive Use in Asia

Development of Downstream Oil & Gas Industry

Employment Opportunity

Enhancement Economy

Diversification of Industry

Creation

Methanol Project
Direct Employment Effects by Methanol Project

1. Construction Phase: about 2,000 works

2. Operation Phase: 120~130 persons

Employment Effects by Potential Methanol Derivatives

Operation Phase (direct employment basis)

Methanol project: 120~130 persons

+ Potential derivatives: 620~630 persons

Total: 740~760 persons

(not including construction works)
Enhancement of Local Economy

Methanol Project at Sungai Liang Industrial Site

Methanol

- Welding companies
- Manufacturers
- Construction equipment companies
- Maintenance companies
- Shipping companies
- Shipping agencies
- Marine surveyor
- Bank
- Insurance

Wide Variety of Derivatives from Methanol

- Fuel cells (DMFC)
- Dimethyl ether
- Methyl t-butyl ether
- Chloromethanes
- Formaldehyde
- Paraformaldehyde
- Polyacetal
- Formic acid
- Bisphenol F
- Epoxy resins
- Methylenediphenyl-diisocyanate
- Neopentylglycol
- Trimethylolalkanes
- Polyester
- Pentaerythritol
- Alkyd resin
- Dimethyl terephthalate
- Acetic acid
- Acetyl Cellulose
- Vinyl Acetate
- EVAL
- MMA
- Acrylic resin
- Methoxysilanes
- Silicone resin
- Methylamines
- N-Methyl-2-pyrrolidone
- N,N-Dimethylformamide
- N,N-Dimethylacetamide
- Choline Chloride
- Tetraammonium salts
- Hexamethylenetetramine
- Ethylenediamine
- EDTA salts
- Hexamethylenediamine
- Polyamide
- Isophoronediamine
- Polyurethane
- m-Xylylenediamine
- Hydrogen cyanide
- Sodium cyanide
- Ammonia
- Acrylonitrile
- Acryl fiber
- Textiles
- AS/ABS resin
- Acetonitrile
- Rubbers
- Acrylamide
- Flocculants
- Hydroxyl amine
- Ethanolamines
- Hydrazine
- Melamine
- Melamine resin
- Pylidine
- Urea
- Urea resin
- Fertilizers
- Nitric acid
- Nitrate salts
- Nitrobenzene
- Aniline
- Caprolactam
- Polyamide
- Ammonium salts
- Tolylenediisocyanate
- Polyurethane
- NG
Methanol Project at Sungai Liang Industrial Site

Good Example of Development in MGC Niigata

- Ubidecarenone
- Catalase
- Dimethyl Ether
- Methacrylic Acid
- Methylmethacrylate
- Intermediates for MMA
- Formamide
- Meth 2-Hydroxyethylglycol
- Paraformaldehyde
- Hexamethylenetetramine
- Methylamine
- Dimethylformamide
- Methyl Formate
- Dimethylacetamide
- Dimethylaminoethanol
- Acetaldehyde
- Ethylamine
- Liquefied Carbon Dioxide
- Dry Ice
- m-Xylene
- m-Xylanediamine
- Nylon-MXD6

MGC Niigata factory
MGC ‘s Technical Support for Methanol Project

**Technical Package**

- Catalyst(s)
- Design
- Operation
- Safety Technology

Technology Transfer to the World
- Methanol
- Formaldehyde
- Methyl amine
- Hydrogen Cyanide
- Dimethyl ether
- Super-pure Ammonium Hydroxide
- H₂, CO from Methanol
- MX-Nylon, etc.

Technology Transfer

- On the Job Training
- Training Center
- Practice in MGC‘s J/V

Based on MGC ‘s experiences in Saudi Arabia & Venezuela
Preservation of the Environment

- Protect the environment
- Ensure safety
- Maintain health

Air Pollution Control & CO2 Recovery

CO2 Recycling

CO2 Recovery Unit

Waste Gas

Industrial Area Boundary
Waste Recycling

Industrial Area Boundary

Realization of Methanol Project

Collaboration

Brunei Darussalam
- Natural gas resources
- Strategic location

MGC&Itochu
- Proven technology
- Marketing capability
- Reliable construction
Thank you.

*Mitsubishi Gas Chemical Co., Inc.*
*ITOCHU Corporation*