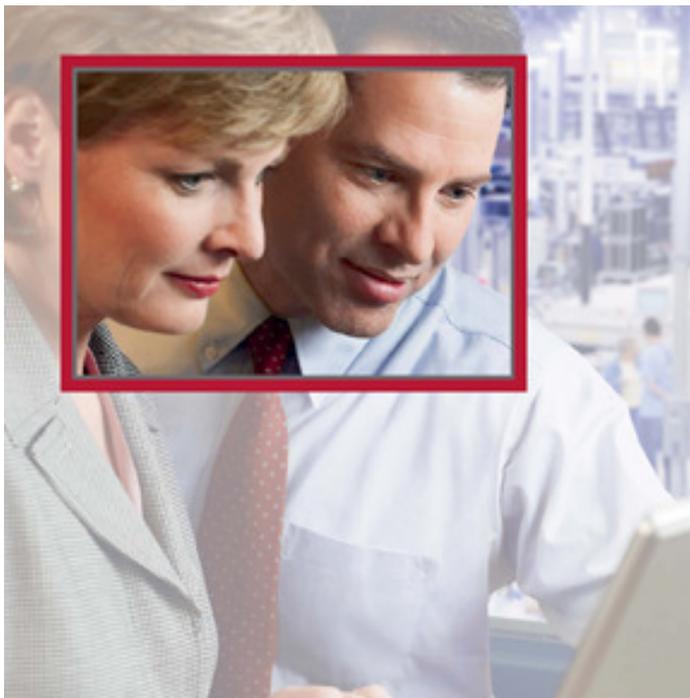


LISTEN.  
THINK.  
SOLVE.<sup>SM</sup>



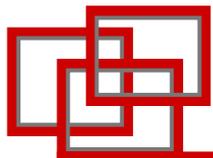
## RA产品在油气 (Oil&Gas) 行业的应用 (炼化&海油)

林道儒  
罗克韦尔自动化 行业部门  
石油化工/天然气 行业应用专家

Tel: ( 86-20) 8384 9977  
Ext: 20661

Mobile: 13924059335

Fax: (86-20) 83849989

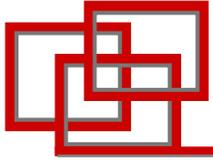


# 目录

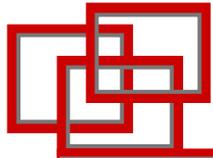
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1. 行业相关产品应用分类说明

2. 罗克韦尔产品在石油化工炼化过程的应用



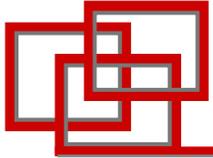
## 1. 行业相关产品应用分类说明



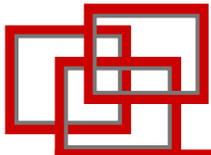
## 一.行业相关产品应用分类说明

---

- PLC—Programming Logical Control
- DCS—Distributed Control System (Process Control)
- SCADA—Supervisory Control And Data Acquisition
- ESD—Emergency Shutdown Device
- 变频器/IMC/(IC:E3/SMC/开关电源等)/PEMS (电力能源管理系统)
- ENTEK(状态监测系统)
- 软件(先进控制:Pavilion)
- 维护、培训(Service)

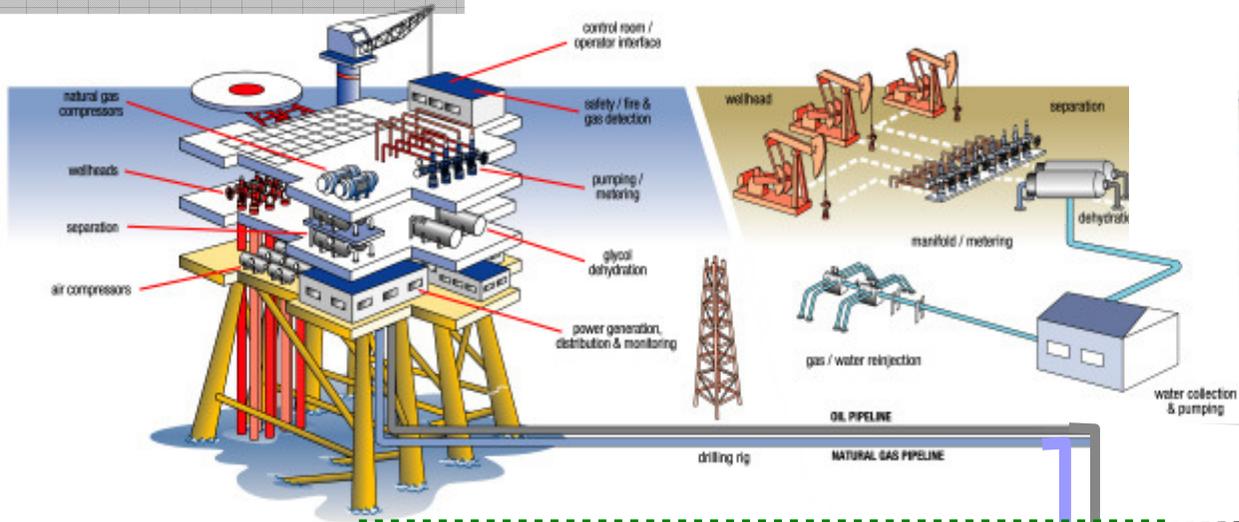


## 2. 罗克韦尔产品在石油化工过程的应用



# 油气行业生产过程

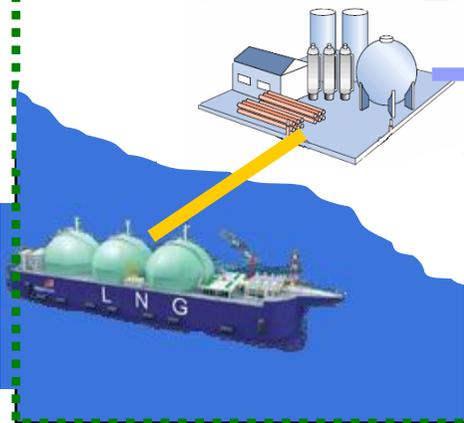
## 海洋油气生产



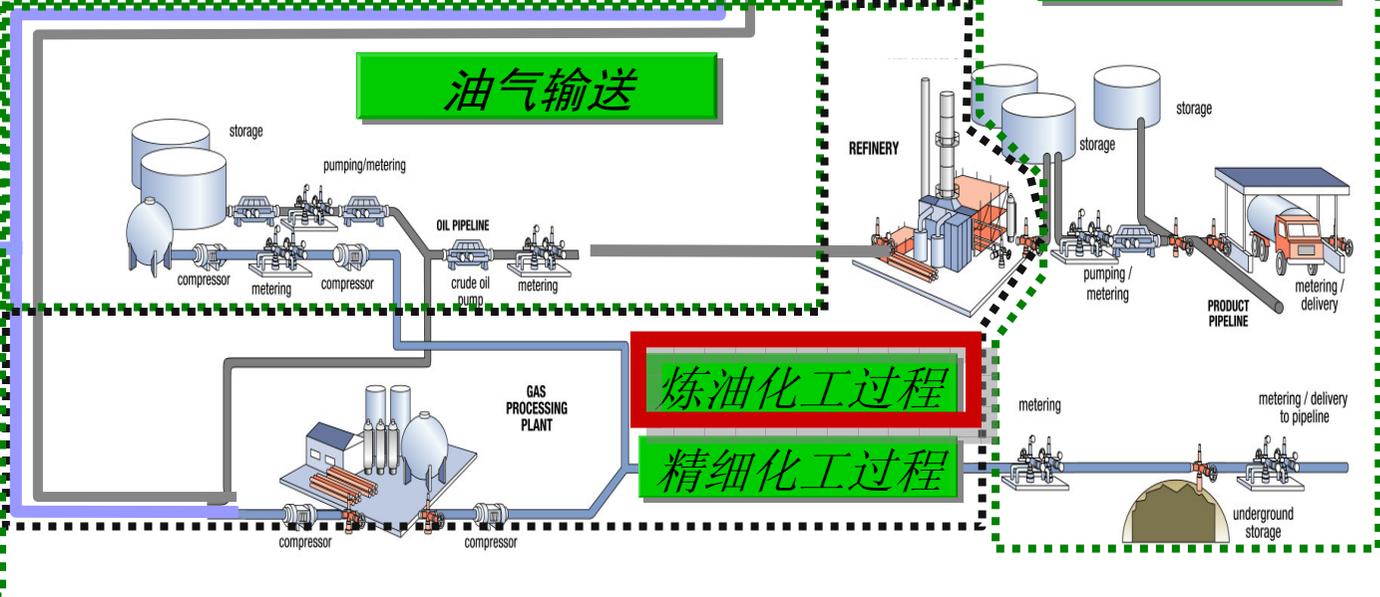
## 陆地油气生产



## LNG



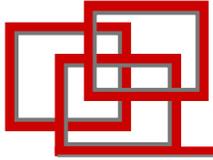
## 油气输送



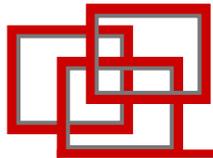
## 储存及配送

## 炼油化工过程

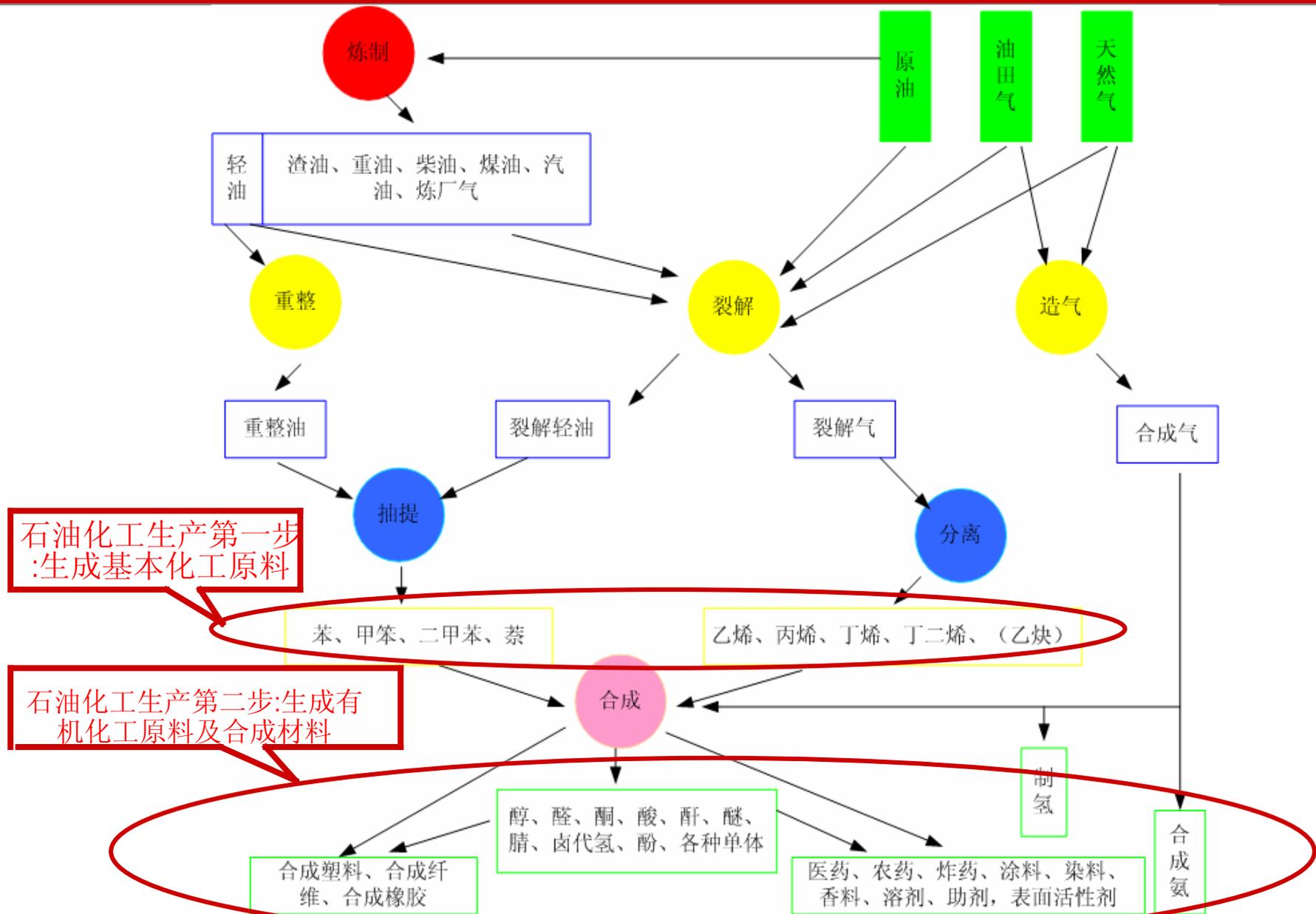
## 精细化工过程

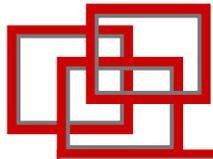


## 炼化过程应用



# 石油化工原料、主要生产过程与产品关系示意图





## 罗克韦尔在炼化过程关注：

ESD/ITCC/F&G应用

库(罐)区SCADA

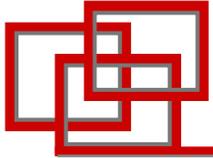
变频器类产品应用(中低压变频器&IMC)

先进控制Pavilion

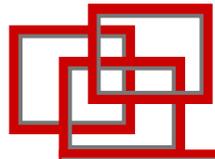
机组泵站控制

状态监测产品应用

锅炉/水处理/Sub-System Control/PEMS

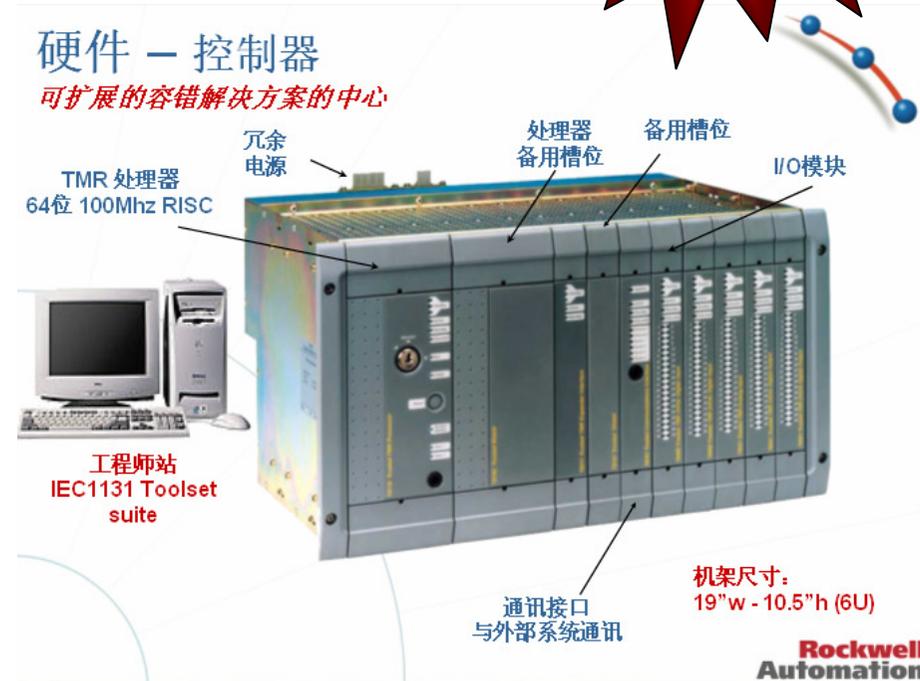


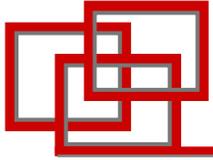
## ESD/ITCC/F&G应用



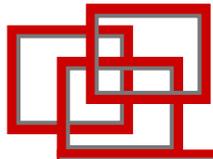
# RA安全系统（Safety Systems）的应用：

- 安全等级达到SIL2（TuV Certified up to SIL2），ControlLogix 是首选（ControlLogix Standard）
- ICS 安全系统安全等级达到SIL3(Trusted TM 系统获颁 T Ü V AK6 ， 和 NFPA 72,85,86 以及 IEC61508 SIL 1-3 等等认证。
- 都具有SOE功能， ControlLogix精度可达到毫秒， ICS精度可达到1毫秒。
- ICS 典型应用（Typical Applications）：
  - 过程关断（Process Shutdown）
  - 紧急停车（Emergency Shutdown）
  - 火气系统（Fire & Gas）
  - 锅炉管理
  - 机组控制
  - 阀门测试

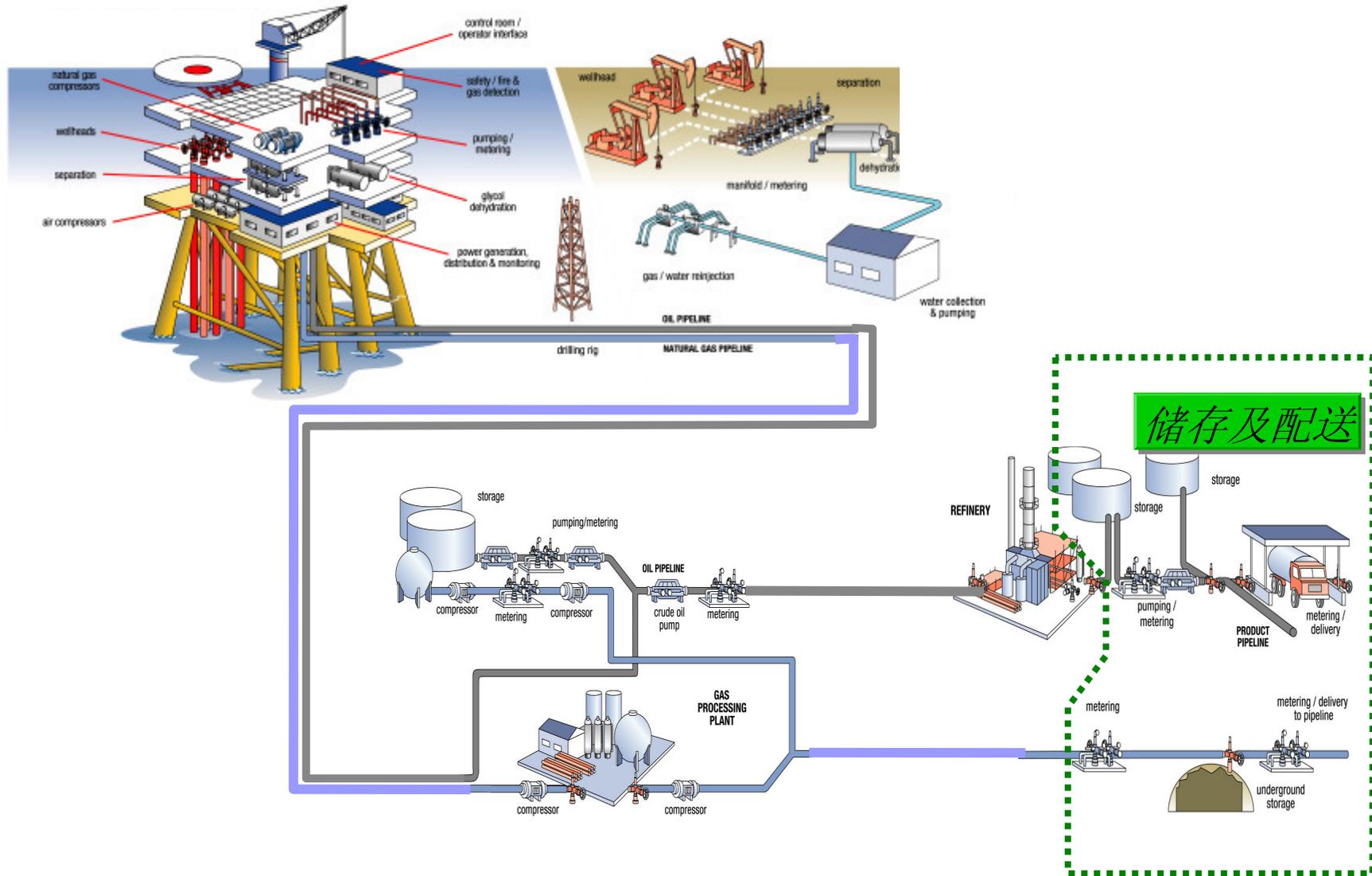


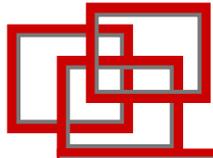


## 油库罐区控制的典型应用



# 油气储存管理（油库）





## 油库仓储自动化控制 (RA Solution特点)

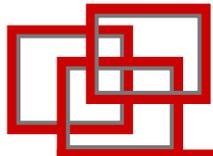
- **过程控制(Process Control)**  
(收油(Receiving)、罐区计量(Tank Gauging)、装车(Truck, Tanker, Rail Loading))
- **安全系统(Safety System)**
- **消防系统(Fire & Gas)**
  
- **E3、变频器、IMC应用**
  
- **加油站管理(Terminal Management)**

**PURSUE**

Rockwell Automation has a superior portfolio of products and services

**Caution**

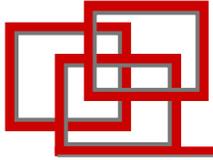
Need to partner with a Software Vendor



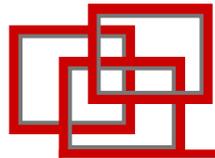
## 油气田、长输管线及燃气SCADA系统采用AB PLC (RTU)的一些主要特点:

1. PLC产品质量可靠稳定(航天+地铁+海油工程大量应用)。
2. 产品系列齐全, 便于构造一个理想的方案。(从小型PLC到大型PLC)。
3. 具有强大的控制功能。
4. 多CPU架构设计, 硬件扩展方便、统一数据库, 程序组态修改容易。 (\*)
5. PLC中组网最灵活, 网络性能最优化。(NetLinx架构, EtherNet/ControlNet/DeviceNet三网合一) (\*)
6. 与第三方设备超强的连接能力(支持FF、Profibus、Modbus、串口模块及其他特殊功能模块)。 (\*)
7. 通讯能力(能实现所有有线无线通讯方式) (\*)。
8. 数据真正带时间标签 (\*)。
9. PLC本身支持逢变则报功能 (\*)。
10. 具有标准流量计算模块(如ProSoft的2100-AGA流量计算模块, 遵循AGA3、AGA8)。 (\*)
11. 数据缓存功能 (\*)
12. 具有冗余功能。





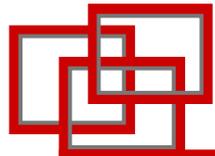
## 海洋石油生产过程应用



# 海油生产自动化(平台): Automation for Offshore Production

- 1. 钻井平台 (Drilling rig)
  - 安全和火气系统(Safety and Protection Systems (ESD, F&G))
  - 电力分配和马达控制(Power Distributor and MCC)
  - 平衡控制(Ballast Control System)
  - 推进控制(Propulsion – MV Drive System)
  - 定位控制(DP system-Partner)
  - 预防性维护(Predictive Maintenance)
- 2. 采油平台(Well Head Platforms)
  - 油井监控(Natural flow wells monitoring )
  - 电潜泵监控(Electric submersible pumps monitoring and control )
  - 注水/注汽监视(Water/gas injection wells monitoring )
  - 气举井监控(Gas lift injection wells monitoring and control )
  - 自举井监测(Automated well test)
- 3. 作业平台 (甲板过程处理 : Top Side Processes)
  - 气/油/水分离监控(Gas/oil/water separation monitor and control )
  - 自举井监测(Automated well test )
  - 加热器控制和保护(Oil heaters control and protection )
  - 油罐液位控制(Oil tank level control )
  - 蒸汽控制(Vapor recovery units control )
  - 污水处理(Water treatment plants )
  - 安全系统(Safety systems )
  - 火气系统(Fire and gas systems )

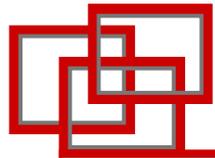




# 海油生产自动化(船-FPSO\LNG\LPG\Chemical): Automation for Offshore Production

- 3. 船体应用(Hull Applications)
  - 报警和监测系统(Alarm & Monitoring System)
  - 安全和保护系统 Safety and Protection Systems (ESD, F&G)
  - 和船体管理和定位系统连接(Interface to vessel management and vessel positioning system )
  - 推进控制(Propulsion control)
  - 压舱控制(Ballast control system )
  - 停泊控制(Mooring control system )
  - 振动监测和保护(Vibration protection and condition monitoring)

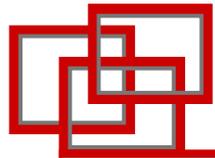




# 海油生产自动化(公用): Automation for Offshore Production

- **4. 计量站(Metering Stations)**
  - 连接计量仪表, 流量计算, SCADA系统等(Interface to temperature pressure and flow instruments; AGA 3, 7 compensated flow calculations; interface to electronic flow metering devices; as well as communications to SCADA systems. )
- **5. 泵站监控(Pump Stations)**
  - 泵的启/停控制(Pump start/stop sequence)
  - 管线压力流量控制(pipeline pressure/flow control )
  - 电机控制和保护( pump/motor protection)
  - 振动监测和保护( vibration protection and condition monitoring)
  - 和SCADA系统的连接( communications to the central SCADA system.)
- **6. 压缩机监控(Compressor Stations)**
  - 压缩机的启/停控制 (Compressor start/stop sequence)
  - 电机控制(turbine or motor speed control)
  - 压力流量控制(pressure/flow control)
  - 流量补偿计算( AGA 3, 7, 8 compensated flow calculations)
  - 压缩机保护(turbine/compressor protection including vibration, temperature, over pressure/over speed, and surge suppression, condition monitoring)
  - 和控制系统连接(communication with the control system. )
- **7. 工业燃烧系统(Industrial Combustion)**
  - 锅炉和加热器控制和保护(Boiler and Heater Protection and Control )
- **8. 电力能源管理系统(Power and Energy Management )**





# 海洋平台和船用设备上罗克韦尔关注： Automation for Offshore Production

1. PAC+ESD (SIS) +F&G;

2. 全套智能型中低压马达控制中心柜 (IMC) ;

3. 中低压变频器及软启动器设备;

4. 电能管理系统 (PEMS)

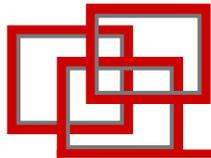
5. 设备状态检测维护系统 (Entek ICM)

6. SCADA系统

7. 子系统制造商的成套控制解决方案 (OEM)

8. 集成自动化系统, 并通过智能网络系统将以上所有系统连接起来, 达到集中控制功能, 并提供预防型维护功能;





# 海洋认证:

**Key Services**

**Quality Driven Class**

Home > Key Services > Type Approval > Approval Lists

**Approval Lists**

[Certificate Information]

Certificate No.: NK90977-AC001

\* Red Color - Expired Certificate

Kind of Approval	TA	Date of Approval	1998-01-14
Expired Date	2013-01-13	Issued Date	2008-05-11

TOP PRINT

Manufacturer: Rockwell Automation, Inc.

Product: Control & Safety System

Product Description: Programmable Controller Products, Processors, Digital & Analogue I/O, Special I/O, Power Supplies, Chassis etc. Operator Interface Products, Control and Display Communication Interfaces for Above. Interconnected Cables and Accessories for Above.

\* See Appendix 1 - 4

\* Place of Production: Rockwell Automation, Inc., Tallmadge Plant



## Type Approval Certificate

Germanischer Lloyd

This is to certify that the undenoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No. 4307902 IH

Company Rockwell Automation, Inc.  
Allen Bradley  
1 Allen Bradley Drive  
Mayfield Heights, OH 44124, UNITED STATES

Product Description Control Logic Configurable Firmware Module  
MicroLogix™ 1000/1200/1500 Programmable Controllers

Type 1756-..., 1761-..., 1762-..., 1763-..., 1764-...

Environmental Category C, EMC2

Technical Data / Range of Application 2 Chx2 Output Configurable Firmware (20 Pin) 1756-C2M  
Analog 4 Input 2 Output, Current/Voltage (24 Pin) 1756-IF4KXF2F  
10-30 V DC Sourcing Input, 13 pts (20 Pin) 1756-IV16  
10-30 V DC Sourcing Input, 31 pts (20 Pin) 1756-R22  
Logix5555 Processor no user memory 1756-L55  
Logix5555 Processor with 1.1 Mbyte memory 1756-L5M013  
Logix5555 Processor with 3.1 Mbyte memory 1756-L5M014  
Logix5555 Processor with 7.1 Mbyte memory 1756-L5M016  
Logix3333 Processor with 1.1 Mbyte I/O memory 1734-L3M023  
Logix5555 Processor with 3.1 Mbyte I/O memory 1734-L5M024  
Logix5555 1.1 Mbyte Memory 1756-M13  
Logix5555 3.1 Mbyte Memory 1756-M14  
Logix5555 7.1 Mbyte Memory 1756-M16  
Logix5555 1.1 Mbyte I/O Memory 1754-M23  
Logix5555 3.1 Mbyte I/O Memory 1754-M24

Test Standard Guidelines for the Performance of Type Approvals, Chapter 2, Edition 2003  
Regulations for the Use of Computers and Computer Systems

Documents Test reports: MARREP2\_02a dated 05-02-2002; MARREP2\_02\_b1 dated 07-02-2002; MARREP5\_04 dated 05-06-2006  
#152/38 dated 5 July 2005; #4590 dated 17 October 2006

Remarks None

Valid until 2012-09-02

Page 1 of 1

File No. 18.07

Hamburg, 2008-06-26

Germanischer Lloyd Marco Rinkel Andrus Grün

This certificate is issued on the basis of "Regulations for the Performance of Type Tests, Part 5, Procedure".

Internet Publication: GL-Approvals

## DET NORSKE VERITAS

### TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. A-10464

This Certificate consists of 7 pages

This is to certify that the

#### Programmable Electronic System

as to

with type designations

#### Programmable Electronic System Modules, Series 1746, 1747, 1756, 1792D, 1793, 2077, 2711 and 2711P

Manufactured by

#### Rockwell Automation

Mayfield Heights, OH 44124, United States

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed B Light Craft and Det Norske Veritas' Offshore Standards

Application

Location classed

Type	1746, 1747, 1756, 1792D, 1793, 2077, 2711 and 2711P
Temperature	D / A*
Humidity	B
Vibration	A
EMC	A* / H*
Enclosure	Required protection according to DNV Rules shall be provided upon installation onboard

\* See limitations on page 5

Place and date  
Havik, 2007-10-29  
for Det Norske Veritas AS

Old Marine Noreig Head of Section Local Office DNV New York Staff Søren Sørensen

Product description  
1746-NT8 8 channel thermocouple input  
1746-C0106 1 channel electromechanically protected output

## Type Approval Certificate

This is to certify that the undenoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

This certificate is issued to:

PRODUCER Rockwell Automation, Inc.  
Mayfield Heights  
OH 44124  
USA

PLACE OF PRODUCTION 8440 Durawood Road,  
Twinsburg,  
OH 44087  
USA

720 Industrial Blvd.,  
Dublin,  
GA 31021  
USA

DESCRIPTION Programmable Logic Controller System  
1756 ControlLogix Series

TYPES	1756-IA02	32 point AC input module
	1756-IB02	Sequence of events input module (24/48V DC)
	1756-IB03	32 point DC input module
	1756-IG16	TTL input module
	1756-B16S0E	Sequence of events input module (90-140V DC)
	1756-OB32	32 point DC output module
	1756-OG16	TTL output module
	1756-IF16	Voltage/current input module
	1756-IF0C15	Source current loop input module-base
	1756-IR04	RTD input module
	1756-IT01	Thermocouple input module - base
	1756-IT02	Enhance thermocouple input module - base

Certificate No. 07/0001

Issue Date 15 February 2007

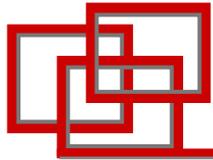
Expiry Date 14 February 2012

Sheet 1 of 2

D.E. Taylor

Lloyd's Register Lloyd's Register North America, Inc.  
1000 South Pine Island Road, Suite # 530, Plantation, Florida 33324, USA

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## 参考消息 1:

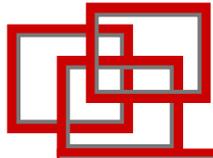
### - 美国商业资讯2007年7月2日密尔沃基消息——

罗克韦尔自动化公司(Rockwell Automation, Inc) (纽约证券交易所: ROK) **今天宣布其已经收购了工业控制服务集团有限公司 (Industrial Control Services Group Limited)**，工业控制服务集团有限公司以ICS Triplex为名进行业务往来。与2007年5月25日首次宣布时的价格一样，此次交易价值现金1.1亿英镑。向ICS股东交付现金的过程将一直持续到2007年8月。

ICS Triplex是向加工工业提供临界控制和安全解决方案的全球领先供应商。ICS Triplex总部设在英国Maldon，拥有500多名员工，业务遍布欧洲、中东、亚洲和北美洲。ICS Triplex公司在开发、交付和维护全球加工工业的高效率、低故障类高级产品和解决方案方面拥有40余年的经验。这些行业主要包括石油与天然气勘探、生产、运输和精炼行业以及化工行业和发电行业。

罗克韦尔自动化公司制造&加工解决方案业务部的副总裁兼总经理Terry Gebert说：“此次战略性的收购大大的拓展了我们加工控制和安全解决方案方面的广泛的业务组合，其满足了罗克韦尔自动化公司和ICS Triplex全球客户的需求。”

ARC Advisory Group 的副总裁Asish Ghosh 说：“由于中国、印度、巴西和俄国经济的发展导致对石油和天然气的需求不断增加，这促进了在石油和天然气生产以及精炼行业进行不断的投资，导致了对安全系统的需求不断提升。收购了ICS Triplex，罗克韦尔自动化公司将在石油和天然气、化工以及发电行业获得强有力的地位，将巨大的改善其在快速发展的加工安全系统和服务市场中的能力。”

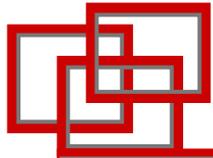


## 参考消息 2:

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### Pavilion Technologies

- As of November 1, Pavilion Technologies, Inc. joined the family of Rockwell Automation companies and will be branded as “Pavilion Technologies, A Rockwell Automation Company”. Internally, the business will be known as Rockwell Automation Pavilion.
- Rockwell Automation Pavilion is a recognized leader in **advanced process control, production optimization and environmental compliance solutions for process and hybrid industries**. Headquartered in Austin, Texas, Rockwell Automation Pavilion brings to our company more than 120 employees worldwide and operations in Belgium, the United Kingdom, China, and New Zealand.



## 三.参考消息 3:

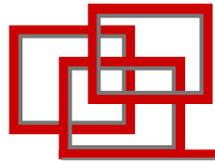
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Rockwell Automation finds successes at ConocoPhillips

  
**ConocoPhillips**

Bohai *Bay project provides future standardization opportunities*

- Rockwell Automation has continued to support ConocoPhillips ever since and is providing nearly \$8M in product and service solutions annually. In 2005, Rockwell Automation with The Reynolds Company signed a three year, \$25M contract to supply over 250 PowerFlex 7000A medium voltage drives and 45 ControlLogix systems for a joint venture between ConocoPhillips and China National Offshore Oil Co. (Bohai Bay Project)

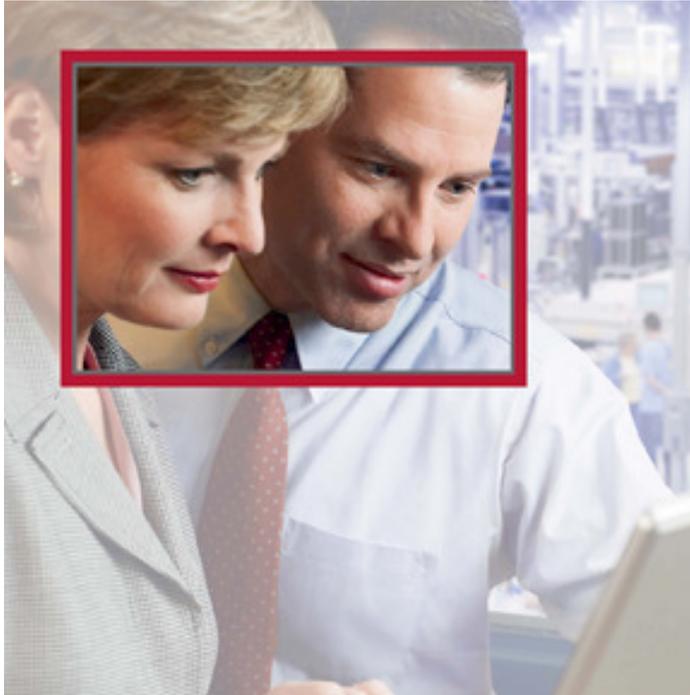


## 罗克韦尔自动化 - 超越您的期待，实现您的目标

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作为全球领先的工业自动化、控制和信息技术产品和解决方案供应商，罗克韦尔自动化定会帮助您很好的达成业务目标。

LISTEN.  
THINK.  
SOLVE.<sup>SM</sup>



谢谢大家！

ALLEN-BRADLEY • ROCKWELL SOFTWARE • DODGE • RELIANCE ELECTRIC

**Rockwell**  
**Automation**