

## *Chemical Management Services: Greening and Optimizing the Chemical Supply Chain in Asia*

Carlton Hotel -- Singapore  
July 30, 2002

### *Summary*

Chemical Strategies Partnership (CSP) and the CMS Forum worked in partnership with the Singapore Confederation of Industries (SCI), Singapore National Environment Agency (NEA), Singapore Ministry of Manpower (MOM), and the U.S. – Asia Environmental Partnership to host a workshop to introduce the CMS model to companies in Singapore and the region. A total of 82 people from 41 different organizations attended this workshop, which featured case study presentations from Seagate Technology, Wacker Siltronic Singapore, Air Products & Chemicals, and Rockwood Electronic Materials. The workshop also included presentations from CSP and the Singapore Economic Development Board (EDB) as well as a panel discussion with key CMS providers, SCI, and EDB.

### *Companies and Organizations in Attendance*

Air Products and Chemicals Asia, Analytical Laboratories, Atofina Sea, Birkart Globistics, BP/Castrol Chemical Management, Chemical Strategies Partnership, Dow Corning Asia, Drex-Chem Technologies, Ellipsiz Singapore, GE Aviation Service Operation, Haas Corporation, Haas FineChem Shanghai, HaasKorea Corporation, Hamilton Sundstrand Pacific Aerospace, Hanson Building Materials, Hewlett Packard Singapore, Honeywell Specialty Chemicals, IBM Singapore, Infineon Technologies Asia Pacific, Johnson Electric Group, JTC Corporation, Katoen Natie SembCorp, Matsushita Electronic Components, Megachem, Novo Environmental Technology Services, P&G Engineering, Philips Electronics Singapore, Rockwood Electronic Materials, Seagate Technology, SGS Testing & Control Services Singapore, Singapore Confederation of Industries, Singapore Economic Development Board, Singapore General Hospital, Singapore Ministry of Manpower, Singapore Ministry of the Environment, Singapore National Environment Agency, Store + Deliver + Logistics, Sysmex Singapore, Temasek Polytechnic, The Straights Times, U.S. – Asia Environmental Partnership, US Embassy, Singapore, Wacker Siltronic Singapore, YCH Distripark

### *Introductions*

#### *John Claussen, Project Director, Chemical Strategies Partnership*

For more than 6 years, Chemical Strategies Partnership, a non-profit US-based organization, has been working to promote chemical use optimization and to reduce chemical waste, risks, and cost by introducing the chemical management services, or CMS, business model to manufacturing sectors across North America. One ongoing challenge in putting manufacturing industries on environmentally sustainable footing is balancing economic and environmental concerns in the provision of goods and services. While CSP's interests lie in improving the environmental performance of industries, we realize that, for business, any new strategy must also make economic sense.

#### *Ooi Chwee Kim, Chairman, Singapore Chemical Industry Council*

The Singapore Chemical Industry Council (SCIC) considers the CMS workshop a significant event for the chemical industry and feels privileged to jointly organize the event. The vision of the SCIC is to play

a part in promoting the chemical industry as a major pillar of the Singapore economy. With this foremost on our minds, the edict of the SCIC is to be proactive in the management of its affairs and to engage in value adding activities for the benefit of its members and Singapore's chemical industry. SCIC believes the CMS business model is such an activity and encourages manufacturers to take advantage of this opportunity.

### ***Opening Speech by the Guest of Honor***

#### ***Dr. Balaji Sadasivan, Minister of State for Health and the Environment***

Singapore's chemical industry is a major contributor to the gross domestic product of Singapore's economy. To optimize cost competitiveness and efficiency for chemical manufacturers, Jurong Island is being developed into a world-class chemical logistics hub to provide integrated logistics support. This workshop provides a forum for the exchange of views and sets the stage for the development of the software infrastructure for our chemical industry. In my view, the CMS business model relates well to the spirit of environmental sustainability. The government, therefore, supports the CMS business model as it complements Singapore's initiative of co-regulation with the industry and our push for better resource utilization to minimize environmental risks, pollution, and waste generation.

### ***What is Chemical Management Services?***

#### ***Tom Votta, Deputy Director, Chemical Strategies Partnership***

CSP aims to reduce chemical use, waste, risks, and cost through the transformation of the chemical supply chain by redefining the way chemicals are used and sold. CSP promotes CMS, a strategic, long-term relationship in which a customer contracts with a service provider to supply and manage the customer's chemicals and related services. Aligning the financial incentives of the chemical user and supplier to reduce lifecycle chemical costs and environmental impacts is the lynchpin to success. CMS achieves environmental benefits and cost savings primarily because it focuses on lifecycle costs instead of material costs, aligning financial incentives of the customer and supplier in a system-wide arrangement. Companies such as General Motors, Nortel, and Raytheon have all seen substantial cost, efficiency, and environmental benefits through implementation of CMS.

### ***Adopting CMS as a Corporate Best Practice***

#### ***Tan Howjwat, Senior EH&S Director, Disk Drive Operations, Seagate Technology***

Chemicals are a unique material carrying external and internal risks and management requirements that other commodities do not. Because of the challenges associated with purchasing, owning, and managing chemicals, Seagate felt that a chemical management specialist could better manage their chemicals in the long run. Chemical management is not a core competency for Seagate, and thus Seagate sought outside expertise. Globally, Seagate has a total chemical spend of \$54 million, 18 chemical using sites, over 282 chemical suppliers, and a variety of chemical, mix, volumes, and processes from site to site. A chemical management solution that would work for Seagate had to be global, flexible, and fast.

Guiding principles for Seagate's CMS program were to "pilot" and then rollout the program to other facilities, decrease the number of chemical suppliers, exploit advanced information technology, minimize the amount of chemicals onsite, and realign the supplier's incentives to focus on savings for Seagate. To meet these objectives, Seagate elected to pursue a global CMS program, starting with a pilot at their facility in Minnesota. Under the CMS model, the CMS provider generates NO revenue by increasing chemical volume—the provider is compensated for effective management of chemicals. In Minnesota, the CMS provider provides inventory, supply chain, and inventory management, helps to minimize risk

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and injuries, and researches new chemicals to be used. The provider also manages a comprehensive IT platform by which Seagate staff are easily able to order, track, approve, and generate reports for chemical use. Under this arrangement, Seagate receives guaranteed savings against the chemical material/management baseline.

Since implementation in October 2001, Seagate has already seen a number of benefits. CMS allows Seagate to focus on their core business—manufacturing disk drives while a chemical specialist focuses on managing Seagate's chemicals and chemical related functions. Already there has been a 50% reduction in onsite chemical inventory and handling, resulting in minimized risk and safer conditions for Seagate employees. Seagate projects that it will reduce FY02 chemical spend by 13%. Environmentally, Seagate has had zero OSHA incidents, zero spills or releases, and zero scrap or obsolete chemical waste. Most importantly, because the program is global, Seagate is able to monitor chemical usage and inventory at their facilities around the world. This could never have been achieved without a CMS program.

### ***Q&A Highlights***

**Q: What was the length of the implementation period? Did you encounter any difficulties? (Ooi Chwee Kim, SCIC)**

*A:* It took six months from the conception of the idea to get started with a pilot program in Minnesota. At first, the biggest challenge was trying to convince the site to participate in the program. Staff at the site worry that such a program will create problems with manufacturing. There were also some contract issues. To overcome these barriers, Seagate staff closely involved with the program took a site visit to another company that had some success with their CMS program. Following these initial challenges, the program has been running smoothly. There have been no injuries and no spills. In fact, other sites are asking the roll-out of the program to speed up so they can begin implementation of the program. Each site wants to be the next to implement. (Tan HowJwat, Seagate Technology)

### ***A CMS Program in Singapore***

***Michael Zeman, Facilities Manager, Wacker Siltronic Singapore***

Wacker is the only company world-wide with an extensive spectrum of silicon products for semiconductor applications and the third-largest global producer of hyperpure silicon wafers for the semiconductor industry. Wacker's facility in Singapore is its newest plant, established in 1999. Wacker's use of hazardous materials, desire for a safe working environment, and the environment and safety laws in Singapore led it to seek outside expertise in chemical and gas management. The primary objective of Wacker's outsourced services—total chemical management (TCM) and total gas management (TGM)—is to utilize an external specialist that could offer expertise in safety and quality, manage the import and transport of hazardous materials in Singapore, provide an off-site warehouse, and minimize costs. Essentially, Wacker was looking for a partner to offer expertise and skills in chemical management.

Services provided by Wacker's TGM and TCM providers include: operation of gas/chemical systems (incl. cylinder/drum change), preventative maintenance, inventory management (onsite and offsite), delivery (loading/unloading), stock reports, order call-offs, and transportation of materials. With this sharing of management tasks, the importance of clearly defining responsibilities for Wacker and the provider staff became clear to Wacker. In particular, they needed to focus on 24-hour monitoring, incoming inspection and tracking of consumption, and maintenance, repairs, and accidents/spills. Working with the provider to ensure services provided are normalized to constantly changing production levels is another key component of Wacker's TGM and TCM programs.

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Wacker has seen a number of benefits due to this new arrangement with its chemical and gas suppliers. They have had zero accidents or environmental impacts since the start up of the operation in 1999, a closed supply chain, quality warranty up to the point of use, emergency response (ERT) expertise, shared information regarding safety, and expertise for hiring and training sufficient manpower.

***Nile Bolen, Regional Manager, Business Development, Air Products Singapore***

Air Products & Chemicals is a multi-national corporation producing industrial gases, chemicals, and energy/environmental systems. Air Products' Asia operations are headquartered in Singapore. Megasy<sup>TM</sup> is the name of the total gas and chemical management (TGCM) services offered by Air Products. Air Products first began offering Megasy<sup>TM</sup> services in 1986 when Motorola “dragged them kicking and screaming” into their facility because they wanted more direct assistance and expertise for managing their chemicals and gases. Since then the scope of Air Products' service offering has grown.

There is no such thing as a “typical” service scope—Air Products provides a different scope of services to every customer. The service capabilities of Megasy<sup>TM</sup> are broad, and can include gas and chemical supply, equipment supply, operations (inventory management, ERT, equipment maintenance), and additional services such as analytical expertise, waste collection and disposal, information technology, and engineering services. The goal of Megasy<sup>TM</sup> is to achieve reduced total cost of ownership, increased up-time, improved safety management, and a long-term partnership with customers.

Air Products currently provides total gas management (TGM) to Wacker Siltronic Singapore. The TGM program began in 1998, and requires three full-time personnel for on-site coverage. At Wacker, Air Products operates and maintains gas cabinets, purifiers, BSGS, gas farm, QMAC, and scrubbers. Since 1999, there have been zero recordable incidents, three equipment incidents, one service incident, zero LTIs, and zero product incidents.

***Keynote Address: Singapore: A Chemical Logistics/SCM Nerve Center***

***Kelvin Wong, Head Logistics/SCM, Singapore Economic Development Board***

The charge of the Singapore Economic Development Board (EDB) is to develop Singapore into a global compelling hub for business and investment. EDB's six focal industry clusters include electronics and precision engineering, biomedical science, chemicals, logistics and transport, information communications and media, and services. Currently, chemicals are the second largest manufacturing sector in Singapore. In order for Singapore to be a world-class hub, logistics and supply chain management (SCM) is an important supporting sector. EDB's vision is to develop a leading integrated logistics and SCM hub in Asia Pacific to support the global economy. To that end, EDB is working to reposition traditional business models, such as air cargo, manufacturing, warehousing, shipping lines, distributors, and trucking, converging them into logistics and supply chain management providers.

***CMS: A Solutions-Oriented Approach***

***Richard Seager, General Manager, Rockwood Electronic Materials***

***Albert Brinklow, European Technical Manager, Rockwood Electronic Materials***

Rockwood Electronic Materials is part of Rockwood Specialties, Inc., a global company that supplies pigments and performance additives, specialty compounds, electronic chemicals, wafer reclaim, and photomasks to semiconductor manufacturers. In addition, Rockwood Electronic Materials (Rockwood) provides total chemical management (TCM) services, which includes managing inventory, delivery, chemical distribution systems, EH&S, waste, quality control and sample, quality, and operations. A number of factors drove Rockwood's decision to offer TCM. On the user side, customers wanted to

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focus on core competency, have a single contact for all chemical purchases, and minimize concerns about ES&H issues. At the same time, customer's recognized that they could benefit from Rockwood's expertise in handling hazardous materials, risk management, and analysis.

Rockwood also performs in-depth chemical/technical audits involving measurement of chemical usage per wafer, chemical utilization per process bath, estimation of D.I. water flow per tool, commenting on alternative applications that may reduce costs, identifying opportunities in waste chemical management, recommending more environmentally friendly chemistries, and identifying future sensitive waste products. Benefits of such an audit include improved wafer throughput and tool efficiency, extended bath lifetime, optimized DI water usage, reduced waste, and improved environmental performance.

***Panel Discussion: Building Capacity for CMS in Singapore and Beyond***

***Nile Bolen, Regional Manager, Business Development, Air Products Singapore***

***Stan Klocek, Vice President of Sales and Marketing, Haas Corporation***

***Richard Seager, General Manager, Rockwood Electronic Materials***

***Ooi Chwee Kim, Chairman, Singapore Chemical Industry Council***

***Kelvin Wong, Head Logistics/SCM, Singapore Economic Development Board***

***Moderator: Tom Votta, Deputy Director, Chemical Strategies Partnership***

**Q: What have been some of the barriers to CMS in Singapore manufacturing, and what do you think are some of the opportunities? (Tom Votta, CSP)**

*A: Often a chemical management firm is perceived as a threat to the company or to the chemical-related functions performed by the company's staff. For example, if a purchasing manager feels his job is threatened, it is necessary to explain that the exercise of purchasing chemicals is only a small part of his job and that chemicals are not as essential as other materials the company is growing. The presence of a chemical manager shouldn't be seen as a threat, but as an opportunity to allow staff to focus on tasks more core to the companies business (Stan Klocek, Haas Corporation)*

**Q: For the manufacturers in the audience who are considering exploring CMS as an option, what do you suggest they do as a first step? (Darcy Whaley, CSP)**

*A: The first question to explore is, "does this make sense for my company?" It is important to investigate and try to get your hands around your current chemical management situation. What is the total cost of ownership? What parts can be considered my company's core competency, and what parts might be better managed by an outside expert? You are talking about doing business in a completely different way, and change comes slowly. (Tom Votta, CSP)*

*A: Another important piece to this is to clarify the definition of CMS. There are a lot of very different programs out there all claiming to be CMS programs. Many electronics firms are already doing CMS, but need to restructure their contract to provide incentives to the supplier. To me it seems the difference in the definition of CMS often lies in the contract mechanism. Air Products has tried gainsharing in contracts, but has had difficulty getting paid. In one program, a gainsharing mechanism was included in the contract, but three years later it has never come to fruition. (Nile Bolen, Air Products)*

*A: Finding a new pay structure is the greatest challenge to the industry. A provider can't rely on getting paid per chip out the door, for example. There are other factors outside the control of the provider that influence the number of chips produced. The challenge here is to develop a standard or a new way to structure revenue. (Fred Read, Rockwood Electronic Materials)*

**Q: To Mr. Wong and Mr. Ooi; you have seen the concept and discussed the obstacles and opportunities. How does CMS fit in to the broader missions at SCI and EDB? What role will your organizations play to help move this or other innovations along? (Tom Votta, CSP)**

*A:* EDB would like to make industry in Singapore more profitable. If CMS is a trend in which industry sees value, then EDB will facilitate further adoption of the model. Today, EDB has a number of good schemes to encourage companies to explore innovative activities and business models. I feel that CMS is possibly a very good thing that industry here can do more of. (Kelvin Wong, EDB)

*A:* From the private sector point-of-view, outsourcing of non-core business by chemical manufacturers is something we have always felt should happen. The difficulty is making it work. SCIC is keen to use CSP's expertise to explore whether there is an avenue to make CMS work in Singapore. It is a Herculean task, but if we are dedicated and committed, then it can work. Next steps are to look into this idea, come up with an agenda and some concrete ideas for moving forward. If this is something good for Singapore, then we will make our best effort to grow it. (Ooi Chwee Kim, SCIC)

### ***Closing Remarks: Reflections and Futures***

#### ***John Claussen, Project Director, Chemical Strategies Partnership***

While the adoption of the CMS model in Singapore is timely in many ways, it is a challenging business model. As Mr. Ooi pointed out in the panel discussion, it is a Herculean task. This workshop is just the first step in a number of CSP initiatives that will assist the adoption of the CMS model in Singapore and the region. CSP provides technical assistance to industries, engages in demonstration projects to advance CMS adoption, conducts outreach through presentations and publications, develops tools and methodologies, and convenes workshops, such as this one. Specifically in Asia, CSP is exploring projects in both Korea and Singapore.

Next steps following this workshop are to publish the workshop proceedings, explore potential partnerships in Singapore, develop a white paper detailing the current industry setting, create specific materials for companies in Singapore, and design and conduct a demonstration project in Singapore. CMS is a growing trend—suppliers are developing capacity and best practices are emerging. CMS can contribute to Singapore's sustainable development goals. CSP looks forward to learning with stakeholders in Singapore and developing a sustainable supply chain framework for advancing the adoption of the CMS model in Singapore and beyond. Thank you.