Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

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JOINT MEETING OF THE CHEMICALS COMMITTEE AND
THE WORKING PARTY ON CHEMICALS, PESTICIDES AND BIOTECHNOLOGY

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Series on Risk Management No. 17

WORKSHOP ON EXPERIENCES AND PERSPECTIVES OF SERVICE-ORIENTED STRATEGIES IN THE CHEMICALS INDUSTRY AND RELATED AREAS
VIENNA, AUSTRIA, 13-14 NOVEMBER 2003
PART 2: SUMMARY AND CONCLUSIONS

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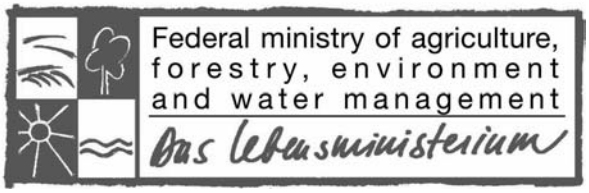
OECD Environment, Health and Safety Publications

Series on Risk Management

No. 17

STRATEGIES IN THE CHEMICALS INDUSTRY AND RELATED AREAS"; VIENNA, AUSTRIA 13-14 NOVEMBER 2003

PART I: SUMMARY AND CONCLUSIONS



INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS

A cooperative agreement among

UNEP, ILO, FAO, WHO, UNIDO, UNITAR and OECD

Environment Directorate
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
Paris 2004

Other Environment, Health and Safety publications related to Risk Management include:

Risk Reduction Monograph No. 1: Lead. Background and National Experience with Reducing Risk (1993)

Risk Reduction Monograph No. 2: Methylene Chloride. Background and National Experience with Reducing Risk (1994)

Risk Reduction Monograph No. 3: Selected Brominated Flame Retardants. Background and National Experience with Reducing Risk (1994)

Risk Reduction Monograph No. 4: Mercury. Background and National Experience with Reducing Risk (1994)

Risk Reduction Monograph No. 5: Cadmium. Background and National Experience with Reducing Risk (1994)

OECD Proceedings: Sources of Cadmium in the Environment (1996)

OECD Proceedings: Fertilizers as a Source of Cadmium (1996)

Risk Management Series No. 6: Methylene Chloride Information Exchange Programme: Survey Results (1996)

Risk Management Series No. 7: Proceedings of the OECD Workshop on Non-Regulatory Initiatives for Chemical Risk Management (1997)

Risk Management Series No. 8: Proceedings of the OECD Workshop on the Effective Recycling of Nickel-Cadmium Batteries, Lyon, France, 23-25 September 1997 (1999)

Risk Management Series No. 9: Proceedings of the OECD Workshop on the Integration of Socio-Economic Analysis in Chemical Risk Management Decision-making, London, 7-9 January, 1998 (1999)

Risk Management Series No. 10: Proceedings of the OECD Workshop on Sustainable Chemistry, Venice, 15-17 October 1998 (1999)

Risk Management Series No. 11: Guidance for Conducting Retrospective Studies on Socio-Economic Analysis (1999)

Risk Management Series No. 12: Lead Risk Management Activities in OECD Countries from 1993 to *1998* (2000)

Risk Management Series No. 13: Framework for Integrating Socio-Economic Analysis in Chemical Risk Management Decision Making (2000)

Risk Management Series No. 14: Technical Guidance Document on the Use of Socio-Economic Analysis in Chemical Risk Management Decision Making (2002)

Risk Management Series No. 15: Need for Research and Development Programmes in Sustainable Chemistry (2002)

Risk Management Series No. 16: OECD Guidance Document on Risk Communication for Chemical Risk Management

Case Studies and Panel Discussion

Stanley Klocek ,
Haas TCM

Under Chemical Management, a single first-tier supplier provides all chemicals, chemical services, analytical, inventory control, chemical process and information management services through suppliers' on site personnel. It is a team approach that decreases the supplier base, provides increased supplier involvement, defines accountability and immediately reduces costs.

What is Chemical Management Services?

Chemical Management Services (CMS) is a business model in which a customer engages with a service provider in a strategic, long-term contract to supply and manage the customer's chemicals and related services.

The CMS model. Traditionally, suppliers' profits are tied to chemical volume-the more chemicals sold, the more profit generated. Under CMS, the providers' compensation is no longer based on volume, but on the quality and quantity of services delivered. This shift to chemical services often aligns the incentives of the supplier and their customer to reduce chemical use and costs. Results to date indicate that the CMS model lowers total chemical costs, and both parties achieve bottom line benefits via reduced chemical use, costs, and waste.

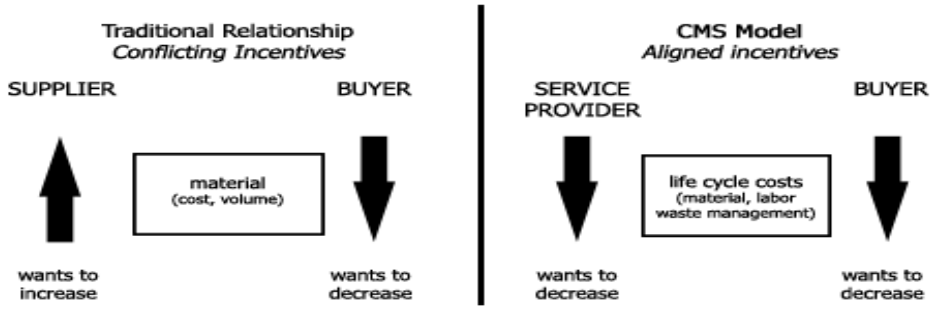


Fig. 1: Aligning incentives **Source: Chemical Strategies Partnership**

With CMS, chemical service providers offer a range of services across the chemical lifecycle (fig 2). For example, a chemical service provider may purchase and deliver chemicals, manage inventory and MSDSs, provide data for environmental reports, research chemical substitutes, and implement process efficiency improvements. By sharing cost savings, the chemical service provider has an incentive to continuously reduce costs and chemical use.

In a more mature relationship the service provider is often paid a fixed fee for each product successfully produced (e.g., a fixed fee per 100 car doors painted or 1000 circuit boards cleaned). Thus, the chemicals themselves become a cost center which the supplier has an incentive to minimize.

CMS is far more than leveraged purchasing. It is focused on optimizing processes, continuously reducing chemical lifecycle costs and risk, and reducing environmental impact.

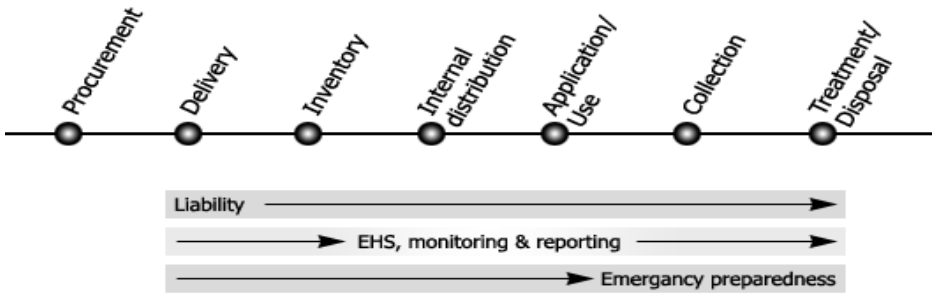


Fig. 2: The Chemical Lifecycle **Source: Chemical Strategies Partnership**

Markets: CMS began in the auto sector in the 1980s as a supply chain management strategy. Today approximately 50 to 80 percent of the auto sector uses CMS due to the strategic and cost benefits of the model.

In other chemical-intensive sectors (e.g., electronics, aerospace, metal finishing), penetration is lower. However, CMS is growing quickly in these sectors, and the CMS industry expects strong growth in all sectors to continue. The growth projections reflect the close linkage between CMS and key management trends, including; outsourcing based on core competency, supply chain management, and strategic partnering.

Chemical Management vs. Traditional Practices

Traditional:

- Large supplier base.
- Large number of chemicals used.
- Large chemical inventories - cost of materials in inventory as high as five times the cost of materials in use.
- Lack of supplier responsibility and accountability.
- Supplier profit based on volume of chemicals used.
- Resistance to change.
- Environmental compliance problems.
- Employee health and safety problems.
- Ineffective use of technology.
- High transaction cost contribution to product (i.e. paperwork processing costs for high volume of transactions).

Chemical Management:

- Single indirect chemicals supplier for a plant. Customer purchases chemical service not chemicals. Chemical Manager provides materials, management, analytical, inventory control and management information systems and services through the ***tcm*IS™**, HAASTRAC® and HAASTEC® proprietary software system.
- Customer maintains control since its employees coordinate overall management.
- Chemical Manager becomes a key team player in the plant production system. "Just-In-Time" inventory of chemicals.
- More effective use of technology.
- Chemical Manager is paid on a parts produced basis and profits are based on service.

Benefits of Chemical Management

- Immediate substantial cost savings, including chemicals, maintenance and paperwork costs, water and energy reduction.
- Enhanced pollution prevention through reduction in number of suppliers, chemical consumption, types of chemicals and waste generation.
- Quantifiable reduction of regulatory reporting needs and environmental exposure. Improved information management for compliance with environmental regulations.
- Reduction of health and safety risks and liability.
- Standardization of specifications, systems and procedures. Beneficial impact on all environmental systems including waste treatment.

- Improved coordination between production, material selection and waste treatment.
- Technological improvements and integration of chemical suppliers into plant manufacturing teams.
- Joint customer and supplier implementation of synchronous manufacturing strategies and material flow.
- Cost reductions by developing a supplier base focused on providing cost effective services verses volume sales.
- Chemical Management will strengthen the corporate basics, not the corporate bureaucracy.

About Haas TCM:
Employees: 300
Gross Revenues: ~US$150 million/yr
Facilities Served: 130
Enterprise-Wide Clients: 6
Countries: 7 - US, Canada, Mexico, Argentina, China, South Korea, Brazil & (Ireland in 2003)
Corporate Operations: West Chester, PA (HQ) Austin, TX- Purchasing & Data Center

Haas TCM: the largest company totally dedicated to Chemical Management

Chemical Management

⇒ Chemical Management is a program that reduces the total cost of using chemicals and improves environmental performance by utilizing the expertise of an outside service provider to optimize chemical processes and systems.

⇒ Under Chemical Management, a single supplier provides all chemicals, chemical services, analytical, inventory control, chemical process and information management services through supplier's personnel. It is a team approach that decreases the supplier base, provides increased supplier involvement, defines accountability and immediately reduces costs.

Total Cost Approach

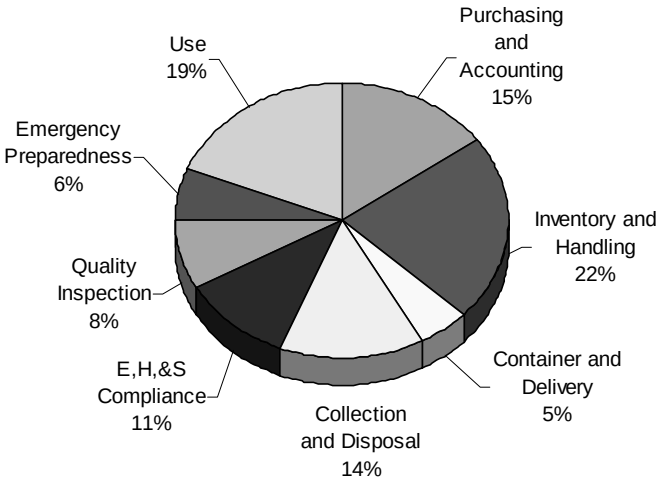
The total cost of using chemicals is not limited to the cost to purchase the products.
Additional cost factors include:

Direct Costs Materials, Containers, Freight, Inventory

Labor	Buying, receiving, quality inspection, material handling, inventory management
Waste	Container disposal, waste disposal, wastewater treatment
Safety	Training, documentation, personal protective equipment, MSDS management
Administration	Insurance, workers compensation, paperwork, accounting
Spill	Spill response, reporting, storage area monitoring, containment systems, remediation
Compliance	Data gathering, report preparation

Total Cost of Chemicals

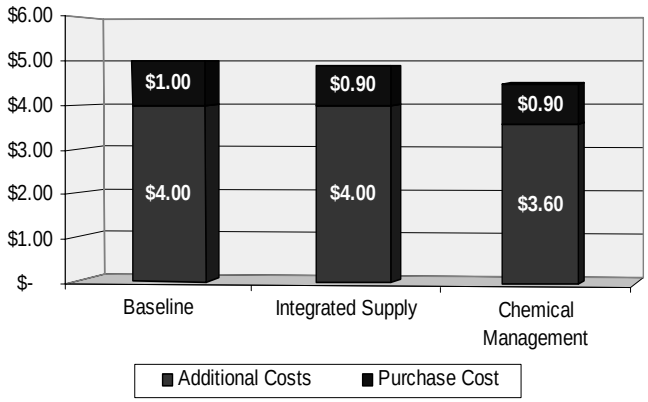
Studies have shown that the actual cost of using chemicals is from 5:1 to 10:1 times the purchase price depending on the industry sector.*



Total Cost reduction is achieved by focusing on the following cost drivers in addition to purchase price:

- Chemical Inventory
- Number of products
- Number of suppliers
- Packaging / Containers
- Safety / Hazards of the products
- Downstream compatibility
- Chemical Usage

Chemical Management focuses on all these costs



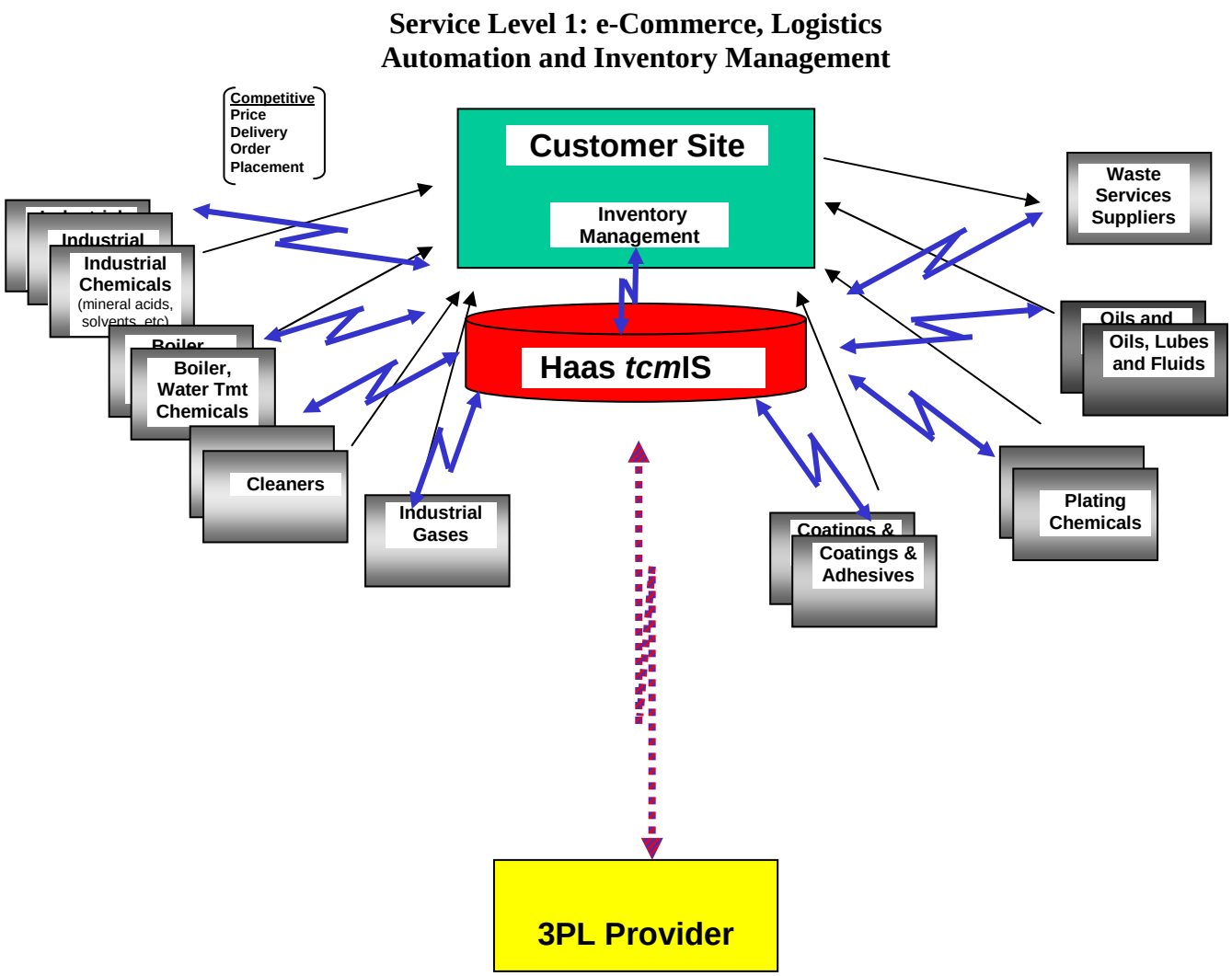
What We Do

Bundle Chemical Lifecycle Work Processes Into a Single Solution

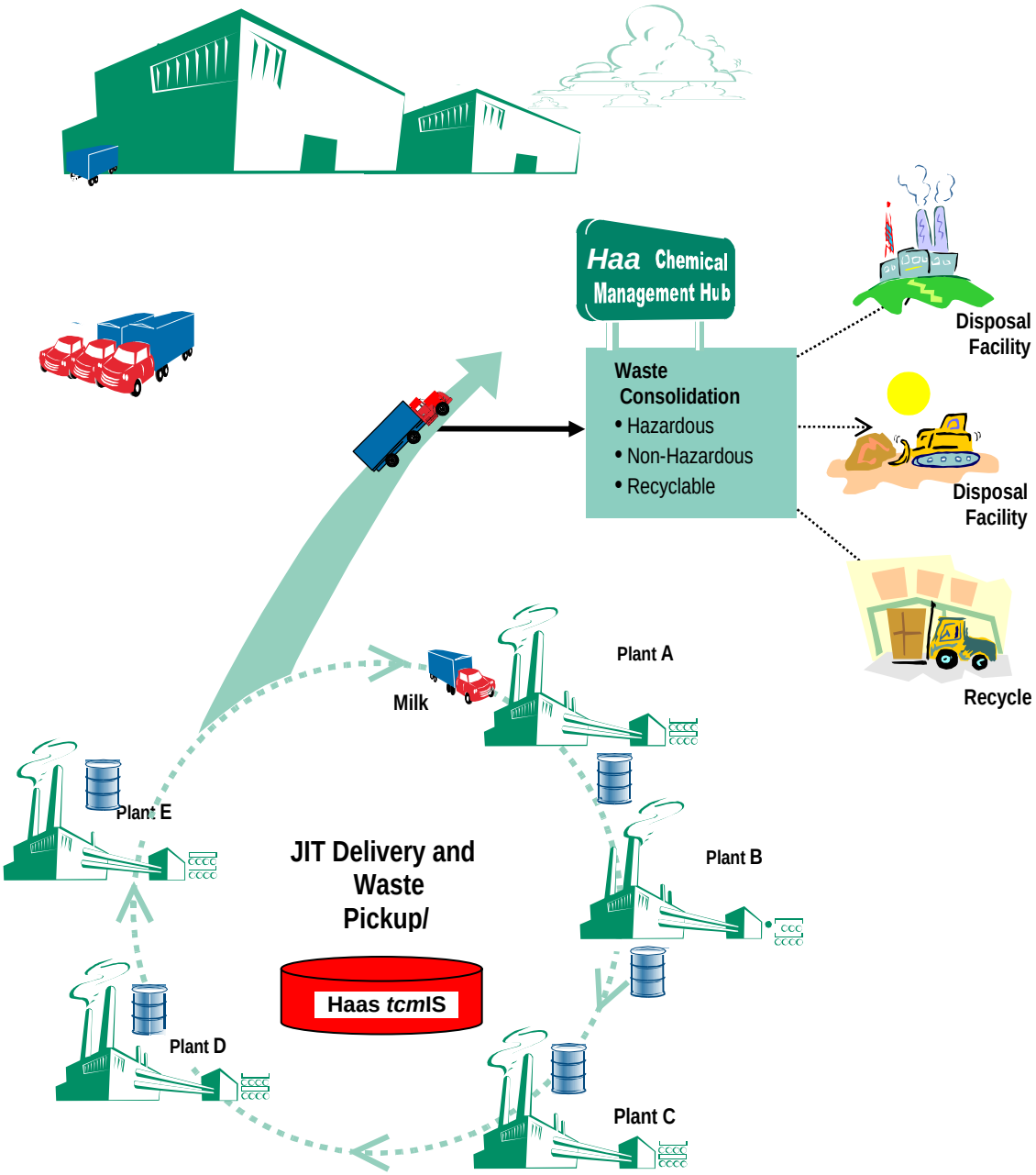
- Sourcing & Procurement => all chemicals
  - Direct and Indirect
  - Catalog and non-catalog items
- Inventory management - Offsite and Onsite
- Just-In-Time (JIT) delivery
- On-site use/technical support
- Automated EH&S compliance and reporting
- Hazardous waste management

Via Three Service Models

Service Level 1: e-Commerce, Logistics Automation and Inventory Management



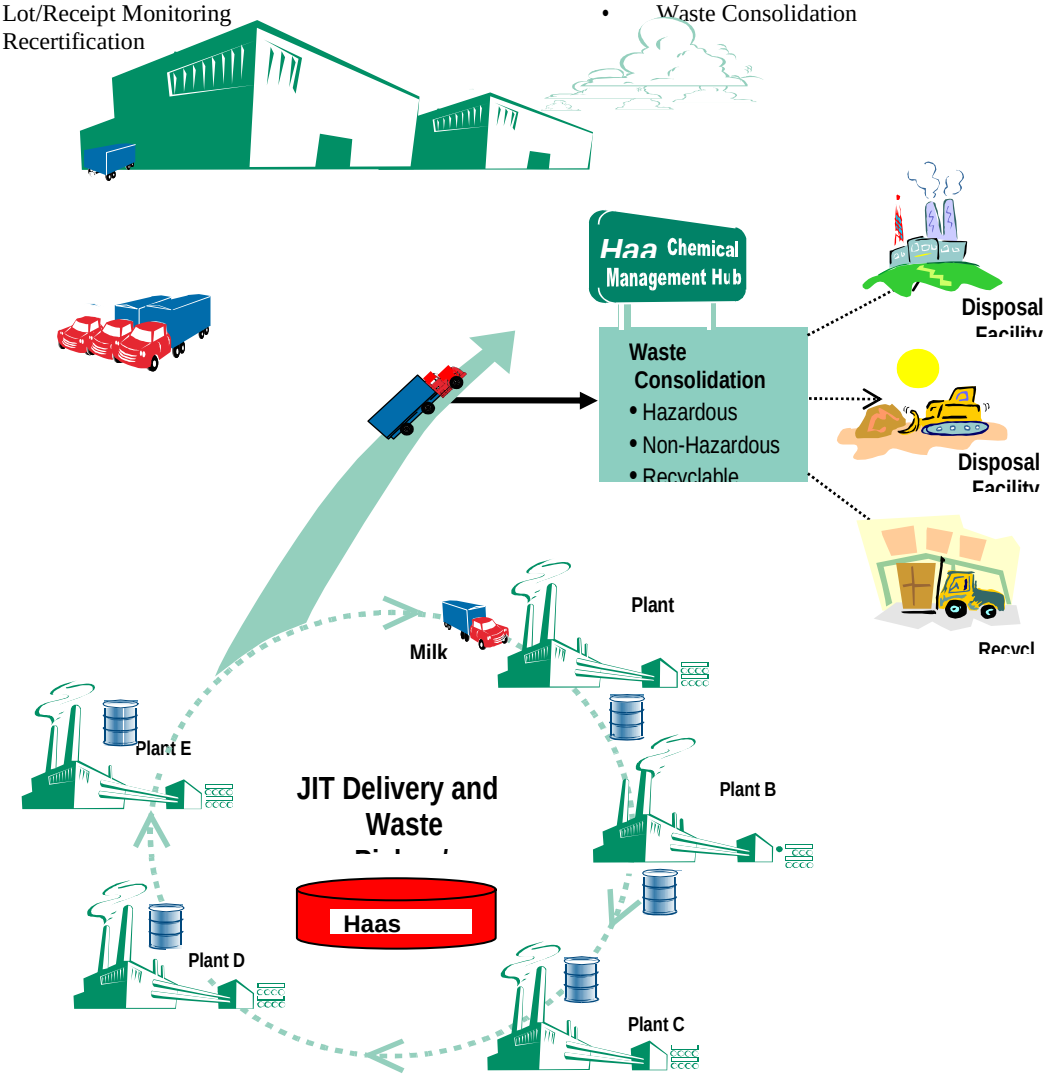
Service Level 2: Offsite Inventory/JIT Delivery
Manage Operation of "Hubs"- Offsite Inventory Mgmt + JIT delivery



Service Level 2 (Con't): Offsite Inventory/JIT Delivery
Manage Operation of "Hubs"- Offsite Inventory Mgmt + JIT delivery

Central Receiving and Distribution Facility

- Receiving, inspection, Quarantine
- QA/QC – Testing, Cert review
- Custom Labeling
- Stocking (min/max)
- Shelf Life Management
  - FIFO
  - Lot/Receipt Monitoring
  - Recertification
- Inventory Management
  - Demand Pattern Analysis
  - Lead Time Monitoring
  - Exception Processes
- JIT Delivery
- Container Management
- Waste Consolidation

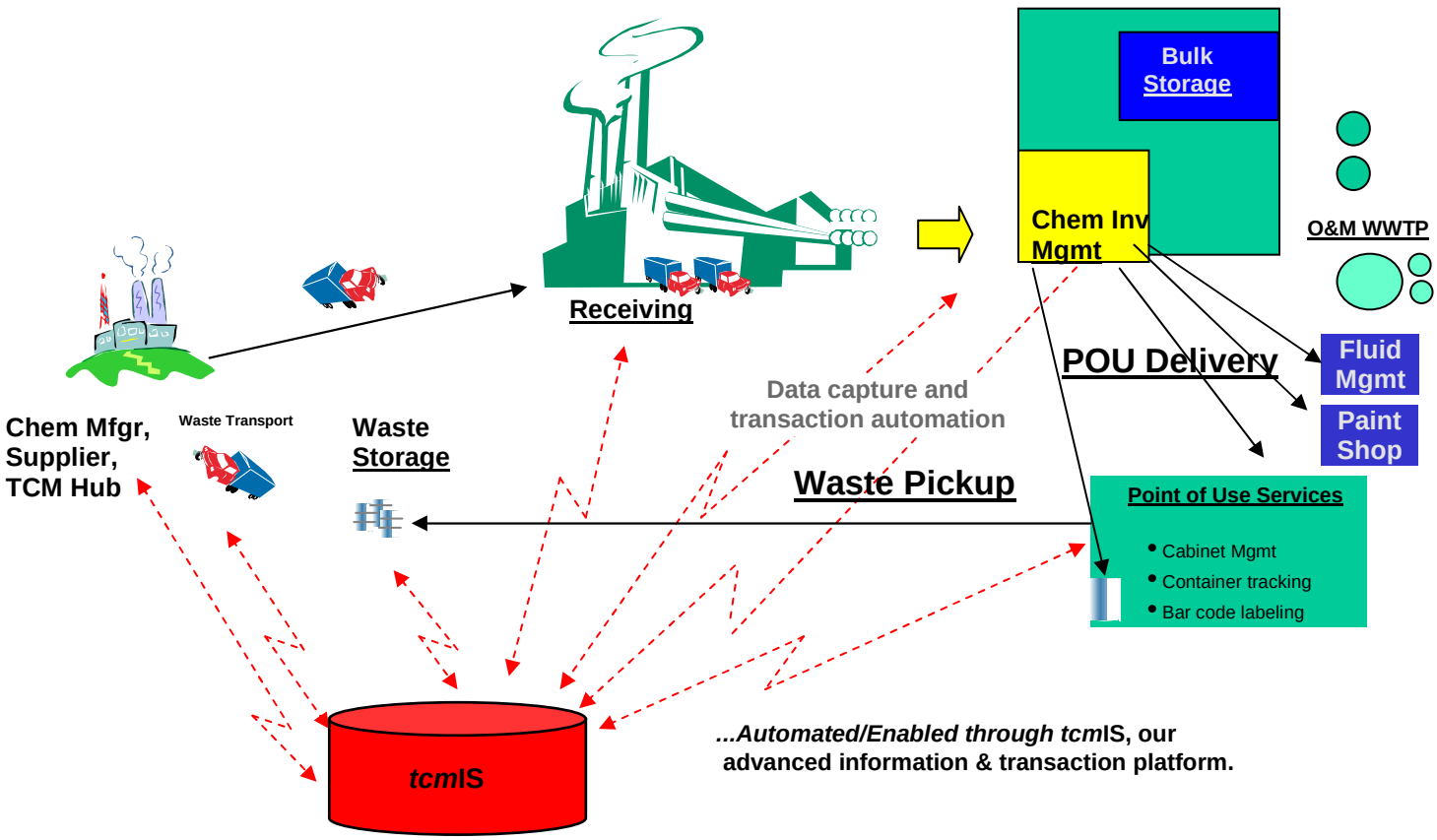


Haas TCM JIT Hubs (Q1'03)

- Dallas
- Decatur, AL
- Tucson
- Boston
- Syracuse
- Minneapolis
- Philadelphia
- Shanghai, China
- Ireland (Q1 '04)
- Singapore (1 '04)

Service Level 3: On site, Turnkey Execution

TCM Client Facility

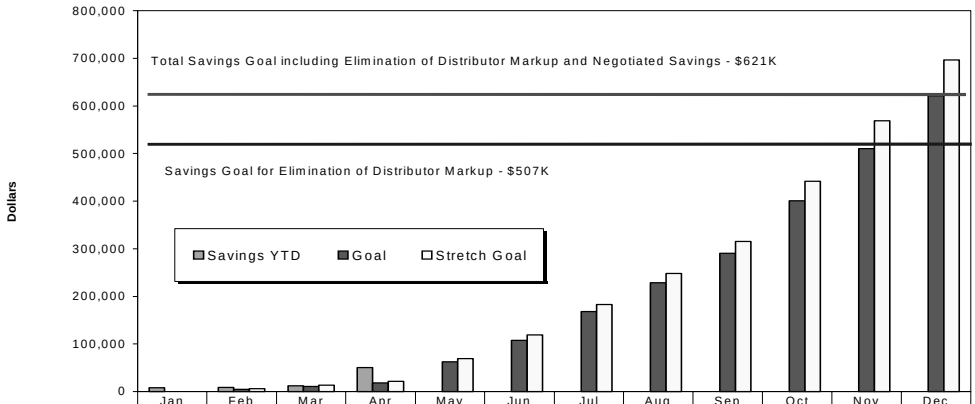


Lifecycle Component	Service Level 1	Service Level 2	Service Level 3
Sourcing and Procurement	• Advanced Sourcing • Procurement & Purchasing System • "Users' " Catalog Leveraged Sourcing & Procurement	• Advanced Sourcing • Procurement & Purchasing System • "Users' " Catalog Leveraged Sourcing & Procurement	• Advanced Sourcing • Procurement & Purchasing System • "Users' " Catalog Leveraged Sourcing & Procurement
Logistics	• Drop Shipment from Mfgr/Supplier	• Off site Inventory Mgmt • JIT Delivery • QA/QC	• On site inventory mgmt • Dock Management
Usage Support	• On line specifications	• Application expertise • QC documentation • On line specifications	• Point-of-use (POU) delivery • Application expertise • QC documentation • On line specifications • O&M Technical Facilities
Environmental Health and Safety	• MSDS Mgmt • Chemical Tracking • Chemical Constituent Recordkeeping/ Reporting • Chemical "Gatekeeping" • Compliance Automation • Waste tracking/ reporting	• MSDS Mgmt • Chemical Tracking • Chemical Constituent Recordkeeping/ Reporting • Chemical "Gatekeeping" • Compliance Automation • SARA exemptions • Waste tracking/ reporting	• MSDS Mgmt • Chemical Tracking • Chemical Constituent Recordkeeping/ Reporting • Chemical "Gatekeeping" • Compliance Automation • Chemical Efficiency Monitoring • Waste tracking/ reporting
Waste Management**	• Waste Stewardship (tracking, labeling, waste "clocks")	• Waste Stewardship (tracking, labeling, waste "clocks") • Waste ordering automation	• Waste Stewardship (tracking, labeling, waste "clocks") • Waste ordering

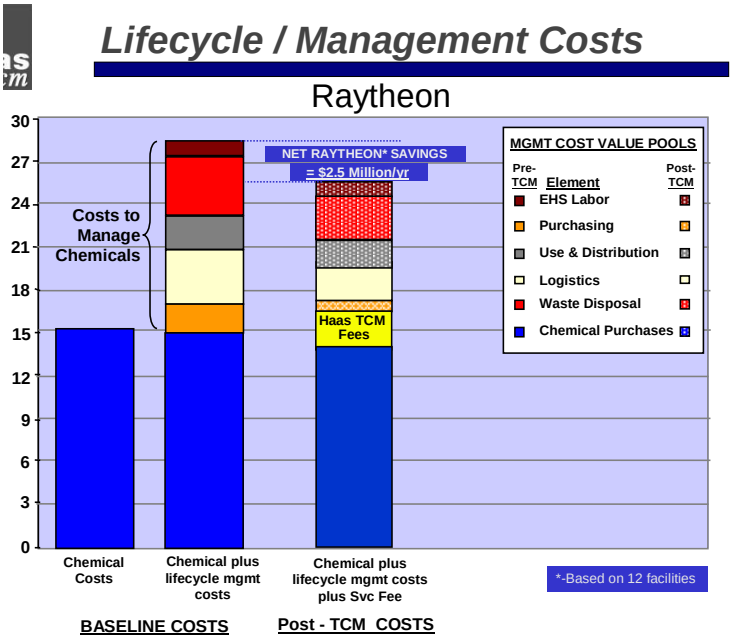
	• Waste ordering automation		automation • POU Pickup • On site mgmt
Business Systems and Management	• IT Bridging • Business Program Mgr • E-procurement • E-invoice/pmt	• IT Bridging • Business Program Mgr • E-procurement • E-invoice/pmt	• IT Bridging • Business Program Mgr • E-procurement • E-invoice/pmt

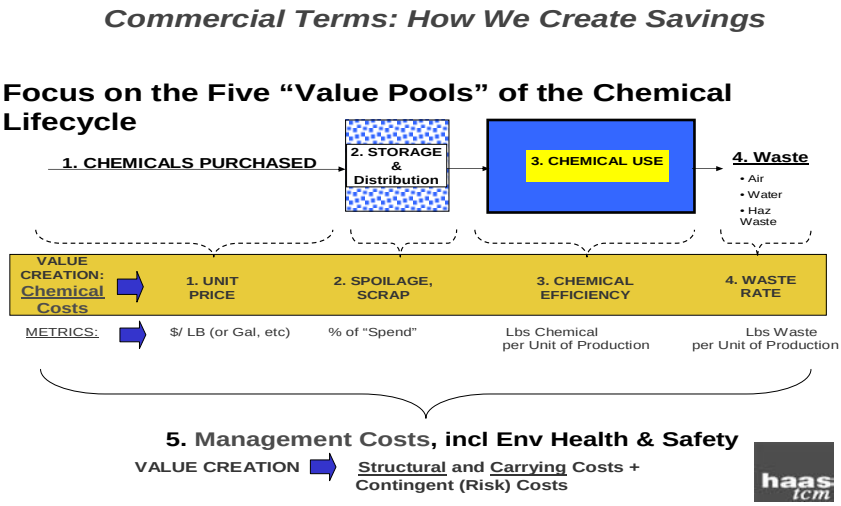
Many Haas TCM's Multi-Facility Customers are Served by Various Service Levels

Haas TCM Customer	Total # of Sites	# Sites Served By Service Level		
		1. e-Commerce	2. JIT	3. Turnkey, On site
RAYTHEON	36	4	27	7
SEAGATE	10	2	2	6
UNITED TECHNOLOGIES CORP	22		10	12
CONSTELLATION ENERGY	1	1		
LOCKHEED MARTIN	3		2	1
BOEING	1			1
BRITISH AEROSPACE	2		2	
SOUTHWEST AIRLINES	12	12		
GENERAL MOTORS	20			20
DELPHI AUTOMOTIVE	12	6		6
DAIMLER CHRYSLER	3			3
US AIR FORCE	2			2
SAUER DANFOSS	5			5
MILLER BREWING CO.	4			4



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Savings YTD	8,343	8,911	12,062	50,471								
Goal	0	5,000	11,000	18,000	62,545	108,090	167,968	228,846	290,724	400,602	510,480	621,358
Stretch Goal	0	6,250	13,750	21,250	69,545	119,090	183,218	248,596	315,224	441,852	568,480	696,358





Chemical Management Financial Model

The cornerstone of a good Chemical Management Program is a financial model which provides incentive to both the supplier and the customer to reduce total costs. A typical model is built around the following concepts:

- A chemical cost baseline based on historical data and correlated to production or plant output.
- Chemical costs based on a pass-thru so the chemical manager has no financial incentive in selling chemicals
- Establish a budget and agree on a target savings level; the chemical manager should but some fees at risk against meeting the target
- Shared savings below the chemical budget

- Management fees to cover the cost of on-site personnel and the value of the services provided.
- Gain sharing arrangement for non chemical process related savings on a project basis.

General Motors & Haas

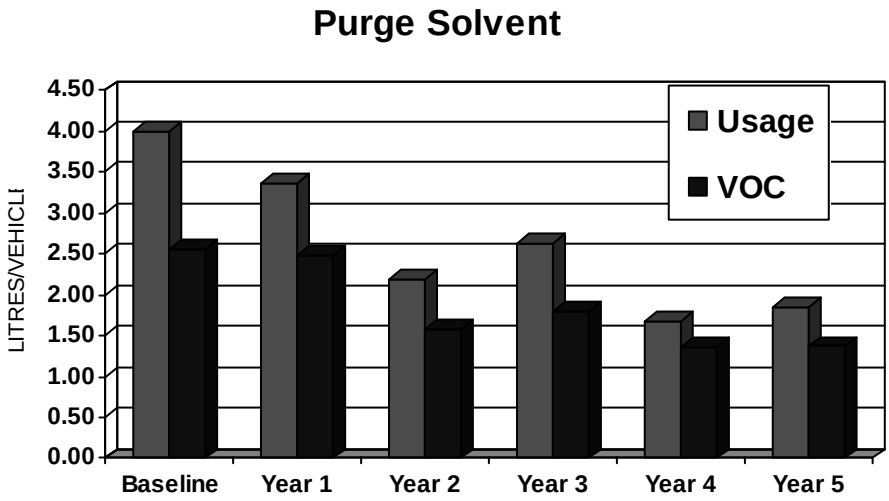
- Working together on chemical management programs since 1994
  - Current Haas / GM Programs:

    - Oshawa, Canada
    - Flint, MI
    - Lansing, MI
    - Baltimore, MD
    - Wilmington, DE
    - Tonawanda, NY
    - Ft. Wayne, IN
    - Shanghai, China
    - Bedford, IN
    - Livonia, MI
    - Moraine, OH
    - Toluca, Mexico
    - Ramos, Mexico
    - Rosario, Argentina

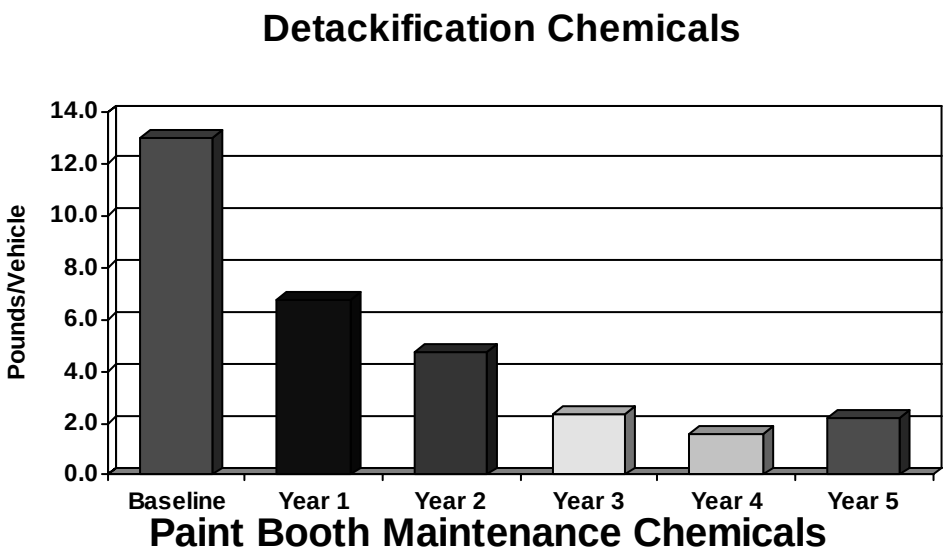
GM automotive manufacturing facility in Ontario

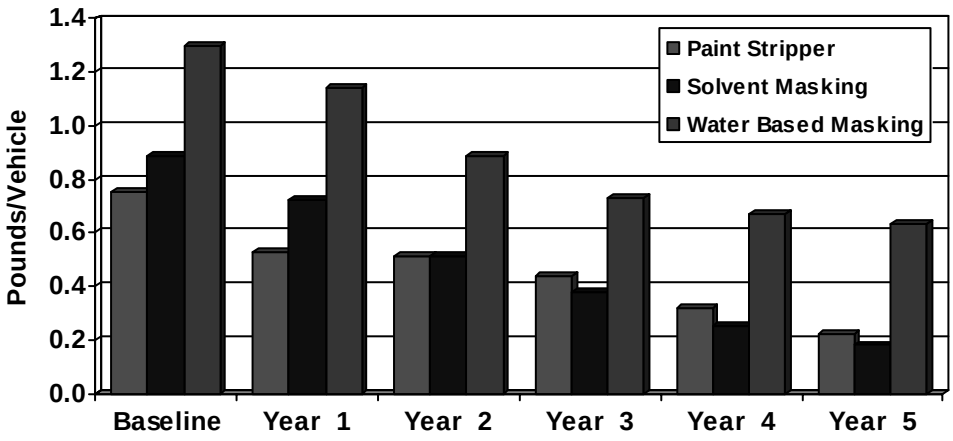
- Chemical Management for all indirect chemicals
- Financial model which includes
  - fixed monthly costs for maintenance materials
  - per unit costs for process related chemicals
  - management fees to cover cost of on-site personnel
- Program has provided year over year savings for 6 years and is currently operating with chemical costs 30% less than the original baseline
- Usage reductions and subsequent total cost reductions in all areas of the program

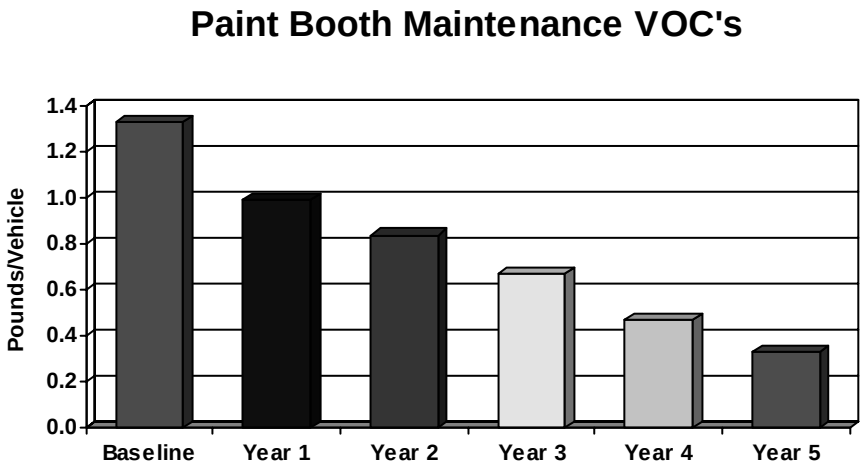
Usage Reduction

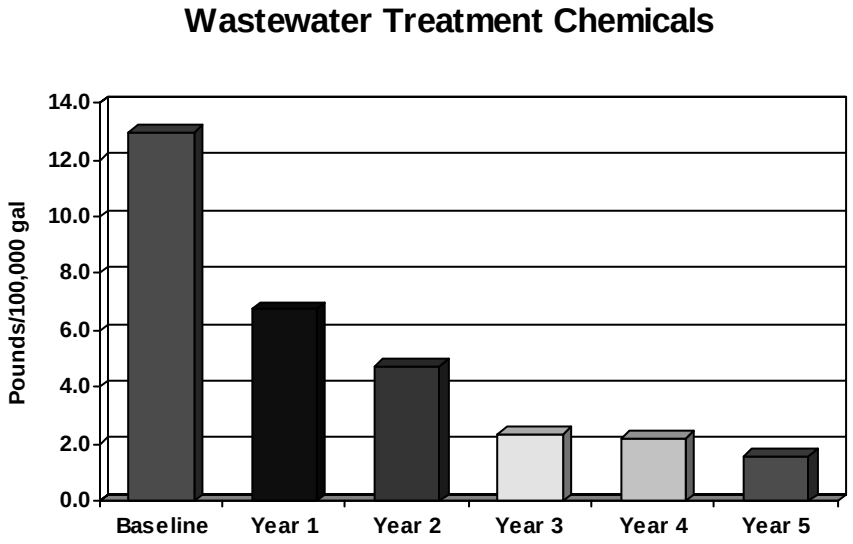


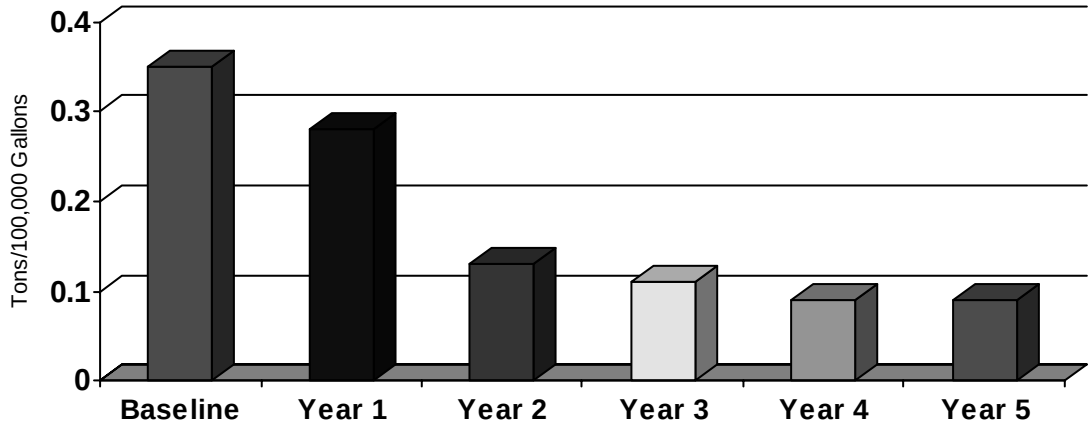
Chemical Management Case History











Chemical Management Case History
Other Accomplishments

- All tri-chlor, naphthalene, and formaldehyde removed from plant
- Consolidation of spray cans by 30%, from 9 suppliers to 1
- Elimination of all plastic drums containing oils
- Drum Management Program reduced on site drums from 600 to 150
- Consolidated water treatment suppliers from 6 to 2 with a 50% cost savings to the plant

Kay Breeden, VP, EHS, Seagate Technologies

Why Chemical Management Services For Seagate?

- Chemicals are a unique material - they are NOT ordered, transported and used like most other consumables;

- Chemicals pose extraordinary risk - to workers, to environment, to plant & equipment and to final Seagate products;
- Seagate's business is "digital storage" - chemicals are not a core competency
- Realization of our "total" chemical costs - Costs of chemicals PLUS costs to *manage* them**.**

EHS Objectives for CMS

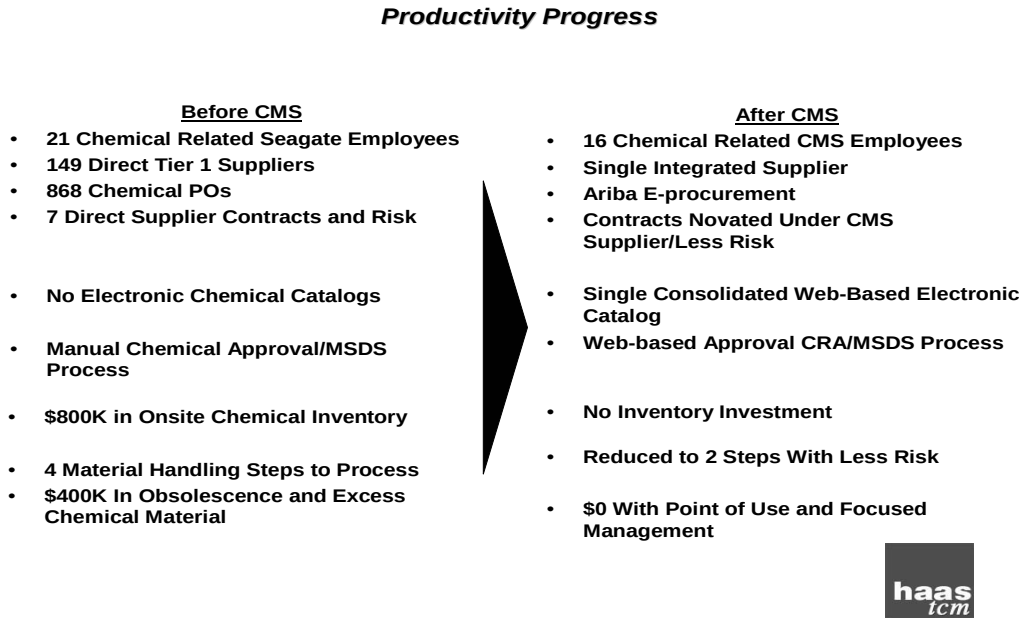
- EHS has been an integral partner in the CMS strategy due to our initiatives to:
- Eliminate chemical risk
- Online chemical information and review applications
- Trained experts provide chemical services
- Partner with vendors to provide safe chemical management

EHS Observation on the Minnesota CMS Implementation

- From the EHS perspective, the MN CMS implementation resulted in:
- Seamless transition from Seagate to Haas
- Chemical expert as partner for Site and Corporation
- Compliance with Site requirements and procedures
- "Can do" attitude and approach to issues
- Overall cost savings to Seagate

EHS Observation on Future CMS Implementation

- Strategies to improve CMS implementations for future:
- Streamline process for implementing suggested improvements and cost savings so that they are not hampered by long approval process
- Need to improve IT interfaces between Haas online systems and Seagate's systems
- Communicate the CMS plan and roll out strategy so that all key players understand the benefits of the program and assist in the transition



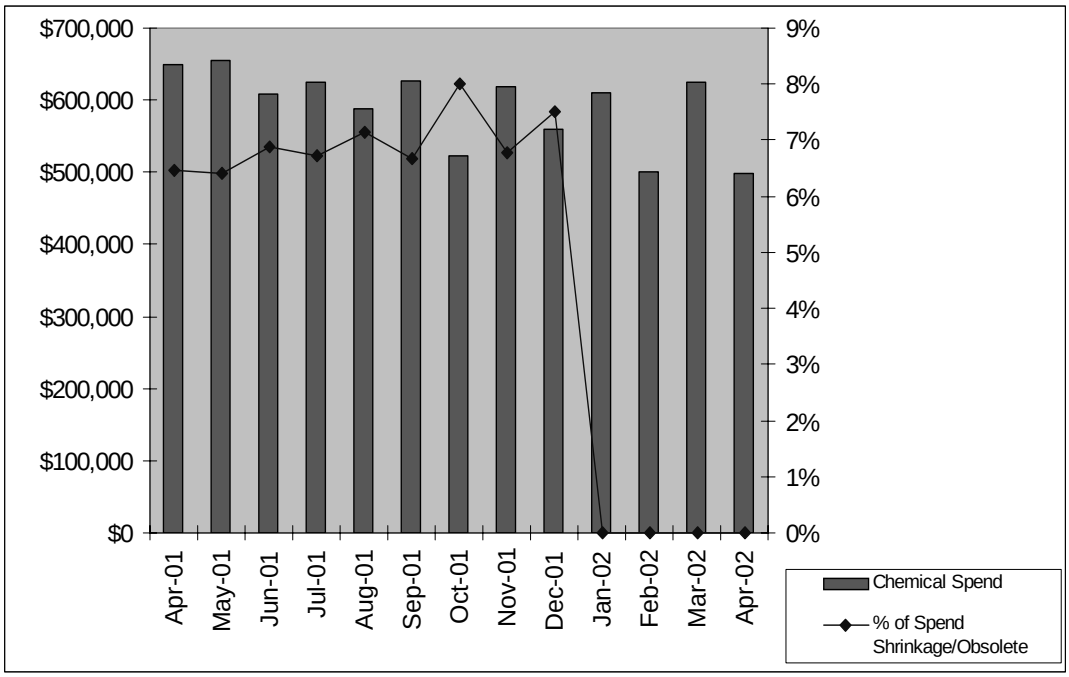
Other Benefits of CMS Program at MN: EHS

First Six Months of Pilot- October '01 thru March '02

- OSHA Incident rate
- Spills/Releases
- Scrap/Obsolete Chemical Waste

Conclusions and Summary of Seagate's CMS Program

- Allows Seagate to focus on core business
- Single Tier One Integrator/single consolidated electronic catalog
- Provides focus on full chemical lifecycle by chemical specialist
- Aligned incentives produces hard savings
- Web-based EH&S/E-procurement capabilities in place (Turn-key)
- Enables E-procurement/AmEx for chemical material
- Reduction in onsite chemical inventory/handling (JIT)
- Minimize chemical inventory costs/obsolescence (Point of Use)
- Minimize risk and safer conditions for Seagate employees
- Improved chemical processes/shared best practices
- Technology transfer/time to market/flexibility
- Improved/standardized chemical processes worldwide



Shrinkage/Obsolete % -Vs- Chemical Spend

Chemical Management Green Accounting

A Chemical Management Program can provide benefits to all functions:

Finance
- Consolidated invoicing
- Reduced inventory costs
- Simplified budgeting

Manufacturing
- Process optimization
- Improved service
- Quality improvements

Environmental
- Single data source
- Usage and ingredient based reporting
- Reduced risk of release
- VOC reduction
- Waste reduction
- Pollution prevention

Chemical Management

Safety
- Less hazardous chemicals
- Training assistance
- Reduced chemical contact
- MSDS Management

Purchasing
- Supplier Management
- New product sourcing
- Transaction processing

Corporation
- Total cost reduction
- Chemical risk reduction
- Environmental compliance

haas tcm

Gregory G. Bond,
The Dow Chemical Company

Experience with Service-Oriented Business Models: Learning Needed for Future Growth

The Facts

- 106-year-old company founded in 1897 by Herbert H. Dow in Midland, Michigan
- A leading science and technology company with annual sales of $28 billion
- Producers of more than 3,200 products at 208 manufacturing sites in 38 countries
- Approximately 50,000 employees globally

Our Mission

To **constantly** improve what is **essential**
to **human progress** by **mastering**
science and technology.

Eight Sustainable Development Principles

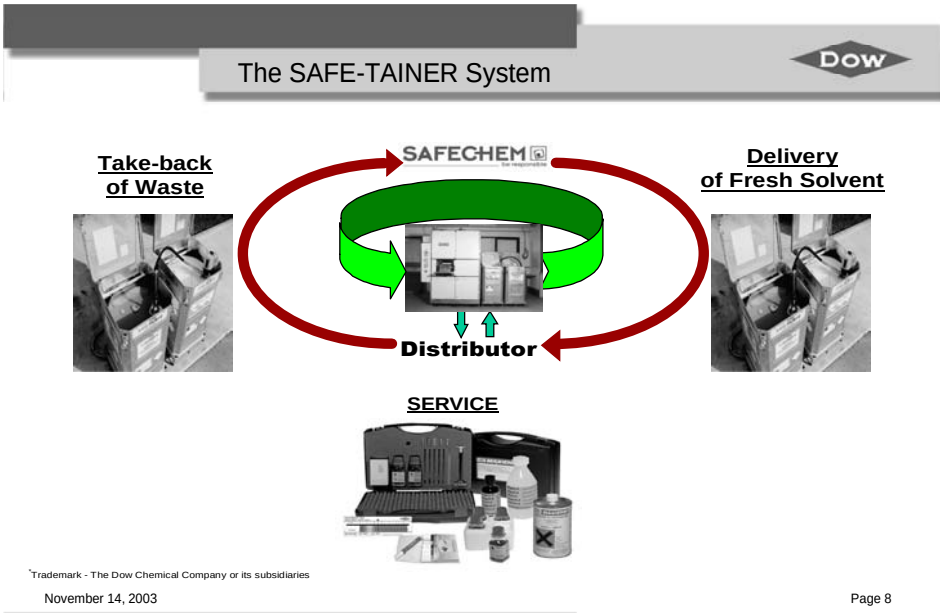
- Measurement and transparency
- Eco-efficiency
- Local versus Dow Standards
- Product Stewardship
- Stakeholder Dialogues and Partnerships
- Eco-System Integrity
- Employee and Public Outreach
- Equity and Quality of Life

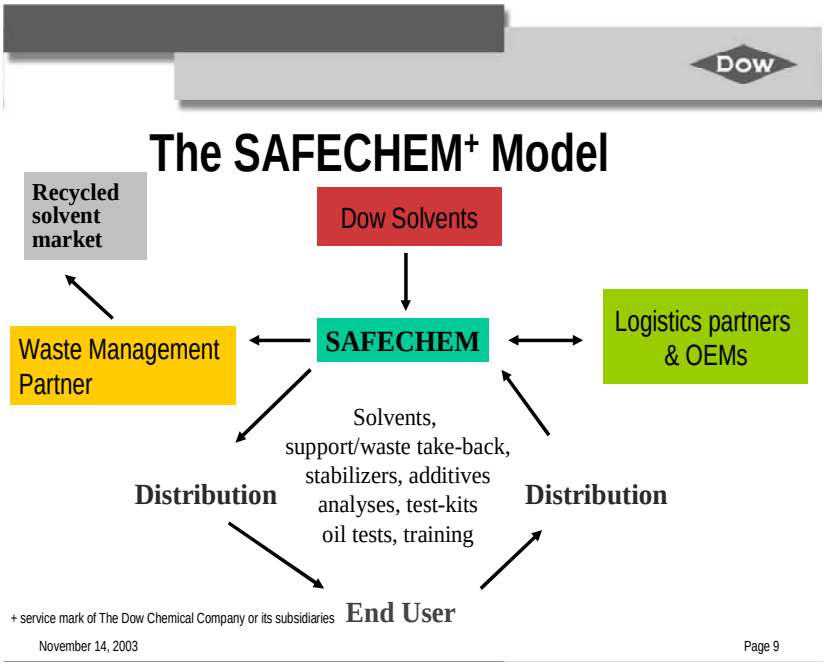
Sustainable Development Operating Plan
12 points

1. ***People****:* Implementation of a comprehensive People Strategy throughout the company
2. ***Brand****:* Education and communication through a corporate reputation and branding strategy
3. ***Transparency****:* Transparency in our activities and performance
4. ***Integration***: Integration of the Sustainable Development Guiding Principles into business, function, and site strategies
5. ***Dialogue***: Better understanding of diverse viewpoints through active stakeholder partnerships and dialogue
6. ***Advocacy***: Proactive management of emerging issues and trends consistent with the Sustainable Development Guiding Principles
7. ***Citizenship‡:*** The manner in which Dow will continue to meet societal needs and achieve value growth around the world, and be accountable for its actions
8. ***Solutions Development***: Development and production of value-added, essential-to-life products that positively contribute to a sustainable society
9. ***Community***: Improvement of societal value through corporate contributions, initiatives and activities, volunteerism and ecosystem enhancement projects
10. ***Six Sigma***: Breakthrough improvements in sustainability through the use of Six Sigma methodology

11. ***EH&S***: Continuous improvement of Environment, Health and Safety performance for 2005 and beyond
12. ***Industry Alignment***: Living the Responsible Care® principles and promoting their implementation throughout the industry

- Innovation in product design and in risk management is ***the*** way to sustainable development
- Transparent regulatory direction is needed that clearly supports proper risk assessment and management, and reduces a focus on hazard alone
- S-M-A-R-T regulation is needed to stimulate innovation while providing structure





Sustainable Development Results

- Solvents can be used longer ⇒ consumption reduction
- Reduced risk from lower emissions and exposure
- More labor-intensive/more high-paying jobs

Critical Prerequisites

- Create awareness about the offering and educate customers on its relevance
- Communications with all stakeholders along the supply chain
- Flexibility! Not a "one-size-fits-all" approach
- Appropriate regulatory models

Impact of Regulation

- Create a favorable regulatory environment
- Regulation of chemical use

S-M-A-R-T

- S – Specific
- M – Measurable
- A – Attainable
- R – Relevant
- T – Trackable

Future Learnings

- Continued innovation in product design and in risk management
- What regulatory framework supports proper risk assessment and management, and reduces a focus on hazard alone?
- Which S-M-A-R-T regulation and policy tools will stimulate innovation while providing structure?

Sentricon®

Termite Colony Elimination System

- 3-step process
  - –authorized pest management professionals install Sentricon stations in the ground
  - –If termites are detected, as little as 1 gram Recruit® bait is placed in affected stations
  - –After colony disappears, bait is removed. Stations continue to be monitored,
- Fees are based in structure size, not the amount of product needed to protect it.

Dow Automotive & Ford

- Raw material supply for, design and manufacture of finished assemblies for cars
- Plant with multiple injection molding machines and paint line
- Combination of supplier-cooperation and total care model

Experience with service-oriented business models: learning needed for future growth

[slide with fast facts] Herbert H. Dow founded the company in 1897 in Midland, Michigan, United States. The company has since grown from a small brine manufacturing facility to a global science and technology company with manufacturing facilities in 38 countries, and approximately 50,000 employees that serve customers in more than 170 countries. We provide chemical, plastic and agricultural products to many essential consumer markets, including food, transportation, health and medicine, personal and home care, and building and construction.

[slide with mission] We are committed to Sustainable Development. In today's every-evolving global society, our responsibilities and contributions must extend beyond delivering excellent product performance. We believe that to be successful, we have to simultaneously excel in all three elements of the triple bottom line of sustainable development:

- economic prosperity,
- environmental stewardship,
- and corporate social responsibility.

[slide with eight SD principles]To ensure this commitment continues to be more than just words, we established eight sustainable development guiding principles. These principles guide our behavior and decision-making. In addition, we introduced a 12-point Sustainable Development Operating Plan which helps us further integrate sustainable development into our business decisions. Back in 1999, we published eight specific tasks to improve our triple bottom line performance. In 2001 we added 12 new tasks, in line with the 12-point Operating Plan **[two slides with SDOP]**. We report our progress against these tasks yearly in our Public Report, explaining where we made progress, what tasks have been completed and which ones require more work. I refer you to our web site www.Dow.com for more details.

In my role as Corporate Director of Product Responsibility, our commitment to Sustainable Development is not a theoretical concept or a nice-to-do, it is a given. In fact, one of the first tasks we set for ourselves was to heighten Product Stewardship efforts globally. This task was

completed in December 2000 with the implementation of a process that ensures that all new facilities and businesses we acquire through mergers or acquisitions are brought up to our Environmental, Health and Safety standards as soon as possible. We continue to make excellent progress in achieving this.

In light of this commitment to Sustainable Development, our involvement with service-oriented business models will probably not come as a surprise to you. Today I will share with you what we have done, what we have learned and what we feel needs to be considered moving forward. But before going into the details, let me give you a summary of what we found: **[slide with key messages]**

- First, we believe that innovation in product design and in risk management is *the* way to sustainable development
- Second, stakeholder acceptance and support are key for the success of service-oriented business models. Without transparent regulatory direction that clearly supports proper risk assessment and management, and reduces a focus on hazard alone, this acceptance and support will not be realized.
- And third, for service-oriented business models to succeed, we need SMART or S-M-A-R-T regulation that stimulates innovation while providing structure.

We reached these conclusions based on our experiences with the SAFECHEM^{+} model, a rent-a-chemical pilot in Switzerland, and our participation in the Austrian Chemical-Leasing study. Let me explain the SAFECHEM model in more detail.

SAFECHEM is a wholly owned Dow subsidiary and closely linked with our chlorinated solvents business. The company markets both chlorinated and non-chlorinated solvents. Chlorinated solvents are used in a variety of cleaning applications, for instance in the manufacture of industrial high-speed knitting needles. These needles must be manufactured to very high quality standards that cannot be met without the use of chlorinated solvents. Other examples of critical applications of chlorinated solvents include ceramic foil, which is essential in space travel and automotive electronics, and automotive safety systems such as airbags.

Chlorinated solvents offer excellent cleaning performance and are therefore technically the product of choice in many applications and absolutely essential in others. At the same time however, these products are covered, because of their intrinsic hazards by a number of European regulations and directives aimed at reducing the consumption and potential emissions.

In the late 1980s, the use of chlorinated solvents in Germany and Switzerland became subject to more stringent regulations. We needed a model that would allow our customers to continue to use these products and achieve the critical, high-quality cleaning results they needed, while simultaneously reducing consumption and minimizing emissions. The SAFE-TAINER** system was developed in response to this need.

[slide with schematic explanation of the SAFE-TAINER system] The system consists of two separate containers. One of these containers contains fresh solvent, the other is used to collect the used solvent. Special connectors and accessories allow the solvent to be transferred to and from the cleaning machine with virtually no risk of emissions or spills. Supply and take-back of the

solvent in the special containers is part of the offering. When this delivery and take-back system is used with Solvent Emission Directive compliant cleaning equipment, a virtually closed cleaning process is created that significantly reduces the potential for emissions and thus the potential for human and environmental exposure, as well as the reduced consumption of solvents.

The system was first introduced in Germany in the early nineties. In 1997, German distributors dedicated to the chemical industry's Responsible Care initiative committed to stop supplying chlorinated solvents in drums and were instrumental in converting customers to closed systems for handling and take-back. Today, SAFECHEM serves over 3,500 customers in 12 European countries.

[slide with key characteristics of SAFECHEM model] The SAFECHEM business model is more than simply a set of two containers. It calls for close cooperation with partners along the supply chain including distributors, waste managers, Original Equipment Manufacturers, and down-stream end-users. In addition, the service offered to the customer does not end with the supply and take-back of the solvent. Dow and SAFECHEM, in close co-operation with their market partners, provide a solutions-oriented approach where experience in Research and Development, Environment, Health and Safety and Technical Development are combined to provide the best solution for a particular cleaning need. Solvent usage is optimized and the life span of the solvent extended through stabilizer systems as well as consulting and support services, like re-stabilization and solvent quality analyses.

SAFECHEM is an example of a business model where the focus has shifted from volume of chemicals sold to service. In essence, the performance of the solvent and the benefits it offers form the basis of the model and less and less the number of drums of solvents sold. The solvent purchase price is still connected with the volume, however support and waste services are also taken into account.

[slide explaining Sustainable Development results] From a Sustainable Development perspective the results are remarkable. Solvent can be used up to 10 times longer[1]. As a result, the use of resources has been reduced by more than 4 times[2], and owing to this approach and other factors, the consumption of chlorinated solvents in Germany has fallen to one eighth of the quantity formerly used. The closed systems significantly reduce the risk for emissions to air and ground and exposure risk for employees. In addition, a service-oriented model is more manpower-intense than a traditional bulk approach resulting in more high-paying jobs. Today, SAFECHEM and supporting companies, such as distributors, re-fillers, and waste managers employ close to 50 people. The SAFECHEM model is a good example of where innovation in product design and risk-management contribute to sustainable development.

[1] Today, emissions are 0.1 kg/hour versus 1.0 kg/hr in the past (90% reduction). I.e. Filling of 100 kg will now last 1000 hours instead of 100 hours (10 times longer)

[2] Ernst Ulrich von Weizsäcker - Faktor vier. Doppelter Wohlstand - halbierter Verbrauch

With the SAFECHEM model we made a first step towards the Total Care model as outlined in the Austrian study[3]. It is an example of model number five, the so-called Responsible Care model. SAFECHEM has responsibility for the supply and take-back of the solvent but is currently not involved in the actual use of the product. The development of SAFECHEM and its expansion across Europe helped us to identify a number of critical prerequisites that in our opinion need to be addressed to ensure a successful further development towards full service-models where the basis of the purchase are the rendered services of and around the solvent.

[slide summarizing the critical prerequisites] Our first learning is that education and creating awareness are important. If customers do not understand the offering or fail to see the relevance and advantages for their business, successful implementation is hard to achieve. We found that customers do not always understand their current cost-structure, making it difficult for them to compare our offering with their current process. We needed to invest time and energy in explaining the offering and its benefits, and convince a number of early adapters. Once the early adapters started using the system our job became a lot easier as they became successful models for additional prospective customers. So, communication is key. Not only with end-users but also with the other parties along the supply chain, including machine manufacturers, distributors and waste managers. As I explained earlier, distributors in Germany played an important role in the success of the SAFE-TAINER system. Understanding and buy-in of all parties along the supply chain are vital in explaining the concept to the customer.

The second thing we learned is the importance of flexibility. Service implies providing solutions. So when service becomes the focus, a capability to be flexible is key. You need to be able to address customer-specific needs and country-specific regulatory requirements while at the same time creating a solution that meets all three dimensions of sustainable development. This cannot be done with a "one-size-fits-all" solution. That this need for flexibility is recognized in industry today shows in the formation of a research consortium late last year. The consortium includes representatives from all important sectors related to cleaning and was established to address exactly solutions provision and its customization to specific, individual needs. Earlier this year, the consortium proposed a project within the 6th European Framework. Unfortunately no funds for this particular project were granted, but the consortium is still in place, looking for ways to address this topic.

The third learning is related to the importance of regulation. Regulation influences end-user perception, acceptance, and behavior. It can level the playing field, provide financial incentives, influence product choice, structure accountability and bring stakeholders together.

Let's take the definition of waste as an example. Waste implies disposal. The product or material has been used, has served its purpose and can be discarded. Under the Basel convention, waste is subject to stringent regulations for moving it across borders. Now, let's consider solvents and chlorinated solvents in particular. These products have a high recycling potential. If properly designed, used solvent can in fact be repaired and brought back into the cleaning process. As

[3] Chemikalien-Leasing. Ein intelligentes und integriertes Geschäftsmodell als Perspektive zur nachhaltigen Entwicklung in der Stoffwirtschaft. Jakl, Joas, Nolte, Schott, Windsperger.

McDonough and Braungart say "waste = food"[4]. Imagine for a moment that a new customer wants to recycle his used solvent. If the used solvent formally fulfills the definition for waste, recycling activities across Europe could be rendered more difficult. Authorities are in a position to clarify and define elements of regulation so that they support the development of service-oriented business models. In this case the definition for waste should take into account those materials that are intended and designed for re-use within the chemical leasing concept.

[slide with impact of regulation] The second manner in which regulation impacts the success of service-oriented business models is through the regulation of chemical use. We frequently hear about the "Substitution Principle". When it comes to risk-management, substitution is not always the best solution. The risk related to a chemical is always determined by the combination of intrinsic hazardous properties and exposure as dictated by its use or application. Regulations should be risk-based rather than hazard-based and stimulate innovation not only on a product level but also on a process and business model level.

Chlorinated solvents are a prime example. These products have been studied extensively for more than half a century and their specific hazardous properties and risks are well-known. Because of this thorough knowledge we have been able to establish safe-handling practices and develop equipment and processes that help manage the product-specific risk during use. Changing to a supposedly less hazardous chemical is obviously not the only way to reduce risk. And this may even introduce other unintended health or environmental impacts which are at least as, or more severe than those of chlorinated solvents, especially if the hazards of the substitute chemical have not been adequately assessed.

We also need to consider that product bans with exceptions for essential uses will not promote the development and use of Best Available Technology (BAT). As these exceptions often have a time-frame associated with them, there is no incentive to invest in new technology which may reduce the overall effectiveness of the ban compared to regulation that promotes other ways of risk-management, innovation and the use of BAT.

For service-oriented business models to be successful, regulation needs to support alternative means of risk-management rather than promoting substitution as the only option. This will allow for the development of new models. In addition it sends an unambiguous signal to customers and other stakeholders that these models are an accepted way to conduct business, which will further stimulate their development and acceptance.

Given the importance of the regulatory environment for the success of service-oriented business models, I hope you will allow me to offer a structure for thinking about this type of regulation. This approach can be summarized as the S.M.A.R.T approach, an acronym for Specific, Measurable, Attainable, Relevant and Trackable.

[slide explaining SMART acronym] In this context**,** SPECIFIC means selecting the right regulatory tool for the situation. Regulatory authorities have a range of options available to them from approaches that are less restrictive, that encourage and incentivize improvements, and allow

[4] Cradle to cradle. Remaking the way we make things. William McDonough and Michael Braungart. North Point Press

experts to apply their knowledge to the problem, to approaches that impose a solution, that are highly restrictive and allow little discretion or opportunity for expert judgement. We obviously favor the former. As said earlier, substitution may not necessarily be the right tool, and the challenge is to match the right policy tool to the situation. The policy tool box includes standards such as ISO 9000 and 14000, market-based incentives, sectoral and company performance agreements, codes of practices (such as Responsible Care), voluntary non-regulatory initiatives and regulation.

MEASURABLE refers to definition of terms, standards, availability of valid and reliable test methods. Phrases like: "no discernable impact" or "no unreasonable risk" need to be defined so that it is clear what we are aiming for and when the objective is achieved.

ATTAINABLE is a call to set realistic goals and implementation schedules that consider the public health or environmental urgency, but also the capacity and institutional capability of both the regulated industry and the regulatory authorities. Some of the emerging environmental issues are still shrouded in a great deal of scientific uncertainty, which understandably hampers realistic goal setting and implementation schedules. We encourage authorities to consider the most cost-effective approaches to achieve the desired result and to be mindful of the need for global competitiveness. Are regulations creating a situation that encourages companies to seek a less restrictive operating environment - that may have a net negative effect on environment, health and safety? Does science allow us to meet the goal? Zero should not be a goal if it is scientifically unattainable.

RELEVANT – The obvious interpretation of relevance is that the policy tool should aim to derive a real improvement to public health or the environment. However, we also encourage regulatory authorities to engage the members of the regulated community in the development process so the resulting requirement can take advantage of their practical experience and knowledge, maybe even identify an existing "best practice" that will achieve the objective. We see partnerships as a step in the right direction.

TRACKABLE - Environmental regulations should be performance-based rather than prescriptive or command and control. They should drive accountability both from the regulated entities and the regulatory agencies. There should be opportunity to reward and recognize good performance - through certificates, but also through regulatory flexibility and relief for going beyond compliance.

I firmly believe that regulations that follow the SMART approach that I just outlined can help create an environment in which service-oriented business models can continue to develop and flourish.

Let me take a moment now to summarize all I shared with you into learnings needed for future growth. In other words, what are the parameters that we need to better understand in order to successfully develop full service models.

[slide with key messages, phrased as future learnings]

I hope that I have been able to illustrate for you how innovation in both product design and risk management can make significant contributions towards sustainable development. We only

just got started on this path and we need to continue to look for enhanced or new product design and services, improved technologies and new risk-management models to realize long-term sustainable development.

Regulation is definitely an area where we need to learn more as it has great impact on financial performance, end-user behavior, product choice and much more.

First, we need to understand the key regulatory elements that create a favorable environment for full-service models to grow and mature.

Second, following the S.M.A.R.T. approach, we need to define what the right policy tools are that stimulate innovation and acceptance and that do not endanger global competitiveness through artificial financial and other hurdles. Regulatory objectives need to be realistic and unambiguous and methods need to be identified to measure achievement. Rather than advocating substitution across the board, regulations need to consider good versus bad applications, rather than good versus bad chemicals. A joint effort of all stakeholders in the service-models and regulatory bodies may well be the right starting point to define the best regulatory environment for the future development of service-oriented business models.

Before closing, I want to share just a few more examples of service-oriented approaches at Dow.

[slide with key characteristics] An example of another business model built on service is the Sentricon® *Termite Colony Elimination System*, which was launched in 1995 by Dow AgroSciences, a wholly-owned indirect subsidiary of Dow.
Subterranean termites are a serious problem in many parts of the world. The Sentricon System is a unique baiting system that eliminates the termite colony with just grams of termite bait instead of the hundreds of gallons of chemicals often applied to protect homes. This reduces concern of overuse and misapplication of chemicals and creates a favorable environmental profile. The key is a three-step process:

1. Authorized pest management professionals install Sentricon stations in the ground outside the structure and monitor them for evidence of termites in the soil.
2. If termites are detected, as little as one gram of Recruit® termite bait is placed only in the affected stations to eliminate the termite colony.
3. After the colony is eliminated, the Recruit bait is removed. However, the station is monitored for any new colonies that may invade the area.

The Sentricon System's termite bait is an insect growth regulator, which disrupts the molting process required by termites to grow and sustain a colony. As a result of the product's remarkable effectiveness, Dow AgroSciences has established an entirely new business model around the Sentricon System. This service-based model places strong emphasis on training and support for authorized pest management professionals to ensure effective use and generate performance success. Fees are based on the structure size, not the amount of product needed to protect it.

Just like in the SAFECHEM example, the focus of this business model is no longer on the amount of product sold.

An example where the supplier enters further in the Supply Chain is the project of the Dow Automotive business with the Ford Motor Company. The business entered into this venture in mid-2000 with in Brazil. The project is a new concept in both company partnership and interdependence in the auto industry. The Ford manufacturing site was built to have different suppliers on the same site working seamlessly with each other and Ford to produce cars. Dow Automotive has entered further in the supply chain by not only supplying plastic resins but also designing and supplying finished assemblies for the vehicle. The business is a full service supplier with complete design, manufacturing and raw materials supply capabilities. Dow Automotive constructed a plant that currently houses multiple injection molding machines and a fully automated paint line to produce bumpers, instrument panels, interior trim, and exterior trim. They supply all of these finished goods on a Just-In-Time basis to the final assembly line with very little inventory. The concept by design reduces costs for transportation and increases the speed in which the assembly plant can react to problems. This is an example of the supplier cooperation model combined with the total care model.

As I conclude my presentation, I want to stress that we firmly believe in the service-oriented business model. Building on our experiences with SAFECHEM and other models within Dow, we will continue to explore the concept of these models. In fact, as you heard yesterday we are supporting a chemical leasing trial lead by PERO, where the full-service model for cleaning will be tested in an actual market place setting. Hopefully, you will hear more about the experiences from this trial at a future occasion.

Thank you for your attention. We do have some time left and I am happy to answer any questions you may have.

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* Trademark of The Dow Chemical Company
** Trademark of The Dow Chemical Company or its subsidiaries
+ Service mark of The Dow Chemical Company or its subsidiaries

Nalco experiences and perspectives in applying service oriented approaches in water treatment to minimize chemical release

MARIA ROSARIA IAPALUCCI – SIGI BERTSCHLER,
ONDEO NALCO ITALIA

During the past century, the company once known as Nalco Chemical Company grew from a fledgling water treatment business to a worldwide leader in water treatment and process chemicals. Nalco's 10,000 employees work with more than 60,000 industrial customers in 130 countries in industry, government and institutions problems, protect the environment, decrease costs, increase productivity, improve profitability by reducing customer total costs of operation, and maintain asset reliability. Nalco's mission is Delivering Customer Advantage by helping our customers grow in their marketplaces. Industries we serve include electronics, food and beverage, automotive, aerospace, medium and light manufacturing, mining and mineral processing, pulp and paper, chemicals, petroleum, steel, power generation, metalworking, refining, commercial real estate, healthcare, personal care, municipal and education.

Nalco's business approach is to build value for our customers. We do this by focusing on our core markets of water treatment and process chemicals and on our corporate strengths – global presence, on-site expertise, and innovative products and services. Our goal is to help ensure optimum and trouble-free operations in the customer's plant, mill, mine or municipality through the prevention of water and process-related problems and proactive process improvements. The Nalco engineers are key to achieving these goals — as consultant, problem-solver, onsite expert and business partner. Nalco works to meet its customers' needs through our commitment to identifying, nurturing, protecting and growing new technologies with the intend to produce only those chemicals that can be developed, manufactured, distributed, used and discharged in a safe and environmentally responsible manner.

Nalco has made Environmental, Health and Safety considerations a priority in order to keep potential risks at lowest reasonable level for Nalco employees, customers and the public The global research groups with more than 450 scientists (Engineers, Chemists, Microbiologist), Nalco develops key ideas, advancing them rapidly and efficiently through our product development process. We apply advanced scientific principles and techniques to develop practical solutions to challenges in a wide variety of industries and applications.

Nalco technologies designed to meet specific needs include:

- TRASAR® – Chemical application control and diagnostics to minimize chemical consumption
- ULTIMER® – Oil-free liquid polymers, winner of the 1999 U.S. Presidential Green Chemistry Award
- STA•BR•EX® – Superior biocides with less environmental impact
- NALCO ACT® – Advanced condensate treatment, non-amine and U.S. FDA-approved
- NALMET® – Heavy metals removal for wastewater treatment

- CoreShell™ – Advanced liquid polymers designed for wastewater treatment, sludge conditioning and as processing aids
- NexGuard™ – Advanced internal boiler treatment chemistries with state-of-the-art diagnostic monitoring, feed and control equipment

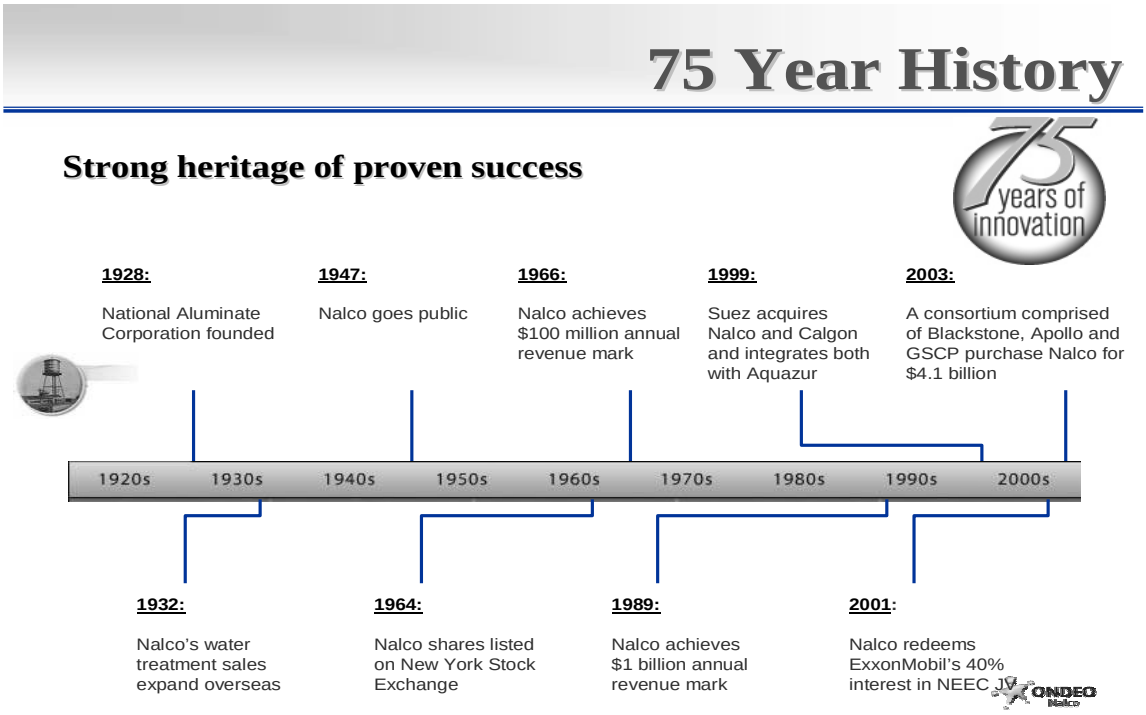
Due to increasing raw water costs, raw water usage and in many locations, a general lack of available water, industry is being faced with increasingly rough challenges regarding water management. To help industry Nalco propose ART™ - Advanced Recycle Technology. These services focus Nalco's worldwide leadership in water treatment and process simulation technologies on identifying practical solutions to real problems.

The PORTA-FEED® System is an example of a Nalco patented technology that has become the standard for chemical handling. Since its introduction in 1985, the PORTA-FEED program has eliminated millions of chemical drums and the problem of residual chemical and replaced them with a more convenient, safer, more economical alternative in handling chemicals. All Nalco business units work to develop complete customer offerings that make efficient use of equipment, chemicals and services to provide complete results.

Nalco Company takes pride in the fact that it has always conducted its business in an environmentally sound manner. We believe it is each employee's responsibility to became familiar with the environmental laws and regulations and to be sure that all our activity fully comply with these laws and regulations.

Nalco experiences and perspectives in applying service oriented approaches in **water treatment** to minimize chemical release

1928 National Aluminate Corporation formed
1959 Name changed to Nalco Chemical Company
1999 Purchased by SUEZ
2001 Name changed to Ondeo Nalco Company
2003 Purchased by Investors group →
Blackstone - Leader in private equity
Apollo – Premier Private Equity Fund with Expertise in Chemical & Service Businesses
GSCP – Private Equity Fond of Goldman Sachs
Name changed to Nalco Company



- Nalco is the world leader in water treatment and process improvement applications, providing services, chemicals and equipment to industrial and institutional customers
- Customer base is diversified across multiple industries
  - More than 60,000 customer locations
  - Business is divided into three core divisions
    - Industrial and Institutional Services (I&IS)
    - Energy Services (Energy)
    - Paper Services (Paper)
- 5,000 Engineering Team supports customers in 130 countries
- 2003 Sales: $2.7 billion

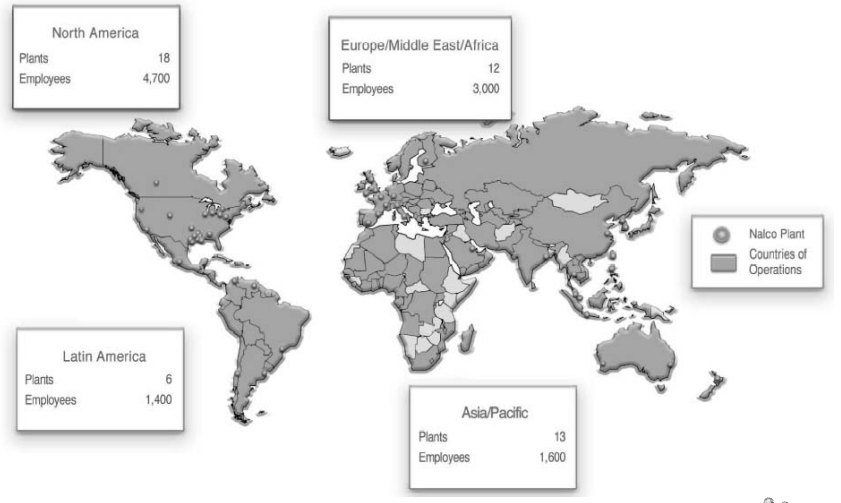
Company Overview

World leader in water treatment and process applications

Nalco

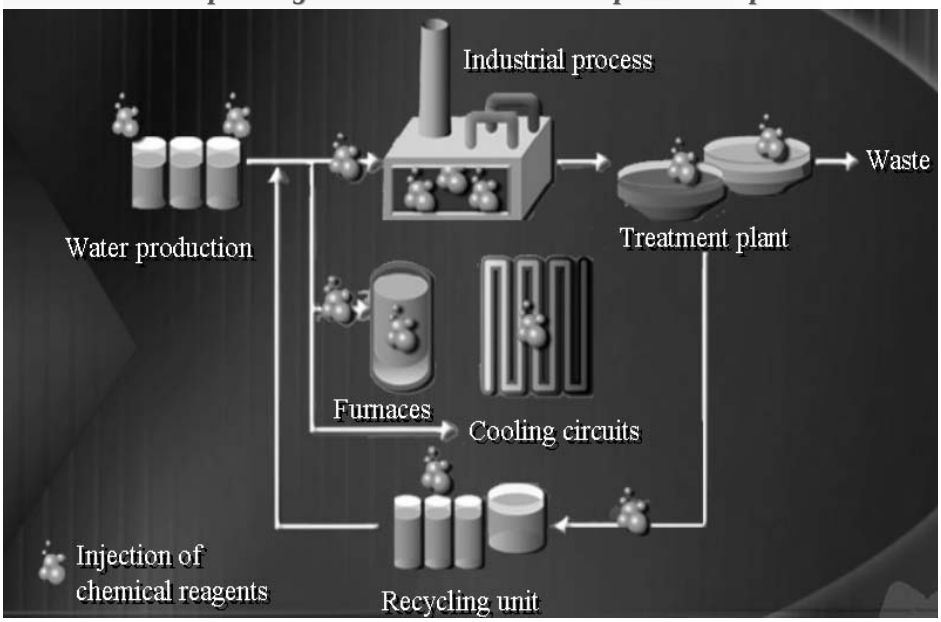
	Industrial & Institutional Services	Energy Services	Paper Services
Markets	• Food & Beverage • Buildings, Hotels, Hospitals • Chemicals, Pharma • Manufacturing, Metals, Utilities, Mining	• Exploration • Field Development • Production • Refining • Petrochemical Manufacturing	• Fine Paper • Uncoated Free Sheet • Coated Free Sheet • Newsprint • Tissue • Containerboard
Market Positions	#1 Market Position	#1 Market Position	#2 Market Position

Unmatched Global Presence



Water Treatment Services: A Service Business

Operating the industrial customer's production plant



- Delivering Customer advantage™
  - Improve our customers' products and optimize their operations
- Develop innovative technology
  - Providing ever-improving integrated solutions
  - Technological expertise

- Invest $150 mm/year in R&D and Marketing
- Worldwide group with 450 Researchers (Engineers, Chemists, Microbiologists)
- Designed to provide program, technology and problem-solving
- Assistance to Nalco customers by:
  - New technology development
  - Technical support
  - Customer analytical and research laboratories

- Over 1200 Patents Registered
- 4 R&D 100 Awards in 2000
- ULTIMER
- Advanced Condensate Treatment
- TRASAR
- High Stress Polymer
- ART - Water Recycling

Environment, Health, Safety and Sustainability Principles

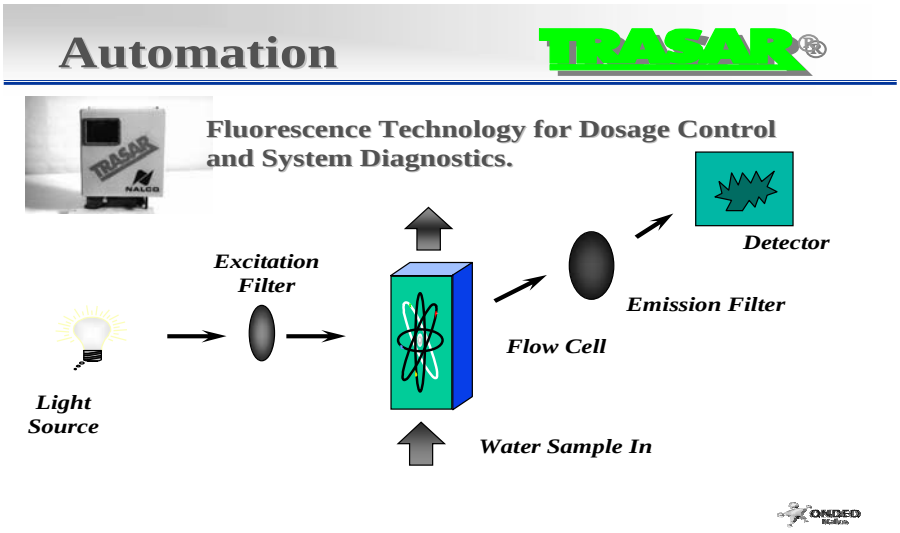
The Ondeo Nalco Company manages its global operations with concern for the health and safety of individuals, the environment and with a commitment to global sustainable development. We operate by the following principles:

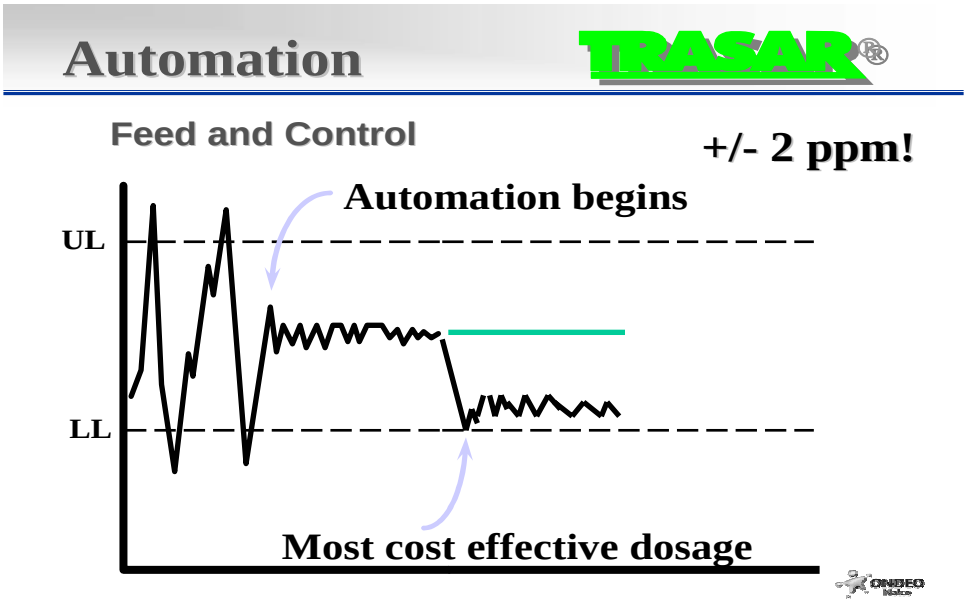
- Conduct business in a safe, secure and environmentally sound manner, consistent with Responsible Care®, the chemical industry's commitment to ensuring a chemical product's safe evolution from concept through customer use, to disposal, recycle or reuse.
- Develop environmentally sustainable and safe solutions – through our products, processes and technology – that bring value and confidence to our customers, employees, communities and our business.
- Comply with applicable laws and regulations and apply responsible standards where laws and regulations do not exist.
- Operate our facilities in a resource-efficient manner that protects the environment and the health and safety of our employees, contractors and the communities in which we operate.
- Strive for continuous improvement in the area of safety, health and the protection of the environment with the goal of zero injuries, illnesses, incidents, waste generation and emissions.
- Train all employees to work safely, preventing injuries to themselves and others, avoiding damage to property and protecting the public interest.
- Ensure procedures are in place to implement these principles and communicate openly about environment, health and safety issues.
- Support of these principles by all levels of management and all employees.

Business Partners: CONVENTIONAL

- **Sales on quantity (€/kg)**

    - sometimes apply more chemical product than really required to guarantee performance and efficency
    - basic automation (chemical feeding proportional to water flow)
    - Comply with existing regulation which is different from country to country

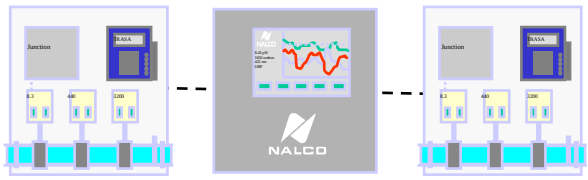




Automation: Diagnostics

- System Volume (m3)
- Blowdown (m3)
- Holding Time Index (hrs)
- Leak Detection
- Dosage control tracking
- Actives consumption
- Many more.

Automation: Smart System Example



- Multiple Systems Capability
- Multiple Parameters Capability
- Data Logging
- Data Processing
- Feedback Control
- Remote Alarm and Communication

Data transfer example through e-mail or text

- Multiple Systems Capability
- Multiple Parameters Capability
- Data Logging
- Data Processing
- Feedback Control
- Remote Alarm and Communication

Water Resource Management

Bio-Manage – a clean cooling advantage

- Comprehensive programme of biocides, monitoring , diagnostic techniques and consultancy services
- Emphasis on value, ROI, expertise, training
- Assure excellent process performance; helps our customers to improve their Environmental, Health and Safety performance

Bio-Manage is the Nalco brand name that encompasses our suite of biocides, monitoring, diagnostic techniques and consultancy services. This highlights to the customers that they are not just buying a chemical when they deal with Nalco - they are buying a package of products, services and expert advice that delivers improved performance in areas such as process efficiency, health and safety, environmental compliance, ease of use and demonstrates unique ROI. This will move the focus away from price per kilo to value.

We must all become expert at putting this message across to our customers. If we do not the result will be that we will end up fighting the price battle and losing.

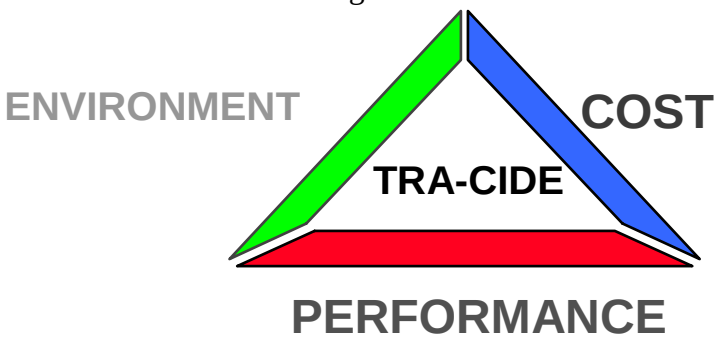
As we learn about our new product think about how we will ensure we do not product vend.

TRA-CIDE
Diagnostic System
For Advanced Biomanagement

- On-site analysis of system water toxicity
- Measurement of total viable biomass (ATP)
- Real time evaluation of biocide performance
- Immediate results

BENEFITS

- Determine the most effective biocide program
- Rapid adjustment to maximize performance
- Minimize chemical release
- Ensure no negative effect on effluent



A.R.T. ™ Advanced Recycling Technology

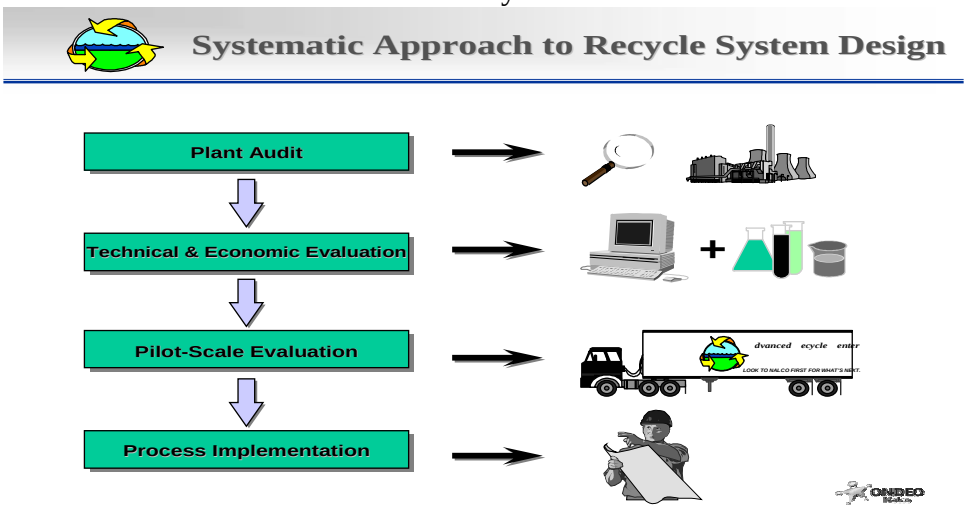
Typical Goals

- Reduce Raw Water Volume
- Reduce Discharge Volume
- Reduce Operating Costs
- Avoid Water Shortage problems
- Proactive Environmental Policy

ART is a Team of experts who apply Nalco's resources and experience to solve customer specific water resource management problems using innovative technology…

Typical Goals

- Reduce Raw Water Volume
- Reduce Discharge Volume
- Reduce Operating Costs
- Avoid Water Shortage problems
- Proactive Environmental Policy



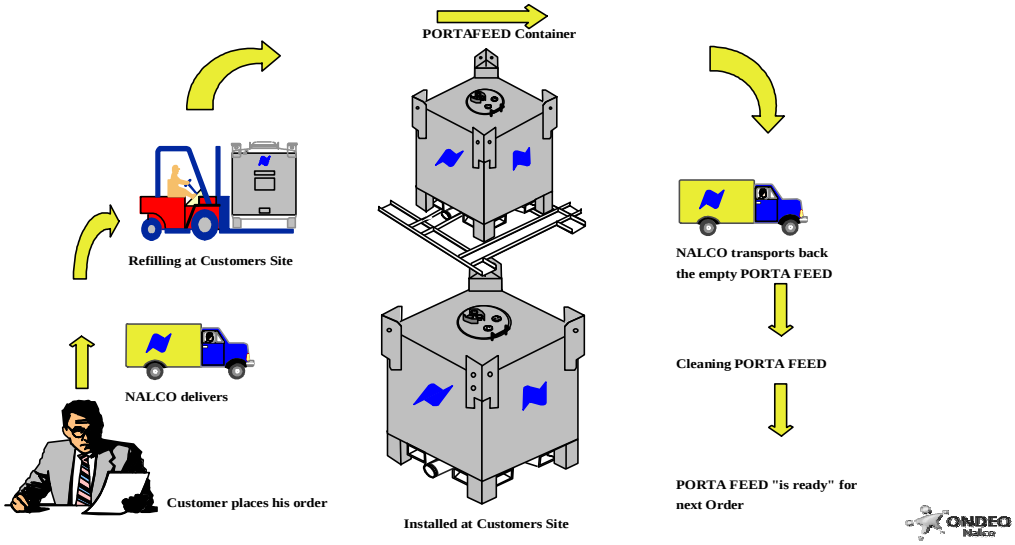
Product Stewardship

- **PORTA-FEED Advanced Chemical Handling System**
- **Zero Defect Bulk Delivery Service**
- **Industry Leading Material Safety Data Sheet Program**
- **24-Hours "ALERT" Emergency Response System**
- **Product Stewardship Customer Assessment**

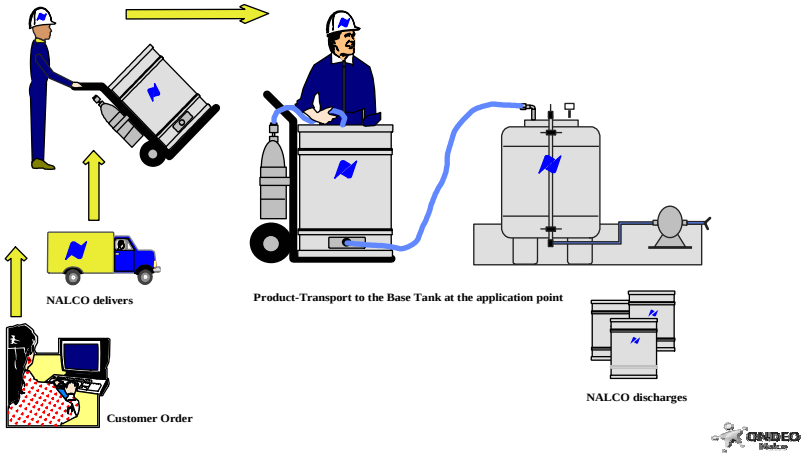
These programs and services help assure that our products can be stored, handled, used, and disposed of in a safe and environmentally responsible manner.
The potential exposure of people and the environment to our products is as low as reasonably possible.

- This program assure that our products can be stored, handled and used, in a safe and environmentally responsible manner.
- The potential exposure of people and the environment to our products is as low as reasonably possible

PORTA-FEED Nalco Delivery Systems



PORTA-FEED Nalco Delivery Systems

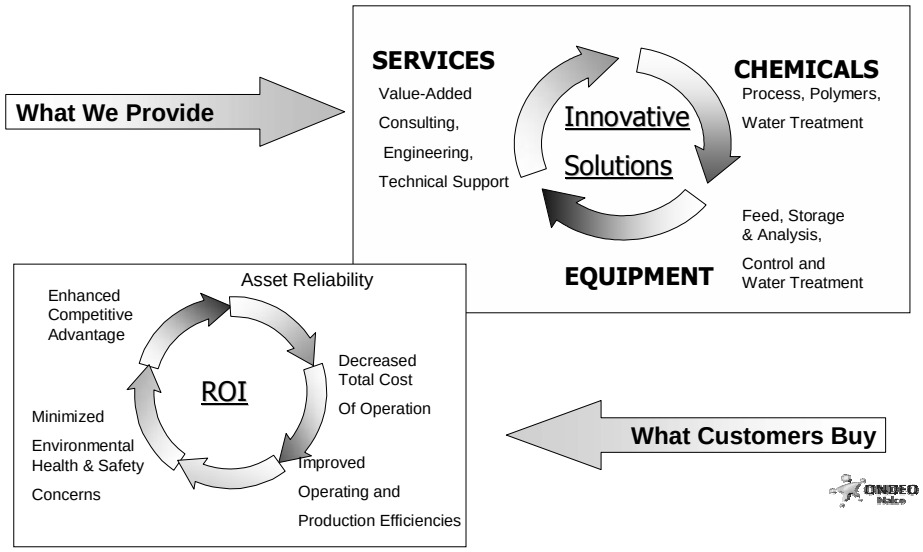


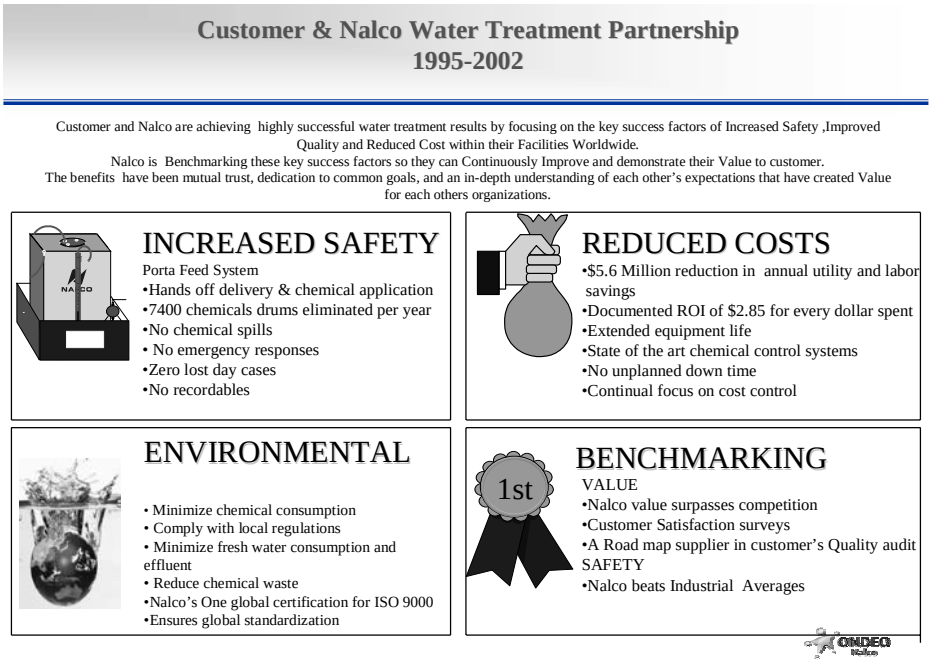
- Eliminate chemical handling
- Prevent chemical spills and eliminate chemical exposure hazards
- No residual chemical (typically 2 to 3% residual is left in the drums)

Since the introduction of PORTA-FEED in 1985, more than 3 million drums have been eliminated

- **Fixed monthly fee, price/unit production**: fixed cost and on budget υ **NO SURPRISE!**
- **Long term agreement**: investments on automation and control, requirements well defined, evaluation done on agreed parameters υ **RELIABILITY and PERFORMANCE**
- **Gainsharing**:saving on chemicals products consumption υ **MINIMIZE CHEMICAL RELEASE**
- **Best practices, benchmarking**: standard service, approved products

Business Model – Value Proposition





Chemicals Distribution: An American Legal Perspective
Liability and Risk Management in an Evolving Regulatory Environment

Robert W. Curry,
Partner, Edwards &Angell, LLP

Environmental Practice Group

The goal of the present Conference, which is being sponsored by the OECD and the Austrian Federal Ministry for the Environment, is to explore how chemicals distribution strategies might effectively be advanced towards bundling of services through leasing rather than merely selling chemical products. The broader context in which this goal is being tested is the promotion of economic and environmental sustainability by finding value in the distribution chain based on using ***less*** rather than more of the chemical products whose functionality is essential within a given industry or market segment.

Among the many conditions and influences that will serve to facilitate or impede development of this newer approach to distribution is the ***legal framework*** within the partners in these business arrangements will act. These partners include those direct stakeholders such as the chemical developer/supplier, and the customer whose ultimate product requires the use of the chemicals in the process of manufacture and marketing. Less direct but still critical "partners" include workers and invitees at the facilities involved in the manufacturing and distribution chain, and abutters living or working in the immediate area as well as within broader community impacted by the operation of these facilities. Also having a major societal interest as well as responsibility are the governmental authorities who have been or will be charged with both regulation of the production and distribution of the chemicals, and with enforcing laws which seek to respond to risks associated with releases of hazardous chemicals or the exposure of others to chemicals or their byproducts in ways that would be harmful to public health and the environment.

In my presentation at the Conference, I will comment, principally although not exclusively, from an American perspective, on the legal framework within which these partners must presently operate. Of obvious interest to the promotion of alternative, more environmentally sustainable chemical distribution strategies is the complex regulation of the development and introduction of new chemicals into the distribution chain, as well as the proposed use of existing chemicals for new applications. These are the activities whose regulation the chemical industry is well familiar. They include, in the U.S., *inter alia*, the Toxic Substances Control Act of 1977 ("TSCA") and the Emergency Planning and Community Right to Know Act of 1986 ("EPCRA"). These are activities that will also be regulated in the EC in part by the emerging regulations known as REACH (see, as of the time of this writing, the European Commission's Proposal for a Regulation of the European Parliament and of the Council Concerning Registration, Evaluation, Authorisation and Restrictions of Chemicals, 29 October 2003, COM (2003) 644).

I have chosen in the time allotted at the Conference to focus on the less direct but legally critical risk and liability issues affecting chemicals distribution under such laws, in the U.S., as the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended ("CERCLA", known as federal Superfund) and the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments Act of 1984, and the Pollution Prevention Act of 1990. These laws, although ostensibly enforced autonomously, in fact establish a framework of liability that partners in the chemicals distribution chain typically do consider (or should consider) in making business decisions about the form of a joint venture or similar business arrangement implied under the umbrella concept of "chemicals leasing." In this presentation, I refer to the legal concept of "environmental liability" as the present obligation, imposed by law, to make a future expenditure as a result of present or past manufacture, use, release or threatened release of a regulated chemical substance. I refer to the concept of "risk" in terms of the *potential* obligation to make a future expenditure as a result on an ongoing or future manufacture, use, release or threat of release of these substances.

The burden of this presentation is that these complex regulatory systems are designed, in terms of the present emphasis at this Conference, to identify and recoup the economic value realized by parties who fail to manage and control the impacts of their manufacture or distribution of hazardous chemicals and thereby to promote more environmentally advantageous business practices in the distribution process. Moreover, the way in which these laws operate have a definite impact on the stakeholders acting in the chemicals supply chain which is literally grounded in their perception of the costs, risks and liabilities attendant on the ownership and operation of the facilities at which these chemicals are developed, used and ultimately, to the extent not consumed in the process, disposed.

Among the positive impacts of these laws from the standpoint of the leasing strategy is the promotion of recycling rather than disposal and the minimization of pollution attendant on waste disposal, all of which involve services that might be bundled under the leasing approach. At the same time, I will discuss whether or not these laws can effectively be said, by their sheer complexity and focus on the facts of ownership and strict liability for release or disposal, to impede the widespread implementation of leasing, rather than selling, chemical products.

Chemical Leasing and Chemicals Management

- Assumes that the chemical is not consumed or emitted in the first process use
- The leading variant assumes that realizing the value of what is left requires significant intellectual as well as financial capital
- How does the law respond to this possibility?

Critical Legal Concepts: Environmental Liability

- "Polluter [Should] Pay" – a goal, rather than an enforceable standard.
- In the U.S., the ***owner*** of a facility is chief among those who are responsible for damages arising from environmental risks.
- ***Strict liability*** – without regard to fault – is the operative concept.

Chemical Products and Their Significant Environmental Risks

- Contamination of property
- Operations not in compliance with regulatory requirements/permits
- Third party exposures (workers, users, abutters)

Private Party Liabilities Associated with the Identified Risks:

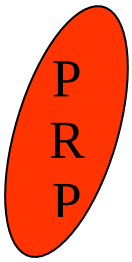
- Damages for cleanup on and off-site
- Natural resource damages ("NRD")
- Governmental fines and penalties
- Damages in "tort" for property damage, to extent not covered above, and for personal injuries

Key U.S. Laws in Managing and Accounting for Environmental Risks

- CERCLA (Federal "Superfund")
- RCRA (Waste management)
- Other Laws, e.g.

- TSCA
- EPCRA
- Securities disclosure laws

CERCLA (Superfund)

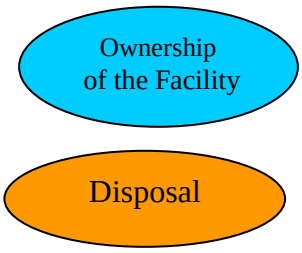


- Italia's Seveso TCP Release; the Galicia Oil Spill
- America's Love Canal; the *Exxon Valdez* Oil Spill
- Liability for Costs of *Response Actions* and for *NRD*

CERCLA and EU Liability Schemes

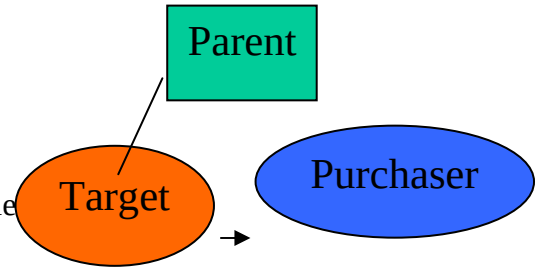
- CERCLA is directed to the federal government's authority (U.S. EPA) to cleanup and capture costs from responsible parties
- Does not cover personal injury (health) or private party property damages

CERCLA "PRPs"



- Current Facility Owners/Operators
- Past Owners/Operators "At Time of Disposal"
- Those Who "Arrange" Disposal
- Transporters Selecting Site of Disposal

Upstream/Downstream
CERCLA "PRPs"



- Parents of Subsidiary Corporations
- Shareholders of Corporations Can Be Liable ("Veil Pie
- Successor Liability
- Other Contractual Parties

CERCLA's Useful Product "Defense"

- "Any person who by contract . . . *arranged* for dispo
- So, if a Monsanto *merely sells* a chemical to its user, downstream handler spills it, user is liable but not M

Sellers are Not "Disposers"

Should this "Defense" Impede Leasing?

- Courts are divided regarding cases where residual value of used chemical at issue.
- Some focus on "intent" of parties.
- Others focus the transaction and ask: is it a subterfuge for disposal?

CERCLA and Leasing

- Facility Owners/Operators Remain Strictly Liable for Releases Whether or Not Chemicals Leased
- Chemical Manufacturers Merely Selling Product Can Avoid Liability
- Leasing as "Arranging" for Disposal

EU's Emerging Liability Regime

- Focus on "Operator" rather than "Owner"
- Activity-focused, differentiating among types of activities based on dangerousness with regard to causation and proof of negligence
- Directive's impact on leasing problematic in context of uncertainties in its implementation by the Member States and in its judicial interpretation through litigation

RCRA

- Regulates sites that treat, store or dispose of "hazardous wastes" (including USTs)
- Waste tracking from "generation" to "disposal"
- Imposes significant requirements for cleanup of sites where improper waste disposal occurs

Focus on physical

RCRA's Complex Waste-Management Continuum

- Waste generally not regulated as *Hazardous* (HW) if not also a "*Solid Waste*" (SW)
- Complex rules for ascertaining both, with multiple exceptions, whose logic and scope not transparent
- Complexity alone a disincentive to undertaking leasing

Certain Commercial Chemical Products

- Unused or off-specification products not SW if reclaimed
- But recaptured as SW if:
  - Otherwise used in a manner constituting "disposal"
  - Burned or used to produce fuel (unless the discarded product was itself a fuel)
  - Accumulated speculatively

Recycled Materials under RCRA

- Generally, reused or reclaimed materials
- May be SW or HW depending on methods
- Types of recycling: Closed loop, Off-line, Off-site

RCRA's Regulatory Incentives and P2

- Requirements scaled to volumes generated, but very difficult to avoid most stringent requirements imposed on LQGs

- RCRA's 1990 Pollution Prevention Act amendments (P2) encourages waste minimization and recycling is a key element, but the latter is not effectively regulated and incentives afforded often lost in the "noise"

Leasing as One Response to RCRA

- RCRA's regulatory focus on physical location and duration of storage should not ***discourage*** leasing.
- If chemical developer/supplier is willing to apply know-how and seeks to reduce "one off" transactions, RCRA affords at least ***some*** incentives to leasing through the recycling rules.

A Word About Those "Other Laws"

- TSCA and REACH
- Securities laws disclosures in the U.S.
- Chemical toxicity and product liability
- Know-how protection (especially if not patented)

Shifting the Paradigm Towards Leasing

- U.S. laws neither promote nor rule out
- Judicial review of a joint venture/lease concept will be required
- Major stakeholders may seek legislative clarifications
- Similar concerns likely within EU framework

PANEL DISCUSSION

Kick-off Statement: Panel Discussion:
"Will REACH boost Service-Oriented Strategies in the Chemicals Business?"

Karl G. DOUTLIK,
The European Commission

As a representative from the European Commission I would like to use this opportunity to stress that a number of ongoing EU-initiatives exhibit parallels to the new business models, which were presented during the past two days. Let me just mention the recently published Commission Communication "Towards a Thematic Strategy to Implementation of Integrated Product Policy – Building on environmental life-cycle thinking as the European Sustainability Strategy, but also to the diverse initiatives aiming to enhance eco-efficiency.

At the core of the recently proposed system for the new EU – chemicals policy is **REACH** – a single, integrated system for Registration, Evaluation and Authorisation of CHemicals. REACH would require companies that produce and import chemicals to assess the risks arising from their use and to take the necessary measures to manage any risk they identify. This would reverse the burden of proof from public authorities to industry for ensuring the safety of chemicals on the market.

This new model has been devised specifically to meet the challenges of Europe's future chemicals policy. These key targets are contained in the EU's 6th Action Programme for the Environment, which stipulates the following requirements:

"Chemicals that are dangerous should be replaced by safer chemicals or safer alternative technologies not entailing the use of chemicals, with the aim of reducing risks to man and the environment."

The Action program also demands to "…place the responsibility on manufacturers, importers and downstream users for generating knowledge about all chemicals (duty of care) and assessing risks of their use, including in products, as well as recovery and disposal."

It finally commits the Union to " *…**aim at achieving within one generation (2020) that chemicals are only produced and used in ways that do not lead to a significant negative impact on health and the environment …".***

The EU's future chemicals policy, of which the recently proposed REACH system represents the centrepiece, is the tool that should lead to these goals. REACH is based on the principle of documentation, evaluation and minimisation of hazards resulting from the chemicals – above all by the industry itself. The proposed new system is setting high standards for protection of health and the environment while safeguarding the competitiveness of enterprises and improving the potential for product innovation. This

balance would be to the long-term benefit of chemicals manufacturers, importers, users, small and medium sized enterprises, consumers and for health and the environment.
With the new conditions and the new circumstances, the REACH – System will establish, the conventional paradigm "supplier here – customer there“ will hardly be crowned with commercial success. The responsibilities are too interwoven and deep-seated and the line between manufacturer and user of chemicals is becoming less relevant, having the overall goals in mind.
In the framework of Europe's future chemicals policy and due to the obligation to document the environmental and health hazards associated with chemical substance, the supplier-customer relationship will be compelled to acquire an entirely new quality. The REACH system is in a way going to mandate an intensified dialogue between producers and users of chemicals in both directions of the supply chain:
On the one hand the supplier will have to document hazards, chemicals are showing, as well as risks occurring during their use and application. On the other hand also the user will be challenged to make new experiences gained during the handling and use of the chemicals available to his partners and to the system itself. These new obligations will require not only reasonable efforts by companies, it will also require a new culture in terms of information exchange, communication and cooperation.
In judging and quantifying the efforts the REACH system will require, the positive effects for the industry’s competitiveness must not be neglected. On account of the future legal requirements an intimate knowledge of the chemicals’ features and the effects during their life cycle can become a factor that might positively shape competition.

The REACH system has the potential to intensify cooperation and to intensify exchange of experiences. The business models presented during this conference can form the adequate commercial framework, the adequate structure to transform this intensified dialogue and cooperation into economic success. The information generated within the REACH system can be the precious basic material for the know-how development in service oriented strategies.
It is up to implementation of the REACH system to make sure, that this intensive form of cooperation will mobilise synergy effects, which – contrary to prevailing apprehensions – will give Europe a pronounced edge as a location for the chemicals industry.

Toshijiro OHASHI,
New Energy and Industrial Technology Development Organization

Chemical Product Leasing Business in Japan- Survey Results for Selected Experiences –

An Example of a Leasing Business in Japan
(Chemically Processed Home Use Rental Mops)

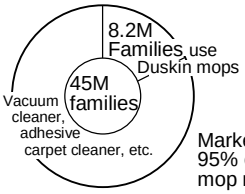
Company and Products

Floor mop Floor mat, etc.

Duskin Co. Ltd.
Established in 1963

Freed women from tiring dust cleaning work requiring wet rags

Market



Market share: 95% of "rental mop market"

Rental process scheme

Sales:
Floor mops: ¥780/month
Floor mats: ¥750/month
Average: ¥ 1,300/family·month

Sales distribution:
Delivery person: 25%
Franchisee & Duskin: 75%

Stakeholder's benefit

- User
  - Convenience (less labor and better function)
- Delivery person
  - Less time constraints (work time can be flexible)
  - Fashionable job

→ Attractive new job for housewives

Keys to success

- Creation of new business based on the following:
  - New chemical products (technology importation)
  - Lifestyle shift (spread of Westernized way of living → new needs)
  - Increased demand for women's jobs → new work force

Environmental impact

- Fewer chemical emissions released into the environment (better chemicals management)
- Long life use → low energy and material consumption

This example shows:

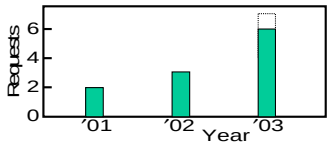
- A combination of new needs, new products and new work force
- A new housekeeping requirement was satisfied by a rental product

Background and Keys to Success

Increased need

- Requests for JICC* to "clean on commission" are steadily increasing

*Japan Industrial Conference on Cleaning



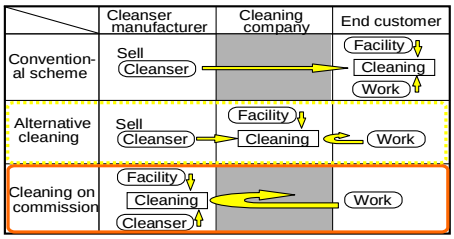
Background of needs

- Rapid change in products and processes
- Sophistication of cleaning technology

Product and function

- Various washing and cleaning of products and parts for industrial purposes

Business schemes



Needs for Leasing Type Business
(An Example in Industrial Cleaning)

Observation on Leasing of Industrial Cleaning

Present evaluation of "cleaning on commission"

- Quality: OK
- Delivery time: OK
- Cost: too high

As a result, this business is only at the study level

Present evaluation of "alternative cleaning"
This business started several years ago.
The number of companies grew to about 30 and then declined to approximately 10.

Barriers for new business

- Cleaning is regarded as a "low-tech" process, so users will not pay a lot for such a service
- Most users are small business enterprises, and the labor cost of cleanser manu-facturers is higher than that of users.
- Service contacts are not suffi-cient to enable easy recovery of investment.

For successful leasing of chemical products,the following is important:

- It is desirable that the value or cost of operations needed for using chemical products is large.
- Product manufacturers must make the best use of their technology, skill, knowledge and now-how.
- It is advantageous if the operations are technically difficult or require unique facilities.
- It will be more advantageous when the environmental or safety requirements of laws and regulations become stricter.
- Various business models, including quasi-patterns should be considered.

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