11/2011
November

CHEManager EUROPE

THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCE MARKETS

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Non-compliance in pharmaceutical production is on the rise.

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Under Construction

AkzoNobel will invest around €60 million to increase the production capacity of its Automotive and Aerospace Coatings business in China.

Korea's LG Chem is considering delaying a new investment plan to build a polysilicon production plant.

Europe's biggest urea plant goes on-stream in the Netherlands.

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People

Nicolas Boël has been unanimously nominated as Solvay's board of directors, effective May 9, 2012. Boël will be replacing current chair Aloïs Michielsen.

Wolfgang Büchele will be replacing Harri Kerminen as president and CEO of Kemira Oyj on April 1, 2012.

John W. Marsland has been appointed senior vice president and general manager, Global Merchant Gases at Air Products.

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No Compliance, No Sale

How the Complex World of Regulations is Affecting the Industry

Berndt Stürznickel
Product Owner for Product Compliance Process Industry, SAP
(Photo by Andreas Endemann)

Regulations – Compliance in the chemical industry has gained a tremendous amount of significance over the last several years. Reach in Europe and the Toxic Substances Control Act in the U.S. are not the only regulations setting the standards for compliance; many other countries are coming up with regulations of their own as well. Also, gaps in supply-chain communication can sometimes lead to a supplier being inadvertently non-compliant. Brandi Schuster caught up with SAP's Product Owner for Product Compliance Process Industry Berndt Stürznickel at the company's Chemicals Compliance Customer Conference on Oct. 19 in Königstein, Germany. "If you have a distribution company between the producer and the customer, it is very possible that the original supplier doesn't know what the end consumer has done with the product," he said.

CHEManager Europe: How important is compliance in the chemical industry?

B. Stürznickel: Chemical compliance is nothing new for the industry. Based on the customer interviews I've conducted, compliance and related issues, such as sustainability, have absolutely the highest priority — even higher than making revenue. I've talked to companies who have recalled products that were still in the early development phase because of concerns regarding compliance and other issues that had to be solved before the product could be sold.

What are the consequences of non-compliance?

B. Stürznickel: Entire batches of a product can end up being recalled. This could cost a company millions of euros and also might damage the brand. It could also be that the product itself is compliant, but not compliant in terms of what the customer wants to do with it. For example, if a company supplies substance to a customer and they want to incorporate it into a cosmetic product, the supplier might be violating purity standards.

How clear does usage intent have to be when supplying a product to a customer?

B. Stürznickel: This is something that sometimes means the supply chain can be disrupted. At the end of the day, what the customer wants to do with a product isn't always clear to the supplier. If you have a distribution company between the producer and the customer, it is very possible that the original supplier doesn't know what the end consumer has done with the product. It's not that anything has been done incorrectly, but the supplier simply doesn't have the full scope of what the customer wants to do with it. That is a problem.

Back in 2002, SAP did a case study for the first version of Reach. Four supply chains were observed, and in one finding, the original producer of a substance was absolutely surprised about what one end consumer did with it. And this was a simple supply chain with only a few steps. This can play a significant role when it comes to different compliance situations, such as Reach, cosmetics, bioscience, etc.

What can companies do in terms of supply-chain communication in order to cut out these cases of inadvertent non-compliance?

B. Stürznickel: The Reach legislation defined the first benchmark, so supply chain communication is really key for most companies. Also, the further one goes down the supply chain, the more important communication becomes. For article producers and consumer-product manufacturers, supply-chain communication is critical — not only in terms of Reach, but also when it comes to exposures in areas and user protection.

Also, it is important to know what the customer's purpose and intention is when incorporating a substance into a product. That is of utmost importance. Yet, this is one of the biggest hurdles within the chemical industry and its customers.

Who has the most responsibility when it comes to communicating in a supply chain?

B. Stürznickel: Everyone has the same responsibility.

What about in terms of being aware of that burden of responsibility?

B. Stürznickel: if we talk about the process industry itself, most people are aware of the responsibility they carry; in the regions in the world with a long-lasting history of compliance, that is. The real problem isn't being unaware of responsibility; it's more of being unable to bring supply chain communication to a proper level. For example, maybe the problem is something as simple as missing contacts. This can unravel very quickly: I don't know who to communicate with; I don't know the counterpart in the company; they use different tools than we do; I don't have the proper IT tools in order to execute communication, etc.

There are plenty of different reasons when the communications process doesn't work the way it should. However, most companies are aware that supply chain communication and the process of exchanging information are important for them – especially because a large number of regulations similar to Reach will come into force in many countries around the world

You said in countries with a long-lasting history of compliance. What about countries where sometimes compliance issues can be a problem? The usual example here is, of course, Asian countries.

B. Stürznickel: First of all, Asian companies are interested in selling to Europe. They know that compliance is vital for them. Without compliance, there are no sales. So that is clear. The point for them is we have such a vast amount of regulation — Reach; the Regulation on Classification, Labeling and Packaging of Substances and Mixtures (CLP); Globally Harmonized Systems (GHS); etc. This leads to confusion on the side of these Asian companies. It's not that they are lacking the willingness to comply; rather they are lacking the knowledge as to how to comply.

But this isn't necessarily an Asian problem.

B. Stürznickel: It is more or less a general one. The same problem can affect small and medium-sized companies in Europe. From a regulatory perspective, the Asian Pacific region is the most dynamic region when it comes to product compliance regulation. This is where we see a lot of the "Reach-like" regulation popping up.

Which just complicates matters further, particularly for multinational companies who find themselves having to comply with different regulations all over the world, such as the TSCA in the U.S. and Reach in Europe.

B. Stürznickel: This means those companies must have an intensive supply chain communication process. Those companies must also bear in mind the compliance situation of the supply chain connection. For example, let's say I want to produce product A in country B, and I have a list of three suppliers. When it comes to international shipments, it can vary between compliance and non-compliance, depending on which supplier I choose. Tracking the supply chain combination is very important for companies. Many companies are defining substances that can be used in a production process that is globally available at the same quality level and has global compliance coverage. And oftentimes, these decisions are coming from the top.

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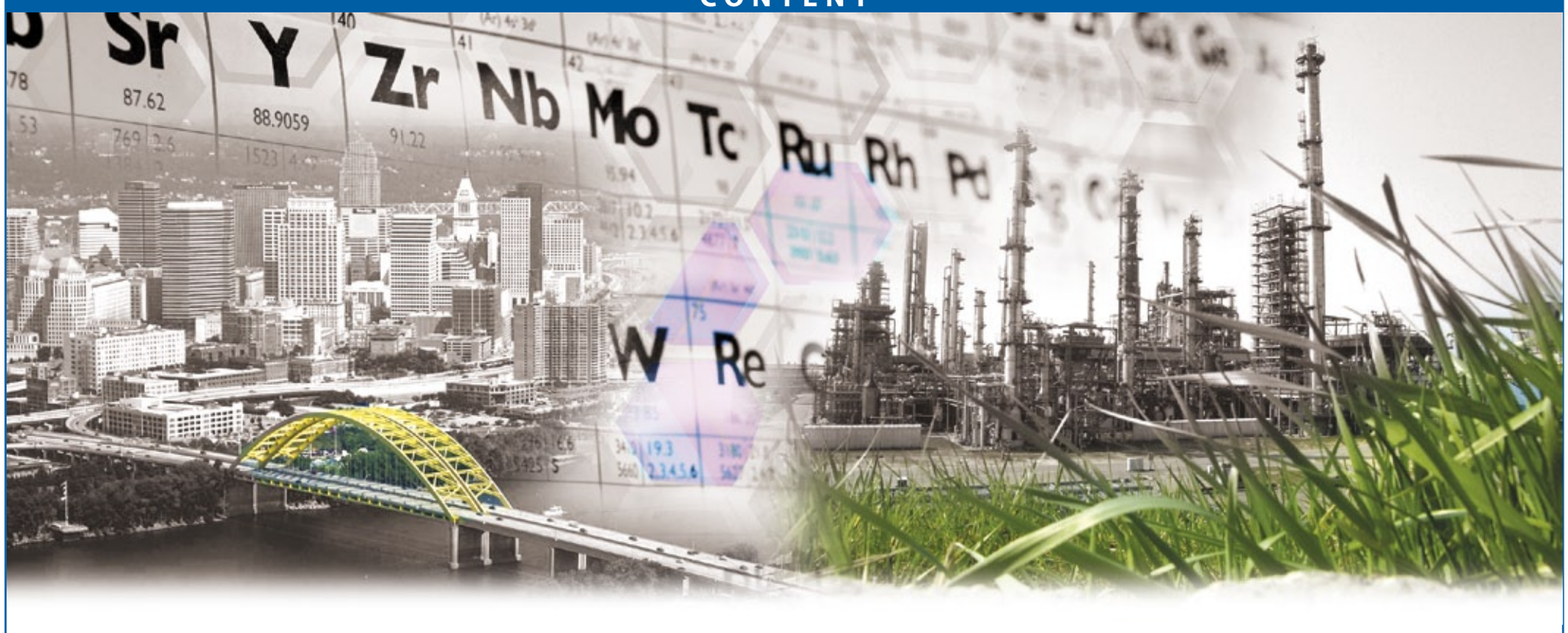

Lonza Sees Growth on Pharma Outsourcing

Swiss drugs industry supplier Lonza is set to grow underlying sales and operating profit this year despite the strong Swiss franc as it benefits from robust demand from pharmaceutical groups, particularly at a plant in China.

But the group said in its third quarter business update that the franc and high raw material prices had weighed on its margins, particularly at its life sciences ingredients unit, and that this was unlikely to change any time soon.

Like many other Swiss companies, Lonza is battling with headwinds from the franc, which hit a series of record highs against the dollar and the euro earlier this year.

Lonza now expects the franc to have an impact of 80 to 90 million francs on its operating profit, up from a previous forecast of 70 million francs ($81 million).

Lonza Chief Executive Stefan Borgas said, however, the Swiss National Bank's move to cap the franc against the euro last month had reduced volatility.

Lonza has just wrapped up its $1.2 billion buy of U.S.-based Arch Chemicals, a move that will make the group less vulnerable to currency movements and boost its presence in fast-growing emerging markets.

"The long-term prospects for Lonza should still be intact, as the trend for outsourcing for cost

Stefan Borgas
CEO, Lonza

reasons is set to continue and life science products are likely to become more significant," analysts at Wegelin said.

Lonza is well placed to benefit from pharmaceutical companies' efforts to make their manufacturing processes more efficient as they face expiring patents on their top-selling drugs and rising price pressures.

Swiss drugmaker Novartis said it planned to cut 2,000 jobs in Switzerland and the United States to help it deal with the tough pricing environment.

"This announcement by Novartis is just another example that the pharma companies are serious about streamlining their networks and that means that Lonza as a partner for them is much more viable in these kinds of changes," Borgas said.

"For the next one, two, three, years ... I would expect Lonza to maybe profit from this trend," Borgas told journalists on a conference call, adding, however, he did not expect Lonza to benefit directly from Novartis' cuts. ■

Sinopec Completes Pecten Cameroon Stake Purchase

Sinopec Group said it has completed its acquisition of an 80 % stake in Pecten Cameroon from Royal Dutch Shell, gaining its first oil production assets in the African country.

Addax Petroleum, a unit Sinopec Group bought in 2009, inked the $538 million deal with Shell Overseas Holdings on May 25 for the stake in Pecten Cameroon, which owns interests in 12 blocks in waters off Cameroon.

Pecten Cameroon Co, 20 % owned by Cameroon's National Hydrocarbons (SNH), is the operator of two of the blocks.

Sinopec Group, the second-largest Chinese oil producer, said it will get 11,900 barrels of equity oil output per day or 600,000 tons a year from the joint venture in 2011.

Sinopec Group, also the top oil refiner in Asia, runs most of its businesses via listed China Petroleum and Chemical Corp or Sinopec Corp. ■

Huntsman Q3 Beats On Higher Prices

Higher prices for chemicals used to make insulation and paint helped Huntsman post better-than-expected quarterly results. While the results beat expectations, Huntsman's 20% price increase dented volume by 5%, mimicking a problem faced during the quarter by other large chemical makers amid tough economic times.

"Sure, as pricing goes up people will not buy short-term," Chief Executive Peter Huntsman told Reuters. "But I don't think that pricing is affecting demand as much as the overall macroeconomics."

The company's customers – which make goods bought by consumers – are drawing down their own inventories to wait out the weak economy before buying more supplies, he said.

Huntsman said he is bullish on his company's potential for the rest of the year, especially in North America where he said he is not seeing consumer demand slip in any of his business units.

"Longer term, I think the U.S. economy is doing better than the numbers would have us believe," Huntsman said.

For the quarter, the company posted a net loss of $34 million, or 14 cents a share, compared with a profit of $55 million, or 23 cents a share, last year.

Excluding $155 million of restructuring charges and other one-time items, the company posted a profit of 45 cents a share.

Analysts had expected earnings of 43 cents a share, according to Thomson Reuters I/B/E/S.

Revenue rose 24% to $2.98 billion, above analysts' expectations of $2.87 billion.

Peter Huntsman
CEO, Huntsman

In September, the company said it will close some Swiss production facilities in its textile dye units. Roughly 500 employees will lose their jobs.

The shutdown was designed to mitigate adverse foreign currency conversion charges from the Swiss franc, which has risen against the U.S. dollar in the past year.

Huntsman's third-quarter earnings were harmed by $17 million due to the strong Swiss franc.

Sales of Huntsman's polyurethanes, used to make insulation, jumped 26% to $1.21 billion. And sales of pigments, including the popular titanium dioxide white pigment, rose 39%.

Volume fell in all but one of Huntsman's units, indicating that not all customers are willing to pay higher prices. Volume was flat in the performance products unit.

Still, Wall Street cheered the earnings beat. Shares jumped 15% to $12.63 in midday trading on Wednesday.

"We're very encouraged by a record third quarter and I think – barring some sort of cataclysmic event between now and the end of the year – we're headed for a record big year," Peter Huntsman, the CEO, said. ■

Novozymes Trims Sales Outlook after Q3 Profits Rise

Novozymes, the world's leading industrial enzymes maker, is keeping a tight grip on costs to help raise profits this year as sales growth looks set to be slower than originally forecast.

The Danish company, whose enzymes are used to make consumer products from detergents to biofuels, said general uncertainty about the global economic situation had made customers behave more cautiously, and that cautious behavior would continue throughout the year.

Novozymes forecast 2011 profit (EBIT) growth would be between 9 and 11% instead of a previous range of 8 to 11%, but lowered its estimate for sales growth in Danish crowns to around 8% from an earlier range of 8 to 11%.

Chief Executive Steen Riisgaard said in a statement on the company's third-quarter earnings that some customers were holding back on their purchases due to the heightened economic uncertainty.

"As a consequence, and with the expectation that customers will continue to be cautious in the fourth quarter, we have adjusted our full-year sales growth expectations to the lower end of the previously given ranges," Riisgaard said.

"However, more significant changes to the global demand situation have not been included in the full-year guidance," the company said.

Growth in household care enzymes, the biggest category, continued to be driven by increased use of enzymes in detergents to enhance wash performance, enable low-temperature washing, and replace conventional chemicals. ■

DOW CORNING

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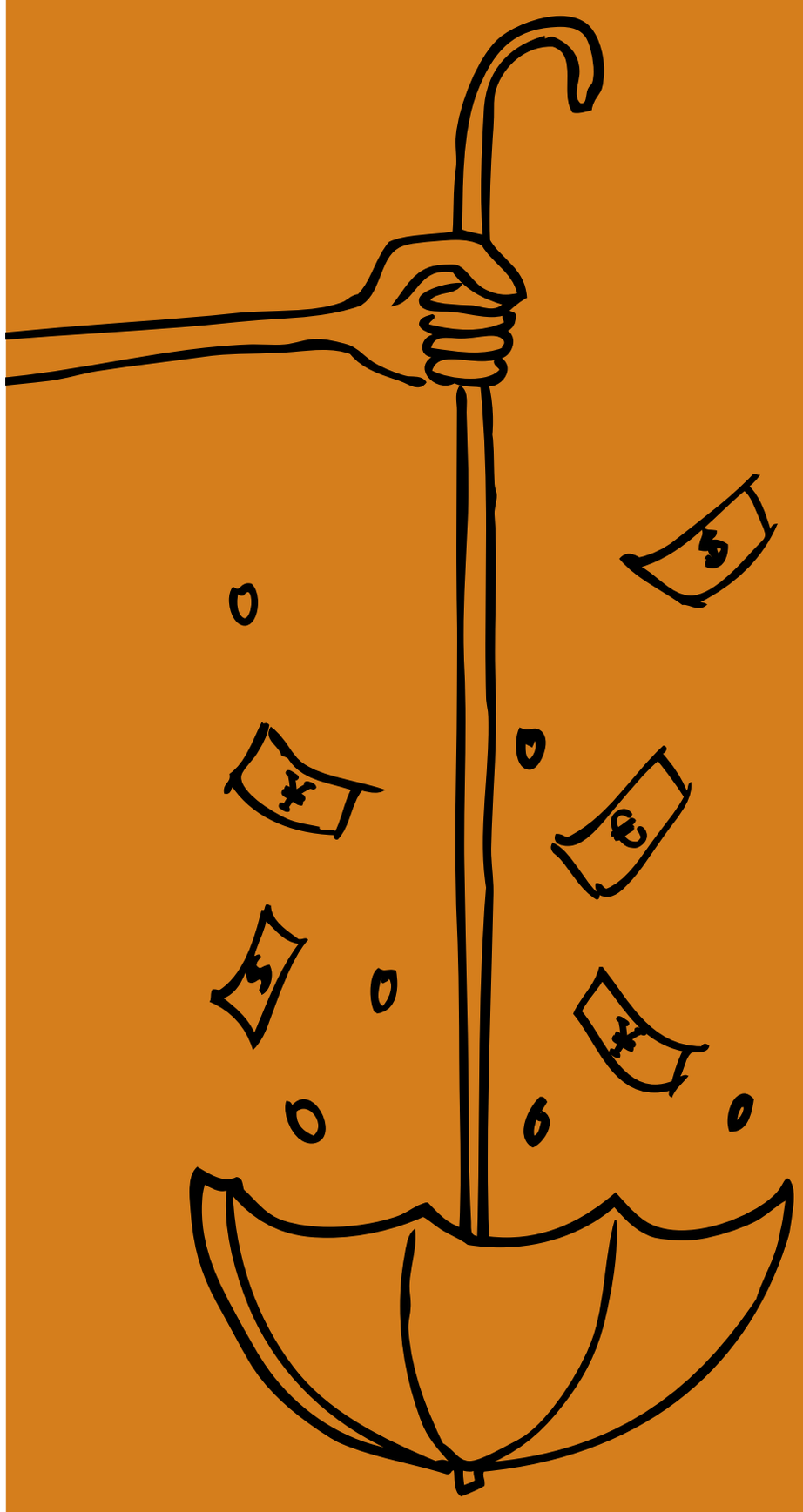

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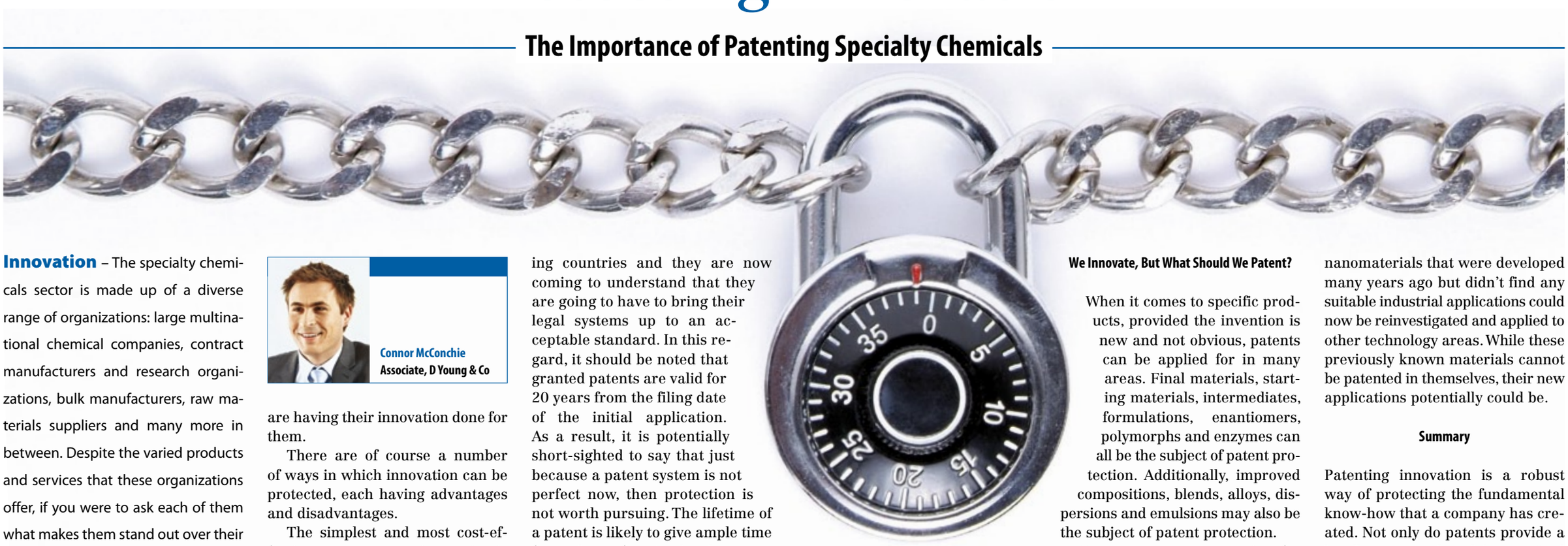
Protecting Innovation

The Importance of Patenting Specialty Chemicals



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Innovation – The specialty chemicals sector is made up of a diverse range of organizations: large multinational chemical companies, contract manufacturers and research organizations, bulk manufacturers, raw materials suppliers and many more in between. Despite the varied products and services that these organizations offer, if you were to ask each of them what makes them stand out over their competitors, it is likely that a similar answer will emerge: "innovation."

At this summer's Chemspec Europe event in Geneva, "innovation" was touted as being the key to most companies' offerings: innovative products, innovative processes, innovative strategies, innovative solutions. The list seems endless. Clearly, it seems that in order to be relevant in the current specialty chemicals sector, you have to be an innovator.

Innovation, Great – But What About Imitation?

While there can be no doubt that offering innovative products and services is desirable, what good is innovation if it can be imitated? The answer is probably "no good at all." In fact, failing to protect innovation is arguably more damaging than never innovating in the first place. After all, if innovation requires an investment in time and money, if is never actually protected, then the reality is that the time and money is simply being spent for the benefit of someone else; in effect, competitors

Connor McConchie
Associate, D Young & Co

are having their innovation done for them.

There are of course a number of ways in which innovation can be protected, each having advantages and disadvantages.

The simplest and most cost-effective way to protect innovation is to keep the know-how behind the innovation secret. While this option may be adequate in some situations, the ability to reverse engineer innovative products can mean that this method may only buy a couple of years of innovation "lead time" at best. At worst, the know-how is leaked and the competitive advantage is effectively lost.

Patents – More Than Just A Piece Of Paper

A more robust option is to use patents to protect the innovation. Of course, patenting actively requires the disclosure of the know-how behind the innovation. As a result, patenting is seen by some as giving an advantage to competitors in countries where patent protection is deemed to be less effective.

However, it is suggested that perhaps this view may be a little overstated. While it is acknowledged that the patent systems of a number of emerging territories have not been perfect at protecting the interests of patentees, these systems are improving. Pressure is being put on those underperforming countries and they are now coming to understand that they are going to have to bring their legal systems up to an acceptable standard. In this regard, it should be noted that granted patents are valid for 20 years from the filing date of the initial application. As a result, it is potentially short-sighted to say that just because a patent system is not perfect now, then protection is not worth pursuing. The lifetime of a patent is likely to give ample time for underperforming legal systems to catch up, and so potential problems with enforcement provisions may be addressed well before the expiry of the patent.

Therefore, companies refusing to protect their innovations through patents because of historical enforcement difficulties are potentially giving up an opportunity to obtain many years of invaluable patent protection. Indeed, rather than keeping imitators at bay by keeping the relevant know-how secret, it could be argued that innovators who fail to patent are in fact giving imitators a free pass to reverse engineer and obtain the know-how, safe in the knowledge that legal action from a patent infringement suit is not an option.

Given that the gulf in investment from research and development to launch is greatest in high technology industries, then the risk of not protecting the know-how behind the innovation must also be greatest. Of course, there is a cost associated with patenting that may not be considered by some to be worth the resulting protection, especially in the short term. However, businesses should not overlook the fact that as well as providing robust protection of their innovation, patents also can also actively add value and contribute to their business in a number of other ways.

Patents are seen by potential investors as a significant measure when assessing the value of a company. Accordingly, as well as actually defending the know-how behind innovation, patents can provide a platform for stimulating further investment and additional innovation.

Also, patents and other intellectual property can be leveraged to obtain additional funding and investment. It is very difficult (if not impossible) to leverage unprotected know-how and so patents can possibly provide a route to additional funding not conventionally available.

In view of the ability of patents to both provide protection for innovation and at the same add value to a balance sheet, what areas of technology should be the focus of patenting activities in the specialty chemicals sector?

We Innovate, But What Should We Patent?

When it comes to specific products, provided the invention is new and not obvious, patents can be applied for in many areas. Final materials, starting materials, intermediates, formulations, enantiomers, polymorphs and enzymes can all be the subject of patent protection. Additionally, improved compositions, blends, alloys, dispersions and emulsions may also be the subject of patent protection.

However, patent protection for improved and scaled-up processes should also be considered. Improvements to otherwise known processes can be particularly important for contract manufacturers. If a process can be improved to increase yield, reduce temperature and reaction times or reduce harmful by-products, it should be protected. By being the sole provider of an improved process, cost reductions can be passed onto customers and therefore provide a tangible competitive advantage. Indeed, rather than just claiming to innovate, companies who patent such improvements can show that the innovation benefits their customers' bottom line.

The ability to patent new uses of known substances should also not be neglected. In many instances, it is the new application of an old substance that proves to be particularly profitable, especially where the cost of the product is low or has yet to find a suitable industrial application. For example, the ability to patent new uses of known substances may be particularly relevant in resurgent technology areas such as the nanosector. Academically interesting nanomaterials that were developed many years ago but didn't find any suitable industrial applications could now be reinvestigated and applied to other technology areas. While these previously known materials cannot be patented in themselves, their new applications potentially could be.

Summary

Patenting innovation is a robust way of protecting the fundamental know-how that a company has created. Not only do patents provide a legally respected and harmonized way of preventing others from imitating innovation, patents also provide investors with a more tangible means of valuing a company. Patents can therefore be seen as actual evidence of "innovation" and lend some credibility to using a term which is coming fatigued. Also, the additional ability of patents to potentially provide alternative means for securing investment should not be overlooked. Patents can provide a versatile tool in protecting, quantifying and even strengthening the critical know-how which is at the heart of the "innovation" which the specialty chemicals sector values so highly.

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No Compliance, No Sale

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Is it becoming more common that supply chain communication is becoming more of a board priority?

B. Stürznickel: It is getting more and more to this level. It is becoming clearer that compliance isn't just about Reach. In order to deal with that, many companies have begun to define a corporate-wide approach with support from the C level.

How has the compliance situation changed over the last couple of decades in the chemical industry?

B. Stürznickel: In the past, a compliance document was simply something that was created at the end of a process and was assigned to a logistics shipment. Back then, the availability of the safety data sheet was checked. Sometimes shipments would go out and the safety data sheet would be provided two weeks later. Sales were key.

Now the situation is much more complex. First the registration must be checked by customs, not by a chemical enforcement agency within the country. So, the pre-registration, registration and existence on the existing chemical substance list must be shown. If there is a problem with any of these items, the shipment gets held up at customs, which can affect the sale.

Brandi Schuster speaks with Berndt Stürznickel at the SAP Chemicals Compliance Customer Conference in October. (Photo by Andreas Endemann)

Also, as I mentioned earlier, there are more and more Reach-like regulations popping up. Also, more consumer product regulations are cropping up, so I think in 2011 it is easy to say that more than 20 countries released new consumer product regulations, and in each country at least one new regulation. So we can easily count between, let's say, 20 and 50 new consumer targeting, product targeting regulations. In the end, companies have to do more checks and as a consequence, it becomes clear that it creates a compliance and logistical challenge for companies. SAP supports its customers not only with proven-in-use software solutions like SAP EHS Management or SAP ReachCompliance, but also offers regulatory content – the key to staying compliant.

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European Chemical Groups Downbeat on Growth, Costs

European chemical groups warned of slowing demand in the construction industry, compounding problems with rising raw materials costs as they reported third-quarter results.

Global chemical industry leader BASF reported higher-than-expected quarterly earnings, but warned that growth was slowing as customers run down inventories.

"BASF's customers planned more cautiously, reduced inventories, and partially delayed orders in expectation of possible falling prices," it said in a statement.

The chemical industry's dependence on highly cyclical investment goods makers, car manufacturers and the construction industry makes it especially vulnerable to a downturn.

In addition, the overhead costs tied to its massive plants drag earnings lower when demand and capacity usage drop, although a dip in the price of oil since May has eased some cost inflation for some petrochemical raw materials.

"Europe looks to be the worst of all. We have been fairly downbeat on growth prospects, if we can even talk about growth at all," said ING analyst Jan Hein de Vroe. "They all stick to their guidance, but these were never really challenging."

He said underlying results for the sector are worse than the headline consensus estimates and the companies are currently relying on cost cuts to protect earnings. Belgium's Solvay, which bought French rival Rhodia in September, said demand for vinyls and special chemicals has slowed, but stuck to its full-year outlook for improved core profit at its chemicals and plastic units.

Solvay said the slowdown in global demand for PVC, used in construction "should be emphasized." The impact was stronger in Europe, it added.

French specialty chemicals group Rhodia reported quarterly REBITDA of €273 million, up 16% from the year-ago period.

Germany's Bayer said its MaterialScience unit, which makes the transparent plastic for the panoramic roof in Daimler's Mercedes SLK convertible, would have adjusted full-year EBITDA of €1.3 billion.

The group had previously predicted the unit would achieve a gain on last year's level of €1.36 billion and cited higher raw material and energy costs for the revised outlook.

Belgian chemicals and plastics group Tessenderlo said its plastic pipe system and profiles unit suffered a decline in profits, hit by low demand in construction.

Even though construction and automobile markets remain weak, U.S. chemical maker DuPont reported higher-than-expected quarterly profit, boosted by price hikes for products such as titanium dioxide, a white pigment known as Ti02 that is used to make paint.

Dutch group AkzoNobel, the world's largest paints company, abandoned its 2011 profit outlook citing slowing economic growth and rising cost, such as Ti02. ■

DSM Sees Slowing Demand After Q3 Tops Forecast

Food and chemicals group Royal DSM said lower consumer and business confidence was hitting demand in the electronics and electrical sectors, after the Dutch company reported quarterly profit that beat estimates. The chemical industry is particularly exposed during economic slowdowns because of overhead costs for production plants as well as the dependence on highly cyclical machinery makers, car manufacturers and the building sector.

Although DSM has sold off its lower-margin bulk chemicals businesses to concentrate on less cyclical food ingredients and high-end plastics, Chief executive Feike Sijbesma said DSM would not be immune to a deterioration in the economy.

Still, the company, which makes vitamins and food supplements for humans, fish, poultry and cattle, reiterated 2011 would be a strong year.

Chief Financial Officer Rolf-Dieter Schwalb said the slowdown in the electronics and electrics sector had continued into the fourth quarter and construction markets were expected to remain weak for the next few years.

"We clearly see a softening in demand, but that is all we can say at the moment," Schwalb told reporters, declining to comment on the 2012 outlook. "The economy is not growing as fast as it was before and we have to be mindful of that." ■

Strategic Raw Materials

More Than Just Volatile Markets

Raw Material Shortages – Volatile markets have been giving purchasers quite a bit of a headache for some time now. However, this might be the less severe problem compared to supply shortages that have to be expected or that are here already for a notable number of strategic raw materials. Many companies down the value chain seem to be not alarmed, yet.

Prof. Dr. Ronald Bogaschewsky
University of Würzburg

But it is obvious that disruptions in the raw materials supply chain will have major effects on availabilities and prices of all parts and components that need these materials in their production process. Rare earths, for instance, are needed for many technically advanced products in electronics, in "green products," etc. and cannot be substituted by other materials without substantial loss in performance, quality, endurance, or cost-effectiveness.

Strategies for Volatile Markets

The short term problem is volatility. And this disturbing condition of certain supply markets is prone to stay for quite a while due to speculations by professional investors that are not backed by real demands for raw materials. As a matter of fact, nobody can really predict where certain supply market prices will go in the short- to mid-term. Purchasers therefore already switched to short- and very short-term contracts, wherever possible and reasonable.

Financial instruments (hedging) are applied by larger companies, for a price premium, of course, but the majority of small and medium-sized companies have to struggle closing one contract after the other at more or less acceptable conditions. Only some companies, such as the sports equipment manufacturer Puma, are going for long-term contracts in order to have a more reliable basis for price calculations for their next collections to come. Others, such as Adidas, from the same industry seem to be luckier, since they outsourced their entire production.

However, this is neither always possible nor desirable in any case. It is the sad truth that so far investment companies, banks, financial agents and other people with lots of many are gambling intensively on the raw material markets. Companies in need for these materials are well advised to apply technical and chart analyses in order to have a chance not to get "ripped off" by the markets.

Prepare for Supply Shortages

It has been reported frequently in the media that China delivers up to 97% of all rare earths for customers around the world. As announced by the Chinese government, China is closing down illegal mines and is putting more pressure on the mining companies and consecutive production stages to stick to the more severe (or less lax) environmental regulations. But the major threat to companies outside China is that the government wants to make sure that companies producing in mainland China have access to all raw materials needed for production, and that this supply comes for very competitive prices. As a matter of fact, China itself already consumes 60% of all strategic rare earths on the market. Due to the fact that especially heavy rare earths are primarily needed for innovative technologies, China uses this pole position to foster its own industries. Furthermore, companies from abroad are forced to invest into the Chinese market by setting up manufacturing facilities on the mainland, thus bringing highly welcome, latest technologies into the country.

Supply Strategies for Strategic Materials

Many companies work hard on finding substitutes for critical materials. Henkel, for instance, invented new polymers to overcome supply shortages in ethylene vinyl acetate, a substance needed for producing adhesives. Another, strategy might be backward integration. German energy company RWE for instance set up a plant for pellets production in Georgia, U.S., to benefit from the large timber resources in this state, while demand for timber products in the U.S. is declining. It is a profitable option to export pellets to Germany and use them as biomass in their usually coal-driven power plants.

As most industries went in the opposite direction from the 100% self-owned value chain practiced by Henry Ford in the early 1910s, backward integration seems an odd opportunity. Companies like Porsche or BMW are down to 15% value-add of the automobiles they are producing. However, backward integration in this case could mean jumping all the way to the beginning of the value chain in order to get access to strategic raw materials that are critical for one's own production process or for other members of the value chain the companies has to rely on.

There are more examples from the steel industry where the steel producer invested in mines to back-up supply options. In some cases, getting involved in the first step of the value chain could not only secure supply but may also help in pushing the environmental and/or ethical image of the company. Nestlé, Mars and Unilever are all engaged in projects to help farmers in the developing world to set up a more effective and more efficient farm. They work on convincing farmers to quit planting coca and switch to cocoa, coffee and the like by awarding them with long term contracts. Accompanying social projects for better education, medical fitness, etc. are run.

Prepare For The Future

Wherever possible, it seems to be even more valuable than ever to employ an intense relationship management to strategic suppliers and to do anything to be perceived as a preferred customer by the relevant suppliers. If things on the supply markets are turning even worse, it seems to be inevitable to team up with other companies in order to get better access to the relevant supplies. In Germany, the "Raw Materials Alliance" has been started by the Federation of German Industry, an effort to bring together companies in need of strategic raw materials and to invest in mining and supply projects together. Basic data about geological resources are provided by the German Mineral Resources Agency, a subdivision of the Federal Institute for Geosciences and Natural Resources. Besides collecting geological data, options for substituting materials and for recycling as well as closed value chains are developed by the Fraunhofer ISC (Fraunhofer Institut für Silikatforschung) in cooperation with the Chair of Resource Strategy at the University of Augsburg, Prof. Dr. Armin Reller. Practitioners from all industries are developing opportunities in the group "Rare earths and strategic raw materials" on the website www.forumbeschaffung.de, a dedicated professional network for supply managers.

At this point in time, it is an urgent matter to spend more time on developing detailed supply strategies for strategic raw materials and parts, components, etc. that rely on these materials. It seems to be irresponsible to ignore the supply shortages that are around the corner or already on the doorsteps, only because a company is not in need of these raw materials in its own production process. Sooner or later every member of the supply chain will be affected, when producers in the backward supply chain are running into supply problems. Therefore, a detailed supply chain risk management is an essential tool for the company to survive.

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LyondellBasell's Q3 Profit Doubles

LyondellBasell's third-quarter profit nearly doubled, widely beating Wall Street's expectations, on strong chemical and oil refining margins. The company benefited from higher prices for certain types of crude oil, as well as higher efficiency at its flagship Houston refinery, which had been under repairs.

For the third quarter, LyondellBasell reported net income of $895 million, or $1.51 a share, compared with $467 million, or 84 cents a share, in the year-ago period.

Excluding one-time items, LyondellBasell earned $1.53 per share. By that measure, analysts expected earnings of $1.22 per share, according to Thomson Reuters I/B/E/S. Revenue rose 29% to $13.29 billion. Analysts expected $13.33 billion. Operating income in the company's largest unit, which supplies the basic chemical ethylene, jumped 34% to $599 million.

Operating income of the refining unit increased more than fivefold to $454 million.

The company, which emerged from bankruptcy protection last year, also said it would buy back nearly $2.8 billion in debt, substantially improving its balance sheet. ■

PetroChina, Sinopec Q3 Profits Beat Forecasts

China's No.1 and No.2 oil and gas producers, PetroChina and China Petroleum & Chemical Corp (Sinopec), reported third quarter net profit that beat estimates, as strong oil and gas production growth offset refining losses. The Chinese government cut domestic fuel prices by about 3%, effective Oct. 9, leaving the refining business of state-run oil firms Sinopec and PetroChina in the red.

Analysts expect outlook for the two companies to be hampered by more refining losses due to the lower domestic fuel prices imposed by the Chinese government and a resource tax which will be levied nationwide this month.

"The impact from the fuel price cut on Sinopec will be comparatively smaller, because its refining operations are more efficient, while PetroChina will be affected more," said Yan Shi, a UOB Kay Hian analyst in Shanghai. ■

Dow Chemical Profit Narrowly Misses Expectations

Dow Chemical narrowly missed Wall Street's quarterly profit expectations as cost increases and economic worries dented demand in Europe and North America. Dow raised prices during the third quarter to offset a $1.7 billion increase in raw material costs, a step that brought flat volume growth globally. The results show that for at least some of customers, the price hikes were too much.

"There was just so much panic in the marketplace, which clearly must have created conservation on the part of a variety of product buyers," said Hassan Ahmed, a chemical industry analyst at Alembic Global Advisors. "Economic theory dictates that as you elevate pricing there will be some sort of demand response."

Latin America and Asia were bright spots for Dow, where volume rose 7% and 5%, respectively.

"If you look at a company like Dow, North America and Europe are just several regional legs in a global strategy," said The Valence Group's Peter Hall, who advises chemical companies. "What we used to refer to as 'emerging markets' really now has emerged and is a major part of the overall sales mix."

Dow reported net income of $815 million, or 69 cents per share, compared with $512 million, or 45 cents per share, in the year-ago period. Revenue rose 17% to $15.11 billion. Analysts expected $14.63 billion.

Dow's agricultural unit posted a surprising operating profit for the quarter, a contrast with rival DuPont which posted a loss in its ag unit.

Operating profit in the coatings and infrastructure unit only fell 3%, despite the weak U.S. housing market. ■

Communicating Nanomaterials

The Chemical Industry Perspective

Polarizing Debate – From lighter materials for cars, stronger wind turbine blades to better insulation for homes, nanomaterials help create innovative products and improve processes in many sectors. The results help build sustainable, competitive industries while improving quality of life in Europe. Polarization of the debate on nanomaterials, however, is creating a gap between innovation opportunities on the one hand and safety concerns on the other. New mindsets are needed to unlock the European nano debate.

Véronique Garny
Director Product Stewardship, Cefic

The chemical industry is willing to address both aspects openly.

Nanomaterials bring tangible benefits to society and are considered key enabling technologies in virtually all industries. They play a growing role in developing innovative solutions to societal challenges, for example in the fields of energy, water and mobility. At the same time, weighing in the potential risk factors associated with specific applications of nanotechnologies is crucial to enable society to benefit from their development.

Balancing the need to address worker safety, consumer health and environmental concerns while building public awareness and acceptance for nanotechnology applications is a challenge for all actors involved in the nano debate. Communicating the benefits of nanomaterials is as important as being ready to discuss risks and uncertainties.

Ensuring Safety

Ensuring that nanomaterials are produced, used and disposed of in a safe and sustainable way is essential to ensure their contribution to societal benefits. The European chemical industry, represented by Cefic, sees the existing risk assessment paradigm and regulatory framework based on the precautionary principle as a solid basis for this. The EU has in place a comprehensive regulatory framework underpinned by the precautionary principle. It can be implemented and, where necessary, its guidance can be adapted to effectively regulate nanotechnologies and nanomaterials.

Cefic also participates in setting harmonized standards and methods by contributing to the work of international bodies, such as the Organization for Economic Co-operation and Development (OECD), the International Standardization Organization (ISO), the European Committee for Standardization (CEN) and the European Union. Industry is already involved in reviewing testing procedures and methodologies to adapt them to nanomaterials when appropriate. This is done through the OECD testing program to ensure scientific consensus. In addition, industry takes part in EU research projects aimed at raising the overall knowledge level about nanomaterials. Results of these activities are also available via dedicated websites, such as the EU NanoSafety Cluster website (www.nanosafetycluster.eu).

As legal frameworks are updated, the chemical industry contributes to providing information and expertise to improve standardization recommendations and guidance, for example under Reach or food legislation. Improving measurement techniques remains a challenge to ensure affordable, robust and standardized methodologies.

Focus On Communication

Nanomaterials represent a wide variety of substances with specific properties. Some of them have been in use already for decades, such as carbon black in tires, while some are new, such as carbon nanotubes. As stated by the scientific committee of the European Commission (SCENIHR) in their 2009 opinion, nanomaterials are similar to normal substances in that some may be toxic and some may not. "Nano" is an indication of scale, not a hazardous property. It is therefore not pertinent to speak about a generic nano effect, but rather a case-by-case evaluation has to be made. The wide range of potential applications means that there is no one-size-fits-all solution for communicating on nanomaterials.

"Nano" is an indication of scale, not a hazardous property.

Making information on nanotechnologies and nanomaterials easily digestible and understandable for the public is a challenge that industry, authorities and other actors in the debate are actively addressing. Sharing the wonders of nanotechnologies means telling a rather complex story that also includes potential uncertainties. Listening to stakeholder concerns, addressing public requests for information and engaging in open dialogue are important components of the stakeholder dialogue process.

Tools and channels for communication and transparency on nanomaterials exist. It remains up to industry to ensure availability of adequate and relevant information to downstream users, customers, regulatory authorities and other stakeholders. This information is transmitted in different ways, including safety data sheets, classification and labeling notifications, codes of conduct, registration dossiers and stakeholder dialogues. While increasing transparency is important, a line should be drawn regarding confidential business information which can only be made available to the authorities for competitiveness reasons.

To make information available to the public, some companies and national chemical industry associations have developed detailed information tools through dedicated websites. Cefic members have worked on an extensive document under the Responsible Care program, bringing together the various available references linked to nanomaterials safety. In addition, partnerships with downstream industries are key to ensure common understanding on how nanomaterials should be handled and how to implement legislation in an appropriate way.

Europe Cannot Miss the Boat

The development of nanotechnologies and nanomaterials is a global issue. The worldwide chemical industry association, the International Council of Chemical Associations, or ICCA, contributes to the international debate on nanomaterials within the SAICM project – the Strategic Approach to International Chemicals Management. This voluntary program aims to ensure that developing countries have access to similar information and tools as do developed countries as far as chemicals management is concerned. The chemical industry is working diligently towards acceptance of common regulatory principles for chemicals. These should equally be valid for nanomaterials.

In parallel with international chemicals policy development, research and innovation around nanotechnologies and nanomaterials is speeding up around the globe. The fear is that Europe will lag behind. It mustn't. To meet the great challenges facing Europe today, particularly in energy efficiency, health and welfare, the development of nanotechnologies is essential. As key enabling technologies in several industries, nanotechnologies also contribute to keeping and creating skilled jobs in Europe.

To make sure Europe can help bring the next great breakthroughs for safe, sustainable nanomaterials, it is important that the debate on these potentially game-changing materials achieves the right balance between benefits and risks. The chemical industry is committed to working with its partners in an open and responsible way to make this happen.

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A Board-Level Priority

Strategic Chemicals Management and Reach

Deep Impact – Reach affects almost all departments in a chemical company. It is not only an issue for the regulatory affairs manager, but has an overall impact on procurement, production, distribution, sales and marketing. Customers, authorities and investors need to be assured that a company is compliant with the Reach legislation. TNO Triskelion advises that Reach compliance relates to your license to operate and therefore has to be a priority for management all the way up to board level.

Hans Marquart
TNO Triskelion

Doeke van der Schaaf
TNO Triskelion

'We Buy, Transform and Sell Chemicals'

Manufacturers, formulators, distributors, downstream users and article users are all affected by Reach. In many companies, at least some people understand part of the effects of Reach. However, many internal Reach processes are only now being developed and not fully integrated. Hence our sketch of various situations that may occur:

Your purchasing department should consider a number of things. Questions may arise about the substance identity and composition. According to the European Chemicals Agency (ECHA), this is an issue for improvement in registrations in general. Does the substance fit the identity of the registered substance? Has the substance been registered at all? You should be able to tell from the registration number. If the substance is bought from outside the EU, we advise to check whether an Only Representative (OR) for importers can cover your registration, too. Otherwise, you may be able to buy access to an existing dossier and act as a joint registrant. Several components may need to be registered for a chemical mixture from outside the EU. Chemists may provide relevant details on the composition.

Strictly Controlled?

Doing a chemical transformation implies that you use intermediates. We have seen many intermediates stated to be used under "strictly controlled conditions." Verification of these statements is a key issue in the ECHA work plan for 2012. Can your plant managers and environmental health and safety experts justify that the conditions are indeed strictly controlled? Several companies we audited told us that a critical outsider helps to improve their justification. Intermediates not under strictly controlled conditions and other substances may come with exposure scenarios. An (external) audit helps to ensure that the use, operational conditions and risk management measures in the exposure scenarios cover your situation. These documents often contain jargon or criteria that do not facilitate easy checking against real world situations.

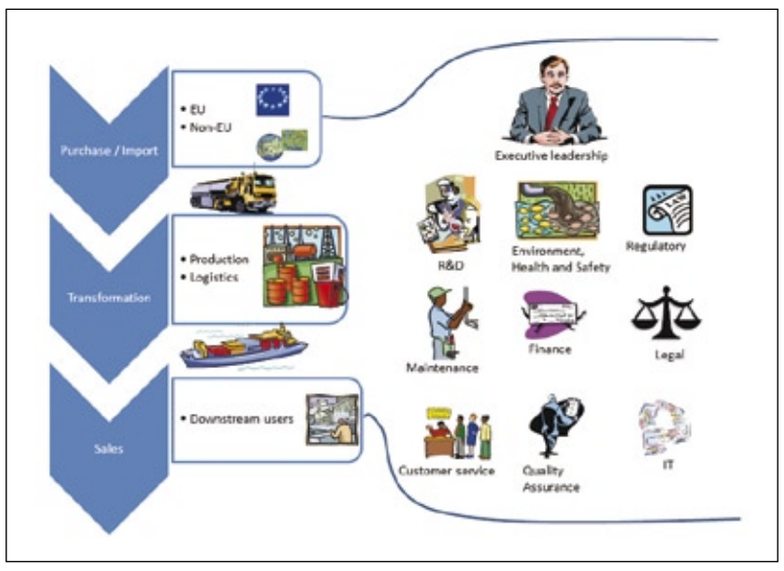
Strategic Business Decisions

What if the described use, conditions and risk management measures do not cover your situation? Strategic business decisions are needed. Do you stop this process (and stop selling the product)? Are the investments to modify process, conditions or measures worthwhile? Technical expertise and market knowledge are needed to make a business case.

In some cases, e.g. when you start a new production, you may have to consider registration now. Your annalists need to obtain relevant identifiers of the substance. Perhaps it fits the Reach definition of a polymer that does not require registration. Toxicologists should determine the classification of your chemical. If it is classified, exposure scenarios for manufacture and use throughout the life cycle are needed. Your EHS experts can develop these or work together with consultants.

Questions During Sales Process

A number of questions may pop up during the sales process of your product. Do you know the uses of your clients (and their clients)? Can your sales people obtain written assurance on strictly controlled conditions for intermediates? Is your substance of very high concern, and does it end up in an article? Your customer service may be able to help your clients with the resulting communication requirements. When your sales see a promising new market, you have to check whether the new use is covered under the existing registration. One company wanted to sell off-specification materials. Our advice was to widen the scope of the substance definition for this material and refer to the existing chemical safety assessment, since safe use was still ensured. Keep in mind that Reach dossiers contain specifications of the products you manufacture and this may limit your options.



Communication partners in Reach compliance

Communication Is Key

You should consider Reach implications throughout your business. Buy a product for a nice price in China? Consider registration requirements. Safe use recommendations from your supplier? These may be obligatory under Reach, just like your recommendations can be obligatory for your clients. Reach therefore requires substantial internal and external communication.

Purchase, sales and customer support departments are in the frontline. They communicate with suppliers and buyers. They should be able to discuss product identity and should be able to answer questions on the (extended) Safety Data Sheets that you provide with your product. They need sufficient Reach knowledge and proper communication with technical experts, production managers, EHS specialists, etc. When you start a new product or open a new market, communication is needed to create an economically sound business case and to gather use related information for your Reach dossier.

Because Reach communication affects many groups in your company, a strong internal communication structure is crucial. Good communication with suppliers and clients also helps.

Ownership And Responsibility

Why make such a fuss about Reach? Reach itself provides a clear and highly convincing business reason: "No data, no market." You may think your Reach work is ended by keeping the Phase I registration deadline on Dec.1, 2010. TNO Triskelion thinks this was only the beginning. Phases II and III are still to come and the follow-up for registered substances provides substantial responsibilities. Continued Reach compliance is a crucial part of your license to operate.

Pro-active compliance with Reach helps restore trust in chemicals and improves the chemical industry's reputation. Remember that people in Europe are not convinced that chemicals are safe. Even now, after Reach has been in progress for several years, 50 % of members of European Parliament stated in a Cefic survey that chemicals are unsafe and not properly tested. Widespread Reach compliance efforts will help to change that mindset.

Reach inspections by authorities can be expected. Be prepared for a smooth inspection. You should know the requirements. You should be able to answer relevant questions, e.g. on issues mentioned earlier in this article. Proper documentation is very helpful to show due diligence. If you cannot convincingly show to be compliant, warnings or fines can be the result. In extreme cases the continuation of your business might be at stake.

Please keep in mind that Reach is not "just" a project for regulatory affairs managers. Reach compliance requires management ownership and responsibilities throughout the company. Good practice is to establish a Reach team under auspices of the general management with a strong manager and representatives from various departments. In this way Reach compliance can become a successful element of your business.

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The Backbone of Transatlantic Economy

Foreign Direct Investment Offers European Companies Foothold in U.S.

Overseas – "It is foreign investment – the deepest form of global integration – that binds the transatlantic economy together, not trade," reported The Transatlantic Economy 2010 study published by the John Hopkins University.

According to this report, foreign investment generates greater wealth on both sides of the Atlantic, creates more jobs, and produces higher incomes. No two regions of the global economy are as economically fused as the two parties straddling the ocean, making the transatlantic economy the largest and wealthiest in the world.

Corporate Europe accounted for 71% of total foreign direct investment (FDI) in the U.S. in 2008 ($2.3 trillion). No other region worldwide has invested as much in the U.S. nor created as many American jobs as Corporate Europe. British, French, and German foreign investors remain the largest and most prominent investors in the U.S.

Ohio – Direct Investment from Europe

Ohio is one of the leading U.S. states to benefit from this European investment. Of the $43 billion in foreign direct investments (2007), 40% came from Europe – that amounts to $17 billion, of which the United Kingdom, Germany and France contribute more than $15 billion.

The economic center of Ohio is the metro region Cincinnati USA. For example, the number of German businesses there increased by 18% in the last few years – to 82 subsidiaries today. Overall nearly 400 foreign companies have settled in Cincinnati USA, most of them from Europe – such as Air Liquide, L'Oreal and Mane from France, GlaxoSmithKline and Ineos from Great Britain and BASF, Lanxess or Krauss-Maffei from Germany. About 1,000 companies do international business and generate export revenues of $17.5 billion (2008). More than 370 of the Fortune 500 companies are represented in the region; 10 of them, like Procter & Gamble and Macy's, have their headquarters there.

Neil Hensley
Senior Director Business Development, Cincinnati Chamber of Commerce

Susanne Kutterer-Schacht
CEO, Kutterer Mauer

Kutterer Mauer Expands Capacity

The metropolis Cincinnati is located along the Ohio River where the states of Ohio, Kentucky and Indiana meet and is the gateway to the industrial Midwest. About 40% of all U.S. industrial production sites can be reached by truck within one day.

"At this location we are equally close to clients and suppliers," Susanne Kutterer-Schacht said. Together with Klaus Mauer, she shares the management board of Kutterer-Mauer.

The company from Karlsruhe and Heidelberg, Germany, has been represented in Cincinnati since 2007 and manufactures injection-molded plastic components for the packaging industry, e.g. for cosmetic products. Local clients include Procter & Gamble, L'Oreal and GSK, known for its Sensodyne tooth paste brand.

"One reason for our move to the USA was to expand our international presence to two continents," Kutterer-Schacht said.

In fall 2010, Kutterer Mauer increased its capacity and invested in six new injection molding machines – four 160-ton and two 200-ton machines. With this, the roughly 10-fold higher demand since last year can be met. "Our workforce in the USA has grown to 25," Kutterer-Schacht said.

Manufacturing Growth in Cincinnati

The manufacturing industry, with its jobs is growing more strongly at present in the Cincinnati USA region than the U.S. average. In the first half of 2010, the 3.2% increase in the number of jobs in production was three times that of the U.S. as a whole. In November 2010, there were 111,000 people employed in this sector – 5% more than in the same period in 2009. The U.S. Congress Joint Economic Committee reports that nearly 20,000 jobs were created in the manufacturing industry in Ohio during the last year.

"In addition to the chemical and automotive supply industries, the consumer products sector and its manufacturing and logistics chain is one of the economic driving forces for the region," said Neil Hensley, Senior Director for Economic Development of the Cincinnati Chamber of Commerce. "Many European companies are integrated here, like fragrance maker Givaudan from Switzerland or Solvay from Belgium, which fabricates cosmetic precursors."

Award as 'Consumer Marketing Innovation Hub'

In 2010, the Cincinnati metro region was awarded the title "Consumer Marketing Innovation Hub" by the U.S. State of Ohio and the Ohio Department of Development (ODOD), an honor that requires future perspective as an essential component, with new approaches to consumer marketing and new milestones.

Ohio 2010 was called "The best business climate in the Midwest" by a trade journal. As Ohio's business center, Cincinnati USA was designated "Consumer Marketing Innovation Hub" because of its expected new impulses in consumer marketing.

In the last eight years, the number of employees in advertising and design businesses grew by 35% — to 11,700 employees today. "The developments in these branches are usually preceded by developments in the secondary sector," Hensley said.

Benchmark For Chemistry: Location Quotient

In the last few years Cincinnati USA's competitive position as a chemical, pharmaceutical and life sciences industry location was enhanced. A study conducted by the University of Cincinnati indicated that Cincinnati USA achieved a location quotient of 1.41 for the chemical industry. This means that the region is home to a 41% higher number of chemical companies than would be expected for a region of 2 million people, given the U.S. average. And it is a clear indication that the chemical industry enjoys local production benefits and is active in the major export-oriented league.

Chambers of Commerce Facilitate Market Access

"The Cincinnati USA Regional Chamber has access to special programs to facilitate the establishment of companies – ranging from business, market and strategy consultation, to incubators for start-ups, to network activities that are essential for foreign companies," Hensley said.

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Clariant Sees Cautious Customers As Europe Slows

Clariant said it expected a further slowdown in economic activity as customers in its plastic and coatings businesses run down stocks, after the strong Swiss franc weighed on third-quarter profit.

Clariant said that sales in the third quarter rose 25% in local currencies to 1.865 billion Swiss francs, slightly better than the average forecast in a Reuters poll. Chief Financial Officer Patrick Jany said the slowdown noted in the second quarter in the plastics industry had spread into pigments, with customers placing smaller, more cautious orders as economic uncertainty clouded their outlook.

"Our customers are extremely cautious in managing their inventories because they don't have a clear view on how 2012 will develop," Jany said. "Therefore the general tendency is to replenish what you have sold and try to reduce you inventories."

But Jany said he did not see a return to the situation in 2008 and 2009.

"It's a smooth coming down in terms of orders rather than a collapse," he said.

Clariant said it had noted a slowdown in emerging markets over the last few quarters. But the group said sales in its less cyclical units, which account for some 50% of sales, were holding up well, particularly in the oil and mining services and catalysis and energy units.

Higher raw material costs had been offset by price hikes, while the integration of Süd-Chemie would lead to some 700 job cuts worldwide, Clariant said.

EBITDA fell to 216 million francs from 232 million francs a year ago, as the strong Swiss franc ate into margins, despite the Swiss National Bank's rate cap. The Basel-based company cut its full-year sales and margins target on Sept. 5 basing its new forecasts on exchange rates of 1.14 francs per euro and 0.80 francs per dollar. Just a day later, the Swiss National Bank set a cap of 1.20 francs per euro to shield the Alpine economy from the threat of recession.

Although the SNB's move had improved the situation with the franc, other currencies remained volatile, Jany said.

Clariant confirmed its guidance for full-year sales between 7.0 billion Swiss francs ($8.9 billion) and 7.2 billion and a margin on the basis of EBITDA of between 12.8 and 13.2%.

Jany said Clariant would focus on growing organically but would consider some small acquisitions in the range of 100 to 400 million Swiss francs. ■

Novasep Celebrates 140 Years in Leverkusen

Novasep is cebrating 140 years of expertise in hazardous chemistry at its site in Leverkusen, Germany. The site initially produced explosives for the coal industry and has retained its specificity, producing and handling hazardous chemicals ever since its foundation in 1871. Since the take over by Alfred Nobel in 1873, the range of expertise has been largely extended.

In 2005, the Nobel site became part of Novasep, which is today a market leader in hazardous chemistry for process development and production of APIs, advanced intermediates, agrochemical ingredients and specialty chemicals. This position arises from the subtle combination of a unique historical know-how and continuous innovation. For example, a historical explosive product was transformed into a life saving drug when the production of pharmaceutical nitroglycerine preformulations was implemented on the site, following cGMP rules. Today, Novasep is the largest worldwide pharmaceutical nitroglycerine producer.

Hazardous chemistry often allows shorter synthetic pathways and therefore helps reducing costs, time lines and environmental impact significantly. In addition to the highly specialized know-how in azide chemistry, the broad expertise of hazardous chemistry carried out at Novasep in Leverkusen, includes oxidation, nitration, the use of hydrazine, Grignards, alkyllithium, lithium aluminium hydride, carbon disulfide, nitroalkanes and many more, with experience gained over decades. More recently, innovative processes like carbonylation or ozonolyse reactions have been developed. The use of diborane or diazomethane gases generated in-situ was also implemented and represents a breakthrough for hazardous chemistry in terms of efficiency and productivity. ■

Bending The Rules

Non-compliance is on the Rise

Steady Increase – All who follow industry trends will have noticed an increase in regulatory actions related to non-compliance issues. We can see this in the increased issuance of inspectional observations — or 483s — by the U.S. Food and Drug Administration (U.S. FDA) and by the withdrawal of certificates of suitability (CEP) certifications by the European Directorate for the Quality of Medicines and Healthcare (EDQM).

The first question to be addressed is whether this increase is due to a demand for a higher level of compliance as reflected by more demanding regulations, a more rigorous application of existing regulations or a lowering of standards within the companies? An inspection of the nature of the non-compliance letters reveals that many of the issues raised are absolutely traditional, that is, issues that were prevalent in the 1990s and that had presumably become so well understood as to be virtually eradicated within the established industries. However, analysis of U.S. FDA data indicates that one of the major issues over the last two years has related to quality control units, with failure to review and resolve incidents adequately including: extending investigations to other lots affected; undocumented and/or unsubstantiated investigation conclusions; and lack of or inadequate corrective or preventive actions taken, including recalls.

Imprecise Wording

Two other major citation areas have been failure to adhere to production procedures and inadequate or failed validation of production procedures and analytical methods.

A significant increase was also noticed in training deficiencies, and here we can see a clue as to what is happening. The regulations state in 21 CFR 211.25(a): "Training in current good manufacturing practice shall be conducted by qualified individuals on a continuing basis and with sufficient frequency to assure that employees remain familiar with GMP requirements applicable to them."

Inspection of this simple regulation reveals three words that are somewhat imprecise: "qualified individuals," "continuing basis" and "sufficient frequency." The increase of actionable events is simply a reflection of the authority's interpretation of these terms. For example, the head of a department may actually be a very poor trainer, or sufficient frequency may not be once every five years. A most astute phrase became popular with the FDA: "trained or really trained?"

Inaccurate Information And Heparin

Much of this more rigorous application of the existing regulations has been as a reaction to considerable criticism that has been levelled at the U.S. FDA. The U.S. Government Accountability Office (U.S. GAO) — the investigative branch of Congress — issued severe criticisms of the FDA, including comments that they have several separate data bases of manufacturing organizations, one listing 3,000 approved companies and another having approximately 6,800 establishments. A not insignificant number have inaccurate information, including wrong names and addresses. This was highlighted by the Heparin crisis that started in 2008, where it was determined that Chinese companies that provided the starting materials used in its production had not been inspected, in part, due to confusion as to the exact names and addresses of the companies involved. Even after the crisis, which included U.S. deaths and severe medical complications the FDA were not able to investigate some of the raw material suppliers.

The same GAO estimated that FDA may inspect about 8% of foreign establishments in a given year, and it would take the agency more than 13 years to inspect these overseas establishments once. The actions of the FDA were also called into question in that from 2002 through 2007, the agency issued warning letter following 15 overseas inspections in which serious deficiencies were identified. However follow ups were not timely and often relied on paper declarations rather than re-inspection.

At her appointment as commissioner of the FDA, Margaret Hamburg announced that the FDA would become far more aggressive by streamlining the issuance of warning letters and will follow up more quickly on assessment and follow up on corrective action after a warning letter is issued.

The Situation In Europe

The European situation is more difficult to monitor because there is no publically available data base. However, it can be seen that that since starting actual inspection of API manufacturers, the EDQM has revoked a significant number of certificates of suitability. In the second half of 2010, some 19 APIs had their certificates revoked or suspended because of either failed inspections or refusal to even allow inspection.

Thus we can see that there is a definite increase in the more rigid application of existing regulations, but this does not adequately explain the fundamental nature of the non-compliance issues. Therefore we must ask if standards are getting lower. Certainly part of the explanation is that new companies are trying to get onto the European and U.S. markets without having done their homework. Statements such as "the investigator observed individuals in the clean area with open toe or open foot sandals, torn plastic booties, wearing no masks and wearing no gloves" or a sterile facility with " holes in the ceiling and visible light coming from the roof near the ventilation system, bubbling of the vinyl and disintegration of the wall under vinyl in the freeze dryer room, visible black mold on the wall, a poor drain system for the freeze dryer steam venting system, and a soft (spongy) wall" obviously reflect new management major lack of understanding of what is required in that they could even contemplate passing an inspection.

Non-compliance within Established Companies

However, there are sufficient non-compliance issues with well-established companies to suggest that there is a lowering of standards. Certainly times are tough for the industry, both branded companies with a lack of new products, and generic companies with more competition for less off patent products. In an economic crisis there is an immediate cost saving reaction and quality assurance (QA) is often considered as one of the first areas for downsizing as it is a "non-profit center." The cost saving in QA can take two forms, either as a simple reduction in head count or in firing of senior (expensive) staff and replacing them with less-experienced people.

It has been suggested that such downsizing has been a root cause for the many recalls that have plagued Johnson & Johnson over the last two years. It is interesting to read the 133-page report produced by the special committee of their board of directors, which essentially found that in spite of the numerous recalls there were no red flags or indications of systemic failure that were overlooked by the board or executive team. This is an interesting conclusion when root cause analysis teaches that most root causes are as a result of senior management or policy decisions.

There are two other factors that may be related. The traditional path into QA used to be from within existing staff who had been through the mill — either senior production, engineering, quality control or analytical staff moving on to QA roles. These people had a solid, hands on knowledge of the industry and a good, all-round knowledge of the critical processes and quality attributes of the products being manufactured. The increased complexity of the business has resulted in a great increase in specialization; where once an analytical chemist would develop, validate and use a method, we now have a development chemist, a validation expert, a technical transfer specialist etc. This specialization means that the people moving into QA do not have a broad grasp of issues that could affect quality.

The second factor is the diversion of attention of quality staff from their traditional roles to trying to come to grips with some of the new approaches including process analytical technology, quality by design and design of experiments. These new approaches, while laudable, are difficult concepts and pressure to introduce them, often from senior management who actually may not fully understand them, is certainly putting more pressure on staff responsible for ensuring compliance.

The factors discussed above affect both generic and branded companies but often it is suggested that the problem is really found in the generic industry. An alternate view is expressed that the generic industry is singled out for more rigorous treatment. This reflects more the defensive knee-jerk reaction of the generics industry rather than any hard data. A quick check of issued 483s over the first half of the year shows some 14 issued to generics companies and two to branded companies. If one takes into account the relative number of generic to brand companies, it is clear that these figures do not reflect an undue bias in favor of generics.

What Does the Future Have in Store?

There has been a recent trend in FDA inspections to have more than the traditional two inspectors. Even five inspectors have been known to turn up, and the FDA has stated that this is an excellent way of carrying out "on the job training." Added to that, there is the pending Prescription Drug User Fee Act (PDUFA) agreement for generic registration fees that will be spent on recruiting more inspectors. Factor in the increased cooperation between the FDA and European Medicines Agency (EMA) in terms of better communications and some joint inspections, and all companies are going to face far more inspections carried out by less and less experienced inspectors coming from different regulatory backgrounds.

Final Recommendations

1. Go back to basics: Simple fundamental compliance issues must be addressed as a top priority. Only go for new concepts when you are absolutely sure that you have no hidden time bombs about to blow up in your face.
2. Reduction in QA staff either in numbers or quality is a false economy: Compare it to the cost of dealing with a serious non-compliance issue and potential loss of business or destruction of a company's reputation.
3. Document, document and document in good clear terms, bearing in mind appropriate root cause analysis and corrective/protective action
4. Never compromise on training. If staffs are not trained adequately, then how can they perform their functions correctly?

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Global Pharma to Pump Cash Into Russia

Viiv Healthcare, a GlaxoSmithKline and Pfizer joint venture, will start manufacturing HIV medicines in Russia in partnership with local drugmaker Binnopharm. Agreeing a local partnership is a way for international drug companies to secure guaranteed sales in Russia, which wants to reduce dependence on imported drugs. Global drugmakers have pledged at least $1 billion in investments in Russian manufacturing, packaging and research and development.

Below are the international pharmaceuticals producers that have existing facilities in Russia, those that have announced plans to set up local manufacturing sites, or are considering such a move:

GlaxoSmithKline — Viiv Healthcare, an HIV company set up two years ago by GlaxoSmithKline and Pfizer, and Russia's Binnopharm said on Wednesday the Russian firm would manufacture ViiV's drugs for the local market. The British group and Binnopharm, a unit of Russia's Sistema , earlier agreed that the Russian firm will make Glaxo's cervical cancer, rotavirus and pneumococcal vaccines for the Russian market. Glaxo already has a hepatitis vaccine filling and packaging plant as part of a joint venture with local Russian partners.

AstraZeneca — Anglo-Swedish firm said in June it would set up a new research center in St Petersburg, having earlier this year pledged more than $150 million in investments into construction of a Russian manufacturing plant.

Genzyme — The U.S. biotech firm said in March it planned joint research projects with Russian high-tech centre ChemRar, including joint research on three to five of Russia's topical therapeutic fields and technology transfer.

Pfizer — The world's largest drugmaker in March entered into an agreement with Russian biopharmaceutical company Petrovax Pharm to manufacture Pfizer's innovative pneumococcal vaccine at the Petrovax Pharm facility in the Moscow region.

Orion — The Finnish drugmaker said in February it was in advanced acquisition talks with several unnamed Russian firms. It already has packaging projects with Russian producers.

Novartis — The Swiss drugmaker said in December it would invest $500 million in Russia over the next five years as part of a partnership focused on local manufacturing, R&D and public health development.

Teva — Israel's Teva plans to invest up to $100 million in a drug production plant in Russia as it aims to more than triple Russian sales by 2015, a Russian executive told Reuters in July.

Ipsen — The French group said in October it was considering setting up production in Russia, including through a partnership with a local manufacturer.

Novo Nordisk — The world's No.1 insulin maker said in April it would invest $80 million-$100 million to build its first production facility in Russia.

Sanofi-Aventis — A Russian government commission approved in May the company's acquisition of a controlling stake in a Russian insulin plant after the firm said in November it would take part in the government's Pharmpolis Project, aimed at making global firms produce medicines in Russia.

Nycomed — The privately owned Swiss drugmaker said in September it would invest €65-75 million ($86-$99 million) by 2014 to build a liquid sterile products and solid medicines production plant in Russia.

Johnson & Johnson — Struck an agreement with Russia's Pharmstandard to localise secondary packaging of its cancer drug Velcade in Pharmstandard's production plant.

Krka — The Slovenian drug firm said in January it planned to triple production capacity at its factory near Moscow, built in 2003, over the next three years in what will be one of its major investments in 2010.

Gedeon Richter — The Hungarian drugmaker, which has a manufacturing and packaging plant near Moscow, in April raised its stake in Russian drug firm Protek to 5% from 4%.

Servier — The French Company built a tablet production factory in the Moscow region in 2007.

Stada — The German drugmaker became Russia's second-largest local producer after buying Nizhpharm in 2005 and Makiz-Pharma in 2007.

Fresenius Medical Care — The world's largest kidney dialysis company, a unit of German healthcare conglomerate Fresenius, said in July it agreed to acquire a private operator of dialysis clinics in Russia's southern Krasnodar region.

■

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Under Construction

Jacobs Awarded Contract in Jubail
Jacobs Engineering said it has signed a deal with IDEA Soda Ash and Calcium Chloride Company (ISACC) to provide engineering and project management services for the construction of a SR1.1 billion industrial complex in Jubail's Second Industrial City. Construction on the facility, which will have an annual capacity of up to 800,000 tons, is slated to begin mid-2012. The commissioning production run is scheduled to start by end of 2014 and commercial operations will follow in the first quarter of 2015.

AkzoNobel to Build New Coatings Plant In China
AkzoNobel said it is planning to invest around €60 million to increase the production capacity of its Automotive and Aerospace Coatings business in China. As well as constructing a new production facility in Changzhou, the company will build related warehousing, quality control laboratories, support facilities and offices on the new site. The project will increase capacity by around 25 million liters and the site is projected to be operational in early 2014.

LG Chem Might Delay Polysilicon Production Plant
Korea's LG Chem is considering delaying a new investment plan to build a polysilicon production plant due to changes in the solar industry. The country's largest chemical company announced in June that it would spend 491 billion won ($435 million) to construct the 5,000-ton-per-year polysilicon plant.

Europe's Biggest Urea Plant Goes On-Stream
ThyssenKrupp EPC contractors have supplied and commissioned a plant for the production of 3,500 tons per day of urea solution in Sluiskil, Netherlands, for Yara. The plant, which took three years to build, has now been handed over to the customer. Yara has invested €400 million in its construction. ThyssenKrupp Uhde was responsible for the engineering, supply of all equipment and the construction of the plant on a fixed-price, turnkey basis.

Evonik Commissions New Chlorosilane Plant
Evonik Industries has commissioned a new plant in the town of Sinich, Italy for the production of high-purity Siridion chlorosilanes. Evonik supplies the chlorosilanes to a neighboring production plant owned by MEMC Electronic Materials Company for producing ultra-pure silicon.

Wacker, Dow Corning Open Pyrogenic Silica Plant in China
Wacker and Dow Corning have completed the second phase of their joint pyrogenic silica plant in Zhangjiagang, China. The pyrogenic silica plant, together with a siloxane plant involved a combined $1.8 billion investment. The combined capacity for siloxane and pyrogenic silica at the site, including the second phase silica plant, is expected to reach 210,000 metric tons per year.

Managing Complexity in Plant Maintenance

Reducing Costs and Outages in Process Industries

Uncontained Complexity – Plant maintenance within process industries is often complicated and managing several plants is even more difficult. The same tasks are often performed differently at different plants, even when they are owned by the same company. Uncontained, such complexity can breed inefficiencies, extend the duration of plant outages and increase costs. There is a better way. A.T. Kearney's six-step approach to managing complexity in plant maintenance helps mitigate "bad" complexity in individual plants while increasing sales and revenue potential.


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The Gulf Cooperation Council (GCC) region's access to feedstock and the changing nature of global demand likely means that more companies in process industries will be building production facilities in the Middle East. The players will be both primary and secondary companies, including manufacturers of petrochemicals, fertilizers and metals. Joint ventures between GCC-based companies and foreign multinationals are already common, and while this typically creates exclusivity and propriety issues, there is usually nothing to prevent the sharing of best practices across several plants operated by the same parent company.

Nonetheless, individual plants often operate independently with minimal interference from other plants or company headquarters. This often leads to unnecessary complexity — particularly in plant maintenance — as the same tasks are completed at different plants using different approaches. Considering how much value is locked up in plant maintenance improvements, managing complexity in this area is vital for improving efficiency, reducing downtime and outages and cutting overall costs.

Resolving The Impasse

"My plant is different and this procedure is too complex — those techniques won't work here." This is a common — and understandable — refrain we hear for justifying plant complexity. However, our detailed studies of plant maintenance processes find that such statements do not pass muster. Indeed, we developed a more nuanced six-step approach to complexity management that estimates objectively the "value" of complexity at different plants — eliminating the costliest complexity while making clear to all stakeholders the financial benefits of change. To this last point, the financial benefits often prove to be a vital factor for corporate managers facing resistance from individual plants.

We recently applied this approach to replace superheat bundles on a boiler for a process utility that operated numerous power plants in the Middle East. Superheat bundles are large water tubes (steam) located in the boiler that can only be replaced by taking a plant offline for up to 13 weeks. By standardizing certain processes, the company was able to shorten the outage period by 10-25 % at individual plants, representing $2 million in total additional revenues. While some steps increased costs on the front end, the net benefits — including higher profits — have been substantial.

A.T. Kearney has developed a six-step approach to manage complexity in process industries. The following outlines each step in our six-step approach:

1. Determine where to focus complexity management efforts. What processes will get the maximum impact from complexity management efforts? The ideal processes are those performed multiple times (either at different locations or during different periods), have demonstrated some unpredictability at the various sites, and have some possibility for generating tangible results. What is the key to identifying the target processes? Determining the value of the complexity relative to its cost. Some complexity adds incremental value, while some is more costly than is justified. Targets for complexity reduction should be examined for possible upstream and downstream impact on other processes.

The superheat bundle replacement work was deemed a good target. It was large, inherently complicated and expensive, and played a major role in how long and often the plant went offline — which in turn affected potential revenues. A typical outage period for bundle replacement could last up to 13 weeks, with each day adding up to a net revenue loss of as much as $250,000. And most vendors across different plants operated independently of each other with minimal communication about possible ways to shorten the process. While each power plant was slightly different, the existing level of complexity was high and unnecessary at all locations.

2. Plot current process steps. Mapping processes and outlining how they are performed will help illustrate the complexity, while plotting each step in the process will help identify all of the variations. At the end, you will have a map of your current process steps, their duration and a baseline cost for the entire process.

The superheat bundle replacement process had 19 discrete steps, which we mapped by plant, noting duration and method for each step. We also calculated process cycle efficiency, which is the percentage of total time devoted to value-added activities. The figure notes the three value-added activities in the process. By mapping the process, total duration time for each step, and tasks that could be performed concurrently, we identified which plants had considerable variations in times to perform certain steps.

3. Identify variations in the process steps. Documenting variations in each process step is the most time-consuming part of the approach, but also the most rewarding in terms of uncovering unnecessary complexity, and finding more efficient ways to perform a process. Identifying variations might be different ways of doing things based on experiences at other locations or new techniques in the market.

Experts are useful in helping to brainstorm ideas; their assistance helps generate buy-in from workers later in the implementation phase. The company conducted independent workshops with mechanical contractors and plant management to help identify faster ways to accomplish certain tasks, repeating this for every task to obtain a best-practice process for superheat bundle replacement. All additional costs necessary to implement these best practices (materials, labor or capital investments) were quantified and used in a final evaluation.

4. Determine which "best practices" to apply. In comparing the costs of best practices with the costs of current practices, every step in the process is examined for ways to reduce material costs or labor, or to shorten the cycle. Importantly, not every current practice requires replacement by a "best practice." Indeed, every location is different so new best practice steps may actually negatively affect parts of the process. So implementing a best practice requires considerable thought about its effect.

How do you know when process variation is worth keeping and when it is worth replacing with a best practice? The decision often depends on the company, the plant, and the speed or smoothness of the process, among other things. When a plant's peculiarities prevent the use of best practices, we recommend the next best practice. A step-by-step analysis creates a customized best-practice roadmap that helps reduce the duration of outages.

5. Evaluate standardization opportunities. Having one team examine processes at each plant will facilitate discussion of process standardization across plants. Subject matter experts may also help determine the feasibility of standardization. The potential to standardize should be evaluated with consideration for necessary complexity versus unnecessary complexity. One common challenge is the resistance to change — as many will see best practices as criticism of plant management. With this in mind, standardizing should not mean eliminating necessary (that is, value-adding) complexity.

6. Quantify the value of standardization. Armed with a detailed map of best-practice and standardization options across plants, the last step is to quantify their value and reduce value-destroying or unnecessary complexity. In the face of resistance, this is critical. Complexity must be justified relative to its explicit costs, such as the time to complete a complex task, and hidden costs, such as failing to take full advantage of the workforce's inherent skills. The value of standardization is quantified by the reduction in time, labor or materials due to the new simplified process.

Quantifying value is vital for implementing broad, company-wide change. Most senior executives in process industries are well aware of the potential for standardization across their plants, yet entrenched philosophies at individual plants can make it difficult. Communicating the benefits and generating broad buy-in requires hard work.

Hitting the Right Targets

Managing complexity in plant maintenance will improve efficiencies and increase financial returns for companies in the process industries. The six-step approach described in this paper will help address and simplify processes that often lead to value-destroying complexity at individual plants. The key is finding and hitting the right targets as well as generating the stakeholder buy-in that will be vital for long-term success.

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Fit For The Future

Integrated FDT Solution Saves Time and Cost

Look To The Future – Decades of operation, modernisation and expansion have left many chemical plants with a somewhat haphazard automation mix of different controls, process control systems, remote I/Os and field devices. The various components may use different communication protocols such as Hart, Profibus or Foundation Fieldbus, and are often based on different device integration technologies.

Dr. Christine Eckert
Freelance journalist

The situation is not different at Nedmag Industries Mining and Manufacturing. Based in Veendam in the Netherlands, Nedmag is the leading European supplier of very pure, synthetic dead burned magnesium oxide (DBM).

Three years ago, Nedmag had only a vision of modern asset management. Today, the company prides itself on its user-friendly plant asset management system providing central access to all instruments and offering users a perfect future-proof automation structure. With an integrated asset management system using FDT technology combined with a "multilingual" device management tool, Nedmag Industries achieves real productivity advantages and savings in its maintenance and service operations.

Improving Productivity

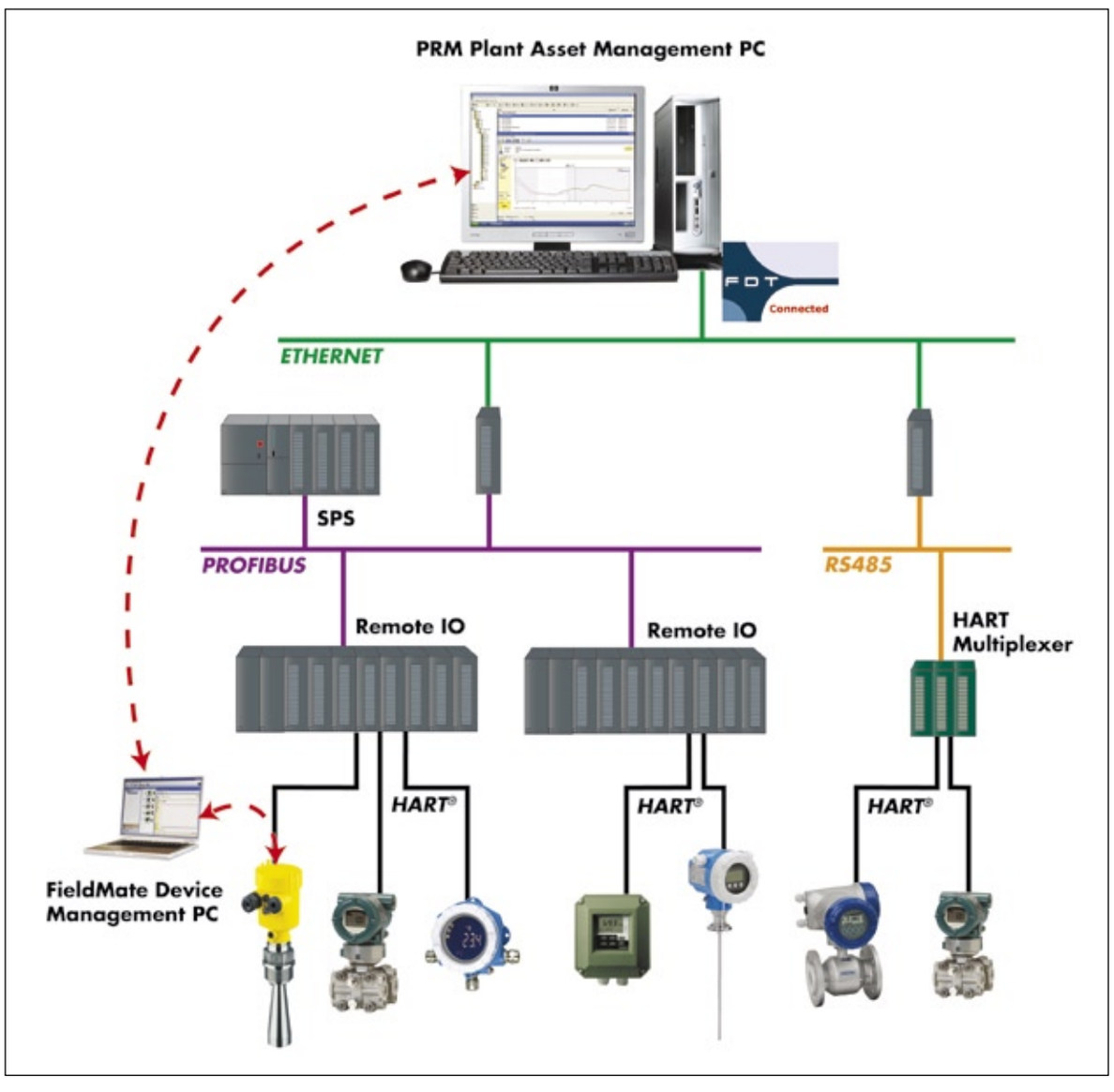
Using state-of-the-art automation technology will help any organisation to carry out its operations with fewer employees. This is a feature which is becoming increasingly important as the number of specialised personnel available to manufacturing companies is constantly decreasing. Furthermore, the external maintenance provider with which the manufacturing company is working must understand the technology and be able to use it, even if their own personnel regularly changes.

There are other areas where major savings can be made. Not only does the team save time on maintenance tasks if they can access a device directly from a PC: so too does the service provider. With its standardised and integrated interfaces, FDT technology provides a common environment for configuring, operating or maintaining any device – regardless of vendor, type or communication protocol.

Nedmag Industries Mining & Manufacturing, Veendam, The Netherlands

The Dutch company was initially using a complex, non-Windows based system for plant asset management. Wim Zomer, project leader at Nedmag, recalls: "I always had to keep the instruction manual handy to know what to do next. We used the system so rarely that we always needed to remind ourselves how to use it the next time. Therefore, user-friendliness was high up on the list of priorities when the team went to search for a new system." In Yokogawa's PRM (Plant Resource Manager), they found a system that completely satisfied their requirements. With FieldMate – Yokogawa's integrated device management tool – the vendor also provides a solution to portable device maintenance. Another important advantage of this package is that all device data can be accessed centrally thanks to the synchronisation between the two systems.

A further benefit of this solution is that it enables unlimited access to all intelligent field devices. FieldMate from Yokogawa was the first tool to fully embrace both the FDT and EDDL device integration technologies, and it supports all the important Fieldbus protocols in the process industries.



Device Patrol Saves Time

Earlier, it often took days of downtime before plant failures were fixed. In particular, the analog technology used often meant that engineers had to undertake a lengthy process of searching for and systematically ruling out possible causes of faults: a process that could last up to one or even two days. FDT technology, on the other hand, allows the user to look into the device directly from a PC. Central access means that incorrect parameters can be identified and a diagnosis given immediately. By using Hart Communication and end-to-end FDT technology, engineers at Nedmag can now resolve most issues much more quickly and efficiently than before. A look at the PC and the instrument tells what is wrong.

A key function of the PRM system is Device Patrol, which continuously monitors the status of all the devices in the system. In the past, if there was a problem with a level measurement, for example, the automation team had to ask the external service provider to take a look at the device. The maintenance engineer would then check on-site to see if a cable or input card, for example, was faulty. Now, by opening the plant asset management system, the engineer immediately can identify the errors at an instrument, even though the device might be kilometres away.

The mine, where the basic raw material magnesium chloride is extracted, is at a distance of 5 km from the production site and the offices. "If somebody has to travel there, it takes up to half a day to get into the car, drive to the other side of Veendam, arrive at reception, set up the laptop and carry out the tests. This is far too time-consuming." Now, as Wim Zomer explains: "At the PC, we usually know what to do within a short time. Even if somebody had been on-site, it would not have been possible to repair the instrument as it was simply configured incorrectly. Thanks to FDT technology, it is not necessary to send somebody to the plant, leading to savings in time and travel costs."

Nedmag still has high hopes of implementing features such as predictive maintenance in the future. This may not be too far off as all the necessary ingredients are in place. The Plant Resource Manager has only been running for a few months. The main focus in the initial stage was to save time on service and maintenance tasks. The more tasks the automation team can solve directly from the PC, the greater the savings the company can make.

Technology Offers Added Value

The automation experts also appreciate other system features, which make day-to-day work so much easier. For example, the audit trail enables detailed tracking of any changes to the device. Who did what, why and when? If a device issues a warning, the history shows the number of warnings and faults previously issued.

The Dutch company also reaped the benefits of FDT technology during the commissioning phase in the automation of the first of two sintering furnaces. The team was required to test a large number of instruments within a short time frame. The commissioning stage is simpler and faster if the plant asset management system can be used to test and simulate an instrument, and to check if it is "alive."

Fit for the Future

Wim Zomer explains: "If we do not include the time invested in developing the concept, then the digitalisation of 240 devices, which can be read online using FDT, cost a total of €15,000. Today, approximately two thirds of the devices are intelligent through HART communication. They will be gradually connected to the company's network in order to be able to take full advantage of the intelligence they contain. The number of devices that can be operated, monitored and maintained from a central point continues to grow. "We can say today that we want to proceed with plant asset management, but it cannot be done overnight. Everything takes time. The main thing is to dare to take the first step," explains Wim Zomer with conviction. The technology works. Now it is time for the next generation to roll out these state-of-the-art solutions in all of the plants and to take advantage of the opportunities they offer. Nedmag can already report initial success in the area of device management and the time savings that have been gained here.

The first step has been taken. From the field to the office, the combination of digital communication and FDT technology offers users centralised access to each and every device at all levels. Nedmag is perfectly prepared for the future thanks to the FieldMate device management assistant and the Plant Resource Manager from Yokogawa.

▶ www.fdtgroup.org

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SABIC to Build Plant in China

SABIC's Innovative Plastics business, Chongqing Xiyong Micro-electronics Industrial Park, and the Chongqing Economic and Informatization Commission announced a memorandum of understanding where SABIC would establish an engineering thermoplastics compounding plant in Chongqing, China. The move supports the Chinese government's 12th Five-Year Plan to expand into the country's western region and reinforces SABIC's commitment to build on its long heritage of serving this important marketplace with innovative and consistently high-quality materials solutions.

The new compounding plant, which is expected to be online in 2013, will produce several of SABIC's world-class polycarbonate, polycarbonate blends and other high-quality engineering thermoplastics to provide easier access for southwest China customers. ■

Linde Opens Plant in Giheung

Linde Korea, a member of The Linde Group, held a ceremonial event to celebrate the completion of its second air separation plant in Giheung, which has a total investment value of $180 million. Linde Korea's new facility is capable of producing high purity industrial gases which are required in diverse manufacturing processes. With the additional capacity from its new plant, Linde Korea said it is well-positioned to supply the rising requirements for nitrogen, oxygen and argon from its customers involved in the steel, electronics, semiconductor, metal, glass, shipbuilding, automotive and petrochemical industries. ■

Enjoying Automation

Control For High-Pressure Steam Boiler Systems

Success – At Loos, the acronym SUCcess stands for "Start-Up-Control combined with Shutdown and Standby," a control and equipment variant facilitating automatic steam boiler operation in the operating modes normal operation, heat maintenance, cold standby and hot standby. At the push of a button or using an external request signal, the steam boiler can be started up fully automatically and gently when cold, shut down and protected against overload during normal operation.

Markus Tuffner
Head of Marketing Services, Loos

Cold Starts

Cold starts place a considerably higher mechanical load on shell boilers than normal operation. Characterized by the fact that the water in the boiler does not boil, cold starts occur after periods of down time or when multi-boiler systems are used with sequence control without pressure and temperature maintenance (cold standby). A higher level of mechanical stress is involved because the temperature difference between the flame tube and the boiler shell is greater than in normal operation. That is why the flame tube expands noticeably more than the boiler shell in normal operation. As a consequence, between the flame and boiler shell or the flame tube and the colder smoke tubes there is considerably more mechanical stress on the respective connecting and stay elements, such as the flame tube floor connection, stay tubes, flame tube reversing chamber connections or gusset stays. This stress is increased even more if there is either no or very limited vapor bubble formation during the start-up procedure, which is the case when the steam shut-off valve is closed, for example. The natural circulation (fig.1) normally found in the steam boiler is not triggered. The result is temperature stratification in the boiler (cold at the bottom, hot at the top) with additional thermal stresses.

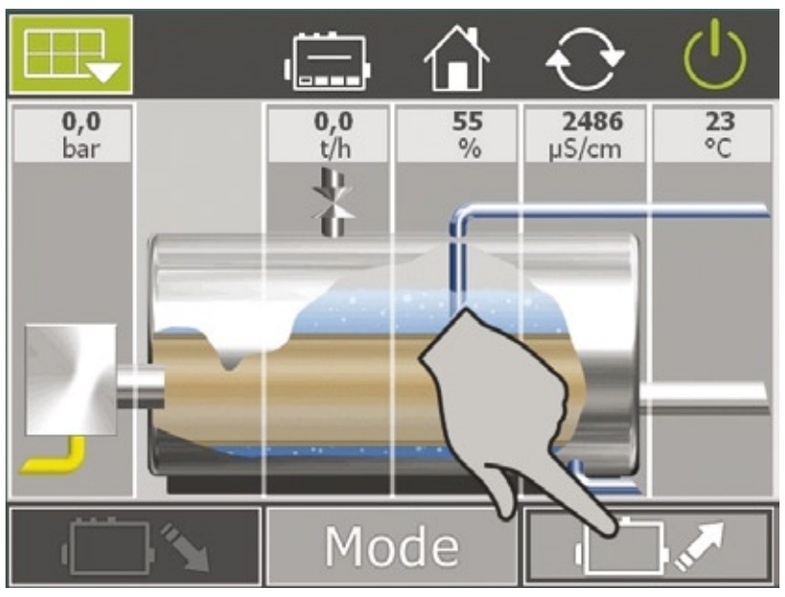
Overload and High Load Change Speeds

Every steam boiler is designed to continuously supply a specific nominal output. If the steam extraction quantity rises above this nominal output, the boiler's current working gauge pressure drops even though the burner is operating at maximum capacity. Depending on the load peak, this more or less rapid decrease in working gauge pressure and the resulting reduction in the boiling point produce re-evaporation effects throughout the boiler's water content. This means that additional vapor bubbles form in the entire water content of the boiler. Since steam has a greater volume than water and the vapor bubbles take a while to rise to the water surface in the steam chamber, the water foams. On one hand, this can have the negative effect of producing uncontrolled high water or shutdowns due to insufficient water; on the other hand, it can also cause water entrainment in the steam outlet. The negative consequences are wet steam, water impact, corrosion, salt deposits and leaky valves in the steam condensate network.

Great changes in load, i.e. high load change speeds and the associated great fluctuations in pressure, can cause unfavorable flow conditions to develop even if the nominal output has not been exceeded. The vapor bubble formation required to dissipate heat from the heating surfaces can stagnate, that is, cause many small bubbles to join together to form larger vapor bubbles which do not leave the heating surfaces immediately, thus making conditions favorable for local overheating.

Avoiding Stress And Premature Wear

Due to the reasons stated above, cold starts with steam boilers should be as gentle on the boiler as possible and follow the operating instructions exactly. Until a low working gauge pressure has been reached, the water content should be warmed up with the burner capacity as low as possible. The boiler's water level should be monitored with regard to the water's thermal expansion. If the water level rises too much, it should be lowered using the blow-down valve. It is important that the boiler water is mixed well during the start-up process. This prevents unnecessary loads in the form of thermal stresses and can be achieved by opening the steam shut-off valve slightly. A small steam quantity can flow into the connected network. The boiler's natural internal water circulation is triggered. Once the mean work gauge pressure has been reached, the steam extraction quantity should be slowly increased by opening the steam shut-off valve in steps. Water impacts in the lines due to the presence of condensate, steam boiler overload, as well as any unnecessary stress in the pipeline network connected can be avoided by slowly heating up the network.



User interface of the Loos Boiler Control LBC – boiler starts fully automatically when the "start up" icon is pressed or by means of an external signal.

Overload and High Load Change Speeds

Ideally, these interconnected topics should be taken into account when designing the systems and consumer structure. If great fluctuations in steam reduction and therefore also in the network pressure, e.g. from the steam accumulator, cannot be avoided, automatic units should intervene as needed to limit or prevent steam extraction and thus any resulting negative consequences.

Automatic Start-Up, Standby And Shutdown Control SUC

The automatic start-up, standby and shutdown control SUCcess facilitates automatic operation of units that would otherwise have to be operated manually. The steam boilers are equipped with motorised steam shut-off and starting shut-off valves as well as an automatic blow-down valve in addition to the usual boiler equipment. The control and regulating functions integrated in the LBC boiler management system provide for automatic cold starts that are gentle on the boiler. Overloads and high load change speeds are achieved, and negative after-effects are suppressed using control technology.

Cold Starts Or Cold Standby For Multi-Boiler Systems

The boiler is started up gently at the push of a button or using an external signal. Until an adjustable pressure has been reached, the water content should be warmed up at low burner capacity. The water level is continuously monitored throughout the process and controlled with the aid of the automatic blow-down valve, if necessary. The motorized starting shut-off valve is opened to allow a small quantity of steam to flow off. The boiler's natural internal water circulation is triggered, preventing unnecessary thermal stresses. Once the pressure has been reached, the steam shut-off valve opens with an adjustable starting cycle to slowly warm up the network downstream. The boiler is now in normal operation.

Shutdown Process

The automatic shutdown process can also be triggered by the push of a button or using an external signal. The steam shut-off and starting shut-off valves (if applicable) close and the burner capacity is slowly reduced until the burner control finally interrupts fuel supply completely. The boiler is now on standby and waits for the next commands.

Reaction to Overload and High Load Change Speeds

The integrated overload protection function ensures that steam quality remains unchanged in the event of sudden jumps in load. If the steam boiler's working gauge pressure is reduced although the burner is operating at the nominal load, this is a sure sign of overload. The integrated boiler protection control recognizes the problem and reduces steam discharge with the aid of the motorized steam shut-off valve until the boiler pressure is stable again. This prevents water entrainment and its negative consequences, such as brining and corrosion of downstream components.

Heat Maintenance Mode or Hot Standby For Multi-Boiler Systems

During heat maintenance or standby mode (e.g. with multi-boiler operation if the follow-in boiler is not needed), steam discharge is completely suppressed for this boiler. The burners switch on only sporadically in this operating mode to compensate for losses from thermal conduction and radiation. If this condition is maintained for a longer period of time (> 3 days), temperature stratification begins to develop in the boiler. If boilers kept warm this way are switched to normal operation, the high operating pressure (hot upper range) gives the appearance that the boiler is immediately available. If so required, the boiler control will then charge the boiler within a very short period at high burner load. If there is temperature stratification in the boiler, extreme thermal stresses then occur.

The automatic start-up control intervenes here as well. The starting shut-off valve opens every time the burners are sporadically switched on in heat maintenance mode or hot standby mode. The boiler's natural internal water circulation is stimulated, mixing the boiler water. This prevents temperature stratification and extreme thermal stresses in the boiler.

Customer Benefit

With its automatic protective functions, the start-up control SUCcess ensures that the boiler has a long, trouble-free service life. Operating personnel must no longer carry out a long list of control tasks – one push of a button is now all it takes to cold start the boiler. During normal operation, the automatic functions intervene in the event of an overload, protecting the system from water entrainment and negative consequences, such as water impact, corrosion and brining of downstream elements. In the heat maintenance phase, steam extraction is facilitated every time the burner is switched on. This stimulates natural internal water circulation and breaks up temperature stratification. Boiler attendants are relieved of a multitude of tasks, allowing them to focus solely on monitoring and supervisory functions.

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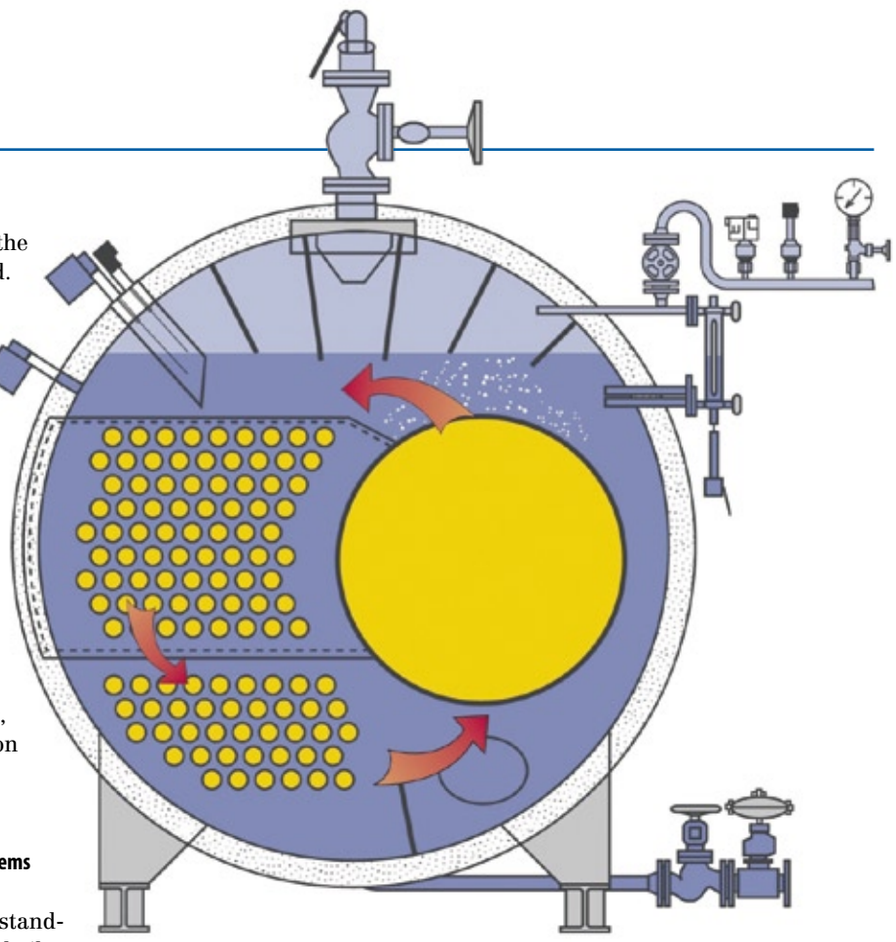

Diagram of natural circulation within the boiler, provided that steam discharge is allowed during the start-up process.

chemanager-online.com/en/tags/steam-boilers

BP Agrees to Pay Texas $50 Million for Pollution

BP's U.S. subsidiary has agreed to pay $50 million in civil penalties to the state of Texas for pollution from its Texas City refinery, including the deadly March 2005 explosion, state Attorney General Greg Abbott Said.

The fine is equal to the amount BP Products North America paid in 2009 to the federal government for pollution from the explosion, which killed 15 workers and injured 180 other people. The agreement comes as BP is marketing the 406,540 barrel-per-day (bpd) Texas City refinery, which accounts for 2.2% of U.S. refining capacity. In addition to the $100 million in fines paid for pollution stemming from the refinery, BP has paid the U.S. Occupational and Safety Administration $71.6 million for worker safety violations and over $2 billion settling legal claims from the explosion. "The agreement reflects the state's commitment to protecting air quality and holding polluters accountable for illegal emissions," Abbott said. The agreement must be approved by a state court judge in Austin, Texas, before it will take effect. The court must wait 30 days after the agreement is made public before it can act. ■

Climate Change

An Emerging Risk for Chemical Plants?

Flood Resilience – At first sight, climate change and plant safety seem to be separate issues, with the first one having much more public attention. However, we did not need Fukushima to demonstrate that natural hazards can be a major risk for any technical installation. A guideline is being developed by the German Commission on Process Safety to increase the resilience of chemical plants against floods, taking into account the expected climate change.

Christian Jochum
Chairman, German Commission on Process Safety

Water – Resource and Risk for Chemical Plants

Climate change is one of the hottest topics both in the scientific as in the media world. Although its root causes and final consequences are still under heavy debate, an increase of extreme weather phenomena cannot longer be denied. This is not limited to but includes heavier precipitation. On the other hand, water is one of the most important utilities for chemical plants. Easy access to sufficient cooling water was one of the main reasons for building many chemical plants near rivers. Those plants had always to manage the risk of floods (as well as of droughts). A risk of flooding also exists in coastal areas and even at locations far away of surface water as a possible consequence of heavy local rain.

Flooding of chemical sites causes a number of severe risks. Hazardous chemicals from storage areas can be washed into the floods leading to environmental damages. Process equipment can be damaged by floating up or struck by swimming debris, also leading to hazardous emissions. In addition to the risks for people and environment the damages caused by flooding itself and the following business interruption can have a dramatic economic impact.

Regulation Of 'Natech' Risks

Those risks are well known to the operators as well as to the regulators. One of the basic requirements of the German statutory order on hazardous incidents – by which the European Seveso Directive for major hazard installations has been implemented – is protection from natural hazards. This includes not only flooding, but also snow, wind, earthquakes, etc. In the upcoming revision of the Seveso Directive, those "natech" risks (the combination of natural and technical risks) will be emphasized stronger, too.

The risk of floods is well known. Authorities and insurers have invested a lot in mapping risk areas. Most chemical plants in those areas have taken this risk into account both by technical measures as in their emergency plans. Therefore the consequences of floods to chemical plants have been limited in the past.

However, a number of questions remain open, especially:

- On which severity of floods (esp. water level) the safety measures have to be based?
- How to assess the risk of flooding by heavy rainfall?
- Are the existing data on floods and rainfall still valid under the assumption of a climate change?

New German Guideline (TRAS)

These were the questions that prompted the German Commission on Process Safety (which advises the federal government) to work out a technical guideline (TRAS) for the protection against floods and heavy rain. It aims especially at major hazard sites covered by the statutory order on hazardous incidents. The project was strongly supported by the German Federal Ministry for the Environment, as it fits into the "German Strategy for the Adaption to Climate Change." Based on two research projects sponsored by the German Federal Environment Agency, the guideline gives recommendations how to assess the risk of flooding in the safety reports and which safety measures could be applied.

For existing installations, floods should be considered that (retrospectively) occur every 100 years. This is the frequency on which the risk maps of the water management authorities are based, too. Flooding by local heavy rainfall recommendations for a case-by-case assessment are given, also based on retrospective data. In general, the balance has to be made up between inflow and outflow of water from different sources.

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The 'Climate Factor'

As this is more or less a traditional approach, the provisions for climate change needed an intense discussion. It would be neither reasonable nor legally acceptable for operators of chemical plants or for their competent authorities to follow up and evaluate the highly controversial scientific discussion on climate change. The commission therefore opted for a pragmatic approach. It recommends adjusting the (undisputed) retrospective data for water levels and rainfall by a "Climate Factor" of 1.2 for new installations with a lifetime until the year 2050. A 20 % increase of the severity of floods and heavy local rainfall until 2050 is well in between most scenarios of the scientific debate on climate change. This Climate Factor need not be applied if more specific knowledge is available, and it will be reassessed every five years.

The German statutory order on hazardous incidents also requires that the operator consider major hazards with a very low probability of occurrence but catastrophic consequences. Due to the low probability, technical safety measures may not be reasonable, but measures to mitigate the consequences may be necessary. The commission decided that for this purpose flooding of the site should be assumed, regardless of any cause, if the risk of flooding cannot be excluded a priori.

The draft of the guideline (TRAS) has been successfully tested for its practicability and was during the last months open to comments from all interested parties and especially the competent authorities of the German federal states. The Commission on Plant Safety will decide upon those comments in the coming weeks. The draft (and later the approved guideline) is available at www.kas-bmu.de.

Other 'Natech' Risks

Floods and heavy local rain are not the only natech risks to be considered. For other risks caused by heavy precipitation (snow, hale, landslides etc.), the commission regarded the information as not yet sufficient for a guideline. However, these risks are covered in supplementary information to the TRAS, which is published on the same website. For strong winds, another guideline is under consideration by the commission. For earthquakes the German Chemical Industry Association has recently issued a guidance. Lightning is covered since long by safety regulations. It remains a duty of any operator to assess all possible hazards for chemical plants. Guidelines as the above mentioned cannot repeal this duty, but help in fulfilling it.

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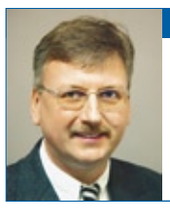
An Intermediate Balance

One Year of The Mandatory Application of GHS in Europe

One Year On – The regulation (EC) No 1272/2008 on the Classification, Labeling and Packaging of hazardous substances and mixtures (CLP) became mandatory for substances as of December 2010. The implementation of the Globally Harmonized System (GHS) outside of the European Community/European Economic Area is not uniform. For example, a final legal act for making the GHS mandatory in the U.S. is still not in place. As a consequence of the building block approach of the UN GHS, we have to accept that we will have regional and national versions of the UN GHS – which is in contradiction to the promise of real global harmonization of classification/labeling of chemicals.



Dr. Norbert Müller
Global Dangerous Goods Safety Adviser, Schenker

Among the downstream users of chemicals are logistics companies. Over the last year, they have been confronted with new hazard symbols and pictograms when their employees have loaded or unloaded packages onto trucks and containers. This is in addition to having to deal with the new contents of material safety data sheets when they check the acceptance of chemicals for storage in their warehouses. It is now time to strike an initial intermediate balance.

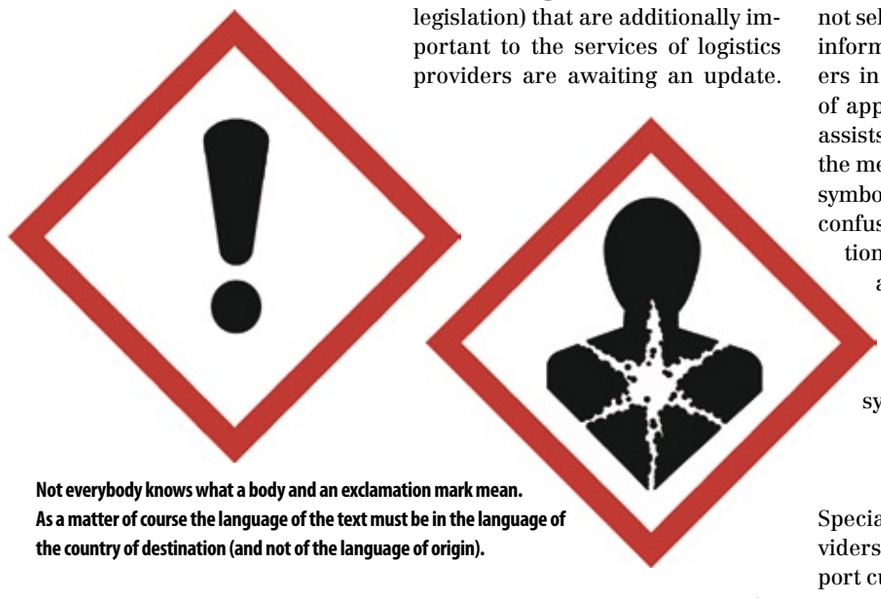
Initial Experience With GHS

Companies intending to place hazardous substances on the market in the member states of the European Union have had two years time to prepare. Several logistics companies in Europe were surprised at the fact that many hazardous substances were not re-classified and re-labeled under the CLP regulation in time; other companies are obviously experiencing problems with the correct application of the CLP regulation; both can cause a profusion of problems. Global players in the chemical industry in particular have taken the opportunity to re-classify and re-label their preparations/mixtures too under the CLP regulation, although they have time to do so until mid 2015. The current situation is characterized by the fact that employees loading and unloading packaging in distribution terminals and warehouses have to adopt two more or less different systems, in particular ones with symbols and pictograms.

The Impact Of GHS

The impact on logistics companies are as follows: The re-classification and, as a consequence, the re-labelling of hazardous chemicals means the update of:

- Material Safety Data Sheets (MSDS) in accordance with article 31 and annex II of the regulation (EC) No. 1907/2006 (Reach) or ISO 11014. In accordance with articles 76 and 77 of Reach a program to reinforce Reach and CLP in the EC was initiated. The relevant authorities are checking MSDS and labels to see if they are compliant with the requirements of the Reach and CLP regulation. The majority of logistics companies appreciate this initiative as a contribution to increase the quality of MSDS and labeling.
- An assessments of the risks to health and safety at work in accordance with article 9 of the directive on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391).



Not everybody knows what a body and an exclamation mark mean. As a matter of course the language of the text must be in the language of the country of destination (and not of the language of origin).

- Explosion protection documents in accordance with articles 4 and 8 of the directive on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (1999/92).
- Inventories of chemicals in warehouses with their specific data.
- Standard operational procedures that refer to the classification and labeling details.
- Prohibitions of mixed storage which depend on classification and labeling.
- Warning signs in accordance with the directive on the minimum requirements for the provision of safety and/or health signs at work (92/58).
- Plans for fire brigades where special areas for hazmats are marked.

Further Work

Several regulations connected with the CLP regulation (downstream legislation) that are additionally important to the services of logistics providers are awaiting an update. The most important regulations for logistics service companies are the European directive on the control of major-accident hazards involving dangerous substances (Control of Major Accident Hazards ((COMAH)) or Seveso II), which is the basis for the German statutory order on hazardous incidents and the German regulation concerning plants for which a special license is necessary. The commission has published a draft concerning the update of the Seveso II directive (Seveso III). A consequence of the adaption of the CLP regulation is e.g. the restructuring of the requirements for the storage of aerosols. The European Insurance and Reinsurance Federation will have to update its directive on the planning and installation of sprinkler systems (directive 4001) in accordance with the new threshold values of the flashpoint for flammable liquids.

Communication

There are many symbols that are not self-explanatory. How is this new information to be publicized? Posters in the language of the country of application are very useful. This assists the employees in identifying the meaning of the more or less new symbols and pictograms and to avoid confusion. Due to the long transitional period for re-classification and re-labeling of hazardous preparations/mixtures until mid 2015, we have to accept two different labeling systems.

Summary

Specialized chemical logistics providers are often requested to support customers, especially from outside Europe in the proper application of the CLP regulation. This can present both a new challenge and an opportunity.

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Finding The Energy

Efficiency and the Impact Of EU Legislation

Directive Replacement – The European IED (Industrial Emissions directive) was published in January 2011. This replaces the former IPPC (Integrated Pollution Prevention Control) directive. Directive 2010/75/EU, concerning Industrial Emissions (IED), merges the existing directive 2008/1/EC of the European Parliament concerning IPPC, with six industrial-sector specific directives, into a single directive for the clarification and simplification of existing provisions.

The directive establishes a general framework for the control of principal industrial activities with a view to controlling emissions arising from industrial installations into air, water and soil. A key element of the directive rules that installations should operate only if they hold a permit or, in certain cases, if they are registered. IED follows the concept of best available techniques (BAT).

Completing the link between energy efficiency and carbon emissions saw the announcement on June 22 of the proposed EU directive on energy efficiency. This will now go into a consultation period. However, its proposals are wide ranging from the power generation and distribution industry through retail customers, energy efficient buildings to industrial energy consumers. The drive behind this directive is that, on current performance, the EU is unlikely to reach its previously announced 20-20-20 targets (a reduction in EU greenhouse gas emissions of at least 20 % below 1990 levels, 20 % of EU energy consumption to come from renewable resources and a 20 % reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency, all by 2020).

Clearly while many BATs will be sector specific, the common strand throughout will be the adoption of a systematic approach to energy management. This is a universal concept and likely to be the backbone of any permit to operate. The proposed energy efficiency directive specifically mentions the adoption of energy management systems for SMEs and regular energy auditing of large industrial complexes. This paper looks at the implications and requirements and in particular how modern measurement and control technology play a key role in being able to achieve the aspirations of the BATs.

What the Directives Mean to the Site Operator

Individual EU Member States will develop their own permit and licence to operate systems within the aims of the directives. However, given the diversity of industrial sectors and the prominence given in the BATs, energy management systems will become the framework under the licence to operate. In an analogous way to quality management, they provide an auditable structure for both compliance and improvement, defining what is the appropriate process for managing "energy" for the site/installation in question.

The drivers behind energy performance are many and varied – in most cases there is no single issue or cause which can be tackled in isolation. Hence the topic is ideally suited to a systems management approach which drives a culture of management responsibility, process measurement, problem identification, corrective action and improvement. This can be seen in the International and European standards for Energy Management, (BS) ISO 50001.

Thus high-quality process measurement, data management, control and reporting form the foundation for any successful systematic energy management. Many aspects will be cross-discipline – maintenance (asset management) as well as operational (process control and optimisation). Energy efficiency is affected by phenomena on many time frames – long term equipment efficiency as well as real-time minute-by-minute plant performance. Thus the growth of modern plant systems, with integrated cross-site and multi-level databases, provides the ideal foundation for the development of solutions to such a multi-level problem.

The Key BAT

The important BAT is the EU reference document ENE. Its purpose "is to provide general indications about energy efficiency techniques that can be considered as the appropriate reference point to assist the determination of a BAT-based permit…."

The document, some 400 pages long, is a comprehensive résumé of good practice, covering steam systems, electricity, combustions, compressed air, HVAC and many other important areas of common operation.

However, right from the start, the executive summary stresses the importance of a formal systematic management approach to energy efficiency and its applicability to all types of installation. In its summary it specifically mentions:

- Benchmarking.
- Checking performance and taking corrective action, paying particular attention to monitoring and measurement.
- Appropriate use of energy models, databases and balances.
- Establishing and reviewing energy efficiency objectives and indicators.

Thus there is a clear steer that measurement, monitoring and control have a key role to play in achieving BAT for energy efficiency. Accurate energy data and performance metrics, on a variety of timescales, provide the foundation for any improvement system.

Plant Measurement and Data Base

The cornerstone of all the activities is a reliable and accurate plant measurement system, feeding a modern database with seamless connectivity to broader business and engineering systems. Timely energy-related decisions need accurate plant measurements enhanced by density, pressure and temperature compensations when necessary (e.g. for critical steam flows). Traditional design standards have not served energy monitoring well and adequate measurement point coverage on older units and also packaged units may be inadequate. However, modern wireless technology allows easy addition of new measurement points. Ideally, data base techniques such as plant-wide data reconciliation can improve the quality of the basic data.

Operational Control And Optimisation

Inevitably plant energy performance tends to be a trade-off between the push for higher yields/margin and achieving desirable energy benchmarks. Thus it is a classic multi-constraint problem. Plant stability is key if the fine balance between these often competing priorities is to be achieved. Consequently modern control techniques such as multivariable model-based control, feed-forward and constraint pushering all play an important role in providing the stable plant platform.

Density and stoichiometric control of furnaces and boilers, improved anti-surge control of compressors, pressure minimisation of distillation columns, furnace coil balancing, recycle minimisation and heat recovery maximisation by constraint pushing are all typical of the control techniques that should be standard for a modern energy-efficient plant. On top of the basic stabilisation, there are ample benefits to be gained by model-based process optimisation. Energy vectors need full credit and careful representation in process optimisers. Utility optimisers play an important role in drive selection (steam vs electricity) and the continual rebalancing of steam networks to ensure the best use of the most efficient generating equipment and minimising unnecessary letdowns.

Equipment Performance Assessment

Equipment condition is a major factor in a sites energy performance – in particular the effects of fouling and degraded heat transfer. Fouling of heat exchangers, reduced turbine efficiencies, pump performance, flue gas recovery networks and other similar applications all require careful monitoring of their performance with a view to the optimal time to clean, taking out of service or other regular tasks (such as sootblowing of furnace ducts).

In the past, this was often done by a standard rotation approach (e.g. "clean every 30 days") whereas a more modern approach is condition based where the decision is based on the actual process measurements (and their performance over time) plus economic factors such as cost of downtime, cost of cleaning etc. Thus classical maintenance planning techniques can be brought into an almost real-time environment.

The availability of (historical) process data via PC links to maintenance staff brings vital information onto the desks of staff, who traditionally did not have easy access to control room measurements. Furthermore, the ability to seamlessly integrate historical process data with equipment data from the maintenance management system (e.g. SAP) allows even more intelligent applications, integrating maintenance records and current performance.

Reporting, Visualisation And Benchmarking

Modern reporting and visualisation techniques play an important role in enabling the systems needed to achieve BAT. Both from the perspective of managing the plethora of information into digestible forms, and also in providing improved insight – particularly important when analysing causes and trends in energy performance against a wide range of (sometimes) conflicting drivers.

Historically, the energy report was a piece of paper that arrived on the site managers desk at the end of each month. It contained perhaps some simple metric – e.g. energy/feed and some rudimentary explanation for the previous month's performance against a historical benchmark. A process of "explain away the difference" would be undertaken and that was it.

The other key issue is presenting performance reports with data that is appropriate for the party handling it and their ability to utilise it. Thus the granularity and issues that may be presented in a daily performance report to the plant shift leader is very different to the monthly report to the Site Manager. The reports have to be consistent with the span of control of the intended recipient.

Fortunately drill-down and dashboarding techniques allow a single performance database (based on the process historian) to generate consistent reports which satisfy these requirements.

Conclusion

Energy efficiency initiatives have been around for many years with varying degrees of success. They often fall between other more immediate operational demands. Sustainability is an issue. However in a climate of rising energy costs and increased environmental pressures, the EU is using energy efficiency as a key driver in the pursuit of lower carbon emissions – it is tangible and has clear benefits in reduced operating costs for the end user. Depending on the starting point, energy savings of 5-10 % are achievable.

Achieving these goals in a sustainable manner against a dynamic operational background is clearly a management and control issue – therefore reliable and accurate measurement and control systems have a major role to play in meeting these requirements. Modern instrumentation is a vital enabling technology in realising energy efficiency operation.

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Messer Supplies Nitrogen Unit For Reactor Cooling At Lanxess

Messer, an industrial gases specialist, is installing a reactor cooling unit at Lanxess. The Cryocontrol unit, which uses cryogenic liquid nitrogen as a coolant, will be used for rubber-related research and development purposes at the Dormagen site. The start-up of this unit provides Messer with a new reference in the field of reactor cooling.

In modern pharmaceutical and fine chemical production (e.g. in the production of active ingredients), very low process temperatures are often required in reactors. These low temperatures help to ensure targeted control of synthesis steps or to increase product yield. Temperature requirements as low as -100 °C are not unusual. As a rule, high temperatures are also required in the same process step. The Cryocontrol process uses cryogenic liquid nitrogen to produce these low temperatures. ■

CNOOC Still in Talks BP's PAE Stake

China's biggest offshore oil producer CNOOC said talks are still ongoing for a $7 billion bid to buy BP's stake in Argentina-based oil and gas group Pan American Energy LLC (PAE), despite a lapsed deadline last week.

On Oct. 25, CNOOC said Bridas Corp, its 50% joint venture, had not obtained the necessary regulatory approvals to complete the bid. It had said Nov 1. was the deadline after which either party would have the right to terminate the agreement. ■

The Sugar Platform

Biorefineries for a Bio-Based Economy in Europe

New Energy – Fossil resources are limited, but the global demand for fuels and chemicals is continuously rising. In addition to European and national legislations that set ambitious targets for greenhouse gas reductions, there is also increasing public and industrial pressure to develop alternative technical solutions for an economically viable supply of bio-based fuels and chemicals. Therefore, the development of economically competitive solutions for biorefineries combined with a low-cost fermentation medium is of important strategic interest. To stay competitive, low cost and easy to use fermentation substrates are needed.

Dr. Irina Sterr
Business Development Manager, Corporate R&D, Süd-Chemie

Enzymatic Liquefaction of the Whole Sugar Beet

The production of bio-based fuels and chemicals requires the availability of a renewable feedstock at affordable costs. Today, industrial fermentation processes mainly use hydrolysed starch or glucose as a fermentation substrate. But also sugar cane molasses is a possible feedstock, e.g. for microbial biopolymer production. However, because of alternative use in food and feed, both sugar sources are limited in volume and only available at high price levels. Especially the price for molasses has seen a strong increase over the last years, on the one hand as a result of a decreased sugar cane molasses production due to a poor sugar cane harvest in India and Brazil and on the other hand increased usage of molasses in developing countries like India. Therefore, the development of a low-cost fermentation medium is of huge interest for the fermentation and sugar industry.

Companies worldwide have consequently developed technologies to provide fermentation substrates on the basis of various cellulosic and hemicellulosic feedstocks. This includes byproducts from the agro and the food processing industries as well as high-yield agricultural crops, such as wheat straw, corn stover, sugar beet, beet pulp, cane bagasse and others.

Sugar beet, for example, is a current high-yield crop which has been used as a source of fermentable carbohydrates throughout Europe for years. For a long time, sugar cane from countries like Brazil or India was the only source of fermentable sugars for European countries with no own sugar production like Germany.

Sugar Beets in Europe

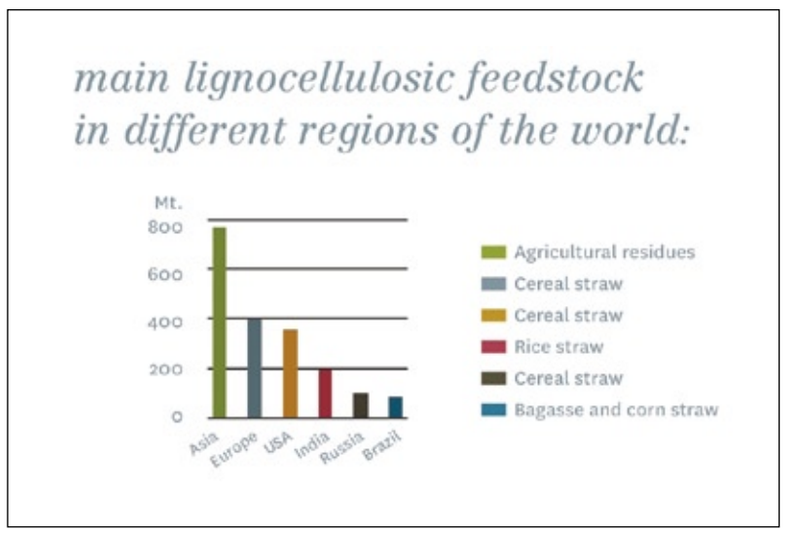
With the growing of sugar beets throughout Europe, the dependence of sugar from sugar cane growing countries was released. Due to the protection of the European sugar market (with import quotas and high import tariffs for sugars) the European beet sugar was competitive. A further feature to protect sugar prices inside Europe was the implementation of sugar quotas to limit over-production of beet sugar. The sugar market reform in 2006 led to a decreasing quota for the production of sucrose from sugar beets. But sugar beet (Beta vulgaris) is still a very interesting crop as it is among the agricultural crops with the highest biomass and sugar yields. In Europe, sugar beet is currently the main agricultural source for the production of sucrose. To ensure that farmers will have another outlet for their sugar beets the production of sugar beets for industrial usage was improved. Thus, access to raw materials at reasonable prices was opened to the fermentation industry.

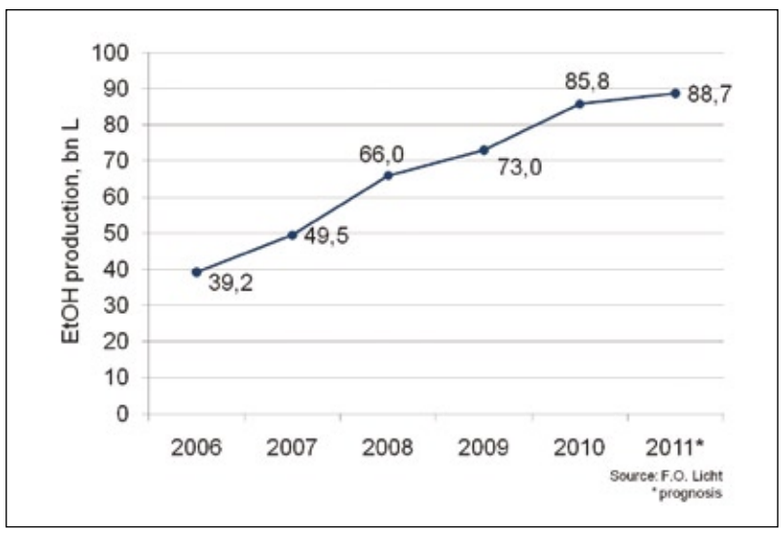
Süd-Chemie, a Clariant group company, works on a proprietary and innovative process for the enzymatic liquefaction of the whole sugar beet without using diffusion method or adding any water developed to further increase the sugar content and make sugar beet an even more attractive feedstock.

The sugar beet contains about 77 % water and 23 % dry matter. About 75 % of the dry matter is sucrose while the rest is cell wall material and other soluble and non-soluble ingredients such as minerals, fats or vitamins. The sugar beet is cut into small strips (usually in a sugar factory) from which the sucrose is extracted by diffusion. The resulting sugar juice is used for the production of crystallized sugar, but can also be utilized directly for fermentation e.g. of bioethanol. Either way, after diffusion the remaining fraction of the beet is the beet pulp which is traditionally used as animal feed after drying.

Due to the liquefaction process, the content of fermentable sugar resulting from sugar beets will be significantly enhanced by additionally hydrolysing the cell-wall polysaccharides (cellulosic and hemicellulosic fraction of the sugar beet) and converting it into monomeric sugars. Through this gentle process, the vitamins and minerals of the beet remain in the resulting solution, making this liquefied beet an all in one, ready-to-use and low cost fermentation media usable for a variety of bioprocesses, such as production of ethanol, lactic acid or succinic acid and other bulk and fine chemicals. A main feature of this process is that no sugar beet pulp remains, which is dried for usage as animal feed in a very inefficient way needing a high energy input.

But also for the development of lignocellulosic hydrolysates as a fermentation substrate, big efforts are made by several companies especially in Europe and in North- and South America. Their processes are using enzymatic hydrolysis of cellulosic biomass like wheat straw, corn stover or bagasse to produce monomeric sugars for fermentation. These technologies are ready for commercialization. The main target is the production of cellulosic ethanol based on these feedstocks.





The Rise Of Bioethanol

Bioethanol is the most important biofuel worldwide. In 2010, the worldwide production of bioethanol has reached 85.8 billion liters, and there is a high growing potential due to national legislation. For example, the EU has set a goal of 10 % renewables in the transportation sector until 2020. With a potential gasoline demand in the EU of 100 billion liters, the demand for bioethanol will grow from actually 3.7 billion liters to at least 10 billion liters.

Today, the main feedstock for the bioethanol production in Europe is wheat, but the green house gas savings are quite low, lying between 47 % and 69 % in comparison to lignocellulosic based bioethanol where green house gas savings of up to 95 % can be reached. And there is a big potential for agricultural residues in the EU – approximately 300 million tons of cereal straw per year are being generated. In the U.S., the generated amount of agricultural residues (cereal straw and corn stover) is at 400 million tons per year. Depending on the region, up to 60 % of these residues can be harvested without any risk regarding soil quality.

Potential In Europe

To tap the full potential in the EU, approximately 1,000-2,000 cellulosic ethanol plants could be built based on cereal straw as feedstock. Thereby 20-30 % of the gasoline demand in the EU can be covered with such a regionally produced liquid energy source. Cellulosic ethanol is the primary product of these processes, but there is more potential. Besides its usage as biofuel, ethanol is also an important feedstock for the chemical industry. It can be converted to further platform chemicals like acetate, acetaldehyde or ethylene. Ethylene, for example, is the basic material for the polyethylene production, one of the most important plastic materials in the world. But also the sugar resulting after the hydrolysis step can be used for fermentation of other bulk and fine chemicals or chemical intermediates. The enzymatic hydrolysis of lignocellulosic biomass provides a competitive sugar platform for the generation of "green" chemicals and fuels.

From today's view there are market-ready technologies which are able to provide sugars at competitive prices and which in the medium term can provide an important contribution to a more sustainable production in the chemical industry and the transportation sector. Now a political framework supporting investments in this area has to be created to display the full economic and ecologic potential of these new technologies to retain Europe's leading position in innovation.

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New Cyber Attack Targets Chemical Firms

At least 48 chemical and defense companies were victims of a coordinated cyber attack that has been traced to a man in China, according to a new report from security firm Symantec.

Computers belonging to these companies were infected with malicious software known as "PoisonIvy," which was used to steal information such as design documents, formulas and details on manufacturing processes, Symantec said.

It did not identify the companies, but said they include multiple Fortune 100 corporations that develop compounds and advanced materials, along with businesses that help manufacture infrastructure for these industries.

The bulk of the infected machines were based in the U.S. and United Kingdom, Symantec said, adding that the victims include 29 chemicals companies, some of which developed advanced materials used in military vehicles.

"The purpose of the attacks appears to be industrial espionage, collecting intellectual property for competitive advantage," Symantec said in a white paper on the campaign, which the company dubbed the "Nitro" attacks.

The cyber campaign ran from late July through mid-September and was traced to a computer system in the U.S. that was owned by a man in his 20s in Hebei province in northern China, according to Symantec.

Researchers gave the man the pseudonym "Covert Grove" based on a literal translation of his name. They found evidence that the "command and control" servers used to control and mine data in this campaign were also used in attacks on human-rights groups from late April to early May, and in attacks on the motor industry in late May, Symantec said.

"We are unable to determine if Covert Grove is the sole attacker or if he has a direct or only indirect role," said Symantec's white paper. "Nor are we able to definitively determine if he is hacking these targets on behalf of another party or multiple parties."

The Nitro campaign is the latest in a series of highly targeted cyber attacks that security experts say are likely the work of government-backed hackers.

Intel Corp's security unit McAfee in August identified "Operation Shady RAT," a five-year coordinated campaign on the networks of 72 organizations, including the United Nations, governments and corporations.

In February, McAfee warned that hackers working in China broke into the computer systems of five multinational oil and natural gas companies to steal bidding plans and other critical proprietary information.

Symantec said that the Nitro attackers sent emails with tainted attachments to between 100 and 500 employees at a company, claiming to be from established business partners or to contain bogus security updates.

When an unsuspecting recipient opens the attachment, it installs "PoisonIvy," a Remote Access Trojan (RAT) that can take control of a machine and that is easily available over the Internet.

While the hackers' behavior differed slightly in each case, they typically identified desired intellectual property, copied it and uploaded it to a remote server, Symantec said in its report.

Symantec did not identify the companies that were targeted in its white paper and researchers could not immediately be reached.

Dow Chemical said it detected "unusual e-mails being delivered to the company" last summer and worked with law enforcers to address this situation.

"We have no reason to believe our operations were compromised, including safety, security, intellectual property, or our ability to service our customers," a Dow spokesman said.

A spokesman for DuPont declined to comment. ■

ABB to Power Subsea Oil and Gas Field in Norwegian Sea

ABB said it has won an order worth about $36 million from oil services company Aker Solutions to provide drives and transformers to their subsea power distribution system for the Asgard subsea oil and gas field operated by Norway's Statoil. The order was booked in the third quarter.

ABB's equipment will ensure power as well as optimized motor speed and control, for the world's first subsea gas compression system from onboard the Asgard A floating vessel off the northern coast of Norway. The electrical system will be able to transmit 15 megavolt-amperes and 189 hertz, enough to power over 10,000 homes, over a distance of 43 kilometers. Once completed, this will be a world record distance as well as the highest voltage and frequency achieved between a drive on a floating production facility and a compressor on the seabed. ■

Ashland Expands Global Natrosol Hydroxyethylcellulose Production

Ashland said it is expanding production for Natrosol hydroxyethylcellulose (HEC) across its global network through capacity additions at its facilities in Nanjing, China, and Zwijndrecht, the Netherlands. The company said it is adding 7,000 metric tons of capacity. ■

Full Transparency To The Limit

Managing Energy Efficiency at Bayer

Fewer Emissions – Successful reduction of energy consumption and CO_2 emissions requires a systematic approach. Since climate protection is a key element in its sustainability strategy, Bayer has developed and systematically implemented the "Bayer Climate Check" and the integrated energy management system STRUCTese (Structured Efficiency System for Energy). In contrast to most state-of-the-art energy management systems that merely measure energy consumption STRUCTese allows a detailed measurement and tracking of energy efficiency, which provides full transparency about the status quo in each plant and the further improvement potential up to the limit of best available technology.

Dr. Christian Drumm
Project Manager
Energy Efficiency, Bayer Technology Services

Based on the encouraging results that have been obtained with this methodology in the last three years, Bayer Material Science now has even raised its climate protection targets for 2020 and is thus continuing its ambitious approach.

Increasing Need to Optimize Energy Efficiency

The chemical industry as a large contributor to greenhouse gas emissions committed itself to reduce these emissions and to take environmental and social responsibility. Optimizing energy efficiency can provide a major contribution towards this goal. Beyond the global climate challenge, in the light of rising energy prices the reduction of energy costs has become a key lever to decrease the manufacturing costs. Last but not least, there is also an increasing interest of governments in energy efficiency where some regulation has already started. In order to benefit from tax reliefs it is necessary to have an energy management system according to EN 16001 in place from 2013 on.

The Bayer Climate Program

For these reasons, Bayer positioned itself as a pioneer in climate protection with a global climate program in 2007 and ambitious targets for cutting greenhouse gas emissions. Bayer MaterialScience, which has the highest energy consumption of the Bayer sub-groups committed to reduce the specific greenhouse gas emissions by 25 % in the period 2005 to 2020. In order to achieve these targets, the lighthouse projects "Bayer Climate Check" and STRUCTese were brought to life.

The Bayer Climate Check combines the quantification of specific CO_2 emissions of industrial products with a Climate Footprint and a systematic screening for energy efficiency potentials in an energy efficiency check. The methodology follows internationally recognized standards, is based on the Six Sigma approach and has been certified by TUEV Sued.

The energy efficiency check helps to identify all potentials for energy savings in chemical plants and buildings. It starts with a systematic analysis of overall energy consumption and energy distribution of a plant. In the next step, improvement ideas are collected by means of equipment checklists, and best practices input of process experts and a brainstorming session together with the plant staff. The full range of optimization levels including energy and utility supply, raw materials, heat integration, equipment, operational improvements, process design improvements and buildings and facility (fig. 1) is considered in the energy efficiency check. All improvement ideas are evaluated with regard to technical feasibility and profitability and prioritized for implementation by means of an energy savings portfolio (fig. 2).

STRUCTese — Managing Energy Efficiency

The rapid and sustainable implementation of the identified energy savings potentials often is a significant challenge due to various reasons: lack of time for energy efficiency measures in the daily business, reluctant approval of investments for plant modifications or energy efficiency being only a secondary objective behind yield, throughput and quality. The energy efficiency management system STRUCTese accelerates this process by raising awareness on all levels of the organization for the topic energy and integrating it into the daily workflow of production sites.

The Energy Loss Cascade

The Energy Loss Cascade (fig. 3) is the key element of the energy efficiency management system STRUCTese. Beyond simply measuring energy consumption the energy loss cascade allows the quantification and tracking of energy efficiency. The plant energy optimum on the left side of the cascade represents the minimum specific energy consumption to produce the desired product at the given site and available infrastructure. This important benchmark sets the ultimate energy efficiency target for the existing plant. The gap between the actual consumption of the plant and the plant energy optimum is divided into several loss categories, which allow visualizing different sources of energy efficiency losses and identify the key levers for energy efficiency improvement. This approach achieves an unmatched level of transparency in the management of energy efficiency.

The loss category "sub-optimal equipment" comprises all investment projects identified in the Bayer Climate Check and thus shows, where improvements can be achieved most effectively. Several dynamic loss categories are distinguished, visualizing efficiency losses due to operational aspects such as partial load or sub-optimal operation. Since the distribution of dynamic losses over the different loss categories is determined with an automatic system, the energy loss cascade can be continuously updated in any desired time interval. In combination with suitable KPI's this represents an ideal tool for energy efficiency target setting and transparent control throughout all levels of the management.

The loss cascade is supplemented by further measures that create awareness for energy efficiency on all levels of the organization. A real-time energy efficiency monitor enables the plant operator to improve energy efficiency continuously through optimal process operation. Daily energy protocols summarize average energy consumptions and energy relevant process parameters of the last 24 hours for the discussion in every morning meeting of the plant team. With this integrated approach, the whole company is oriented towards energy efficiency from the upper management to the plant operator.

Bayer Material Science Stretched Its Climate Targets

The rollout of STRUCTese at Bayer has commenced in 2009 and included already 32 plants at the end of 2010. The rollout will be completed by the end of 2012 and will comprise about 60 plants. Up to the present, a reduction of energy consumption by 550000 MWh and annual CO_2 emissions by 135000 tons has been realized. Ultimately, Bayer Material Science expects to realize an annual CO_2 emission reduction of 700,000 tons by energy savings. Based on the encouraging results throughout the STRUCTese roll-out so far, Bayer Material Science has just recently stretched its climate target from 25 to 40 % reduction of specific CO_2 emissions until 2020 compared to the 2005 baseline.

Energy Efficiency Management is available for the whole process industry

The Climate Check and STRUCTese methodologies have been developed by Bayer as a means to assure that the ambitious targets of the Bayer Climate Program will be achieved, but are offered to external customers as well. Being designed for world-scale energy-intensive chemical production processes right from the start, the methodology is currently extended in a public funded project towards a universal management and benchmarking standard for energy efficiency suitable for any kind of production facility in the process industry.

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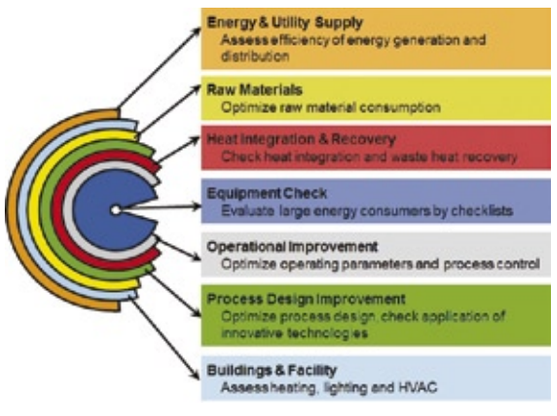


Fig. 1: Energy Efficiency Potentials in the Bayer Climate Check

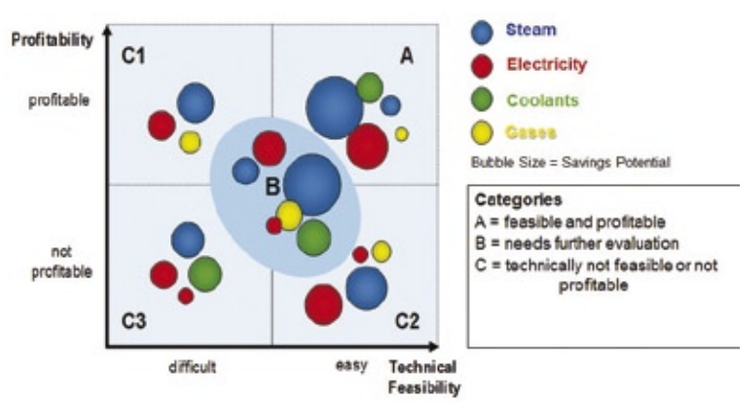


Fig. 2: Typical energy savings portfolio

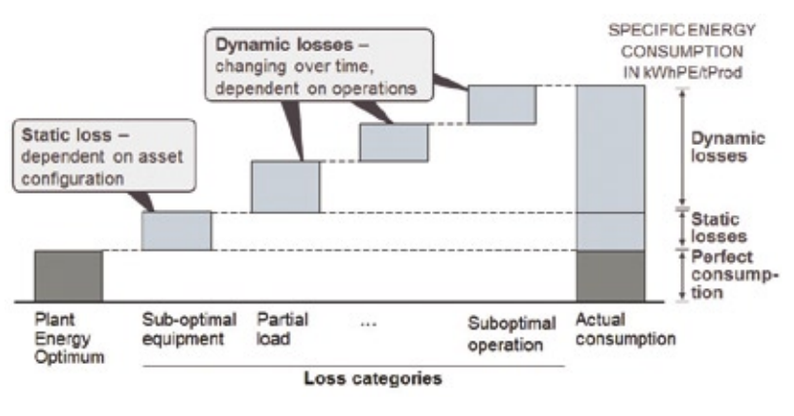


Fig. 3: Energy Loss Cascade

Nicolas Boël Appointed Chairman of Solvay Board of Directors

Nicolas Boël has been unanimously nominated as chairman of Solvay's board of directors, effective May 9, 2012. Boël will be replacing current chair Aloïs Michielsen, who is retiring after 44 years at the company. Boël has been a member of the board of directors for over 13 years. He started his career at Belgian steel producer Usines Gustave Boël and occupied different managing functions at the steel and aluminium producer Corus in the U.S., Belgium (Duffel) and France (Maubeuge). In 2004, he was promoted to the position of General Manager at Myriad, a reference in the world of coated products industry. Since 2006, he is board member and member of the nomination and remuneration committee of Belgian financial company Sofina, listed on NYSE Euronext, and board member of various other family companies. ■

Air Products Appoints John Marsland Senior VP, General Manager of Global Merchant Gases

Air Products announced that John W. Marsland has been appointed senior vice president and general manager, Global Merchant Gases. He succeeds Robert D. Dixon, who is retiring from the company in early 2012.

Marsland currently serves as senior vice president and general manager, Electronics, Performance Materials and Supply Chain, where he has had leadership responsibility for the Electronics and Performance Materials business segment, as well as Supply Chain, which includes the Global Engineering, Global Operations, Energy and Materials, and Continuous Improvement organizations. He will continue to serve as a member of the company's corporate executive committee in his new role. ■

Wolfgang Büchele Appointed Kemira Oyj President and CEO

Wolfgang Büchele has been appointed Kemira Oyj's President and CEO as of April 1, 2012. He will be replacing Harri Kerminen, who will be retiring. Büchele has been a member of Kemira's Board of Directors since 2009. He has spent most of his career in BASF's Fine Chemicals organization in Europe, China and United States. Since 2009 he has been member of the board and CEO of BorsodChem Zrt. in Hungary. ■

Huntsman Wins Two Materialica Awards

Huntsman has won two Gold Materialica Awards based on criteria including elements such as innovation, development and application potential, creativity, technical quality and measured data.

The first award won was in the Surface & Technology category, received for the company's new white solder mask for LED application; Probimer 77 white. Supporting new EU regulatory restrictions for eliminating light bulbs, the solder mask is used in general lighting with specific applications in the automotive industry for front and rear vehicle lighting and in the aerospace sector for cabin lighting.

Huntsman has also won a second joint award with Lamiflex in the product category for the Ciclotte; an exclusive exercise bike made with high-tech carbon and glass based pre-impregnated from Lamiflex, using a high-performance resin system from Huntsman. ■

New Site Manager at Wacker Burghausen Site

Dr. Dieter Gilles will head Wacker Chemie's Burghausen site effective March 1, 2012. He will succeed Dr. Willi Kleine, who is retiring on this date. The Burghausen plant, with about 10,000 employees, is Wacker's largest production site and the biggest chemical site in the German state of Bavaria. ■

Sustainability And The Industry

Moving beyond reputation

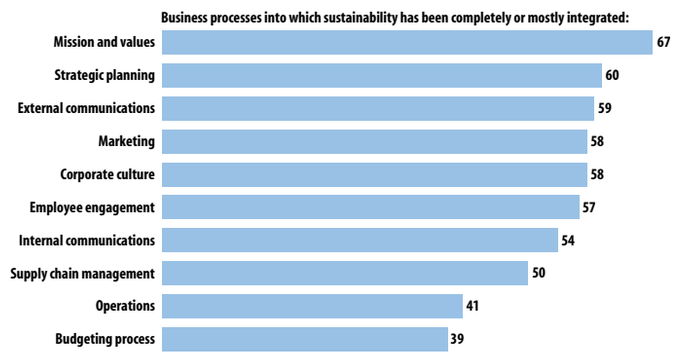
% of respondents, n=2,956

Source: McKinsey, the Business of Sustainability Survey 2011 © CHEManager Europe

McKinsey's most recent Business of Sustainability survey explored why and how companies are addressing sustainability and to what extent executives believe it affects their companies' bottom line, now and over the next five years. Most executives say their companies are taking action are reducing energy usage and reducing waste in operations. Fewer respondents report that their companies are leveraging the sustainability of existing products to find new growth or committing R&D resources to bring sustainable products to market. Yet both of these are important ways sustainability can drive growth: organizations that act in these areas are the likeliest to say they're more effective than their competitors at managing any other sustainability initiatives. These results suggest that companies may be better able to find a competitive advantage when pursuing growth activities than operational activities.

Widespread integration

% of respondents, n=2,956

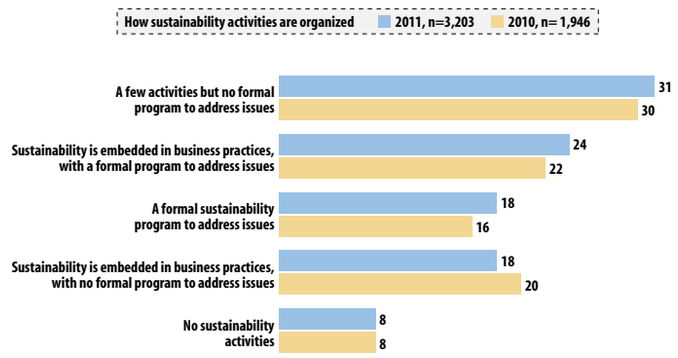


Source: McKinsey, the Business of Sustainability Survey 2011 © CHEManager Europe

Companies are also integrating sustainability across many processes, according to respondents: 57 % say their companies have integrated sustainability into strategic planning. The most integrated area is mission and values, followed by external communications, while the least integrated areas are supply chain management and budgeting.

Little change across leadership criteria

% of respondents

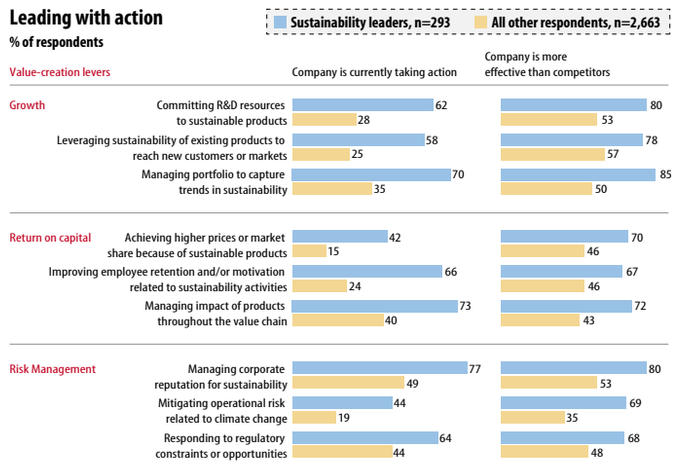


Source: McKinsey, the Business of Sustainability Survey 2011 © CHEManager Europe

Sustainability has stayed at about the same place on CEOs' agendas, and about the same share of respondents say they have formal programs to address it. The share of respondents saying their companies effectively manage sustainability has even shrunk somewhat. Starting last year, we used these three characteristics to define a group of "sustainability leaders," companies that are more adept at capturing value through sustainability along various measures that the survey asked about.

Leading with action

% of respondents



Source: McKinsey, the Business of Sustainability Survey 2011 © CHEManager Europe

Respondents from companies in the leaders' group say their companies do more on every aspect of sustainability; this is especially true in the areas of growth and risk management that, along with return on capital, are three ways in which sustainability can create value. For example, 94 % say their companies have integrated sustainability into strategic planning, versus 53 % of all other respondents. Compared with the integration of sustainability into other processes, however, the leaders' supply chains and budgets are less integrated; respondents at other companies report this pattern as well. In addition, respondents in the leaders' group are more likely than other respondents to report that their companies are pursuing each of the 13 actions related to sustainability listed in the survey, more often than the rest of respondents do.
Source: McKinsey

Lanxess and the AMREF – The African Medical and Research Foundation (AMREF) was founded in 1957 by three surgeons as the Flying Doctors Service of East Africa. Three doctors – Sir Michael Wood, Archibald McIndoe and Tom Rees – drew up a groundbreaking plan to provide medical assistance to remote regions of East Africa, where they had all worked for many years as reconstructive surgeons. The German chemical company Lanxess has been working to support AMREF; because of their efforts, 25 schools in Tanzania are receiving rainwater treatment systems and new sanitary facilities. www.lanxess.com/www.amref.org

Coming up in our December issue

- **We look back at the major deals that went down in 2011**
- **Our China expert Kai Pflug examines current trends in the Chinese chemical industry**
- **Ruben Gill of AspenTech explains how software solutions can achieve success for specialty chemicals manufacturers**
- **And much more!**

The December issue of CHEManager Europe will be published on Dec. 8.

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Imprint

Publisher:
GIT VERLAG
Wiley-VCH Verlag
GmbH & Co. KGaA
A Company of
John Wiley & Sons, Inc.

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Bank Account
Commerzbank AG Darmstadt, Germany
Account No. 01715501/00,
Routing No. 50880050
The current price list is valid from 1st October 2011

CHEManager Europe appears 10 times in 2011.

Print run: 20,000
(IVW Report
Q3 2011: 19300 tvA)
Seventh year 2011
Subscriptions
10 issues €84
incl. postage
single copy €13.50
plus postage

Students receive a discount of 50 % upon presentation of a valid certificate. Subscription orders can be canceled within 1 week in writing. Dispatch complaints are possible only within 4 weeks after publishing date. Subscription cancellations are accepted 6 weeks before end of year.

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Printed by
Druckzentrum Rhein-Main
GmbH & Co. KG
Alexander-Fleming-Ring 2
65248 Rüsselsheim

GIT VERLAG
Printed in Germany
ISSN 1861-0404