

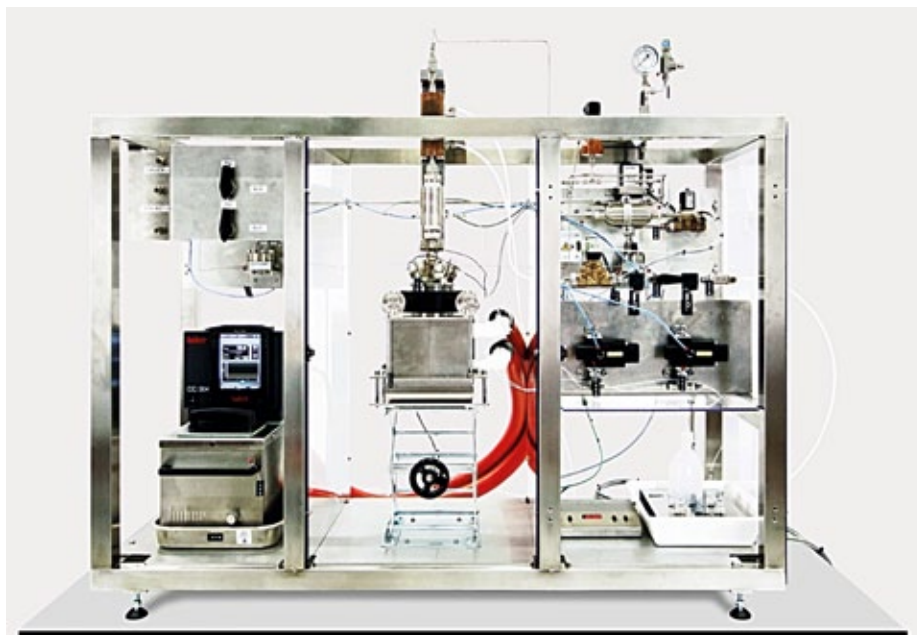
# Two partners focused on innovation

Berghof Products + Instruments provides customised high pressure reactor to ILS

Integrated Lab Solutions GmbH (ILS) from Berlin develops and constructs individual R&D test systems for chemical and pharma companies and research institutes over four continents. "We tailor our systems specifically to our customers' processes and research aims", explains ILS Manager



Highpreactor high pressure reactor



Center of the ILS system is the Berghof high pressure reactor Highpreactor

Dr Anton Nagy, who founded the company in 2005. "To do so, we have an increasing need for special components that fulfil very specific requirements".

For an innovative high pressure calorimeter test system to investigate mixtures with hydrogen fluoride (HF) and water, ILS required a high pressure reactor that cannot be damaged by extremely aggressive and corrosive aqueous HF solutions (hydrofluoric acid, which is used for purposes such as to corrode glass and metals).

Highpreactor high pressure reactors from Berghof stand out from the competition thanks to their interiors completely lined in PTFE plastic. They thereby also offer

secure protection against highly corrosive and caustic chemicals. Furthermore, Berghof is one of few manufacturers to possess the expertise and capacities to implement sophisticated individual solutions with special requirements.

"Only Berghof was able to provide us with a reactor that met our requirements," explained Dr Nagy from ILS. "This, along with the excellent and close cooperation between ILS, Berghof and our customer, were crucial in the successful execution of the project".

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## Company anniversary 2015

1st + 2nd quarter

We would like to thank those celebrating the anniversary for all their hard work and loyalty to Berghof.

### For 25 years

Bernhard Hauser  
Claudia Faisst  
Dietmar Sieland  
Elke Lengerer  
Konrad Malsch  
Michael Fink  
Rainer Krämer  
Rolf Kober

### For 10 years

Andrea Eitel

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Symphonic Water Solutions: 10, ILS: 12

# Berghof

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## Dear reader,

„Living innovation“ is the theme of the current issue of Berghof News. Ever since our company's foundation almost 50 years ago, innovation – turning ideas into marketable products – has been the foundation of our success.

A central task over the coming years will therefore be to bring our vision of „Berghof – your innovation hub“ further to life. The articles in this issue show that we are on the right track.

A „hub“ is a junction, a turntable. Berghof as „your innovation hub“ means a platform for innovation achieved through a network of internal and external partners who work closely together and exchange know-how, contacts and ideas. This exchange should welcome everyone, from customers with their very specific requirements to industry experts, researchers, traders and even the competition. A good example: this year, Berghof Analytik + Umweltengineering organised the first Berghof Hydrogeology Innovation Forum, which discussed new hydrogeological methods as well as possible solutions to critical future issues.

As well as being an active innovator and driver of innovation, Berghof also helps its customers to successfully implement their own innovative ideas. Examples in this edition include Dresden Technical University with research in the field of electromobility, m-tec GmbH, the world leader in dry mortar systems and Integrated Lab Solutions GmbH, which builds individual R&D testing facilities for chemical/ pharmaceutical companies and research establishments.

I hope the new edition of Berghof News once again provides an interesting, inspiring and entertaining read.

Kind regards,

Stefan Stemmer



# Groundwork laid for growth

## Berghof on track for BeSt 2026 growth strategy

Continuous growth in all divisions at Berghof continued in 2014: The company group was able to increase its turnover by approx. 5 % to some 42 million euros compared to 2013. The management is on track for the BeSt 2026 growth strategy, which aims to generate turnover of 200 million euros with 400 employees by 2026: “We have set ourselves a highly ambitious goal, that we can only reach together”, says Stefan Stemmer, President of the Berghof Group. “For this purpose, we are investing in growth-promoting structures and our employees’ qualifications”.

### Focus on niche markets

A clear, strategic objective is important for successful, controlled growth. Berghof is also stepping up its focus on developable niche markets and is evolving from a pure supplier of components and products to a provider of solutions and systems. “In order to increase the market penetration of

existing products, the product portfolio was streamlined and the range expanded by product bundles, including services”, explained Stefan Stemmer. “Internationally, we are striving for greater geographical coverage, with a particular focus on China and the USA. We are therefore investing more and more in sales and marketing, both quantitatively and qualitatively in the form of training”.

### Growth-promoting structures

A growing organisation needs to adapt its structures and processes to new requirements. The development and qualification of employees working in an increasingly international environment plays a central role here. New organisational and cooperation structures must arise, and of course the necessary infrastructure must be put in place in order to create room for such growth. Berghof will invest in new production sites and in a new ERP and CRM sys-

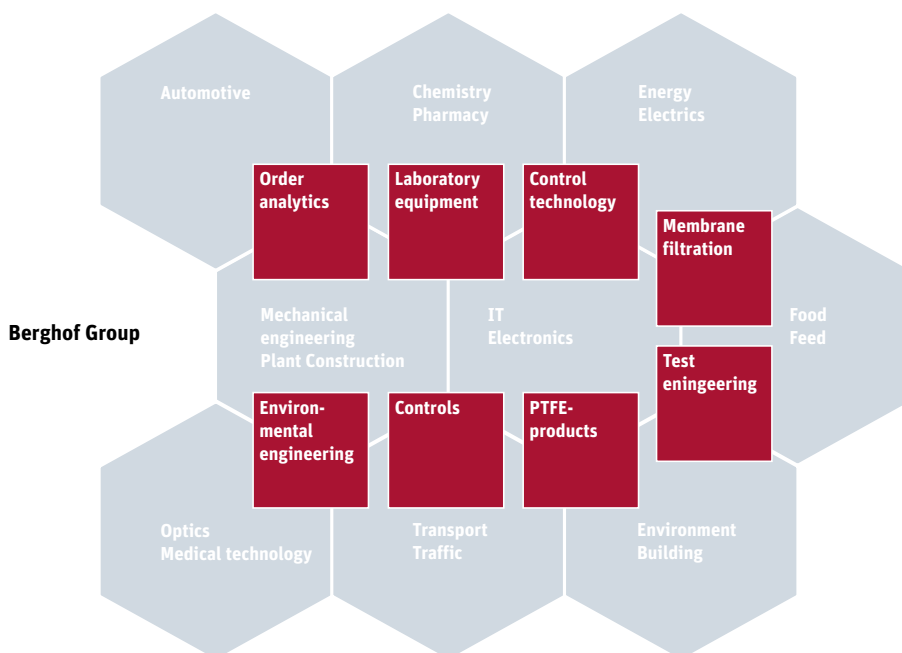
tem alike. Berghof is also continuously investing in its machinery.

### Innovation drives growth

The most important requirement for greater growth is innovation, however – new ideas that give rise to more competitive products, services and processes. Berghof started life as a research institute – these roots serve as both obligation and inspiration for Berghof and are expressed in the “Berghof – your innovation hub” company vision. The close and personal cooperation that Berghof prides itself on with suppliers, customers, partners and external specialists helps to turn ideas into innovations. Regular event series, such as intercompany “innovation days”, foster such cooperation further. In the spring, Berghof invited specialists from research, economics and public authorities to a “Hydrogeology Innovation Forum” to discuss untapped topics in the field of groundwater management – an example that will set a precedent for other Berghof companies.

## Berghof – your innovation hub

### A network of strong partners



# Customer satisfaction as driving motivation

## Customer satisfaction survey results

Satisfied customers are a key factor in assuring the success of a company, and the customers' evaluation of the company's portfolio of products and services is a valuable indicator for the work of the company and its employees. That is why Berghof carried out a customer satisfaction survey for the second year in a row last year. Approximately 20 % of those asked took part – thank you very much!

Berghof achieved very good results in the first customer evaluation of "Please rate your overall satisfaction with the Berghof Group". 88 % (2012: 86 %) of the companies asked were "very satisfied" to "satisfied" with Berghof (see graphic 1).

Innovative and flexible – rising trend

A high degree of innovation and flexibility are often the deciding factor when it comes to whether a project will be approved. Around 80 % (innovative) and 81 % (flexible) of those asked ascribed these properties to Berghof's solutions (see graphic 2). "A motivation for the future path currently being tread and vision of "Berghof – your innovation hub"), says Stefan Stemmer, President of the Berghof Group. In comparison with the last survey – 2012: 72 % innovative and 69 % flexible – an upward trend can also be seen here.

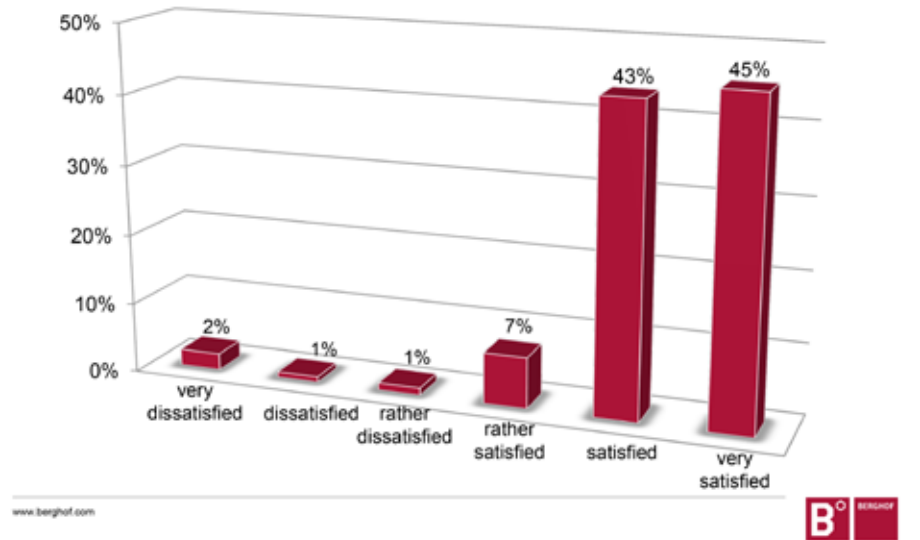
This trend is also reflected in the overall assessment of Berghof solutions with regard to the high level of quality and cost-effectiveness. 85 % (2012: 78 %, high quality) or 42 % (2012: 43 %, favourable) of those asked associate these features with Berghof's solutions (see graphic 3).

Further specific service areas that were placed under the microscope in terms of satisfaction and importance to the customer:

- Products and services: Here, the scope of services offered, quality and attractiveness of pricing are evaluated in comparison to the competition.
- Order processing: Time until order processing, delivery time, adherence to deadlines, completeness of delivery and commercial processing formed the focus in this area.
- Employees and consultation: The reachability, competence and friendliness of employees was analysed here.
- Documentation and information: In

### Customer satisfaction survey 2014 | Group

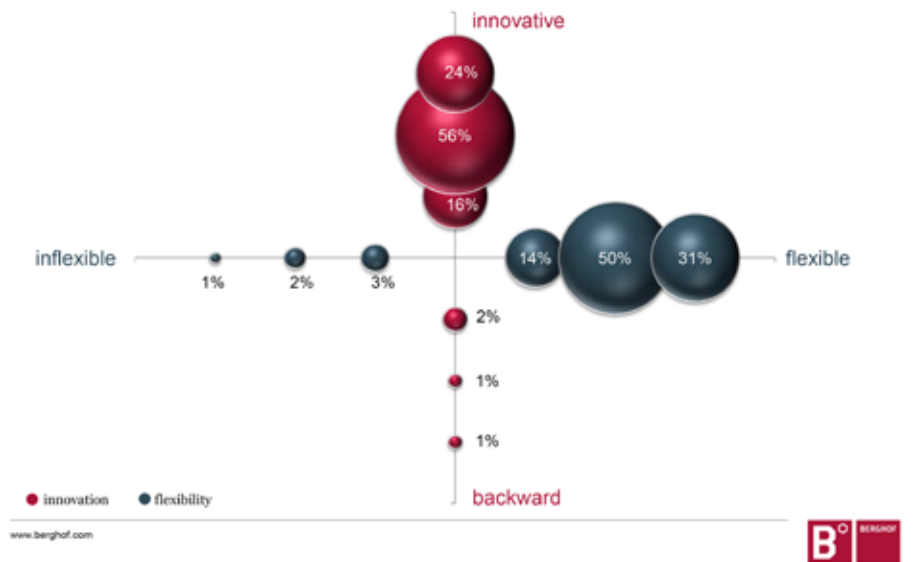
#### Overall satisfaction



Graphic 1

### Customer satisfaction survey 2014 | Group

#### Associations with Berghof solutions



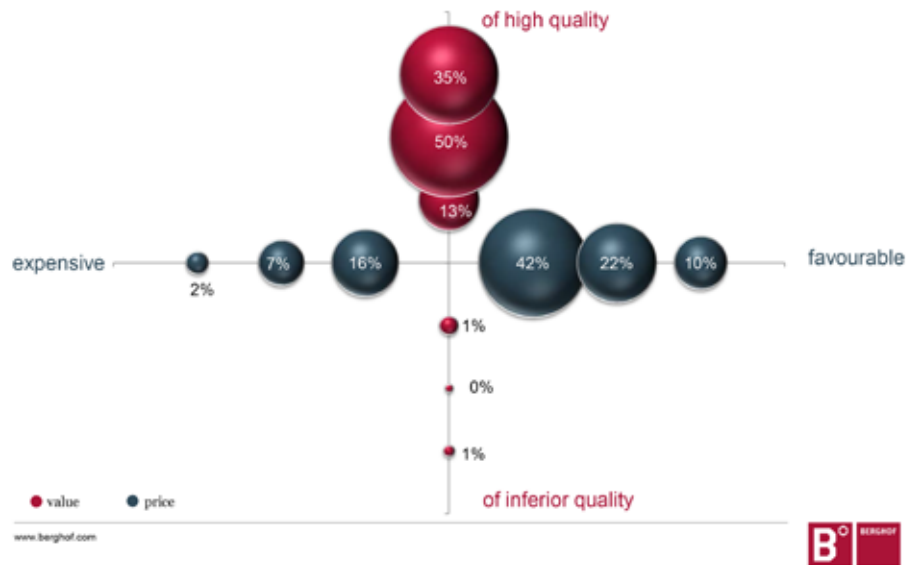
Graphic 2

- particular, the quality of the technical and product documents, design of the company website.
- Complaints and after-sales: Specifically, customers were asked whether there were grounds for a complaint, what the reaction to and processing of

- complaints are like, and how satisfied they were with the repair duration and the quality of technical services.
- Media and channels of communication: Here, it was determined via which communication channels customers find out about product innovations.

The most important thing or top priority for the customers asked with regard to the entire Berghof Group was the quality of products and services. Second place was given to the competence of the employees, and third most important was observing deadlines in order processing. The highest levels of satisfaction were for competence and for friendliness, followed by the reachability of Berghof employees and the completeness of deliveries, as well as the quality of technical services.

## Associations with Berghof solutions



Graphic 3

## New research test stand for TU Dresden

### Focus on electromobility and energy efficiency

**Berghof Automation:** Electromobility is on the rise: Vehicles of practically all shapes and sizes are now driven by electric motors – everything from bikes to buses and trucks. Berghof has also been active in this future-facing market for years, and has made a name for itself with products such as testing stands for automobile manufacturers, Deutsche Bahn (German national rail network) and other customers, all tailored to the particular customer.

Berghof has now developed a high-performance “test stand for electrical machines and engines with a focus on energy efficiency and electromobility”, as it was named in the tender, for Dresden Technical University (TU). During the reliability, endurance and functional tests, the test stand monitors electrical, mechanical and thermal characteristics.

“A special feature of our test stand is the ability to choose either motor or gene-

rator operation”, explains Philipp Miska, Project Manager in test and system technology at Berghof Automation. “In addition, it has two loading mechanisms and can therefore test high speed ranges of up to 13,500 rpm as well as high torque ranges above 1,000 Nm at low speeds.” High speeds are required for fast cars, whereas high torque is required for heavier vehicles such as buses.

“Berghof is able to flexibly implement even very strict requirements on our test stands”, says Philipp Miska proudly. “We use standard industrial components as far as possible in order to ensure that replacement parts will be available for many years. For our customers, this means greater supplier independence and therefore security for your investment”.

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Test stand for electrical machines and engines: Focus on electromobility and energy efficiency

# Testing Technology Day for Bosch

## Powertrain in the limelight

**Berghof Automation** organised a Technology Day on the theme of testing for the employees of Robert Bosch GmbH. The event took place on May 13th, 2015 at Bosch's development site for automotive engineering in Schwieberdingen, Germany.

Close business relationships have existed for more than 30 years between the testing technology businesses of Berghof and Bosch. The Technology Day was designed to give Bosch developers the opportunity to learn about exciting new developments in testing technology and to discuss current issues. „We want to create a network for the transfer of knowledge with our customers and partners which benefits all involved,“ said Peter Deckelmann of Technical Sales at Berghof Automation GmbH.

The Testing Technology business unit at Berghof Automation GmbH develops and produces customised testing systems for product development, endurance operation and production. The automotive sector is a major focus; the testing spectrum ranges from seats for commercial vehicles and cars to electronic access systems and powertrain components such as injectors, direct injection systems and fuel intake manifolds.

Berghof's technologies for powertrain testing employ hardware and software solutions produced by Berghof's partner, National Instruments (NI), including the LabVIEW development environment and the cRIO controller platform. Berghof works closely with NI and is a Silver Alliance partner in its global Alliance Partner Network.

The main focus of the technology presentations at Bosch was the various solutions that Berghof creates using NI's technologies for the laboratory environment and powertrain production.

The highlight of the program was a live demonstration of the capabilities of Berghof's powertrain testing systems for controlling HDEV- and Piezo injectors. In addition, in a guest lecture entitled „From measurement data comes knowledge“, NI introduced new features for its DIAdem test data management software. The eventful day, which was greatly enjoyed by the participants, ended with a get-together in a relaxed atmosphere.

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Presentation of technological innovations and latest trends during the „Testing Technology Day“

# Mobile PumpTruck for building materials

## Flexible sequential control with secure network connection

**Berghof Automation:** With an export profit of 220 billion euros, Germany was once again the leading exporter worldwide in 2014. One of the main reasons for this was the innovative ability of German companies, which are global market leaders in many fields. Berghof has made it its goal to use its expertise and experience to help such innovative companies successfully make their ideas a reality.

M-tec mathis technik gmbh, which was founded in Neuenburg am Rhein in 1978, is one of these hidden champions. The global market leader in dry mortar facilities develops computer-operated production systems, processing machines as well as logistics systems for the building materials industry and holds numerous patents, such as for mixing equipment, mixing pumps or mobile dry mortar silos. Since 2014, m-tec has belonged to Chinese construction machinery manufacturer Zoomlion.

### Mobile mixing directly on site

M-tec also uses various control solutions by Berghof in its products. The most recent example of the cooperation between Berghof and m-tec is the PumpTruck m-tec PT. It is a truck or trailer structure, which combines a silo and a mixer and enables screed or other building materials to be mixed and delivered directly on the construction site. Thanks to a power generator and water tank, the truck can work completely self-sufficiently where necessary. The advantages: greater flexibility and efficiency, simplified construction site logistics and lower costs.

“m-tec’s particular area of expertise lies in mixers”, explains Achim Machura from Berghof Automation’s Technical Sales department, which led the PumpTruck project at Berghof. “Through fully automatic dosing, our controller permanently ensures the optimum mixing ratio and also observes environmental parameters such as temperature and air humidity. Via the



Mobile PumpTruck m-tec PT equipped with Berghof control technology

vehicle’s CAN bus (controller area network), the controller communicates with the weighing controller M-Box developed by m-tec, which supplies the weight data for the building material components”. The largest PumpTruck version, the PT-FC for foam cement, boasts a mixing container with a volume of 1,000 litres and a maximum feed rate of 20 m<sup>3</sup>/hour.

### Secure communication

In order to process the delivery, the PumpTruck system can also communicate directly with the construction company or building material supplier’s inventory management system, thanks to Berghof’s control engineering. A secure connection to the web portal of a Berghof partner is established through mobile signal via a router, which creates VPN access (virtual private network) to the company network of the m-tec customer. Should an order be placed, the ERP system creates an email with the order data and sends this to the

PumpTruck. The driver loads the order on his/her iPad via a specific app or via the terminal built into the truck, drives to the pickup address and brings the building material to the desired location. “Once the process has been completed, our controller generates a data record for the order”, explained Achim Machura. “This includes not only order data and times, but also details regarding the quality of the delivery and the precise mixture ratios. This data is used to display a delivery note on the tablet, which the customer can add comments to and confirm.” The signed delivery note is sent in PDF format to the customer and the supplier’s order centre and can be further processed electronically there without media inconsistencies.

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# Innovation Forum for Hydrogeology – helping to shape the future

## **Berghof Analytik + Umweltengineering:**

Earlier this year, Berghof Analytik + Umweltengineering held its inaugural Innovation Forum. Its focus was hydrogeology, specifically the following areas: „Innovations in the field of hydrogeological measurement and sampling methods“ and „Innovative approaches to the search for radioactive waste disposal sites and possible future hydrogeological issues in this area“. The aim of the forum was to establish a sustainable, interdisciplinary platform for the exchange of know-how, networking and to discuss concrete and future problems in the field of environmental engineering.

## **New procedures in focus**

Renowned experts from professional practice, science and research presented and discussed innovative groundwater sampling and measurement methods, whereby the determination of the flow direction and speed is crucial. Based on previous projects carried out using their measurement system, Phrealog showed that their system allows both indicators – even in deep aquifers – to be derived precisely from the horizontal groundwater passage of drilled wells. The acquired measurement data then supports, clarifies and evaluates existing flow models.

In addition, new groundwater pumping sampling systems were debated, such as „soft“ low-flow or depth-levelled pump sampling, and passive sampling as demonstrated by IMW; these were compared to the advantages and disadvantages of conventional methods. The ensuing discussions concluded that all methods only work if no vertical currents are present at the measuring points – this can be demonstrated using flow meter measurements. „By combining the Phrealog and IMW processes with our “Thermo-Flowmeter” measurements we can also detect hydraulic short circuits, determine inflow horizons



Inaugural „Hydrogeology Innovation Forum“

and carry out level-oriented, floor-related sampling,” explains geologist Peter Halla of Berghof Analytik + Umweltengineering. „These parameters reaffirm the validity of the measurement results.“

ISCO (in-situ chemical oxidation) groundwater decontamination, which was

introduced by Züblin Environmental Technology using practical examples, completed the first part of the event. This technology eliminates contaminants in situ using appropriate oxidizing agents, thereby accelerating the decontamination project considerably.



Platform for exchanges of ideas and know-how, discussions, networking



### Disposal site search – hydrogeological challenges

The second day of the forum, which focused on „Hydrogeological issues in relation to the search for disposal sites for radioactive waste“, was led by Dr Uwe Hekel from HPC, Dr Andreas Gautschi from Nagra and Dr Judith Flügge from the Society for Plant and Reactor Safety (GRS). One important aspect of this subject is that radioactive waste must not come into contact with groundwater at any time.

Drs Hekel and Gautschi focused on clay rock and Opalinus Clay as a host for radioactive waste, citing their barrier proper-

ties, hydrogeological exploration methods and results, as well as lessons learned internationally.

Dr. Flügge rounded off the day with a discussion of hydrogeological issues relating to the disposal of radioactive waste. Model-based calculations for groundwater flow and contaminant transport are being performed as part of a long-term safety analysis, for which tools based on current GRS research projects are also being developed – these were presented along with approaches to hydrogeological issues and their possible solutions.

Positive feedback from the participants and the common wish for a continuation have confirmed the importance of networking opportunities and knowledge exchanges of this kind. Berghof is now planning to extend this interdisciplinary „innovation hub“ across the entire group of companies to stimulate discussions of unresolved technological problems facing target markets and their possible solutions.

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## Focus on Environmental Due Diligence

### Environmental risk assessment for properties and the significance of land recycling

#### Berghof Analytik + Umweltengineering:

When a company is planning to expand a site, it is faced with the ecological-political requirement of keeping the consumption of land as low as possible. “It is important for industry and communities to recycle areas that are already inhabited”, explains Andreas Sonntag from Berghof Analytik + Umweltengineering.



Area recycling and environmental risk assessment of inhabited properties.

Such properties must generally be inspected for subsoil contamination resulting from previous and current use. The assessment and evaluation of buildings or specific building structures is of major importance here. For the production industry, what is known as environmental due diligence (EDD) has become an important part of the general risk assessment for properties. In this area, Berghof offers services that go far beyond the historic and technical analysis of land and buildings. Berghof organises needs-based networks, within which aspects such as noise and dust emissions as well as infrastructural issues are dealt with. Furthermore, future-oriented plans are considered, such as the location of a property in relation to planned protected zones.

Services requested also include the creation of comprehensive concepts for building demolition or qualified subsoil remediation in line with state of the art technology. Berghof also offers a preparation for tenders service (VOB) as well as the associated construction management.

“In all these areas, our geoinformation and database systems we have developed in-house are a major advantage. All evaluation-related data is recorded here along

with the costs and statutory stipulations”, says Christian Eichelmann from Berghof Analytik + Umweltengineering. This means that site analyses can be carried out very quickly. Various scenarios, e.g. for different types of subsequent usage, can be played out in real time. “We are also able to respond as quick as a flash during sale negotiations. For example, should drawing certain parallels from the sale be considered, we can tell immediately what effects this would have on renovation costs”.

Berghof has extensive experience in the risk assessment of various industries, such as the metal, electrical, steel, foundry, chemical and paper industries, as well as in military buildings. On the basis of the varied project experience, the range of services should now be further expanded both nationally and internationally. “Even in our neighbouring countries, companies are increasingly taking the lead from German standards”, says Andreas Sonntag.

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# Quality control of the wood cycle

## Recovery, rectification, ash management

### Berghof Analytik + Umweltengineering:

Wood is an attractive raw material, increasingly so for direct energy and heat generation. Often, the wood also has a history, for example as building timber, a piece of furniture or rail sleepers, and frequently has been treated with chemicals. The waste wood ordinance classifies wood into four categories based on its use and degree of contamination (from A I = high quality, to A IV = highly contaminated). It also stipulates that used wood must be inspected for quality at least every 500 tonnes.

As a recognised inspection body in waste management, Berghof Analytik + Umweltengineering not only offers laboriously created and documented laboratory analyses of wood quality. Waste wood treatment facilities and biomass power station operators can rely on a complete waste wood quality assurance service. "Berghof

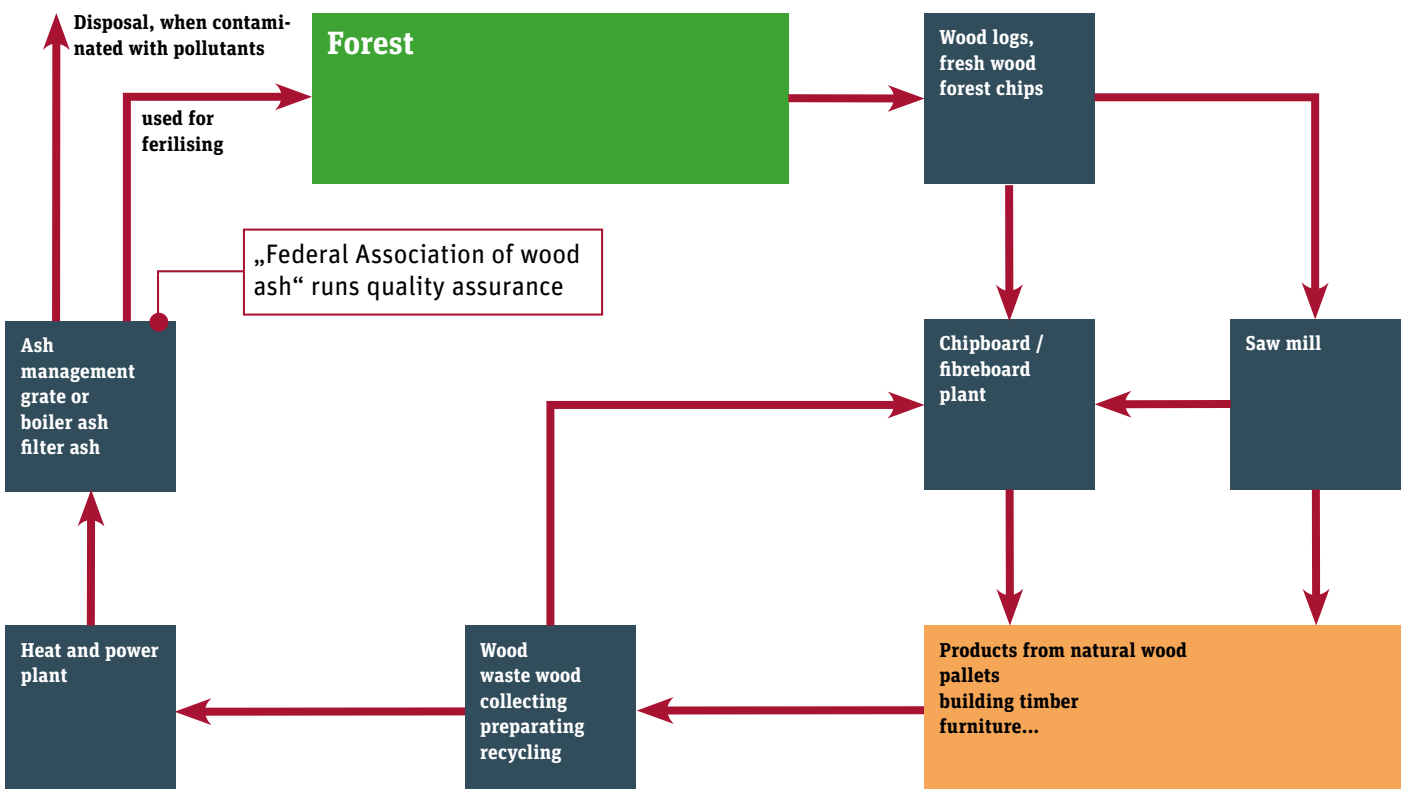
does not leave its customers alone with their analysis results", says Jürgen Haaff from Berghof Analytics. "We provide consultation in advance, carry out professional sampling, check the plausibility of the analysis results and also create recycling concepts." Furthermore, Berghof also offers seminars and training into sampling in accordance with LAGA 98 (national/regional working community waste) as well as training for staff on incoming goods inspections at power stations.

A further subject places even greater emphasis on energy recovery from waste wood: ash disposal. "The pollutants do not disappear upon incineration. Lead, chromium, cadmium etc. as well as various salt compounds remain behind. Here, we see whether the grate or boiler ash would be suitable fertilisers or whether they need to be disposed of", explains Jürgen Haaff. Fil-

ter ash may potentially have to be disposed of as hazardous waste.

In order to ensure sustainable management for waste wood treatment facilities and biomass power station operators, the advisory service in particular is to be expanded. Jürgen Haaff: "Wood is a natural product and of course of varying chemical composition. Regular quality control of the input material (especially the detrimental substances analysis) not only allows the resource-saving operation of power stations; the recycling and disposal costs for wood ash can also be reduced through the use of higher quality wood".

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# Symphonic Water Solutions values external AnMBR technology by Berghof

**Berghof Membrane Technology:** Organically heavily contaminated wastewater, as obtained for example in the food industry, demands high-performance wastewater treatment processes. A good example is anaerobic wastewater treatment, in which organic materials are biodegraded in the absence of oxygen, simultaneously creating thermal energy and an energy-rich biogas which can be used to generate electricity.

## The OEM partner: Symphonic Water Solutions

The American plant manufacturer Symphonic Water Solutions Inc. (SWS) specialises in the design and construction of effective and efficient water and wastewater management solutions. SWS has designed several plants for use by cheese and yoghurt producers in Richland County, Wisconsin, to clean up the wastewater produced there.

In the dairy industry, wastewater is mostly produced during the cleaning of tank and production systems. Daily disinfection routines leave behind whey residues and also detergents and biocides, which present a particular challenge for biological treatment – a challenge which SWS has met head on with innovative external anaerobic membrane modules (AnMBR = anaerobic membrane bioreactors) from Berghof. In 2010, SWS created the first SWS AnMBR plant using an external filtration system based on Berghof Membrane Technology (BMT) with a capacity of 2,160 m<sup>3</sup>/d.

## External design – compact, flexible and low-maintenance

So what's so special about Berghof membrane modules? In contrast to submerged membrane technology, Berghof membrane modules are not installed in the plunge tank, but rather as an external filtration system outside the basin. „This design has many advantages,“ says Rick te Lintelo, Director of Sales and Marketing BMT. „With our innovative Biopulse filtration system we can easily minimise membrane conta-



Wastewater treatment system with Berghof external AnMBR technology

mination by varying the water flow and automatic backwash depending on the level of water pollution. In addition, our external modules are very easy and efficient to clean compared to submerged membranes.“ In cheese and yoghurt production there is a high sensitivity to water hardness, which external membranes handle better than submerged systems,“ explains Te Lintelo. These are significant advantages for the treatment of anaerobic wastewater, which carries a very high pollution potential. Another benefit valued by SWS is the extreme simplicity of expanding the external modules if the plant's capacity needs to be increased.

In addition to its compact design and flexible usability, the Berghof external filtration system's ease of maintenance and low running costs have proven to be additional benefits.

With a degradation efficiency for organic substances of more than 99 %, AnMBR technology is also significantly more effective than conventional anaerobic technology, whose degradation efficiency is on average 75-90 %. As well as being highly suitable for the food industry, the Berghof external filtration system is also finding uses in many other areas –wherever there is strongly polluted wastewater, such

as landfill seepage, the oil/gas and textile industries and in some cases even municipal wastewater.

## Dynamic market development

With industrialisation and the growth of the world's population, the importance of clean water is increasing. „Awareness is also growing that you can save disposal costs through proper treatment of wastewater,“ says Rick te Lintelo. „One can even earn money with the created biogas by using it to generate electricity or heat.“

Whether in Europe, North America, Asia or Latin America, Berghof Membrane Technology's wide range of solutions for AnMBR technology enables it to respond very flexibly to unique conditions and individual customer requirements. „We are confident of very positive future developments,“ says Te Lintelo. „We offer our OEM partners a complete engineering package; from consultations to find the best individual technological solutions through to support during commissioning. And if desired, we also supply a full rack with modules, valves and pump, fully assembled and wired. Ultimately, all that matters are satisfied customers.“

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# New microwave digestion units

Smart laboratory equipment which simplifies the daily challenges

**Berghof Products + Instruments:** When developing new laboratory equipment for sample preparation during trace analysis and high-pressure synthesis, Berghof uses the expertise gained through its own research and analysis to provide its customers with functional, application-specific products. Current examples are the new microwave digestion systems.



Microwave digestion system: Speedwave Entry - the efficient one

## Fast results with microwave digestion

Sample preparation for instrumental analysis requires so-called 'digestion', in which the analyte is transferred completely into solution and supplied in liquid form to the analytical determination step (e.g. ICP-MS, AAS method etc.). It is important that digestion can be performed easily, safely and as quickly as possible because, in practice, sample preparation takes up most of the analysis time. Digestion is especially quick in closed vessels heated using microwave digestion systems, which warm the sample solutions directly and very uniformly.

## Application-focused product design

„Microwave digestion systems from all manufacturers now offer a plethora of features, often at the expense of usability,“ explains Dr Kerstin Dreblow, head of Berghof's Application Laboratory and Laboratory Equipment Marketing Division. „By contrast, we pursue a consistent, application-focused approach.“ With the Speedwave Entry, Berghof offers a device for routine analysis, study and training which consistently

focuses on the essentials: simple handling, safety and low operating costs. For more experienced users with more demanding analytical applications, there is the new Speedwave Xpert with a vast range of functions, which nevertheless remains very easy and intuitive to use thanks to its innovative design and refined operating concept. All Berghof systems use toolless digestion vessels made of high quality TFM™ PTFE and are characterised by innovative sensor technology for optimum process control.

## Speedwave Entry: compact and efficient

The Speedwave Entry is optimised for fast, secure and cost-effective routine analysis tasks in, for example, agriculture, the animal feed and food industries, environmental analysis and medical laboratories. Thanks to its

customisable „Quick Start“ control, the selected application can be started via only a few keystrokes; the device then continuously monitors the process and automatically adjusts its power output depending on the sample temperature.

## Speedwave Xpert: the all-rounder

The new Speedwave Xpert is suitable for complex digestions with difficult samples such as alloys or ceramics. It adopts the innovative top-loader design from its successful predecessor, the Speedwave 4, which greatly facilitates filling and emptying. However, it also introduces significant new features, including two magnetrons with a total of 30 per cent more power (2000 watts) and a larger display with improved user interface and web-based visualisation via mobile devices. Its advanced sensor technology ensures increased safety and a longer life by not only contactlessly monitoring internal pressure and temperature, but also the temperature on the outside of the digestion vessels, thus further prolonging their service life. Berghof presented the new Speedwave Xpert to the general public for the first time at Achema, Frankfurt, Germany in June 2015.

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Microwave digestion system: Speedwave Xpert - the professional one