

Restoring the functionality and ecology of polluted land: Remedios (Aberdeen, UK)

The Cleaning Agents

Their name says it all. Remedios, of Western Scotland, offers environmental services including the cleansing of contaminated land. *Lab Times* investigated, and interviewed the company's Technical Director, Graeme Paton.

Sometimes, dirt must be cleaned carefully. Take brownfields as an example, contaminated by hazardous waste or pollution after industrial use. It is estimated that there are about 100,000 contaminated sites in the United Kingdom. Those having the potential to be reused

must be investigated prior to cleansing and at this point a young Scottish company comes into play.

Remedios was founded in 1999 when Ken Killham and Graeme Paton, respectively Professor and Reader in soil science at the University of Aberdeen (Scotland, UK),

created a spin-off company rooted in the bioremediation market. The idea was to use biosensors to measure environmental pollution. "We decided to start up a business because we were doing research for some large clients who did not want to pay for 3-year post-docs. As you may know, the



Photo: Giuliana Defforio

Polluted ground in your front garden? Ken Killham (left), a Professor of Soil Science at Aberdeen University, and Graeme Paton (right), a soil toxicologist and Technical Director at Remedios Ltd., know what to do.

University has lots of costs, overheads and so on. So we found a different way of approaching the problem by turning our expertise into a company," Paton reports.

So Remedios is a thoroughbred spin-off of the University of Aberdeen. The company's premises are located in the Aberdeen Science and Technology Park, in the suburbs of a city where the presence of the oil industry is strongly felt. Aberdeen, Scotland's third most populous city, is the centre of Europe's petroleum industry, often called the "oil capital of Europe". The Scottish city boasts the largest heliport in the world and an important service harbour serving off-shore oil rigs. The oil industry in and around Aberdeen has created half a million jobs since the 1960s.

In light of decreasing oil production, the municipality has to find new economic sectors. One attempt to break new ground is the Technology Park, whose construction was supported by Scottish Enterprise (a regional development agency aimed at helping local companies evolve in the market). It hosts about 40 small local companies at an affordable price. For Remedios, being in the Technology Park is an indirect way of working with other aspiring companies. However, in terms of trying to penetrate a national

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(never mind global) market, being located in one of the furthest reaches of northern Scotland is not ideal, since Aberdeen is fairly far away from Edinburgh and Glasgow, the main connecting airports, let alone London, Berlin, Paris and Munich/Martinsried. Having to pay extra travelling costs to do business was becoming unsustainable, both for the company's finances and its carbon emissions. Paton says that, "to overcome this disadvantage at the beginning, Remedios set up an office in Birmingham. We then decided to close it down as it was not very cost effective. People seek market expertise, not the proximity of an office."

Encouraged by business angels

Remedios is entirely private. They decided not to ask friends to invest in the business. As Paton says, "they would have hated us if business went wrong". Instead, five other founders (three from industry, two from academia) joined the two scientists. The necessary seed money was provided by some angel investors in exchange for shares of the company. The University of Aberdeen



Photo: Giuliana Delfino

A contaminated factory site anywhere in the UK. For the Remedios crew, it's a place screaming for their specialist attentions.

did not directly invest in the business but in its infancy Remedios clearly benefited from the University's infrastructure ("in the first 4-5 years we rented a property belonging to the University for a good price, but having to change location three times in only five years made us look for something else"), saved money on licensing costs and was granted match-funding.

In the beginning, Remedios applied biosensors for pollution and this later developed into offering a wider range of environmental services as, "we now also carry out environmental risk assessment and remediation". When asked for the reason of this about-face, Paton admits that it is because the market changed. "When we first started there was no specific regulation on contaminated land, but we knew it was going to be released soon. UK regulations and the set of procedures later published by DEFRA (Department for the Environment, Food and Rural Affairs) made people look more at models rather than at biological responses coming from biosensors. We had to adapt."

Typically, several steps are carried out in a contaminated site. First of all, the company's team of consultants retrieves all of the information available about the site. Later on, environmental samples are collected and chemicals analysed in the laboratory. The interpretation of these results leads to a risk assessment, a computer-based interpre-

tation of the fate and toxicity of chemicals in the environment. The remediation of the contaminated site is the final step. Biosensors, different bacteria specially designed to work in sites contaminated with hydrocarbons, detect and predict which contaminants are on the site and how long it will take to degrade them.

'Buy-remediate-sell'

Interestingly enough, the typical Remedios customer is a developer. "Companies buying disused areas such as railway yards and industrial sites remediate them, then resell them so that new infrastructures such as airports, buildings and factories can be built," Paton says. The 'buy-remediate-sell' business is worth a great deal of money. The UK remediation market is worth €1.1 billion each year. There are many companies and thus plenty of competition. The average price for cleaning up a site is €550,000 per hectare.

Since the entry into force of the Maastricht treaty in 1992, Remedios's range extends far beyond the UK. The Maastricht treaty forces the polluter to pay for remediation. Since then Remedios has been showered with wonderful market opportunities, especially in those countries wanting to adjust to European standards, such as those located in Eastern Europe. "In Serbia," Paton says, "many multinational companies are bringing in European standards in terms of restored environment. A similar process



(left) Oil-contaminated soil at an industrial site; (right) At a Serbian landfill site, Remedios personnel carry out a groundwater training course for the staff at the plant, in order to make a use of local resources for future monitoring.

took place in Eastern Germany after its re-union with Western Germany. The central government has invested a lot of money in the last 15 years.”

Remediation market goes global

To a large extent, the remediation market is going global too. Remedios offers its consultancy to several countries outside Europe. “Apart from the USA, which is not covered by our insurance, we have worked everywhere, with more sites restored in Europe (UK, Germany, France, the Netherlands, Belgium, Serbia). We are increasingly attracting a full range of international clients, as we are now operating in Russia. Soon there will be a project starting in China. And in Iceland, too.”

“In Eastern European countries, for people like us the excitement comes from having a lot of contaminants.”

Nonetheless, there also are countries where Remedios has already been but does not want to do business any more, “we are a small company, so our cash flow can be problematic sometimes. We did some work in Brazil, but we did not get paid for it... I do not think that we are going to plan any more remediation there,” Paton recalls. In the near future, the company is also looking forward to getting bigger sites since, “the bigger the site, the more interesting it gets in terms of pollutants. For example, in countries located in Eastern Europe, for people like us the excitement comes from having a lot of contaminants!”

The company is also investing its resources in research and development. “We mostly tend to be responsive to the market. We do not fund blue sky research [i.e. re-

search done for theoretical reasons rather than for a practical application]. Usually, a new Ph.D. project starts each year. At the moment, we invest half of the money, the other half comes

from a research council such as EPSRC (Engineering and Physical Sciences Research Council).” Time and resources are invested in research to find new products, “as we would like to attain a leading position in the market. For example, we have just evolved tools to help our clients select the most sustainable options for remediation. These tools are free for our clients to use. We help our clients use them.”

Training and professional development is another focus in several countries, especially those located in Eastern Europe.

Paton invests much of his time in training and development both as a University fellow and as a company leader. The company hopes that in the future, trained people will independently be able to carry out tasks within the project.

Better scientists understand business

When asked for suggestions for young scientists who would like to turn their ideas into a business, he stresses that they should, “believe in what you’ve got; do it!” Another important take-home message is to jump at any opportunity for business training, and learn how balance sheets and business-plans work, “Writing a research grant is very similar to writing a business plan. You really have to know where you can get money from. Some people do not realise

there are several sources available. Rather, the problem is what proportion of company shares are you willing to give up to start-up the company. The best thing is to get in-

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involved with an external entrepreneur who believes in you and in your idea and knows how to make money out of it”. He concludes, “don’t ever be afraid to ask for help.”

Finally, to young researchers his advice is to look beyond their research topic and, if interested in business, to think about how an idea can be turned into a business. “Almost anywhere in the UK, universities organise competitions where students can bring in their ideas and win good money by having fun.” Paton is convinced that, “it makes you a better scientist if you understand business”.

He is certainly convincing. Paton is going to participate in the creation of a new spin-off company that uses a whisky by-product to clean contaminated land. Within a year, DRAM (Device for the Remediation and Attenuation of Multiple pollutants) technology, a faster and more cost-effective method of remediation, will be launched onto the market. GIULIANA DEFLORIO

Freelance Biobusiness Writers Wanted

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Please contact:
wk@lab-times.org