

COMPANY NEWS

## Ultra-pure Cancer Treatment Powder Processed by ASL

ASL has signed a Manufacturing Agreement with pSiMedica Ltd, the UK operating subsidiary of Australia-based global nanotechnology company pSivida Limited, for the manufacture of the process intermediate for its lead brachytherapy (cancer treatment) product 32-P BioSilicon™ ("BrachySil™") at ASL's Sheffield manufacturing facility.

The atomising facility housed in a state-of-the-art clean room was fully commissioned in Q1 of 2005. The facility, designed to GMP (medical Good Manufacturing Practice) specifications, houses a specially designed melting and water atomisation unit used to produce ultra-pure (99.9999%) silicon-phosphorous alloy powder with particles in the 10-100 micron range. This unique facility manufactures BioSilicon™ the process intermediate for BrachySil.

BioSilicon™ microparticles are activated to become BrachySil™, converting the phosphorous into its radioisotope form - <sup>32</sup>P at one of AEA's facilities in Germany. It is this neutron irradiation that requires ultra-low levels of contamination in the parts per billion, hence the need for a state of the art clean room at ASL's facility.

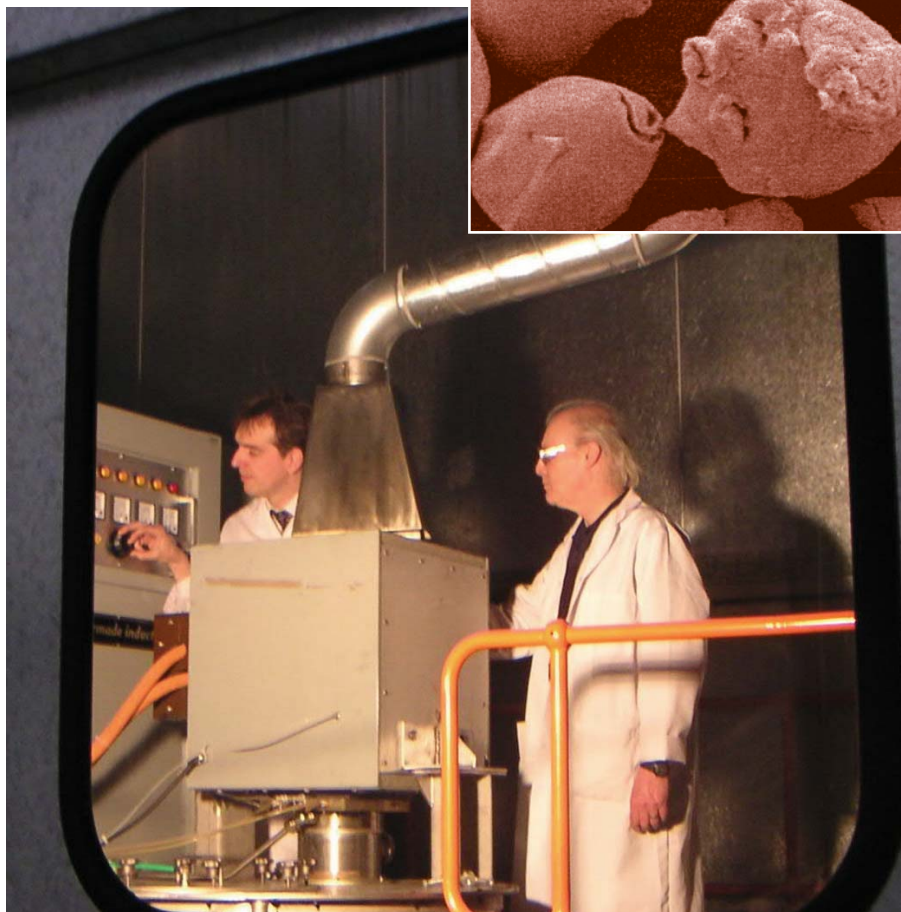
BrachySil™ has been developed by pSiMedica as a 'device' for the direct intratumoural treatment of cancers. Clinicians will receive BrachySil™ as a sterile powder for resuspension in an injectible aqueous formulation, administered via fine gauge needle using ultrasound or tomography for accurate placement.

pSivida Director, Mr. Gavin Rezos said, "The signing of this manufacturing agreement is a significant step forward in the commercialization of BioSilicon™. ASL is a world leader in particle atomisation and we are extremely pleased to have been able to secure their services for what is an integral role in the overall production and supply process."

*A view into the cleanroom facility at ASL.*

ASL's Chairman and Technical Director, John Dunkley said, "We welcome the opportunity to work with pSiMedica on the development and potential commercial realization of this exciting new product. The innovative skills of our development team and our purpose-built manufacturing suite in Sheffield are well suited to servicing pSiMedica's unique requirements. We have doubled our building area, allowing us to install this dedicated new facility, and expand our current business".

Powder produced at ASL's clean room facility has been used in Phase II clinical trials in Q1 2005, at Singapore General Hospital, with primary liver cancer as the first clinical indication. The excellent results obtained will be followed by a dose profiling study during 2005. A product launch is expected in 2006.



<b>Company News</b>	Page
Ultra-pure Cancer Treatment Powder	61
<b>Technology</b>	
Avoiding Cross Contamination in Atomisation	62
<b>Future Events</b>	
Atomisation Course to Run Again	62
<b>Company News</b>	
New Solder Atomiser Commissioned	63
<b>Company News</b>	
University of Madrid Atomiser Commissioned	63
<b>Technology</b>	
Laval University Order Water Atomiser	63
<b>Future Events</b>	
PM2TEC 2005 Montreal Canada	63
<b>Company News</b>	
ASL Completes a Record Year	63
<b>Future Events</b>	
PM2005 Prague Czech Republic	64
<b>Past Events</b>	
Hagen Symposium 2004	64
<b>Company News</b>	
ASL's Chinese Agent's New Address	64
<b>Company News</b>	
New Personnel Join ASL	64

# Avoiding Cross Contamination in Atomisation

Many of the issues below will be discussed in detail at the Perdac atomising course

Unless producing a single product, all atomiser operators must consider what happens when they change from one product to another. Cross contamination of a powder with that previously produced in a plant is very rarely allowable without strict limits. Simple chemical analysis may state that 0.1% of Ni is allowable in a Cu alloy, but it is also possible that individual particles of, e.g. Tool Steel in Stainless Steel may be very obvious (due to corrosion) and thus limits of 1ppm or even much less may be demanded. Problems of this sort can be dealt with in many ways, but can be divided into two approaches; Operational and Design. In all cases the objective is to avoid having to dismantle and clean the plant too often or for too long. There are unlucky operators who find they are spending 20 or even 40% of operating hours on clean-down.

## Operational Methods

### 1. Campaigning

This is running alloys with higher tolerance of cross contamination after each other. For example, in Brazing alloys keep phosphorus alloys together and Cadmium alloys together. ASL had one client who required Cd<5ppm in one alloy, 15% in another. This requires we remove second alloy to 99.997% level. Clearly if we had another Cd alloy with 10% Cd allowed, a 99% removal would be perfectly adequate.

### 2. Use "purging" or "wash" heats.

Instead of cleaning out a system, one can simply process a scrap melt (e.g. when changing from ferrous to copper) of copper alloy that is used again for remelting. If the system contained 1kg of powder, this will replace the contamination of, say, 500kgs of powder by one kg of iron (0.2%Fe) to contamination of 500kgs of powder with one kg of powder (from the "wash" melt) itself containing only 0.2% of Fe, reducing contamination to 0.2% of 0.2% = 4ppm. But if the contamination has built up in bad

dead spots in the system, it may not dilute away as planned, so this must be checked and partial cleaning used in addition.

### 3. Marketing

This is probably the most important approach, but not necessarily the most easy to implement. The sales and marketing people must avoid offering to supply alloy powders without clear understanding of how they are specified for contamination, especially with respect to metals already in production. Sales and production need to work very closely together to avoid either disappointing customers or incurring large extra costs (as downtime).

## Plant Design Methods

### 1. Dedicated Equipment

Costs of atomisers themselves can be small compared to costs of pumps, compressors, gas supply systems, water recycling systems or melting systems. So duplication of critical items, such as atomiser vessel and post atomising processing, which can then be dedicated to particular classes of powder, can be affordable. Consideration of this in the initial design stage may drastically reduce down time due to cleaning of systems.

### 2. Simplify the system

For instance use simple settling tanks than can be hosed out instead of continuous filters that are hard to clean. Use simple tipping pan filters instead of rotary or belt filters. These are cheaper and easier to clean. It may be that the extra labour involved in operation of simple plant is more than saved in cleaning down.

### 3. Use cyclones

They are far more cleanable than filters so for product recovery they are much better. Back up if necessary with a filter for emission control or equipment protection.

### 4. "Clean" Design

Keep ducts short if possible, reduce the surface area of the system when possible, avoid powder "traps" in joints etc by welding up, e.g. gas atomising vessels, in one piece.

Polish up internal surfaces, and make sure welds are not just ground off.

### 5. Washable design

When designing in stainless steel one can make provision for washing the plant down with water, even designing special cleaning jet systems. Remember it is then necessary to dry it. In jacketed systems, the cooling water can be heated to help drying or, in vacuum systems, outgassing.

### 6. Wet collection

Perhaps an extreme version of 5 above is to use water quenching gas atomisation instead of dry atomisation. In the case of precious metals, this reduces the losses of metal, by reducing plant volume very greatly (perhaps by 90%) and allowing very easy wash-down. The extra cost of drying of smaller volumes of metal, is easily off-set by greater productivity and smaller capital cost. This technique is also used in NiCrBSi alloy production.

## FUTURE EVENTS

# Atomisation Course to Run Again



It is proposed to run the course entitled "Atomization for Metal Powders" this year. The new 2 day format course will be presented by Professor Andrew Yule of Salford University and John Dunkley of ASL.

The lectures will focus solely on atomising, from the fundamentals, through specific techniques, to operation and economics of plant.

To register an interest to participate please see [www.perdac.com](http://www.perdac.com) or contact us here at ASL.

## New Solder Atomiser Commissioned

The electronics industry relies on high purity solder powders with narrow size range, perfect spherical shape and low oxygen content. These are used to produce solder pastes which are used to make thousands of reliable joints between components on millions of circuit boards. ASL developed ultrasonic atomisation of solders in 1994 and has sold several plants of this type having outputs around 30kg/hour and a yield of around 30% in the required Type III (25-45 microns) size range.

However, the demand in the market has continued to grow, while prices have fallen, requiring new developments to make powder faster and cheaper. To satisfy this demand, ASL has designed and successfully tested a centrifugal atomiser to operate at 100kg/hour and achieve over 50% yield in the Type III range. Following extensive testing in Sheffield, the unit was commissioned at the client's premises in China in the first quarter of 2005. We expect our client to become the leading electronic grade solder powder producer in China.



The centrifugal solder atomiser installed at the clients facility.

## COMPANY NEWS

## Laval University Order Water Atomiser

Laval University have ordered a 30kg R+D water atomiser enabling them to increase their research in the field of powder metals.

An order has been placed by Université Laval, Quebec City, Canada, for a new 30kg R+D water atomising system to be located in the department of mining, metallurgical and materials engineering. The acquisition of the system was made possible through funding by the Canadian Foundation for Innovation and the Ministry of Education of the Province of Quebec. The project has been awarded through the New Opportunities Fund and is designed to support cutting-edge research infrastructure in areas of strategic importance to Canada. The water atomizing system will be used to develop new ferrous alloys designed for high performance applications. The equipment will also be utilised to train highly qualified personnel through teaching/demonstration activities as well as undergraduate thesis. For more details, professor Carl Blais can be reached at [carl.blais@gmn.ulaval.ca](mailto:carl.blais@gmn.ulaval.ca) or +1 418 656-2049.

## FUTURE EVENTS



## PM²TEC 2005 Montreal Canada

The Metal Powder Industries Federation will be holding their annual International conference on Powder Metallurgy and Particulate Materials in Canada.

The venue will be Montreal's Palais De Congres during 19th-23rd June 2005.

John Dunkley of Atomising Systems will be presenting a paper on hot gas atomising. Further information on this event may be found from:

Metal Powders Industries Federation  
[www.mpif.org](http://www.mpif.org)

## COMPANY NEWS

## University of Madrid Atomiser Commissioned

ASL commissioned the atomiser at Universidad Carlos III de Madrid in the last quarter of 2004. The versatile 10kg batch atomiser allows the university to atomise using either gas or water and will give them the freedom to produce many alloy powders relating to their research topics. We look forward to seeing the progress made by the university by using this system.

## COMPANY NEWS

## ASL Completes a Record Year

The last financial year, from October 2003 to October 2004, proved to be a record year for ASL. Orders received were double their previous high. In the previous financial year, our special powder business and contract research work expanded considerably to fill the gap left due to low levels of major plant sales. The contract research work continued to prosper and we held on to a high level of powder sales, but added to these was a record intake of orders for 5 major plants. As a result, our staffing has expanded (see page 64) and will continue to expand. We also moved into the neighbouring building, doubling our workshop floor area with future expansion in mind.

## Hagen Symposium 2004

In early December the DGM (Deutsche Gesellschaft für Metallkunde) hosted its annual Hagen Symposium meeting at Hagen near the Ruhr. Again ASL attended and were represented by Paul Rose and Dirk Aderhold.

There was an increased number of stands this year, particularly evident by the reduced walking space in the exhibition area. This is a true indicator of the increased popularity of this German language conference and exhibition.

The Hagen Symposium attracts a high level of attendance due to the select papers and professional organisation.

The 2005 conference will be on the 24-25th November. Further details from Frau Schlieper tel: 0049 (0)2331 958817 e-mail mschlieper@fpm.wsm-net.de



## Euro PM2005 Prague Czech Republic

The Euro PM2005 Congress and Exhibition moves to Prague for 2005. Hosted by the EPMA, the venue will be the Prague Congress Centre running over 2nd-5th of October 2005

ASL hope to see you there as we will again be taking a booth and presenting a paper on centrifugal atomisation.

Further information on this event may be found from:

European Powder Metallurgy Association (EPMA)

[www.epma.com](http://www.epma.com)

## ASL's Chinese Agent's New Address

UDI, our agent in China, has moved to new offices.

If you require information regarding ASL's capabilities relating to China please contact Mr Dimi Dimitrov.

Dimi speaks Chinese fluently, so language is not a barrier.

Contact:

UDI Ltd. Beijing Office

Suite 1809-1812

Tower E2, Oriental Plaza,  
No.1 East Changan Avenue,

Dong Cheng District,

Beijing 100738 PRC

Tel: 0086 (0) 108518 3966

Tel: 0086 (0) 108518 3977

e-mail: [dgd@public.bta.net.cn](mailto:dgd@public.bta.net.cn)

## New Personnel Join ASL

As part of ASL founder John Dunkley's long-term plan to put in place a next generation management team, Dipl. Ing. Dirk Aderhold

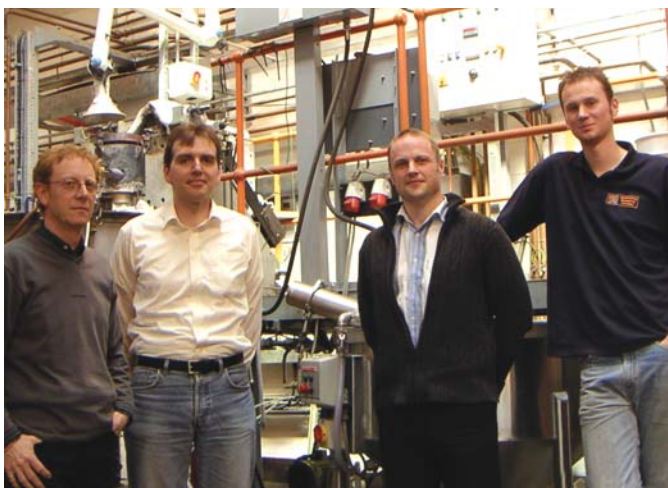
has joined ASL as technical manager. After a 6-year course in chemical engineering at Dortmund University, Dirk worked for 9 years for a major international metals and chemicals company, where he developed much improved production technology which he implemented at plants in many countries.

His excellent understanding of process engineering and the scientific basis of designs has already proved useful at

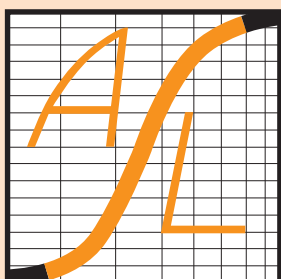
ASL in designing high temperature equipment and he has already been very actively involved in operating atomisers in our facilities and in analysing their behaviour. He is working closely with Dr Paul Rose, our Technical Sales Manager, Craig Winfield, Manager of Engineering and Contracts and Simon Dunkley, Operations and Finance Manager to satisfy our demanding clients.

ASL's engineering department has recently expanded through the appointment of John Boffey and John Bauer as design engineers. John and John (yes it has caused confusion already) are working on the many new client projects as well as ASL's expansion.

Gary Taylor has been appointed as a junior technician working on powder production, R+D and commissioning of equipment.



L-R John Boffey, Dirk Aderhold, John Bauer and Gary Taylor.



### Atomising Systems Limited

Unit 8, M1 Distribution Centre, Vulcan Road  
Meadowhall, Sheffield S9 1EW England.

Tel: +44 (0) 114 26 26 200

Fax: +44 (0) 114 26 26 201

e-mail: [info@atomising.co.uk](mailto:info@atomising.co.uk)

Web Site: [www.atomising.co.uk](http://www.atomising.co.uk)

#### DIRECT LINES

##### Sales:

+44 (0)114 26 26 205

##### Engineering:

+44 (0)114 26 26 206