

UK-Russian Closed Nuclear Cities Partnership Programme
Oxford Study Tour Visit Report
March 23 – 30, 2003

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1. Introduction

Within the framework of the UK-Russian Closed Nuclear Cities Partnership Programme (CNCPP), a group of nineteen Russian government officials and scientists from six Closed Nuclear Cities and the Ministry of Atomic Energy visited Oxford and London for a Study Tour on innovation from March 23-30, 2003. The Oxford Study Tour's primary objectives were

- To familiarize Russian delegation members with all aspects of technology commercialization and sustainable economic development in Oxfordshire.
- To introduce them to key players in each stage of the innovation process.

The week was designed to highlight each step in the innovation cycle, initially focusing on the origination of a bright idea and the practical steps scientists take to move from the theoretical concept stage to the start-up phase. In the next stage, the emphasis shifts to the incubation process, when consideration is given to practical issues such as the acquisition of physical space, training and initial financial backing, as well as market evaluation of the concept. As the bright idea matures into a viable product and a management team is further developed, the next steps typically taken by a small company to launch its product onto the market include focusing on sales and production, the further development of management skills and raising of additional funds. At the end of the process, hopefully, the small company matures into a growing enterprise. Appendix 1 contains a chart with an overview of the Study Tour's rationale.

The week began with a visit to the state run nuclear research institute at Harwell, managed by the UK Atomic Energy Authority (UKAEA). The majority of the site and its workers faced downsizing and privatization during the late 1980s and early 1990s. Representatives from UKAEA discussed their experiences of a complex conversion situation and the current roles of UKAEA in decommissioning the research legacy and managing Harwell as a science park. During the afternoon, the Chief Executive and senior managers of AEA Technology, formerly the commercial arm of UKAEA that made the successful transition from a large public laboratory to a private business, addressed the delegation.

Tuesday's meetings were with organizations that support innovation and technology commercialization in Oxfordshire. These meetings highlighted the process by which research concepts are assessed for commercialization potential and, if deemed worthwhile, how the scientists are supported through the incubation process.

Wednesday morning's meetings focused on financing for start-up technology companies. During the afternoon, delegates visited Oxford Instruments, a major scientific company with production facilities in the region. A visit on Thursday morning was made to the Oxford Science Park and during the afternoon members of the County Council discussed the multiple ways they support innovation in the County and how they developed their economic strategy for 2001-2005. The week's meetings concluded with presentations from the UK government's regional organization responsible for promoting economic

development in Southeast England and from the UK Department of Trade and Industry's Technology Promoter for Russia, learning how DTI supports innovation through international technology partnerships with Russia. At the end of Friday's meetings, delegation members met with UK CNCP team members to review lessons learned and to obtain delegate feedback on the Study Tour. A copy of week's schedule is included as Appendix 2.

Russian delegation members each received a briefing book, in Russian, that included the following information: Schedule, Emergency Contact Information for Visit Hosts, Contact Information for Meeting Hosts, Background Information on Each Organization to Be Met With, and Background Information on Oxford and London.

2. Overview of Study Tour Delegates

There were 19 Russian participants in the delegation, including two people from PE International Moscow's office (Alexander Tsibulya and Lena Parkhomenko) and an interpreter, Alexey Gorchakov. Both Lena and Alexey translated for the group during the week. The remainder of the Russian participants came from three groups:

- Technical experts from the Kombinats and Institutes. These included Alexander Kroupine (Seversk Kombinat), Boris Kerbel (Seversk Polytechnical Institute), Boris Vodolaga (Snezhinsk VNIITF), Vladimir Zhigalov (Sarov VNIIEF), Yury Zavalishin (Avangard/Sarov), Vladimir Sergeev (Novouralsk Kombinat), and Vitaly Malyy (Zheleznogorsk Kombinat).
- City Administration officials. These included Andrei Katarguine (Zheleznogorsk), Vladimir Malkov (Ozersk), Victor Lavrov (Sarov), Valentin Feldman (Novouralsk), and Vladimir Klimenko (Snezhinsk).
- Representatives from the Ministry of Atomic Energy. Vladimir Starosotnikov and Gennady Golomysov from the Conversion Department. Vladimir Sterekhov from the International Relations Department and Anatoliy Abramov from the Department for Protection of Information and Nuclear Materials.

Additional details about Russian delegation members can be found in Appendix 3.

The Russian delegation arrived on Sunday evening and an in-briefing was held to review the overall rationale behind the Study Tour and highlight the meetings planned during the week. Russian participants were asked to write down personal goals for the week, which would be reviewed on Friday during the out-briefing to identify whether the Tour had met their needs/expectations. A chart is attached as Appendix 4 highlighting the personal objectives identified by each member of the delegation.

3. Meeting Highlights

(Copies of presentation slides, when used, for the above meetings are being collected by the Moscow Office and disseminated to delegates via e-mail. Contact details for all meeting hosts is available in Appendix 5.)

3.1 Monday, March 24

3.1.1 UKAEA

John Wilkins, Head of the Harwell Site, made a presentation on the history and transformation of UKAEA's Harwell site from large government owned and operated civilian nuclear research and development facility to its status today. Tim Cockerill, Development Manager, provided further details about the commercial development of the Harwell campus and its future plans. Mary Hills, Facilities Manager, gave an overview of the day-to-day running of the Harwell campus facilities. Nick Hance, Public Relations Manager, took the delegation on a site tour, including a visit to DIDO, and gave an overview of the role of the Public Relations Department at Harwell.

Harwell was established in 1946 as a civilian nuclear research and development facility. During the 1950s and 1960s, UKAEA's primary mission was to conduct research for the UK government. Over time, however, the UK government reduced its needs for nuclear research and the downsizing of Harwell began. The most significant transformation of UKAEA took place between 1986 – 1996; in 1990 the experimental reactors closed and by 1996 the privatization of AEA Technology was underway. There are a total of 4,000 people working at the campus today, including employees with Rutherford Appleton Laboratory and the Medical Research Council.

The major reduction in staff numbers took place largely because of employees taking the opportunity for early retirement under favorable conditions. Another large part of the staff moved to private companies – many on the Harwell campus. UKAEA underwent a major transformation as it began to compete for work with private sector organizations and became customer oriented. The transformation required fundamental changes in the way employees approached and carried out their work.

Today, UKAEA provides specialized services with research as one small component of its overall mission. Its major roles today are to oversee the decommissioning of nuclear facilities, operate the site, provide property services and promote science and innovation in the community. Much of the day-to-day work it oversees is carried out by contractors. The security boundary around Harwell will continue to shrink over the next ten years as decommissioning progresses, allowing new land and buildings to become available for commercial purposes.

Harwell began to actively promote property development and leasing in 1996. Major up-front investment in infrastructure at the campus was required during the 1990s costing £20 million. In 2000, the innovation center was established and 40 small companies are located there today. UKAEA had a large stock of old buildings which could be refurbished at a relatively low cost. In 2001, the first new building for a private company was constructed under a 999 year lease agreement. Today, there are 80 different organizations occupying 40% of the buildings on campus and they employ 80% of the campus workers.

Additional key points made during the morning included:

- Tim Cockerill's presentation reviewed the Master Plan for the Harwell site and emphasized the often long lead times required for development. He highlighted the need to maintain good relations with the community, especially with local government leaders responsible for approving planning and zoning.
- Nick Hance noted that staff at UKAEA receives a 1% bonus if they meet their media ratings targets for the year which the Russian delegation found very interesting.
- Mary Hills emphasized the importance of the following:
 - Need to be flexible – what tenants want changes over time
 - Tailor services to meet customer needs – don't provide services people will not pay for directly
 - Accounts must be transparent to tenants
 - Hire contractors to provide services when possible

Other statistics provided during the meeting in response to questions from delegate members included:

- Timeframe during which major job cuts took place – 1987 – 1994
- The UK government funds the Harwell site - £30 million/year (10 for operations and 20 for decommissioning). 40% of campus operating costs are covered by lease payments (excluding decommissioning work).
- Rent rates are set in line with similar commercial properties in UK
- Many employees were re-trained by the private companies that hired them and many transitioned to similar jobs in the private sector so no training was required
- Reasons why a non-nuclear company would choose to settle at Harwell include: lower rent, excellent scientific base for companies working in a variety of science sectors, positive atmosphere, skilled workforce and site security
- Rent income from leases goes back directly to the UK government and is not specifically earmarked to come back to the Harwell site
- Prospective tenants are screened for financial soundness and their safety records are reviewed
- The Public Relations Department has 2 employees at Harwell and 12 within UKAEA
- It took approximately two years for the Facilities Department to transform on-site services
- Cost per square foot of office space – £15/sq foot for high quality and £5 for low quality industrial

The discussions with UKAEA representatives gave Russian delegates lots of food for thought about how to approach the re-structuring of a government owned enterprise, such as an institute or kombinat, and the concrete steps taken to transform it into a more commercially oriented, customer service driven organization. The fact that UKAEA retains title to the land within the Harwell campus and retains a small but still official

government role (which Minatom would insist) was positive for delegates to hear and allowed them to consider the UKAEA experiences as a potential model which might be adapted in the Closed Cities.

3.1.2 AEA Technology (AEAT)

Peter Watson, Chairman of AEA Technology, focused his presentation on the process of commercialization and privatization of nuclear expertise and facilities at UKAEA (including at Harwell). Initially, Harwell was focused on weapons development and advanced reactor research and development, and represented the UK in the international nuclear energy community. Harwell started as an 'atom village' in 1946 and UKAEA was a government owned scientific enterprise. By 1960, there were 40-45,000 people working for UKAEA at various sites. Scientific innovation became a focus in the 1970's and thus began the transition from government ownership to private company. Legislation was put in place in 1965 that allowed the diversification of income sources and the separation of three organizations (AWE, NRPB and BNFL) from within UKAEA in the early 1970s. The weapons related functions were removed to AWE Aldermaston in 1971. By 1989, the number of personnel at UKAEA had been reduced to 11,000. The goal was to move toward further reductions by the mid-1990s down to 8,500. Between 1972 and 1998, there was a slow and sustained movement toward developing businesses in non-nuclear technical areas. In 1989, the consulting firm McKinsey & Company conducted an in-depth study on the transformation of Harwell and provided valuable recommendations. This study, and subsequent consulting work performed by McKinsey & Company proved very helpful in introducing new ideas and breaking down internal cultural barriers to change. In 1994, Harwell was split into UKAEA and AEA Technology and then in 1996 AEA Technology was privatized. The key elements of change emphasized throughout Peter Watson's presentation and subsequent dialogue with delegates were: it can be done, it takes patience and persistence, it takes clarity of vision, focused execution, retraining and good leadership. Also that commercialization and privatization should be undertaken in sequence, not in parallel.

Other key facts provided:

- AEAT used to have 37 technical directions/operating groups and now has 3
- In 1994, 55% of sales were to government – by 2000 this had been reduced to 22%
- Top management – of 19 people reporting to the Chairman in 1994, only two remain as direct reports
- R&D tends to be 30% to 40% of sales in some of the technology development business areas but is only 2% to 3% in areas such as environmental consulting

Human resource changes were the focus of Keith Russell's presentation. Mr. Russell is AEAT's Company Secretary. He emphasized the lack of control they had regarding staff salaries and benefits when they were a UK government organization. He reviewed the step-by-step the process they underwent between 1960 and 2000 to transform the human resources functions within the company. The major steps taken included:

- Bringing employee pay under direct control and link pay to performance

- Change from public sector benefits to private – reduction in annual leave and redundancy rights and increases in incentives like bonuses and share options
- Transition from people perceiving they had a right to a benefit, etc. to benefits being tied directly to what the budget could support
- Changing the way employees were recognized

He highlighted the lessons they learned over the years in developing various bonus programs, stressing the need for such schemes to pay for themselves and to be transparent and realistic. He also presented information on the extensive skills re-training efforts that took place during the 1990s within AEAT.

Robert Bell, Group Director for AEA Technology's Environment Group, began his presentation by recounting his early days with Harwell as a scientist working in the fast reactor research group and the transition he made during the 1980's to business manager. His presentation focused on the importance of re-orienting one's work around the profit and loss statement and managing overhead costs. It emphasized the direct day-to-day link between conducting business and the costs associated with running that business. Based on his experience, the first part of the transition (i.e. helping scientists accept that change was inevitable) was the most difficult. Once scientists had accepted the changes, the rest of the transition process was relatively quick to implement. In his presentation, he reiterated the importance of the following:

- Scientist training in business and finance
- Leadership from top management - critical for the successful transition and implementation of new approaches
- Consistent and frequent employee performance reviews – created a strong communication feedback loop between managers and employees during the transition.

The story of AEA Technology's journey over many years through commercialization and ultimately to privatization was inspiring to all delegates. The AEAT presentations provided concrete examples of the steps taken by the leadership and employees of a nuclear research and development enterprise to successfully transform into a thriving private company. Delegates were able to identify with the challenges faced by management during the re-structuring and respected Peter Watson and his team for what they had been able to achieve.

3.1.3 Intellikraft

Gleb Ivanov was born in Sarov and went to Moscow State University. In the early 1990s, he started a technology consulting company in Moscow called TETRA and after collaborating with several British government organizations in the mid-1990s, decided to start his own technology company in Oxford. He has office space at Oxford Innovation and obtained seed capital financing through the Oxfordshire Investment Opportunity Network. In addition to sharing his personal experiences in starting his technology business in the UK, his presentation to the group covered the following issues:

- Technology push versus market pull

- Various ways to sell a technology (i.e. product sale, license agreement, strategic partner, JV)
- Intellectual property – importance of patents and having a trustworthy partner
- Competitive pricing – Russian technology development advantages/disadvantages
- Importance of building a strong management team and the need for professional consultancy
- Opportunities to access start-up funding

Gleb Ivanov, a once local scientist and someone delegates could relate to, provided an excellent example of a Russian scientist who has successfully navigated his way through the incubation process in Oxford and is managing a growing high-technology company.

3.2 Tuesday, March 25

3.2.1 The Oxford Trust

Rob Eyre, Research Manager from The Oxford Trust, made an informal presentation to delegates starting with the organization's history. The Oxford Trust was established in 1985 by Sir Martin Wood to promote science and enterprise and is primarily funded by an endowment initially provided by Sir Martin Wood of £1 million, with additional funds coming from activities with partners such as local universities. Initially, the Trust supported local startups in the Oxford area and in 1986 opened the first innovation center in the United Kingdom. In the early 1990s, the Oxford Trust spun off its innovation center activities and created Oxford Innovation. Today, the Trust has two main areas of activity: education (i.e. promoting science and engineering in schools) and reporting on companies utilizing innovation networks in Oxfordshire and throughout the UK. The Trust also helps organize Venturefest Oxford, a two day meeting to support the development of high-technology businesses in the region. It was started four years ago, is held annually, and has an average of 2,000 participants each year. It includes an exhibition, seminars and entrepreneurial presentations.

Delegates found it difficult to understand the concept of an endowed charitable trust and were quick to point out that there were few, if any, individuals in Russia interested in pursuing such an approach in the Closed Cities. They were, however, interested in how a charitable organization could serve as a catalyst for innovation in a region

3.2.2 Oxford Innovation

Colin Alexander, Director of Projects and Consultancy, organized several presentations on Oxford Innovation (OI) and its activities. Mr. Alexander said the OI team sees themselves as innovation engineers. OI's primary activities include managing 13 incubation/innovation centers, supporting spin-out companies, promoting cluster development in the UK and Europe, and running OION (see below). Delegates were provided an overview of OI's innovation centers, which house over 230 companies. Total turnover at OI is £4 million per year (55% from facility rentals and 45% from

consultancy projects funded indirectly by the UK government and EU). Mr. Alexander stressed that while they are a self-sustaining commercial organization, their primary focus is not on making large profits but on supporting innovation in the community. Each year they have, on average, 70 companies coming into their centers and 70 leaving; they promote this constant turnover in an effort to keep new ideas flowing between tenant companies. Over the past ten years, OI estimates 4,500 companies have graduated from their innovation centers, resulting in the creation of 1,500 jobs and contributing £22 million in tax revenues. OI has a minor link with Russia, where in Chernogolovka they have been providing consulting services.

Peter Baikie, Technical Director, made a presentation on some of the consultancy tools OI has developed, including the Innovation Tool Kits and Guides. OI has 7 Tool Kits and Guides, including the Technology Exploitation Guide and the Innovation Action Tool Kit. They are essentially a series of self-help workbooks which entrepreneurs can use to support the start-up process. The kits and guides are most effectively utilized in conjunction with seminars that last for one to two days per kit. Mr. Baikie also discussed the technology audits OI has conducted, most recently at Oxford Brookes University in the Biosciences Department.

George Blumberg, Senior Consultant, presented more in-depth information for delegates on the development and operation of the innovation centers. He emphasized that they do not just provide space but foster a creative and supportive atmosphere for start-up companies to thrive in. The centers offer short-term leases (1 month), ramped pricing for space rental and aim to move firms through within 3 years. OI never takes a stake in a tenant company. Each new innovation center requires between \$100-200,000 in initial investment and these capital costs are generally covered by public funds. Each center's operations are then self-sustaining after an initial one to three year period. Mr. Blumberg also gave an overview of the EU KREO Network of Innovation Centers of Excellence including locations in Karlsruhe, Rhone-Alpes, Emilia-Romagna, and Oxford. KREO specifically aims to support scientists as they move from conducting basic research to the pre-seed capital stage of developing a start-up company. KREO also disseminates innovation best practices across Europe. The network has helped move 50 projects from basic scientific research to the private sector.

What delegates found most useful from the Oxford Innovation presentations were the details about innovation center development and management. Most of the Closed Cities, whether through the institutes or the city administrations, have a technopark and they benefited from hearing about the best practices OI as landlord has put in place in its multiple locations. Delegates could identify with the need for the centers to be operationally self-sustaining but had a harder time considering where they could obtain financing for the initial capital investment.

3.2.3 Oxfordshire Innovation Opportunity Network (OION)

Alastair Cavanagh, Manager, met with delegates to give an overview of OION's activities. The organization was created in 1995 to help plug the equity gap for high-

technology start-up companies in Oxfordshire. It is funded primarily through memberships and they take a 2.5% success fee for money raised through the network. Members have to go through a vetting process prior to being accepted. OION has approximately 120 active investors, mostly private individuals. Mr. Cavanagh highlighted for the group the various types of funding which start-ups can typically access in the UK and the amounts that can be raised with each. OION is classified as a business angel network and companies typically look to raise between £50,000 to £1 million. OION holds monthly meetings during which five to six companies make 15 minute presentations about their organization and its funding requirements. OION reviews between 40 and 50 business plans each month and those organizations selected for presentation at the monthly meeting go through extensive coaching. OION has closed 35 deals in the past two years totaling £9 million.

Delegates were fortunate to be invited to attend the monthly meeting of OION at the Said Business School later Tuesday evening. Delegates listened to three companies make presentations: Purely Proteins (biotech firm – looking to raise £200,000), Armstrong Healthcare (medical robotics – £800,000) and Crimelocator (security surveillance systems – £400,000).

Both the visit with Mr. Cavanagh and the OION monthly meeting gave Russian delegation members a window into the running of a successful business angel network. During the monthly meeting, delegates saw how each of the presentations were similarly structured yet how each varied according to the style of the presenter. Delegates know how badly they are in need of business angels to support innovation in the Closed Cities but currently consider Minatom their only source for this type of funding.

3.2.4 ISIS – Oxford University Innovation

Tom Hockaday, Executive Director of ISIS, talked to delegates about the role of Oxford University and ISIS in the promotion of scientific innovation and technology commercialization. Oxford University is the largest research university in the UK with an R&D income of £206 million per year deriving from HEFCE, Research Councils, Charities (esp. Wellcome Trust), Industry, the EU etc. ISIS was created in 1997 to help commercialize the technology developed as a result of this research. ISIS is owned by Oxford University (OU) and generally the University owns the IPR. ISIS has three main activities: licensing, consulting and supporting spin-out companies. ISIS has 34 people on staff. Its project managers oversee a portfolio of 560 projects, roughly 40 projects per manager, and the operating budget is £1 million per year. Project managers typically work with scientists to write a business plan. Further support is given to attract financing, locate suitable managers for the new company and identify appropriate business service providers (lawyer, accountant, etc.). In 1998, ISIS began to take shares in most of its spin-out companies and waits for a flotation before redeeming its share. Their investment time-line is roughly 10 years. Mr. Hockaday provided details about the relationship between scientists, the University and investors. He also gave information about the 4 million pound University Seed Challenge Fund (average grants of £50,000), and the ISIS College Fund (2nd round financing of up to £500,000). ISIS runs the Science

Park at Begbroke as an incubator for 5 startups, and runs the Oxford Innovation Society, set up in 1990 for investors (individuals & companies) seeking advance information on ISIS launches – the annual membership fee is £6,800.

During the ISIS meeting, Russian delegates heard how the University encourages its research scientists to pursue commercialization of their technologies and how, through ISIS, these scientists are supported in the innovation process. Delegates were somewhat surprised to learn that the University was not afraid of losing its scientists, which is one of the concerns in the Closed Cities institutes. Delegates found the information on how IPR, royalties and shareholder rights are addressed between scientists and the University very helpful.

3.3 Wednesday, March 26

3.3.1 Oxford Technology Venture Capital Trust (OTVCT)

Lucius Carey, Managing Director of Seed Capital Ltd., started OTVCT in 1983. He began the meeting by telling his personal story of graduating from university as a physicist and engineer and making the transition early in his career into an entrepreneur. His story captivated the audience. OTVCT operates similar to OION, but on a somewhat larger scale and invests in a portfolio of high-technology ventures – all early-stage startups in the Oxford area. OTVCT functions as a business angel and remains closely involved in the management of its projects. It charges a management fee of 2%. He reviewed the five Venture Capital Trusts they have already launched which they raised over £20 million for and which are quoted on the Stock Exchange. These funds involve roughly 80 investors and they generally have a good track record in portfolio selection. He also detailed their latest £5 million capital fund which closes on April 4th. On average each fund invests in 25 companies, funds must be fully invested within three years of the formal launch of the fund and no single company can receive more than £1 million. He highlighted the UK government's tax strategy to increase the flow of capital to small businesses (i.e. an investor gives £1 but only has to assume 80 pence of risk, the other 20 pence assumed by the government). Mr. Carey focused the second-half of his presentation on how small technology start-ups raise funds in the UK from venture capital companies (VCs) and from the public equity markets. He arranged for delegates to hear from Peter Nolan at Biomedica and Kevin Matthews at Oxonica about their specific experiences in raising capital from different sources.

During the morning with Lucius Carey, delegates found the nuts and bolts information provided about financing for high-technology start-up companies in the UK to be very helpful. While many of them had received general information in the past about financing for small companies, rarely had they been able to have an open discussion about business angel, VC and equity market funding options.

3.3.2 Biomedica

Peter Nolan, Senior VP for Commercial Development, talked to delegates about the problems small biotechnology firms have in obtaining funding to support the lengthy process of getting new drugs to market. Biomedica's research and development is focused on drugs to treat cancer and Parkinsons. The company started in 1996 with 5 employees and 5 patents and now has 81 employees and 71 patents filed. Mr. Nolan gave an overview of Biomedica's unique history in going directly to the equity markets (first AIM then LSE) to raise funds, rather than through angel or VC networks. He recounted the company's start in 1996, when the founders owned 50% of the shares, and the dilution of their ownership down to 5% over the years as they raised more financing, as well as the company's drop in valuation from £65 million to £16.5 million in the past few years. Delegates appreciated having an opportunity to hear directly from a company that had gone through the innovation process and successfully raised money via the equity markets.

3.3.3 Oxonica

Delegates met with Kevin Matthews, CEO of Oxonica, a material science firm currently specializing in nanopowder applications. Oxonica has raised £4M from a consortium consisting of BASF, two VCs, one US firm (NextGen). Mr. Matthews talked about the tradeoffs between staying focused on development of one product versus keeping more R&D options open with multiple product development and spreading risk. They choose to spread risk and are developing several products simultaneously. He gave details not only of the process Oxonica went through to raise money, but also the general process small, high-technology companies have to go through to raise VC funding in the UK. He highlighted Oxonica's capital lease program for laboratory equipment (17% annual interest) and gave delegates a tour of the laboratories. The frank discussion about the advantages and disadvantages of obtaining VC financing was of particular interest to delegation members.

3.3.4 Oxford Instruments (OI)

The visit to OI started with a tour of the superconducting magnet production floor directed by Kevin Timms, Production Manager. After the site visit, Sir Martin Wood, company founder, met with delegates and recounted the start of the company in a shed in the bottom of his garden in 1960 with his wife (with a turnover of £2,000). OI now has 1,700 employees and a turnover of £200 million. The company specializes in manufacturing superconducting magnets for medical (especially NMR, ICR and other scanners) and research applications, sells 6000 magnets annually, and has about 50% of the world business in this sector. It has grown entirely out of retained profit and they spend approximately 10% of turnover on R&D each year. 40% of OI's staff have PhDs. Sir Martin Wood inspired delegates as he talked about what he saw as the key ingredients for the success of his organization: total commitment to customer satisfaction, excellence in scientific research, high quality manufacturing, delivery on schedule and inspiring intelligent and creative people in the workplace. Frank Trundle, Marketing Director for

the Superconductivity Group, who made all the arrangements for the afternoon at OI, wrapped-up the session by making a presentation on plans for future product development within his Group at OI.

Sir Martin Wood's story, exemplifying the difference one individual's leadership and vision can make, inspired delegates. They thoroughly enjoyed the tour of the production facilities – seeing first hand OI's modern infrastructure and learning about how employees are motivated to operate safely and efficiently.

3.4 Thursday, March 27

3.4.1 Oxford Science Park

Ian MacPherson, Business Development Manager for the Oxford Science Park, made a detailed presentation about how the Park developed over the years and operates today. In the mid-1980s, Magdalen College, which owned a large parcel of land in southeast Oxford, began to look for a partner to develop a science park. In 1988, Magdalen formed a 50/50 joint venture partnership with Prudential which had land management experience and financing for the project. The first building was completed in 1991 and it was agreed that for the initial 10 years of the life of the Park all revenues would be ploughed back into the Park's further development. Magdalen College and Prudential are currently about half-way into the overall development of the site. They hold an architect competition for each new building. Today they have over 40 companies located at the Park, employing approximately 1,000 people. There are no manufacturing or production facilities on site, companies can only manufacture to prototype. 30 square meters of space costs £1,093 per month all inclusive (phone line, utilities, reception secretary, etc.). The actual Science Park staff is small – they have 3 managers and 2 administrators. Mr. MacPherson gave an overview of their competitive advantages and why Oxfordshire, in general, is an attractive location for high-technology start-up companies. Unlike Oxford Innovation's centers, the Science Park does not provide mentoring or consulting services.

Ian MacPherson's presentation on the Oxford Science Park gave delegates another, more commercially oriented model for how they could structure their technopark management in the Closed Cities. Delegates particularly found the history of the site's development and its financial details of interest, but found it difficult to imagine how such an alliance between a Russian university or institute and a Russian private company could be forged.

3.4.2 Oxfordshire County Council

Delegates spent Thursday afternoon learning about the role of Oxfordshire's County government in supporting innovation from Martin Stott, Head of External Policy and Partnerships. Oxfordshire was primarily an agricultural region 30 years ago and has developed into a dynamic center for research and entrepreneurship. The vital ingredients that have combined to transform the region's economy have included institutions of higher education, public research and development laboratories, and individuals and organizations that have promoted technology innovation. The County Council has added

a supportive public policy framework to these ingredients, helping to make Oxfordshire a premier center in the UK for innovation and entrepreneurship. The Council's major success has been to reduce unemployment in the region from a high in 1993 of 21,000 people to just over 3,000 in January 2003. The Council employs 16,000 people, located in 1,000 outlets, and operates with a budget of £500,000 per year. There are 70 members of the Council and officials are elected every 4 years. The Council's Executive Body has 9 people. Mr. Stott explained the multiple ways the Council promotes innovation and high-technology commercialization in the region, including but not limited to: land use planning, transport/road/utilities infrastructure, public transport, advocacy role for Oxfordshire with the Federal government and provision of high-speed broadband connections in rural areas. He highlighted their primary challenges: limit growth of a two tiered economy, expand skills base by improving schools, address transportation challenges, reduce bureaucracy, and revitalize the rural economy.

Delegates heard the story of how the Oxfordshire County Council actively transformed the region's economy and it gave them hope that similar transformations could take place in the Closed Cities even under very different circumstances. What delegates took away from the County Council meeting more than anything was the important role regional and local government officials, and the policies they develop and implement, can play in promoting innovation. Delegates had a hard time understanding why there was not a direct correlation (and therefore increase) between the Council's operating budget and the increased wealth generated in the region as a direct result of the public innovation initiatives.

3.4.3 Oxfordshire Economic Partnership (OEP)

Jean Mitchell, Executive Director of OEP, made a presentation on the development of the Oxfordshire Economic Strategy (2001-2005). OEP was created in 1998 and was tasked by the County Council to develop a sustainable economic development strategy for the region. Funding for the strategy's development came from a small grant from the Southeast Regional Development Agency and in-kind contributions from partner organizations (such as printers). Over the 10 months it took to draft the strategy, OEP became a focal point for input from public and private institutions throughout the area and helped to build consensus. The strategy deals with three main issues: competitiveness and innovation, sustainable development and social inclusion. Within these issues it identifies seventeen objectives. Its aims are to:

- Improve the competitiveness of the Oxfordshire economy to achieve a gross domestic product (GDP) per capita that ranks among the top ten sub-regions in Europe
- Achieve growth in productivity, whilst sustaining the county's environmental assets
- Fulfill the employment potential of all the citizens in Oxfordshire by increasing participation in the labor market and matching skills to job opportunities

OEP has also supported the Council in the establishment of enterprise hubs, helping convince people that they can achieve more in partnership than by working independently.

Russian delegation members sometimes dismiss ideas as impractical because funding is not available in the Closed Cities for certain initiatives. However, during Dr. Mitchell's presentation, they heard first hand how a regional economic strategy was developed, and consensus built amongst private and public stakeholders, on a very lean budget. The statistics given during the afternoon made it clear to delegates that the strategy's implementation was having a positive impact on the regional economy.

3.5 Friday, March 28

3.5.1 Department of Trade and Industry (DTI) – Innovation

Juan Matthews, International Technology Promoter for Russia, started the Study Tour's final morning by giving an overview of the role of the UK Federal government in promoting innovation and scientific commercial interactions. He is one of 16 technology promoters within DTI that actively looks for technologies to help British industry operate more efficiently and effectively. Besides the United States, Great Britain has the second highest volume of technology exports in the world at \$15 billion per year. Dr. Matthews highlighted the problem that British industry faces because it is not as productive as its main competitors and that this discrepancy is being addressed in the following ways by the national government: increase use of high-technology, increase investment, promote best practices in industry, improve skills set of labor force and reform laws to encourage innovation. The current national budget to stimulate innovation is £400 million and that amount is expected to double over the next two years. He reviewed the sixteen mechanisms put in place by the national government to promote the development of high-technology start-up companies, including the SMART and LINK programmes and the Central Enterprise Fund. Within the context of CNCP, he will be working with UK team members to identify potential links with UK industrial partners, and he is also available to work directly with representatives from the Closed Cities if they have a specific technology they would like help developing with a UK partner and help in identifying potential partners.

3.5.2 Southeast England Development Agency (SEEDA)

Sarah Lamy, Performance Manager within the Innovation Team at SEEDA, reviewed the policies and instruments being put in place by the regional government to support innovation. Her presentation gave very practical information about exactly how the regional government executes its innovation strategy with the goal of "establishing a seamless system for developing sustainable young companies". SEEDA saw that while the private sector was providing physical workspace for start-up companies in the region, it was not providing intensive business support and it was determined that this type of support was vital to the healthy development of new high-technology companies. SEEDA has been tasked to create 20 enterprise hubs (physical) and 20 enterprise

networks (virtual) by the year 2007. The key elements of SEEDA's innovation support at its enterprise hubs include: business champions (recognized leaders in business who have successfully navigated the full innovation cycle), flexible workspace (rent space by hour, day, week, month), access to financing, business to business mentoring and networking, access to research facilities, business services support, training, and retention of hub directors who coordinate all hub activities. SEEDA operates what they term as hatcheries, as well as innovation centers, within the enterprise hubs; the idea being that companies that hatch on a site will move into more permanent space within the site's innovation center. Each hub receives a maximum of £250,000 over three years to support its initial creation and development. After three years a hub must become self-sustaining. Hub directors meet on a quarterly basis to share best practice and to contribute to regional policy making. Their typical hub has up to 20,000 square feet of space. Ms. Lamy outlined a pilot project they are considering launching that would offer a turn-key package for space and business support services over a 36 month period for £52,740 and gave the details of exactly what services would be included. She also mentioned that a new VC organization had been established for the region with SEEDA's help.

Some key statistics she highlighted:

- Of the 3.7 million businesses in the UK, 99% have less than 50 employees
- Small business provides 45% of employment in the region
- The southeast of England is the largest contributor to the exchequer in the UK
- SEEDA estimates that 150 companies are being incubated and 750 are receiving support annually (companies operating in any science park in the region can access SEEDA's hub and network support services)
- It is estimated that each new company established over a three year period leads to four new jobs being created in the region

Delegates were very eager to learn more about the different types of support for start-up companies offered by SEEDA. It was clear they would like to be able to develop similar enterprise hubs and networks but that the public funds used by SEEDA to 'prime the pump' were simply not available in Russia.

3.6 Cultural Activities

During the week, delegation members had several opportunities to learn more about the city of Oxford and the University. They took a Guide Friday bus tour of Oxford which highlighted the main tourist sites of interest and gave a good overview of the city's history. On Tuesday evening, they were invited to join Christopher Watson at his home for dinner. On Wednesday evening, they attended a dinner at Magdalen College arranged by David Vincent, an alumnus, and had a walking tour around the College's grounds. The cultural high point of the visit took place on Thursday afternoon when delegates were given a private tour of the President's Lodgings and the Cathedral at Magdalen College by the President, Anthony Smith. He recounted some key moments in the College's history and told some of the stories behind the beautiful furnishings, including a tapestry that belonged to Catherine of Aragon. He took the Russian delegation into the private library and showed them a number of its most treasured artifacts, including the

oldest known book in the world written in the hand of its author from the 12th century. Dr. Smith provided the group with a rare and special glimpse into the inner world of an Oxford University college.

4. Media Interaction

Vladimir Starosotnikov, in his capacity as head of the Russian delegation from Minatom, was interviewed by The Oxford Times on Tuesday, March 25th. A picture of the delegation was taken by the newspaper at the Begbroke Science Park on Wednesday, March 26th. The article is to appear in the monthly magazine supplement distributed with the newspaper on April 4, 2003.

BBC Radio Oxford and Six TV were contacted and expressed initial interest in the visit. However, due to sensitivities surrounding the international political situation, it was decided, in conjunction with Neil Burrows in DTI's Press Office, that we would not pursue interviews at those two media outlets.

5. Summary of Delegate Feedback

Delegates reported that they were generally pleased with the results of the Study Tour. They found the meetings informative and useful and thought the Tour was well organized. During the out-briefing on Friday, each delegate highlighted specifically what he learned from the visit and how that related to the personal objectives he set forth at the beginning of the trip. Most delegates thought it would be useful to hold a Study Tour follow-up meeting in three to four months. This would give them time to digest all the information they received, formulate some concrete ideas about how best to follow-up, and identify where they might like further interactions with selected Study Tour meeting hosts. Appendix 6 contains a summary of delegate comments from the wrap-up session. Appendix 7 contains more formal delegate comments collected from post-study tour feedback forms.

There was general consensus that the visit to Harwell was one of their most productive days. However, they noted that Harwell was primarily a civilian nuclear research and development facility, while the Closed Cities are primarily working in the military nuclear sector. They would like to have visited, or met with, representatives from a military site that was going through the downsizing process. There was also a general perception amongst delegates that while Harwell's scientists faced many of the same issues scientists are facing in Russia today, that Russian scientists face a greater challenge because of their many years under a Communist regime. It was a widely held view that Russian scientists have a more difficult psychological and emotional transition to make than their UK counterparts.

6. Lessons Learned and Recommendations for Future Study Tours

Several lessons learned centered around logistical issues. In the future, we would generally allow delegates to have evenings free, with perhaps one organized evening meal during the week. If group members are unable to arrive mid-day on the Sunday before official meetings begin, we would give them time on the first or second day of a visit to do some sightseeing in the area.

In spite of sending some background information on each of the Closed Cities to meeting hosts and the summary of CNCP, many of our hosts did not have a good understanding of the scale of the downsizing faced in Russia's Closed Nuclear Cities. In advance of the next study tour, we will consider hosting a briefing with meeting hosts to provide more in-depth background information on the Closed Cities and to highlight some of the unique challenges they face. Such a briefing would allow us to work with meeting hosts to develop the most relevant presentations possible for delegates. Note however, that since such a meeting would require more of the speakers' own free time, it may prove difficult to arrange.

While the Russian briefing books contained information on each meeting host, in the future we will consider reviewing each organization, and highlighting its relevance within the overall rationale for the week, prior to each meeting to ensure understanding. On some occasions, there seemed to be a lack of appreciation by Russian participants regarding the seniority of the meeting hosts and the mission of the organizations.

In terms of concrete follow-up from the Study Tour, we will be pursuing the following developments:

- Lithium ion battery electrolyte (useful market information was provided to Krupin from Seversk by AEA Technology Battery Systems, which can form the basis of more detailed market investigations)
- Nanopowders (Krupin from Seversk talked briefly with Oxonica)
- Magnets (Seversk might be able to link up with Oxford Instruments)
- Robotics (Snezhisnk might be able to link up with Armstrong Healthcare from the OION meeting)
- There is a possibility that one of the organizations that run investor networks (such as OION or OTVCT) might be able to help CNCP identify business angels willing to work in Russia
- Closed City administrators heard many concrete examples about ways to stimulate the development of high-tech startups. We believe additional follow-up may be needed to help these administrators adapt some of the information they learned and formulate concrete ideas for implementation in the Closed Cities.
- The Innovation Tool Kits and Guides outlined by Oxford Innovation may be able to be adapted for scientists and entrepreneurs in the Closed Cities.
- Several delegates were interested in the KREO Network, which might serve as a model for developing a link between innovation centers/technoparks in the Closed Cities and Oblasts.

- Several of the key elements SEEDA has developed to promote innovation in its enterprise hubs and networks have applicability in Russia. We will be talking with SEEDA about how some of their services might be adapted for the Closed Cities and identifying potential sources of funding to support such activities.
- The annual Venturefest Oxford meeting could potentially be replicated in regions where Russia's Closed Cities are located. Start-up high technology companies from the Closed Cities may also be interested in participating in Venturefest and renting exhibition space.