EIGHTH QUARTERLY REPORT
AND YEAR 2 ANNUAL REPORT

Grant #CCN-0012-G-00-4111

Uniting Science and Education and the Transfer of Technology for Sustainable Economic Development and Environmental Protection in South-Central European Russia

Submitted by
Washington State University
for
The Russian-US Science, Education and Economic Development Consortium

Table of Contents

EXECUTIVE SUMMARY

OUTPUT A: ORGANIZATION, ADMINISTRATION AND MANAGEMENT

- Planning for the incorporation of new Consortium members, Texas A&M and the University of Tennessee completed; inaugural meeting held, expertise identified and structure defined.

- The expansion of library capabilities were enhanced. US training for Pushchino librarians were completed. Equipment and learning materials have been procured.

- The Friends and Partners Network is expanding capabilities to include Consortium related activities. The potential to provide scientific information and increased grant sources is under discussion. The leveraging of funds through other organizations continues to be utilized.

- Infrastructure, office space and personnel issues for the OGRD have been completed. Seminars on grant proposal writing lead to the training of over 70 scientists and the reward of four CRDF grants for Pushchino researchers.

- In cooperation with the ISF all earmarked equipment and supplies, computers, chemicals, software, teaching materials, for Year 2 have been ordered and received in-country.

- Support Offices at WSU, UC and Pushchino continue to be fully operational. Support has been provided in administration, planning, procurement, consultancies and budgeting.

- Communications activities have lead to increased Internet and telephone availability. The private company STACK has increased its capacity to provide high technology access to Pushchino institutes and continues to leverage funds from non-grant sources.

- The goals, objectives and activities of the Information Office have been defined. Journal articles, brochures, media assistance and Internet presence has increased the visibility Pushchino activities.

OUTPUT B: EDUCATION AND TRAINING PERFORMANCE AND CAPACITY

- The Continuing Education Unit has established significant relationships with Russian institutional stakeholders. Continuing education methodologies have been approved by the Russian government.

- Economics capacity was enhanced through in-country economics course which has lead to sustainable economics curriculum development in Pushchino.

- The Joint Master's Degree Program has begun to look at implementation mechanisms and

funding potential through collaboration with the OGRD. Collaboration with ESU has resulted.

- Faculty from the PSU Department of Foreign Languages received US training in teaching methodologies. The impact of audio/video learning technology has increased awareness and interest in language skills.

OUTPUT C: GENERATION OF ENVIRONMENTAL TECHNOLOGIES

- Field testing on the bioremediation of contaminated sites have been successfully conducted. A business plan to market the technology and identify private firms continues with the Technopark group.

- Pseudomonas 2-79, biocontrol of wheat diseases, is proven to be effective in neutralizing wheat diseases. Successful Russian and US collaborative research continues in this area.

- Research into biosensor methods for environmental pesticide control continues to be successful. Kits, which enable field usage by farmers, have been developed and commercial application is being discussed with Technopark group.

- Over 1000 bacterial strains were examined for ice nucleating properties. Forty-five strains were identified. Results indicate that these strains can protect plants from frost damage. Findings will be presented at a national conference in October.

- Environmental Policy and Planning data collection continues. Significant contacts with potential Russian stakeholders have been established. A regional environmental conference will be held this Spring, which will serve to highlight the Pushchino Environmental capacities to stakeholders.

OUTPUT D: SUSTAINABLE AGRICULTURE AND A MARKET-BASED FOOD SYSTEM

- New biopesticides for the control of cucumber and tomato diseases have been developed. These technologies were adopted by greenhouses throughout Russia. Agreements between IBPM and Plant Protection Stations in Russia have been signed to expand use on a commercial basis.

- The Plant Health group successfully completed studies on the integrative protection of wheat, apple and vineyards with PPS in Krasnodar. As a result, this method has been recommended in a leading government agricultural journal.

- A proposal for the development of a potato seed pilot center has been submitted to the European Bank for Reconstruction and Development (EBRD). A business plan was developed which analyzes the profitability of a potato seed certification laboratory network.

The Russian Minister of Agriculture designated the Technology Transfer and Training Unit (TTTU) group to strengthen the federal seed certification program.

OUTPUT E: COMMERCIALIZATION OF TECHNOLOGIES

- A hepatitis diagnostic kit was developed in collaboration with *Your, Ltd.* and IBPM.

- Field tests of Pseudobacterin-2 were completed. The grape harvest utilizing standard treatment methods yielded 10.2 tons per hectare, while the P-2 treatment yielded 11.6 tons per hectare.

- A licensing agreement to produce biopreparations for plant protection from fungal diseases was reached with the private firm *Ecoservis.*

- A contractual agreement to provide technical expertise and products for the bioremediation of oil contaminants was reached with *LUKoil-Urayneftegas.* The Technopark is expected to receive income from this activity early next year.

- The Technopark received permission from State authorities to conduct large scale field trials of Pseudobacterin-2 and begin distribution to several agricultural firms. The Technopark is expected to receive income from this activity during the Summer of next year.

EIGHT QUARTERLY REPORT AND YEAR 2 ANNUAL REPORT

Grant #CCN-0012-G-00-4111

Uniting Science and Education and the Transfer of Technology for Sustainable Economic Development and Environmental Protection of South-Central European Russia

Introduction

Grant #CCN-0012-G-00-4111 is being implemented by the Russia-US Science, Education and Economic Development Consortium. US members include Washington State University, as the prime contractor, and the Division of Agriculture and Natural Resources of the University of California System (Berkeley, Davis and Riverside). Russian members are the Pushchino Biological Research Center, Pushchino State University (PSU) and the Higher Agro-Biotechnological College. Collectively, the term "Pushchino Alliance" will be used to describe the Russian member institutions who are participating in the grant activities.

Year 2 of the grant ended on September 30, 1996. The purpose of this report is to illustrate how Year 2 grant activities have built upon the work conducted during Year 1 and describe how those activities have impacted the overall purpose of the project.

During Year 2 of grant implementation several key sectors were emphasized which deal directly with the issue of self-sustainability for Pushchino and the surrounding region. These areas include:

- **Private Sector Development and Support**; the involvement of US firms, technology transfer and commercialization
- **Continuing Education**; addressing educational needs and opportunities in high priority areas such as economics, environmental technologies and environmental protection.
- **Mutual beneficial** collaboration between scientists from the US and Russia;
- Focusing strategic decisions on a **new model** of science and education serving Russian society;
- Enhancing the **planning, management and administration capabilities** of the Pushchino Alliance;
- **The development of PSU** to provide education relevant to economic development and the Russian market economy;

The monitoring and evaluation plan of subprojects (activities) related to the above areas of emphasis

for Year 2 is outlined in the Year 2 Work Plan.This activity was completed in August, 1996 in Pushchino by the Principal Investigator, Dr. James Henson, Dr. Jan Noel, Dr. Alex Boronin, Dr. Vasilly Akimenko and other US and Russian personnel involved with various levels of planning and management. This monitoring and evaluation visit served as a basis on which project management will evaluate, plan and implement grant activities during the 9 month no-cost extension period (see forthcoming Grant Extension Work Plan).

Purpose

The purpose of the *Pushchino Project* is to further develop and enhance the capacity and performance of the Pushchino Alliance and its member organizations in collaboration with US partners in science, education and the transfer of technology to support sustainable economic development and environmental protection of South-Central European Russia.

The project focuses on five output areas which include:

A. Enhancing organization, planning, evaluation and performance of the Pushchino Alliance to ensure that the purpose of the project is achieved.

B. Further strengthening of educational performance and capacity in environmental science, sustainable agriculture and related topics.

C. The development and strengthening of information systems and environmental technologies in high priority areas related to sustainable agriculture and a market based food system in the region.

D. The continued development of the relationship between agriculture and market based food systems in the region.

E. The development of a Technopark for the commercialization of technologies which facilitate and support the establishment of private sector enterprises.

Year 2 grant activities have made significant impact in all five output areas and these activities are continuing to focus upon previous accomplishments. Specific accomplishments which have lead to broad impact during Year 2 are described in the following report.

OUTPUT A: ORGANIZATION, ADMINISTRATION AND MANAGEMENT

This Output utilizes the organization, management and operations capacity and performance of the Pushchino Alliance, WSU Support Office, UC Support Office and the Consortium, working in collaboration in order to support programs and grant activities. It is also the focus of planning, administration and management performance improvement necessary for institutional and human

resource development.

Consortium Expansion

- During Year 2 progress has been made towards the enlargement of the U.S. - Russia Science, Education and Economic Development Consortium. Through on-going discussions with officials from the University of Tennessee and Texas A&M University regarding potential impact and benefits to the project and other areas, an initial meeting was held in September, 1996. The agenda focused primarily upon the structure of the Consortium (see Appendix II) and the programmatic contributions each institution can contribute to grant related activities. As a result of the September meeting, The University of Tennessee and Texas A&M University have joined the Consortium, adding expertise and experience to grant activities related to bioremediation, biochemistry, communications technology and environmental decision making.

  The enlarged consortium membership will strengthen grant activities during the extension period by providing additional expertise in the above mentioned areas and by leveraging grant funds through other resources. Specific activities which will involve new consortium members during the Extension period include the development of a consortium World Wide Web site, collaborative research efforts in bioremediation other applicable environmental technologies and expertise and resources related to environmental decision making.

Library

- The purpose of the library subproject during Year 2 and the extension period is to improve the information service provided by the PSU and Central Pushchino Library for educational and research purposes. In the environmental sciences, agriculture and other related fields it is essential that researchers and instructors are able to have access to up-to-date, world wide information. The exchange of scientific information, both in Russia and abroad, is a necessary pre-condition for Pushchino researchers to take an active part in international collaborative research and to be competitive for research grants and other opportunities.

- During the year both libraries were expanded to include reference, bibliography and patent departments to support education and economic development activities. Since September 1995, use of these expanded and existing facilities by PSU students increased by 30% and circulation of library holdings went up 20%.

- The holdings of the libraries have been inventoried and a needs assessment was conducted by PSU Vice-Chancellor Lev Kalakutksy to determine the selection of new acquisitions. WSU Project Consultant, Donna McCool, who is Assistant Administrator of the WSU Libraries, assisted in identifying and procuring new learning materials for the library, including encyclopedias, books and CD-Rom databases. Through the purchase of CD-Rom towers, these scientific databases will be networked from the library to the scientific institutes and

university, enabling researchers and educators to have access to the latest scientific information.

- As part of the overall effort to orient the emerging library program towards electronic information and modern library techniques, two Pushchino librarians received training in the US at the WSU libraries in Pullman. There, they were exposed to the basic function and structure of specialized libraries, engineering, veterinary medicine, health sciences, as well as the benefits to on-line catalogs, Internet learning and networked CD-Rom databases. In large part due to the continuing collaborative efforts of Ms. McCool, cooperation between WSU and Pushchino libraries has strengthened in information exchange, needs assessment (technology and equipment) and human resource development.

- During the extension period the activities of the Libraries will focus on the following areas:

  -Provide greater access to scientific databases on CD-ROMS.
  -Institute mechanisms to receive copies of foreign journals form US libraries located at WSU and the UCB.
  -Organize seminars for graduate students and faculty to provide training in methods of information technology and library structure.
  -Institute an automated search systems in both libraries by creating electronic catalogues.
  -Organizing an exhibition of literature related to science and environmental decision making.

Friends and Partners

- The University of Tennessee's Center for Networking Initiatives has continued to build upon previous collaboration with the Office of Grants and Research Development in Pushchino and the Consortium through the Friends and Partners Network. Established through the collaborative effort of UT's Greg Cole, the Center's Director, and Natasha Bulashova, Director of Pushchino's grants office, F&P continues to provide information about Russian and American history, culture, travel, language and current events. Yet through discussions held during Year 2, and particularly during the last quarter, between Mr. Cole and US Project Coordinator, Mr. Raja Rao, F&P will begin to look at ways to provide current scientific information on the F&P network. Under review now are activities which will enable the F&P Network to assist grant activities related to information through the Internet.

- Currently, the F&P Network's *Funding Opportunities Database* is one of several resources utilized by the OGRD to identify potential funding sources relating to the Newly Independent States (NIS). A combined information and grant source will enable Pushchino researchers to locate and prepare grant proposals. As a result of these discussions and preliminary agreements during Year 2, the Extension period will witness the leveraging of grant funds through UT resources to meet the F&P objective. Moreover, is it expected that there will be additional leveraging of funds regarding information and networking in Pushchino through

F&P's various public and private funding streams.

Office of Grants and Research Development (OGRD)

- The purpose of the OGRD is to provide information and support services for seven research institutes and for the Pushchino State University. The information support function includes two primary functions: 1) training assistance in writing proposals, preparing budgets and providing regular instruction on the use of information systems utilized by the grants office; 2) utilizing the Internet and other information technology to prepare and disseminate regular communication about research opportunities, governmental policy affecting research opportunities and international collaboration the office is made aware of. Utilizing these two approaches, the OGRD will is able to benefit the entire Pushchino research community by providing access to global information, i.e., grant opportunities, and serve as the focal point to train staff in order to successfully prepare research proposals.

- During Year 2 the infrastructure of the OGRD was established. Staff was hired and trained, office procedures were created and the communication and computer infrastructure was established. After these functions were established, the OGRD, in cooperation with WSU consultant James Wills, held a series of seminars regarding techniques for grant writing and submission. The office sent 40 pre-proposals to various funding agencies and over 30 full proposals to the Civilian Research and Development Foundation (CRDF), Proctor and Gamble and several other government and non-government agencies.

- As a result of the infrastructure development efforts, the information capability and the training provided by US consultants, the OGRD was able to facilitate four successful grant awards to Pushchino researchers through the CRDF. Working with US collaborators, these awards vary in range from between $10,000 - $80,000 and 80 percent of funds must be expended in-country. This is a good illustration of how specific infrastructure and training activities conducted during Year 2 have lead to sustainable impact in the last quarter.

Equipment

- During Year 2 project procurement efforts have resulted in the successful acquisition and transportation of all earmarked grant equipment and supplies to Pushchino. The International Science Foundation (ISF) has continued during Year 2 to assist grant implementation by providing shipping and customs assistance in Russia and the US. Over the past year The WSU Support Office has been working closely with ISF to ship audio/video teaching equipment, slide projectors, books, reference materials, computers (including spare parts, supplies and software), informational databases stored on CD-ROMs, and assorted chemicals for environmental research activities. The efforts of the ISF have greatly reduced the time and resources normally necessary to transport and approve equipment going in to the Russian Federation and is a positive illustration of how project administration is working with other organizations to reduce costs associated with specific activities.

Support Offices

- During Year 2 the Pushchino Support Office has continued to remain fully operational by providing support to US offices and, in particular, assisting in providing in-country administrative and monitoring functions. The office is effectively carrying out its responsibilities to support the purpose and outputs of the grant. Ms. Kathy Gelhar, In-Country Coordinator, and her Russian staff have provided support to visiting US consultants and trainers; managed accounts; prepared reports; and handled logistics and travel arrangements.

- The US Support Office, located at WSU, continued to provide support in budgets, purchasing, personnel, travel logistics and administration in support of grant activities. In addition, the Support Office provided orientation for consultants conducting grant activities in Pushchino and facilitated interaction between Pushchino and US researchers. Principal Investigator, Dr. James Henson, and US Project Coordinator, Mr. Raja Rao, provided planning, management and operational functions during Year 2.

- The University of California Support Office, located in Berkeley, is headed by the Co-Principal Investigator, Dr. Milt Schroth. The UCB Support Staff, along with Dr. Seymour Van Gundy, UC/Riverside, assisted in communication, personnel and progrmmatic support of grant activities. Dr. Schroth and others have also identified and facilitated the programs of several expert consultant and trainers (see Appendix III).

Communications

- The purpose of the Communications subproject is to improve the existing communication resources in Pushchino by effectively including modern information technologies which will dramatically increase the capacity of the Pushchino Alliance to utilize telecommunications and information networking. During Year 2 the following results were achieved.

- Since November, 1995 the communications group has been working on a major project to expand the communications capabilities available in Pushchino through the installation of a radio relay line for both Internet access and expanded telephone capacity. Through the coordinated support of the Russian Foundation for Fundamental Research ($62,000), Stack, Ltd. ($20,000), Moscow Cellular Communications and the Serpukhov Telephone Company (these entities are defraying significant capital costs), the project is currently in the final stages of implementation. During the last quarter the radio relay line was tested in preparation for connecting the channels. Equipment necessary for the operation of the relay was acquired with additional support from a NATO networking grant, as well as support from IBPM and Stack, Ltd.

- An agreement was reached with the Russian Internet providers Relcom and RELARN which

will allow traffic from Pushchino research and educational institutions to use the additional international Internet channel once the radio relay line is fully complete. The agreement translates into a savings in communication costs to Pushchino institutes of at least $2,000 per month at current use rates. Potentially, this savings could mean as much as a $9,000 per month savings to Pushchino institutes at the anticipated future level of use once the new line becomes operational.

- Based on the realized and potential impact of the communications activity a detailed plan of the structure of a non-profit non-governmental organization was developed. Pertinent legal issues were explored and draft charter was developed. Equally important, an agreement was reached between Pushchino institutes to create a technical council to develop a unified technical policy for the operation and development of the Pushchino information network. The Council is the first stage of the development of an organized, unified and sustainable communications infrastructure in Pushchino.

- During the next reporting period the communications group will: focus on the completion of the Moscow-Pushchino radio relay channel; continue the search to identify additional funding for infrastructure development; provide technical support for the development of a US-Russia Consortium WWW site; and hold consultations with US telecommunications consultants in order to develop business strategies.

Information Office

- The purpose of the Information Office is to create a system for the collection, presentation and delivery of information to ensure awareness of and support for key project-related areas of activity of the Pushchino Alliance. During Year 1 the Information Office had been functioning minimally and not providing anticipated information needed by Russian, US and international organizations with interests in Pushchino. Thus, enhancing the capabilities of the Information Office was identified as a priority in Year 2.

- A working group was formed to define the purpose and goals of the Information Office subproject and develop an initial work plan. Representatives of project administration, other subproject leaders from IBPM and PSU and the principle investigator from the Information Office were assembled in order to ensure that the Information Office would reflect the interests and needs of the Project. Based on the recommendations of the working group, office space was acquired, equipment was purchased, Internet connections were made and qualified staff were identified.

- After the initial infrastructure needs were met, the office was able to conduct activities pertaining to outputs. These include:

  -the consolidation and organization of existing Project information, including journal articles and brochures, into files, databases and reports;

-preliminary work done on the establishment of a Consortium WWW site;
-The preparation of new written materials associated with Pushchino Alliance institutions and specific subproject activities for dissemination to outside organizations, including bioremediation, biological control and Environmental Policy efforts;

- Using information on the above project activities, The Information Office participated in the regional exhibition "Nature Around Man" at the Serpukhov Exhibition Hall. As a result of this activity, the Russian company *Uspekh*, specializing in technology transfer, contacted the Technopark regarding potentials for collaboration. In addition, the ecological division of *Radio 1 Ostankino* contacted the Information Office for assistance in identifying individuals in Pushchino for radio interviews about their project related activities.

- The Information Office is now a functioning structure. Through its internal relationship with subproject members and its external contacts with an array of third party interests, the Information Office has established key flows of information which has allowed it to represent the goals and activities of the Project and the Consortium to outside organizations. The capabilities the Information Office has developed have become a valued resource for both Project participants and the consumers of Project related information.

- Activities to be conducted next quarter and throughout the Extension period include:

  -The development of mechanisms for the *rapid* dissemination of information to outside stakeholders, including brochures, press releases and short "fliers" in Russian and English.
  -Providing increased media related support for on-going Project activities and exhibitions.
  -The completion of the Consortium WWW site with the capabilities to regularly update information.

OUTPUT B: TRAINING PERFORMANCE AND CAPACITY

This Output focuses on the training performance and capacity emphasizing environmental science, sustainable agriculture and related topics to enhance formal, non-formal and continuing educational programs of PSU and the provision of training.

Environmental Science Continuing Education System at PSU

- The purpose of this subproject is to further develop and strengthen the training performance and capacity in environmental science for various levels of constituents, including high school students, teachers, university faculty and administrators, by establishing and maintaining the operation of an environmental science continuing education center.

- During Year 2 one of the major objectives of this subproject was the establishment of a continuing education center. The activities related to this output included the development

of concepts, the identification of target audiences and program areas and the identification and procurement of space and infrastructure to house these activities. These objectives were met during the third quarter of this reporting period. Having met these objectives, activities during this last quarter have focused on the development of programs and client bases which will ensure the financial sustainability of the activity. This has been accomplished in part by the development and maintenance of significant relationships with institutional stake-holders such as Russian Ministry of Education, the Moscow Regional Institute for Continuing Education and Serpukhov District Committee on Education. In addition, the Continuing Education Unit (CEU) has developed a new model of teaching methodologies for Russia which includes a combination of theoretical, practical and extensive field training which is popular with students, but more importantly, has been approved by the Russian Ministry of Education.

- Other activities this quarter included:

  -the successful organization of college preparatory courses for high school students.
  -the development of modular courses in fruit and vegetable growing for area farmers and residents.
  -Information was circulated regarding the activities of the CEU in preparation for the Conference on Environmental Education to be held in St. Petersburg in November, 1997.
  -Two workshops were held with faculty from Moscow State University dealing with collaborative continuing education activities.

- During the grant extension period the CEU will be focusing on drafting proposals to be submitted to the Russian Federation of Cities to secure support for regional educational programs in the environmental sciences and continue its outreach efforts with high school students and district residents.

Enhanced Educational Capabilities in Selected Disciplines

- Dr. Bruce McWilliams, a post-doctoral instructor in economics from the University of California, Berkeley, completed an in-country economics course in Pushchino on August 15. Resident in Pushchino for 4 months, Dr. McWilliams strengthened the economics teaching capabilities in Pushchino for the future, while simultaneously training PSU students, faculty and other professionals in macro and micro economic principals and specific subject areas related to agriculture and environmental policy. A total of 25 PSU Msc students were trained. While the enthusiasm for the course was impressive, the significance of its lasting impact is greater. The material that Dr. McWilliams utilized during his course is being replicated by PSU faculty as an on-going course and as part of a broader economics curriculum. As Pushchino and Russian society in general strengthen economics capabilities, Dr. McWilliams' course is a good example of education creating a sustainable impact.

Joint Masters Degree in Environmental Sciences

- The primary focus of the subproject on the Joint Masters Degree has been to explore the opportunities for the establishment of a joint MS program in the environmental sciences between WSU, UC and PSU. Issues related to the regulation and funding of these types of collaborative activities by the Ministry of Higher Education were explored during Year 2 and model programs already in existence in the US were studied. Similar and different conceptions and applications of joint programs in the US and Russia were identified through a US training visit of Dr. K. Sidorova, subproject leader. Potential mechanisms for the implementation of a program were identified and are reflected in the draft Cooperative Agreement on Joint Master's Degree Programs within the framework of the US-Russia SEED Consortium. The draft agreement, approved during the last quarter, makes provisions for long term collaboration between the universities, as well as for direct contacts between collaborating departments within the College of Sciences of each institution. Steps were identified to locate potential funding sources for Russian students studying in the US. The subproject group is working with the OGRD to locate additional opportunities.

- The activities related to the Joint Degree Subproject has resulted in new initiatives between PSU and Far Eastern State University (FESU) in Vladivostock. A proposal on collaborative programs between these universities has been drafted. Presently, PSU and FESU will work together to develop contacts with other universities in the West and in Russia to further joint exchanges in the biological and environmental sciences.

Development of Programs and Methodologies for Teaching English as a Second Language to Master's students at Pushchino State University

- The purpose and objective of this subproject is to develop programs and utilize modern methodologies for teaching English as a second language to Master's students and faculty at PSU. This subproject aims to develop a clear and concise curriculum with testable performance objectives for each level of study as well as to master new educational methodologies to enhance teaching capabilities.

- During Year 2 a major focus of the English subproject has been to develop a program and methodologies which will enable the staff of the Department of Foreign Languages to meet individual student needs, according to their level of abilities. Activities conducted by the PSU faculty this year, which have contributed to this goal, include: US training at WSU and UC/Riverside IALC units; the application of the TESOL methodology by PSU staff; and the acquisition of audio and video learning technology which allows for accelerated and individual learning. The familiarity achieved with the curricula used at the IALC at WSU and UC/Riverside has led to a new conception of the curriculum with the establishment of clear cut objectives in teaching all aspects of the English language, with a more precise grammatical overlay from semester to semester.

- The impact of audio and video technology in the language acquisition process has been profound. The English language teaching capability at Pushchino has been pioneering in its

efforts to blend cutting edge technology with current teaching methodologies. Utilizing the newly acquired equipment during this reporting period, PSU staff will be able to develop video-based packs of materials to teach basic and business English on an individual basis. As a result of these innovations, the potential for offering additional English courses to the Russian business community has been enhanced. During the Extension period the Department of Foreign Languages and the Continuing Education Unit will build upon their existing agreement to organize business English courses and market this capability to attract potential clients.

OUTPUT C: GENERATION OF ENVIRONMENTAL TECHNOLOGIES

This Output utilizes the capabilities of the Pushchino Biological Research Center to develop high priority technologies that have potential application in solving or preventing environmental problems in Russia, the US and throughout the world. In this process, some of the extensive technical capabilities of the Center will be reoriented and focused on the prevention and remediation of current and future environmental pollution and degradation problems.

Technology for the Bioremediation of Soils Contaminated by Oil and Oil Products (Black Oil)

- The purpose and objective of this subproject is to develop technologies for the bioremediation of soil polluted with oil and its products based both on activation of local flora and the application of scientifically constructed biopreparations.

- During this reporting year experiments were carried out using bioremediation products in fields contaminated with black oil and diesel fuel. The duration of the experiments was two months, with follow-up testing done towards the end of this reporting period. In both instances the contaminated sites were treated twice with the biopreparations, once at the beginning of the experiment and one month later. The analysis performed at the end of each session showed that the treatment of diesel fuel contaminated sites with biopreparation significantly reduced the content of pollutants compared to the control site. Enforcing their findings, these field trials were conducted in areas with differing climates and landscape, yet yielded similar results.

- During the last quarter of the year subproject members classified the important strains into a database. A technology for the process of cultivating these strains in pilot fermentations was developed. And the resulting microbial strains were used for actual (applied) bioremediation of oil-contaminated sites in Western Siberia.

- During the Grant Extension period subproject members will be working closely with members of the Technopark to market this technology within the Russian industrial sector (see output E: Commercialization of Technology).

Biocontrol of Diseases in Wheat

- The objective of this subproject is to develop new, non-pesticide, environmentally friendly biological control methods for the control of diseases of wheat and barley. One of these target diseases is *take-all*, a significant problem in both the US and Russia. There are presently no satisfactory seed treatments against this disease, no resistant cultivars and current farming practices have aggravated the problem to the extend that many fields in Russia now yield only about half their potential. Increasing recognition of the undesirable effects of chemical pesticides, both in the U.S. and Russia, necessitates the development of alternative ways to control soil borne diseases, including *take-all.*

- Working in close collaboration with Dr. Linda Thomashow, at WSU's USDA Root Disease and Biological Control Research Unit, this year researchers on both sides have demonstrated significant suppression of the *take-all* infection by focusing on the strain *Pseudomonas fluorescents* 2-79. During this reporting period researchers have built upon previous work by demonstrating that the strain is also effective when applied in the field. The 2-79, in fact, produces the antibiotic phenazine-1-carboxylate, which plays the major role in the suppression of *take-all.*

- By characterizing pathways by which these strains move, the joint research team has been able to create a model of the phenazine biosynthetic pathway, which is a significant breakthrough in the field. As a result of their findings, three research papers have been presented and are awaiting publication approval in the journals: *Applied and Environmental Microbiology* (English); *Molecular Biology* (Russian); and *Proceedings of the Russian Academy of Sciences* (Russian).

- During this reporting period the US team has been able to leverage a portion of funding through USDA and other resources to conduct these activities. Next quarter researchers will focus on submitting research proposals to other organizations in order to enhance their activities.

Development of Biosensor Methods for Environmental Pesticide Control

- The goal of this research is to elaborate on a highly sensitive and specific laboratory express-method for qualitative and quantitative determination of the herbicide 2.4-dichlorophenoxyacetic acid (2.4-D) and adopt its use for regional environmental control. The research is based on the use of enzymes and can determine the presence of pesticides as well as ions of heavy metals in the environment. This detection method can be converted into compact devices which can be used outside of the laboratory environment and in the field.

- Year 2 activities have been focused on the construction of a scale model of the biosensor analyzer for detection of organophosphorus pesticides and the herbicide 2.4-D. The biosensor analyzer was completed and water samples were collected from various sources in

the region for testing. The purpose of the testing was to determine the potential level of toxicity using the biosensor analyzer. The results were presented to agricultural producers in the Pushchino region at a seminar organized by local farmers and the municipal heating plant. These organizations expressed an interest in using the biosensor method for evaluation of the contents of pesticides and overall toxicity in real samples.

- During this quarter the cumulative results of the activities undertaken in this subproject were prepared into a proposal and submitted to the Technopark group for determination of the potential practical application of the biosensor. The field model developed as a result of the biosensor subproject is sufficiently simple in construction that it could easily be converted for commercial production. Equally important, it is also sufficiently simple in operation to allow agricultural workers with no special training to use it.

Bacterial Ice Nucleating Activity

- The objective of the bacterial ice nucleating subproject is to create biopreparations from ice nucleating bacteria for agriculture and environmental usage. If environmentally safe ice nucleating biopreparations can be produced, then they would have significant value in reducing plant and crop damage from snow and light frost.

- During Year 2 over 1000 bacterial strains were studied for ice nucleating properties. They were collected from several different geographic and climatic regions. As a result, 45 strains with ice nucleating activity were selected for further study. Two active strains, *Pseudomonas* 9 and 16 were closely examined and were found to freeze at below normal temperatures. Research conducted during the end of this reporting period concluded that there are at least 5 strains which suppress the growth of INA, or frost activity. The results obtained from this data analysis will be useful for the future development of biopreparations for plant protection from frost damage. These results will be presented at the Conference on the Protection of Plants in Posad, Russia on October 22-24.

Serpukhov Environmental Policy and Planning Research

- As mentioned in earlier reports, Russia is attempting to address the sustainable use of its natural resources as well as the risk posed by current levels of pollution and environmental degradation. A necessary requirement for success in understanding these problems is the formation of mutually beneficial partnerships between local, regional and national levels of government and the scientific community. To this end, the purpose of the Serpukhov Environmental Policy and Planning Research Subproject is to create an informational baseline for environmental monitoring and the development of balanced land-use planning policy at the regional level in the Serpukhov District. The basis of the monitoring efforts have focused on the capabilities of the Pushchino Alliance and US partners in analytical chemistry, geochemistry, forestry, agriculture, soil science, population biology and computer science.

- The system developed within this subproject over the past nine months represents a new tool for environmental policy and planning use in Russia. As a result, significant contacts have been established between Subproject leaders and the Serpukhov District Committee on Agriculture, the Serpukhov Ecological-Hygienic Service, The Russian Federation Forest Protection Service and a host of medical institutions throughout Russia with a concern for the human health component of the research.

- Within the framework of subproject outputs, data on the condition of natural resources, soil pollution levels, surface and ground water and human health were collected and presented to officials from the Serpukhov regional government. As a result of the data and the methods utilized to acquire it, a regional conference will be held in March of next year where subproject members will present a plan to conduct environmental monitoring and policy recommendations for the regional government. In addition, current data collection and assessment capabilities at Pushchino Center have allowed for the development of alternative strategies for the use of forest areas. For example, using GIS technology, research results from the analysis of the Prioksko-Terrasny State Forest Reserve (Serpukhov) has lead to a joint study of implementing new methods of forest management for forest lands in the Serpukhov District. Preliminary discussions regarding the possibility of the application of this work with the forest enterprise *Russki Les* and the Federal Forest Service were held in August and September.

- A highlight of activities to be conducted next quarter include:

  -continued collection and analysis of data on pollution levels in the region;
  -descriptions of the effects of excessive concentrations of certain pollutants on human health;
  -an analysis of the sources of pollutants from industry and agriculture in the region;
  -a report on possible remediative and preventative measures to reduce health and environmental risks;
  -a description of key public policy measures that could reduce environmental risk, if implemented;
  -the organization of two seminars to discuss preliminary monitoring results and data collection methods;

OUTPUT D: SUSTAINABLE AGRICULTURE AND A MARKET-BASED FOOD SYSTEM

This output focuses on enhancing agricultural productivity, sustainability and a market based food system.

Biopesticide Technologies for Greenhouse Pathogens

- The purpose of the subproject is to develop new biopesticide products for greenhouse use on the basis of plant growth promoting rhizobacteria (PGPR) Pseudomonas. Collaborating with the Technopark group, subproject leaders aim to produce environmentally friendly agrobiotechnologies for greenhouses and to develop a plan for the commercialization and field utilization of these technologies.

- During this reporting period new technologies for the biocontrol of diseases affecting greenhouse cucumbers and tomatoes have been developed. These technologies were tested, adopted and applied in greenhouses in Nizhnii Novgorod, Belaya Dacha and other sites in the Russian Federation. Initial results indicate that the biopesticides applied on the cucumber and tomato plants in the various greenhouses promote the increased yield of these crops. Equally important, however, is that the cost of the biopesticide created in Pushchino is not more than seven million rubles per hectare, compared to 32 million rubles per hectare using soil steaming technologies. As a result, several agreements between IBPM (Pushchino) and Plant Protection Stations in Stavropol, Krasnodar and Nizhnii Novgorod have been signed. These agreements call for large scale field trials of the biopreperation product to begin in these areas and will allow for the expanded use of these technologies to additional greenhouses on a commercial basis.

- Next quarter activities relating to further field testing and commercialization efforts will continue. It is anticipated that during 1997 new formulations of bipreparations based on new strains will be developed and field tested.

Plant Health Center

- The purpose of this subproject is to develop a functioning working group to form the basis of a plant health center which: 1) provides training and consulting on applied methods of pest diagnosis for producers; 2) facilitates the adoption of new biotechnology strategies and methods for the control of pests in laboratories and plant protection stations; 3) establishes a network of collaboration with leading specialists on plant protection in Russia.

- This quarter subproject team members completed field experiments on the integrative protection of wheat, apple trees and vineyards with the Institute of Biological Plant Protection in Krasnodar and provided technical assistance to new Plant Protection Stations, biofactories and biolaboratories, which are beginning to prepare large scale field trials of *Pseudomonas* inoculum developed in Pushchino. Based on the results of these experiments, the integrative biological protection of wheat , vineyards and apple trees (Pseudobacterinp-2) has been recommended in the Journal of the Department of Agriculture and Food Production of the Administration of Krasnodar Krai.

- Subproject members are making significant progress in both organizational and scientific areas. New contacts made with institutes and scientists involved with plant health problems in Russia and the US will allow the group to draw upon the expertise of other institutions and

facilitate the necessary approvals required for the wide spread field use of these preparations. Next quarter, the Plant Health group will continue to assist other subproject groups, individuals, institutes and private firms in the application of these new biopreparations and continue to train personnel in monitoring plant pathogens in several agricultural units within Russia.

Technology Transfer Training Unit (TTTU)

- This subproject aims to establish a pilot center of agricultural technology transfer and extension service development in the Serpukhov District and districts in South-Central Russia. Once operational, the center will provide: monitoring of the socio-economic and agrotechnological enviroment in the region; consultation services to individual farmers and collective farms on problems in selected fields; field training of extension service development by improving skills and capabilities of regional agricultural personnel; and the establishment of demonstration plots and farms to illustrate new technologies and methodologies.

- During this reporting period specific activities relating to outputs include:

  -The development and submission of a potato seed pilot center project proposal to the European Bank for Reconstruction and Development.
  -A seminar was held in Pushchino on the organization of a seed certification center. Support was given by the Plant Division of the Russian Ministry of Agriculture.
  -Diagnostic methods to detect potato viruses have been approved for field application.
  -The renovation and acquisition of the laboratory facilities has lead to the imminent establishment of Pushchino as the second officially registered test laboratory recognized in the Federal Certification System.

- During this reporting period the operational capability or the diagnostic laboratory has been a top priority. The laboratory, which uses a combination of virus detection methods, is currently undergoing the process of accreditation. Simultaneously, a business plan has been prepared which analyzes the profitability of organizing a network of seed certification laboratories, as well as the production and distribution of detection kits. Production facilities and trained personnel are available in Pushchino to begin the process of kit production and pathogen control for potato seeds once the accreditation is formally received into the federal certification system. In conjunction to this activity, the Russian Minister of Agriculture has designated the TTTU working group to plan an investment program to further strengthen the certification system.

Integrated Potato Project

- The purpose of this subproject is to establish a model potato seed production program by developing certified pest resistant potato seeds and improved varieties using standard and molecular technologies.

- During this reporting period several important meetings and communications were held with several research and private institutions. Among them include: The Agricultural Board of the Serpukhov Region regarding different seed varieties and basic quality; K.V. Malakhina, Senior Agronomist, Joint Stock Company Dashkovka; and various experts from the Moscow Potato Institute. These meetings resulted in the development of a basic system of potato protection from diseases and insects and an expose on seed production in Pushchino where several large Joint Stock Companies (Dashkovka and others) participated. Other activities and results included:

  -1,300 viroid and virus free plants were obtained utilizing microclonal propagation techniques.
  -Out of 18 Russian potato cultivars treated by the working group no pathogens were found in the samples obtained from Dashkovka.
  -Evaluation and tasting of select potatoes were carried out by 35 participants, including farm directors, in August. The event revealed a high level of interest in obtaining virus free potatoes and highlighted the potential investment possibilities by these groups.

- Activities to be conducted during the next reporting period include the micropropogation of 1,300 plant varieties using hydroponic devices and the study of storage potato seeds in warehouses belonging to the Joint Stock Company Dashkovka.

OUTPUT E: COMMERCIALIZATION OF TECHNOLOGY (TECHNOPARK)

This output emphasizes the establishment of capacity and the conduct of effective mechanisms to commercialize technology. It will provide a downstream flow of revenues necessary for sustainability, focused on the commercialization of technologies and their transfer to the commercial sector and the development of small businesses.

Technopark Organization and Operational Structure

- During Year 2 the purpose of the Technopark has been to continue to focus on the organizational structure and development of a system of transfer of high technologies for use in sustainable economic development and environmental protection of the region. Objectively, this has involved organizing the Technopark as a legal structure and creating new methods of technology transfer suited to the changing legal and economic landscape in Russia.

- A highlight of activities leading to purpose include meetings and communications with: Dr. A.I. Sokolov, Director of Research for the Russian Federation Committee of Higher Education; N.R. Tumanov, Director of the Russian Union of Small Enterprises; Y.N. Dolghin, General Director of the private firm *Concord*; A.I. Ryndin, Director of Marketing

for *Ecoservis, Ltd*; and several other individuals and organizations relating to specific technologies, legal status and private sector investment.

- Additional activities completed during the reporting period include:

1) A new technology, a hepatitis C diagnostic kit, was developed jointly by *Your, Ltd.* and IBPM. The Technopark will participate in its certification at the Russian Ministry of Public Health.

2) Field tests of the Pseudobacterin-2 were completed. After five applications the compound proved 72 percent effective against oidium (fungal disease of grapes).The grape harvest utilizing standard treatment methods was 10.2tons per hectare, while the Pseudobacterin-2 yielded 11.6 tons per hectare.

3) A licensing agreement to produce biopreparations for plant protection from fungal diseases on grape vines was reached with the private firm *Ecoservis*. The initial production agreement is for six tons per week, an amount sufficient to cover 3,000 hectares. Following the agreement, a roundtable on the practical application of Psuedobacterin-2 was held in cooperation with the Experimental Biofactory for Plant Protection and the Lukyanenko Research Institute of Agriculture in Krasnodar Krai.

4) A contractual agreement on integrated remediation of oil polluted sites and surface waters with the joint stock company *LUKoil-Urayneftegas* was negotiated and completed. Environmental mapping of polluted territories, chemical and microbiological analysis and field experiments of integrated remediation provided the framework to create an integrated scheme for the remediation of oil polluted soils and surface waters in the Urai region. Income from *LUKoil* is expected early next year.

5) The Technopark received permission from State authorities to conduct large scale field experiments (50,000 hectares) of Pseudobacterin-2 and begin distribution of this product to several agriculture firms. In order to continue success of this technology a number of seminars and training sessions were held in Krasnodar Krai on the usage of Pseudobacterin-2 for the protection of vegetables and fruits. A business plan was subsequently developed. Compensation from the Krasnodar Institute for work completed is expected to be received during mid-Summer of 1997.

- Next quarter the Technopark working group will focus on: 1) receiving permission from the Russian Ministry of Agriculture and Food to begin the application of Pseudobacterin-2 on other crops; organizing a major conference, with *LUKoil* and other private firms, on the integrated remediation of oil-polluted soils and waters; increasing continuing education and training, while focusing on the marketing of technologies.

PARTICIPANTS TRAINED

- During the last quarter of fiscal year 1996 there were a total of 379 individuals who were trained or participated directly in project activities in Russia and the United States. Of this total, 176 were men and 203 were women. The breakdown is as follows:

Unit	No. Trained	Women	Men
OGRD	04	02	02
Library	03	03	0
Information Office	02	01	01
Communications	07	0	07
Environmental Science/Cont. Education	19	10	09
Teaching English as a Second Language*	02	02	0
Bioremediation Technology	09	03	06
Biocontrol of Wheat Diseases	07	01	06
Bacterial Ice Nucleation	11	05	06
Biosenors	09	01	08
Environmental Policy and Planning	13	05	08
Integrated Potato Project	47	15	32
Technology Transfer Training Unit	07	05	02
Greenhouse Pathogens	20	14	06
Plant Health Center	36	25	11
Technopark	183	111	72

*These figures do not represent students, faculty and others who received English language instruction during this reporting period.

CUMULATIVE EXPENDITURES AND ENCUMBRANCES

TABLE 1	PUSHCHINO PROJECT QUARTERLY EXPENDITURE REPORT July 1 - September 30, 1996				
Budget Category	**Budget Amount**	**Expended**	**Encumbered**	**Category Total**	**Cumulative Total**
Personnel/Benefits	492,268.00	54,920.23	91,917.14	146,837.37	480,039.74
Travel/Accommodations	138,233.00	20,133.06	14,711.68	34,844.74	173,237.49
Workshop/Training	76,575.00	28,636.12	46,303.12	74,939.24	137,536.41
Operations Costs	383,733.00	103,149.40	5,314.89	108,464.29	277,842.02
Equipment	219,200.00	13,002.00	20,750.72	33,752.72	116,841.11
Sub Contracts	526,660.00	4,326.01	34,574.32	38,900.33	119,626.39
Indirect Costs	364,051.00	61,473.59	12,184.73	73,658.32	295,291.62
Total	**$2,200,720.00**	**285,640.41**	**225,756.60**	**511,397.01**	**$1,600,414.78**

APPENDIX I

QUARTERLY REPORTS

QUARTERLY IMPLEMENTATION PROGRESS REPORT

UNITING SCIENCE AND EDUCATION AND THE TRANSFER OF TECHNOLOGY FOR SUSTAINABLE ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION OF SOUTH-CENTRAL EUROPEAN RUSSIA

THE RUSSIAN-U.S. SCIENCE, EDUCATIONAL, AND ECONOMIC DEVELOPMENT CONSORTIUM

GRANT NO. CCN-0012-G-00-4111

FOR THE PERIOD:

BEGINNING APRIL 1, 1996
AND ENDING JUNE 30, 1996

\wpdoc\pushchin\qrtrpt2.96

SUMMARY OF ACCOMPLISHMENT FOR APRIL 1 - JUNE 30, 1996 QUARTER

During this quarter, significant progress continued to be made toward the achievement of grant purpose and outputs. Accomplishments and actual and potential impacts are being increasingly relaized building upon previous activities, inputs and accomplishments. The potential for greater success is evident. Important among these from an overall perspective is the further development of Pushchino and the Consortium activities as a model for a "Partnership for Development Cooperation" with broad potential implication for US development activities in Russia and elsewhere. Specific accomplishments are summarized below under outputs:

OUTPUT A: ORGANIZATION, ADMINISTRATION AND MANAGEMENT

- Planning for the incorporation of new Consortium members, University of Tennessee and Texas A&M University were conducted; inaugural meeting to be held next quarter.
- Banking issues were addressed and collaboration with the International Science Foundation continued to be beneficial.
- Communications capacity continued to be enhanced with broader use of e-mail and information access through networking of the Center. The private, joint communications company STACK has expanded capabilities and is seeking a potential US partner.
- The Friends and Partners Network continues to expand in terms of content and user access and represents a significant success; funding from non-grant sources continues to be leveraged and effectively utilized; it has taken on broader significance in Consortium activities lead by the University of Tennessee;
- Administrative staff capabilities were enhanced through the services of consultants from UC Berkeley;
- The Office of Grants and Research Development continued to provide information; communications through networking was strengthened; proposals were prepared and submitted;

OUTPUT B: EDUCATION AND TRAINING PERFORMANCE AND CAPACITY

- The Joint Master's Degree between Pushchino State University (PSU), WSU and UC/Berkeley moved forward this quarter through the approval of a draft agreement. This document details how the agreement would be implemented and what the cost and benefits would likely be to each institution.
- A total of 61 MSC students graduated in May, this represents a significant accomplishment in the development of PSU programs;
- Continuing education courses emphasizing environmental related topics continued to be presented with 86 persons trained in a variety of topics during the quarter;
- Training capacity continued to be strengthened by the purchase of library and reference materials;

OUTPUT C: GENERATION OF ENVIRONMENTAL TECHNOLOGIES

- Bioremediation research has been successful in developing technology for treating oil spills and pollution, technology useful to both Russia and the US. The technologies significantly decreased diesel fuel and other contaminates. Field assessments were initiated in Siberia. Next quarter field testing will continue in concert with the Technopark and will examine the feasibility of commercialization.
- Research in the biocontrol of diseases in wheat continued this quarter with good progress. Researchers have successfully completed advanced experiments which indicate that their antibiotic strains can control "take-all" root disease (an important wheat disease of both the US and Russia). Field trials of promising technologies were begun and will continue next quarter.
- Research on the destruction of chemical weapons utilizing microbial systems were investigated with support from the Russian Department of Defense; an international conference of the biological destruction of chemical weapons was successfully planned and conducted in Russia in collaboration with Texas A&M University under the aegis of a NATO grant.
- Environmental Policy and Planning Training for Russians was held at WSU with the objective of developing a capability to plan and conduct environmental policy and planning in Russia and other countries for private and government clients; the Serpukhov district serves as the case study with the information to be provided to district government.

OUTPUT D: SUSTAINABLE AGRICULTURE AND A MARKET BASED FOOD SYSTEM

- The Plant Health working group developed two antibiotics which control some major plant diseases. Field testing began on a variety of crops and will continue next quarter to determine their utility and potential commercialization.
- Technologies for the biotechnology of greenhouse plant pathogens continues to progress. Tests are underway in greenhouses in Nizhnii Novgorod. Next quarter selected technologies will be studied for potential commercial application.
- The TTTU Unit has begun to organize joint-enterprises using farm demonstrations. Workshops were held in Pushchino to identify possible users of these technologies. Next quarter the Unit will organize enterprises to sell diagnostic kits and continue to identify clients.
- Training materials were developed and utilized for training to enhance home garden food production; the initial efforts have been well received;

OUTPUT E: COMMERCIALIZATION OF TECHNOLOGIES

- Potentials for commercialization of environmental technologies have been examined with discussions with commercial firms and draft agreements prepared with the Moscow Oblast Health Authority, the join stock company Lukoil and the firm Ecoservis (see under C above). An agreement was signed with Ecoservis.

- Field trials of technologies continue (see C above)
- Potential investors and partners have continued to be sought.
- An agreement was signed with LAHEME, a Czech firm to provide office, laboratory and storage for joint commercial activities for the production and sale of medical diagnostic kits in Russia, the Czech Republic and other former Soviet Union countries.
- The utilization of commercial ventures and relationships to sustain the Center and grant activities continue to be emphasized.

The *Uniting Science and Education and the Transfer of Technology for Sustainable Economic Development and Environmental Protection of South-Central European Russia* (Pushchino Project) has completed its seventh quarter of implementation. During this quarter of implementation the purpose of the project, to further develop and enhance the capacity and performance of the Pushchino Center, has been organized under five output areas:

A. Enhancing organization, planning, evaluation and performance of the Pushchino Center to ensure that the purpose of the Project is achieved.

B. Further strengthening of the educational performance and capacity in environmental science, sustainable agriculture and related topics.

C. Further development of information systems and environmental technologies in high priority areas related to sustainable agriculture and market based food systems.

D. The continued development of the relationship between agriculture and market based food systems in the region.

E. The development of the Technopark for the commercialization of technologies which facilitate and support the establishment of private sector businesses.

During the seventh quarter the Pushchino Project has moved forward in all five output areas. Project Management monitored activities conducted during this period. They are briefly described below with a summary of notable accomplishments given in the Executive Summary.

OUTPUT A: ORGANIZATION, ADMINISTRATION AND MANAGEMENT

This Output utilizes the organization, management and operations capacity and performance of the Pushchino Center, WSU Support Office, UC Support Office and the Consortium working in collaboration in order to support programs and grant activities. It is also the focus of planning, administration and management performance improvement necessary for the institutional and human resource changes.

Consortium Expansion

- During this quarter progress has been made towards the enlargement of the U.S - Russia Science, Education and Economic Development Consortium. As a result of meetings between the Principal Investigator of the Project, Dr. James Henson, and Dr. Homer Fisher, University of Tennessee and Dr. James Wild, Texas A&M University, a Consortium meeting will be held in September, 1996. The agenda will focus primarily upon the structure of the Consortium and the programmatic contributions each institution will make to grant related programs and activities and to sustainability. As a result of these ongoing discussions, it is

anticipated that:

-Washington State University (WSU) will continue to focus on the areas of project administration, environmental technologies, agriculture and environmental policy and planning.

-The University of California, Berkeley (UCB) will continue activities in economics, agriculture and administrative support.

-The University of Tennessee system, will primarily deliver expertise in communication technology, including networking and other internet based technologies.

-Texas A&M University will contribute to the Consortium through its experience and expertise in bioremediation and other environmental technologies and in the biological destruction of chemical weapons.

This is not an exhaustive list of functions each member will be performing within the framework of the enlarged Consortium, but a summary based upon some of the capabilities of each institution. The Consortium members participate in grant supported activities while simultaneously leveraging those resources to access non-grant funds to achieve the grant purpose and outputs.

International Science Foundation

The International Science Foundation (ISF) has continued to assist the project in providing shipping and customs assistance for equipment and supplies destined for the Pushchino Center. During this quarter their Grant Assistance Program (GAP) has assisted project procurement operations in shipping and customs clearance for books and reference materials for the Pushchino State University (PSU) Library, chemicals for environmental research activities and software packages to assist in land management modeling efforts.

Banking

During the previous quarter an institutional bank account was established for the project. During this quarter the institutional account was in use, but continued dialogue with banking officials continue. The transfer of funds and their subsequent utilization in Pushchino functioned to support grant activities. The delays in country expenditures are now being overcome and will be less of a problem than in the past.

Office of Grant and Research Development (OGRD)

The OGRD continued to access a large amount of information about potential funding and make these available to Pushchino scientists and educators. Utilizing this information and previously presented proposal preparation training, Pushchino scientists continue to prepare proposals for funding from sources in the US and Canada. It is anticipated that 20-30 proposals will be prepared and submitted for potential funding. During these processes, Pushchino scientists continue to gain experience in proposal writing and composition, which was not the case under the previous Government with central support almost exclusively from the Academy of Sciences.

Library

Reference materials and books continued to be identified and ordered during the quarter. Plans were developed for the training of two Pushchino State University librarians who will spend a month at the WSU Library learning current library techniques and the organization and operations of emerging information systems and the electronic library. The training will occur during the next quarter.

Communication

Communications capabilities within Pushchino Center continue to be improved with the laying of hard-lines between STACK (the joint Venture Communications Company) and it's central capabilities and all the institutes and the Pushchino City utilizing non-grant funds. These improved capabilities will enable the scientists in all 8 institutes as well as the town people of Pushchino to access information via e-mail and the Internet. This enhanced capability will enable electronic technologies to be used for continuing education, to access information about funding opportunities through the Office of Grant and Research Development and for communications.

STACK, a joint stock company with private ownership and partial ownership by the Institute for Biochemistry and Physiology of Microorganisms of Pushchino, provides communications support. The continued improvement of communications equipment and capabilities will potentially enable this company to play a significant role in communications for the center, Pushchino city and for the Serpukhov district and as a success story of privatization.

Friends and Partners

The University of Tennessee's Center for Networking Initiatives continued to work with the Pushchino Center through the Office of Grant and Research Development and the Friends and Partners program. The latter has continued to grow in terms of information available and the number of contacts to access this very popular Internet program. Support from grant and mostly from non-grant resources has been utilized. Dr. Greg Cole from the UT and Natasha Kilashova continued to provide leadership for this very popular program.

Since its inception in 1994, Friends and Partners has received grants from the U.S. State Department, the North Atlantic Treaty Organization (NATO) and Sun Microsystems, who have donated the server software which is the backbone of the system in Pushchino. Information about Russia and its history, culture and contemporary events continue to be available and utilized by a significant number of US citizens and organizations.

Staff Training

The level of training of support staff (secretaries, accountants, administrative assistants, etc.) has been found to be deficient in modern administrative methodologies. In order to assist in improving staff effectiveness and efficiency, A. Jeffrey and J. Greer, Management Systems Officers, UCB, traveled to Pushchino where they worked with administrative and support staff to define the level of training of staff and to provide training in modern administrative methodologies such as planning, time utilization, personnel and budget procedures, computer use, communications and others. Over 40 staff participated in these training procedures. Additional follow-up training needs were identified.

Support Offices

During the quarter the support offices continued to provide support for grant programs and activities.

The Pushchino Liaison Office headed by Ms. Kathy Gelhar continued to provide a range of budget, personnel, travel and administrative activities in support of activities in Pushchino. Support was also provided for US consultants spending time in Pushchino conducting grant activities.

The US Liaison Office at WSU continued to provide communications, purchasing, budget, personnel, travel and programmatic support for the grant. The office and Mr. R. Rao and Dr. J. Henson provided planning and coordination during the quarter.

The UC support office provided communication, personnel and programmatic support under the leadership of Professor M. Schroth and Professor S. Van Gundy.

The Steering Committee composed of Professor A. Boronin (Chair), Dr. J. Henson and Dr. J. Noel of WSU and Drs. M. Schroth and S. Van Gundy of UC held discussion by phone to approve grant activities and to monitor progress during the quarter.

OUTPUT B: TRAINING PERFORMANCE AND CAPACITY

This Output focuses on the training performance and capacity emphasizing environmental science, sustainable agriculture and related topics to enhance formal, non-formal and continuing educational programs of PSU and the provision of training.

Enhanced Educational Capabilities in Selected Disciplines

As the Pushchino Center reorients its extensive capabilities in the biological sciences to better serve Russian society, it is imperative that they strengthen educational capabilities in selected disciplines. Primary among these is economics. To assist, the grant supported the strengthening of economics teaching capabilities while simultaneously training students and scientists. Dr. Bruce McWilliams, a post-doctoral in economics, has been resident at Pushchino for 4 months. During this report period he has provided continuing education training (see under Environmental Science Continuing Education Center), has presented as economics course to 25 Russian MSc students, has assisted faculty to develop economics skills and has worked with scientists in the planning and conduct of research related to agriculture and the environment. These activities have been very successful with an obvious increase in understanding of the importance and role of economics and enhanced economics teaching and research capabilities. The continuing education activities are given below.

MSc Programs in Environmental and Related Disciplines

In May, the first large group of 61 MSC students graduated from the Pushchino program. The latter is a pioneering program in Russia which is being utilized as a model for other universities in Russia (a group of 3 students graduated last year). This year the number of students enrolled has approximately doubled, indicating the relevance of and interest in the program.

Joint Masters Degree in Environmental Sciences at Pushchino State University

The goal of this sub-project is to create joint Masters Degree program between WSU, UC and PSU. During this quarter the objective was to draft a joint document between these institutions which establishes a framework for such a program. The Joint Degree program will to be initiated in stages. First, the program would involve joint faculty and student exchanges focusing primarily on research. Then, courses will be taken at each university which would enable students to receive credit at their home institution. Lastly, the students will receive degrees from both institutions.

This quarter several models of joint Master's Degrees in the U.S. have been studied in order to determine which one, or combination of models, can be most applicable to meet project outputs. A draft document between WSU and PSU has been created which focuses on administering a Joint-Master's Degree program within academic fields that are mutually compatible such as Forest Ecology, Ecology and Environmental Policy. In addition, specific mechanisms for implementing the Joint Degree, administrative contacts and faculty collaboration, have begun.

Activities to be conducted during the next quarter will include:

-The formation of working groups composed of administrators, graduate school representatives and faculty within each institution in order to resolve outstanding issues such as funding mechanisms and size of the program.

-The preparation and distribution of materials for perspective faculty and students, which will reflect the rationale and mutual benefits of the program. And the preparation of a Russian/English handbook regarding procedures as well as descriptions of the courses offered.

-Compilation and editing of documents regarding the Joint Master's Degree program for distribution and approval by the State Committee on Higher Education of Russia and formal approval in the US.

Intensive American Language Center (IALC)

The purpose and objective of this subproject is to develop programs and utilize modern methodologies for teaching English as a second language to Master's students and faculty at PSU. This subproject aims to develop a clear and concise curriculum with testable performance objectives for each level of study as well as to master new educational methodologies to enhance teaching capabilities.

The curriculum for teaching English as a second language to Master's students and scientists has been developed, patterned after the WSU Intensive American Language Center (IALC) model. The curriculum not only includes new concepts, such as functional English, but also a more precise grammatical overlay associated with speaking, reading and writing.

The potential for organizing courses in Business English for a fee within the Department of Foreign Languages at PSU is being explored. Subproject personnel have determined that by offering courses in Business English they will be able to tap a large Russian business market in terms of language services required by the Russian private sector. This will also utilize facilities at Pushchino for housing enrolled students to ensure complete immersion. This quarter an agreement has been reached between the Foreign Language Department and the Continuing Education Unit to develop mechanisms for organizing courses in Business English and to market and advertise these courses to attract potential clients thereby supporting sustainability.

Environmental Science Continuing Education Center

The purpose of this subproject is to further develop and strengthen the continuing education training performance and capacity in environmental science and related topics. It will enhance the level of environmental science education with various categories of students (high school students, Pushchino State University students, faculty, administrators and environmental professionals).

Activities during this quarter pertinent to output included:

-Regular meetings between subproject leaders and the Russian Ministry of Education regarding approaches to the problems of continuing biological and ecological education for advanced high school students.

-A series of workshops with the Pushchino District Committee on Education related to the organization of environmental science teaching at high school and university levels.

-The conduct of training course in biology and environmental sciences between May and June for advance placement high school students throughout the Russian Federation.

-Presentation of an economics course for advanced high school students, for MSc students at PSU and for scientists;

Activities of the Continuing Education Center have also focused on identifying priority areas in continuing education based upon a fee for services approach to assist in financial sustainability. Such include: business English courses for entrepreneurs, administrators and multinational companies; environmental science related topics including environmental impact assessment; environmental economics; and others.

This quarter the process to procure an audio/visual educational center has been initiated. This will allow both faculty and students to use motion cameras, VCRS, computer and editing technology to assist in developing relevant and more effective educational materials. Next quarter it is anticipated that the system will be shipped to Pushchino by the ISF and ready for use by the end of September.

Next quarter's activities will include the preparation of an educational Summer camp for teaching and support personnel; a market assessment of the demand for a business English course in Pushchino; the development of regional educational programs in ecology and ecological studies; and seeking funding for the latter through the Moscow Regional Government and the Union of Russian Federation Cities.

OUTPUT C: GENERATION OF ENVIRONMENTAL TECHNOLOGIES

This output utilizes the capabilities of the Pushchino Biological Research Center to develop high priority technologies that have potential application in solving or preventing environmental problems

in Russia and the US. In the process, some of the extensive technical capabilities of the Center will be reoriented and focused on the prevention and remediation of current and future environmental pollution and degradation problems.

Technology for the Bioremediation of Soils Contaminated by Oil and Oil Products (Black Oil)

- The purpose and objective of this subproject is to develop technologies for the bioremediation of soil polluted with oil and its products based both on activation of local micro flora and the application of constructed biopreparations.

- During this quarter experiments were carried out in the field in soil contaminated with black oil and diesel fuel. The duration of the experiments was two months. The contaminated soil was treated with biopreparations twice: at the beginning of the experiment and one month later. The analysis performed at the end of the first and second months of the experiment showed that treatment of diesel fuel-contaminated sites with preparation BNP1 reduced by a factor of two the residual content of alkanes as compared to the control site(the site not treated with the biopreparation). The result of this experiment indicates that the applied biopreparation cut in half the amount of residual diesel fuel contamination remaining at the end of the treatment period.

- During the next quarter the initial testing will be replicated and expanded to include other oil products under field conditions in Siberia.

Biocontrol of Diseases in Wheat

- The objective of this subproject is to develop new, no pesticide, environmentally friendly biological control methods for the control of diseases of wheat and barley. One of these target diseases is "take all", a significant problem in both the US and Russia. There are presently no satisfactory seed treatments against this disease, no resistant cultivars and current farming practices have aggravated the problem to the extent that many fields in Russia now yield only about half their potentials. Increasing recognition of the undesirable effects of chemical pesticides, both in the U.S. and Russia, necessitates the development of alternative ways to control soil borne diseases, including "take-all."

- Working in collaboration, researchers from Pushchino Center and WSU's USDA Root Disease and Biological Control Research Unit, have demonstrated significant suppression of "take-all" infection. Potential for increased production are promising with data to be available next quarter. This quarter, overlapping DNA fragments containing individual phz genes and their different combinations were cloned in E. coli under the control of promoters for T7 RNA po-lymerase. E. coli clones carrying these plasamids together with P. Fluroescens 2-79 marker exchange mutants were used to identify production of phenazine-1-carboxylic and its possible intermediates. HPLC analyses revealed a possible role of certain genes in antibiotic biosynthesis. Mutations in phzCDEF completely abolished phenazine synthesis, suggesting

their importance for antibiotic production. PhzG appears to be a kind of recharging enzyme starting at the incorporation of the system. The result indicates that PhzAB may play a stabilizing role in the functioning of the other enzymes of the biosynthetic pathway resulting in disease suppression. These indicate significant potential for controlling "take-all" and other important soil borne diseases.

- Based upon the results of the experiments mentioned above, as well as previous data, two papers were prepared and submitted for publication in the Journal of Bacteriology, English and Russian versions. In addition, results of this quarter's work has made it possible for researchers to synthesize phenazine 1-carboxylate in E coli cells containing only phzCDEFG genes which in turn make it possible in further experiments to construct effective transgenic Pseudomonas strains for the biocontrol of "take-all". Next quarter's activities will focus on completing the studies of the distribution of phz genes among different phenazine producers, field testing and the preparation of publications reporting the results.

Environmental Policy and Planning

As Russia attempts to address the sustainable use of its natural resources as well as remediation of current pollution and degradation, capabilities in environmental policy and planning are essential. A necessary requirement for success is an understanding by local, regional and national governments and their officials of the role, importance and impact of environmental policy and planning. The Serpukhov Policy and Planning subproject is designed to further develop the understanding of and capabilities in policy and planning by Pushchino scientists and the development and sharing of environmental information with the Serpukhov regional government including the development of an environmental use plan for the district.

- To assist in this process, an environmental policy and planning training workshop was held at WSU from June 17 - 27, 1996. A total of 7 Russian trainees attended the Workshop conducted by three WSU faculty members. Topic addressed at the workshop included among others: Environmental laws and regulations, remediation and waste management, chemical analysis of soil samples, forest management and the impact of economic variables on Environmental Policy. Participants visited U.S. National Forests, met with USFS research personnel and developed programming models for land management.

OUTPUT D: SUSTAINABLE AGRICULTURE AND A MARKET-BASED FOOD SYSTEM

This output focuses on enhancing agricultural productivity and sustainability and a market based food system.

Animal Health

Associate Dean of Veterinary Medicine Dr. David Hird and Dr. N. J. MacLachlan, UC Davis

conducted a consultant visit to Pushchino to work with members of the Animal Health sub-project on problems and issues associated with genetic improvement of cattle and disease diagnosis. A student from UC Davis will spend time at Pushchino collecting data on mastitis in dairy cattle next quarter.

Plant Health Laboratory

- The purpose of this subproject is to (1) further develop, improve, adopt and/or commercialize technologies for disease diagnosis for use in agriculture production; (2) to develop and facilitate the adoption of new biotechnological strategies and methods of biological control of some major pests, which decrease or eliminate the use of toxic chemicals and pesticides; and (3) to continue to strengthen a working group made up of a number of leading Russian specialists on plant protection to develop new methods of biological control of plant pathogens.

  During this quarter subproject group achieved several notable successes. Among them were the planning and joint conduct of field experiments with promising biocontrol technologies with collaborating Russian institutions in Krasnodar, Kharkov (Ukraine) and Moscow. Results also included the use of new methodologies to identify bacterial strains producing antibiotics useful in biological control and the provision assistance to plant protection stations to produce Pseudomonas inoculants for large scale field trials.

  Large scale experiments on integrated biological protection of grapes, apples, wheat, cabbage and sugar beet root in the Anapa Region were started. These experiments are being implemented jointly by the Institute of Biological Plant Protection (Krasnodar), the Institute of Plant Growth (Kharkov, Ukraine) and the Institute of Vegetable Production in Moscow. The results will be available next quarter. In addition, PCR primers have been generated that specifically identify producers of two antibiotics. This has lead to the distribution of over 10,000 liters of Pseudomonas inoculants to Plant Protection Stations in Krasnodar, Stavropol, Viatka, Nizhnii Novgorod and Moscow Regions. The impact of these on crop production is now being examined.

  During this quarter and the next, subproject members have and will continue to assist in the application of new technologies, the training of personnel, and the evaluation of results.

Biopesticide Technologies for Greenhouse and Field Pathogens

The purpose of this subproject is to develop new biopesticide products on the basis of plant growth promoting rhizobacteria (PGPR) Pseudomonas. Subproject leaders aim (1) to produce environmentally friendly agrobiotechnologies for use in greenhouses; (2) to develop plans for commercialization, including a procedures manual and strains for application in commercial greenhouse and fields.

The objectives for this quarter included:

-Greenhouse test new mixtures on the basis of a combination of old and new Pseudomonas strains and apply these mixtures in greenhouses in the Nizhnii Novgorod Region;

-Continue monitoring the key soil-born plant pathogens in the greenhouses where the experiments with these mixtures are being carried out;

-Continue preparation of official permit documents for large scale application of Pseudomonas aureofaciens BS13933-inoculants; and

-Working together with the Technopark Working Group, further expand working contacts with commercial greenhouses and regional plant protection stations in Russia.

Several meetings and communications were held during this quarter between Subproject personnel and leading specialists, government officials and commercial contacts. Among them were Dr. V.G. Kisliakov, Head Agronomist, Novgorod Region; Dr. N.R. Diadshchev, Deputy Director, Research Center of Toxicology and Sanitary Regulation; and Dr. F. Polikarpova, Senior Researcher, All Russian Selection-Technological Institute of Horticulture and Nursery Culture, Moscow. These interactions have lead to agreements between Pushchino Center and Greenhouse operations in Nizhnii Novgorod to continue to test new technologies.

In brief, ongoing work on the development and commercialization of biotechnologies for use in greenhouses has led to opportunities for commercial use of some of the technologies developed at the Pushchino Center. The application of this new biotechnology in commercial greenhouses in Nizhnii Novgorod shows promise and will be further evaluated next quarter. Increasing interest in these technologies in that region will ptoentially allow Subproject members to expand the use of these technologies to additional greenhouses on a commercial basis. This will be explored with the assistance of the Technopark working group. The potential for commercialization will continue to be stressed during the next quarter.

Integrated Potato Project

The purpose and objective of this Subproject is to develop a disease free and potentially certified potato seed production program and to test new varieties using standard plant breeding and testing procedures by the Agrotechnological College.

During this quarter several meetings were held between Subproject members and US consultants. Drs. T. German and S. Slack provided training, evaluated the current procedures and assisted in improving a system for producing virus-free seed potatoes using microclonal propagation and

hydroponic methodologies to produce minitubers. They worked with project scientists and with the Chief Agronomist and Chief Pest Control Advisor of the Dashkovka Joint Stock Company. As result of these interactions, the program to field grow virus free seed potatoes has been given added impetus. This includes all the technological operations of preparing potato seeds for planting, choosing planting machines, soil preparation, and tillage. This program is being developed within the framework of collaborative activities with the Timiryazev Agricultural Academy, Moscow, The University of California, Berkeley, WSU and other Russian specialists.

Significant progress has been made towards achieving subproject objectives. The hydroponic, in vitro propogation is working well; this is a new approach for rearing potato microtubers. In addition field demonstration plots using microtuber propogated plants and 20 potato varieties (16 from Russia and 4 from Holland) were planted and will be evaluated next quarter. Commercial agreements to sell microtubers have been reached with the state (Oblast) government administrations of Yaroslavl and Nizhnii Novgorod. Delivery will begin in March, 1997. The success in the minituber activities has enabled subproject members to begin the propagation of the next generation of elite minituber production in accordance with the commercial needs of farmers and joint stock companies.

Activities to be conducted during the next quarter will include:

-continued multiplication of potato plants in the tissue culture system;
-adaptation of these plants in special tuber devices before planting;
-planting 1,300 plants into hydroponic devices;
-harvesting super elite potato seeds from the Dashkovka Joint Stock Company for commercial activities;
-evaluating the results of the variety trials.

Technology Transfer Training Unit (TTTU)

In cooperation with PSU, the scientific research institutes of Pushchino Center, Washington State University, the University of California and Oblast (State) authorities, this Subproject aims to establish a pilot center of agricultural technology transfer and extension service development in the Serpukhov district and other districts in South Central European Russia. Once established, this center will provide: monitoring of the socio-economic and agritechnological environment in the region; consultation services to farmers and collective farms on problems in selected fields; training in fields of extension service development while improving the skills of regional agricultural personnel; and establish demonstration plots and farms to demonstrate new technologies and methodologies.

During this quarter numerous meetings and communications had taken place between Subproject scientists and regional/state authorities and farmers and farm managers in the field. This resulted in a workshop held in Pushchino between May 27 - 30 which focused on the implementation of the Russian federal program on the preservation of rare aborigenic breeds of dairy cattle and on the development and application of techniques for cattle certification. Participants included members of the Russian Academy of Agricultural Sciences, Ministry of Agriculture and animal certification

specialists from the regional and oblast levels.

Other activities carried out this quarter pertinent to project outputs included:

-A seminar with high school teachers and Agriculture College faculty members was held in Pushchino. An integrated program, including three years of high school education and three years of college education leading to a Bachelor's Degree, was finalized.

-Reference and education literature on seed growing and potato diseases has been organized in order to develop a methodology manual for publishing. Topics include: potato diseases; protection of potato seeds from diseases; new technologies for potato certification; and potato growing in hydroponic devices and bioreactors.

-The previously mentioned potato field demonstration of potato varieties was organized and planted at the Dashkovka farm in Serpukhov.

Utilizing new technologies developed during the previous quarters, activities have begun to explore potential joint-enterprises for seed potato production. Also as a result of the seminars and workshops held this quarter, groups of possible users (clients) of these new technologies have been identified.

Activities next quarter will focus on:

-The organization of venture enterprises which will produce and sell diagnostic kits in regional seed production centers.
-Hosting a conference on the problems of establishing potato seed growing and certification programs, which will include participants throughout the NIS.
-Begin the organization of the Center of Seed Certification in Pushchino. The Center will focus on food, potato, cattle and sanitary certification and personnel training.
-Continuation of the home garden food production activities;
-Conduct of a potato field day with the associated evaluation of the potato variety trials.

OUTPUT E: COMMERCIALIZATION OF TECHNOLOGY (TECHNOPARK)

This output emphasizes the establishment of capacity and the conduct of effective mechanism to commercialize technologies. It will provide a downstream flow of revenues necessary for sustainability focused on the commercialization of technologies and their transfer to the commercial sector and the development of small businesses.

Technopark Organization and Operational Structure

This quarter meetings and communications were held with individuals, public institutions and the private sector in order to organize the Technopark as a legal entity; continue the search for private sector investment; and explore the possibilities for commercialization of selected technologies. Notably among these individuals with whom Technopark staff interacted were V.E. Shukshunov, President of the Russian Association of Technoparks; S.M. Platonov, General Director of the Russian Foundation of Small Business Support; V.G. Kasatsky, Chairman of the Aresenal Commercial Bank and A.I. Ryndin, Chief, Marketing Department, Econservis, Ltd.

Additional activities completed this quarter include:

1) An agreement regarding general cooperation between the Moscow Oblast Health Department and Pushchino Center was concluded.

2) A licensing agreement for the production and distribution of Pseudo-bacterin-2 with the research/industrial enterprise, Ecoservis, was concluded.

3) A contractual agreement for the use of Pushchino oil spill remediation technologies with the Joint Stock Company, Lukoil was discussed and a draft prepared. Lukoil is one of the major Russian oil producers.

4) A training session on biomethods of plant protection was given in the village of Garkushy, the Temrjuk region of Krasnodar. Sample packages of the biopreparation Pseudobacterin-2 were distributed among 6 farmers and 28 villagers in Garkushy for the bio-protection of tomatoes, cucumbers, onions, garlic, potatoes, melons, corn and a variety of fruit trees. These will be evaluated next quarter.

5) The potential for the expansion of the jointly held communications company STACK has been explored. Efforts to develop a plan for a US private firm partner will be explored next quarter.

6) The identification of potential US commercial firms interested in participating was continued. During this quarter discussions have been conducted between Griffin Chemical Company and Project administration to further define Griffin's interest in participating in Pushchino private sector activities. Drs. Henson, Schroth and Boronin met with President Randy Griffin, Vice-President Jim Bone and other Griffin officials to explain Pushchino and its activities. Very constructive discussions were held. The Griffin company will further examine potential commercial activities in Russia in association with the Pushchino Center.

Next quarter the Technopark working group will focus on: 1) the continued analysis and

44

selection of commercially viable projects; 2) continue negotiations to reach agreements regarding bioremediation, plant protection and fish breeding technologies; 3) maintain efforts to secure additional support to develop existing Pushchino Center technologies into commercial products.

PARTICIPANTS TRAINED

- During this reporting period there was a total of 135 individuals trained in Russia and the United States. Of this total, 73 were men and 62 women. The breakdown is as follows:

Unit	No. Trained	Women	Men
Technopark	4	1	3
Policy and Planning	7	2	5
Technology Transfer and Training	15	8	7
Potato Project	2	1	1
Plant Health Lab	8	7	1
BTGP	4	3	1
Bioremediation Tech.	9	3	6
Env. Sci. Continued Ed. Center	86	37	49
Total	**135**	**67**	**73**

CUMULATIVE EXPENDITURES AND ENCUMBRANCES

TABLE 1	PUSHCHINO PROJECT QUARTERLY EXPENDITURE REPORT April 1 - June 30, 1996				
Budget Category	**Budget Amount**	**Expended**	**Encumbered**	**Category Total**	**Cumulative Total**
Personnel/Benefits	492,268.00	69,976.71	96,596.37	166,573.08	429,798.74
Travel/Accommodations	138,233.00	22,094.20	(255.26)*	21,838.94	138,137.49
Workshop/Training	76,575.00	18,818.24	44,064.24	62,882.48	106,661.41
Operations Costs	383,733.00	35,850.71	(48,688.71)*	(12,838)*	120,689.02
Equipment	219,200.00	13,590.88	23,454.72	37,045.60	106,543.11
Sub Contracts	526,660.00	61,131.54	1,900.33	63,031.87	82,626.39
Indirect Costs	364,051.00	48,789.63	(974.68)*	47,814.95	220,658.62
Total	**2,200,720.00**	**270,251.91**	**116,097.01**	**386,348.92**	**$1,205,114.78**

*Adjustments for over-reported Operation Costs and Travel/Accommodation due to fund advances included in and reported as expenditures.

PLANS FOR THE FOURTH QUARTER: FISCAL YEAR 1996

- Conduct U.S. training for Subproject leaders associated with the Joint Masters Degree program, the PSU library and information resources, programs and methodologies for teaching English as a second language and biopesticide technologies for greenhouse pathogens.

- Continue to further develop joint cooperation between WSU and Pushchino regarding the WSU Multi-phase Environmental Research Center and the growing environmental research and policy capacities of the Pushchino Center.

- Plan an Environmental Policy and Planning Workshop in Pushchino to address issues in environmental monitoring and analysis and forest management and natural resource management. The long term objectives of this activity are to establish a Center for Environmental Protection and Restoration at Pushchino that will be able to undertake

interdisciplinary research and development services for a variety of public and private sector clients and to provide input and assistance for environmental policy and planning for the Serpukhov District.

- Submit a request for a no-cost extension of the plant. Project administration will review subprojects to determine which activities provide Pushchino Center with the greatest potential for long term sustainability.

- Initiate shipment through the ISF's Grant Assistance Program of budgeted equipment items including personal computers, information resource materials and an audio/visual educational system.

- The U.S.- Russia Science, Education and Economic Development Consortium will hold a meeting next quarter to plan Consortium expansion. The University of Tennessee and Texas A&M University will send representatives to the meeting to conclude organizational and programmatic elements of the Consortium.

- Continue the testing of technologies and identify potential private sector participants for commercialization of promising technologies.

QUARTERLY IMPLEMENTATION PROGRESS REPORT

UNITING SCIENCE AND EDUCATION AND THE TRANSFER OF TECHNOLOGY FOR SUSTAINABLE ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION OF SOUTH-CENTRAL EUROPEAN RUSSIA

THE RUSSIAN - U.S. TECHNICAL, EDUCATIONAL, AND ECONOMIC DEVELOPMENT CONSORTIUM

GRANT NO. CCN-0012-G-00-4111

FOR THE PERIOD:

BEGINNING JANUARY 1, 1996
AND ENDING MARCH 31, 1996

48

The *Uniting Science and Education and the Transfer of Technology for Sustainable Economic Development and Environmental Protection of South-Central European Russia* (Pushchino Project) has completed its fifth quarter of implementation. During this quarter of implementation the purpose of the project, to further develop and enhance the capacity and performance of the Pushchino Center, has been organized under five output areas:

A. Enhancing organization, planning, evaluation and performance of the Pushchino Center to ensure that the purpose of the Project is achieved.

B. Further strengthening of the educational performance and capacity in environmental science, sustainable agriculture and related topics.

C. Further development of information systems and environmental technologies in high priority areas related to sustainable agriculture and market based food systems.

D. The continued development of the relationship between agriculture and market based food systems in the region.

E. The development of the Technopark for the commercialization of technologies which facilitate and support the establishment of private sector businesses.

During the second quarter of the fiscal year the Pushchino Project has moved forward in all five output areas. Project Management reviewed the activities conducted during this period. They are briefly described below.

OUTPUT A: ORGANIZATION, ADMINISTRATION AND MANAGEMENT

Accreditation

- During the quarter an institutional bank, accredited through the Bureau for International account for a foreign legal entity was opened which will allow for the expeditious transfer and payment of funds for in-country grant activities. Working closely together, the Washington State University Support Office (WSU/SO), Pushchino Support Office (PSO) and Russian Federation government officials managed to methodically proceed through the numerous phases involved in this process.

International Science Foundation

- Working with the International Science Foundation's (ISF) Grant Assistance Program (GAP), the WSU/SO facilitated the transfer of office equipment, computers and other grant related materials to Pushchino. The GAP has proven to be an effective mechanism for shipping

materials directly from the US to Russia. The ISF has been able to import equipment duty free for organizations working with other non-profit Russian institutions. In addition, next quarter activities will include the shipment of several text books and equipment for the Pushchino State University (PSU) Library and Continuing Education Center.

Trade Mission

- Washington State University's's Small Business Development Center and Ecologically Sustainable Development, Inc., of Elizabethown, New York, will lead a trade mission consisting of 15 US businesses to Russia in June. Preliminary discussions held during this quarter between the two groups, and with consultation from the WSU/SO, have resulted in the selection of Pushchino as one of the stops for the delegation. In the information packet distributed to various businesses throughout the US, Pushchino is described as a location with broad potential for business collaboration in environmental programs and high-technology. Next quarter activities will focus on how to best market the potential for commercialization of Pushchino Center technologies.

Western European Funding Sources

- The project is witnessing the implementation of the Western European Funding Data Base (WEFDB). During the quarter, the Office of Grants and Research Development (OGRD) has become proficient in the utilization of various partner organization databases on the World Wide Web (WWW), which will allow Pushchino Center to establish linkages with Research institutes and Universities throughout Western Europe and North America. In addition, the OGRD has facilitated the distribution and application of several research grant opportunities.

Office of Grants and Research Development

- James Wills, former director of WSU/OGRD, conducted six seminars on the systematic approach to writing research proposals. Approximately 50 participants participated in these seminars, which lead to 15 full proposals submitted to the Civilian Research and Development Foundation (CRDF) Cooperative Grants Program. Progress was also made towards selecting and training staff, setting up equipment and gaining access to basic information sources necessary for the establishment of a Grants and Information Office.

MicroAg.

- Private sector interactions between MicroAg. and the Project continue to be explored. The combined interest in the potential opportunities to support commercialization of technologies remains the overall goal. In addition, next quarter activities will include the commencement of collaborative discussions with Griffin Chemical Corporation of Georgia. Topics will include contract research, field testing, disease control and training.

Consortium Expansion

- The Consortium Steering Committee continues to monitor and evaluate progress and future potentials for the project. A decision was thus taken to enlarge the Consortium membership to include Texas A&M University and the University of Tennessee, Knoxville, who are already currently collaborating with Pushchino Center. The enlarged Consortium will provide a strengthened mechanism for planning, monitoring and evaluating Consortium projects and activities.

University of California Support Office

- During this quarter the UC Support Office has provided valuable assistance to the project regarding expert consultant visits, planning for training visits and workshop preparation. Highlighting UC's participation in the project this quarter were the economics courses in Pushchino lead by Dr. Bruce McWilliams of the University of California. Working with local economists and stakeholders, Dr. McWilliams conducted seminars on systems ecology, natural resources and agro-business. His 3 month effort has had a profound effect on those participating in the seminars and working in these areas.

  Other activities conducted by the UC Support Office:

  -Sent two consultants, David Hird and Jim Maclachlan, to Pushchino in order to work with Pushchino veterinary personnel.

  -Milt Schroth and Seymour Van Gundy had several meetings to ensure UC system wide cooperation and coordination regarding project activities.

  -Evaluated and modified scope of work activities for consultants and participant trainees in order to ensure travel expenditures relate directly to project output areas.

  -Taken a co-leadership role with WSU regarding potato and other agriculture programs in order to ensure their sustainability and relevance to the project.

OUTPUT B: TRAINING PERFORMANCE AND CAPACITY

Intensive American Language Center

- The development of programs and methodologies for teaching English as a second language to Master's students at Pushchino State University (PSU) continued to be strengthened during the reporting period. Frederick O'Connor, Coordinator, Intensive American Language Center/WSU, traveled to Pushchino to introduced the use of technology in foreign language

training and conducted a needs assessment for both present and future development. The coordination resulting from the O'Connor consultancy has resulted in greater availability of English language materials and the identification of Pushchino IALC personnel for training in the U.S.. Activities conducted during the next quarter include curriculum changes, redefinition of methodological scope and evaluation testing.

Joint Master's Degree in Environmental Sciences at Pushchino State University

- The prime objective of this activity is the preparation for a joint Master's degree between PSU WSU and UC. The goal, for the previous and current reporting period, is to enhance the administrative capabilities of PSU and the quality of regulations and procedures through the inclusion of elements of programs of Master's in education through environmental sciences and new educational methodologies used in US land grants universities.

  Some of the activities conducted during this reporting period which pertain to the output of a joint Master's Degree Program include:

  -Analysis and comparison of Master's education at WSU and UC with programs currently being developed in PSU to identify programs at PSU which are compatible with programs offered at WSU and UC.

  -Potential for teaching Russian as a foreign language to US students of joint degree programs was assessed and preliminary plans were developed.

  -Material on Master's programs offered at WSU and UC were presented to the PSU faculty in order to encourage the incorporation of useful elements into PSU degree requirements.

  Master's programs offered at WSU and UC in the Life and Environmental sciences were analyzed, and salient differences from the Russian programs were noted. Opportunities for adapting PSU programs to the US models, whether as part of joint degree programs or as a part of the routine reexamination of Master's programs, are being explored. A mechanism for interaction with US partners at the level of individual departments has been devised. Departments with particular potential as partners in joint degree programs are in the process of selection.

  Activities to be conducted during the next reporting period include: US training of Pushchino Center personnel involved in the planning and implementation of the Joint Master's Degree Program; the identification of comparable fields of study at PSU, WSU and UC; the development of course content; the designing and scheduling of courses and academic calendars to allow for increased opportunities to individualize students schedules according to the Joint Degree requirements.

52

Establishment and Development of Environmental Science Continuing Education System at Pushchino State University

- The purpose of this subproject is the further develop and strengthen the training performance and capacity in environmental science and related topics. This subproject will enhance the level of environmental science education with various categories of students (high school students, teachers, faculty and administrators) by establishing and assuring operations of the environmental science continuing education center. The implementation of the draft scheme emphasizes local and regional needs and resources to insure that input into the activities will be partially defrayed by local bodies and institutions.

  Some accomplishments during the reporting period included:

  -regular interactions with the Ministry of Education; discussions with the Chair of the Serpukhov District Committee on Education; direct contact with specialists in pre-university education.

  -Dr. Yuri. A. Rochev, member of the CEU Board, attended an international conference titled, "Mathematics, Computers, Education" in Moscow and reported back to the Pushchino working group organizational principles of the education process at PSU. There was an exchange of relevant documentation between PSU and Dubna State University (Moscow Region). And an agreement has been reached on cooperation in the field of continuing education and in joint university projects in ecology related disciplines.

  Activities to be conducted during the next quarter include:

  -A seminar on the "Practical Approaches to the Environmental Quality Evaluation in Ecological Education at School" for instructors in the Serpukhov District.

  -preparatory work on the Continuing education unit for beginning intensive short-term courses in Economics, English and Russian.

  -Orientation of new teaching materials, computers, visual aids, texts, to increase the efficiency and scope of the Continuing Education Center.

OUTPUT C: GENERATION OF ENVIRONMENTAL TECHNOLOGIES

This output utilizes the capabilities of the Biological Research Center to develop high priority technologies that have potential application in solving or preventing environmental problems in Russia and the US. In the process, some of the extensive technical capabilities of the Center will be reoriented and focused on the prevention or remediation of current and future environmental pollution

and degradation problems.

Bacterial Ice Nucleation Activity

- The purpose and objective of this subproject is to create an organizational structure and develop a system to transfer high technologies for use in sustainable economic development of the region (Serpukhov) and protection of the environment.

  One of the accomplishments resulting from this activity is related to ice nucleation. Two primary strains selected during this reporting period have been assessed for their ice-forming characteristics. The maximum temperature at which ice-forming activity is observed in 50% and 90% of the cells has been determined. This determination places the selected strains in the category of strains most effective at forming ice at the highest temperatures. *This indicated that these strains could be effective at lowering the temperature and time required to freeze food products for preservation.*

  Work during this quarter has focused on assessing and identifying the strains earlier selected, as well as enhancing their effectiveness at ice nucleation. Next stage activities will include laboratory experiments on the resistance to frost of plants treated with antagonists of ice-nucleating bacteria. Specifically, taxonomic identification of the selected strains has been initiated in order to allow for *the use of these strains for commercial purposes in the future.*

Biocontrol of Diseases in Wheat

- The purpose of this project is to develop a new method of biological control of "take-all," caused by *Gaeumannomyces graminis var.tritici,* which is among the most destructive root diseases of wheat worldwide. There are presently no satisfactory seed treatments against this disease, no resistant cultivars, and currents farming practices have aggravated the problem to the extent that many fields now yield only about half the potential set by fertilizers and other agronomic inputs.

  In the previous quarter Pushchino and WSU scientists had already sequenced the DNA fragment of 7 kb which contains the genes *phz*ABCDEFG necessary for phenazine-1-carboxylic acid production by *P.fluorescens 2-79*. In this reporting period primers specific to *phz*C and *phz*D as well as primers specific to *phlD* gene (phloroglucionol production) were used for PCR screening of the IBPM collection of *rhizospere pseudomonads*. As a result seven strains have been tested. It was found that Pseudomonas sp. 38a and *Pseudomonas* sp. 7H contain phloroglucinol genes, and P. A *ureofaciens* BS1393 and P.aureofaciens BS 1391 have phenazine genes. The results were confirmed in re-tests.

  During this quarter very important information was obtained about the distribution of phz and phl genes among rhizospere pseudomonads. Characterization results of the IBPM

54

collection on antibiotic production and in vitro inhibition of root pathogens will be very useful in further experiments dealing with the construction of the effective transgenic Pseudomonas strains in biocontrol of take-all disease. Next quarter project activities will involve completing the HPLC analysis *of phenazine 1-carboxylic* acid production in wild and mutant cells and begin studies on the distribution of phz genes among the Pseudomonas strains.

Development of Biosensor Methods for Environmental Pesticides Control Based on Application of Enzyme Electrodes and Immunosensors

- The purpose and objective of this research is to elaborate a highly sensitive and specific laboratory express-method for qualitative and quantitative determination of a herbicide, 2.4-dichlorophenoxyacetic acid, and to adapt and use it for regional ecological control of environmental pesticides.

  During this reporting period the accomplishments of this subproject included:

  -The study of the parameters of sensor based immobilized cholinesterase;
  -Detection of organophosphate pesticides in controlled laboratory conditions;
  -The writing of a computer program to determine the kinetic and amplitude parameters of the sensor output signals;

  The results achieved to date indicate that the model enzyme sensor created on the bases of immobilized cholinesterase is highly sensitive. It can detect concentrations of pesticides (in laboratory conditions) at extremely low conditions. Next quarter, using the enzyme sensor, researchers will attempt to measure the concentration of phosphorus organic pesticides added to rivers, snow-melts, and well water to compare the sensor on samples similar to field environments.

Technology for the Bioremediation of Soils Contaminated by Oil and Oil products (Black Oil)

- The purpose and objective of this subproject are to develop the technologies for bioremediation of soil polluted with oil and its products based both on the activation of local micro flora and application of the constructed biopreparations.

  During this reporting period experiments were carried out in a model soil system made up of sterilized wood soil in 25 g portions in glass petri dishes. Soil moisture was 8-10%, which would approximate soil moisture in the Summer after several weeks without rain. The duration of the experiment was 3 months. The relative amount of each of the strains from the bacterial association were determined.

The results of these experiments lead the researchers to conclude that:

1) The comparatively low amount of water in the soil samples was shown to have an unfavorable effect on the number of pseudomonades. The relative amount of pseudomonades decreased by 70-85% after one month and remained low throughout the experiment.

2) The higher level of pollution (5% as opposed to 1%) was accompanied with increased efficiency of bacterial associations.

During the next quarter two series of tests with active associations of degraders strains will be conducted in natural conditions on soil contaminated with black oil and diesel fuel.

OUTPUT D: SUSTAINABLE AGRICULTURE AND A MARKET-BASED FOOD SYSTEM

This output focuses on enhancing agricultural productivity and sustainability AND A market based food system which are being designed and implemented by the Higher Agro-Biotechnological College and other Pushchino Center institutes through collaboration with the University of California and Washington State University.

Plant Health Laboratory

- The purpose of this subproject is to develop, improve, adopt and introduce more streamline methods of pest diagnosis in plants and introduce new biotechnological strategies and methods of biological control of some major pests.

Specifically, during this quarter researchers were able to:

-Complete development of the method of apical meristem using thermo-therapy for obtaining viral-free potato plants.

-Start development of the method of obtaining viral-free potato plants using antiviral agents.

-Continue research on biological control of potato, wheat and sunflower plant pathogens.

-Transform various qualities of potato and sugar beet plants by delta-endotoxin gene of Bacillus thuringiensis.

This quarter significant contacts with institutes, scientists and organizations associated

with plant health problems in Russia have been initiated. During the next quarter realization of joint plans with colleagues in various agriculture departments will be coordinated in order to commence spring-summer field activities. In addition, assistance in the application of new technologies, such as the teaching of personnel and services in monitoring plant pathogens in various agricultural units in the Russia, will continue.

Integrated Potato Project

- The purpose and objective of this activity is to develop a cooperative effort between Russian institutions, WSU and the UC System to establish a model potato seed production program. And secondly, to develop certified pest resistant seeds and new improved varieties using standard and molecular technologies.

  During this reporting period Dr. E.V. Mamonov and other researchers had several meetings with representatives of the Russian Department of Agriculture of the Yaroslaov Oblast regarding the potential collaboration in the supply of micro tubers and test-tube plants. They also met with the Deputy Head of the Department of Agriculture of the Serpukhov District, I.V. Lopatain, regarding plans for growing virus-free seed potatoes at Dashkovka. In Pushchino technical and organizational plans regarding growing potatoes from minitubers were made a at meeting with the deputy Director of the farm at Dashkovka and at various planning seminars. One of the results of the meetings was the finalization of plans for the organization of a demonstration plot of elite seed potatoes of local varieties.

  During this quarter significant progress was made with three stages of the work with potato seed material: test tube, hydroponics and greenhouse. Intensive work was carried out in the planning for the greenhouse stage of growing the minituber s received from the first batch of plants grown in test tubes and hydroponics. Next quarter work will focus on:

  -Production of minitubers in hydroponics
  -Planting of minitubers in hydroponics
  -Planting of demonstration plots
  -Testing new varieties for viruses and viroids

Technology Transfer Training Unit (TTTU)

- In cooperation with Pushchino State University, the scientific research institutes of Pushchino Center, Washington State University, the University of California and oblast authorities, this subproject aims to establish a pilot center of agricultural technology transfer and extension service development in South-Moscow (Central Russia) regions.

  When examining the US Land Grant and Extension Service models for elements which can most rapidly and successfully be adopted in the conditions existing in Russia, at present it

51

is essential to consider the current organization of agricultural enterprises in Russia, as well as trends in this area in the United States. In the United States Extension Service is undergoing evolution: the increase in the size of farms and agrobusinesses has led to the development of direct extension, bypassing the existing system of University Extension Services. Since this trend in the US parallels the pattern of organization in Russia, this newer model of technology transfer and information dissemination, addressed to the large agricultural companies, rather than small-scale producers, has great potential for adoption in Russia.

During this reporting period accomplishments were made regarding the transfer of techniques of seed potato growing in hydroponic devices, techniques of certification of seed potatoes, organization of the first Russian regional laboratory of certification of seed potato, training personnel for these laboratories in Pushchino and discussions on output devices and diagnostic equipment for these laboratories. Moreover, a symposium on federal programs on the preservation of rare aborigenic breeds of dairy cattle and cattle industry development was held in Pushchino on January 29. Participants included members of the Russian Academy of Agricultural Sciences and other specialists from the Russian Ministry of Agriculture.

Activities that will be undertaken next quarter include:

-Selecting stakeholders at the level of the oblast administrations and appropriate federal ministries.

-Organizing in Pushchino a conference addressing issues related to industry beef cattle breeding and the conservation and restoration of animals of vanishing breeds.

-Begin the organization of the Center of Certification in Pushchino (food, potato, cattle, sanitary certification and personnel training).

-Publication of manuals and methodological recommendations on potato certification methods; development of the curricula for the students involved in the Extension Service.

Biopesticide Technologies for Greenhouse Pathogens

- The purpose of this subproject is to develop new biopesticide products on the basis of Plant Growth Promoting Rhizobacteria (PGPR) Pseudomonas and to establish commercialized technologies based on these products. These new biopreparations and agrobiotechnologies are mainly developed from regional plant protection stations and biofactories in Russia. These units can produce and realize new Pseudomonas-inoculants and technologies in agriculture.

Accomplishments during this reporting period:

-Meetings and communications with several individuals and organizations including K.E. Sidelnikov, Head of the Government Chemical Committee of the Ministry of Agriculture.

-Agreements with the Stavropol and Nizhnii Novgorod Plant Protection Stations have been achieved to produce biopreparation on the basis P. aureofaciens BS1393 strain and to continue greenhouse and field trials this year (field trials are important for full registration of biopreparations in the Russian Federation).

Progress towards the purpose and objective of this subproject are continuing successfully. New formations of biopreparations based on Pseudomonas and Flavobacterium strains were successfully tested in greenhouses and the results have allowed researchers to continue work on other bacterial mixtures. Work during the next quarter will focus on the analysis of these experiments.

OUTPUT E: COMMERCIALIZATION OF TECHNOLOGY (TECHNOPARK)

This subproject address the long term sustainability of the Pushchino Center. An effective mechanism to commercialize technologies, generated through research, education, training and outreach activities of the Pushchino Center, will provide a downstream flow of revenue needed to address recurrent cost structure problems. The Technopark focuses on the commercialization of technologies and their transfer to the commercial sector and development of small businesses as incubators.

Technopark Organization and Operational Structure

- The Pushchino Biological Research Center Technopark has been established for the assistance of science-based businesses and the commercialization of technologies. Its three main objectives are to 1) promote the commercialization of the Pushchino Center; 2) transfer the intellectual property of the Pushchino Center to business and industry; 3) provide a financial return for the Pushchino Center and personnel. It is a further objective of the Technopark to utilize existing facilities in order to provide a supportive environment for the formation of private entities organized under science based technologies.

  The main objective of the work conducted during this reporting period was to start creation of the Technopark information system capable of providing assistance to the projects associated with the commercialization of technologies. Booklets and other information material was prepared concerning the structure and types of Technopark activities. These booklets contain questionnaires for Technopark users (research groups, companies and investors). This information has been distributed to firms dealing in

science based technologies such as Perftoran, Lakhema International, Biosensors and MEKBI. As a result, these groups have declared their interest in using the Pushchino Center Technopark in order to commercialize their products. Further, these groups have had on going dialogue with Technopark personnel involving specific technologies and methods towards the commercialization process.

The Technopark working group has also focused on three projects identified as promising technologies for commercialization during the evaluation of technologies conducted in the preceding quarters. As a result of further screening of proposals with input from the organizations which will serve as founders of the Technopark, a fourth technology has been added. These projects are : (a) bioremediation of soils and water contaminated with petroleum products; (b) microbiological methods of plant protection; (c) regional problems of public health; (d) intensive fish-production with microbiologically based feeding systems.

In the area of bioremediation some of the technologies can already be used commercially; the focus during this quarter has been on preparing a business plan and contracts to conduct bioremediation on specific sites. In the area of plant protection, the Technopark working group is moving forward in initiating contractual agreements with various companies and organizations.

During the next quarter the Technopark working group will continue formation of the intellectual property and juridical databases, and carry out the analysis of databases, determine the potentials for technology transfer to the Russian market, work to register the Technopark as a legal entity and continue negotiations to reach agreements regarding bioremediation technologies, plant protection and fish production.

PARTICIPANTS TRAINED

- During this reporting period there were a total of 119 individuals trained. Of this, 66 were men and 53 women. These training activities included but are not inclusive to: long term US training in biological/genetic control of soil born pathogens; Technopark activities related to commercialization; IALC structure and operations; joint Master's Degree programs and environmental science and continuing education programs.

  Specifically, the OGRD activities relating to proposal development training and structural frameworks provided training to approximately 50 individuals who enthusiastically contributed to successful seminars and consultant activities.

PLANS FOR THE THIRD QUARTER: FISCAL YEAR 1996

- Participation in an Environmental Policy and Planning Workshop to be held at WSU June 16 -

July 3. This group, consisting of 6 Pushchino scientists, will receive training in Forest Management Policy and Environmental Management Methodology and Policy.

- Continued development of an Agro-Business workshop to be held in Pushchino in late Summer.
- On-going negotiations between The University of Tennessee, Texas A&M University, The University of California/Berkeley and Washington State University regarding the conclusion of negotiations on Consortium expansion.
- Agreement between WSU, PSU and Far Eastern State University on a joint Masters Degree Program.
- Continued US training of Pushchino personnel which is directly related to Project outputs.

PROJECT ENCUMBRANCES AND EXPENDITURES

CUMULATIVE EXPENDITURES AND ENCUMBRANCES

TABLE 1	PUSHCHINO PROJECT QUARTERLY EXPENDITURE REPORT FOR THE PERIOD JANUARY 1, 1996 - MARCH 31, 1996				
Budget Category	Budget Amount	Expended	Encumbered	Category Total	Cumulative Total
Personnel/Benefits	492,268.00	84,414.85	27,450.43	111,864.88	290,676.09
Travel/Accommodations	138,233.00	10,720.55	13,113.12	23,833.67	129,411.67
Workshop/Training	76,575.00	1,938.00	6,000.00	7,938.00	49,778.93
Operations Costs	383,733.00	31,556.27	14,177.16	45,733.43	147,704.18
Equipment	219,200.00	2,707.50	0.00	2,707.50	69,497.51
Sub Contracts	526,660.00	2,493.86	52,152.34	54,646.20	71,746.86
Indirect Costs	364,051.00	38,184.81	22,292.58	60,477.39	195,136.25
$Total	**2,200,720.00**	**172,015.44**	**135,185.63**	**307,201.07**	**953,951.49**

61

SUMMARY

The *Uniting Science and Education and the Transfer of Technology for the Sustainable Economic Development and Environmental Protection of South-Central European Russia* is project of wide scope and complexity. In cooperation with USAID, WSU, the UC system, the Pushchino Center and personnel working within these organizations, much has been accomplished during this reporting period. As stated at the beginning of this report, the project is based upon five output areas which address several key areas of US development policy. As evidenced from this report, the Russia-US Technical, Educational and Economic Development Consortium, in cooperation with USAID, is making significant progress in these areas. With the incorporation of new Consortium members, continued support from all organizations involved and a commitment to collaboration, success will be ensured.

QUARTERLY IMPLEMENTATION PROGRESS REPORT

UNITING SCIENCE AND EDUCATION AND THE TRANSFER OF TECHNOLOGY FOR SUSTAINABLE ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION OF SOUTH-CENTRAL EUROPEAN RUSSIA

THE RUSSIAN - U.S. TECHNICAL, EDUCATIONAL AND ECONOMIC DEVELOPMENT CONSORTIUM

GRANT NO. CCN-0012-G-4111

FOR THE PERIOD

BEGINNING OCTOBER 1, 1995
AND ENDING DECEMBER 31, 1995

EXECUTIVE SUMMARY

The "Uniting Science and Education and the Transfer of Technology for Sustainable Economic Development and Environmental Protection of South-Central European Russia"(Pushchino Project) has completed its fourth quarter of implementation.

The purpose of the "Pushchino Project" is to further develop and enhance the capacity and performance of the "Pushchino Center" and its member organizations (the Biological Research Center of the Russian Academy of Sciences, Pushchino State University and the Higher Agro-Biotechnological College), in collaboration with US partners, to utilize science, education and the transfer of technology to support sustainable economic development and environmental protection in South-Central European Russia.

The Pushchino Project is organized around five Outputs which include:

1. Enhancing organization, planning, evaluation and performance of "Pushchino Center" to ensure that the purpose of the Project is achieved.
2. Further strengthening of educational performance and capacity in environmental science, sustainable agriculture and related topics.
3. Further development and strengthening of information systems and environmental technologies in high priority areas related to sustainable agriculture and market based food systems.
4. Strengthening and further development of a sustainable agriculture and a market based food systems in the region.
5. Further development and strengthening of a Technopark for the commercialization of technologies which will facilitate and support the establishment of private sector businesses.

During the quarter Consortium partners:

- WSU In-Country Support Office: The official legalization of the Washington State University Support Office in Pushchino, Russia. The In-Country Support Office has continued to be hampered in its attempts to establish a Support Office bank account due to tax authority's refusal to grant tax free exemption. However, an account has been available which allows the utilization of Project funds in Russia.

- Office Equipment: Computers and Printers were shipped during the quarter to Pushchino through a collaborative agreement with the International Science Foundation. Computers and printers arrived intact and are in operation at Pushchino.

- Consultants: Drs. James Henson, Director of International Programs, Jan Noel, Director of International Programs - Development Cooperation and Thomas Byers, Pushchino

64

Project Coordinator participated in discussions with Workgroups in Pushchino for the development of the Fiscal Year 1995-96 Workplan.

- Workplan: The fiscal year 1995-96 workplan was completed, with incorporation of the fourth quarterly report, and submitted to both the USAID Mission in Moscow and USAID in Washington.

- Project Development: Dr. David Zilberman, UC participated in discussions with Department of Agricultural Economics faculty at WSU to address methods to incorporate natural resource economic issues into education, research and outreach activities in Pushchino. This builds on the conference held at Berkeley, California during the previous quarter and will lead to the implementation of an economics capability being developed, collaboratively between WSU and UC, in Pushchino.

- Administrative Visits; U.S.: Mr. John Braley, Project Officer USAID/Washington spent four days in Pullman reviewing progress on grant related activities (A copy of his program is attached). WSU felt that the meetings were very useful and productive, supporting the belief that project management was effective and efficient in dealing with issues pertinent to the grant.

  Administrative Visits Russian: The In-Country Coordinator, Ms. Kathy Gelhar, visited WSU and UC. Her time was spent reviewing achievements of the project, next steps and fine tuning required to ensure even better performance. Activities focused on administration in-country, coordination, communication, financial control, inventory control and facilitation of normal day to day operations of the field office.

INTRODUCTION:

During the first quarter of fiscal year 1996 the Pushchino Project moved closer toward achievement of its goal and purpose. Project management reviewed activities being conducted in each of the five output areas to refine and adjust implementation procedures to better meet the challenges of the second year.

Output A: Organization, Administration and Management

Washington State University Support Office

The Washington State University Support Office (WSU/SO) supported a number of activities during the quarter. The Support Office spent time finalizing the development of the fiscal year 1996 workplan. This effort originated during the previous quarter through meetings held in Pushchino and was followed up during this quarter through a Portland meeting with other members of the Steering Committee. This meeting was used to discuss and agree upon Project

65

supported activities which should be included in the Plan of Work. Work continued in support of opening a bank account for the Pushchino Support Office through provision of information to the Pushchino office.

Accomplishment During Report Period

International Science Foundation

During the quarter, the International Science Foundation (ISF) facilitated the transfer of office equipment to Pushchino. Grant Assistance Program (GAP) participation, set up by the WSU/SO directly with the IFS, has proven an effective mechanism for shipping materials to the Russian Federation. With the agreement in place, the Project has been able to import materials duty free and will be able to purchase commodities in country free from value added tax.

Western European Funding Sources

The Project completed development of a Western European Funding Data Base (WEFDAB). The data base procedures manual was provided to the Pushchino Office of Grants and Research Development. It provides Pushchino Center with access to funding sources, in Europe, which are not readily available through the normal funding data bases in the United States. The WEFDAB may become an instrumental part of generating resources to support high priority research and administrative development activities.

The WEFDAB may be used to identify funding sources for development and research in the following areas: a) management, b) education, c) agriculture, d) environmental research and e) commercialization of technology. Utilization of United States' funding databases will support research in a variety of scientific endeavors. Reductions in support for overseas development initiatives requires diversification of funding opportunities for Pushchino Center. Part of this effort has been accomplished through development of the WEFDAB.

Meetings

Members of the executive committee met in Pullman, Washington to discuss the preparation of the 1996 Plan of Work.

Interaction with Private Enterprise Groups

An effort to introduce private sector initiatives with Pushchino Center was launched during the quarter. This involve a Washington State based group, MicroAg. The private sector group was interested in opportunities to help support the efforts being made by the Technopark to develop commercial technologies.

66

Pushchino Support Office

Meetings and communications

* Year-two planning workshop and associated meetings with subproject leaders and US and Russian project leadership (August).
* Meetings with project administration, consultants and other interested parties during administrative travel to Washington State University and the University of California, Berkeley (December).
  - Project administration (Jim Henson, Jan Noel and Tom Byers from Washington State University; Milt Schroth and Emery Roe from University of California): project planning and implementation.
  - Masumi O'Connor, International Programs, Washington State University: financial and expense reporting issues.
  - Dan Hardesty, International Programs, Washington State University: procurement issues.
  - Vince Hutnak and Mary Bambery, Sponsored Programs, Washington State University: financial issues.
  - Jim Wills, Office of Grants and Research Development, Washington State Univeristy: planning for consultancy to OGRD.
  - Raja Rao, International Programs, Washington State University, regarding Western European funding sources database developed for Pushchino Office of Grants and Research Development.
  - Donna McCool, Associate Director, Washington State University Libraries, regarding planning for library consultancy.
  - Muriel Oaks, Washington State University: Distance education subproject planning.
  - Garrell Long, Department of Entomology, Washington State University: planning for activities in potato subproject.
  - Jack Horne, Director, Science, Mathematics and Engineering Education Center, Washington State University: water quality monitoring within Environmental Planning and Policy and/or Continuing Education subprojects.
  - Frederick O'Connor, Coordinator, Intensive American Language Center, International Programs, Washington State University: planning for consultancy to enhance English language teaching.
  - Bruce McWilliams, Department of Agricultural and Resource Economics, University of California Berkeley: discussion of proposal for economics course in Pushchino.
  - Grazyna Michalska, Department of Agricultural and Resource Economics, University of California Berkeley: discussion of potential for collaboration with Technopark subproject.
  - David Zilberman and Jerome Siebert, Department of Agricultural and Resource

Economics, University of California Berkeley: coordination of activities in the area of economics.

- Vincent Resh, Department Environmental Science, Policy and Management (Entomology), University of California Berkeley: participation in Environmental Planning and Policy subproject.
- Kathleen Gilcrest, College of Natural Resources, University of California Berkeley: planning for consultancy to information office.
- Jeanene Greer and Ann Jeffrey, administrative staff, Department of Molecular and Cell Biology, University of California Berkeley: planning for workshop to enhance administrative and managerial effectiveness.
- David W. Hird, Director of International Programs, School of Veterinary Medicine, University of California Davis: planning for consultancy in animal health.

* Meetings regarding registration of representative office, legal status of office and documentation required for opening bank account:
  - Ministry of Science and Technology Policy: Zlata I. Lapteva, Administration for Coordination of International Scientific and Technological Cooperation; Yuri N. Mshensky, Director of the Department of Life Sciences, Biotechnology and Forest-Industrial Complex;
  - Bureau for International Humanitarian and Technical Assistance: Alexander Prilepin, E. F. Izgarshev;
  - Tax Service of the City of Pushchino: V. Iu. Goncharova, Chief; S. S. Sivozhelezov Head of the Department Taxation of Legal Entities;
  - Tax Service of Moscow Region: T. A. Gvardybadze, Deputy Director Department of Foreign Economic Activity; P. A. Mochalkin, Director Dept. of Foreign Economic Activity; N. T. Shelemet, Deputy Chief of Tax Inspectorate
  - Social Security Fund of the Moscow Region: A. I. Martynov;
  - Social Security Fund of the Russian Federation, Legal Department: L. I. Chikmacheva;
  - Social Security Fund of the City of Pushchino, A. V. Dotlova
  - Obligatory Medical Insurance Inspectorate of the City of Pushchino: V. Luchitsky
  - Pension Fund of the City of Pushchino: M. S. Chepur.
* Meetings with Alexander Shaborov, International Science Foundation, regarding assistance in duty-free importation of equipment and supplies.
* Meetings with other guests and contacts of Pushchino institutions introducing them to the Project and Consortium:
  - Susan D. Schaeffer, Professor, School of Business and Economics, Department of Management and Finance, California State University Hayward.
  - Donna Wiley, Professor, School of Business and Economics, Department of Management and Finance, California State University Hayward; Director, joint degree program with Academy of the National Economy, Moscow.
  - Gregory S. Cole, Director, Office of Research Services, University of Tennessee.
  - Jeff D. Ferry, Country Representative, Russia, VOCA.
  - Richard Stone, Correspondent--Russia, Science Magazine.
  - Lena Heron, Farmer to Farmer Volunteer, Winrock, working with the organic

farming group Econiva.

- Jerome Siebert, Department of Agricultural and Resource Economics, University of California Berkeley.
- David Granatstein, Center for Sustainable Agriculture, Washington State University; working with Center for Citizens' Initiatives program in Sergev Posad Agricultural High School.

Equipment

Two shipments of equipment, representing 25 computers and 11 printers, as well as other smaller items, were received. These were purchased in the US, with customs clearance handled by the International Science Foundation according to an agreement which allows us to share their tax exempt status. This equipment was checked for defects, marked with inventory numbers and distributed to project participants for use on project activities.

Purchase requests planned under the project were received and reviewed together with International Programs procurement officer Dan Hardesty. Procedures for procurement were reviewed, and outstanding issues identified.

Accreditation

The Representative Office of Washington State University was accredited with the Bureau for International Humanitarian Aid and Technical Assistance (BIHATA) of the Russian Federation. Consultations with bank representatives indicate that the certificate of registration meets the requirements of the Central Bank for opening a non-resident bank account for a foreign legal entity. On the basis of this certificate we have begun receiving the additional documents necessary for opening a bank account (notice of registration with the tax, social security, pension and medical insurance authorities). At present all documents are ready with the exception of notice from the tax inspectorate.

The project support office provided communication and coordination between US and Russian project participants, as well as among Russian participants; communicated with Russian participants individually and in meetings of working groups on status of subprojects, status of project administrative activities, difficulties and questions arising.

Consultant Support

The office provided support for 13 consultants and other guests of project: coordination of planning for trips between US and Russian participants; development of itinerary and scheduling of meetings; scheduling and announcing of seminars; briefing individuals on overall project and project elements related to their activities; provision of logistical support (housing, transportation, translation services). Participant training in the US was facilitated for one individual.

Progress towards acheiving purpose and objectives

During this report period the Support Office has continued to function to provide necessary services to Project participants and collaborators. In addition to the routine operation of the office, attention has been focused on increasing the efficiency of financial and procurement operations, as well as on planning for the second year of the project.

Issues and problems

Continuing delays in establishing bank account due to difficulties in understanding our status on the part of Russian officials.

Status of activities scheduled

* Facilitate and participate in planning process for second year of project: completed.
* Work with Project Coordinator to clarify, improve and (where possible) finalize accounting, procurement and inventory procedures: procedures clarified and improved; documentation of current procedures under preparation.
* Continue to provide support to project activities: ongoing.

Training activities and number of individuals trained

The following seminars were conducted:

* General Nematology and its Relationship to a University in an Agricultural Colleg, Dr. J. Baldwin, 10 participants (2 women, 8 men)
* The Potato Pest Program as Model for Nematode Management, Dr. I Thomason, 7 participants (3 women, 4 men)
* Field Day and Diagnosis Day: Practical Training on Processing Nematode Samples and Identification, Drs. Thomason and Baldwin, 4 participants (3 women, 1 man)
* University Infrastructure and Shared Governence in the University of California, Dr. M. Nachman, approx. 60 participants (approx. 40 women, 20 men; PSU faculty, administrators and graduate students)
* Overview of Continuing Education, Dr. Azzaretto, approx. 15 participants (approx. 5 women, 10 men; PSU faculty and administrators, continuing education working group).
* System of Evaluation in the University of California, Dr. Nachman, approx. 30 participants (10 women, 20 men; PSU faculty and administrators)
* Applied Research and Community Service, Dr. Azzaretto, approx. 25 participants (10 women, 15 men; PSU faculty and administrators)
* Successful Business Plans, Dr. J. Siebert, 7 participants (2 women, 5 men)
* Market and Demand Analysis, Dr. J. Siebert, 7 participants (2 women, 5 men)
* General Principles of the Organization of Technology Transfer, Dr. J. Siebert, approx. 30 participants (15 women, 15 men).
* Four men and four women participated in the day-to-day operation of the office.

Activities scheduled for next quarterly report period

* Prepare documentation of project implementation procedures.
* Continue attempts to open bank account.
* Begin preparation of close-out plans.
* Continue to provide support for project activities.
* Work with subproject leaders to improve reporting, particularly reporting of any available impact data.

University of California Support Office

General:

* Weekly email to Alex Boronin, Kathy Gelhar, and Jim Henson about planning, monitoring progress in the various research and administrative areas.
* Purchased and mailed reagents and hormones necessary for Research.
* Had planning meeting with David Hird, UC Davis about proposed trip to work with animal group. Considerable email orienting the group on needs and activities in Pushchino.
* Had several meetings with J. Greer and A. Jeffrey about proposed trip to help build a stronger administrative support group (secretarial, accounting etc.) at Pushchino. Prepared written proposals.
* Several meetings with Dr. David Zilberman about developing economics program in Pushchino. Meetings and orientations with Bruce McWilliams who will spending 6 months in Pushchino teaching economics and interacting with Russian students.
* Prepared and maintained UC. support office for USAID consortium. Files are updated, materials of potential importance to Russian scientists are collected, and information from programs such as Russ Log-out of the University of Maryland are compiled as a means of remaining current on economics, social, and agricultural activities in Russia.
* Important information from the above activities are sent to Pushchino.

October:

- Traveled to Pullman to consult with executive group about project.
- Several meetings with Mr. and Mrs. Ron Tyler, Farm advisor, in relation to his going to Pushchino to help build an extension system and to interact with those interested in modern agriculture.
- Meetings with Drs. D. Zilberman, S. Van Gundy, Boronin and Mr. Dick Bearhs on consortium planning at Santa Cruz. Dr. Boronin was introduced to Mr. Ron Tyler who then showed him agriculture and modern storage facilities. Interacted with Mr. Dick Beahrs, Senior V.P. of Time Warner, who is an associate from the private sector. Mr. Beahrs has contributed $100,000 to the project.

- Dr. David Zilberman met with WSU consortia members over planning for the economics course in 1996.
- Dr. S. Van Gundy and Dr. M. Schroth met and oriented the new V.P. of U.C agriculture about consortium activities. Discussed U.C. role.

December

- Van Gundy and Schroth participated in an executive meeting at Portland with WSU consortia members. Planned for the future.
- Ivan Thomason and Jim Baldwin taught short course on nematology to Pushchino ag group. Also identified important pathogens in fields intended for planting disease free seed.

Communications

Accomplishments During the Reporting Period

The Pushchino-Serpukhov section of the channel providing access to the Internet in Moscow has been transformed from asynchronous analog to synchronous digital with a rate of 64 Kb, and for that purpose equipment costing $3000 has been purchased with matching funds and installed;

Additional funding covering expenditures on Pushchino-Moscow channel and traffic has been obtained from a NATO grant ($6000 over 3 months);

A project has been developed for creation of the first section of a high-speed channel Pushchino-Moscow for providing access to Internet for Pushchino Research Center. Financial support has been received in the amount of 250 million roubles (or $54,000) by a grant from the Russian Foundation for Fundamental Research (RFFR).

A contract with "Moscow Cellular Communications" has been signed for construction of a radio relay line Pushchino-Serpukhov for data transfer with the rate of 2 Mb and for increasing the number of telephone channels (estimated period of implementation 4 months).

Network controllers were purchased and 15 PCS were connected to the local network and virtual working groups have been created for project participants.

On the base of the existing telecommunication possibilities a Russian-American ecological workshop within the framework of the "Globe" project was organized; approximately 50 individuals, including representatives of US and Russian schools and universities participated in the workshop.

72

Progress Toward Achieving Purpose and Objective

- Significant improvement of qualitative and quantitative characteristics of regional telecommunication system of the PRC were made. Putting into use state-of-the-art equipment and a more effective and rational use of the already existing resources has been effective in raising productivity.
- Analysis of options for a dramatic increase in data transfer capabilities of all the links of the telecommunication system and especially the channel of the PRC connection to the Internet, including assessment of financial needs and search for additional financial sources and partners for implementation was undertaken.
- A significant increase in the flow of data between the PRC institutes on the Internet at minimum cost was achieved. At the beginning of 1995 average one-day external traffic of the PRC was 100-150 Mb, in the middle of the year 150-200 Mb, and in December 1995 250-400 Mb. The overall foreign traffic of the PRC has increased: At the beginning of 1995 500 Mb per month, in the middle of the year 800 Mb, in December 1500 Mb. The overall traffic of the PRC-Internet exchange in December was 9000 Mb. In addition, the quality and reliability of the network on the whole has increased significantly due to the creation of duplicate channels and usage of more reliable digital telecommunication devices.
- Rapid growth in the demand for computer based electronic communication and data exchange in the PRC and among project participants has increased. As a result of the work completed, a telecommunication project has been developed for the creation of a high-speed channel Pushchino-Moscow for Internet access with a step-by-step increase of the data transfer rate from the current level of about 64 Kb to 2 Mb. For the implementation of the first stage a grant for 250 million roubles from the Russian Fund for Fundamental Research was received. These funds will be invested in the building of a radio-relay line Pushchino- Serpukhov, which will provide data transfer with the rate of 2 Mb in that section and will increase the availability of long-distance telephone lines in Pushchino. Complete implementation of this part of the telecommunication project will require additional financial support in the amount of 150 million roubles. Potential sources of additional funding have been identified and will be pursued during the following quarter.
- A big achievement towards completion of the whole project is receipt and installation of PCS purchased for the Project. More than a half of these computers (15) are connected to the PRC network, which has raised the effectiveness of work on the project significantly.

Output B: Training Performance and Capacity

Title of Subproject: Development of Programs and Methodologies for Teaching English as a Second Language to Master's students at Pushchino State University (PSU)

Accomplishment During Report Period

Master's programs have been introduced gradually during the last two years in connection with the organization of multi-level system of higher education. However, the State Committee of Higher Education does not have program modules available which address teaching foreign languages to Master's students.

A clear, concise curriculum with testable performance objectives at each level of study with innovative educational methodologies to improve teaching capabilities of the faculty is being investigated. This addresses the broader English language needs of Master's students and of Pushchino Center's personnel.

- A major focus during this quarter has been developing written progress tests and final exams for the Master's students of the first and third semester. The tests used during the previous two years have been revised. The aim of the tests is to give students a cognitive grasp of the patterns and also to provide the sort of exercises that promote real fluency in the use of these patterns.
- During this quarter requirements for the final oral examination have been worked out for the third semester Master's students.
- Topics for conversation have been selected for each level.
- Passages of interviews with native speakers have been selected and re-recorded to be used to assess listening and comprehension skills.

Progress Towards Achieving Purpose and Objectives

In developing progress tests and final exams use has been made of grammatical structures and patterns as well as of vocabulary exercises that meet a real need at every particular level of instruction. The tests are designed to incorporate what is generally considered to be a communicative approach to language teaching.

The topics chosen for final oral examination are relevant to the students' concern, daily lives, life's experiences and scientific interests. They are variously designed to encourage the students to talk about themselves and their activities, to engender cross-cultural comparisons and to be thought - provoking. The materials used seek to consolidate and integrate all language skills and are of great benefit to our students as in language learning it is very important to have a sense of achievement.

Title of Subproject: Joint Master's Degree in Environmental Sciences both of Pushchino State University (PSU), Washington State University (WSU), and The University of California (UC).

Purpose and Objectives of Subproject

The prime objective of this activity is the preparation of regulatory documents for the joint Master's degree at PSU. In order to enhance the administrative capabilities of PSU and the quality of regulations and procedures through the inclusion of elements of programs of Master's education in environmental sciences and new educational methodologies used in US land grant universities.

Accomplishments During Report Period

Factual information concerning Master's education at WSU and UC was requested and received at the beginning of January, 1996 through the Russian - US Consortium coordinator Kathy Gelhar.

Activities in Pushchino and Other Locations Pertaining to Output

The major focus during this quarter has been examining various materials concerning Master's education in the USA as well as studying the experience of WSU, UC (Berkeley, Riverside, Davis), IU (Indianapolis), OSU (Corvallis, Oregon), Cornell University, Utah State University.

The materials studied are as follows: General catalogs, faculty programs in research and extension, programs for graduates and undergraduates of various colleges and departments, graduate and undergraduate handbooks, international education programs, bulletins, etc.

Progress Towards Achieving Purpose and Objectives

This quarter is a preliminary stage of the work on the subproject and is primarily concerned with the study of the various patterns of Master's education in environmental sciences at some US Universities.

Output C: Generation of Environmental Technologies

This output utilizes the capabilities of the Biological Research Center to develop high priority technologies that have potential application in solving or preventing environmental problems in Russia and the US. In the process, some of the extensive technical capabilities of the Center will be reoriented and focussed on the prevention or remediation of current and future environmental pollution and degradation problems.

During the quarter, progress continued to be made on activities previously approved by the Working Groups and Executive Committee. Summary information is given below.

Title of Subproject: Biocontrol of diseases in wheat

The purpose of this project is develop a new method of biological control of take-all, caused by *Gaeumannomyces graminis var.tritici*, which is among the most destructive root diseases of wheat worldwide.

During this quarter additional sequence information of *phz* gene locus was obtained. It revealed the existence of two regulatory genes with significant homology with corresponding members of a two-component sensor-regulator family, which regulates gene expression in response to environmental and cell density signals. This data, as well as the results of our experiments on the possibility to synthesize phenazine 1-carboxylic acid in E.coli cells containing only phzCDEFG genes, will be useful in further experiments dealing with the construction of the effective transgenic *Pseudomonas* strains in biocontrol of take-all.

Plans to 1) complete the HPLC analysis of phenazine 1-carboxylic acid production in wild type and mutant *P.fluorescens* 2-79 cells as well as in *E.coli* carrying different individual phz genes, and 2) start the studies on distribution of *phz* genes among the rhizospheric *Pseudomonas* strains from the collection of the Institute of Biochemistry and Physiology of Microorganisms, Pushchino have been made.

Title of Subproject: Biopesticide Technologies for Greenhouse Pathogens

The purpose of this subproject is to develop new biopesticide products on the basis of Plant Growth Promoting Rhizobacteria (PGPR) Pseudomonas and to assist establishment of technologies commercialized from these biopreparations.

Research focuses on evaluation and analysis of all experiments and trials of various formulations of bacterial inoculant which influence plant health in greenhouses. The results showed that traditional approaches to plant protection with use of chemical preparations and steaming of soil can be replaced by new biotechnologies.

- IBPhM RAN concluded an agreement with Krasnodar Experimental Factory of Biological Crop Protection Products to develop regional technology on production of our biopreparation. This is based on P. aureofaciens BS1393 strain.
- A comprehensive toxicological and sanitary evaluation of promising new strains will be conducted.
- The sixth committee of the Congress was held in biological methods in integrated plant protection. Our reports to this committee (December 6, 1995) were devoted to practical use of rhizosphere pseudomonads on protection of various agricultural plants. Meetings and discussions on this problem were very productive and allowed us enter into relations with a number of persons from the Department of Agriculture who can and want to facilitate progress of new approaches to controlling pathogens.

Progress Towards the Purpose and Objectives

A number of formulations of biopreparations using Pseudomonas strains were tested in the greenhouses and promising results have allowed us start the application of new technologies in some greenhouses. The work on toxicological evaluation of the P. aureofaciens strain BS1393 have been finished in cooperation with Research Center of Toxicology and Sanitary Regulation of Biopreparations. All documents were passed to the Ministry of Agriculture and Food Production of the Russian Federation for the following stage of examination and registration of biopreparation "Pseudobacterin-2".

Title of Subproject: Construction of potato resistant to insects, phytopathogens and herbicides

The purpose of the subproject is the development of transgenic potato varieties resistant to insects, phytopathogens and herbicides. This is planned to be accomplished through the transfer of the delta endotoxin gene of Bacillus thuringiensis and buckwheat proteinase inhibitor gene into potato cells and then to regenerate transformed cells to whole plants.

Transformed potato plants with delta-endotoxin gene of Bacillus thuringinsis var.berliner display resistance against thrips and spider mite, as observed in preliminary experiments on interaction between these invertebrates and young transformed potato plants.

A technique for genetic transformation of Russian potato varieties and for regeneration of transformed potato cells and for potato clonal micro propagation is being developed. The Delta endotoxin gene of Bacillus thuringiensis has been transferred into potato cells, resulting in transgenic potato resistant to lepidopteran insects, spider mite and thrips (for spider mites and thrips, this is new achievement).

Title of Subproject: Development of Biosensor Methods for Environmental Pesticides Control Based on Application of a) Enzyme Electrodes and b) Immunosensors

The purpose of this research is to elaborate a highly sensitive and specific laboratory express-method for qualitative and quantitative determination of a herbicide, 2.4-dichlorophenoxyacetic acid (2.4-D) and to adapt the sensor for use in regional ecological monitoring.

Accomplishments During Report Period

Minimum herbicide concentrations detectable by the biosensor were estimated. The estimate of potential sensibility of the sensor was performed with concentrations of the enzyme labeled 2,4-D which provided zero signal (the signal corresponding to herbicide absence in a sample) exceeding more than 10-fold the background signal. Maximum sensibility of the sensor was 1 Ng/ml 2,4-D. Coefficient of variation of zero response for separate concentrations labeled with 2,4-D in the analysis did not exceed 10%.

Working characteristics of the sensor were determined on the basis of immobilized cholinesterase for model inhibitors - prozerine and ezerine. As a working parameter the degree of inhibition of immobilized cholinesterase, relative change in enzymatic activity of CE when contacted with the inhibitor was used. Minimum detectable concentrations of inhibitors were not higher than 0.005 mM. The working range of measurements was 0,005-0,5 mM. The effect of activator ions on anticholinesterase activity of model agents was studied.

The modeling of the block measuring the sensor's signal amplitude was completed. A mathematical model was developed, describing the processes of biochemical reactions and mass-transfer in bioreceptor. An algorithm and a computer program for multichannel biosensor signal registration were developed. Rostov-on-the-Don State University student O.Efremova and Kazan State University graduate student Kremleva N. were taught principals and methods of biosensor measuring of concentrations of compounds inhibiting enzyme activity. An amplifying block, which is the main part of the biosensor model, has been designed and passed on for laboratory testings.

Title of Subproject: Environmental Policy Monitoring of the Serpukhov Region

Purpose and Objectives of Proposal

The purpose of the subproject is to create an information system concerned with natural resources in the Serpukhov District (the region near Pushchino) for sustainable development of the region including sustainable resource use, land-use planning and human health monitoring based on modern achievements in analytical chemistry, geochemistry, forestry, agriculture, soil science, population biology of plants and computer science.

Draft GIS design has been developed. GIS of Serpukhov region will include databases of natural resources, economics and human health for Serpukhov region and corresponding maps for Serpukhov region in scale 1:50,000, and more detailed maps of Serpukhov city and Prioksko - Terrasny State Reserve in scale 1:10,000.

The following digital maps were created:

- Topographical map of Serpukhov region which is a base for other thematic maps;
- Schematic map of Serpukhov-city, where local sources of industrial pollution and transportation network are marked;
- Thematic maps for Prioksko-Terrasny Reserve area (soil map, parents rock material map, forest inventory map) which is a natural background for Serpukhov region and can be used for an evaluation of the present ecological situation of the investigation area;
- Thematic maps of some agricultural farms for an evaluation of present land use and as a base for forecasting;

The following databases were created:

- Data sets of biosphere monitoring of the region including concentrations of some pollutants (heavy metals, pesticides and etc.) in soils, rivers and ground waters and biota;
- Data sets of air and water pollution of Serpukhov city;
  - heavy metals content,
  - chloroorganical content,
  - integrated assessment of Serpukhov pollution;
  - data sets of Prioksko-Terrasny Reserve including data on rare and endangered species and detailed assessment of the current state of forest and grassland territories which are typical for Central Russia;
  - data sets of the agrochemical state of some agricultural farms.

Title of Subproject: Technology for bioremediation of soils contaminated by oil and oil product (black oil)

Purpose and Objectives of Proposal

To develop technologies for bioremediation of soil polluted with oil and its products based both on the activation of local microflora and application of the constructed biopreparations.

Field testing was performed using a mixture of strains M01, M04 and M09. This mixture was chosen as the most balanced by the character of changes in the residual mazut fractions in the preliminary experiments with liquid medium in the laboratory condition.

The analysis has showed the following:

- The application of the bacterial mixture have decreased the content of residual mazut by 70% while in samples with endogenous microflora the content of residual mazut was decreased by 40%;
- Salts addition gave some positive effect only in the case with the bacterial mixture (a decrease of the residual mazut content additionally by 12%).
- The application of the bacterial mixture and salts addition into soil permitted to qualitatively change the character of mazut biotransformation in the region of heavy fractions - heavy aromatic and resin compounds.

Output D: Sustainable Agriculture and a Market-based Food System

The output focuses on enhancing agricultural productivity and sustainability and a market based food system which are being designed and implemented by the Higher Agro-Biotechnological College and other center institutes through collaboration with the University of California, and Washington State University.

Title of Subproject: Technology Transfer Training Unit

Purpose and Objectives of Subproject

Establishment of a pilot center of agricultural technology transfer and extension service development in South-Moscow (Central Russia) regions.

Accomplishment During Report Period

- An agreement in principle has been reached at the Administrations of Serpukhov District, Moscow Oblast and the Agricultural Ministry to support financially and organizationally the establishment of an education-analytical Center.
- The State Committee for Higher Education, the Ministry of Agriculture and the Administration of Moscow Oblast have approved the concept of teaching students at the Bachelor's and Master's level and retraining specialists in the field of the Extension Service.
- The development of education plans and programs for bachelor and specialists in field of the Extension Service has been initiated.
- An analysis of the agro-economic situation in farms of the Serpukhov District (analysis of vegetable, beef and dairy sectors) is being carried out.
- - A two-day course for economists of collective farms and for farmers on the topic of tax policy and accounting was conducted with 12 persons in attendance. Seminars for gardeners (77 persons) were held.
- An agreement with the JSC "Dashkovka" and the JSC "Volokhovo" on organizing an experimental center of seed potato production (50 ha) and demonstration plots (1 ha) for comparative testing of various potato varieties has been concluded.
- A plan for establishing a network of laboratories with the head (pilot) one in Pushchino has been developed and proposed by the Agricollege and supported by the Ministry of Agriculture of the Russian Federation as well as by the Administrations of the Nizhnyi Novgorod, Yaroslav, Kostroma, Tula and Leningrad Oblasts.
- The technological problems of adaptation of sterile plants and acceleration of the maturing cycle are being addressed.
- By the middle of 1996 the commercial enterprise producing diagnostics kits is planned to be established and orders for delivering these diagnostics kits to oblasts are expected to be received.

Activities to Be Conducted During the next Quarterly Report:

- Hold in Pushchino, during the first quarter of 1996, an interregional conference on problems associated with the formation of a beef cattle breeding industry (association of breed farms, network of farms of hybrid cattle, feedlots etc.) and conservation and restoration of animals of vanishing breeds;
- Select stakeholders (2-3) and specialist-managers (2-3) for travel to the USA to study

organization of system of seed potato certification (state law, regulations and infrastructure), systems of Extension Service and Technology Transfer.

Title of Subproject: Integrated Potato Project

Accomplishment During Report Period

The first cycle of potato minitubers growing in hydroponic devices has been completed producing some 15 000 virus- and viroid-free minitubers of potato of the Lugovskoy variety. A second batch of 1,300 test-tube plants of potato of the Lugovskoy variety has been grown for planting into the hydroponic device. These plants require adaptation in a special chamber prior to planting into the hydroponic device.

Preparations for the field stage of reproduction of the first batch of seed material have been initiated. This stage will be carried out in collaboration with the joint stock company Dashkovka, a large-scale vegetable farm in the Serpukhov region, according to a principle agreement reached earlier during the project. A fall ploughing of the plot to be used in potato seed reproduction was made. Samples of soils to be tested on concentration of nitrogen, phosphorus, potassium, pH value were taken.

A consultancy on investigating of nematode and means of protection was held in Pushchino. Special attention was paid to the problems of growing virus-free seed potatoes in field conditions. Recommendations were given on the equipment required to carry out the necessary tests; this equipment was thereafter purchased with matching funds.

We are working together with the Yaroslav, Nizhny Novgorod and Kostroma oblasts to support their efforts to establish the production of virus-free seed material using hydroponic equipment. Such equipment has been purchased by these oblasts, and we have now reached agreements regarding the sale of test-tube plants and minitubers of Lugovskoy variety potatoes with delivery starting in March 1996 for reproduction in their hydroponic devices.

Activities to Be Conducted During next Quarterly Report Period

- Planting of 1,300 plants into hydroponic devices;
- Production of minitubors of potato;
- Improvement of technology of preparing of soil, planting, watering and caring of seed plantations of potato;
- Development of system of protection of plants against diseases and pests;
- Testing and sanitizing of potato varieties for diseases and pets.

Title of Subproject: Animal Health Laboratory

Purpose and Objectives

The purpose of the subproject is to set up an "Animal health laboratory" as a new inter-institute service using the facilities and staff of the Pushchino Agricollege, Pushchino Research Center Institutes and nearby state and private farms.

The major objectives of the Animal Health Laboratory Subproject are as follows:

- Organization of biochemical and genetic certification of Russian aborigen well breed cattle for preservation, breeding, and trade.
- Cooperation and interaction with former state and small private farms regarding analyses of animal blood, fodder and animal products in order to help them in diagnosis, animal treatment, and to save aborigen cattle including the provision of facilities, staff, diagnostic tests, and vaccines.
- Dissemination of new approaches and methods in disease diagnosis, animal certification and treatment of cattle in several regions of Russia.

Accomplishments During Report Period

- Established working contact with 7 former state farms in the field of biochemical and genetic analysis and treatment of their cattle.
- Over these three months the AHL group have analyzed 220 blood samples of cattle from Kostroma and Yaroslavl regions in order to choose appropriate donors. These analyses included determination of blood groups, caryotype, enzymes and proteins in plasma and blood cells (10 proteins).
- Collection of information on animal diseases and veterinary medicine capabilities in various regions of Russia (Moscow, Kostroma, Nizhny Novgorod, and Yaroslavl regions) has continued.
- Within the report period kits for Salmonella detection in food products and animal tissues have been developed. Two variants of the kits based on the use of monoclonal antibodies to different Salmonella lipopolysaccharides (LPS) are offered.
- Preliminary experiments on mastitis express detection are in progress. It is proposed to use the peroxidase activity of bacteria and leucocytes in milk to detect the diseases induced by various agents.

Progress Towards Achieving Purpose and Objectives

Collection of an embryo bank of aborigen cattle was begun. Fifty embryos of beef cattle and 50 embryos of dairy cattle were obtained and cryo-conserved in the bank. This program is designed to preserve aborigen and elite cattle in spite of dramatic condition in dairy-farms and calf-farms. The activity has received the support (including financial support) from the Ministry of Agriculture, Regional Administrations (14 regions) and the Russian Livestock Breeding Association. Preliminary work was conducted to arrange a seminar for farmers and regional

agricultural administrations on the selection and preservation of elite cattle in January of 1996.

Based on results of blood analyses, 30 elite cows out of 2000 cows were selected as embryo donors in Nyzgnyi Novgorad region ("krasnaya gorbatovskaya"), treated them for endometritis, and prepared them for hormonal stimulation and superovulation.

Activities to Be Conducted During the next Quarterly Report Period

- Collection of information will be continued.
- Genetic certification of cattle in Kostroma, Yaroslavl and Nyzhnyi Novgorod regions will be continued for choosing aborigen and elite cattle which could be used as donors of embryos.
- There are about 60 donors which have been treated for superovulation. An expedition will be sent to collect (wash out, isolate) embryos from these donors for transplantation and cryo-preservation.
- An immunodiagnostic group will be added by specialists in PCR.
- The facilities and reagents for the Model laboratory of virus viroid diagnostics will be completed.
- The seminar on cattle genetic certification will be held.

Title Of Subproject: Plant Health Laboratory

Purpose And Objectives of Subproject

The purpose of this subproject to concentrate efforts of leading scientists in Pushchino, Moscow, St. Petersburg, Krasnodar and other locations to help solve the most important plant health problems for agriculture of South-Central European part of Russia.

Accomplishments During Report Period

- Staff training in diagnosis of key viral, viroid, bacterial and fungal diseases of potato was in large part completed. Two researchers (Orlova I.V. and Rukavtsova E.B.) of Plant Health Lab. were trained on virus and viroid diagnosis at the Dept. of Virology of Moscow State University. The phytopathologist Zubko I.Ya. and microbiologists Petrikevich S.B. have mastered the methods of Phytophtora and Erwinia diagnosis, but need further training on PCR analysis of these plant pathogens. Such training will take place in collaboration with the Dept. of Molecular Biology of Moscow State University.
- The method of virus control in the process of growing monoclonal potato plants has been developed in collaborations with Dept. of Virology of Moscow State University.
- Transformation of potato plants by Agro-bacterium strains carrying delta-endotoxyn gene of Bacillus thuringiensis was carried out in collaboration with Dr. Burianov's group. Southern blot hybridization method confirmed that transformed potato plants contain delta-endotoxin gene. The analogical experiments on transformation of sugar beet plants by Agro-bacterium strains carrying a various variants of delta-endotoxin gene are

conducted.
- Microbiological analysis of the hydroponic installation have been finished and new bacterial and fungal isolates were collected for future research.

Output E: Commercialization of Technology (Technopark)

This Sub Project addresses the long term sustainability of the Pushchino Center. An effective mechanism to commercialize technologies, generated through research, education, training and outreach activities of the Pushchino Center, will provide a downstream flow of revenue needed to address a recurrent cost structure problems. The Technopark focuses on the commercialization of technologies and their transfer to the commercial sector and development of small businesses, as incubators, when this is appropriate.

Title of Subproject: Technopark Organization and Operation

Purpose and Objectives of Proposal

Creation of organizational structure and development of a system of transfer of high technologies for use in sustainable economic development of the region and protection of the environment.

A General Agreement about cooperation between the Health Department of Moscow oblast, presidium of Pushchino Scientific Center and MONIKI was prepared. On the basis of this general agreement, three agreements on specific areas of collaboration were prepared:
- Organizational, research and practical work directed towards the optimization of prophylaxis, diagnosis, treatment and rehabilitation of gastroenterogical patients in Pushchino and region;
- Development of clinical and diagnostic methods in gastroenterology;
- Conduct of continuing education of staff of clinical and diagnostic laboratories of Moscow area.

An economic substantiation of work on bioremediation of oil-contaminated soils of Western Siberia was prepared and presented to the oil company LUKoil.

Progress Towards Achieving Purpose And Objectives

During this quarter the structural organization of the Technopark was reviewed due to difficulties in realizing the founding of the Technopark as a legal entity with the organizational structure originally proposed. A new, simpler structure was devised in order to streamline the process of reaching an agreement with all the founding parties, and initial negotiations with these parties were held.

Functioning to date as an informal association, the Technopark working group has focused on

three projects identified as promising technologies for commercialization during the evaluation of technologies conducted in the preceding quarter:

- Bioremediation of soils and water contaminated with petroleum products;
- Microbiological methods of plant protection;
- Address regional problems of public health in gastroenterology.

Project Issues and Problems:

Banking: The legalization of the In-Country Support Office has been completed and opening of a bank account is in its final phase. It is expected that the Support Office bank account will be operational during the second or third quarter of fiscal year 1996. However, this has not created a serious problem due to an account operated on behalf of Washington State University having been in place for several quarters.

Plans for the Second Quarter; Fiscal Year 1996

During the second quarter there will be a two workshops held in Pushchino which will be followed by the presentation of an economics course and several mini-workshops associated with the course presentation. These include the following:

- Participation in an Environmental Policy and Planning Workshop
- Proposal Development and Contracting Workshop
- An issues short-course (12 weeks) in economic theory and natural resource economics for masters degree students and scientists
- Several mini-workshops on natural resource economics, applied agricultural economics, micro-economic theory for special stakeholders

Project Encumbrances and Expenditures:

Encumbrances and expenditures during the quarter increased $80,000 over the previous quarter's encumbrances and expenditures. This represents a trend in expenditures which roughly increases four times the previous quarters cumulative expenditures. The managed utilization of these funds will result in flattening out of this expenditure pattern during quarters five and six of the next fiscal year while quarter four of Fiscal Year 1995 will finish with cumulative expenditures and encumbrances between $500,000 and $600,000. Expenditures and Encumbrances during the quarter were associated with personnel, travel/accommodations, workshops/training, operations, equipment, subcontracts and indirect costs.

CUMULATIVE EXPENDITURES AND ENCUMBRANCES

TABLE 1	PUSHCHINO PROJECT QUARTERLY EXPENDITURE REPORT				
Budget Category	Budget Amount	Expended	Encumbered	Category Total	Cumulative Total
Personnel/Benefits	492,268.00	71,979.30	51,258.09	123,237.39	230,068.39
Travel/Accommodations	138,233.00	14,710.29	6,338.23	21,048.52	111,916.23
Workshop/Training	76,575.00	5,338.33	0.00	5,338.33	41,840.93
Operations Costs	383,733.00	22,534.20	2,666.10	25,200.30	104,636.85
Equipment	219,200.00	65,931.08	917.40	66,848.48	67,707.41
Sub Contracts	526,660.00	4,811.66	89,853.20	94,664.86	106,953.86
Indirect Costs	364,051.00	35,318.38	22,168.23	57,486.61	156,827.09
Total	2,200,720.00	220,623.24	173,201.25	393,824.49	819,950.76

SUMMARY:

During the first quarter of Fiscal Year 1996 the workplan was completed and submitted. This was followed by implementation activities in support of the workplan objectives.

- The official legalization of the Washington State University Support Office in Pushchino, Russia was accomplished.
- Computers and printers were shipped.
- Administration participated in discussions with workgroups in Pushchino for the development of the Fiscal Year 1996 Workplan.
- The fiscal year 1995-96 workplan was completed, with incorporation of the fourth quarterly report, and submitted to both the USAID Mission in Moscow and USAID in Washington.
- Dr. David Zilberman and Emery Roe, UC participated in discussions with Department of Agricultural Economics faculty at WSU to address methods to incorporate natural resource economic issues into education, research and outreach activities in Pushchino.
- Mr. John Braley, Project Officer USAID/Washington spent four days in Pullman reviewing progress on grant related activities.
- The In-Country Coordinator, Ms. Kathy Gelhar, visited WSU and UC to review

achievements of the project, discuss next steps and identify what fine tuning of the Project was required to ensure even better performance.

The "Uniting Science and Education and the Transfer of Technology For Sustainable Economic Development and Environmental Protection Of South-Central European Russia" is a complex project. It requires the combined efforts of USAID, the Russian - U.S. Technical, Educational and Economic Development Consortium and expertise from institutions such as the University of Tennessee and Texas A&M, working in a collaborative, complimentary fashion, to ensure success.

APPENDIX II

SEED CONSORTIUM

Diagram of SEED Consortium

Russian - US Science, Education and Economic Development (SEED) Consortium

US Members*

- University of California - Division of Agriculture & Natural Resources (UC/ DANR) - Berkeley, Riverside, Davis
- Washington State University (WSU) | Consortium Secretariat
- Texas A&M University (TAMU)
- University of Tennessee (UT)

Russian Members**

- Pushchino International Environmental Center***
- Biological Research Center (BRC)
- Institute for Biochemistry & Physiology of Micro-organisms (IBPM)
- Pushchino State University (PSU)
- Agrobiotechnological College (Agro-College)

Advisory Council

Potential US Associate Members

Private Sector Firms
Universities
Research Institutions
Public Sector Institution
Non-governmental Organizations

Potential Russian Associate Members

Serpukhov Regional Govt.
Private Firms & Joint Enterprises
Universities and Research Institutes
Public Sector Institutions
Non-governmental Organizations (NGOs)

* Each member will have one member of the Steering Committee and one member of the Executive Committee.
** Initially, two Russian Steering Committee members will represent the five Russian members, one for research and one for education. The Russian members (and associate members) are collectively labelled the "Pushchino Alliance".
*** The Center will be primarily a Russian entity, initially, but with representation from US Consortium members. One function of the Center is to facilitate and assist activities of the Consortium.

pushenv.ppt

APPENDIX III

CONSULTANCY REPORTS

PUSHCHINO PROJECT
CONSULTANCY ABSTRACT
FISCAL YEAR 1996

Name	Subproject	Dates
James J. Wills	Office of Grants and Research Development	1/5/96-1/26/96
Donna L. McCool	PSU/BRC Library Project	1/24/96-2/15/96
Frederick H. O'Connor	Intensive American Language Center	2/15/96-3/4/96
Dr. Jerman Rose	Technopark/business development activities	2/26/96-3/7/96
Dr. Roger P. Martin	Serpukhov Environmental Policy and Planning	3/13/96-3/23/96
Dr. Walter Butcher	Serpukhov Environmental Policy and Planning	3/15/96-3/22/96
Dr. Bruce McWilliams	Education/Training Performance and Capacity	3/15/96-8/15/96
Dr. D. Hird/DVM N. MacLachlan	Animal Health Center	4/23/96-4/30/96
Ann Jeffrey/Jeanene Greer	Organization, Administration and Management Training	5/25/96-6/7/96
Drs. Tom German/Steve Slack	Integrated Potato Project	6/13/96-6/19/96
Colleen Y. Taugher*	Animal Health Center	7/3/96-9/11/96
Dr. J. Siebert	Sustainable Agriculture: Animal Health Center/Integrated Potato Project/TTTU	7/27/96-8/9/96
Dr. Walter Butcher*	Serpukhov Environmental Policy and Planning	9/10/96-9/20/96

* Indicates that the majority of funding was generated from non-grant resources.

Final

Travel/Consultancy Report
Pushchino Project

1. Name of Consultant: James J. Wills

2. Date Report Prepared: February 20, 1996

3. Inclusive Dates of Consultancy: January 5, 1996 - January 26, 1996

4. Purpose and Objectives of Consultancy:
   A. Present a series of grant writing seminars that will assist the Pushchino scientists to achieve the following:
      1. Developing full research proposals
      2. Establishing procedures for locating research partners to collaborate with the NIS scientists with emphasis on the following:
         a. Partners program within the Cordis software
         b. Contacting the authors of scientific literature in the relevant areas
         c. Distributing research interests statements to WSU/UC faculty
      3. Develop pre-proposals for submittal to funding agencies
   B. Develop proposal "Assist Groups" within each institute
   C. Develop "Proposal Improvement Committees" within each institute
   D. Assist the Pushchino OGRD in development activities as requested
      1. Patents or the transfer of new technology
      2. Find additional funding opportunities through the use of a European data base procedure manual developed at WSU
      3. Expand the OGRD library of hard cover books to assist in proposal writing techniques
      4. Miscellaneous general discussions in areas of concern
   E. Consult with individual Pushchino scientists on funding sources, writing techniques, and general proposal preparation procedures

5. Relation of consultancy to project purpose and outputs.
   A. Fifteen years prior experience within the Office of Grant and Research Development at WSU allows the flexibility to fit the need of the existing in-country situation and level of expertise.
   B. Two weeks prior experience in Pushchino, working with the scientists, OGRD staff, and administration.
   C. A broad base of knowledge on proposal preparation acquired through actual experience and the use of David Bauer video tapes.

6. Location of consultancy including dates:
Located and working in Pushchino, Russia from January 8, 1996 - January 24, 1996

7. Individuals, Organizations including locations with whom traveler met and worked:
Worked in Pushchino, Russia with the following:

Dr. Alexander Boronin, Russian Project Co-Director
Dr. Vassily Akimenko, Russian Project Asst. Director
Ms. Kathy Gelhar, WSU In-Country Project Coordinator
Ms. Natasha Bulashova, Office of Grant and Research Development
Ms. Ludmila Belyakova, Head of Patent Department, Institute of Biochemistry and Physiology of Microorganisms
Ms. Julie Allaire-MacDonald, Deputy Director, Office of Democratic Initiatives and Human Resources, U.S. Agency for International Development
Mr. John Thomas, Agricultural Development Officer, USAID/Russia
Pushchino OGRD Staff
60-75 individual scientists from all institutes

8. Accomplishments:

To fulfill the purpose and to complete the objectives of the project the following activities were completed with documentation recorded within the OGRD and the project support office.

A. A series of 6 seminars were presented on a systematic approach to writing research proposals.

1. Handouts were developed for use within the seminars
2. Out-of-class assignments were developed which were designed to increase the level of knowledge of the seminar participants on proposal writing
3. Approximately 40 participants began and finished the seminar series which required a total of approximately 18 hours

B. 7 additional seminars were conducted with individuals preparing full proposals for the Civilian Research and Development Foundation Cooperative Grants Program (CRDF).

This series included 15 to 20 different participants from those who attended the seminar mentioned in item A and ended with approximately 15 proposals in the process of being prepared. This activity represented approximately 15-20 hours. With the help of pre-proposals requested by Natasha prior to my arrival, the OGRD staff developed a letter to the Russian Ministry of Science requesting approval for scientists, who have previously participated in defense related work, to submit to the CRDF program. This is a requirement of the program and necessary to complete before submittal.

C. A number of meetings were held with individual scientists from both seminar groups on a wide variety of subjects relating to writing proposals and receiving grants. Special attention was given:

1. During the preparation of a full proposal by Dr. Marina Donova for Procter & Gamble.
2. During the review and editing of approximately 10 of the CRDF draft application.

D. Assisted with the development of approximately 50 U.S. partnership requests that will be handled by WSU and UC. The partnerships will assist with the application for future programs.

E. Seminar activity resulted in approximately 40 individuals working with OGRD staff in a one-on-one mode on the computer attempting to locate funding sources through the use of key words. (Hands on learning experience for participants)

F. Assisted Natasha in explaining the importance of OGRD activity to AID personnel and the anticipated results of the project.

G. Assisted Kathy in explaining the importance of reports to AID project participants with emphasis on significant and relevant material that should be included within the information.

H. Toured several institutes and discussed the importance of grants with scientists and administrators.

I. From a call for volunteers within the seminar series, approximately 25 individuals within 5 institutes responded and attended a seminar to develop an "Assist Group". The group will assist others in their institutes on the techniques of proposal writing and advising on the OGRD resources available. A discussion was held on the activities or responsibilities to be completed allowing the group to be successful. (The seminar stressed the importance of the OGRD follow-through for the group to be effective in each institute).

J. Also from the call for volunteers, approximately 12 individuals and 4 institutes responded and attended a seminar on the development of a "Proposal Improvement Committee". The seminar content included the following:

1. A handout was prepared on a suggested format to follow for review purposes
2. Discussed OGRD resources that are available to the committee
3. Discussed suggested activities for the committee
4. Stressed the importance of OGRD follow-through to successfully motivate the committee

9. Conclusions and/or Recommendations

A. The most important result from the visits to the Pushchino Institutes during the past 6 months is the significant increase in the "level of awareness" concerning proposal writing and the receipt of grants.
B. The two seminar groups were a success with all participants taking an active part in the activity relevant to each.
C. Full proposals/applications are in the process of being developed.
D. It is anticipated that grant funding will be obtained in the future from either the P & G/CRDF program/or other funding agencies.
E. The overall effort to establish the OGRD as a centralized facility for all the institutes and central Russia must be continued and a plan developed to compensate the OGRD for services provided.

10. Suggested Follow-up Activity

A. On July 1, 1996, a determination/re-evaluation needs to be made by the appropriate project directors, concerning the successes and weaknesses resulting from the 2 visits made to Pushchino. Consideration needs to be given on the value of an early fall return visit to Pushchino by the consultant.
B. WSU needs to monitor proposals submitted by all institutes/funding received/patents applied for/and technology transfers problems and successes.
C. U.S. science partners need to be found in response to requests made by Pushchino scientists to allow a better chance for the Pushchino scientist to obtain support.
D. On July 1, a review needs to be made of the success achieved by the OGRD staff concerning the Assist Group, Proposal Improvement Committee, and the follow-up activity offered to further the role of these groups.

Travel/Consultancy Report
Pushchino Project

Each individual who travels to conduct project related activities must complete the following travel report form at the completion of each period of travel. Since most consultancies related to the project will involve travel, the same format will be used for the report of consultancies. A report must be completed and submitted to the U.S. Project support Office at Washington State University for U.S. travelers and consultants. Russian travelers and consultants will submit their reports to the Pushchino Support Office. The report must be completed and submitted within two (2) weeks of completion of the travel/consultancy.

1. **Names of person traveling and/or consultant:** Frederick H. O'Connor

2. **Date report prepared:** March 15, 1996

3. **Inclusive dates of travel or consultancy:** 2/15/96 - 3/4/96

4. **Purpose and objectives of travel/consultancy:**

   Enhance English teaching capabilities of the English Department Faculty at Pushchino State University. Work with the faculty to assist them with curricular development, pedagogic development, assessment tool application, and appropriate technology planning and implementation. Discuss broadening of program offerings with the Continuing Education Group and the English Department.

5. **Relation of travel and/or consultancy to project purpose and outputs:**

   This sub-project fits in with Pushchino State University's ability to provide quality education, outreach services, and generate revenue enhancement.

6. **Location of travel including dates at each sit:**

2/15/96	in transit
2/16/96	Amsterdam
2/17/96 - 3/1/96	Pushchino
3/2/96	Amsterdam
3/3/96	in transit

7. **Individuals, organizations including locations with whom traveler met and worked:**
   See attached schedule. Names are in bold face.

8. **Accomplishments:**

   Conducted workshop on curricular re-evaluation for the English Department, Pushchino State University.

Conducted workshop on assessment of students' English, with particular emphasis on assessing oral proficiency for the English Department, Pushchino State University.

Gave demonstration of language proficiency interviewing for the English Department, Pushchino State University.

Conducted discussions of pedagogy for the English Department, Pushchino State University.

Taught demonstration lesson of grammar teaching in the target language for the English Department, Pushchino State University.

Conducted needs assessment and planning for technology in language teaching (English and Russian) for the Department of Foreign Languages, Pushchino State University.

Held several discussion regarding the setting up of special short courses in Business English with the administrators and staff of the Continuing Education Unit, Pushchino State University.

Held a meeting to discuss development of Russian as a Second Language Course with the Registrar, Pushchino State University.

9. **Conclusions and/or recommendations:**

1. Pushchino State University needs upgraded educational technology to effectively meet is current and potential future needs in instruction. These technology needs fall into three phases:

Phase 1 Audio-visual technology

-a 12-place audiocassette language laboratory (220 volt AC) with double-tracked recording capability
-a cassette player to be used in the console to broadcast audio (220 volt AC)
-a multi-system (SECAM/PAL/NTSC) video player to be used in the console to broadcast audio and video (220 volt AC)
-two 26" TV (Multi-system) to be mounted in the language lab for video viewing (220 volt AC)
-2 double-deck portable cassette decks with high speed dubbing capabilities
-2 multi-system TV/VCRs (220 volt AC) to be mounted on carts for classroom use

Phase 2 Stand alone computers

-an as-yet unspecified number of stand-alone personal computers to be used by students to work on composition, grammar and reading skills

Phase 3 Networking and Telecommunications

-a network server and software to connect the personal computers from Phase 2 and to provide a link to the World Wide Web for student use

2. Additional text and audio resources for the English Department, Pushchino State University are needed.

-Bid for Power: English for Business and Commerce

-videocassette series

-supporting text materials

-Other text materials and supporting audio resources to be identified

3. MBA students or graduates should be engaged to assist a responsible administrator from Pushchino State University in conducting a market survey to determine the feasibility of offering Business English and/or Russian as a Second Language courses in Pushchino for clients in the Moscow area.

10. **Suggested follow-up activities, if any:**

1. Support should be offered for two members of the English Faculty to visit intensive English programs in the United States for a period of approximately two weeks.

2. Support should be offered for the Registrar, K. Sidorova, who is also a Russian as a Second Language expert, to visit U.S. universities in order to study Russian Language programs and administrative systems.

3. Support for Phase 1 of Pushchino State University's educational technology needs (detailed in #9) should be provided.

4. Support for additional teaching materials for the English Department, Pushchino State University should be provided.

5. Support for MBA student(s) or graduate(s) to assist in the conduct of a market survey should be provided.

Attachments

1. Curriculum of the Intensive American Language Center, which was used as the basis for re-evaluation of the departmental curriculum of the English Department, Pushchino State University.

2. Samples of questionnaires used at the Intensive American Language Center, Washington State University to gauge student satisfaction with both individual classes and the overall program, which were presented to the Registrar and English Department, Pushchino State University.

TRAVEL/CONSULTANCY REPORT
PUSHCHINO PROJECT

1. Name of person traveling and/or consultant: Jerman Rose

2. Date report prepared: March 15, 1996

3. Inclusive dates of travel or consultancy: February 26 - March 7, 1996

4. Purpose and objectives of travel/consultancy: Consultancy to work with Russian colleagues at Pushchino State University regarding issues of developing a marketing plan, commercialization of technology and business development programs in Serpukhov region of Russia.

5. Relation of travel and/or consultancy to project purpose and outputs: Outputs contributed to building of management capacity and increased self sufficiency through commercialization of technology.

6. Location of travel including dates at each site:

February 26	Travel from Pullman to Moscow via Spokane, San Francisco and Frankfurt
February 27	Arrive Moscow and travel to Pushchino
February 28-March 6	Pushchino
March 6	Travel from Pushchino to Moscow
March 7	Travel from Moscow to Pullman via Frankfurt, Chicago, and Spokane

7. Individuals, organizations including locations with whom traveler met and worked:

All meetings, discussions and observations were accomplished in Pushchino at the various institutes.

Name	**Affiliation**	**Topics**
Kathy Gelhar	Project Coordinator	Various relating to history and development of project, local needs, scheduling of meetings and activities
N. P. Kuzmin O. S. Stupar	Technopark	Several meetings regarding the organization, facilities

V. Ye. Sudavtsov T. Gaidamat		activities and needs of the Technopark
Name	**Affiliation**	**Topics**
G. R. Ivanitsky	Technopark/AO Perftoran	Technopark organization, activities and needs
O.P. Gorbunov	Russia Ekofarm	Commercialization of plant protection
V. A. Samoylenko	IBPM Pilot Plant	Pilot Plant capabilities and marketing activities
V. K. Akimenko	Project Assistant Director	Current status, needs, and outlook of project including marketing plan
L. Belikova	Patent Office	General discussion of organization and operation of the Patent Office
L. V. Kalakutsky D. L. Pinsky	Continuing Education Center	Marketing of English and Russian Language programs and possibilities for WSU students
M. S. Konstantinova	English Department	Capabilities for English language programs
V.V. Dynnik	Agrocollege	General discussion of background, aims and needs of the agrocollege
K. Ya. Sidorova	PSU Administration	Two meetings discussing general development and needs of PSU
Ye. I. Maevsky	Animal Health Laboratory	Discussion of technology commercialization experiences
Vladimir Adanin	Interpreter and guide	In the course of events general discussion of the situation in Russia in general and Pushchino in particular
Operations Director Name unknown	Czech Joint Venture	Discussion of joint venture operation and possibility of using WSU student to assist

8. Accomplishments:

A. A two-day two-part workshop on the Commercialization of Technology and Strategic Marketing Planning was held on March 4 and 5 in the seminar room of the

101

Institute of the Biochemistry and Physiology of Microorganisms (IBPM). The language of instruction was Russian and utilized overhead slides in Russian. The workshops were promoted by project administrative personnel by means of a flyer circulated to the institutes and other interested parties. About 12 persons attended the first session and approximately 10 attended the second. The attendees represented a number of different units and institutes, and had extremely differing levels of prior knowledge about the topics.

The following topics were presented and discussed under the title of *Commercialization of Technology*:

What is Commercialization of Technology?
Sources of Commercial Success
Resources for Commercialization
The Innovation Process
Alternative Points in the Process for Technology Transfer
The Product Life Cycle, Premarket and Market Phases
The Commercialization Process
Anticipating Buyer Needs
Alternative Transfer Means
Technology Transfer as a Strategy
Marketing Issues
Finding Buyers

The following issues were presented and discussed under the title of *Marketing Planning*:

A Planning System
Benefits of Planning
What is Strategic Planning
Stages of Strategic Planning
Marketing Planning
Components of a Marketing Plan
Analysis of the Current Marketing Situation
Identification of Threats and Opportunities
Objectives and Problems
Strategic Marketing
Target Markets
The Marketing Program
A Marketing Budget

A Plan of Action
System of Control

As part of the Marketing Planning workshop participants received a copy of a Marketing Audit in Russian for use in their own organizations. This Marketing Audit was a guide for evaluating the current marketing situation of a firm or organization and included questions related to both the external and internal components of the marketing situation. Time constraints prevented detailed practical application of the audit during the workshop.

B. Discussions were held with representatives listed above regarding a Marketing Plan for Pushchino Center. See Conclusions/ Recommendations below.

C. Discussions were held with officials of the Technopark, the Czech joint venture, Pushchino State University (PSU) administration and the continuing education area regarding possibilities for utilizing the services of Washington State University (WSU) graduate business students. Three specific projects were identified for which student assistance might be appropriate and useful. These are: assisting in the development of a marketing plan for the Technopark and for Technopark projects, market research activities to determine the demand for English and/or Russian language courses among foreign companies in Moscow region; financial and marketing analysis for the Czech joint venture.

D. Discussions were held with representatives listed above regarding business training and the WSU Small Business Development Center (SBDC) model. See Conclusions/Recommendations below.

Conclusions and/or recommendations:

A. The workshops seemed to be appropriate and interesting to the majority of participants. Discussion, particularly on the second day, was lively and indicated a reasonably high level of interest. Future workshops should include more hands-on activities based upon the actual activities of participants. For example, if interested participants could be identified a month or two prior to the workshop, they could be sent assignments for preparation before the workshop meetings. The workshop could be tailored to particular businesses, technologies or projects. Workshop activities would then be focused on actual market plan preparation. Individuals actively involved in specific commercialization of technology projects could benefit from step by step training over a longer period. Such training could be accomplished using a combination of on site short workshops and distance learning technologies. The training activity should be energetically promoted well in advance of the scheduled starting time. Finally, the key to the success of such training would be the motivation and commitment of the participants. Participants should be identified and informed of the goals and objectives of the training before the workshop. Participants should have clear incentives for active and sincere participation.

B. A new institutional and organizational identity uniting the institutes at Pushchino is still in the process of development. While the old organizational structure for coordination between the institutes is apparently still in place, it was evident from a variety of sources that a Pushchino Center with a clear, widely-accepted mission and unified organizational administration is in the early stages. This impression was reinforced

whenever the question of a marketing plan for Pushchino Center was raised. Put concisely there was little enthusiasm expressed for the development of such a plan.

The idea of strategic planning and marketing planning is grounded in agreement on mission, organizational identity, and organizational objectives. To be of value, the planning process must have the commitment of top management. In the context of current conditions in Russia this becomes even more important.

In discussions it appeared that there was a wide range in the level of understanding of marketing and a great deal of skepticism as to the applicability of marketing concepts to the situation of the institutes at Pushchino or in Russia in general. The lack of confidence in the future direction of the country contributes to this skepticism. Long term planning systems depend to a large extent on assumptions in which the planners can have at least a minimum level of confidence. In particular it seemed that many people were waiting to see the outcome of the upcoming presidential election, and not likely to commit to long term planning until any new direction in the national situation becomes evident.

Given the conditions in Pushchino and in Russia, it is probably premature to spend a great deal of effort on the development of a strategic marketing plan for Pushchino Center. This is not to say that such a plan could not be developed, rather that there may be other approaches with would yield better results in the short term. Instead of concentrating on the idea of a Pushchino Center encompassing all of the institutes, PSU, the Agrocollege and other units located in Pushchino the model of a multidivisional business firm may be useful.

In this model there is a hierarchy of strategic planning. At the corporate level, strategy describes a company's overall direction in terms of its general attitude toward growth and development. This level considers the types of activities the organization will be involved in and oversees the flow of financial and other resources to and from its divisions. Business strategy in contrast occurs at the divisional level emphasizing the improvement in competitive position of the company's products and services in a specific industry or market segment. Strategic Business Units usually grouped around similar products are generally considered semi autonomous with authority to develop their own strategies within corporate objectives. The lowest level of strategy is the functional level within each strategic business unit. Within the constraints of the corporate and business strategies around them, functional departments develop strategies in which their activities and competencies are marshaled for improved performance.

This model may be useful in planning iterative training activities which would allow interested and willing managers and staff at each level the opportunity to develop an understanding of marketing planning. This would help them to develop action plans for the achievement of unit objectives, even in the absence of a common commitment or unified leadership at the "corporate" level. One clearly identifiable strategic unit is the Pushchino State University. Since it draws support from all of the institutes, training in marketing planning for PSU may serve as a good starting point.

In any case the planning process is only useful to the extent that the participants recognize its importance, commit to the implementation of the plan, recognize it as a

process directed at continuous improvement, and establish a control system for monitoring and adjusting the plan as conditions change.

C. General discussions were held with a number of individuals regarding the feasibility and usefulness of using WSU Master of Business Administration (MBA) students in the project. With the assistance of N. P. Kuzmin and L. V. Kalakutsky, several options were explored.

Perhaps the most promising project was the possible use of one or two MBA students to do a specific market research project to determine the demand for English and/or Russian Language training among foreign enterprises in Moscow. Such a project would involve contacting enterprises to determine their needs and the types of language training services which could be provided by the Continuing Education Center at Pushchino.

The specific tasks for the students in this situation would include developing a market research plan, identifying target enterprises, preparing a survey, calling on enterprise officials to conduct the survey, analyzing and summarizing the results and presenting them to staff at Pushchino.

Mr. Kalakutsky expressed enthusiasm and support for such a project and suggested that the students work closely with one or more Pushchino staff to train them in the methodology and approach of such market research activities. Similar projects could then be conducted in the future by local staff in other markets.

Such a project would provide expertise to accomplish a needed task, gathering marketing information for decision making and developing management capacity at

Pushchino for the future. The project has the advantage of being conducted primarily in English. Estimated time for completion of the project would be 6 to 8 weeks. Resources required would be travel, room and board, and a small stipend for the students involved. In addition to time in Pushchino this project would require that students spend at least one substantial block of time in Moscow for data collection. How this would best be accomplished would have to be determined by the interested parties in Pushchino.

A second possibility for MBA students would be to work with the Technopark on development of marketing plans for the projects they currently have or which might have potential for development N. P. Kuzmin indicated that he believed that such a student might contribute to the development of marketing planning capacity for the Technopark by providing assistance and information about the role of marketing in the development of technology based ventures. Kuzmin's associate O. S. Stupar, because of his excellent command of English, could supervise such a person while learning the techniques and approach from the interaction.

A final possibility was suggested in conversation with officials of the Czech joint venture. They suggested that it may be useful to have an MBA student assist them in marketing development and perhaps in assisting in financial analysis.

If students are to operate successfully in the Pushchino environment they must be carefully selected. Flexibility, resourcefulness, persistence and an excellent ability to relate to people will be essential. Students with some exposure to Russian language and the biological sciences would be ideal.

D. Several discussions were held regarding business training and the WSU SBDC business counseling system which has already been successfully transferred to Romania and Krasnoyarsk. The SBDC approach is built upon utilization of existing university faculty who have a familiarity with economics or business management. The emphasis of the SBDC international projects has been on the training of consultants to perform the business development work of the center. In order for SBDC efforts to be most effective Pushchino officials should identify individuals with the necessary background to become business development specialists on site in Pushchino.

Because of the large distances involved and the differences in institutional missions it is probably not realistic to expect Russian counselors from Krasnoyarsk State University to provide much continuing support for development of Pushchino business counseling capacity without significant incentives.

Finally the demand for business development specialists in Pushchino is not evident and should be carefully identified as part of the planning for establishment of SBDC services at Pushchino. This might also be a project that WSU MBA students could undertake during an internship in Pushchino.

E. The situation of the Technopark at Pushchino appears complex and the organizational forces behind the multiple forms of the Technopark are difficult for an outsider to understand in only a brief visit. However, the following recommendations are offered for consideration.

1. The Technopark activity conducted by Mr. Ivanitsky appears to follow closely the American model: a systematic approach to identifying start up businesses and

collecting information on their business development needs. Mr. Ivanitsky indicated that there appeared to be limited demand for such services. However, this aspect of the Technopark could benefit from a more marketing oriented approach to promotion. The promotional materials which were on display in the institute, while detailed, were not designed to attract attention or stimulate interest. This is another project that might benefit from an MBA intern's attention.

2. The Technopark activity conducted by Mr. Kuzmin which concentrates on more direct commercialization of technologies would benefit from thorough evaluation of the market feasibility of the projects and concentration of efforts on the most promising of these. The situation in Russia offers significant challenge to commercialization activities. It is because fo these challenges that marshalling and focusing limited resources becomes more important. If a technology does not have real commercial potential, which means the promise of significant return on investment of resource, it should not be pursued.

TRAVEL/CONSULTANCY REPORT
PUSHCHINO PROJECT

Each individual who travels to conduct project related activities must complete the following travel report form at the completion of each period of travel. Since most consultancies related to the project will involve travel, the same format will be used for the report of consultancies. A report must be completed and submitted to the U.S. Project Support Office at Washington State University for U.S. travelers and consultants. Russian travelers and consultants will submit their reports to the Pushchino Support Office. The report must be completed and submitted within two (2) weeks of completion of the travel/consultancy.

1. **Names of person traveling and/or consultant:** Donna L. McCool

2. **Date report prepared:** March 8, 1996

3. **Inclusive dates of travel or consultancy:** January 24-February 15, 1996

4. **Purpose and objectives of travel/consultancy:** The purpose of the consultancy is to serve as a library consultant for the Pushchino Project. Specific objectives for this trip included the following:
   - to become familiar with the state of current library development and library leadership at Pushchino State University and Pushchino Center.
   - to convey to Pushchino librarians information about the WSU Library and library developments in the U.S.
   - to develop short- and long-term training plans, assist in identifying librarians to be trained, and identify funding opportunities for training.
   - to finalize a draft plan for short-term document delivery service between WSU and PSU.
   - to identify telecommunication and electronic equipment requirements within the PSU Library.
   - to transmit information about library resources and develop a list of information resources to be added to the PSU Library.
   - to assess the ability of libraries in Moscow to assist with library development in Pushchino.
   - to facilitate development of a mission statement for the PSU Library.

5. **Relation of travel and/or consultancy to project purpose and outputs:** The "Pushchino Project" goal is to enhance the sustainable economic development of the South-Central European region of Russia. This consultancy addresses the strengthening of library and information support for Output B of the Project, "Educational performance capacity in environmental science, sustainable agriculture and related topics...".

6. **Location of travel including dates at each site:**
   Pushchino February 1-9, 1996
   Moscow February 10-14, 1996

7. Individuals, organizations including locations with whom traveler met and worked:

Pushchino:
- University Administrators:
  - Lev Kalakutskii
  - Vassily Akimenko
  - I.A. Rochev
  - Deputies and Assistants to Deans
- Pushchino State University Library:
  - Galia Treskova
- Pushchino Center, Central Library:
  - Tatiana Kharybina
- Other librarians who attended presentation (list attached)
- Other Institute libraries visited:
  - Soil Science and Photosynthesis Library
  - Protein Research Library
  - Biochemistry and Physiology of Microorganisms Library
- Head, Computer Center: Sergei Lyssakov
- Head, OGRD: Natalia Bulashova
- Scientists:
  - VKM Group-L.V.Kalakutskii, A.L. Mazanov, L.I. Evtushenko and one other individual
  - A.Yu. Budantsev, Institute of Theoretical and Experimental Biophysics
  - M. Nikitina, Institute of Protein Research
  - V.V. Demidov and one other individual, Institute of Soil Science and Photosynthesis
  - Other scientists who attended seminar (list attached)

Moscow:
- Library of Natural Sciences, RAS:
  - A.G. Zakharow, Director
  - Natalya Bicherova
- Moscow State University:
  - Larisa Shikhmuradova
  - A.I. Vislyj
- Library for Foreign Literature:
  - Ekaterina Genieva, Director
  - Eugenia Rosinskaya
  - Tatiana Feoktistova
  - Olga Azarova
- U.S.A.I.D., Moscow Office:
  - Dmitri Fadeyev
  - Julie Allaire-MacDonald

8. Accomplishments:

Visited PSU Library, the Pushchino Center Central Library and three other Institute Libraries. Became familiar with current status of library development in Pushchino. Became acquainted with

new PSU Library Director, Galia Treskova and with Central Library Director, Tatiana Kharybina. Attended Ms. Treskova's first meeting with deputies and assistants to university deans.

Presentation made to PSU and Institute librarians (list of attendees attached).

Presented seminar, "Universities and the World of New Information", to Pushchino scientists (list of attendees attached).

Discussed training needs, candidates for training, and funding opportunities with university administrators L.V. Kalakutskii and V.K. Akimenko. Discussed training issues with personnel at the Foreign Literature Library.

Discussed the document delivery project with L.V. Kalakutskii and V.K. Akimenko.

Assessed PSU Library telecommunication and computing needs. Visited Moscow State University Library with PSU and Central Library librarians to view the MSU automated library catalog, the catalog being used by many university libraries in Russia. Viewed the catalog of the Library for the Natural Sciences, the catalog used by Pushchino Institute libraries. Discussed with personnel at the Library for Foreign Literature the library network being developed among Moscow libraries.

Developed strategy for acquiring additional books and other information resources for the PSU Library (strategy statement attached). Investigated the availability of collection development tools of potential value to the Pushchino librarians at the Library for the Natural Sciences and the Library for Foreign Literature. Gave publishers' catalogs and information about the Internet and commercial document delivery services to the PSU librarian.

Visited three Moscow Libraries: Library for the Natural Sciences of the Russian Academy of Sciences, the library which employes the Pushchino Institute librarians (accompanied by Tatiana Kharybina and Galia Treskova). Also visited Moscow State University Library (accompanied by Tatiana Kharybina and Galia Treskova) and the Library for Foreign Literature (accompanied by L.V. Kalakutskii and Galia Treskova). As noted above, a variety of issues related to training, library networks and automation, and collection development were pursued.

Facilitated discussion and development of a draft mission statement for the Pushchino State University Library (draft statement attached). The mission statement will guide decisions related to collection development, training, telecommunications and equipment purchase.

Held debriefing with USAID personnel at conclusion of trip.

9. **Conclusions and/or recommendations:**

Library Development: If students, faculty, and scientists at Pushchino are to remain competitive, they must have access to information which is available to the rest of the world. Because of economic constraints, changes in scholarly communication, and a variety of

other factors, access to information is severely limited in Pushchino at the present time. Libraries can, and should, assume a leadership role in searching for solutions to these problems. Russian libraries in general are several decades behind western libraries in the application of automation and other new informational technologies. The libraries at Pushchino are no exception. Historically, Pushchino has had good libraries, but at the present time the abiltity to add new information resources, especially foreign literature, is very limited. Subscriptions to foreign scientific journals have been cut drastically.

Training: The first priority for training should focus on the directors of the PSU Library and the Pushchino Center Central library, Galia Treskova and Tatiana Kharybina. Ms. Treskova assumed her duties as head of the PSU Library only within the past month but appears to be energetic, a creative thinker, and open to change. She was formerly employed by an institute library. Ms. Kharybina is an experienced library leader who also appears to be open to change. Because the educational and research missions are so closely intertwined at Pushchino, library development should be viewed as a collaborative effort between Pushchino State University and Pushchino Center to the extent possible. Students and faculty of the university are also associated with the Research Center and will use the institute libraries as well as the university library to obtain needed information.

Dr. Kalakutskii speaks of the need to achieve a critical mass in terms of effecting change in libraries at Pushchino. To achieve that mass, it will be necessary to identify additional influential individuals within the institute libraries to be exposed to a different model of modern library service.

Short-Term Training: Ms. Treskova and Ms. Kharybina would both benefit from an introductory overview of current library service in the U.S. The WSU Libraries can provide this overview. It is recommended that the two directors spend 4-6 weeks at WSU before the end of the Project. The program for them will cover the concept of service, reference, interlibrary loan and document delivery, library user education, collection development, and library automation. Special emphasis will be placed on the use of electronic resources, including CD-ROM and the Internet.

Long-Term Training: Several programs in the U.S. provide professional library training for Russian librarians. Information regarding the programs was sent to Pushchino prior to this visit. Some of these programs provide the master's level education that is considered the basic professional credential in the U.S. Serious consideration should be given to getting some of

the Pushchino librarians into these programs. Unfortunately, neither Ms. Treskova nor Ms. Kharybina can meet the age requirements for the fully-funded Freedom Support Act Program, as both are over 40 years of age. They could, however, participate in training provided by the Mortenson Center at the University of Illinois. Both need to strengthen English language skills in order to participate. This would not be a degree-granting program. Other funding possibilities to support participation in a degree program should be pursued.

In terms of training for a larger number of Pushchino librarians, it is recommended that discussions be held with personnel at the Foreign Literature Library in Moscow regarding training which could reach a larger number of individuals. Leaders at the Foreign Literature Library expressed interest in assisting libraries in Pushchino with training. The WSU Libraries and Pushchino Libraries should also discuss areas for future collaborative training. The latter could partially achieve the need to develop a larger number of librarians with knowledge of the current state of library development in the west.

Document Delivery: It was decided to put the proposed document delivery project on hold for the present. In the short time remaining for Project activity, other tasks are of higher importance, particularly training and collection development. The document delivery project can be brought up for renewed discussion at a later date, if there is continued interest.

Telecommunications: The PSU Library needs telecommunications connections, computers, CD ROM drives, printers, and software. Library staff also need to develop skills in using electronic and networked information. There should be a computer for staff to use in developing their own skills, so that they can teach faculty and students to access new forms of information. One or two computers are needed by library users to access the existing Pushchino library catalog, to use CD-ROM products, and to access the growing body of information on the Internet. Funds to support Internet traffic must be budgeted.

Information Resources: PSU Library staff and University administrators responsible for building library collections will need to continue building a core collection to support the university curriculum. If administrators and librarians are at WSU during the coming summer, time should be devoted to creating a desiderata list, a list of titles to be added as funding becomes available. The Library Director should get on publishers' mailing lists so that catalogs can be sent to the library for review by librarians, administrators, and university faculty.

The PSU library mission statement indicates that print and non-print information resources will be available in the library. In addition to computers and CD-ROM drives, the PSU library needs a VCR and monitor in order for library users to view video cassettes.

In order to avoid duplication, careful thought must be devoted to which titles should be in the PSU Library and which titles more properly belong in the research-oriented Institute libraries. Library personnel at Pushino have good experience in this area as a result of past decision-making regarding journal locations.

As libraries in the U.S. are learning, it is no longer possible for the Pushchino libraries to purchase and own all the information needed within a university. The PSU library will need to identify a core collection to own and then identify how other information will be accessed through interlibrary exchange and document delivery.

As a last comment, it was not clear to what extent the present decentralized approach to acquiring databases is beneficial to members of the Pushchino community. That is, to what extent are the various databases purchased by one institute accessible to individuals associated with another institute? This question is relevant to the PSU Library because many faculty and students are also associated with an institute and presumably are using their institute's information resources. Given the paucity of current information resources in Pushchino, one must ask whether a model that makes all information readily available to all members of the community might not be of greater benefit to Pushchino's common good. One might also ask whether those databases should be located in libraries rather than in offices.

Moscow Libraries: Again, like American libraries, the Pushchino libraries cannot be self sufficient. The libraries should be alert to the possibility of collaborative relationships with other area libraries. Attention should be given to the developing electronic network connecting key Moscow libraries. Will it be possible in the near future for the Pushchino libraries to participate in order to access other library catalogs, to engage in interlibrary exchange of information and to participate in other communications?

Planning: There would be value in developing a three- to four-year plan for library development. A strategic plan would serve as a basis for additional collaborative projects and for seeking external funding. Pushchino librarians and university administrators should work together to

develop such a plan during, or after, the visit of the Pushchino librarians to WSU. The WSU Libraries could be of assistance in facilitating those planning efforts.

10. Suggested follow-up activities, if any:

Training: A decision must be made soon regarding participation of the two library directors in training at WSU before the end of the Project. If an affirmative decision is made the two Pushchino librarians must begin intensive English language training and must develop basic computer skills. Before coming to WSU they should be able to use word processing software and Windows and should receive a basic introduction to the Internet. This trip should be scheduled for a period mutually convenient for Pushchino and WSU Libraries. Donna McCool will pursue this discussion with Jim Henson. Donna McCool will also begin drafting a program for the Pushchino librarians' visit to the WSU Libraries.

The WSU and Pushchino libraries should continue to explore areas for additional collaboration. These discussions should be added to schedules for summer visits by PSU librarians and administrators.

Donna McCool will contact the Mortenson Center to gather more information about funding sources to support attendance in that program by Pushchino librarians.

Telecommunications: Orders for computing equipment should be written and submitted to appropriate personnel for approval. A VCR and monitor should be ordered. Telecommunication lines need to be pulled to the PSU Library.

Information Resources: There is a tight deadline for expending remaining funds for information resources (see Strategy Statement). Both sides need to monitor progress.

Mission Statement: PSU administrators and library personnel need to finalize the statement and send to WSU as a point of information. Donna McCool will contact the PSU Library Director about her assuming responsibility for facilitating the completion of this document.

Planning: As schedules for possible summer visits to WSU are developed, library planning sessions should be included as an agenda item.

Донна МакКул

Зам.директора библиотек
Вашингтонского Государственного
Университета
по административной работе

5 февраля1996 **14.30**

к. 201, ИБФМ

проводит семинар

Университеты в мире научной информации

Лист регистрации присутствующих
на семинаре Донны Маккуи
«Университет в мире научной информации»
5 февраля 1996 г.

ФИО	Организация
Калмыков В.Л.	ИБК
Лысаков С.	ИБФМ
Сидорова Е.	ПущГУ
Казакова А.А.	ИПФС
Симонов А.В.	ИГУ
Бузанков А.Ю.	ИТЭБ
Калакуцкий Л.В.	ИБФМ, ПГУ
Белякова Л.Г.	ИБФМ, ПГУ
Чувякова Е.В.	ИБФМ
Дегтерева О.В.	ИБК
Акименко Л.В.	ИБФМ
Ядамин В.М.	ИБФМ
Очишевец М.М.	ИМПБ, ПГУ
Беспалова Л.А.	ИБП
Бурнашова Л.А.	ИБП
Захарова С.С.	ИБП
Миллерман Т.Н.	ИБП
Чеботарева М.И.	ИБП
Федяева Т.Н.	ИБП
Кондрашенкова А.Е.	ИБП
Виноградова Г.А.	ИБФМ
Черкасова И.Ю.	ИБП
Чижикова Р.А.	ИБК
Лихачев Б.А.	И.Б.К.

Strategy for Ordering Books
PSU LIbrary

Task	Person Responsible	Comments
1. Solicit purchase recommendations from leaders of faculty groups	Galia	Galia to solicit input week of February 12. Each person will be asked to submit a list of 10 titles in priority order
2. Solicit purchase requests from Long, Thorton and others at WSU. Look at textbooks in use at WSU.	Donna	
3. Gather catalogs from publishers to the extent possible and send to Pushchino	Donna	It may be difficult to get these to Puschino in time to be useful for the mid-March deadline.
4. Prepare lists of titles to be purchased	Galia and Lev to coordinate in Pushino Donna to send titles to Pushchino for possible addition to list	Cost of the basic list should come to the total funds available plus 20%. Second list totaling an additional 30%-50% of available funds should be submitted for quick purchase should additional funds be available.
5. Check titles to be ordered in Books in Print	Galia	Books in Print on CD-ROM is located at the Foreign Literature Library and the Natural Sciences Library, RAS. Both libraries have other selection tools which could be consulted to identify appropriate titles.
6. Fax titles which cannot be located in Books in Print to Donna for further checking	Galia and Donna	
7. Fax lists to Tom Byers, WSU International Programs with copy to Donna	Kathy	Lists should be faxed by March 15, or April 1 at latest.
8. Develop a third list comprised of more expensive items with high unit costs which could be ordered and delivered to Pushchino quickly. Fax list to Tom Byers, copy Donna.	Galia, Lev Kathy	These might be CD-ROMs, films, etc.

DRAFT

DRAFT

PUSHCHINO STATE UNIVERSITY LIBRARY

Mission Statement

The mission of the Pushchino State University Library is to provide library materials and library services to meet the educational requirements of faculty and students at the graduate and post-graduate level. It is also available for use by residents of Pushchino and those living in the surrounding area.

The Library is supported by the University, with funding from the Ministry of Higher Education. During its formative years, the Library is supported with additional funding from the Russian-US Technical, Educational, and Econonic Development Consortium.

There is a three-part reporting structure. For matters concerning the relationship of the Library to the educational process, the Library director works with the Vice Chancellor for Academic Work. For matters related to space, budget, personnel and other administrative matters, the Library Director works with the Vice Chancellor for Academic Work. And, for matters related to relationships with other Pushchino Research Center libraries, the Library Director works with the Vice Chancellor for Research. **[Editorial query: the organization chart on page 14 of the PSU catalog indicates that A. Rochev and V. K. Akimenko have the same title -- Vice Chancellor for Academic Work. Is that correct?].**

By focusing on educational needs of faculty and students, the PSU Library collections complement library collections at the other research-oriented Pushchino Center Libraries. The libraries work closely to avoid unnecessary duplication of materials. The PSU Library collects books and periodicals in traditional print formats as well as other non-print and electronic resources. **[Shall we add the following statement here? As an educational institution, the PSU Library will build and maintain a basic library collection of information resources to support the PSU curriculum. However, because of economic pressures and changing trends in scholarly communication, the PSU Library may, where appropriate, emphasize access to certain information resources rather than development and ownership of a large library collection].**

DMc:NW
2/22/96

Pushchino Project Travel Report

Name: Roger P. Martin
Date: March 26, 1996
Travel Dates: March 13-23, 1996

Purpose of Activities:
Workshop to present the need for economic input into environmental policy decisions and to formulate concrete plans for research activities through the summer. Travel and work activities were in support of the workshop except for Thursday, March 14 where one day was spent in Paris for consultations with Dr. Daniel Deybe for work related to the TSMM project.

Location and Dates of Travel:
March 13: Departure Pullman
March 14: Arrive Paris, Consultations in Paris
March 15: Depart Paris, Arrive Moscow
March 16: Depart Moscow, Arrive Pushchino
March 17: Preparatory Work in Pushchino
March 18-22: Workshop in Pushchino
March 22: Depart Pushchino, Arrive Moscow
March 23: Depart Moscow, Arrive Pullman

Individuals and Organizations:
Met with numerous faculty members of the System's Ecology Department at the Pushchino State University including: Alexander Komarov, Chair; Larisa Khanina, researcher; Erina Erionia, researcher; Demetri Orlinski, researcher; and others. Roman Popadyuk, forester with the Academy of Sciences. Vladimir Larionov, economist with the agricultural college. Dr. Vassily Akimenko, assistant director of Pushchino project. Dr. Alexander Boronin, Rector of Pushchino State University. Dr. Iu Rochev, Vice Chancellor for Academic Affairs. Dr. Eugene Maevsky, Vice Director of the Institute of Theoretical and Experimental Physics.

Accomplishments:
Days 1 & 2: Listened to presentations by Russian scientists on ecological conditions in the Serpukhov region, thus gaining an appreciation for present environmental problems and areas of strengths and weaknesses at the university.
Day 3: Together with Walter Butcher and Bruce McWilliams presented 5 hours of lectures on the incorporation of economics in the formation of ecological policies. Succeeded in gaining an appreciation for the importance of economics and a clear understanding of environmental economic methodologies.
Day 4: Identified two specific research projects: 1) an assessment of the health risks, environmental damage and economic merits of a proposal to diver 1.2 million cubic meters of water per day from the Oka river and, 2) an environmental and economic assessment of several alternative management strategies for various ecological zones in the Serpukhov forest.
Days 5 and 6: Made detailed plans for the initial implementation of the research projects over the

122

remaining six months. Specific tasks to be conducted over the next six months in the implementation of the forest policy analysis project are as follows.

Forest Policy Analysis

Primary Objectives:
The primary objective of the proposed forestry research is to identify optimal forest management strategies for selected regions of the Serpukhov District of Russia. The methodology employed will take into consideration both the economic and ecologic aspects of the forest and the results obtained will be used as the basis for forest policy recommendations.

Goals:
1) To identify 3 to 5 sites in the Pushchino forest reserve to be used as study sites for the research. The sites will be typical of large sections of the broader Serpukhov forest and will be defined by vegetation type, vegetation age, climate and soil type.
2) To identify present ecological conditions in each study site and predict the ecological impacts present and most common forest management practices high have on the study sites. This should include consideration of at least the following, but could include other ecological indicators as well. It may also be possible to develop an overall ecological health indicator that includes consideration of many ecological variables.
    - Vegetation population, type, age and health
    - Wildlife populations, type and health
    - Fish population and type
    - Wildlife and fish habitat
    - Water quality
    - Others

3) To identify present economic conditions in each study site and to predict the economic impacts present and most common forest management practices might have on the study sites. I expect Vladimir Larionov and Bruce McWilliams will help on this goal. Data should include at least the following:

Outputs:
- Description of present (most common) management practice
- Potential timber production in M^3 at a variety of harvest intervals (a timber production function). Potential to produce livestock (or possibly total livestock feed in Kg and/or calories)
- Potential mineral production
- Fish production (or a description of the fishing quality)
- Recreational use of the forest (a description of the recreational quality and an estimate of the number of visitors) . Non forest products like mushrooms and, perhaps, others (a description of quantities and/or an indicator of quality)

Inputs:
- Labor (man-days)
- Trucks (number needed and total days of use)
- Saws (number needed)
- Gasoline (liters)

Oil (liters/Kg)
Maintenance
Management
Construction of all types
Etc., Etc.

4) To identify resource and economic constraints for each study site. This might include limits on timber production, road construction, labor, machinery, etc.

5) To identify resource and economic constraints across all study sites, or perhaps the entire Serpukhov district.

6) To select two or three alternative (new, potential) management strategies for each study site. These should be selected according to the expert opinions of Russian scientists. Roman Popadyuk should be able to help.

7) To predict the ecological and economic impacts the alternative forest management practices might have on the study sites. This will include the same information requested in items 2 and 3 above.

8) To incorporate the economic and ecologic information in a mathematical programming model.

9) To select an optimal management strategy for each study site using the previously developed mathematical model. Selection of an optimal strategy will be made with consideration given to resource constraints and the economic and ecological impacts of the management strategies.

Outputs:

1) Management strategies for selected areas of the Serpukhov forest will be analyzed and optimal strategies selected from the alternatives available.

2) The most important economic and ecologic constraints on the forest system will be determined. Improvements in economic benefits resulting from the relaxation of these constraints will be noted.

3) The economic value of forest lands in the study sites will be determined, thus providing an estimate of a fair market price for the land.

4) Personnel at the ecological institute will receive training that will enhance their capability to conduct empirical environmental policy planning and impact analysis. Theoretical input will be provided in part through Bruce McWilliams seminars, and empirical applications through a short course in bio-economic modeling to be taught at Washington State University.

Schedule of Activities:

April 7	Identify study sites
April 21	Identify existing ecological conditions at each site
April 21	Obtain historical production records from Ministry of Forestry
June 1	Predict ecological and economic conditions under present and alternative management options for each study site
June 10-30	Bio-economic modeling workshop at WSU
August 1	Economic analysis of study sites completed
September	Results seminars

Bio-Economic Modeling Short Course

Purpose:
To provide capability in integrated biological and economic modeling and simulation methodologies in order for the Pushchino environmental institute to predict, with improved accuracy, the ecological and economic impacts of present and potential new natural resource uses.

Location:
The location of the short course will be at Washington State University using both classroom and computer lab facilities.

Activities:
1) General introduction to economic modeling using the GAMS programming language.
2) Incorporating biological information in economic models.
3) Construction of remedial bio-economic simulation model for selected regions of the Serpukhov forest. Model will incorporate the biological and economic information gathered by participants in the workshop prior to departing Russia.
4) Analysis of biological and economic results obtained from the computer model.
5) Optimal selection of forest management strategies using the completed model and biological and economic data gathered by the Russian scientists.
6) Report writing.

Participants:
To be determined but to include a minimum faculty of the Systematic Ecology Department at Pushchino, Russian economist(s), and forester(s).

\pushchin\martin.wp

125

Biological and Economic Analysis of Forestry Management Alternatives for Serpuhkov District, Russia

Primary Objectives:
The primary objective of the proposed research is to identify optimal forest management strategies for selected regions of the Serpuhkov District of Russia. The methodology employed will take into consideration both the economic and ecologic aspects of the forest and the results obtained will be used as the basis for forest policy recommendations.

Goals:
1) To identify 3 to 5 sites in the Pushchino forest reserve to be used as study sites for the research. The sites will be typical of large sections of the broader Serpuhkov forest, and will be defined by vegetation type, vegetation age, climate and soil type.

2) To identify present ecological conditions in each study site, and predict the ecological impacts present, most common, forest management practices might have on the study sites. This should include consideration of at least the following, but could include other ecological indicators as well. It may also be possible to develop an overall ecological health indicator that includes consideration of many ecological variables.

Vegetation population, type, age and health
Wildlife population, type and health
Fish population and type
Wildlife and fish habitat
Water Quality
Others

3) To identify present economic conditions in each study site and to predict the economic impacts present, most common, forest management practices might have on the study sites. i expect that Vladimir Larionov and Bruce McWilliams will help on this goal. Data should include at least the following:

Outputs:
Description of the present (most common) management practice
Potential timber production in M^3 at a variety of harvest intervals (a timber production function)

Potential to produce Livestock (or possibly total livestock feed in Kg and/or calories)
Potential mineral production
Fish production (or a description of the fishing quality)
Recreational use of the forest (a description of the recreational quality and an estimate of the number of visitors) Non forest products like mushrooms and perhaps others (a description of quantities and/or an indicator of quality)

Inputs:
Labor (man-days)
Trucks (number needed and total days of use)
Saws (number needed)
Gasoline (liters)
Oil (liters/Kg)
Maintenance
Management
Construction of all types
Etc, Etc

4) To identify resource and economic constraints for each study site. This might include limits on timber production, road construction, labor, machinery, etc.

5) To identify resource and economic constraints across all study sites, or perhaps the entire Serpuhkov district.

6) To select two or three alternative (new, potential) management strategies for each study site. These should be selected according to the expert opinions of Russian Scientists. Roman Popadyuk should be able to help.

7) To predict the ecological and economic impacts the alternative forest management practices might have on the study sites. This will include the same information requested in items 2 and 3 above.

8) To incorporate the economic and ecologic information in a mathematical programming model

9) To select an optimal management strategy for each study site using the previously developed mathematical model. Selection of an optimal strategy will be made with consideration given to resource constraints and the economic and ecological impacts of

the management strategies.

Outputs:

1) Management strategies for selected areas of the Seruphkov forest will be analyzed, and optimal strategies selected from the alternatives available.

2) The most important economic and ecologic constraints on the forest system will be determined. Improvements in economic benefits resulting from the relaxation of these constraints will be noted.

3) The economic value of forest lands in the study sites will be determined, thus providing an estimate of a fair market price for the land.

4) Personnel at the ecological institute will receive training that will enhance their capability to conduct empirical environmental policy planning and impact analysis. Theoretical input will be provided in part through Bruce McWilliams seminars, and empirical applications through a short course in Bio-Economic modeling to be taught at Washington State University.

Schedule of Activities:

April 7	Identify study sites
April 21	Identify existing ecological conditions at each site
April 21	Obtain historical production records from ministry of forestry.
June 1	Predict ecological and economic conditions under present and alternative management options for each study site
June 10-30	Bio-Economic modeling workshop at WSU
August 1	Economic analysis of study sites completed
September	Results seminars

Bio-Economic Modeling Short Course

Purpose:
To provide capability in integrated biological and economic modeling and simulation methodologies in order for the Pushchino environmental institute to predict, with improved accuracy, the ecological and economic impacts of present and potential new natural resource uses.

Location:
The location of the short course will be at Washington State University using both classroom and computer lab facilities.

Activities:
1 General introduction to economic modeling using the GAMS programming language.

2 Incorporating biological information in economic models

3 Construction of remedial bio-economic simulation model for selected regions of the serpikhov forest. Model will incorporate the biological and economic information gathered by participants in the workshop prior to departing Russia.

4 Analysis of biological and economic results obtained from the computer model.

5) Optimal selection of forest management strategies using the completed model and biological and economic data gathered by the Russian scientists.

6) Report writing.

Participants:
To be determined but to include at a minimum faculty of the systematic ecology department at Pushchino, Russian economist(s), and forester(s)

Maevskaya Natasha, 12:24 PM 9/11/96 , Travel report

X-PH: V4.2@cheetah
From: "Maevskaya Natasha" <PSO@ibpm.serpukhov.su>
To: "Project Management Specialist" <dfadeyev@usaid.gov>,
Jim Henson <henson@wsu.edu>, "Raja Rao" <RRAO@intprogs.ip.wsu.edu>,
"Milton N. Schroth" <schroth@nature.berkeley.edu>
Date: Wed, 11 Sep 1996 12:24:48 GMT+4
Subject: Travel report
Priority: normal

Travel/Consultancy Report
Pushchino Project

1. Names of person traveling and/or consultant: Bruce P. McWilliams

2. Date report prepared: August 20, 1996

SEP 16 1996

3. Inclusive dates of travel or consultancy: March 15 through August 15.

4. Purpose and objectives of travel/consultancy:
To plan and present an economics course to students at Pushchino State University (PSU). To designing materials and assist Russian colleagues so that the course can be taught by the university faculty in the future. To work with the Pushchino faculty to enhance their understandings and capabilities in economics. To participate and be a member of the Serpukhov Environment Policy and Planning Subproject (SEPPS). To work with, and provide economic input to the Higher Agro-Biotechnological College (Agro-College) and its associated programs as appropriate.

5. Relation of travel and/or consultancy to project purpose and outputs:
A. This trip fits in with the output specified in section B of the USAID project in that we are developing a program for, and doing training in, areas related to environmental science and sustainable agriculture.
B. The trip also fits in with the goal of training business persons in business development and management; a purpose stated in section D.1.b.

6. Location of travel including dates at each site: Pushchino, Russia, March 15 - August 15.

7. Individuals, organizations including locations with whom traveler met and worked:
PSU: Vladimir Larionov, Lev Kalakutsky, and Iurii Rochev.
Agro-College: Vladimir Dynnik, Evgeny Maevsky and Vladimir Larionov.
SEPPS: Aleksandr Komarov and Dmitry Orlinsky (in addition to the WSU participants George Hinman, Walter Butcher, Steve Metcalf and Roger Martin.

8. Accomplishments:

130

A. A basic microeconomics course was developed and taught (three hours per week). Vladimir Larionov (the resident agricultural economist, who was the only candidate for teaching the course in the future) cooperated in the lectures. A typical lecture had me teaching the basic material for most of the time, and then Vladimir would relate/compare the subject material to the current or historical economic environment in Russia. In general, this split worked pretty well.

The course was attended not only by university (PSU) students, but also by students in the Agro-college, extension students, and by the interested general public. Unexpectedly high attendance rates (over 40 students in some lectures) necessitated moving the lectures to a larger lecture hall. Nine students took exams and received certificates verifying that they completed the course

Reasons for taking the course ranged from wanting to understand the new economic environment in Russia, wanting to get an understanding of economics for personal business reasons, wanting to get the certificate to show that taken an economics course for potential or actual (e.g., his teaching economics at a high school) use, and wanting to hear English.

B. Materials were prepared based on the lectures. These materials, together with the homeworks and exam can form the basis for future courses. The lecture-based materials are in English, but can readily be translated into Russian.

C. Weekly seminars in environmental economics were also given (2-3 hours per week). The purpose of these seminars was to attempt to tie economic issues with the applied biological research being conducted at the institutes. The students who attended the lectures also attended the seminars. This allowed the lectures and seminars to build on eachother.

D. I participated in the March 16-23 SEPPS workshops with the WSU faculty in helping to identify and address environmental issues in the Pushchino region, and develop plans for collaborative action. Subsequently I met with the Pushchino SEPPS members to discuss the economic aspects of their workplan and to evaluate the porgress being made. The group had made substantial progress in collecting data and developing an analysis of the problem and demonstrated knowledge about the role of economics in the analysis.

E. I worked with the Potato Seed Project in helping to develop their business plan. The plan calls for the production and sale of virus-free potato seeds at various stages of development as well as the production and sale of testing kits for the viruses.

9. Conclusions and/or recommendations (as appropriate):

The course was an overall success. However, if more time were available, separating the lectures into two groups in which one would be for the general public and last for only a few lectures on topics of general interest, and another designed for a smaller, more 'serious' group that would go into the theoretical models and assumptions more carefully, would be preferable. Given the limited time available, the chosen method was probably best.

The team-teaching aspect of the course was important in maintaining a balance and in providing a participatory role for Dr. Larionov. The significance of this is that the material taught can be replicated by Dr. Larionov as an on-

going course or as part of a broader economics curriculum (discussed in "follow-up section below). It is my understanding that Dr. Larionov is applying for such a course to become part of the curriculum provided by the university in the future. This would be a positive, on-going result of the project.

The course taught did not cover as much material as would be taught in a normal semester course load. The reason for this is a combination of the fact that we were limited to less than a full semester, that translation took up some time, and the format of the lectures in which a "normal" lecture (given by me) was supplemented with a discussion of its relevance to Russia's economic situation (Vladimir Larionov). However most of the important topics (and some particularly relevant for Russia) were presented. A full semester course would require supplementing the lectures presented. Additional topics would include consumer theory, externalities and public goods (this was presented in the seminars, but is not included in the lecture write-ups), and expanding on the general topics presented (e.g., income and substitution effects, technology isoquants, and production with two variable inputs), and may include choice under uncertainty, and interest rates and vestment decisions.

For the seminars, it would have been good to get more attendance from the research and faculty in the institutes who trying to apply their research. The fact that the seminars were advertised together with the class lectures may have made the two synonymous in peoples' minds, and therefore the seminar participants were the students sitting in on the course. In addition, providing the seminars over a shorter period may have helped encourage other participation.

A comment here about the quality of the "students" is appropriate. While the mixture of the "students" ranged from a high school student who was interested in studying economics in a university program, to researchers and school teachers many of whom themselves already had Ph.D.'s, I was very impressed with the overall interest, enthusiasm and level of intellectual capability of the students. They frequently asked relevant questions, and their motivation helped maintain the general interest in the course. Much of this is due to the environment created by the existence of the institutes, and the high level of ability of those who work there.

10. Suggested follow-up activities, if any:

General interest in economics at the university and its associated institutes at this time is strong. Creating a framework at PSU for not only the students, but the public at large can study and learn economic tools would be useful. To this end, ongoing cooperation between PSU and WSU, as well as the UC system and other members of the Consortium can be very useful. Extending the range of courses taught, and having visitors help develop the tools for teaching (for example, possibly graduate students doing it in conjunction with their research agenda) would probably generate a great deal of interest.

In the current situation, it seems most reasonable to limit the program to the provision of one or two economics courses. My suggestion would be to expand the current microeconomics class to include materials appropriate for a full semester class, and to develop a second class in environmental and resource

economics (it could be a "short" course to supplement the microeconomics course, or a full course not requiring familiarity with economics). Both of these could be accomplished using team-teaching methods using visiting economists familiar with the subjects and working with a capable local economist such as Dr. Larionov. The reason for an environmental and resource economics focus would be to provide a healthy and necessary continuity with the rest of the focus of the university (biological sciences). While business classes are popular, they are now being offered at various institutions, and there is no compelling reason at this time for someone to study business at PSU rather than some other place.

Over the long run, the situation may eventually allow consideration of a broader economics-based program for the university. However such a program would necessitate hiring additional (at least two) teaching and research professors. The curriculum of courses that arise from this may take three forms. One program would be in environmental and resource economics, playing off the university's comparative advantage in that area as well as providing continuity with the overall university program). A second possible program would be to pursue business-oriented courses, reflecting the interests and needs of many individuals and groups in Russia's current economic climate. A third approach would be to present a more "general" economics curriculum which could include a smattering of both the environmental economics and business courses, allowing students to focus on specialized topics after getting a base in fundamental economics courses (such as the one designed this semester).

1

****
Washington State University
Representative Office
Prospekt Nauki, 5, IBPM
142292, Pushchino
Moscow Region, Russia
Tel/Fax: (095) 923-36-02
****

[redacted]om ljmcadam@ucdavis.edu Thu Jul 18 10:24:34 1996
[redacted]ate: Thu, 11 Jul 96 16:44:00 PDT
[redacted]m: "McAdam, Lorna J." <ljmcadam@ucdavis.edu>
[redacted]c "Osburn, Bennie I" <biosburn@ucdavis.edu>,
'Boronin A' <boronin@ibpm.serpukhov.su>,
[redacted]"Hess, Charles E" <cehess@ucdavis.edu>,
[redacted]'Maevsky' <emaevsky@venus.iteb.serpukhov.su>,
'Henson J' <henson@wsuvm1.csc.wsu.edu>,
"Cullor, James S" <jscullor@ucdavis.edu>,
[redacted]"'Gelhar, Kathy'" <kathy@ibpm.serpukhov.su>,
"Maclachlan, Nigel J" <njmaclachlan@ucdavis.edu>,
'Rao R' <RRAO@intprogs.ip.wsu.edu>,
[redacted]'M Schroth' <schroth@nature.berkeley.edu>,
'Kim E' <sevigny@uclink2.berkeley.edu>,
'Vangundy S' <vangundy@ucrac1.ucr.edu>
Cc: "Hird, David W" <dwhird@ucdavis.edu>
[redacted]ject: Pushchino Report

TRIP REPORT

Report of Visit to Pushchino of NJ MacLachlan and DW Hird, 23 April - [redacted]April 1996

[redacted]sday 23 April

We arrived at 6:05 pm in Moscow. Clearing immigration and customs took [redacted]? hours. There were no difficulties, only very slow processing crew. We [redacted]e told that stamping of our currency declaration was not necessary. (This [redacted]ved true on leaving.) We were met at the airport by able interpreter [redacted]ladimir Adanin and arrived in Pushchino by about 9:00 pm where we were met [redacted]by Kathy Gelhar for a short briefing.

[redacted]ednesday 24 April

In the morning we went to the Project Support Office for introduction [redacted]and debriefing and met with Vassily Akimenko, Deputy Director of Pushchino [redacted]project from the Russian side and Deputy Director of the Institute of [redacted]Bi[redacted]chemistry and Physiology of Microorganisms. We also met with Eugene [redacted]Ma[redacted]evesky, Animal Health Lab Project leader and Deputy Director of the Institute of Theoretical and Experimental Biophysics. During the rest of [redacted]the day we met with Dr. Maevesky and other participants in the Animal Health [redacted]Pr[redacted]ject: Igor Beletsky, head of laboratory of molecular genetic engineering, Institute of Theoretical and Experimental Biophysics and Tatiana Glasko, Laboratory head, Institute of Agricultural Biotechnology, Kiev, Valery [redacted]Gl[redacted]asko, department head, Institute of Agricultural Biotechnology, Kiev, and [redacted]Ni[redacted]a Simanova.

Pushchino is located in the Serpukhov District of the Moscow Oblast. [redacted]It is not primarily a dairy region but specializes in the production of [redacted]potatoes and cabbage that are sent to Moscow. It is one of the former [redacted]Soviet science cities which specialized in different areas of basic [redacted]research. However, funding in Russia now for basic research is restricted [redacted]and investigators in this institute are attempting to diversify with one [redacted]group intending to involve itself in Russian agriculture. This is the [redacted]Animal Health Laboratory project headed by Dr. Eugene Maevesky. The dairy [redacted]industry in the Serpukhov region appears to be in serious trouble. The [redacted]total population of dairy cattle has reportedly decreased in the past 7 [redacted]years from 28,000 to 13,000 with 6,500 of these being cows. There is [redacted]reportedly high calf mortality and low milk production. We were told that 2 [redacted]- 6 liters per day is considered good milk production. There is a water shortage because of extensive use of the aquifer by Moscow which has

resulted in depletion of the aquifer. There is little regional or federal support for the agricultural industries. Gasoline is in short supply as well as parts for equipment, making it difficult to harvest feed such as alfalfa for cattle. There is no beef cattle industry per se, rather the beef consumed is culled dairy cattle.

Local livestock experts believe that before the native dual purpose cattle were crossed with Holsteins there was little or no tuberculosis, leucosis, or mastitis. It is claimed that these diseases were introduced by Holsteins and/or that Holstein crosses are more susceptible to them. It is claimed that an increased lymphocytosis results in lowered resistance to infection. As a result of these and other considerations, efforts currently are being made in Pushchino to develop a project to identify and classify native cattle breeds that may be useful in future breeding. Embryo transfer technology is necessary for this work. In the former Soviet Union there were 96 embryo transfer stations but now there are only 4 in Russia. The Animal Health Laboratory (AHL) in Pushchino has developed an embryo technology team headed by Dr. Armen Ovsepian (head of the Embryo Technology Group, Agro College from Armenia). Drs. Tatiana and Vasili Glasko will soon transfer from Kiev to Pushchino to work in the Agro College genetics project.

Major objectives of the genetics project are to develop beef and dairy breeds separately, as well as milk and meat dual purpose breeds for smallholders. In order to do this appropriate genetic markers must be developed. The techniques now being used by the Glaskos include serum electrophoresis and blood groups but not BOLA typing (The Moscow Veterinary Academy reportedly is doing BOLA typing). In addition to doing work on parentage and disease resistance/growth and other desirable traits in cattle the Glaskos also work with horses, including the Guzul breed from the Carpathian region, a small stocky horse with great stamina; Russian Trotters and also Russian riding horses that look like Arabian horses. They are very aware of Dr. Bowling's publications from UC Davis and also find the same breed-specific markers in their Arabs as she does.

As far as finding native cattle and cooperative farmers, they've had their best luck in Nizhny Novograd some 800 kilometers to the east. Other activities of the Glaskos include detecting genetic abnormalities.

We visited the molecular biology of Dr. Igor Beletsky. Dr. Beletsky has several large laboratories which appear to be very well equipped and are very active in several research projects. Dr. Beletsky clearly is an outstanding molecular biolobist, and is using contemporary methods to characterize nucleases, amongst other projects. We were also shown a hand-build flow cytometer with superb operational capabilities. The facilities, expertise and resources available in Pushchino clearly are state-of-the-art in a number of areas.

Thursday, 25 April.

Visit to Serpukhov Veterinary Station with Dr. Maevesky to visit Dr. Galina Fedorovna Khmylova, head of Veterinary Department of the Serpukhov District. Her son, Anton Gennadievich Khymylov is a third year veterinary student in the Moscow Veterinary Academy.

The veterinary office and diagnostic laboratory is located in the city of Serpukhov in a building built in 1939. The main function of the area veterinarian is veterinary inspection, preventive medicine and treatment of ill animals, state veterinary service, enforcing the Russian veterinary law,

agnostic and laboratory serology, and a diagnostic laboratory service. . Khmylova reported to us that for more than 10 years there has been no ctious disease in cattle in the Serpukhov region with the exception of ucosis. Cows are to be tested for tuberculosis with the skin test twice a ar. All animals in small herd with a reactor may be killed, but in larger ds, positive animals are treated with antibiotics. Cows are to be tested e a year for brucellosis. Cows also are to be tested once a year for ucosis, either by hematologic tests or immunodiffusion which is done here the laboratory.

In the former Soviet regime, farmers were compensated for animals stroyed because they tested positive to leucosis but now they are only d if they have purchased the non-obligatory animal health insurance. rucellosis has not been diagnosed in this region for a number of years and herefore vaccination is not practiced. Brucellosis is found in other ions of the former Soviet Union. Foot and mouth disease has not been n here for more than 20 years in cattle. It is obligatory that cattle be accinated twice a year for foot and mouth disease. In 1995 there was an break of foot and mouth disease in pigs in the Moscow Oblast reportedly nsmitted from Chinese pork. Yearly vaccination against anthrax (Siberian lcer) is obligatory. Occasional cases are seen in individual animals. Other vaccines are given as needed. Leptospirosis vaccination is given e per year. There have been some cases on one collective farm. Rabies present in such wild animals as foxes and other small wild carnivores. All dogs are vaccinated free of charge with the obligatory rabies vaccine.

Types of veterinary practitioners in the Serpukhov District include hose working for the state veterinary services, industrial veterinarians work on joint stock companies (former communal farms), military eterinarians and border inspectors. Each joint stock company has its own eterinarian who is responsible for the care of 800 animals. There are 8 rge joint stock companies in the Serpukhov region and 4 smaller farms that ve 25 to 40 cows each and 100 to 300 pigs. There is a monthly census of attle numbers. Each month the industrial veterinarians send the number of imals present in their company. The official census for 1/1/96 was 13,381 ttle which included 7,100 cows and at 4/1/96 there were 6,300 cows. There re 3,500 cows on small private premises, 1-5 cows per premises. Data on hese premises are collected yearly. The district veterinary office has a st frame of all livestock premises.

Current problems in the veterinary district are reportedly related in rge part to the difficult economic situation of the country. There are portedly many noninfectious diseases, especially metabolic diseases related to deficiency of vitamins and microelements. It was reported that arterly blood checks are made for carotin, PK, protein and carbohydrates a a serological profile. Cattle in this area are kept 8 months of the year in barns and 4 months of the year outside. Because there is insufficient machinery in working condition to harvest forage, and problems with buying sufficient concentrate due to the economic conditions, newborn calves reportedly are often weak and do not grow properly. Cost of milk production has increased but milk price has decreased. It was reported to us that the cost of production of a liter of milk is 1,800 - 3,000 Rubles but the state price is only 1,200 Rubles per liter (5,000 Rubles = US 1 dollar). Payment for milk is based on fat, not protein. Periodically milk is checked for density, acidity and total bacteria count. Reportedly, industrial veterinarians check monthly for subclinical mastitis. Mastitis is reportedly a serious problem. Barns have wooden floors for warmth in winter. A current problem associated with the difficult economic situation is that repairing of these wooden floors is difficult. Also maintenance of

the milking machines and associated equipment, eg. liners, is difficult and increased mastitis has been the result.

We also had the opportunity to tour the district veterinary diagnostic laboratory in the same building. Dr. Nikolai Evgenjevich Titov is head of the laboratory. Post mortem examinations are not done here but rather on individual dairies by the industrial veterinarians and then specimens are sent to the district veterinary laboratory for analysis. Analyses performed include chemical and toxicological analysis of forage, fecal samples for helminths, and a variety of serological tests: brucellosis - agglutination, complement fixation tests; leucosis - immunodiffusion tests; and tests for chlamydia and glanders. There is a bacteriology section. Bee disease diagnosis is also a service of the laboratory; they report no European Bee disease present. Toxicological examinations include those for nitrate, mercury, arsenic, fluorine, organochlorines, organophosphates, and poisonous plants.

The scheduled visit to the Dashkovka dairy farm was canceled because the farm reportedly did not believe itself to be in conditions to receive foreign visitors

In the afternoon we met at Pushchino Higher Agrobiotechnological College regarding work with other regions with Dr. Vladimir Dynnik, head of sustainable agriculture working group in Pushchino project and Chancellor of the Agro College. Because the Agro College was unable to obtain space in the main Pushchino institutes it established itself in nearby buildings and converted a former police station to offices, a conference room, and a computer laboratory. Students and staff reportedly all pitched in do the remodeling and it was indeed a very nice job. Drs. Dynnik and Maevesky have made valiant efforts to collaborate with livestock producers in the Serpukhov region but have had a series of difficulties with collaboration and therefore are beginning to look father afield, as mentioned before, to the East.

Friday 26 April

In the morning we met at the main office of the joint stock company Balkovsky, a former collective farm. This farm was organized in 1965 as part of a larger collective farm which consisted of almost 8,000 hectares with 980 persons associated with it. There were 5,000 cattle including 2,650 cows. During 1989, production from the dairy farm was at its peak with an average production of 4,000 liters per cow per lactation, a 92% birth rate, and an income of 3 million Rubles annually. Today, there 3,000 cattle of which 1,500 are cows. There are 552 workers and the average milk production per cow is 2,500 liters per lactation. There are 5,020 hectares of land remaining. Vladimir Mironchikov, head of the joint stock company, associated many of the financial difficulties to low worker morale and resultant poor productivity, no subsidization from the state for production and insufficient connection with Pushchino Science Institute. Therefore, production has decreased by 50% compared with 1989 (total farm production) and the farm is 2 million Rubles in debt. They are living from past resources created during the previous prosperous period. They believe that they have a good management team with good specialists including the animal husbandry and veterinary specialists. They believe they can only survive 1 - 2 years more. They hope for increased agricultural prices and decreased production costs.

We visited a company dairy, Balcova, that is dairy divided in two, each

.th 200 cows. Now all the companies farms have 3,000 cattle including 500 cows, 560 workers. Head veterinarian at Balkovsky (each farm has its ı vet) is Dr. Valentine Tolokonnikov. The head zootechnician is Vasili .aev. Cows are housed in large flat barns with long milk vacuum lines that ɔrtable milking machines are plugged into. Cows are milked 3 times a day. ach milker milks 33 cows per milking. Calf mortality is reported to be . Milk production average is 7.5 liters per day. Calves are reportedly ɔrn weak especially in the Spring. Artificial insemination is used; semen obtained from the central station and costs approximately $1 per dose. rns are tie-stall barns and during Spring and Summer cattle are released outside corrals. Heifers are bred at 12 - 18 months of age. Summer is ıe primary insemination period. Rectal palpation for pregnancy for agnosis is performed 3 months after conception. The average number of es of semen per conception is reported to be 2.5.

At both the dairy and the district veterinary office we raised the sue of Colleen Taugher's planned (Summer '96) Master of Preventive eterinary Medicine (MPVM) mastitis project. In both cases we were met with nitial reluctance and skepticism, but eventually it seemed that both the strict veterinarian and the director of the joint stock company (dairy) re willing to support the project. The project, modified after this visit ɔ Pushchino has been faxed and will be translated into Russian and provided the manager of the dairy farm and the district veterinarian. Another ssible collaborator for the dairy project would be the farm located in ipiey, midway between Pushchino and Serpukhov on the main road (there is us service from Pushchino). Another possible collaborating dairy farm is harskoe 35 kilometers from Pushchino. The director's name is Viacheslav ashin. He is a personal friend of Eugene Maevesky and has visited milk and eat processing installations in the United States.

isit to the Agro College

There are now approximately 17 cattle breeds and 17 horse breeds and any sheep breeds native in Russia that are disappearing. Their objective s to restore, perhaps, 7 breeds. Much of the work of the Agro College is potatoes. It is claimed that a 40% ketosis rate is observed on local iry farms and that a major cause of disease in calves is ammonia toxicity. In the afternoon J. MacLachlan gave a seminar on arboviral diseases and D. rd a seminar on epidemiologic studies of foot warts in dairy cattle at the roBio College. Later we visited the vivarium, directed by Dr. Sedovnikov, large new facility designed to meet international guidelines for use and re of laboratory animals. Up to the present these facilities are not ng used to their full capacity.

We visited the analytical food safety laboratory headed by Vladimir zniak head of TESTSIP Laboratory. The laboratory, equipped with support om the European Community, conducts toxicologic and other tests in foods, especially imported foods, as required by Russian law. This was a very pressive facility and concrete evidence of the dynamic entrepreneurship of e Agro College which produced these tangible results.

Saturday 27 April

We visited the vivarium and the embryo transfer facility headed by rmen Ovsepian. They have several hundred embryos from rare breeds stored re and possess a micro manipulator and are working with 7 of 15 cattle

possible breeds. Their ultimate aim for each of these 7 breeds is to obtain a minimum herd size of 100 with 3 - 4 bull lines, built up through embryo transfer, accompanied by genetic analysis to determine purity. We then visited the beef cattle rancho, perhaps 10 kilometers from Pushchino. There are now over 300 beef cattle here on 1,200? hectares. The result of a donation of 100 mixed beef cattle that arrived in November 1993.

In the afternoon we visited the Prioksko-Terrasny Reserve, located in a transitional ecological zone and with a considerable amount of interesting flora and fauna. It was especially notable for its breeding herd of European Bison. Afterwards, we had a delicious and memorable barbecue in the woods.

Sunday 28 April

On Sunday, with Vladimir Dynnik, Eugene Maevesky and Kathy Gelhar we discussed the visit and plans for future collaboration. In the Fall of 1996, 10-15 veterinary students from the Moscow Veterinary Academy will enroll in the Agro College for masters degrees in embryo technology and perhaps other subjects. Dr. MacLachlan outlined a proposed collaborative plan which was greeted enthusiastically by the group.

Monday 29 April

We were received by Dr. Alexander Mikhailovich Baronin, director of the project. He expressed his support for our efforts to collaborate in animal health and production, and especially for the concept of extension of knowledge to the Russian livestock industry. Dr. Baronin is also director of the Institute of Biochemistry and Physiology of Microorganisms. In his opinion the Animal Health Laboratory is a long-term project, but we also need some immediate payback. In the long term a very important contribution could be creation of an extension service.

Later in the morning we drove to Moscow and for a few hours Dr. Maevesky acted as our tour guide as we saw the wonders of Red Square and the Kremlin. Later in the afternoon we visited the Moscow Veterinary Academy in the southeastern part of Moscow. We met with Dr. Peter Gorelikov, Deputy Rector for International Affairs. He mentioned that he had been in contact with the Virginia Maryland School of Veterinary Medicine and also with UC Davis by means of the MPVM program. He gave us a letter of invitation for Dr. Ian Gardner, Director of the MPVM program, School of Veterinary Medicine, UC Davis to visit in October. Dr. Gorelikov will be traveling to the United States in November and December and is also interested in going to California. We also met with Dr. Alexandr A. Sidorchuk, chairman of epidemiology and infectious diseases and Dr. Eugene S. Voronin, chair of pediatric diseases, as well Nicolai Konstanich. Professor Mark Naidensky, Chair of Zoohygiene, and an acquaintance of Dr. Maevsky's, was out of town. We stated that our intention was to pursue a collaborative program with Pushchino, and that we hoped the Moscow Veterinary Academy would consider joining us.

The Moscow Veterinary Academy has a 5.5 year curriculum with 3,000 students, 20 to 30 in each year are foreign students and there are approximately 100 graduate students. There are approximately 300 faculty members, 1 teacher for each 10 students. There are approximately 35 veterinary schools in Russia. We visited the library and several classrooms. The veterinary academy occupies an extensive area with several new buildings. The curriculum appears to have some similarities to other

European curricula in that considerable emphasis is given to animal science as well as to clinical veterinary medicine. It was not clear how much contact there is with veterinary medicine outside of Russia: most of the publications that we saw in the library were in Russian. It is also not clear as to what extent research is conducted here at the veterinary academy as opposed to veterinary research institutes. There appears to be some separation of teaching which is centered here at the veterinary academy and research which is done at other institutes, although research certainly does take place here at the Moscow Veterinary Academy.

That afternoon we drove back to Pushchino, and met with Kathy Gelhar.

Tuesday, 30 April

We left Pushchino at 3 am and were driven to the Moscow airport for a 7 am departure.

Overall Impressions

Obviously there are many difficulties in a proposed collaborative program between institutions in the United States and in Russia. However, the need and the opportunities are so great that it would seem an excellent opportunity for collaborative ventures.

We were especially impressed by the people we met in Pushchino. It was very clear to us that Drs. Maevesky, Dynnik, Beletsky and others that we met are absolutely first-rate scientists, an issue of paramount importance because this common background and thought processes enable successful communication and collaboration. Kathy Gelhar is an invaluable resource.

It was also very evident our Russian colleagues in Pushchino were very anxious to collaborate with us, another absolutely essential ingredient for successful joint ventures. We were impressed also by the dynamic nature of the persons, facilities and programs of the Agro College. This is a dream that's developing a track record.

Perhaps on the negative side of the balance sheet is the lack of veterinary expertise in the Agro College. However, this is certainly one area where we could compliment each other nicely, justifying collaboration between American institutions and Pushchino. Another problem too, is relations with the local veterinarians and dairy industry. However, it appeared to us that these difficulties are due to traditionalist inertia of reluctance to change. It is important that efforts continue to be made to work with nearby dairy industry, but also to develop contacts further afield as is currently being done.

TRAVEL/CONSULTANCY REPORT
PUSCHINO PROJECT, IPDO

1. Name: Walter R. Butcher

2. Date: April 29, 1996

3. Dates of consultancy: March 15-22, 1996

4. Objectives:

   Prepare and present materials on use of economic analysis in natural resource and environmental assessment and policy evaluation.

   Work with Institute staff and Puschino State University faculty on plans for short-term research, further training, and proposals for the future.

5. Relation to Project Purpose:

6. Location of consultancy:

   March 15--travel
   March 16-17--Puschino, preparation
   March 18-21--Puschino, workshop
   March 22--travel

7. Individuals and Organizations:

   A. Komarov, E. Priputina, L Khanina, R. Popadyuk, D. Orlinsky, S. Zudin, V. Larionov, I. Rochev.

8. Accomplishments:

   a. Learned about the natural resources, environmental conditions, and problems/concerns of the Serpukhov District.

   b. Learned about the ongoing research and the capabilities of the researchers.

   c. Presented, together with Roger Martin and Bruce McWilliams, lectures and discussed with Russian colleagues, the approaches and necessary steps for including economic analysis in the consideration of resource and environmental plans and policies.

   d. Helped identify two specific short-run research topics and begin formulation of plans for additional training on research into these topics, for specific short-term research investigations, and for a reporting workshop to be held in the fall.

9. Conclusions/Recommendations

a. There is at this time in Puschino an almost total lack of capability for or activity in economic analysis. It will be important to stick to basics and link economic evaluation and optimization to the physical and biological spheres to which the scientific staff are oriented.

b. The environmental and resource management problems that have been identified would be quite suitable for economic analysis with explicit consideration of environmental effects.

c. The current economic problems and disruptions will make it very difficult to get environmental and resource management considerations enacted at enterprise, district, or higher levels.

d. The institutes at Puschino need to consider very carefully the implications of identification with the regulation of economic activity for the purpose of protecting the environment. If not handled very carefully, potential private and public contractors for the services of the institute could be driven away by too close identification with environmental defense.

10. Suggested follow-up activities:

a. Establish linkages with other Russian researchers and research institutes that have or are developing expertice in environmental and natural resource economics and policy analysis.

b. Supplement the course that Bruce McWilliams is offering by activities that will tie economic analysis closely to the research beginning or already underway on environmental and resource management topics.

c. Bring Russian scientists to Pullman for training and collaborative work on environmental health and forest resource planning.

TRAVEL REPORT

Names of travelers: Ann Jeffrey and Jeanene Greer

Date Report Prepared: August 26, 1996

Inclusive dates of travel/consultancy: May 25, 1996 through June 1, 1996, and June 7, 1996

Purpose/Objectives of travel/consultancy:

To gather information on management structure and support services currently in place at Pushchino State University (PSU) and the participating research institutes, and to assess administrative needs for the programs being developed at PSU and the institutes. Specific objectives include: 1) Define current administrative support systems of Pushchino State University and the Institute of Biochemistry and Physiology of Microorganisms (IBPM); 2) Identify current and projected administrative support needs of PSU and institute faculty; 3) Discuss UC Berkeley departmental administrative support and management structures with PSU and institute administrators and managers, and evaluate whether any of our models might fit their needs.

Relation of travel and/or consultancy to project purpose and outputs:

Improving/enhancing administrative support systems is one of the project objectives.

Individuals, organizations including locations with whom traveler met and worked:

Vassily Akimenko, Deputy Director, IBPM
Yuri Rochev, Vice-Chancellor, PSU
Kathy Gelhar, In-Country Coordinator, Pushchino Project
Tatiana Tantseva, Project Support Office Assistant
Natalia Maeskaia, Project Support Office Assistant
Elena Agalarova, Registrar, PSU
Ludmila Belyakova, Head of Patent Department, IBPM
Natalia Bulashova, Director of Office of Grants and Research Development, IBPM
Vera Dmitrieva, Information Office, IBPM
Tatiana Gaidamak, Technopark Assistant
Olga Kiseleva, Desktop Publishing Office, IBPM
Marina Kolokolova, Registrar's Office, PSU
Tatiana Korneeva, Economist, IBPM
Ludmila Leonenko, Central Office, IBPM
Sergei Lyssakov, Head of Computing & Network Facility, IBPM

Veronica Ogorodnikova, Assistant Director for Financial Questions, IBPM
Irina Safroni, Economist, PSU
Raisa Sankina, Head of Budget & Planning Department, IBPM
Kamilia Sidorova, Academic Secretary, PSU
Irini Siniutina, Head of Budget & Planning Department, PSU
Natalia Soboleva, Head of Graduate Division, PSU
Oleg Stupar, Technopark
Elena Vorobeva, Assistant to the Director, IBPM

Accomplishments:

Summary

Activity during the visit included information exchange sessions and small individual or group meetings to discuss specific needs and interests. During the first two days, we visited some of the Institute and University offices to get an overview of their organization and operations. Based on this introduction, we worked with Kathy Gelhar to develop a list of topics on administrative structure and systems at UC Berkeley, and presented eleven one to one-and-a-half hour sessions over the last three days of the week. Session topics are listed in Appendix A, and a list of the materials that we distributed at the sessions is provided in Appendix B. Friday, May 31, we had a final meeting with Deputy Director Akimenko to discuss our observations. Finally, we met with key administrators throughout the week of May 27 through May 31, and also on June 7. At these meetings we discussed priorities for administration at IBPM & PSU, and possible follow-up projects that would address these priorities and build on our meetings. The content of these discussion is incorporated below in "Conclusions and Recommendations" and "Suggested Follow-up Activities".

Overview of Administrative Structure

During our visit, we primarily focused on Objectives Two and Three (from the previous page). We realized that although much of the routine administrative work is similar in both countries, there are significant differences in the underlying business culture that could not be assessed in a short visit. Instead, we focused on trying to identify new administrative directions and priorities, and on presenting an overview to the staff of our structure and systems. The two sections that follow provide a brief general outline of PSU & IBPM administration. This information is not comprehensive. There were some offices that we were not able to meet with at all due to staff vacations or other scheduling problems. Other offices focused on presenting an overview of their programs, rather than their structure.

Administration - Pushchino State University:

There are ten administrative units in Pushchino State University: the Office of the Registrar, Graduate Division, Personnel Office, Accounting, Financial Planning, Personnel,

Supply, Workplace Safety, Internal Services, and Desktop Publishing. For the most part, these report directly to the PSU Vice Chancellors. Of these offices, we visited only with Office of the Registrar, Graduate Division and Financial Planning. Meetings with the first two focused primarily on a presentation of University programs & services, rather than specific administrative responsibilities and functions. Most of the information on the structure of the PSU units was obtained through a separate meeting with Kamilia Sidorova, Assistant Chancellor.

There are seven Academic Centers (departments), based out of each of the seven institutes, that each have an administrator. Institute Directors also function as Department Heads, and Academic Center administrators report to the Institute Director/Department Head. There are also several University-wide Departments (Humanities and Foreign Languages). We did not get specific information on reporting lines for these units, but believe that they report to Vice Chancellor Rochev.

The Office of the Registrar (5 Staff) reports to Vice Chancellor for Academic Work Rochev. The Registrar's Office is responsible for a broad range of duties and is the primary contact office for the Academic Centers. Based on the presentations made to use during our visit, the Registrar's Office also seems to handle: determination of student stipend level, scheduling, data collection for development of the academic calendar, lecturer stipends or fees, etc. We did not get specific information on division of duties and responsibilities.

The Graduate Division (2 Staff) reports to Vice Chancellor for Research Kalakutskii, who also heads the Council on Teaching Methodology. Again, based on the programmatic presentation, we believe that the Graduate Division staff work with the students to finalize and record the students' personal work plans, schedule specialty exams, etc.

The Personnel Office (2 Staff) report to Vice Chancellor for Academic Work Akimenko. We did not visit this office at either PSU or IBPM. We were told that the Personnel Office maintains the documents of the University students and employees. This is not exactly analogous to the function of US personnel offices. Russian citizens have an official set of documents that travel with them through school, and later work. When they enter a school or start a new job, these documents are registered and held by the Personnel Office of their business or institution. At PSU, the Personnel Office is also responsible for issuing diplomas to graduating students.

The offices of Financial Planning (2 Staff), Accounting (4.5 Staff), Supply (1 Staff), and Workplace Safety (1 Staff) ultimately report to Vice Chancellor Akimenko, but directly to an operations director, Surkov. We did not meet Surkov, and are not sure of his exact title or his specific duties and responsibilities. The parallel position at IBPM is the Deputy Director for General Questions. As at IBPM, this position is also responsible for Physical Plant. In addition, at PSU, Surkov is responsible for Dormitories and Media and Equipment.

The only unit we met with of the departments reporting to Surkov was the Office of Financial Planning. Economist Irina Safroni deals with planning and management of the

University budget. Total funding for the University comes from the Russian State. The federal budget allocation systems seems quite political, with some universities favored over others. Once the annual budget is established, Universities are not guaranteed that they will receive the full funding that has been allocated. The government distributes the budget on a monthly basis and the amount that the University receives in any given month can vary considerably. Further, although the annual budget has already been determined, the University must request each monthly allocation. Because of this continuing uncertainty, significant effort is spent on second guessing and projecting short term funding needs. We did not have the opportunity to discuss long term budget planning, but imagine that it would be difficult to do in such an uncertain environment.

The Office of Internal Services (2 Staff) reports to Academic Secretary Kamilia Sidorova. This office provides clerical support producing reports and correspondence related to PSU. The University also provides partial funding for two staff (.75 FTE) from IBPM for Desktop Publishing and editorial support in producing informational brochures on PSU. Kamilia Sidorova reports to Chancellor Boronin, but also works with the other Vice Chancellors to develop policies, procedures, and programs for the University. Her position is analogous to that of an Assistant Vice Chancellor in a US University.

Administration - IBPM:

Administrative support for IBPM reports to Deputy Director Vassily Akimenko. An administrative operations manger, the Deputy Director for General Questions, Lev Tsvetnitsky, reports to Deputy Director Akimenko and is responsible for the departments of Accounting, Planning, Supply and Physical Plant. We were unclear on how involved Tsvetnitsky actually is in managing administrative services, since he did not participate in any of our meetings. Each department (excluding Physical Plant, which we did not tour) generally consists of three to four staff members. On our tour of the IBPM offices we were introduced to the staff of each department and received a brief overview of their functions. The Accounting Department handles the basic accounting services; accounts payable, payroll, etc. Planning manages the funding allocated from the government along with funds from other sources and is responsible for budget control and financial planning. Purchasing functions for the institute are handled by the Supply Department. Physical Plant is responsible for facilities and all related building matters.

The Office of Grants and Research Development (OGRD) and the Patent Office both report directly to Deputy Director Akimenko. OGRD (3 staff) helps identify funding opportunities and provides up-to-date information on fund sources and agencies through their world wide web site. OGRD also helps facilitate the process of applying for contracts and grants. The Patent Office deals with all (Russian) patents and other related legal matters. This operation is reportedly quite large (10 - 20 staff). We met briefly with the Head of this unit, Ludmila Belyakova, but did not tour the offices.

There are several positions that report directly to Director Boronin. Elena Vorobeva is Assistant to the Director, and is the senior staff person in the Director's Office (2 staff). The Director's Office provides administrative and secretarial support for the directors,

arrangements for meetings, contact with visitors and guests of the institute, etc. Since the Director's Office houses one of the Institute's two Moscow telephone lines, they are also responsible for answering a large volume of incoming long distance calls and for sending and receiving all faxes. The Academic Secretary (who was out of town during our visit) also reports directly to Boronin. She assists with the dissemination of scientific information to appropriate personnel in the Institute (e.g., general invitations to conferences, requests for publications, etc.). The Assistant Director for Financial Questions, Veronica Ogorodnikova, heads up special projects in the financial area. She reports to Director Boronin, but generally through Deputy Director Akimenko. Ogorodnikova also assists the Support Office with special financial projects.

Conclusions and/or recommendations:

Conclusions:

The current administrative system at IBPM is very similar to the University of California system prior to the days of significant grants funding. Thirty years ago, UC received 70% of its total budget from the State and 30% from extramural funds. Today the ratio has reversed. In those earlier years, UC faculty handled the bulk of the higher level administrative work. As the grant funding level increased, so did the need for increased accountability at lower administrative levels. In more affluent times, there was no critical need to analyze expense versus budget. The staff simply processed the transactions, and if money ran short, the Department would request a budget augmentation. Those days are long gone, and changes in the funding base has precipitated the need for a drastic change in how we administer, and in our expectations of staff. This has been a painful process, in part because the University only recognized the need to focus on developing a more professional staff in the relatively recent past.

Under the current system at the Pushchino Institutes, research scientists are responsible for a significant amount of administrative operations work and staff tend to handle routine transaction-oriented work. Paralleling UC, but on a much more dramatic timeline, Russian State funding has been cut by 60% over the last few years, and researchers are now looking more towards grant funding to support their programs. As at UC, the administrative focus is changing to meet the needs of changing programs and a shifting funding base. Part of this change has to include a shift in workload responsibility and a redefinition of the role of administrative staff in the Institutes and the University.

In many ways, effecting change may be considerably more difficult in Russia than in the US. Russia's business culture is significantly different than ours. Because many arrangements are negotiated and finalized face-to-face, a great deal of work that is handled in the US by administrative managers or analysts must be transacted personally by the scientific directors. On the other hand, PSU & IBPM are in the unique position of being at the forefront of a changing system, and therefore should have the opportunity to influence the development of new administrative systems. This has already proved to be the case

with academic policy development at PSU. Many procedure approval requests that have been forwarded to the State come back (virtually unchanged) as official policy.

PSU and IBPM have some extremely impressive administrative staff, who have been instrumental in the implementation of new systems and programs. Kamilia Sidorova (PSU), Sergei Lyssakov (Head of Computing & Network Facility, IBPM), and Natalia Bulashova (OGRD, IBPM) have all undertaken ambitious and innovated projects. Sidorova has taken a central role in both establishing an administrative support structure for the academic program and student services at the University, and in developing policy and procedures for the University's new programs. Lyssakov, who heads the communications subproject, has organized Stack Ltd., which currently provides internet services to the Serpukhov region and is now considering expansion. Bulashova has worked in partnership with the University of Tennessee to develop a web site that helps investigators identify grant funding programs that are relevant to their research. Bulashova identified Tennessee has a potential partner and developed the relationship.

We met many other administrative staff members who have the potential to make similar contributions. A majority of the unit heads we met with were intelligent, forward-looking individuals who were open to change. However, a few areas that need strengthening were noted, including: staff training systems, general infrastructure, and employee responsibility levels. First, as a general statement, the administrators need to develop their analytical skills to include analysis of business systems, process, and organization. In addition, there has not been a significant need in the past for financial analysis (of grant expenditures, for example), and more staff need to be trained in these skills if the institutes intend to move towards a larger base of grant funding. Second, although employees have at least some access to computer workstations, it does not appear that they fully utilize spreadsheet or database programs in their daily work. Third, much of the computer hardware is out of date and unable to run current software. (This could certainly be a contributing factor in the second point.) Fourth, the responsibility gap between the scientific administrators and the staff is also duplicated within the staff organization. The staff unit heads do most of the work, and their assistants handle only the very lowest clerical and miscellaneous duties. Given this current system, there is a danger that the administrative heads (and scientific directors) will become extremely overloaded and prove to be a serious bottleneck for work flow. Ultimately, this could impact their ability to implement planned new programs. As a final point, the scientific directors should consider that the current administrative organization may not be the most effective structure in another five years.

Recommendations:

- All unit heads should be given the opportunity to receive training/experience in both organizational and systems analysis, and in project management. Train a small group of administrators in this area, so they can serve as specialists for the institutes, and ultimately train others. Analytical experience could also be developed through joint projects that span several units (such as the information office workgroup that is being formed). As some units move towards functioning as small businesses (e.g., computing

and desktop publishing), these unit heads will also need to be proficient in financial & cost analysis, and cost/benefit and market studies.

- A system needs to be established to delegate administrative responsibility to the lowest appropriate level. In order to develop and implement a redelegation plan, an analysis should be conducted. First, it is necessary to assess which duties currently handled by researchers and administrative unit heads could (theoretically) be redelegated. Once this has been established, a further assessed should be done to determine where this could be implemented now - on even a limited scale.
- Conduct a planning and analysis project to assess the long-term administrative priorities of IBPM and PSU. Determine what new programs are planned and what type of administrative support they will require. The experience at UC indicates that when new programs of this sort are introduced, the amount of administrative work increases. Develop a provisional plan for meeting these needs, and assess the ability of the current administrative structure to support these needs. Consider the option of restructuring the administration, and in this reorganization distribute the new responsibilities to develop one or more additional positions at the upper level of administrative leadership to provide the workload relief that will inevitably be necessary for the research directors.
- The system of performance-based rewards should be reviewed. The existing awards system is ineffective due to the fact that the level of salaries, and correspondingly, bonuses is too low. Employees are forced to find work on the side, which decreases thei willingness to work harder for an insignificant material reward. In addition, bonuses are usually given not as a reward for work well done, but as a supplement to the salary. The existing system of material rewards is a significant barrier to redelegating and reassigning responsibilities, since employees are generally reluctant to take on any new assignment without additional income "up-front". Nonetheless, there have been employees who have taken initiative, and whose positions have evolved as a result. In order to support new programs and initiatives, a system of rewards should be implemented to recognize the staff who materially contribute towards the development and implementation of new systems. This recognition can take various forms: changes in whom the employee reports to or who reports to the employee that would raise the status of the employee; improvements in the employees' work space; greater authority to make decisions independently; bonuses and raises; receiving a commission on transactions, etc. Further, this recognition needs to high-profile enough, so that the "cause and effect" of the reward is recognized by all the administrative staff . An assessment of meaningful awards (both monetary and non-monetary) should be completed, and some type of performance-based reward system should be established. Since this concept represents a major culture shift, it would be advisable to introduce the system on a small scale and expand it slowly as recognition of its value grows.
- The computer infrastructure (both hardware and software) needs to be improved, and staff need to be trained on these systems. Computers and software become obsolete so quickly that a replacement plan should be designed with user priority needs establishe for both IBPM and PSU. New equipment should be regularly purchased for the "powe users", and the older models recycled down the line. Older equipment from the

laboratories could also possibly be assigned to administration. Accounting and financial support are particularly critical areas in this regard. Grant funding agencies in the US. and Europe do not accept the Russian accounting system that the institutes are required to use. However, there are excellent financial packages available commercially. Given IBPM's excellent computer support, such a system could potentially be adapted to generate reports that could satisfy both systems, thus removing one stumbling block to receipt of direct grant funding.

- The function and role of OGRD should be reviewed for possible expansion. Sponsored Research Offices at US universities notify researchers of funding opportunities, but are also the responsible office for submitting (signing off on) proposals, negotiating terms and conditions of awards, and for overseeing compliance for any reporting or certification requirements. As the institutes begin to receive more grants from European and US agencies, they will need to create new systems for handling these processes.

Suggested Follow-up Activities

- Identify a joint administrative project for collaboration. Ideally, collaborative projects would be preceded by a training session in organizational analysis and strategic planning. Ann Jeffrey would be the UC Berkeley contact and Kathy Gelhar or some other designated staff person (which strong English skills) would be the Pushchino contact. If additional US partners at UCB or WSU are identified, multiple projects could be undertaken. The language barrier is problematic for possible email collaboration, so work-arounds to this problem need to be identified. Ideas for projects include:
  - Collaborate on an administrative analysis of the current structure at IBPM and/or PSU. Jeffrey would work with interested administrative unit heads to develop a description of the purpose and function of their unit, a functional description of the responsibilities of all positions in the unit, a report of current work flow, and a list of skill-sets that exist within the unit. This study would have the dual purpose. It would provide the unit head with experience doing an assessment of their operations, but would also provide the academic directors with information the background and skills that they can draw on when setting up administrative support structures for new programs.
  - Collaborate on administrative issues related to running a workgroup (information office or some other to be determined).
  - Collaborate with a workgroup on a project aimed at providing a new service or function. There are some excellent "step-by-step" workbooks on strategic planning and organizational issues (unfortunately, in English only). Jeffrey is reviewing some of these for her own operation, and has sent several to the Pushchino Project Office for review. IBPM/PSU and UCB would jointly choose a process to work through to use the same methodology for similar projects. Not only could we mutually benefit from the other's experience, but our varying experiences would provide data on differences in business culture between our systems. Improved mutual

understanding of differences in business culture could potentially benefit the overall project.

- Collaborate with Project Office (or some other designated office) on assessing possibilities for redelegation of responsibilities. Trying this in a limited setting could provide valuable information to be used to assess strategies for implementation at a larger level.
- Collaborate with unit heads or a workgroup to increase use of computer spreadsheet or database programs in a wider range of routine tasks. Assess efficiencies (when is it worth it and when is it not?), assist in development of templates, consult on various uses of data, etc. Collaborate on identifying training options (e.g., could US video training be adapted with translation?).

- Assign a staff member from OGRD (or some other appropriate unit) to research the role of Sponsored Research Offices in the US. Ideally, this person should visit some of the different US Universities participating in the Project as part of this process. A US contact should be identified to provide expertise for the analysis, and guidance in any resulting planning process.

Appendix A

***PUSHCHINO PROJECT:** Schedule for Ann Jeffrey, Manager and Jeanene Greer, Administrative Analyst, Molecular and Cell Biology, University of California, Berkeley*

Monday, May 27, 1996

9:30 am Introductory meeting with Kathy Gelhar (in-Country Coordinator) and representatives of IBPM and PSU:
- Introductions
- PSU and Institutes
- Structure of support services at IBPM
- Structure of support services at PSU
- Suggestions of topics for further discussion

10:30 am Tour of Institute and introduction to selected services

12:30 pm Adjustment of program

3:00 pm Individual meetings with IBPM administrators

Tuesday, May 28, 1996

9:00 am Individual meetings with PSU administrators

3:00 pm Individual meetings with IBPM staff

Wednesday, May 29, 1996

10:00 am Planning Meeting: selection of preferred topics, plan sessions to accommodate PSU & IBPM staff schedules.

3:00 pm Session 1: Extramural Funding
- A. Funding trends in the US.
- B. Administrative support in preparing grant proposals
- C. Training Grants
- D. Administrative support for conducting grants: accounting, reporting, planning, budget, contract administration

4:00 pm Session 2: Determination of Operating Budget

Thursday, May 30, 1996

9:30 am	Session 3:	Financial Tracking Systems
10:30 am	Session 4:	Administrative Structure of the Department of Molecular and Cell Biology
	Session 5:	Biology and Biology departments at Berkeley
11:30 am		Available for other meetings
2:00 pm	Session 6:	Career Development in Administration
3:00 pm	Session 7:	Job Descriptions, Performance Standards, Performance Coaching and Performance Evaluations
4:00 pm	Session 8:	Workload Assessment Mechanisms
5:00 pm		Available for other meetings

Friday, June 1, 1996

9:30 am	Session 9:	Types of Recharge Units and How They are Established and Approved
10:30 am	Session 10:	Administration of Graduate Study A. Graduate Admissions B. Department level staff support of academic programs C. Financial support for graduate students D. Career path for graduate students E. Calculation of faculty teaching and other workloads
11:30 am		Available for other meetings
2:00 pm	Session 11:	How are Decisions Made Within the Department: Faculty Responsibilities, Staff Responsibilities, and Joint Committees
3:00 pm	Final meeting with Vassily Akimenko, Deputy Director of IBPM	
4:00 pm	Session 12:	Planning and Implementation of Changes in Administrative Systems A. Infrastructure B. Personnel training

Appendix B

Materials & Handouts

Session 1:
- Research at Berkeley
- A Quick Guide for Preparing Contract and Grant Proposals
- A Quick Guide to Contract and Grant Fiscal Administration
- A Quick Guide to Types of Funding Agreements
- Suggested web sites for contract & grant information
- Contract and grant opportunities - international
- Office of Technology Licensing brochure
- Sample Research Agreement - Industry

Session 2:
- Mid-Year Financial Report for Molecular & Cell Biology (MCB) BH/KH ASU
- Year-End Financial Report for MCB BH/KH ASU
- Year-End Financial Report for MCB Dept.

Session 3:
- Monthly Financial Report
- Training Grant Financial Statement
- Quarterly Projection Statement for Faculty
- Financial Report - Special Projects
- Examples of analytical spreadsheets - DNA recharge financial summary, Media Services expense report of estimated vs. actual, DNA Synthesis income summary

Session 4:
- Overview of MCB Management Structure
- College of Chemistry Business Services Office Organization Chart - Department/College responsibilities
- UCB 1995-96 Organization Chart
- MCB Organization Chart
- MCB Barker/Koshland ASU Organization Chart
- MCB Staffing List
- Other misc. job descriptions and series concepts

Session 5: None

Session 6: Personnel Management Series
- Developing Performance Standards
- Observation and Feedback (Coaching)
- Performance Appraisal

Job Descriptions

Session 7: Effective Delegation: Delegating for Success

Session 8: 1996-97 UCB Recharge Account Control List

Members, UCB Campus Recharge Committee 1996
Review Checklist for Recharge Proposals
UCB Recharge Committee Mission Statement
Federal compliance concerns
UCB Recharge Unit Priorities and Concerns
Hourly Rate Development Schedule
Labor Rate spreadsheets
Sample recharge proposal

Session 9: MCB Department Policies & Procedures for 0% and Affiliated Appointments
Appointment & Promotion - Deans, Dept. Chairperson
Duties of Department Chairperson
MCB Manager job description
Series concept: Student Affairs Officer I - IV
Job Descriptions: Student Affairs Officer I, Administrative Assistant III, Administrative Analyst
Manager/Chair Responsibilities
Discussion Tool for Managers & Chairs
Academic Calendar 1996-97
MCB Graduate Program Bulletin 1995-96
MCB General Catalog Listing
MCB enrollment statistics
Graduate Affairs Office Funding Projections 1996-97
Graduate Affairs Office Funding Actual 1995-96

Session 10: Creating Partnerships: Working Effectively with your Chair(s)
Manager/Chair Responsibilities by Audience/Topic
Barker/Koshland ASU - Central Staff Support
Program concept for Management Services Officer I-IV (Staff Personnel Manual)
Job description - BH/KH ASU MSO

Session 11: Sustaining Excellence in the 21st Century: A Vision & Strategies for the University of California's Administration
Taking Advantage of Change - Leading & Managing Change Workbook
Management Council Report

Packet for Elena Vorobeva, Assistant to IBPM Director:

Job Descriptions - Secretary II, Executive Assistant to the Chancellor
Series concept - Clerical/Administrative
Supplemental Class concepts - Secretary I-III, Administrative Assistant I-IV, Office Supervisor I-II with Minimum Qualifications

CORNELL
UNIVERSITY

College of Agriculture and Life Sciences
Department of Plant Pathology

334 Plant Science Building
Ithaca, NY 14853-4203 USA

Telephone: 607 255-3245
Facsimile: 607 255-4471
Telex: WUI6713054
BITNET:DEJ1@CORNELL.EDU

July 15, 1996

Dr. Milt Schroth
7 Heather Lane
Orinda, Ca 94563

Dear Milt:

Enclosed is a final report for the trip to Russia made by Tom German and myself on 13-19 June 1996. Please contact either of us should you have any questions.

The trip was both useful and informative.

Sincerely,

Steven A. Slack
Henry and Mildred Uihlein Professor
and Chairman

Encl:

copy: T. German

15

PUSHCHINO SEED POTATO PROJECT
TRAVEL REPORT - JUNE 1996

1. Steven A. Slack
Henry and Mildred Uihlein Professor
and Chairman
Department of Plant Pathology
334 Plant Science Building
Cornell University
Ithaca, NY 14853-4203
Tel: 607-255-3245
FAX: 607-255-4471
E-mail:SS18@cornell.edu

Thomas L. German
Professor and Chairman
Plant Pathology Department
1630 Linden Drive
University of Wisconsin
Madison, WI 53706
Tel:608-262-0928
FAX: 608-263-2626
E-mail: TLG@PlantPath.Wisc.edu

2. REPORT PREPARED: July 1, 1996

3. TRAVEL DATES: June 13-19, 1996

4. PURPOSE: To visit with faculty at Pushchino State University and with selected organizations near Moscow about seed potato certification. Concept of visit was to exchange ideas and information regarding seed potato certification.

5. RELATION OF TRAVEL TO OUTPUTS: The draft schedule for the visit is attached. Additional relevant visits included trips to the government seed inspection service of the Russia Ministry of Agriculture in Moscow and to the Potato Research Institute in Korenevo near Moscow.

6. TRAVEL SITES & DATES:

June 13 - Travel from United States to Russia
June 14 - Arrive in Moscow 5:25 P.M.; Travel to Pushchino and dinner with V. Dynnik and E. Maevsky
June 15 - Orientation to Pushchino Agrocollege, including visits to Hydroponics Unit and Biotron. Extensive discussions of project and goals.
June 16 - Visits of Pushchino and surrounding area/sightseeing
June 17 - Met with V. Akimenko to discuss Pushchino State University. Gave lectures on seed potato certification and technology, and visited Serpukhov Agricultural Farm to observe potato crop from minitubers
June 18 - Traveled to Moscow to visit with Government Seed Inspection Service and Potato Research Institute
June 19 - Travel from Russia to United States

7. INDIVIDUALS AND ORGANIZATIONS:

A) Vladimir Dynnik, Head of Sustainable Agriculture working group in Pushchino Project, Chancellor of Agrocollege, 142292 Pushchino, State University, Moscow Region, Russia

B) Eugene Maevsky, Head of Laboratory of Molecular Genetic Engineering, Institute of Theoretical and Experimental Biophysics, Pushchino State University, Moscow Region, Russia

C) Eugene Mamonov, Potato Project subproject leader, Pushchino State University, Moscow Region, Russia

D) Igor Beletsky, Head of Laboratory of Molecular Genetic Engineering, Institute of Theoretical and Experimental Biophysics, Pushchino State University, Moscow Region, Russia

E) Vassily Akimenko, Assistant Director, Head of Laboratory of Anaerobic Processes, Russian Academy of Sciences, Institute of Biochemistry and Physiology of Microorganisms, 142292 Pushchino, Moscow Region, Russia

F) Tatyana Kokyna, Chief of Inspection, Government Seed Inspection, Russia Ministry of Agriculture, Moscow Region, Russia

G) Valentyn Ulanov, Chief of Port, Seed Inspection, Government Seed Inspection, Russia Ministry of Agriculture, Moscow, Russia

H) Boris Anisimov, Deputy Director, Head of Breeding and Seed Potato Center, Russian Academy of Agricultural Sciences, Potato Research Institute, 140052, Moscow Region, p/o Korenevo, Russia

8. ACCOMPLISHMENTS:

The primary accomplishment of this trip was the opportunity to exchange ideas and concepts. From our perspective we were able to share the structure of seed potato certification in the United States and to discuss the technology, regulatory system, and industry needs that drive the seed potato industry. The primary forum for this were lectures provided by both Tom German and Steve Slack during the visit, as well as a forum for discussing the lecture afterwards. Vladimir Dynnik and Eugene Maevsky shared with us the concept of the Pushchino Seed Potato Project, including an outline of the project and a diagram of how that project would be integrated (see attachment). We also had the opportunity to visit the hydroponics unit where minitubers were being grown under hydroponic conditions, the biotron where tissue culture plantlets were being maintained, and prototypes for bioreactors were being developed. Later we had the opportunity to visit the Serpukhov Agricultural Farm where the minitubers were being grown out at the "super, super elite" class of production. These visits and the extensive discussions during the visits enabled us to determine the intent and direction of the project. We were impressed by the productivity demonstrated. For example, with the hydroponic unit, the varieties started producing minitubers after sixty days, and minitubers were harvested every other day for the following sixty days (50-60 minitubers/plant total; 5-20 gm size). A maximum of 10,000 minitubers could be produced/cycle

(7000 minitubers average). Goal is to produce 100,000 minitubers/year (1/2 for oblasts and 1/2 for Serpukhov). They are also interested in generating microtubers in bioreactors. We observed a prototype bioreactor.

Conceptually, they need to be able to increase seed lots 3 X (3 years) before they can sell them for income (however, they did feel that minitubers could be sold for $1.00/minituber and super-super elite seed for $2/kg). Super-super elite seed is the first year field increase of minitubers. They estimate that they need enough seed to sell to plant 200-300 HA which would supply about 2 oblasts (20 oblasts total; Moscow oblast has 70,000 HA potatoes alone, see Table 1). They recognize that there is a need for multiple centers to produce minitubers and increase seed needed for Russia generally.

Major problems are the need to generate pathogen-free plantlets and to develop testing kits (e.g., ELISA kits or PCR kits) to detect viruses and other potato pathogens. They currently have 20 Russian potato varieties in their *in vitro* clone bank, but only 5 are virus-free (these were obtained through Canada). The test kits are needed to verify initial health status of plantlets, as well as to monitor health status of seed increase generations. A further goal is to be the source of diagnostic test kits for oblasts who develop the capacity to produce minitubers. They noted that potato spindle tuber viroid was their most serious problem in their pre-basic seed as over 50% of the lots examined thus far have some level of infection.

The plants grown from these minitubers were excellent in vigor and growth, as observed at Serpukhov. No virus or other disease problems were evident in the grow-out under plastic at Serpukhov. Minitubers had been stored for 3 mo@ 4C and planted on May 15. Plants were about 6-8 in tall. It is clear that the system that was outlined for the Pushchino Seed Potato Project was working effectively.

We were impressed by the commitment of the people in the project and by the technical capability demonstrated. Discussion indicated that as seed stocks were reproduced, virus infection was common among larger production fields (We had minimal opportunity to observe large production fields, but cursory examination did indicate presence of mosaic and leafroll diseases. The plastic house was adjacent to another plastic house of tomatoes and traffic among plastic houses seemed unmonitored. There is some cause for future concern about sanitation and exclusion of disease problems.

The plastic house at Serpukhov covered some 3,000 sq. meters. Plants were spaced 20 cm within rows and 70 cm between rows. They expected to get 10 tubers/plant at harvest. Their varieties are indeterminant in set and they expect 12-25 tubers/plant in the field. The minitubers planted averaged 10 gm and seed tubers usually weigh 40 gm (commercially, 200 gm tubers desired).

It was indicated that the main constraints in commercial production are (1) seed quality, (2) production technology, and (3) late blight caused by *Phytophthora infestans*. Colorado potato beetle is a major insect pest. They average 10T/HA (=100 cwt/AC); they feel that this yield should be 2X-3X higher in Russia and, in fact, it is 3X-4X higher in the USA. They also indicated that they have good late blight resistance in at least three varieties (Udacha-foliar mostly, Nevskij, and Liugovskoj). They were very concerned about the quality of their current storage facility and some

literature we received indicated that commercial losses in storage may reach 20-40% of the crop (this is in addition to the low yields already experienced). Losses are apparently a combination of crop quality and handling, as well as storage conditions (poor ventilation, suspect insulation, etc.).

In our visit to the Potato Research Institute, it became apparent that seed production was a primary component of the Research Institute in addition to the breeding of new varieties (see Table 2). However, it seemed that this seed program was primarily designed to provide an increase mechanism for the new varieties that were being generated. As the production of seed potatoes and the sale of these seed potatoes moves more and more into the free market system, multiple units capable of producing basic seed potatoes seems desirable. Indeed our hosts at Pushchino indicated that there was a desire to establish hydroponic units at a number of the oblasts in Russia. The Potato Research Institute had extensive field and glasshouse capacity, but it seemed that stability of funding was a problem. Apparently, they had lost several technical people in the past year and they were in the process of leasing out space to industry for income. In general, the insecurity for continued internal support seems to minimize the capacity for long-term planning. The infrastructure is very fragile.

9. CONCLUSIONS/RECOMMENDATIONS:

- Continued commitment by the current project in Pushchino State University seems highly desirable and warranted.

- Integration of basic research/applied research/extension efforts needs to be nurtured and encouraged (Land Grant Concept). Mechanisms to enhance this process could include periodic meetings among agricultural scientists to include traditional oral presentations and question/answer sessions as well as demonstration plots using replicated trials to demonstrate the value of new technologies and cultural practices. The latter would also be of value in communicating with grower groups and in achieving the necessary "buy-in" required for program success.

- Core scientists are excellent and they recognize the need to recruit additional excellent, committed personnel. Program continuity and focus will be critical to its success.

- Continued development of the hydroponics system and the diagnostic kits is recommended. We can not comment on the value of bioreactors.

- Spatial separation of the super-super elite seed at Serpukhov from other Solanaceous crops and from nearby potato fields is recommended (It is acknowledged that the capacity for spatial separation is limited). Guidelines for entry into the plastic house with the super-super elite potatoes, as well as sanitation guidelines for working with this crop and subsequent generations of increase need to be developed and followed.

- Emphasis on the elimination of spindle tuber viroid and the development of the capacity to generate virus-free pre-basic seed through thermotherapy and meristem tissue culture techniques is endorsed and recommended (literature on the latter was provided).

- Opportunities for scientific exchange should be encouraged, e.g., they need help with potato storage technology, but they apparently have excellent germplasm for late blight resistance.

10. FOLLOW-UP SUGGESTIONS:

- Both investigators (Steven Slack; Tom German) are willing to continue to provide expertise, both informational (e.g., answering questions via e-mail) as well as collaboratively (e.g., thermotherapy and PCR approaches are part of our expertise).

- We strongly endorse continuation of the project beyond the fall 1996 term date. The project is working and progress is being made. Continuity will be essential.

Travel Report

1. Name, title and institution of person traveling:
Colleen Yuna Taugher
Graduate Student
School of Veterinary Medicine
University of California, Davis

2. Date report prepared: September 10, 1996

3. Inclusive dates of travel: July 3- September 11, 1996

4. Purpose and objectives of travel: The long-term objective is to facilitate improved milk production on dairies in the Serpukhov region. The immediate task at hand was to determine the prevalence and etiology of mastitis on the region's dairies. In conjunction with Dr. Eugene I. Maevsky I intended to work with local veterinarians, learning and discussing their priorities with respect to improved efficiency and production in the region's dairies. We also hoped to identify ways in which Pushchino's Animal Health Laboratory might support the local dairy industry, primarily through the development of mastitis diagnostic tests.

5. Relation of travel to project purpose and outputs: This study facilitated increased contact and collaboration between members of Pushchino's Animal Health Laboratory (U.S.A.I.D. subproject) and the local dairy industry. Further, the ultimate aim of this study is to achieve greater efficiency in regional milk production with the aid of diagnostics and potential consultation from the Pushchino Center.

6. Location of travel, including dates at each site:
- July 3, 1996: arrival in Pushchino, primary residence throughout the visit.
- Weekly visits to Serpukhov from July 11 until August 7.
- In the Serpukhov region, travel to Balkovo July 7-9, to Pronchishchevo July 17-18, to Grizlovo July 23-25, to Shepilovo July 31- August 1, and to Lipitsey August 8 and 16.
- In the Zvenigorod region, travel to Yershovo and Zvenigorod August 14-15.
- Travel to Moscow August 29.

7. Individuals and organizations (including locations) with whom traveler met and worked: Field work: met and worked with Dr. Eugene Maevsky of Pushchino's Institute of Theoretical and Experimental Biophysics (ITEB) and Animal Health Laboratory (AHL), Dr. Nina B. Simanova (ITEB) and Elena Goryachova (ITEB). The four of us met Dr. Galina F. Khmylova, Serpukhov District Veterinarian, and worked with her via the Serpukhov region veterinary station and the Serpukhov Creamery. We worked on joint stock companies with the following: on Balkovsky: Vladimir B. Mironchikov (director), Dr. Valentin D. Tolokonnikov (head veterinarian), and farm veterinarians, Drs. Vladimir S. Tikhov, and Anatoly D. Zakharov; on Zaoksky: Anatoly M. Lebedev (director), and farm veterinarian Dr. Raisa I. Samoshka; on Zvenigorodsky Cooperative: Sergey G. Vovchenko (director), and Dr. Ivan A. (head veterinarian).

Laboratory work: met and worked with Dr. Mikhail B. Vainshtein, of Pushchino's Institute of Biochemistry and Physiology of Microorganisms.

Finally, at the Moscow Veterinary Academy, I met with Dr. Alexander A. Sidorchuk, chairman of the Department of Epidemiology and Infectious Diseases, and with Dr. Victor P. Goncharov, Department of Reproduction, who specializes in bovine mastitis.

8. Accomplishments:
The prevalence and etiology of mastitis was determined on five dairies in the Serpukhov region and on one in the Zvenigorod region. These findings were based on milk samples collected from a total of 244 cows on the six dairies.

At the Serpukhov Creamery, a total of 56 bulk tank samples were taken from a total of 22 dairies over 5 weeks. These samples yielded some information on herd health with regard to mastitis on the represented dairies. But largely, the samples indicated the level of sanitation in the milking systems, and at other points between the cows and the Creamery.

Work progressed on the AHL's rapid diagnostic test for subclinical mastitis. Dr. Nina Simanova of ITEB became acquainted with the California Mastitis Test (the California version of rapid diagnosis of subclinical mastitis) and its application.

With respect to my own career, this study provided an opportunity for me to undertake investigative epidemiologic veterinary work with an international scope. The experience amplified my interest in pursuing a career in veterinary public health and epidemiology.

9. Conclusions and/or recommendations (as appropriate):
The level of mastitis on the Serpukhov region's dairies significantly hampers their productive potential. Contagious mastitis prevails on dairies in this study with a range of 48-77% of lactating cows. These infections are largely subclinical.

A systematic mastitis control program is necessary. Such a program includes sanitary milking practices (such as teat-dipping and milking machine hygiene), monitoring (to detect subclinical cases, for instance), and preventive herd health measures (such as dry cow antibiotic therapy).

10. Suggested follow-up activities (if any):
Continued work with the District Veterinarian in Serpukhov, Dr. Galina Khmylova, is essential. Through her, systematic mastitis control measures may be established. Pushchino's AHL can provide affordable mastitis diagnostic materials, especially for subclinical mastitis, to the local dairy industry. Such tests are not currently available. Perhaps antibiotic preparations, especially dry cow therapy, can be made available in this area by the AHL. Above all, management on the level of herd health is important for local veterinarians, and could be improved through consultation or training.

Finally, mastitis control is one facet of improving the productive efficiency of dairies. Additional problems such as calf mortality remain unresolved on local dairies. Therefore,

further diagnostic, epidemiologic, and management efforts will be fruitful.

TRIP REPORT
Pushchino, Russia
July 27 - August 9, 1996
Jerry Siebert

This report covers the trip to Pushchino during the period of July 27 to August 9, 1996. The trip was a continuation of activities started over the previous year, particularly with the Pushchino Higher Agribiotechnological College. The purpose of the trip was to Present seminars and hold discussions on collaborative projects. The goal of the trip was to Enable Pushchino to become involved as an integral part in economic development of the region, serve as a model for other programs, successfully develop joint plans and collaborative projects that will result in research and education grants, establish a technology transfer system. Activities centered in the following areas:

1. Present a seminar on "Extension Methodologies".
2. Present a seminar on "Business Methods".
3. Work with the Technology Transfer and Training Unit of the Agro-college.
4. Continue development of a business plan for potato project.
5. Follow up on the proposal submitted to the United States Information Agency (USIA) for potential activities.

All work took place at Pushchino State University and the Pushchino Higher Agribiotechnical College with the following individuals: Vladimir Dynnik, Vladimir Larionov, Eugene Maevsky, Eugene Mamonov, A.V. Kamarov, Dimitri Orlinski, and Irina Priputina. Also involved was Bruce McWilliams who has spent the last 5 months in Pushchino on the economics project.

Extension Methodologies.

Extensive preparation took place prior to the trip to Pushchino. This activity grew out of discussions held in October 1995 and April 1996 in Pushchino. In order to prepare people who will be carrying out an extension program in Pushchino, the development of teaching materials and curriculum was requested. This material was collected and organized into an outline and workshop for presentation during this trip. Material and outlines were collected from a number of individuals who have organized and presented similar workshops in other countries as well as Russia. The outline and materials were placed in a notebook; four copies were left in Pushchino. In addition, parts of *The Communicator's Handbook* on communications techniques and technology written by members of the Agricultural Communicators in Education organization were also duplicated and left in Pushchino. These materials and outline formed the focus for four three-hour workshops on extension methods.

The extension methods workshops were conducted over four days. Each workshop was attended by 12 to 15 people, most of who were invited as part of the extension program. The workbooks provided the core material for these workshops. While most of the participants understood English, the workshops did have the services of a translator. Much discussion took place in Russian to discuss the implications and ramifications of the material being presented. The major topics of the workshops were:

1. Organization of Extension Programs
2. Extension Educational Learning System
3. Communications Methods in Extension
4. Extension Program Planning and Evaluation

In addition to the materials that were discussed and left for future reference, additional materials and curriculum will be developed for Pushchino. These include adult learning methods, organization and evaluation of test plots and demonstration plots, statistical methods, economics and policy, working with local governments and interest groups, and leadership principles. Some of these topics were included in the materials organized for the four workshops, but need elaboration and more detail.

The next steps are up to officials in Pushchino to organize and implement teaching programs. It is not clear how this will be carried out at this point, but there is sufficient interest to implement extension programs, particularly as part of the Technology Transfer and Training Unit (TTTU).

Business Methods.

A workshop was also organized and held on Business Methods. The specific topic was *Strategic Planning and Use of Business Plans.* Much of the material came from seminars organized in the past on this topic plus materials developed in another USAID project in Saratov focusing on market development. In addition, a set of materials was left which focused on agribusiness in a market economy and provided an overview of the organization of the U.S. food sector.

Potato Project.

Work continued on the development of a business plan for the virus free potato seed project. With the assistance of Bruce McWilliams and Vladimir Larionov, more precise data and information was developed on markets and costs of production for this project. This data and information was then included in a business plan which was started in March 1996. It is expected that this business plan will be used to secure a loan or grant from the European Union or World Bank and to secure Russian government support.

The financials appear to be excellent. To fully fund the project would require an amount of $1.25 million in building, equipment, and working capital. It would be paid back within two years according to the plans that are outlined. The project has been actually carrying out activities over the last two years and this infusion of capital would fully launch it into profitability.

A key part of the project is the organization of a certification laboratory and manufacture of testing kits. Two previous project consultants (Steve Slack and Tom German) have outline the requirements for the growing of virus free potato seed and the certification activities. Their advice and consultation have been invaluable in moving the project ahead. They recommended certain chemicals and testing kits that are needed in the project for it to reach a level that is certifiable. Some difficulty has been experienced by the Agro-college in getting these materials due to budget constraints. However, it is critical that they be secured. At the end of August, the Russian Ministry of Agriculture will be paying a site visit to Pushchino to certify the laboratory, which will be the first in Russia and

provide a significant competitive advantage. The budget should be reallocated to provide the funds for this crucial and critical part of the project.

More work needs to be done on the business plan, especially in the write-up. As set of tables and graphs, including assumptions, was left in Pushchino both in the form of hard copy and computer back-up. Work will be done here to finalize a polished business plan that can be used by the potato project in raising funds.

Another project that is taking place is the construction of a potato processing facility. Work was started with a U.S. firm, Concord. However, no contact has taken place for over a year. Plans are still in place to construct a potato processing facility; funds may have to be secured from another source. A business plan also needs to be developed for this activity.

Also in the works on the potato project are two extension publications that will be used in the potato education program. These publications will be printed in Pushchino. One concern is that the project is being charged for publication expenses for using the equipment that was purchased with consortium money.

Beef Embryo Project.

Not much time was spent on this project. Some discussions were held and a visit to the ranch was made. The problems in getting the bull semen to Pushchino has thrown the project back by six months to a year. The project was in the process of being reorganized during this trip. One positive note was the work of a UC Davis graduate student in veterinary medicine under the guidance of Eugene Maevsky. She is reporting some good results on her research. At some point, a business plan should be written for this project as well.

Two publications have been developed from this project. One if from a conference held in Pushchino; the other reports results from the project. These were published with equipment purchased through the consortium; however, the Agro-college had to pay for the printing costs.

USIA Grant.

At the time of the visit, no word had been received on the USIA grant between the Pushchino Ecology Program and the CNR Center for Sustainable Resource Development. Some discussion was held on the possibilities of the project, but placed on hold until word is received about the grant.

Future Activities.

At this time, no future activities are planned. Continuing discussions will be on-going with the Agro-college on the potato, beef embryo, and extension projects. These discussions may lead to future activities. Plans are to develop additional extension materials which can be used in Pushchino and to finish the potato business plan. The other activity that may take place is dependent on the USIA grant. Continued discussion and contact will take place, particularly with Agro-college personnel.

TRAVEL/CONSULTANCY REPORT

Puschino Project

1. Walter Butcher, Professor - Department of Agriculture, Washington State University.

2. **Date of Report** - October 10, 1996.

3. **Dates of Consultancy** - September 10-20, 1996.

4. **Purpose:** Work with Russian and American colleagues on environmental risk analysis and forest resource management. Assist in the development of plans for work during the extension of the project and for working papers to be prepared prior to a rescheduled workshop.

5. **Relation to project purpose:** This consultancy was directly aimed at preparing for a workshop and at outlining and facilitating the work to be established during the October - June extension of the project.

6. Travel:

   September 10-11: Pullman to Moscow
   September 11-15: Moscow
   September 16-20: Pushchino
   September 21-October 4: Personal travel, not project related

7. Individuals and organizations contacted:

   Pushchino Project:
   - Alexander Komarov
   - Roman Popadyuk
   - Larisa Khanina
   - Dimitri Orlinskii
   - Irina Pripitina
   - Kathy Galhar
   - Raja Rao
   - Vasilly Akimenko
   - Anna ? (English speaking graduate student with background in Economics)

   Moscow State Forest University
   - Linkolai Ivanovitch Kozshukhov, Doctor of Economy
     Dean of the Department of International Relations
   - Sergey Chumachenko, Forest Simulation Modeler

(continue persons contacted)

Harvard Institute for International Development, Moscow Office
- Bruce A. Larsen, Project Director
- Michael Kozeltsev (Economist)
- Renat Terelet (Economist)
- Elena Strukova (Environmental Policy Consultant)

Forest Research Unit
- Eugeny Prudnikov
- Nickolai Lamtsev
- Olga Smirnova

Others
- Kees Kaaffka, World Wide Fund for Nature

8. Accomplishments:

A. Broadened contacts and interactions with environmental and forest economists and policy analysts.

(1) Harvard Institute for International Development (HIID) Russian Projects Office. The visit to HIID offices provided a contact with a leading center in Russia for economic analysis of environmental issues and provided considerable information about environmental economics in Russia. They have a project on natural resource accounting at Yuroslav, northeast of Moscow; a project on environmental policy reform related to air pollution at Tulla; a regional development planning project at Novograd; environmental health risk assessment and efforts at prioritizing different risk reduction activities, also at Novograd; they are just instituting a study of drinking water quality and measures taken to reduce health risks from drinking polluted water in Moscow; and have major projects underway on forestry in the Russian Far East. In relation to their forestry project, they are beginning some use of nonmarket valuation methods which may have usefulness to studies at Pushchino. That work is underway with the Pushkino Forest Research Institute. They provided us information about a forest economics conference to be held September 26-28 at Pushchino. I proposed that at least one delegate from our project attend that conference. The conference is oriented more towards commercial forest economics than to environmental and resource managements aspects of forestry; however, it provides a good opportunity for making contacts.

2. Moscow State Forest University

We discussed with Professor Kozshukhov possibilities for collaboration with economists at MSFU. Roman Popadyuk prepared a brief listing of the forest economics research projects that are underway in that unit. Professor Kozshukhov has welcomes further discussions and a specific proposal for

collaboration. He is due to assume the leadership of a major forest policy research institute in the near future.

B. Drafting plan of work for the 9-month extension.

I helped Dr. Komarov and other project participants to draft objectives, work plan, and expected results for the July 1, 1996 to June 30, 1997 extension. We followed closely the plans developed in Pullman in June. Our draft was being discussed with Kathy Gelhar and others as I left Pushchino. I assume a final has been developed by now.

C. Reports on summer work

The progress achieved over the summer was reviewed and plans were developed for reports to be completed for the workshop which was scheduled for October. As the prospect of a delay in the workshop was brought into the discussion, we decided to prepare working draft reports by the end of October even if the workshop is delayed until later. A summary of the plans is attached.

D. Working sessions with researchers

Discussions and working sessions with both pollution and forestry research teams were very helpful in both answering questions about the work to date and making plans for additional work during the next nine months.

9. Conclusions and Recommendations:

A. It is not possible to have results from the project ready for presentation by the end of October. I recommend that the workshop to showcase results and capability for policy oriented analysis be delayed until March. However, there needs to be a schedule of activities to be conducted during the interim in order to see that work moves forward to prediction of health and other consequences of pollution and to evaluating the health, environmental, and economic trade-off with measures and policies to reduce pollution damages. Part of that should include drafting working papers by mid-November that cover progress to date and point toward the analyses that will be conducted during the period of the extension.

B. The Pushchino research team is making progress toward "policy analysis" but is still lacking in both training and actual experience. Formal linkages and collaboration with outside units that are involved in economic and policy analysis of environmental consequences would be highly beneficial to the project. Pushchino researchers who are destined to become policy analysts need to have the experience of working together in a project

with someone who has the economics and policy analysis background and is committed to that level of analysis. It is not possible for researchers from WSU to accomplish that in one or two week stints of working together with the scientists. Thus, I would highly recommend there be an attempt to integrate them in with units in Russia in some way. Also helpful would be to develop a policy analysis unit that is to, a considerable degree, free of the conventional type of chemical and other data analysis.

C. I recommend that two or three WSU specialists go to Pushchino for approximately 2-week consultancies during October and November. These should be directed especially at the determination of sources and of remediation opportunities for major industrial and public pollutants. It is also very important to develop for Pushchino the capability to assist industries and communities in dealing with the economic pressures that they are feeling as well as helping them with pollution control actions. It is important to avoid becoming a policing and investigation arm of the environmental agency.

10. Suggested follow-up activities:

A. Develop a schedule of interim working papers to be prepared by WSU and Pushchino researchers.

B. Draft working papers on risk trade-off analysis, evaluation in benefit-cost framework of remediation alternatives, economic model for analysis of forest management alternatives in terms of ecologic and economic costs and benefits.

C. Help to arrange for Dr. Mahalingam and one or two others to visit Pushchino this fall for working sessions aimed at development of remediation alternatives that hopefully can be made to be economically attractive to industries, public agencies, and research institutes.

Reports on Summer Work Under Pushchino Project

We reviewed the progress achieved over the summer and developed plans for reports to be completed by 21 October.

1. Pollution Situation.

The samples taken during the summer have not been fully analyzed due to lack of equipment, reagents, and procedures. PCB analysis in particular has not started. Orlinskii and Pripitina requested help from Steve Metcalf particularly on procedures for conserving samples for later analysis.

Food samples have not been taken because of uncertainty about capability for analysis, especially for PCB, but also for heavy metals due to lack of budget to contract for the analysis. Samples must be gathered immediately during autumn harvest in order to link food to locations in the PCB affected area. Food samples must be collated with the sites of soil and water analysis in order to correlate plant tissue concentrations with soil and water pollution and establish pathways from source to food supplies.

We did not discuss the sample analyses as that is being handled by Metcalf and Arinbassarov.

Orlinskii and Pripitina proposed to use data from the Bureau of Preventative Medicine to identify zones of high pollution concentration and map soil and water pollution levels in Sepukhov City. The Bureau of Preventative Medicine collected the data over a two-year period and have done basic analysis. They are especially interested in having help in locational analysis and GIS displays. There appears to be possibility for continuing cooperative research with their health officials. I stressed the importance of using these data to establish linkages from sources to high pollutant concentration to areas with high incidence of diseases that are known to be linked to exposure to hazardous substances. I also stressed that there is a need to follow through on the sampling program and mapping of pollution concentrations in Serpukhov District.

2. Pollution Sources.

A. <u>Industrial</u>

Dr. Ketzenchev is preparing a report on use of potentially hazardous substances by industries in the Serpukhov area. Some information was provided to Dr. Mahalingam in June. The report will document quantities, form, and location of deposits or discharges that could contribute hazardous substances.

Fate of substances in the environment and pathways to contacts that could damage humans will be described in general. The cases of PCB and

another substance will be described on the basis of review of literature. Tsongas and Hinman will assist Pripitina and Orlinskii.

B. Municipal

For the October report, a summary of the situation regarding population, water use, and approximate sewerage generation and release will be prepared. A simple map of locations will be prepared. There will be a summary of the problems and damages posed by escape of incompletely treated sewerage to water courses and aquifers.

C. Agricultural

Agricultural use of chemicals and fertilizers will be described in general, using secondary data. Primary data for individual farms will be collected before March. The preliminary report will cover total area in various crops, amounts of chemicals generally applied to these crops, general location relative to water sources and residential areas, timing of application, etc. A general review will be provided of the principal pathways that could threaten human health and welfare. Focus will be on nitrates and pesticides.

3. Human Health.

A. Health status

The October report will summarize the health data that have been obtained from health agencies and present maps on relative frequencies of diseases in different locales. The dynamic analysis will consist at this point of a report of trends in rates of reported incidence relative to population during the period for which data are available. Difference in rates and trends will be correlated with areas of high concentration of pollution or of high degree of exposure to hazardous substances.

B. Risk analysis

Basic principles of risk analysis will be explained in an introduction to be drafted by W. Butcher. The explanation will follow the U.S. EPA's guidelines with adaptions and examples relevant to the situation of Serpukhov developed by D. Orlinskii. Dose-response relationships for PCB and selected other pollutants will be summarized by T. Tsongas and G. Hinman. Very preliminary estimates from the international literature and agency procedures will be made for health risks due to exposure to PCB's in Serpukhov. Similar estimates for ???

173

W. Butcher will briefly describe the methods for assignment of economic equivalent values to the health risks and damages. For damages predicted to occur as a consequence of the PCBs and other hazards present in the Serpukhov region, a preliminary illustration of economic valuation will be made by adjusting U.S. and other estimates for relative income and expenditure levels in Russia.

T. Tsongas and G. Hinman will write a brief description on the alternative approaches to reducing risks to health and other damages arising due to pollution.

4. Policy and Program Analysis.

No report for October.

For October - June preliminary economic impact analysis will be conducted for four potential remediation projects or policies. W. Butcher will lead with participation by Orlinskii, Pripitina, and others.

5. Forest Environmental Analysis

The economic model will be updated and a report prepared by W. Butcher using files and text provided by Martin, Popadyuk, and Khanina. A linear programming expert will work with Butcher to introduce extensions and correction to the model, make additional runs and report the results.

Popadyuk and Khanina will continue to work on write up of the procedure by which production and other coefficients were developed. The link between forest management and environmental conditions will be explored further.

During the October-June period, the analysis will be extended to make it more dyanmic and to more fully reflect the long-run effects of ecological disruption and damage.