

Threat Reduction: The Radiological Challenge



Since September 11, there has been heightened concern over the potential diversion of radiological materials.

In the aftermath of September 11, the National Nuclear Security Administration (NNSA) began the Radiological Dispersal Device (RDD) program in response to heightened concern over the threat of a radiological attack. The RDD program, operated by the Department of Energy (DOE), has established partnerships with the International Atomic Energy Agency (IAEA), and several nations, particularly Newly Independent States (NIS), in securing radiological material, and preventing its theft and diversion for use in weapons.

The RDD program is part of DOE's Material Protection, Control and Accounting (MPC&A) program, the objective of which is to reduce the threat of the stockpiles of nuclear weapons and nuclear weapons-usable material of the former Soviet Union (FSU). The RDD program's focus is securing radioactive material usable in a "dirty bomb"—an explosive device containing radioactive material. Such material is available in most countries, and over 100 countries may have inadequate controls to prevent and detect the theft of these materials, according to the IAEA.

"Our mission is to deny materials from getting into the hands of terrorists," said Pacific Northwest National Laboratory (PNNL) RDD program manager, Keith Freier (PNNL was tasked by NNSA to play an integrating role in the management and oversight of the new RDD program).

In this pursuit, the program is presently working with the IAEA and counterparts in Russia, Georgia, Uzbekistan, Moldova, Tajikistan and Latvia, to

locate and secure orphan sources. There are also plans underway for cooperation with other countries and regions throughout the world. A large component of recent efforts has been the identification and consolidation of sites containing "high risk" radioactive materials.

"Once a candidate site is identified as containing attractive radiological materials, our first step is to conduct a site assessment to determine the types, quantities, and activity levels of the material inventory. A typical site may consist of multiple buildings with materials (usable in the assembly of a radiological device) in each. Therefore, a principle objective of the program is to find ways to consolidate the materials into one centralized location, thus allowing us to focus on implementing physical security upgrades at one location rather than many," explained Freier.

Besides working with international partners to consolidate and physically secure radiological materials, the RDD program is seeking to reduce radiological weapons trafficking by creating chokepoints at the ports, railways and highways on major transport routes.

The challenge of reducing the threat of a radiological attack is manifold. First, radiological weapons are, perhaps, more appropriately referred to as "weapons of mass disruption" because of their potential to cause significant financial loss, damage of infrastructure, and widespread fear and panic, rather than high casualties.

"Look at what two little envelopes of anthrax did—it shut down the entire Senate," stated Argonne National

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Message from the Director

We are pleased to present the fourth issue of *Global Security*. This semi-annual publication provides insight into the diverse arms control and nonproliferation work performed by Pacific Northwest National Laboratory (PNNL). The core capabilities of the Lab and its relationships with the US government and Battelle Memorial Institute, which manages the Lab for the Department of Energy, strategically position PNNL to engage with counterparts around the world in various projects to enhance global security.

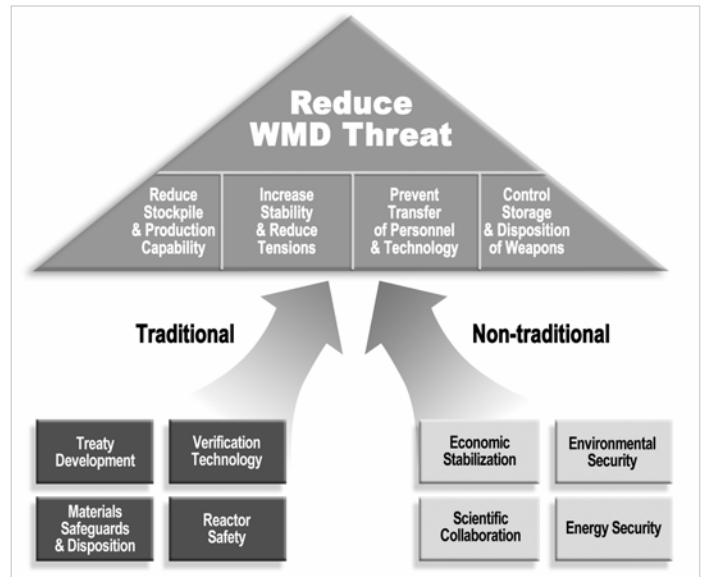
PNNL's efforts in this arena can be divided into four categories: 1) reduction of the production capabilities and stockpiles of nuclear, and other weapons of mass destruction (WMD); 2) promotion of regional stability through tensions reduction; 3) prevention of the transfer of WMD technology and expertise from the former Soviet Union to other countries; and 4) safe storage and disposition of nuclear, radiological, chemical and biological weapons and weapons-usable materials.

PNNL employs both traditional and nontraditional approaches to enhancing global security. The Lab's security work focuses on traditional efforts to reduce weapons threats and prevent the spread of weapons technologies and materials. However, as shown in the graphic, PNNL's activities also include work to promote economic stability, environmental viability, and access to sufficient and affordable energy, all of which are issues that influence overall stability and, hence, impact regional and global security.

The end of the cold war resulted in changes in the global security environment that have altered the way in which stability is regarded. In the bipolar environment of the cold war, nations were restricted in their actions by their alignment with a superpower and the necessity of preserving that alliance. Today, this constraint has been replaced by the multitude of competing interests and concerns of countries, resulting in the outbreak of tensions and conflicts that had been suppressed in the past. A consequent result within the security community has been acknowledgement of the importance of addressing the root causes of conflicts before crises erupt.

The goal of PNNL is to keep informed of existing and emerging threats to global security so that the Lab might find ways in which to employ its scientific and technological capabilities to reduce the threat of WMD proliferation, and strengthen world peace and stability.

Throughout the "Featured Projects" section, you will notice that parts of the above graphic are displayed next to the titles. This is done to convey the type of global security work being



The above graphic provides an overview of the types of security work performed by PNNL and the categories into which it can be divided.

pursued as part of the Lab's endeavor to promote global security objectives.

We hope you enjoy this issue of *Global Security*.

Jim Fuller, PNWCGS Director

Jim Fuller is the founding Director of the Pacific Northwest Center for Global Security at PNNL, and Sector Leader for Defense Nuclear Nonproliferation at Pacific Northwest National Laboratory. As director, Jim leads PNNL efforts to involve state government, foundations and other non-governmental organizations in US Department of Energy and other US government efforts to reduce the threat of nuclear, chemical, and biological weapons, and to promote world peace.

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Featured Projects



Enhancing Russian ADE Reactor Safety

The US and Russia have begun a two-year, \$20 million dollar upgrade of three Russian reactors that PNNL project manager Ron Omberg describes as perhaps the least safe reactors still operating in the world today.

Two of the reactors, ADE 4 & 5 are located in the Siberian Chemical Combine near the closed city of Seversk; the third, ADE 2, is near the closed city of Zheleznogorsk. All provide heat and electricity for people living in the harsh landscape of the Siberian taiga—the Russian forest growing above areas of former glaciation and patchy permafrost where the average annual temperature is -0.5°C .

The design of these reactors precedes the Chernobyl RBMK design, with features analogous to the early production reactors built at Hanford.

Replacing the reactors with fossil fuel power plants will allow the Russians to discontinue the reactors' production of weapons-grade plutonium—1 ½ metric tons of fissile material annually, enough for between 120 and 350 nuclear bombs. Omberg emphasized the importance of “keeping disciplined control of this material in the troubled post-Soviet times in this part of Russia.” These concerns and the risk of diversion of nuclear materials during transport over vast Russian distances—the country has 11 time zones—motivated the National Security Council and the Department of Energy's (DOE) Office of International Nuclear Safety and Cooperation to support shutting down the reactors in five to six years.

As compelling as the nonproliferation issue, is the need to reduce the chances of a Chernobyl-like accident during the interim reactor operation. The decision to move forward on safety measures was spurred by a joint Ministry of Atomic Energy of the Russian Federation and DOE “probabilistic risk assessment” that identified high priority actions that can be taken now to reduce the likelihood of severe accidents at these three reactors. So, until fossil fuel plants begin operation, the old reactors will require safety upgrades.

Safety upgrades include installing: emergency cooling systems; “passive protective systems” that enable rapid reactor shut down; emergency electrical power monitoring systems; fire protection; upgrades to reactor control mechanisms; systems to stabilize graphite stacks within the reactors; and emergency communication systems.

There are 27 individual projects in all. Upgrades will be consistent with the goal of closing down the reactors, and will be evaluated to assure they do not extend



The ADE reactors are perhaps the least safe reactors in operation today.

their life span.

Technical and financial assistance to make the ADE reactors safer is an incentive for the Russians to participate in an overall program, the Elimination of Weapons-Grade Plutonium Production Program, the objective of which is to shut down aging and unsafe nuclear reactors across Russia. Omberg believes that the \$20 million spent on safety upgrades to the ADE 2, 4 & 5 reactors may have a comparable benefit in terms of risk reduction as the efforts spent on upgrading or shutting down commercial reactors throughout the former Soviet Union.

This work is part of a transition that fascinates and gratifies Jim Wiborg of PNNL, also involved in the effort to stop the production of weapons-grade plutonium.

“I never thought I'd see the day when Russian and American scientists would work together to eliminate the production of weapons-grade plutonium,” he said. “The heart of the matter is getting the last three production reactors in the world that are making weapons-grade plutonium shut down.”

He observes that the transition from the cold war arms race to the current dismantlement of production facilities has been even more dramatic for Russians than for Americans. But now, in this new era, he said, the Russian scientists working on these projects “regard us as technical folks trying to solve technical problems together.”

“It has been fascinating for me,” Wiborg said, “to sit across the table from my Russian counterparts and former

(Continued on page 6)

Featured Projects



Debt for Nonproliferation

Progress and Next Steps

BACKGROUND:

House International Relations Committee Hearing on the Debt Reduction for Nonproliferation Act of HR 3836, July 25, 2002

(Hearing, opening statement by Chairman Henry J. Hyde and testimonies of Rep. Ellen B. Tauscher, Charles B. Curtis, Jim Fuller and Undersecretary Alan Larson)

http://commdocs.house.gov/committees/intlrel/hfa80966.000/hfa80966_0.HTM

Foreign Relations Authorization Act, Fiscal Year 2003

<http://pnwccgs.pnl.gov/Initiatives/DfNbill20020930.pdf>

Debt for Nonproliferation: The Next Step in Threat Reduction

By Jim Fuller

http://www.armscontrol.org/act/2002_01-02/fullerjanfeb02.asp

NTI Report:

Debt for Nonproliferation A Concept Development Proposal

for the Design and Operation of a Russia Nonproliferation Fund, January 2002

http://www.nti.org/e_research/NTI_CDP_Apps.pdf

The last issue of *Global Security* featured debt for nonproliferation and its merits as a tool in nonproliferation. Debt for nonproliferation is a term used to connote debt restructuring and reduction, whereby the terms of a loan are changed or partially forgiven in return for which the debtor allocates an agreed upon amount of local currency to a nonproliferation project. Debt reduction has been used to promote environmental objectives, such as conservation and biodiversity, since 1987, when the first debt for nature swap was executed. Debt reduction for nonproliferation employs the same concept, adapting it to fund projects that will secure materials and weapons of mass destruction (WMD).

This article highlights several significant developments regarding debt for nonproliferation, debt exchange, since last fall. Most importantly, President Bush signed the Russian Federation Debt for Nonproliferation Act of 2001 on September 30, 2002. The legislation outlines a process for the United States to reduce the amount of debt owed by Russia in exchange for Russia applying that amount to specific, mutually agreed upon projects that meet the nonproliferation goals of both nations. Debt exchange is constructed as a multiyear effort. The legislation authorizes the President to reduce the amount of Soviet-era debt owed to the United States, sell outstanding Soviet-era debt in order to facilitate a debt exchange, and to sell debt back to Russia. Debt exchange may also be used by G8 members to meet their financial obligations under the G8 Global Partnership Against the Spread of Weapons of Mass Destruction.

As part of the communiqué of the Kananaskis Summit, G-8 members

agreed to commit \$20 billion over 10 years to downsizing and nonproliferation efforts in Russia. The next meeting of the G8, in Evian, France in June 2003, will provide a coordinating venue for further discussion of commitments and project priorities amongst the representatives of the eight countries. There has been some initial discussion by some members regarding the use of the debt mechanism to meet their obligations, although it is not known who may use this option.

Debt exchange offers a credible option for sustaining a Russia nonproliferation sector in the future. Debt for nonproliferation provides a unique opportunity for the United States and G8 members to access additional funding for nonproliferation programs. Not only would debt exchange increase resources for priority nonproliferation programs, it would also provide a mechanism that ensures Russian budgetary participation in the programs. This approach would modify the current model of funding, whereby the US provides the majority of funding for nonproliferation programs. Continuity, sustainability, and Russian buy-in to nonproliferation programs are in the strategic interests of the US and the G8 Global Partnership, and debt exchange is designed to address those interests.

As debt exchange moves forward, both within the US government and within the G8 Global Partnership, one of the foremost considerations will be how partnership is defined. Debt exchange implies a blending of control over disposition of assets and management of programs that differs from other types of bilateral programs. A challenge will be how the G7 and Russia build a partnership around this blending of control that is equitable, sustainable, accountable and transparent. ■

Featured Projects



The Radiological Challenge

(Continued from cover)

Laboratory RDD consultant, Roy Lindley, intimating the much greater potential for disruption and “ripple effect” held by radiological weapons. “What terrorists learned from September 11 is that they can use our infrastructure against us.”

Secondly, the various isotopes impact the human body differently.

“Some things are just as bad in nano-Curies as others are by the Curie,” said Lindley, explaining that the consequences of exposure to radiation depend on variables like the material to which one is exposed, and the type and length of exposure.

There has, however, been consensus within the program that efforts should be narrowed to focus on radioisotopes that are the most easily accessible in quantities large enough to pose a threat.

Thirdly, radioactive materials come in variety of forms, such as pellets and powder, affecting the ease with which materials can be dispersed.

Lastly, the issues of abandoned and orphaned materials have contributed greatly to the enormity of the RDD program’s challenge.

While only a handful of manufacturers produce the vast majority of isotopes, making it relatively easy to trace them to their source, there is very little in the way of regulatory procedure or legal requirements for the disposal of radioactive devices. As a consequence, many are simply discarded or abandoned when their half-life is up and their performance diminishes.

Orphan materials, defined by the IAEA as those outside of official regulatory control, are of particular concern in the FSU, where political upheaval, economic hardship, as well as a lack of inventory records, have left many of the tens of thousands of radioactive sources produced by the Soviets unaccounted for and vulnerable to diversion and use in weapons. In the Republic of Georgia, there has been a string of incidents in which people have suffered severe effects after stumbling upon canisters of cesium-137 used in agricultural experiments during the Soviet era. Several radioisotope thermoelectric generators that were used by the Soviets for communications and navigational purposes in remote northern territories, and which contain up to 40,000 Curies of radioactive material—a quantity rarely found in a single device—cannot be found. And, there is evidence suggesting that such materials have already drawn the interest of violent organizations, including a documented incident in 1996 in which Chechen separatists planted,



Orphan materials are of particular concern in the former Soviet Union.

though did not detonate, a cesium-137 source in Russia’s Izmailovo Park, located in Moscow, in order to demonstrate the country’s vulnerability to such an attack.

While orphan materials are prevalent in the FSU, it must also be noted that according to the IAEA, the US Nuclear Regulatory Commission reports 1,500 radioactive sources orphaned by the commercial sector since 1996, and a European Union (EU) study estimates that approximately 30,000 sources in the EU are at risk of becoming orphaned.

“It’s unrealistic to think we can have 100 percent, absolute control of these materials...” said Freier, acknowledging the enormity of the task on hand. “What we are really seeking to do is to reduce the risk to an acceptable level.”

While the challenge posed by the prevalence of radionuclide sources can be daunting, the RDD program has a growing list of international partners, and has experienced several recent accomplishments.

In October of last year, the RDD team and counterparts in the Republic of Georgia completed rapid physical security upgrades at a facility where several orphan sources were consolidated. Georgia, which has recovered over 280 radioactive sources since the mid-nineties, has both major smuggling routes cutting through its territory, and a large quantity of orphan radioactive material remaining from Soviet times, making the country a major concern in the struggle to reduce the radiological weapon threat.

Similar physical security upgrades have been completed at various site locations in Uzbekistan. The NNSA RDD team is also working with a government institute in Uzbekistan to improve security at a variety of

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Featured Projects

Radiological Challenge

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medical facilities. Medical equipment used for diagnoses and treatment constitutes a large amount of radioactive material used in the commercial sector, making proper management and safeguards important.

And, there are projects currently underway with government entities in Russia to create regional sites for the consolidation and long-term storage of orphan sources resulting from Russia's fifty-year legacy of isotope production. The legacy left the country with an enormous amount of materials that need to be identified and secured. This work is being done in connection with the Russia RADON facilities, which are regional repositories for the disposal of non-nuclear radioactive waste such as that from medical and scientific devices.

Also, on June 12, a tripartite agreement was signed between the United States Department of Energy, Russia's Atomic Energy Ministry (MINATOM) and the IAEA to work together to locate, recover, secure and recycle radioactive sources in the former Soviet Union that are outside the control of nuclear regulators. The agreement stipulated the creation of a working group to develop a proactive strategy to accomplish these goals in respect to orphan sources.

"The challenge is that you have to balance a lot of different things," said Lindley, naming several stages from production, to distribution and disposal where



Promoting Stability in South Asia: US-India Technical Collaboration

Pacific Northwest National Laboratory (PNNL) and Los Alamos National Laboratory (LANL) are currently working with the government of India to identify potential areas for scientific and technical collaboration. The efforts are part of the Department of Energy's (DOE) US-India Science and Technology Initiative, and the Indo-US Science and Technology Forum, both intended to further US objectives in South Asia through enhanced relations with India.

The Indo-US Science and Technology Forum was established to encourage the exchange of ideas, research and development, and the transfer of technology. The forum is also intended to facilitate the organization of joint projects between the two nations.

DOE established the US-India Science and Technology Initiative to channel the skills and expertise of DOE's national laboratory system toward supporting US policy objectives in South Asia. Under the Initiative, PNNL and LANL have been working with US governmental agencies and Indian laboratories to identify non-sensitive, practical areas of mutual interest for project work.

To date, the Laboratories have identified institutions and

security can be improved, and access reduced. "You have to locate where (in the cycle) there is the best bang for the buck for reducing threat," he added, expressing the need for prioritizing and optimally using resources to meet this challenge.



The US and India are identifying areas for potential technical collaboration.

participants in both the United States and India to partake in potential collaborative efforts, and have planned a workshop series to identify key challenges in South Asia requiring technical solutions.

India has a vibrant scientific community consisting of numerous national labs, academic institutes and professional societies. It is anticipated that scientific collaboration will yield practical and political benefits to both countries, improving relations by increasing interaction, and strengthening stability in South Asia through finding solutions to regional problems. ■

ADE Reactor Upgrades

(Continued from page 3)

adversaries. To see the similarities between us. That they have families and careers. To see that they, too, were motivated by patriotism, mistrust and a desire to maintain world balance."

Applied Technology

The Acoustic Inspection Device

A Leap in Container Safety

The US Customs Service is currently testing a customized version of the Acoustic Inspection Device (AID), known as the Customs Handheld Acoustic Inspection System (CHAIS). It is anticipated that this system will greatly improve the ability of Customs inspectors to conduct fast, thorough and accurate screenings of packages and containers entering the United State's borders, vastly improving security.

Container safety has been of special concern since September 11 resulting in the Customs Service's Container Security Initiative, to improve port and maritime security without interrupting the flow of trade—a considerable challenge—and the Service's arrangement with Mehl, Griffith and Bartek Ltd., located in Arlington, Virginia, to have AID customized and mass produced for use by its inspectors.

AID, created by scientists at Pacific Northwest National Laboratory (PNNL), consists of a hand-held, battery-operated sensor unit, approximately the size of a cordless drill, and a handheld PC the size of a palm pilot that operates on a Windows CE platform. The user simply contacts the sensor to the container in question and it transmits ultrasonic pulses that reflect back, resulting in a precise sonic signature that is then compared with a database of such signatures for identification of the contents. In effect, it works similarly to an X-ray, yet poses no hazard to the user.

As explained by Aaron Diaz, AID project manager at PNNL, "The database has a variety of different liquids and solids and the acoustic measurement data associated with each as a function of

temperature and frequency."

The reading for water, for example, would be 1.48 km/s, signifying the acoustic velocity of the fluid. If there is no signature, then there is either something blocking the sound waves, or the container is empty.

The potential of CHAIS for increasing national and international commercial security is enormous. 90 percent of global cargo is transported by containers via ship, rail or by trucks. The United States receives 16 million such containers through the nation's 301 ports of entry each year, of which Customs agents inspect only about two percent.

During a hearing of the US House Coast Guard and Maritime Transportation Subcommittee last year, Richard Larrabee, Director of Port Commerce for the Port Authority of New York and New Jersey, stated, "In the Port of New York and New Jersey, Customs estimates that increasing the exam rate (of incoming cargo) to five percent would generate a backlog of 4,500 containers monthly, require an additional 400 inspectors and cost the industry an extra \$1.2 million a month."

CHAIS, lightweight, simple to use, and noninvasive, makes it possible to screen a significantly higher number of drums, tanks or containers passing through checkpoints. It also increases the accuracy of screenings and reduces the health and safety risks associated with traditional inspection methods.

According to Diaz, AID was



A US Customs inspector uses CHAIS to identify a tank's contents.

originally created under contract with the Department of Defense, which sought a hand-held device for weapons inspections in Iraq after the Gulf War. Different versions of the device, with their own specialized data libraries, exist and are used, for instance, by the Czech Republic, Lithuania and Kazakhstan for anti-smuggling purposes, and by the Internal Revenue Service to verify fuel compliance (fuels used for farming and recreation are taxed differently). It has also been used by border agents in Russia, Georgia, Poland, Cyprus, Malta and Uzbekistan, and is a candidate for use for verification purposes under the Chemical Weapons Convention.

"AID has evolved over the last ten to twelve years from a very primitive device to one that is hand-held and 'intelligent,'" stated Diaz.

It can detect hidden objects inside containers, locating contraband materials. It can discriminate between a variety of different solids and liquids, enabling it to differentiate, for example, between milk, diesel fuel and chemical weapons agents. And, it

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Applied Technology

Antibody Library Enables Rapid Pathogen Detection



Michael Feldhaus (left) and Robert Siegel (right) have worked with colleague Dane Wittrup of MIT to develop the rapid pathogen detection process.

The rapid detection of pathogens has consistently been at the top of experts' lists of the capabilities needed to protect public health and the environment. Since September 11, this need has only grown more pressing. Being able to quickly and precisely determine the presence and nature of biological contaminants protects both soldiers on the battlefield and civilians in the event of a terrorist attack.

One promising approach to pathogen detection is the use of antibodies, proteins that white blood cells produce as part of the human immune system. Antibodies bind to specific proteins on bacterial pathogens, signaling other cells to either kill or remove the bacteria. Antibodies can be used in detection devices to locate proteins of biological warfare agents. And, in industrial applications, antibodies are effective tools for recognizing specific molecules.

Now scientists at the Pacific Northwest National Laboratory (PNNL), working with a colleague at the Massachusetts Institute of

Technology (MIT), have developed processes to enable the rapid identification of new antibodies. Michael Feldhaus and Robert Siegel of PNNL's Fundamental Science Directorate have built an array ("library") of one billion human antibodies and expressed them on the surface of yeast cells using an approach designed by collaborator Dane

Wittrup of MIT.

By incorporating Wittrup's yeast display method, Feldhaus and Siegel can readily modify how an antibody binds to proteins. Being able to increase how tightly a protein and antibody bind together could enhance the effectiveness of antibodies in detecting pathogens and disease. This innovative approach could replace the need to produce antibodies within animals, particularly mice, and opens up new possibilities for rapidly designing medical treatments more acceptable to the human immune system. In medical treatments, antibodies are injected into the body to seek out specific proteins on cancerous cells, for example, and target treatment to those cells. So, development of the antibody library may significantly advance the use of antibodies in biological warfare detection devices, in sensors, and in medical diagnostic tools and therapeutic agents.

"Our antibody library offers many advantages over traditional approaches," said Michael Feldhaus. "We expect it will be a more

effective tool for scientists. Regulated expression of these antibodies allows the library to be expanded while maintaining its diversity. Furthermore, our unique identification process means we can screen for antibodies in days rather than the months it may take using other approaches. Our approach, through the sample preparation and cleanup it provides, gives detection methods such as PCR incredible detection sensitivity."

The National Science Foundation, the Hereditary Disease Foundation and PNNL's Biomolecular Systems Initiative have provided funding for Feldhaus and Siegel's research. The Department of Energy is supporting the scientists' application of the antibody library to the detection of biological warfare agents.

Acoustic Inspection Device

(Continued from previous page)

can measure the fill-level of a liquid in a container.

However its current form does have its limitations, and continues to be refined. PNNL scientists are endeavoring to develop increased reliability and consistency of readings. Developers are also working to enable the device to screen containers that are less than the current four- to six-inch diameter limitation, and to reduce the size of the device itself.

"These days smaller is always better," remarked Diaz.

Forging Alliances

Prominent Uzbek Scientist Visits Northwest

In January, Pacific Northwest National Laboratory (PNNL) hosted Dr. Bekhzad S. Yuldashev, President of the Uzbekistan Academy of Sciences and the Director General of the Institute for Nuclear Physics (INP) in Tashkent. Well known in the Eurasian academic world and among the progressive entrepreneurs of the region, Yuldashev has been leading the efforts of his Uzbek colleagues in building relationships with the US Department of Energy and national laboratories.

The occasion to host Yuldashev presented itself when, in response to an invitation by the University of Washington's (UW) Russian, East-European and Central Asian Studies (REECAS) program, Yuldashev came to visit the Northwest. During his busy week in Seattle, Yuldashev gave a lecture at the UW's Jackson School of International Studies; met with students at the UW's Department of Near-Eastern Languages and Civilizations; gave presentations to a variety of UW scholars, administrative bodies and local dignitaries; and visited the Seattle-Tashkent Sister-City Association.

Yuldashev's relationship with the UW goes back more than twenty years, having started when he came to the university as a Department of Physics Visiting Fellow in the early 1980s. With a career in particle and nuclear physics marked with successes that brought him to Russia's highly prestigious Joint Institute of Nuclear Research, Yuldashev's prominent stature today includes membership in the Joint Institute's Research Council; an active membership in the American Physics Society; and Fellowship in the Islamic Academy of Sciences, among numerous other credentials.

Yuldashev's visit to PNNL while in the Northwest, which was initiated by the Battelle Seattle researchers Kristi Branch and Dr. Ghuzal Badamshina, was part of an ongoing dialogue between PNNL and the Uzbekistan Science and Technology community. A trip to the Tri-Cities was hosted by the PNNL Program Manager, Jennifer Tanner, who made it possible for Yuldashev to meet researchers and managers from a variety of PNNL programs and divisions.

"I found these meetings highly stimulating, this is

exactly the kind of learning that will help us shape our approach to PNNL's potential presence in the region's science community," Yuldashev emphasized.

In the context of a growing interest of the US government agencies to program-building in the independent states of Central Asia, such an evaluation bears a significant weight. It is particularly telling that the concept of regional security dominated as both a framework and a principal topic throughout the intense day of meetings in Richland.

The Laboratory's Associate Director (National Security Division), Mike Kluse, showcased the capabilities PNNL is internationally known for, and highlighted some of the Lab's programs that have been successful in the former Soviet Union, particularly in the nonproliferation domain. Yuldashev was briefed on the most recent projects that brought Uzbek groups to the Laboratory, which were related to emergency preparedness, like the US State Department "First Responders" program. While touring the Volpentest Hammer Training and Education Center, Yuldashev enthusiastically noted that



While touring the Hammer Center, Yuldashev noted that an analogous facility in Uzbekistan could become a tremendous asset.

an analogous facility in Uzbekistan could become a tremendous asset not only for the republic, but for regional training purposes as well. He also pointed out that a similar center built in Uzbekistan would help draw together professional forces from other republics to receive disaster response training, and a variety of scholarly staff, to design new, region-based curricula.

During his meeting with PNNL staff, Yuldashev provided participants with a detailed overview of the multidisciplinary capabilities amassed under the umbrellas of the Uzbekistan Academy of Sciences and the Institute for Nuclear Physics (INP). The former has four divisions consisting of close to fifty scholarly institutions and R&D organizations, museums and libraries. The sets of capabilities span from medical and earth sciences, law and economics, archaeology and

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Forging Alliances

Conference Explores Caspian Sea Basin Security Issues



The Caspian Sea is believed to possess oil reserves comparable to those of the North Sea.

On April 29-30, the Caspian Sea Basin Security conference took place in Seattle at the University of Washington's (UW) Waterfront Activities Center. The objective of the two-day event was to explore US policy options for enhanced regional stability in the Caspian Sea Basin, and the potential for regional cooperation in the areas of energy, nuclear nonproliferation and terrorism.

The National Bureau of Asian Research (NBR), a Seattle-based policy research organization, organized the conference. Co-hosts were the US Army War College's Strategic Studies Institute; the UW's Russian, East European and Central Asian Studies program at the Jackson School of International Studies; and the Pacific Northwest National Laboratory's (PNNL) Pacific Northwest Center for Global Security (PNWCGS).

There has been vast interest in the Caspian Sea region since the dissolution of the Soviet Union. The sea, bordered by Azerbaijan, Kazakhstan, Iran, Russia, and Turkmenistan, is the world's largest inland body of water, and is believed to possess oil reserves comparable to those of the North Sea. However, there has been very little development of these resources due to conflicting claims on the part of the littoral

nations over ownership of the sea's resources, disagreement over which export route should transport reserves to the world market, and concern that issues of governance could lead to regional instability, further impeding the market and political reforms that would enable exploitation of the sea's reserves.

Active participants in the Caspian conference consisted of recognized practitioners, members of the research community, and academics, including members of the UW's Joint Institute for Global and Regional Security Studies. Attendees were primarily from the US government and private sector.

Herb Ellison of the UW's Jackson School provided the opening remarks for the conference. Ambassador Steven Mann, US Department of State Senior Advisor for Caspian Basin Energy Diplomacy, gave the keynote address, "Emerging Conflicts: The Strategic Significance of the Caspian Sea Basin."

Four discussion panels were held during the event: "Regional Perspectives on Military and Economic Security;" "Strategic Security and Military-Economic Dynamics;" "US Influence and Central Asia's Strategic Transformation;" and "US Policy Options for Influencing Caspian Basin Strategic Stability." Specific topics addressed by the panels included short-term conflict of interests between oil and gas, and geopolitical security entities; scenarios for the Caspian region's future; relations between Russia and Iran; various regional power issues that might alter US positioning in the Caucasus and Central Asia; and the challenge of applying oil and gas revenues effectively and for the betterment and advancement of the entire region rather than the enrichment of a powerful few.

Besides serving as an opportunity to draw upon the insight of many experts, the conference was part of an endeavor, on the part of its local hosts, to draw recognition to the Asia policy and security expertise existing in the Pacific Northwest.

"Seattle is seen as a locus of growing interest in Asia issues and PNWCGS wants to make sure that the Lab is involved," stated Kristi Branch, who coordinated PNNL's role in the conference. "In addition, such outreach and dialogue with organizations in the region is a vital component of the PNWCGS mission."

This sentiment is shared by Gael Tarleton, Director of Eurasia Policy Studies at NBR, who spoke of the "critical mass" built by NBR and other regional organizations, expressing satisfaction with local interest and involvement in foreign policy and adding that this conference is anticipated to be the first of a tradition of annual Asia policy conferences to be conducted by NBR.

Arms Control Course by Amb. Thomas Graham Jr.

This Spring Quarter, the University of Washington's (UW) Institute for Global and Regional Security Studies (IGRSS) is offering the course, "International Law and Arms Control" under the instruction of Ambassador Thomas Graham Jr. The course, co-sponsored by PNWCGS, was offered under Graham's instruction for the first time last Winter Quarter, and is now an integral part of IGRSS' core course offerings.

(Continued on next page)

Forging Alliances

UW Humphrey Fellow from China Interns at PNNL Seattle Office



Jia Feng, CEEC/SEPA

Jia Feng, Deputy Director General of the Center for Environmental Education and Communications [CEEC], of China's State Environmental Protection Administration [SEPA], is getting first hand experience in public participation research with staff at the PNNL Seattle Office. Jia is a Humphrey Fellow at the University of Washington (UW) this academic year. His area of interest is public participation in environmental protection.

Jia was a student in a course PNNL staff member, Ann Lesperance, teaches at the UW on international management of the Washington State Puget Sound/British Columbia Georgia Basin ecosystem. After the course was completed, Jia and Lesperance discussed Jia's professional interest in public participation and the experience PNNL has in this area, and Jia expressed a strong interest in doing his Humphrey Fellows academic internship at PNNL with staff involved in the practical realities of public participation and policy.

Kevin Whattam, coordinator of regional nuclear cooperation at PNNL stated, "Linking PNNL with the University of Washington and being able to develop relationships with the next generation of decision makers in selected countries is critical for the success of our programs."

Jia is working with Lesperance and Kristi Branch, who are both in PNNL's Global Security and Technology Policy (GSTP) group and have been conducting a comparison of public participation frameworks in China, the United States and the European Union. Jia will present the GSTP group's findings at an international conference he is organizing later this year in China.

Prior to becoming CEEC Deputy Director, Jia worked in Government Reform and Education at SEPA. He holds a Bachelor of Law and Masters Degree on Environmental Law from Beijing University. In addition, Jia was the director of "Window on American Environment a 22 Episode Documentary Series," which aired on China Central Television (CCTV) in December 2002.

The Hubert H. Humphrey Fellowship Program is administered at the UW School of Public Affairs with its primary support coming from the US Department of State. The Humphrey Program brings accomplished mid-career professionals from designated countries of Asia, Africa, the Caribbean, Latin America, the Middle East and Eurasia to the United States for one year of non-degree graduate study and practical, work-related experience. Fellowships are awarded in a wide variety of fields including natural resources and environmental management; public policy analysis; economic development; business; public health; technology policy; urban/regional planning; and democratic development. The program is intended to help strengthen the global network of knowledge and considered by many to be essential to the full development of human potential. ■

Ambassador Thomas Graham Jr., is an arms control expert and author of "Disarmament Sketches: Three Decades of Arms Control and International Law." He served twenty-seven years with the Arms Control and Disarmament Agency (ACDA), including as director of the agency. In sharing his hands-on professional experiences, Graham, who has been involved in numerous US arms control agreements, provides valuable insight to students. He has also scheduled a line up of prominent speakers for the course. Speakers include Laura Holgate, Vice President of the Russia/Newly Independent

States programs under the Nuclear Threat Initiative, and former head of the Department of Defense's Cooperative Threat Reduction Program; Rose Gottemoeller, former deputy undersecretary of Defense Nuclear Nonproliferation for the Department of Energy and currently a senior associate at the Carnegie Endowment for International Peace; and John Holum, formerly director of the Arms Control and Disarmament Agency and Special Representative of President Clinton for Arms Control and Disarmament.

Graham's course examines the origins and history of legal nonproliferation efforts, the current

debate over the effectiveness of this approach, as well as the future of arms control. Specific issues that are addressed include the political, diplomatic and bureaucratic factors that shape arms control policy; new strategies to counter the proliferation of weapons of mass destruction; current challenges to the international arms control regime; and the role of arms control in US foreign policy under the Bush Administration.

Enrollment in this quarter's class has been high and IGRSS plans to offer other courses under Graham's instruction in the future. ■

Forging Alliances

Economic Cooperation with Russia's Nuclear Cities

PNNL Hosts Zheleznogorsk Mayor Andrei Kartagin

In October, Pacific Northwest National Laboratory (PNNL) hosted Mayor Andrei Kartagin of Zheleznogorsk, a closed nuclear city, as part of its cooperation with Russia under the National Nuclear Security Administration's (NNSA) Nuclear Cities Initiative (NCI).

The closed nuclear cities, designed, tested and manufactured nuclear weapons during the Soviet era. NCI is an effort on the part of NNSA to assist the closed cities in their economic transition by helping former weapons experts to find peaceful, commercial applications for their knowledge. A component of the initiative has been the establishment of the International Development Centers (IDCs), the mission of which is to improve business infrastructure and promote economic diversification in the closed cities. Both NCI and the IDC program make important contributions to DOE's nonproliferation objectives in Russia.

Mayor Katargin, who is described by PNNL NCI program manager, Ron Nesse, as a "progressive commercial type who is very, very good at what he does," also visited PNNL a few years ago when NCI was launched. This latest visit was to "see what has been successful here (in Richland, where PNNL is based) and what is applicable to their experience and bring ideas back and see what works," said Nesse, of the delegation's US tour.

During the three-and-a-half day October visit, Kartagin was accompanied by his Deputy Mayor, Pavel Yakushin, and Sergei Usoltsev, Director of Zheleznogorsk's IDC. The delegation met with PNNL staff and business experts, and toured business incubators and organizations in the Tri-Cities area including TRIDEC, a regional organization promoting business growth, and a forest product plant in Yakima that is presently undergoing plant modernization. The group also met with investors in Seattle, and staff at Oak Ridge National Laboratory, in Tennessee, before returning to Siberia.

Zheleznogorsk is in the process of evaluating and adjusting its economic strategy, as planners in Richland, periodically do. The delegation sought to increase business contacts in the United States and gain a better understanding of how to meet the economic needs of plural interests and industries. To this end, the City of Zheleznogorsk presently has about ten

working groups in which hundreds of its citizens are participating.

The connection between PNNL and Zheleznogorsk extends further than the cooperation by their governments; they share a similar past. Richland, near the Hanford nuclear site, has also been making the transition from nuclear production to the commercial sector over past years. Although circumstances in the two cities are not identical—Richland, for example, has stronger infrastructure and its residents are already familiar with the open market system—Richland provides an interesting case study from which ideas and approaches to economic transition can be culled.

In addition to exchanging ideas and serving as host to Mayor Kartagin, PNNL is working with the business community in Zheleznogorsk on several projects, including one to establish a new software company, Novosoft Zheleznogorsk, and another to modernize the city's wood processing plant.

According to Nesse, the visit by the Zheleznogorsk delegation was constructive for both sides, providing insight to PNNL staff involved in economic diversification activities. He also remarked, "Kartagin has been a pleasure to watch in his progress... and has done a very good job in NCI."

■

PNWCGS Director Elected to NBR Board

In January, Dr. Jim Fuller, Director of PNWCGS was elected to the National Bureau of Asian Research's (NBR) Board of Directors.

NBR is one of a handful of strategic partners of PNWCGS. NBR, a Seattle based nonprofit institution, provides advanced Asia policy research.

PNNL and NBR both share a great interest in Russia and Central Asia. PNNL conducts extensive nonproliferation work in Russia and other nations of the former Soviet Union, including, increasingly, in Central Asia. And, Russia and Central Asia are geographic areas of focus for NBR policy research.

Also, elected to NBR's Board of Directors this January were Jonathan Murray, Microsoft's Vice President of Global Accounts, and Mary Minnich, who oversees The Coca-Cola Company's Asia operations.

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Featured Seminar

KEDO and the North Korean Crisis: How We Got Here

Ambassador Charles Kartman



Kartman stressed the regional and global implications of the current impasse with North Korea.

On February 4, Northeast Asia expert Ambassador Charles Kartman visited PNNL's Richland campus as part of the PNWCGS seminar series. Kartman is a 26-year veteran of the Department of State, and Executive Director of the Korean Peninsula Energy Development Organization (KEDO), which was created in 1995 to implement the Agreed Framework between the United States and North Korea. His presentation was titled "KEDO and the North Korean Nuclear Crisis: How We Got Here."

"I think you read this morning that Secretary of Defense Rumsfeld is considering the deployment order to send a dozen B-1Bs and another dozen B-52s and their support aircraft to Guam for possible use in a new Korean Contingency... an engagement which is after all, for our purposes, all about nonproliferation," Kartman said, beginning his presentation with an observation of current events.

Kartman went on to provide

an overview of US North Korea policy from the 1953 Korean Armistice to present. He began by describing US containment policy toward North Korea during the four decades following the armistice as greatly benefiting South Korea, which received much support from the US in developing democratic institutions and an open market economic system, while conditions in North Korea deteriorated.

In 1990, tensions in Northeast Asia soared after the Yongbyon nuclear facility was detected and "suddenly we needed a North Korea policy." The result was the 1994 Agreed Framework, whereby North Korea would receive two light water reactors to produce electricity under a construction agreement valued at almost \$5 billion. It would also receive heavy fuel oil to supply its energy needs in the interim. In exchange, North Korea agreed to cease and dismantle its fissile material production program. This meant the freezing of the Yongbyon reactor and reprocessing plant, and storage of its 8,000 spent fuel rods which could have by now, in addition to the spent fuel from other reactors that were at the time in progress, yielded material for over 100 nuclear weapons.

"Preventing that from happening was no small thing," Kartman remarked, describing the 1994 accord as a win-win situation for the United States. North Korea agreed to freeze its nuclear program up front, the International Atomic Energy Agency (IAEA) had the right to inspections, and only after the IAEA was satisfied would the light water reactors be constructed.

Unfortunately, both parties did not have the same understanding of the agreement. The United States believed

it had found a second, less potentially threatening, energy option for North Korea. North Korea thought it had removed the incentive to pursue a nuclear weapons program by laying the groundwork for improved relations with the United States. As time went on and North Korea became less satisfied with prospects for improved relations with the United States and began to "misbehave," the United States, in turn, became less satisfied with the arrangement, especially Congress. Then, in the middle and late nineties, a series of events brought the Agreed Framework almost to the point of collapse: the United States uncovered what it (mistakenly) believed to be an effort to duplicate the Yongbyon reactor; a North Korean submarine with commandos grounded in South Korea; and North Korea tested its first multi-stage rocket by firing it over Japan.

Former Secretary of Defense, William Perry, charged with salvaging the situation, boiled US priorities with North Korea down to deterring its attainment of nuclear capacity and the means to deliver such a payload, and approached an apprehensive North Korea to begin new talks. Finally, after a year of diplomatic efforts, in "the twilight months" of the Clinton administration following the summit between North and South Korea, a major breakthrough occurred. Kim Jong Il sent his personal envoy to Washington, DC for meetings with senior US officials. Those meetings resulted in a Joint Communiqué providing the basis for moving relations to a new stage. The Joint Communiqué endorsed the concept of transparency in carrying out the

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Featured Seminar

KEDO and the North Korean Crisis: How We Got Here

(Continued from previous page)

Agreed Framework and agreed that neither government would have hostile intent toward the other.

Following the visit by Kim's special envoy to Washington, Secretary of State Madeline Albright visited Pyongyang, where she held over 10 hours of talks with Kim Jong Il. During that visit, the two sides laid the groundwork for an agreement regarding North Korea's missile production, deployment and sales, while the issue of verification remained unresolved. However, after the change of administrations in the United States, senior level contact between the US and North Korea came to a standstill, with no meaningful discourse taking place until late 2002.

In the meantime, North Korea was reaching out to its neighbors: North Korea apologized to South Korea after a maritime clash ended in gunfire; it admitted to having abducted Japanese citizens, promising that it would never happen again; it affirmed its adherence to all of its nuclear nonproliferation agreements with Japan's Prime Minister Koizumi; and Japan agreed to provide economic assistance after the two sides normalized relations. These shifts in DPRK policy—constituting important changes in *juche*, fundamental to the North—were extremely important because they had Kim Jong Il's personal and public stamp of approval. The only piece missing to the puzzle of North Korea's new positioning in the world was improved relations with the United States.

Then, in October of 2002, during the first real diplomatic contact with the new US administration, the United States made it clear that it found North Korea, which was discovered to have a highly enriched

uranium facility under construction, was in breach of the Agreed Framework. Soon after, the US suspended delivery of fuel to North Korea, resulting in Kim Jong Il's announcement that the Yongbyon nuclear facility would be reopened.

"This is a huge jump from October to now," said Kartman. "Within a few weeks, at most, plutonium will be pulled out of the spent fuel rods (at Yongbyon)... and what used to be a hypothetical 1-2 nuclear weapons will become 6-8... North Korea could afford to test at that point and nothing would prevent them from selling within this year without using military operations."

Underscoring the negative implications for regional and global nonproliferation if the current impasse with North Korea is not solved, as well as the enormous level of estimated casualties—Seoul is in "artillery range" of North Korea—Kartman stressed the importance and feasibility of arriving at a diplomatic solution.

"Even as we are considering the B-1Bs going to Guam... we should have an alternative to suggest to North Korea," he said, expressing the importance of providing alternatives when negotiating with North Korea.

Acknowledging that the United States and North Korea "do not speak the same language... they are two different systems premised on different things..." and that negotiations can, at times, require almost "infinite patience," Kartman stated that he did not believe the situation to be impossible. Since the discourse with the US has ended, North Korea has made it publicly clear that it is open to further talks on three conditions: 1) It wants a

nonaggression treaty; 2) It wants the US to legally recognize its sovereignty; and 3) It wants the United States to agree not to interfere with its economic development.

Ending the presentation by expressing his firm belief that the situation with North Korea can be assuaged, Kartman stated, "When I hear the other side—particularly when the other side is North Korea—establish, as its starting point, conditions that set the bar that low, I want to do that negotiation."

Prominent Uzbek Scientist Visits Northwest

(Continued from page 9)

ethnography, to mathematics and astronomy, material sciences, power engineering and advanced technologies.

The INP, a conglomerate of more than forty institutes and laboratory facilities, is broadly involved with international partnerships in the areas of optics, solar energy applications (the institute houses a 1 MWt solar furnace), semiconductors, instrument-making, et al. The researchers of INP, our guest proudly affirmed, have built an impressive number of joint programs with scientists at the US DOE-operated national laboratories—Sandia, Lawrence Livermore and Oak Ridge.

The talks in Richland brought up an essential need for successful cooperation among the Central Asian republics as one of

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PNWCGS Seminars

The Pacific Northwest Center for Global Security sponsors seminars, conferences and workshops to benefit the global security community and its leaders. These events promote interaction between policymakers, laboratory science and technology staff, and government officials, offering an opportunity for them to discuss and share ideas about the security issues of today.

10/31/02 Concerns about Radionuclide Contamination in the Arctic and Subarctic Regions, Dr. John J. Kelley, Professor of Marine Sciences

Dr. John J. Kelley is Professor of Marine Sciences at the University of Alaska Fairbanks and Chair of the North Slope Borough Science Advisory Committee. Kelley is also former Director of the Naval Arctic Research Laboratory, and program officer of the National Science Foundation's Office of Polar Programs. Dr. Kelley, who specializes in air-sea-gas transfer and atmospheric chemistry, discussed radionuclide contamination in the Arctic and Subarctic regions. It has been reported that for decades the government of the former Soviet Union disposed of over one billion Curies of nuclear materials and more than 100 billion metric tons of industrial waste in the Northern and Arctic regions—the potential environmental impact of which would be enormous. The

disclosures, made in the early 1990s, were from a range of independent sources including defense agencies, academic researchers, former Russian government officials, and other governments. Kelley, discussed the significance of these charges and the findings of scientists in verifying these claims. Visual footage of major underground blasts on Amchitka Island, including the Cannikin test were featured.

02/04/03 KEDO and the North Korean Nuclear Crisis: How We Got Here, Ambassador Charles Kartman, Director of KEDO

Kartman, a 26-year veteran of the Department of State, and Executive Director of the Korean Peninsula Energy Development Organization (KEDO), discussed US North Korea policy and relations. See page 13 for further details.

04/02/03 The UN in Iraq: First Hand Report from An Inspector, Gennady M. Pshakin

Dr. Gennady Pshakin is Head of the Nonproliferation Analytical Center in Obninsk. The center is a non-profit, independent, Moscow-based research and public education organization focused on international security, arms control, and nonproliferation issues as directly related to Russia. Pshakin, has several years of experience as an inspector with the International Atomic Energy Agency and the United Nations. During his seminar for PNNL staff, Dr. Pshakin discussed his experience as an invited country expert in Iraq from 1995 to 1998, and again in 2002 to 2003, providing first hand information and background on Iraq and its history of arms compliance.

the main components of security stability in the region. Of particular interest to all was the idea of creating an initiative to bring together scientists working at Soviet-built nuclear research facilities. This idea is being pursued by Branch, Yuldashev, and Dr. Umar Salikhbaev, who spent three months at the PNNL Seattle office last year. The three have been forming a concept to cluster regional scientists into a cooperative network. The group could launch a council for research reactor facilities, or evolve into a comparable collective association.

Another potentially promising direction that emerged from the Richland discussions was a possible effort to expand the market for Uzbekistan radioisotope production. PNNL's technology commercialization competence attained through programs in

Ukraine and the Russian Federation under the Initiative for Proliferation Prevention could serve as an effective model for similar activities in Uzbekistan.

As stated by REECAS Director, Stephen Hanson, "In addition to everything accomplished by Professor Yuldashev, this visit has also highlighted, once again, the keen spirit of collaboration between the University of Washington and PNNL. Above all, joint efforts helped in devising a broader agenda for the Uzbek scholar's time in the Northwest, even more so in the context of REECAS' recent application for the US Department of State "Freedom Support" grant. That proposal incorporates a pronounced PNNL researchers component in the scholarly exchange program with Uzbekistan in the coming year."

New opportunities are being

explored in the PNNL/UW Uzbekistan-focused group. The UW's Bio-Informatics and Health Economics experts are working with scholars Badamshina, Branch and policy experts at PNWCGS interested in non-traditional approaches to security threats. Whether helping to combat the region's diverse problems—potable water shortages, environmental contamination, and porous border security—or, focusing on drug abuse, limited access to world-wide information, and a great need for comparative religion education, advances in these areas are perceived by the S&T leaders and government decision-makers like Professor Yuldashev, as critical to the Uzbek Republic's developmental process.

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Upcoming Events

May 13

What Happened to the US/Russian Partnership? Professor Stephen Hanson

7:00 p.m. Monte Cristo Hotel, 1507 Wall Street, Everett, Monte Cristo Ballroom
Professor Stephen Hanson, director of the UW's Russian East European and Central Asia Studies (REECAS) program, explores the reasons for the split between the US and Russia over the war in Iraq.

Information: (206) 543-4852/ Sponsored by REECAS

May 14

Income Inequality and Poverty in Ukraine 1991-2001: A Review, Dr.Nazar

3:30-5:00 p.m., University of Washington, TBD

Dr. Nazar Kholod, a political economist at Ivan Franko National University in Ukraine, will speak about income policy and inequality in Ukraine resulting from market reforms.

Information: (206) 543-4852/ Sponsored by REECAS

May 15

Jews and Muslims in Confluence and Conflict, Ross Brann

3:30-5:00 p.m., University of Washington, Communications 202

Ross Brann, professor of Judeo-Islamic Studies and Chair of the Department Near Eastern Studies at Cornell University, will examine the historical conversation between Jews and Muslims and the present significance of this dialogue.

Information: (206) 543-4370/ Sponsored by JSIS

May 15

Patrolling the Revolution: Militias and State-building in Modern China, Professor Elizabeth Perry

3:30-5:00 p.m., University of Washington, Thomson 317

Professor Elizabeth Perry of Harvard University will discuss China's state-building challenges.

Information: (206) 543-4391/ Sponsored by the China Studies Program and JSIS

May 20

The Old and New Eastern Europe: Diverging Paths of Postcommunist Transformations, Grzegorz Ekiert

3:30-5:00 p.m., University of Washington, Thomson 317

Professor Grzegorz Ekiert, a senior scholar at Harvard's Academy for International Area Studies, will discuss the different paths taken by Newly

Independent States following the dissolution of the Soviet Union.

Information: (206) 543-4852/ Sponsored by REECAS

May 29

Israel and Palestine after Iraq, Moshe Ma'oz

7:30 p.m., University of Washington, Kane 210

Moshe Ma'oz, Professor of Middle East History at Hebrew University and former Director of the Harry S. Truman Research Institute for the Advancement of Peace, speaks about relations between Palestine and Israel following the war in Iraq.

Information: (206) 543-4227/ Sponsored by the UW Middle East Center

May 31

Principle and Pragmatism in International Justice, Professor Jack Snyder

Professor Snyder of Columbia University addresses various issues of international justice.

Information: 543-3920/ Sponsored by the UW Department of Political Sciences and the Pacific Northwest Colloquium on International Security

June 4

Human Security in a Time of Terrorism and War: the Canadian View, The Honourable Lloyd Axworthy

7:30 p.m. University of Washington, Kane 210

The Honourable Lloyd Axworthy P.C., O.M., Ph.D. will provide a Canadian perspective on the current dialogue on war and terrorism. Reception to follow, in the Walker-Ames Room, Kane Hall.

Information: (206) 221-6374/ Sponsored by JSIS and PNWCGS

June 11

Putin's Russia in Comparative Perspective, Daniel Treisman

3:30-5:00 p.m., University of Washington, Thomson 317

Daniel Treisman is an associate professor of political science at the University of California, Los Angeles and a widely published author. He will discuss the current direction of the Russian Federation under the governance of Vladimir Putin.

Information: (206) 543-4852/ Sponsored by REECAS

For updated and additional information on PNWCGS events and seminars, see: <http://pnwccgs.pnl.gov>

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