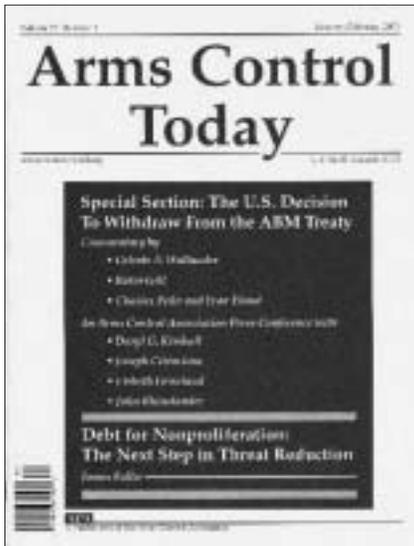


## Debt-for-Nonproliferation: The Next Step in Threat Reduction

### FEATURE

By Jim Fuller, Director of the Pacific Northwest Center for Global Security



January/February 2002

Debt restructuring and reduction, whereby the terms of a loan are changed or part of a loan is forgiven, are common tools used by creditors for a variety of purposes. Wealthier creditor nations, such as the United States, often restructure and reduce debt

owed by developing nations in order to bring about positive economic change in a debtor country. Similarly, the private financial sector restructures private debt owed by nations when it makes financial sense to do so. International nongovernmental organizations (NGOs) and others have also worked with government and private creditors to use debt reduction to accomplish more philanthropic goals that can benefit both public and private creditors in less tangible ways.

Indeed, "debt swaps"—a term used loosely here to denote a creditor forgiving monetary debt in exchange for specific actions by a debtor—have been an effective tool for improving global conditions in a number of ways. The international environmental community, in particular, has been very effective in encouraging and leveraging debt conversion to help meet global environmental objectives since 1984, when the World Wildlife Fund conceived of "debt-for-nature" swaps. In these exchanges, a portion of a country's restructured debt—either commercial debt or official debt owed another country—is forgiven in return for the debtor dedicating an agreed-upon amount of local currency to an environmental project. Over the last two decades, nearly \$1 billion in debt-for-nature swaps have been implemented.

Another important area that would benefit from this relatively new and innovative funding mechanism is nuclear, chemical, and biological weapons proliferation prevention. Since 1992, the United States has directly underwritten about \$10 billion in threat reduction activities in Russia and the former Soviet Union, but the situation in Russia demands even greater investment. Russia's financial problems and security needs both argue for increased involvement by other industrialized nations and the private sector. "Debt-for nonproliferation" swaps are potentially powerful tools that could leverage current conditions to reduce further the security threat from Russia's weapons infrastructure.

Currently, there are more than 30 US-Russian threat reduction programs administered by three different US departments, with a budget that totaled \$750 million in fiscal year 2001. But the September 11 terrorist attacks on the United States, the ensuing revelations as the war on terrorism progresses, and the use of anthrax in the US mail system have called into question the pace with which threat reduction work in Russia is being completed. The human losses endured and the costs to the US economy as a result of the September 11 terrorist attacks would likely pale in comparison to a successful attack using a weapon of mass destruction.

In January 2001, a bipartisan task force co-chaired by Howard Baker and Lloyd Cutler strongly recommended that investments in US Energy Department nonproliferation activities be increased to roughly 1 percent of the annual US defense budget over the next 10 years. Energy Department

*(Continued on page 6)*

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## Message from the Director...

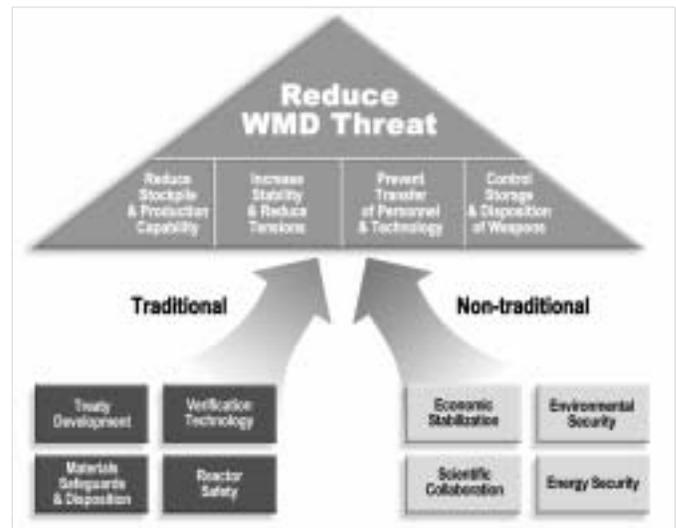
*Jim Fuller is Director of the Pacific Northwest Center for Global Security and of Defense Nuclear Nonproliferation Programs at Pacific Northwest National Laboratory. As such, he leads PNNL efforts to involve state government, foundations and other nongovernmental organizations in Department of Energy and other US government efforts to reduce the threat of weapons of mass destruction, and to promote world peace.*

We are pleased to present the second publication 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, 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 the overall stability of a country or a region 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



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

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 communicate the type of global security work being pursued through the program or project in the article as part of the Lab's endeavor to promote global security objectives.

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

## GLOBAL SECURITY

*Global Security* is a semi-annual publication of PNNL's Pacific Northwest Center for Global Security.

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## Northwest...

# UW and PNNL Offer Summer Opportunities in Global Security

The University of Washington's Institute for Global and Regional Security Studies (IGRSS), in conjunction with PNNL's Pacific Northwest Center for Global Security, is offering a limited number of internships and independent student research opportunities in the area of global security through three separate programs this summer. The Pacific Northwest National Laboratory (PNNL), based in Richland, Washington, is one of the Department of Energy's (DOE) nine national laboratories, providing support to the DOE and other federal agencies in their national security activities.

The first program will offer independent study opportunities to graduate students at the University of Washington majoring in international relations in the Jackson School of International Studies and Department of Political Science. Students will study one-on-one with PNNL staff scientists in a program of self-directed research lasting one quarter. These are non-funded research positions for which students may receive up to five academic credits. By partnering with PNNL staff, students have access to research opportunities that would not otherwise be available to them and in the process become more acquainted with DOE's national security activities and programs. In return, the Lab scientists gain valuable research assistance at no cost to them. The program may also serve as an avenue for recruitment. And, IGRSS will build its relationship with the Lab by filling an important niche.

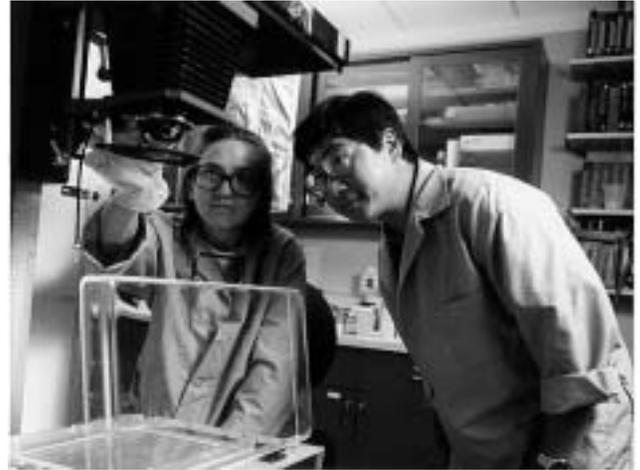
"We expect this summer to serve as the pilot for the program," says Mark Leek of PNNL's Pacific Northwest Center for Global Security, who is responsible for coordinating the program at the Lab. "We hope to continue the program yearly." Leek anticipates some five-to-six independent research projects the first year.

"Much care will be given to identifying appropriate matches of students, projects and scientists," says Leek. "That is one of our highest priorities."

Topics of research will encompass a broad range of subjects. PNNL staff in the National Security Directorate have been invited to submit their ideas for research projects. The matching of students to projects will occur throughout the month of May.

The second program is being launched by PNNL's Pacific Northwest Center for Global Security (PNWCGS) in association with the University of Washington's Physics Department with the objective of building a strong PNNL national security link to the University's physical sciences programs. Two internships, directed at students in the UW's Department of Physics, are planned for Summer Quarter 2002. The internships are available to graduate students and exceptional undergraduate juniors and seniors. Up to six internships are planned in the long-term.

In mid-April, Jim Fuller, PNWCGS director and Deborah Dickman, Product Line Manager in PNNL's National Security Division, met with the Chair of the UW Physics



*PNNL collaborations with universities will build a stronger Laboratory with a diverse staff to handle today's leading problems.*

Department, David Boulware, to discuss initial plans for beginning the internship program and long-term objectives. Acquainting graduate students in physics with research and potential job opportunities in the national security arena fills an important need at the UW as one-third of UW physics graduate students end up pursuing careers outside of academia, reported Boulware.

In addition, Steve Mladineo of Battelle's Washington, DC Office is uniting with the Nuclear Cities Initiative to offer one internship position in arms control and nonproliferation. The position, for which a candidate was selected in April, was made available to seniors in the UW's Jackson School of International Studies. The selected candidate will conduct research to further program development on behalf of PNNL's National Security Directorate, as well as offer direct assistance to the management team of the Nuclear Cities Initiative.

## Featured Projects...



# Economic Cooperation with Chornobyl



*Left to right: Riaz Awan of the Department of Energy and Irina Mitichkina, Vitaliy Tolstonogov, Andriy Bilyk, Anotoliy Nosovksyy of Ukraine.*

PNNL and the city of Slavutych, Ukraine, which was built to replace the city of Prypiat following the 1986 Chornobyl accident, are collaborating to identify a path forward for Slavutych in addressing its economic challenges. PNNL's involvement with Chornobyl began nearly a decade ago in support of the US Department of Energy's International Nuclear Safety Program. The Program was created to reduce the operational and safety risks of Soviet-designed nuclear power plants, which became the responsibility of Newly Independent States after the dissolution of the USSR.

Challenges for the new nations stemmed from the fact that, previously, plants had been centrally maintained and operated by the Soviet Union. The experience and expertise in maintaining these facilities mainly resided in the ethnic Russians who left the newly formed states and returned in waves to what is now Russia, after the Soviet Union broke up. This resulted in a large, technological void. In addition, many of the plants are older models and have been found to have design configuration safety deficiencies that make their operation potentially unsafe. The international community became concerned with these flaws after the 1986 Chornobyl accident, which sent clouds of radioactive contamination throughout neighboring countries.

PNNL's involvement with the Chornobyl site began in 1992, shortly after the dissolution of the Soviet Union. It began with initial radiological assessments for the site and support for operational safety activities like repair of the crumbling reactor ventilation stack shared by

Units 3 and 4. Involvement expanded to include a permanent Lab presence at the site, with staff working to improve plant safety, build a heat plant and build a permanent shelter around the crumbling Unit 4 to contain radiation leakage. Today all four of Chornobyl's reactors have been shut down—the last operating reactor was closed in December 2000—but the actual decommissioning of the reactors continues, as does the project to construct a permanent encasement over the damaged Reactor 4 to contain radiation.

The closure of the plant is cause for great concern in Slavutych, where citizens have relied on the plant for energy, heat and employment. Now that the decommissioning process is under way, employment opportunities and the economic future of Slavutych are uncertain.

In response to the economic challenges facing Slavutych, PNNL and its Chornobyl colleagues have expanded their cooperation on nuclear safety to include tackling economic recovery and diversification. At the moment, there are 10 PNNL staff members living with their families in Slavutych and contributing to plant safety and economic development.

Cooperation between PNNL and the City of Slavutych has included sharing economic development strategies, supporting a WSU-TriCities led US/Ukraine Foundation grant related to economic development, and hosting Slavutych and Chornobyl officials at PNNL's main campus in Richland, Washington. The most recent visit occurred in October 2001 when PNNL hosted Vitaliy Tolstonogov, former director of the Chornobyl Nuclear Power Plant (CNPP); Irina Mitichkina, Chornobyl's deputy director of Human Resources and Social Issues; Andriy Bilyk, deputy chief engineer at the Chornobyl plant; and Anotoliy Nosovksyy, director of the Slavutych Laboratory for International Research and Technology, a research facility located in Slavutych.

The delegation met with PNNL director Lura Powell and various staff members, and toured several Lab facilities. They met with Richland City officials and discussed the similarities between Hanford and Chornobyl and lessons learned from the transformation of Richland, which is the city near the Hanford nuclear site, from nuclear production to environmental remediation. The delegation and Lab staff also discussed PNNL's approach to economic development in the Tri-Cities area, and commercial applications of nuclear expertise. After visiting PNNL's

*(Continued on page 8)*

## Featured Projects...



# Former Weapons Scientists Team with Lab to Fight Cancer

For the past year, former chemical and biological weapons scientists from Russia have been collaborating with staff at Pacific Northwest National Laboratory (PNNL) to identify a cure for cancer. Cooperation has been under the Initiative for Proliferation Prevention (IPP), a federal program to transition Russia's nuclear, chemical and biological scientists to commercial ventures, and in the process, strengthen global security. Since 1995, the Department of Energy (DOE) has invested approximately \$25 to \$35 million a year in the program, finding commercial employment for former weapons scientists, and pairing institutes in Russia and other Newly Independent States (NIS) with industrial partners willing to financially contribute to the development of potentially commercially viable products.

"I'm both excited by the program and a really strong advocate of the program," says Dick Weller, of PNNL, where he is a senior scientist. He and colleague, Jim Morris, have been collaborating with Russian scientists from the State Research Institute of Organic Chemistry and Biology in Moscow to identify and enhance the cancer fighting properties that are found in garlic. The research is part of a project under IPP to promote collaborative work between the DOE national laboratories and former weapons scientists in NIS institutions. The program also exists to partner NIS scientists and their institutes with commercial entities in the United States in order to facilitate the transition of technologies from discovery, to a marketable product, and, ultimately, to manufacturing for sale.

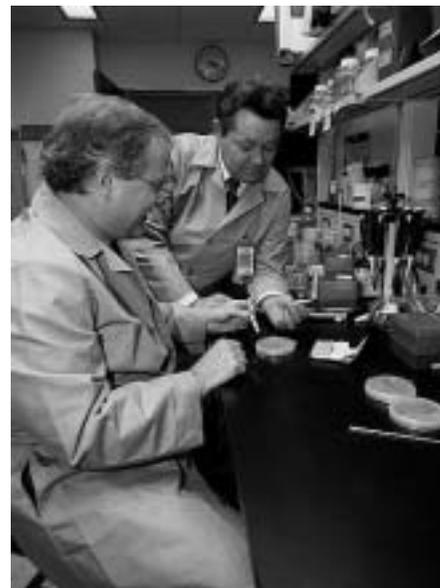
"In my opinion, the advantage of IPP over other Russian (*and NIS*) assistance programs is that it builds on

lab-to-lab and personal relationships... which is what will really sustain trust and transparency over time," says Weller. Another important aspect of the program is that it helps to establish legitimacy and recognition for many NIS scientists who were, for decades, unable to publish their research in the open literature and receive direct credit for their work.

PNNL is the technical lead for many biological and chemical related projects under IPP, and, currently, PNNL scientists are collaborating with NIS colleagues on several projects. The project that Weller and Morris have been working on has made great progress over the last year. The Russian-American team chemically separated garlic extract and tested its various components for cancer killing properties. Upon identifying the components with this cyto-toxic ability, they identified the lowest concentration of those components that still demonstrated high levels of cyto-toxic activity. The most promising components were then crystallized.

At this point, computational biology tools were used to study the structure of each cyto-toxic component and model how it might be altered to make it more effective. Based on these structural predictions, variations of the original chemical structure were synthesized and tested. The outcome was the successful achievement of a higher level of cyto-toxic activity than possessed by the parent compounds.

The next phase of the IPP program entails pairing the State Research Institute of Organic Chemistry and Biology with a US commercial entity in order to pursue product development. If all goes as planned, a final product will be created and the partnership will move to its final stage, in which both the Institute and the



*The Initiative for Proliferation Prevention is a federal program to transition Russia's nuclear, chemical and biological scientists to commercial ventures.*

commercial investor can capitalize on the work accomplished by manufacturing and marketing the product themselves, or selling the rights to do so.

"Some institutes have really caught on to the vision of entrepreneurship and may chose to develop the product themselves," says Weller. "Others may choose to license the technology completely to another institute or company in hopes of creating a... consistent revenue stream in return."

New Horizons Diagnostic Corporation, of Columbia, Maryland, is one company that is presently participating with PNNL in IPP. New Horizons has spent \$1.25 million per year on five different projects. The company hopes to hit the market with some of its collaborative products as soon as this year. One of its products is a device to detect bacteria in food processing

*(Continued on page 9)*

## Featured Projects...



### Debt-for-Nonproliferation: The Next Step in Threat Reduction

(Continued from cover)

nonproliferation programs help Russia dispose of weapons plutonium; protect, control, and account for nuclear weapons material; stabilize the economic situation in Russia's "nuclear cities;" and promote nuclear warhead safety and security. The importance of these programs cannot be overstated, and the Baker-Cutler report indicated that its 1 percent recommendation would total about \$3 billion per year, or \$30 billion over the ensuing decade.

However, neither the departing Clinton administration, the incoming Bush administration, nor the Congress has supported appropriations anywhere close to this level. Clearly, another funding mechanism is needed that will provide a substantial and immediate infusion of cash into Russia's nonproliferation efforts. But the funding needs to minimize the characteristics of an international welfare program in order to promote a long-term, sustainable Russian proliferation prevention enterprise that will last after direct aid stops. A process is needed to ensure that once the acute proliferation issues are successfully addressed, the people whose livelihood depended on the production of nuclear, chemical, or biological weapons have an alternative future. Further funding should be aimed at spurring Russian private-sector interest in the *business* of preventing proliferation.

A well-implemented debt-for-nonproliferation swap would have all these advantages. The processes that may be used to effect a debt swap can be grouped into four categories:

- **Buy-Back:** Debtors repurchase of the debt at a lower value and endowment of a fund to conduct work of value to both creditor and debtor alike.

- **Write-Off:** Creditors forgive some or all of the debt in exchange for establishment of the endowment.
- **Rescheduling:** Creditors reschedule the old debt by exchanging a large amount of paper for a smaller amount--official bilateral debt can be rescheduled and re-directed into an endowment, commercial debt--principal and interest-- is often separated into derivatives, which can be used separately.
- **Tri-Party Arrangements:** A third party, like a NGO, receives a donation or purchases debt from the creditor and negotiates a write-off with the debtor.

By promoting self-investment, debt-for-nonproliferation swaps would encourage infrastructure building and therefore help to generate a sustainable Russian effort to prevent proliferation. A swap could also involve industrialized countries besides the United States, providing broader international participation in preventing proliferation from Russia than currently exists. The establishment of a fund would also probably be the most effective way to involve private and NGO stakeholders in forging public-private partnerships for nonproliferation. Such partnerships would have multiple benefits, such as promoting confidence in the accountability of funds and helping to establish a private-sector component in a long-term nonproliferation effort. Last, but certainly not least, a swap would reduce Russian external debt without forcing Moscow to spend hard currency and draw down its Central Bank foreign reserves, thus serving the long-term goal of promoting economic stability in Russia.

In addition to process-related advantages, it makes extremely good political sense for the West to help Russia while it struggles in its quest for a



Currently, there are more than 30 US-Russian cooperative threat reduction programs.

market-based economy because Moscow has offered strong support for the US war on terrorism and has held the Organization of the Petroleum Exporting Countries at arm's length in its quest to control worldwide oil prices more strongly.

A wide variety of programs could benefit from a viable debt-for-nonproliferation program. Cleaning up cold war nuclear waste could provide an extensive jobs program for former weapons specialists and would make Russian nuclear cities more attractive for outside investment. The long-term sustainability of the US effort in Russian nuclear material protection, control, and accounting is another effort that would benefit from additional funding and greater commitment by Russia's private sector. The evolving European Nuclear Cities Initiative is in need of the innovative financing that a successful debt-for-nonproliferation enterprise would offer. The decontamination of Russian nuclear-powered multi-purpose submarines

## Featured Projects...

is another activity that has yet to be underwritten by the West or the Russians.

Of course, despite these benefits the idea of a swap would be less tenable if there were no financial basis for debt forgiveness. But Russia's economic situation offers some genuine opportunities for constructive debt reduction. The collapse of the ruble in 1998, coupled with the size of Russian federal debt, has severely hampered Russia's transition to a viable free-market economy, its capacity for making social-service and infrastructure improvements, and its ability to fund proliferation prevention and other security endeavors. Russian external debt totals \$147 billion, nearly \$71 billion of which is from the Soviet era. Approximately \$2.7 billion of this Soviet-era debt is owed to the United States. This debt amounts to almost 140 percent of projected revenue from exports and is roughly 42 percent of projected 2002 gross domestic product.

Sizable amounts of Russian external debt are held by the Paris Club and the London Club, two separate ad hoc groups of creditors that meet with representatives of nations about to default on their debt. The Paris Club is currently comprised of 18 creditor nations (including all members of the G-8) and deals with official, bilateral debt instruments. The London Club is comprised of commercial banks. Both organizations meet with debtor nations in order to agree on the best terms for any debt restructuring. Although the United States could theoretically effect a debt swap itself, in reality a swap would involve these forums because unilateral US action could harm the economic interests of other creditors left holding Russian debt.

There is some precedent for Russian debt forgiveness among

these creditors, which have provided some debt relief to Russia. In August 1999, the Paris Club provided a framework agreement that postponed payment of debt principal under their auspices until after the 2001 Russian presidential election but continued interest obligations. In February 2000, the London Club agreed to forgive some of the Russian debt to commercial lenders. In this agreement, \$31.8 billion in claims held by commercial creditors were exchanged for \$21 billion in new Eurobonds. When combined with an eight-year grace period on payment of principal, plus a lower interest rate, total debt forgiveness amounted to 52 percent in present-value terms.

The economic straits brought on by the collapse of the ruble have, until recently, been somewhat offset by the strong price of oil, which has bolstered Russian revenues. This improvement has somewhat weakened the financial case for debt relief because Russia is better able to service its debt obligations. However, the ruble appropriations required for servicing the debt will likely squeeze budgets for reform: revenues from oil and gas sales account for about one-half of the federal budget, and gas and oil prices tend to go together.

Despite this uncertain economic future, securing Paris Club participation in a debt swap would likely be a challenge. For instance, Germany will chair an upcoming Paris Club meeting and therefore have substantial influence on the outcome and the current German position does not acknowledge the benefits of a more liberal debt-relief agreement. Because of potential Paris Club reticence in writing off Russian debt, it is critical that the United States take a lead role in implementing a debt-for-nonproliferation swap—a role that makes particular sense because of extant US involvement in Russian threat reduction efforts. The precedent

for the United States using its financial leverage to effect positive change in other countries is well established, though traditionally the goals of such actions have been developmental rather than security-oriented.

In three exceptional cases, the United States has reduced the debt of severely indebted lower-middle-income countries to promote not only economic reform but also US national security interests.

Each of these three special debt reduction cases required special legislation, and although in Russia's case existing US legislation does, technically speaking, contain authority for debt swaps for various purposes, the chances of a debt swap succeeding would be enhanced by obtaining the positive congressional endorsement that would be represented by new legislation targeted specifically at swapping Russian debt-for-nonproliferation commitments.

Fortunately, Congress has expressed considerable interest toward debt-for-nonproliferation in recent months. On December 20, the Senate passed by unanimous consent the Security Assistance Act, which contained the Debt Reduction for Nonproliferation Act of 2001 (DRNA). It sets forth US security interests in preventing proliferation and reducing weapon stockpiles, especially in Russia, and it recognizes that existing nonproliferation programs have made substantial progress but that the threat remains urgent.

More specifically, the DNRA states that new nonproliferation funding streams—such as debt reductions and exchanges—are needed and that the burden will have to be shared by Russia, the United States, and other debt-holding governments. It further

*(Continued on next page)*

## Featured Projects...

### PNNL-Chornobyl Economic Cooperation

(Continued from page 4)



PNNL staff and Ukraine delegation members discussed similarities between the Hanford (above) and Chornobyl sites.

main campus in Richland, the delegation traveled to Washington, DC to meet with DC Office Lab employees and US officials.

According to Kevin Whattam, of PNNL, who has provided support to CNPP with management, business infrastructure and safety efforts, cooperation between PNNL and Slavutych has also extended to other activities. In 1996, a student exchange between the Hanford and Slavutych Junior High Schools was organized in which students shared their perspectives on living in nuclear communities. The exchange resulted in a book, "Nuclear Legacy: A Tale

of Two Cities." Also, there are three students from Slavutych studying at Whitworth University in Spokane under a PNNL-sponsored education program.

However, despite cooperative activities and the similarities between Hanford and Slavutych, the challenges of Slavutych are somewhat greater: Slavutych severely lacks infrastructure, the city's chief source of income,

the Chornobyl site, is dependent on the country's small budget, and Ukraine is new to the concepts of capitalism and the open market.

In spite of these obstacles, the Chornobyl delegation expressed high hopes and claimed that it finds collaboration with PNNL to be helpful.

"We have very good relations," said Nosovskyy, of the PNNL-CNPP relationship to one *Tri-Cities Area Journal of Business* journalist. "We are in constant contact... (and) the information we get from PNNL will continue to help us... We think the future of Ukraine is very promising."

Investment Agreement" that would be negotiated with the Russians and potentially result in a ruble-based Nonproliferation Fund. It would allow the president to sell the debt to an eligible third party or the Russian government, provided the required nonproliferation plans, commitments, and transparency measures were in place.

The DRNA would require that consequent nonproliferation programs and projects be approved by the US government directly or via its representation on any governing board established to manage the funds, incorporate best practices from established threat reduction and nonproliferation assistance programs, be subjects to US audits, be free of Russian taxes, and that 75 percent of such funds be spent in Russia. Finally, the DRNA would instruct the president (or his designees) to seek the appropriate agreement and arrangements with the Paris Club and establish an interagency committee to ensure that US public and private efforts are not in conflict and that public and private spending on these purposes is maximized, efficient, and furthers US national security interests.

The future of the DRNA now rests with the Republican-controlled House of Representatives, which will likely take its cue from the White House.

As a first step in aiding Russia to reduce the threat of proliferation, the United States should use authority provided by the DRNA to write off the remaining \$480 million in Lend-Lease debt that Russia owes the United States from debt from a time when the United States and Russia were allies—in exchange for a ruble debt-for-nonproliferation fund. The United States should also strongly consider swapping all \$2.7 billion of Russia's

(Continued on next page)

### Debt-for-Nonproliferation

(Continued from page 7)

states that Russia's substantial Soviet-era debt burden severely stresses its budget, will do so even more in 2003 and thereafter, and is among the factors that have led Russian officials to recognize that its future lies with the West.

If enacted in its current form, the DRNA would authorize the president to establish an office

at the Treasury Department to administer the debt reduction and authorize \$300 million in appropriations in fiscal years 2002 and 2003 to offset the cost of the debt reduction to the US Treasury. It would authorize the president to reduce the Lend Lease and agricultural portions of the Soviet-era debt and replace those obligations with new obligations defined in a "Russian Nonproliferation

## Featured Projects...

Soviet-era debt to the United States and encourage other Paris Club members, such as Italy and France, to do the same. Agreement by these principals should be followed by the unsolicited offer of a debt swap to Russian President Vladimir Putin, subject to conditions on the construct and use of the proposed Nonproliferation Fund. In this manner, Russia's investment potential is not questioned; new funds in the order of billions become available to further enhance security around Russia's nuclear, biological, and chemical materials and expertise; and Germany, which holds a disproportionate amount of Russian Paris Club debt, is not disproportionately affected by the actions of other G-8 members.

A debt-for-nonproliferation swap must be supported by the chiefs of state of the nations involved and must include proper surveillance and conditionality to assure operational costs and risks are relatively small and benefits are large and certain. By taking advantage of the lessons learned from highly successful debt conversion programs and their extension to European economic restoration efforts, the US government and the rest of the developed world have a tool to reduce further the Russian nuclear threat in a positive and constructive manner. Debt for nonproliferation could greatly enhance the funds available for proliferation prevention through broader multilateral participation and public-private partnerships, assist Russia in reducing its external debt without hard-currency transfers, and help expedite weapons-complex downsizing in Russia to the benefit of all parties.

*This article was featured in its entirety in the January/February issue of Arms Control Today.*

## Former Weapons Scientists Fight Cancer

(Continued from page 5)

plants, restaurants and hospitals, using natural luciferin/luciferase, enzymes that are extracted from fireflies and which glow in the presence of bacteria.

Another company is DyeSeed, a local seed processing and production company that has worked with PNNL and Russian scientists from Biochimash, a former Soviet weapons development center and Moscow State University on two IPP projects.

One is with a plant growth stimulant that has shown good progress in increasing growth rates for grasses and many broad-leaf plants. The other project is seeking to address the issue of soil remediation through investigation of the use of oil-eating microbes at oil contaminated sites.

"We couldn't do any of this without the laboratory and IPP," said Steve Stilson, Dye Seed general manager. "The preliminary test results for these projects are very promising. If the field tests show potential, it would be beyond my wildest dreams."

Also, PNNL and Russian scientists are pursuing treatments for individuals exposed to biological agents such as anthrax and the plague. During the cold war, the former Soviet Union had a sizeable chemical and biological weapons program that included extensive work with infectious agents for which there are currently no treatments. Periodically, individuals were accidentally exposed to these agents, resulting in a high level of familiarity and experience in dealing with such situations by scientists of the former Soviet Union. These scientists spent a considerable amount of time and energy trying to understand the components of such agents and what makes them so destructive. This



*IPP scientists are seeking to address the issue of soil remediation through investigation of the use of oil-eating microbes to restore oil-contaminated sites.*

knowledge makes them very attractive partners for projects involving chemical and biological technologies.

According to PNNL's IPP Program Manager, Ron Nesse, NIS scientists are highly motivated and have been eager to participate in the program from the beginning. "The only thing they lack is what the commercial partner brings... There's not an awful lot of natural knowledge and synergy between a US company and a Russian lab. We serve as a middle person," quotes the *Potomac Tech Journal*.

"Because of its (IPP) commercial focus once you successfully complete a project and obtain a viable product at a particular institution... it stimulates a lot of enthusiasm to develop the next product," Weller adds to the subject. "This demonstrates how the skills of scientists can be transferred to the commercial market, encouraging further movement by FSU scientists and institutes in that direction.

"The skills are there," says Weller. "I've seen some amazing resumes and technical reports."

## Applied Technology...

# Imaging Science Increases Treaty Verification Capabilities

Advances under the Imaging Science and Technology Initiative (ISAT) at the Pacific Northwest National Laboratory are increasing capabilities in treaty verification and the promotion of regional stability. On a local level, satellite and remote sensing technologies are enhancing the ability of treaty members to monitor for compliance, helping to build transparency between nations, and lending credibility to multilateral agreements. On the regional scale, imaging can be used to characterize factors influencing stability such as environmental changes and crop yields.

"ISAT focuses on the branch of imaging called digital imaging processing," says Doug Lemon, ISAT director. "The challenge in digital imaging processing can be seen by examining the imaging process. When a satellite takes an image, it converts the reflected electromagnetic energy into a series of intensity

measurements over a two-dimensional square grid or set of pixels... (*rendering*) a "pixelized" set of measurements derived from the real object. The challenge of the digital imaging process is to extract from the pixel values the characteristics of the underlying object, and then, to determine the nature of class to which the object belongs."

The initiative began 18 months ago. Since then, "good progress had been made in developing new algorithms for image registration, feature extraction, and change detection," explains Lemon. Technologies exploit three sources of information: spectral intensity, spatial

characteristics, and changes in the measurements over time. So through analyzing information in a series of images, it is possible to estimate an object's shape, composition and detect changes.

There are presently two major shifts in the initiative's focus. The first shift entails placing more effort on the integration of image processing techniques in order to address specific challenges in remote sensing, biology and materials characterization. The second is a shift toward three- and four-dimension representations of

attention to areas that should be reviewed by human experts," says Lemon. "In conjunction with this, we are teaming with experts in high performance computing to develop an image analysis architecture specifically created for high speed processing of images... These efforts are expected to enable new applications of remote sensing that were previously too time consuming to be practical."

The impact of these developments on security efforts is that it will be possible to monitor more and larger areas for compliance. Furthermore, this increased monitoring capacity will make it easier to identify threats to stability, such as conditions threatening fisheries, or other important resources.

Other goals under the initiative include increasing resolution and image quality, which would facilitate the detection and extraction of features, and the tracking of changes from image to image. Another is the interlinking of software

programs and integration of their functions, making data much more manageable. Also, in addition to multidimensional images, the ISAT team is pursuing the development of capabilities that will enable greater interaction between humans and data sets through the use of holograms, and the ability to change or move data by touch and with gestures.

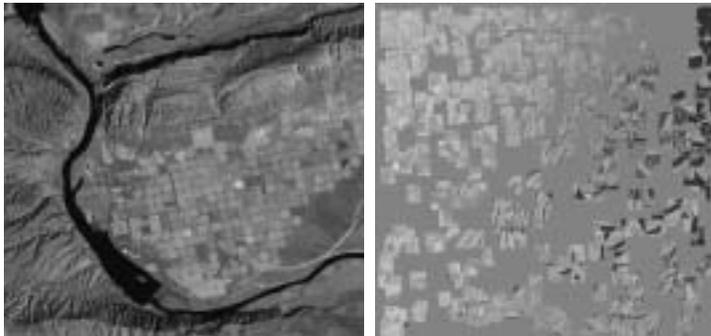
"We have made some good progress," says Lemon when asked about the program's success. "We have also developed some innovative visualization techniques."

digital data, rather than the current flat or two-dimensional representations.

"These high dimensionality images will provide better insights into the composition of materials on the ground, changes in the environment, or man-made impacts such as the construction of new buildings," explains Lemon.

Another challenge, directly relevant to global security is the difficulty in monitoring large land areas. The quantity of data becomes difficult to manage, making it overwhelming and limiting its use.

"One goal of ISAT is to develop smart tools that can scan vast amounts of imagery and then call



*Statistical analysis techniques are being developed to automatically recognize and categorize land features. The original image, above left, has been segmented and then clustered according to land cover type, in the image to the right.*

## *Applied Technology...*

### **Award-Winning Nuclear Monitoring Device Becomes Commercially Available**

The Radionuclide Aerosol Sampler and Analyzer (RASA), described by lead developer Harry Miley as, "an automatic monitoring device for nuclear debris—or any kind of radioactive aerosol in the atmosphere," recently became available on the commercial market.

Development of RASA and a similar device with which RASA is commonly paired, the Automated Radioxenon Sampler and Analyzer, ARSA, began at Pacific Northwest National Laboratory (PNNL) in 1992. At that time, five nuclear monitoring pilot projects were launched, and a down selection process took place to identify and fully pursue the two most promising concepts. While the RASA and ARSA projects have been pursued independently of one another, both project teams have shared the common objective of providing reliable means with which to monitor and verify compliance of the Comprehensive Test Ban Treaty (CTBT), intended to deter nuclear proliferation through prohibiting nuclear testing.

PNNL began conducting aerosol sampling and analysis of the atmosphere in the 1950s. PNNL commenced doing so regularly in the 1960's, about the time the Atmospheric Test Ban Treaty came into effect. What is special about RASA and ARSA is that these automated devices are more sensitive and effective than manual precursors. RASA samples and analyzes the atmosphere for radioactive aerosol particles by filtering huge volumes of air daily, drawing it through a filter that is the same size and material as the most efficient home furnace filters, and then testing the air for abnormal radioactivity. While this technique has been available since the 1960's, PNNL researchers have automated the process and made it 300 times more sensitive than any pre-existing commercial device. ARSA tests for traces of radioactive xenon gas resulting from underground nuclear testing. PNNL researchers have also automated this process, collecting and analyzing gas samples every 8 hours, which allows the detection of very short-lived isotopes of xenon.

The failure of the United States to ratify the CTBT in 1999, and disinterest in the treaty expressed by the current US administration, have been a blow to developers of RASA and ARSA. As described by Miley, "With reduced emphasis on the CTBT many worried that interest in RASA and ARSA would dry up and blow away, but it hasn't... it was a pleasant surprise to find that interest in monitoring is not just tied to the CTBT... perhaps September 11<sup>th</sup> is part of it, but there has been no

downturn in interest as a result of failure to ratify."

Also, the US *does* support the section of the CTBT calling for an International Monitoring System, or IMS. This global nuclear monitoring system would consist of 80 radionuclide aerosol monitoring stations, 40 of which would also be equipped to measure xenon gas. This network, largely consisting of RASA and ARSA technology, will ensure a 95 percent chance of detection of any nuclear testing in the world that vents to the atmosphere within two weeks. In addition, nations that have ratified the treaty are well on the way to creating the IMS, creating a demand for reliable verification technologies.

The market for RASA, priced at \$200,000, has proven substantial; millions of dollars worth of orders are presently in place and "manufacturers are making them as fast as they can," says Miley.

The CTBT Organization has placed orders for twelve RASA systems with an option to buy twelve more. The US Air Force and Defense Threat Reduction Agency, and the German Institute for Atmospheric Research have placed orders. PNNL has three RASA systems operating for pure and applied science research, including one system located on Rattlesnake Mountain for use in an aerosol community research project on the transport of particulate matter from Asian dust storms.

RASA and ARSA are recently developed technology and join waveform technologies (seismic, hydroacoustic, and infrasound) in an interlocking monitoring scheme being applied within the CTBT. Vibrations in the earth, oceans, and atmosphere can detect and localize explosions. Devices monitoring these vibrations would detect nuclear explosions

*(Continued on page 13)*



*The Radionuclide Aerosol Sampler and Analyzer (RASA), tests the atmosphere for radioactive aerosol particles.*

## Forging Alliances...

# Representative Weldon Praises Northwest-Russia Collaboration

US House of Representative Curt Weldon (R-PA) had high praise for Pacific Northwest-Russia cooperation at this year's Foundation for Russian American Economic Cooperation's (FRAEC) Annual Dinner. The event was held on April 22 at the Sheraton Hotel in downtown Seattle with the purpose of sharing insights on US-Russia relations that might prove useful to this region's international community. Representative Weldon, who is Chairman of the Armed Service Procurement Committee and a renowned proponent for improved relations between the United States and Russia, was the evening's keynote speaker.

Weldon, now in his eighth term, has worked with Russian leaders on various issues such as improving Russia's energy supply, remediation of environmental damage, and missile defense. Weldon is also the founder of the Duma-Congress Study Group, which fosters frank and open parliamentary exchange between legislators of the two nations. He recently unveiled, "A New Time, A New Beginning." The paper cautions against the traditional focus of the United States and Russia on defense and security issues, suggesting that a more comprehensive approach to interactions, including cooperation in the areas of economics, development, public health and agriculture, would be more conducive to good relations.

During his speech to guests and sponsors, Weldon emphasized the current possibilities for improved relations between the two countries in light of the unique relationship between Presidents Vladimir Putin and George W. Bush, and the high

level of support that presently exists in the US Congress for strengthening ties. He also stated that activities taking place between the Northwest region and Russia reflect what he would like to see take place in the Northeast.

Weldon praised collaboration between FRAEC and other regional organizations in increasing business and expanding relations with Russia, calling Northwest efforts a "regional model" for what needs to be accomplished. More specifically, he lauded FRAEC's leadership role in the region, which has extended to a wide array of activities such as small business capacity building, the expedition of custom clearances, and representation of the trade interests of Washington state. Weldon also complimented the collaboration of nongovernmental organizations (NGOs), academic institutions and government agencies, and the fostering of close personal connections with counterparts in Russia.

FRAEC, established in 1990, is a premier NGO in business and trade with Russia, and a major stakeholder in Russian affairs within the Northwest. Pacific Northwest National Laboratory (PNNL) and FRAEC have jointly labored under the Nuclear Cities Initiative, under which they have established International Development Centers in Zheleznogorsk and Snezhinsk, two of Russia's closed nuclear cities, with the objective of facilitating the transition from a state to a market economy. The organizations continue to work together to promote economic growth and stability in Russia. FRAEC is also a strategic partner of PNNL's Pacific



*Representative Curt Weldon, Chairman of the Armed Service Procurement Committee and renowned proponent for improved relations between the US and Russia.*

Northwest Center for Global Security (PNWCGS), which places great importance on cooperative nonproliferation and security enhancing activities with regional institutions and NGOs.

This April's Annual Dinner Event was a constructive effort on the part of FRAEC and local organizations to bring together various stakeholders in US-Russian affairs and foster the building of cooperative relationships between entities in the Northwest region with interests in Russia.

Evening sponsors included Battelle Memorial Institute, which manages PNNL for the Department of Energy, Science Applications International Corporation, The Boeing Company, and the Ports of Seattle, Tacoma, Olympia and Everett.

## *Forging Alliances...*

### **IGRSS Offers Arms Control Course Taught by Ambassador Thomas Graham, Jr.**

The Institute for Global and Regional Security Studies (IGRSS) is offering a course on arms control this Spring Quarter at the University of Washington (UW). The course, "International Law and Arms Control," is taught by Ambassador Thomas Graham Jr., former Acting Director of the Arms Control and Disarmament Agency (ACDA), and Special Representative of President Clinton for Arms Control and Disarmament.

Graham is currently the President of the Lawyers Alliance for World Security, a nonpartisan, nongovernmental organization concerned with proliferation issues. During his twenty-seven years with ACDA, Graham was involved with every major arms control agreement in which the United States participated.

Graham's course provides extensive history on arms control including its beginnings, and background on chemical and

biological weapons issues. It also teaches about specific agreements like the SALT, START, ABM, INF, and Conventional Armed Forces in Europe treaties. In addition, the class reviews the function and role of ACDA, the US agency responsible for formulating, advocating, negotiating, implementing and verifying effective arms control, nonproliferation, and disarmament policies, in global arms control and nonproliferation.

The course features several prominent speakers whose presentations are open to the public. Lecturers include: Robert McNamara, Secretary of Defense during the Kennedy and Johnson Administrations, and former President of the World Bank; Laura Holgate, Vice President of the Russia/Newly Independent States Programs under the Nuclear Threat Initiative, and former head of the US Department of Defense's Cooperative Threat Reduction Program; and John Rhinelander, a

leading expert on international law, arms control, expansion of the North Atlantic Treaty Organization and National Missile Defense, and former Undersecretary of the Department of Housing and Urban Development.

Also, Director Jim Fuller of the Pacific Northwest Center for Global Security will give a speech on US-Russian cooperative activities to reduce the proliferation of nuclear weapons.

IGRSS was jointly launched by the UW and PNNL in September of 2000, with the objective of expanding UW programs for teaching, research, and outreach on global security issues from both global and regional perspectives. Since its inception, the Institute has been very active and has enjoyed strong support in its activities and funding from the Pacific Northwest National Laboratory.

Enrollment and interest in this quarter's course by Graham have been high and IGRSS plans to offer the class next year. ■

### **Award-Winning Nuclear Monitoring Device Commercially Available**

*(Continued from page 11)*

in a 100-mile radius within minutes. However, these devices would only be capable of demonstrating that an explosion had occurred. In particular, at low yields these techniques have difficulty in discriminating between normal mining explosions, earthquakes, and nuclear tests. In fact, there are millions of earthquakes per day that are similar to low-yield explosions. The positive proof obtained with radionuclide measurements from RASA and ARSA provide a great measure of confidence to the fast locating ability of the

waveform technologies. Thus, in a sense, the technologies form a diverse and complementary CTBT monitoring network.

"What's really special about ARSA/RASA," says Miley, who also serves as CTBT technical expert for the National Nuclear Security Administration's NA-241 Office which deals with monitoring policy, the Department of State, and the US delegation for the CTBT working groups, in Vienna, "is that they provide a smoking gun because they actually pick up part of the weapon

in the filter." While traces of nuclear testing from the 1970's are still in the atmosphere today, short-lived radionuclides, which are not found naturally in the atmosphere, are a positive confirmation of recent nuclear fission.

In 1998, RASA won a Research and Development 100 Award. In 2001, the RASA and ARSA development teams won a Federal Laboratory Consortium Award for transfer of the device's technology to the private sector. ■

## *PNWCGS Featured Seminar...*

# Laura Holgate Addresses PNNL Staff on Maintaining Russian Nuclear Infrastructure



*Laura Holgate, Vice President for the Russia/Newly Independent States Program for the Nuclear Threat Initiative.*

On May 9, Laura Holgate gave her presentation, "Helping Russia Control Its Nuclear Infrastructure," to Pacific Northwest National Laboratory's (PNNL) Richland staff as part of the Pacific Northwest Center for Global Security's (PNWCGS) seminar series.

"We're just thrilled to have her at the Lab," said Mark Leek, who organizes the PNWCGS seminars, expressing his high regard of Holgate.

Holgate, who held her discussion between 9:30 and 11:00 a.m. in the auditorium of PNNL's William R. Riley Environmental Molecular Sciences Laboratory, is a widely respected nonproliferation expert. She is currently Vice President for the Russia/Newly Independent States (NIS) Programs for the Nuclear Threat Initiative. Founded in January 2001 by Ted Turner and Senator Sam Nunn, the Nuclear Threat Initiative is a nonprofit, nongovernmental effort devoted to preventing the proliferation of nuclear, biological and chemical weapons and reducing the risk these weapons pose. The Initiative's current budget is \$250 million over five years.

"Laura has played an important role in nuclear materials disposition," said Jim Fuller,

PNWCGS director. "Her vision and unbound energy to minimize the proliferation threat have made her a significant collaborator in US-Russia nonproliferation activities."

Before joining the Nuclear Threat Initiative, Holgate directed the US Department of Energy's Office of Fissile Materials Disposition, where she managed efforts to consolidate and dispose of excess weapons plutonium and highly enriched uranium in the US and Russia. Between 1995 and 1998 she served as Special Coordinator for Cooperative Threat Reduction at the US Department of Defense where she provided policy oversight of the Cooperative Threat Reduction "Nunn-Lugar" program. This program directs American assistance to Russia and other states of the former Soviet Union in eliminating the legacy of weapons of mass destruction remaining from the cold war.

Holgate also oversaw Department of Defense policy on United States-Russian cooperation concerning the disposition of fissile materials. She served for two years as Special Assistant to the Assistant Secretary of Defense for International Security Policy, Ashton B. Carter. She spent six months at the Arms Control and Disarmament Agency, which is charged with negotiating, implementing and verifying US arms agreements, as a member of the Clinton Transition team. She also served as Special Assistant to the agency's Acting Director, Thomas Graham, Jr.

"The nation and the world discovered September 11th that there are terrorist forces in the

world who will stop at nothing in their efforts to take innocent lives. The work that the US government does to secure nuclear, biological and chemical weapons and materials is our first line of defense in keeping these weapons out of terrorist hands," Holgate told Congress in recent testimony.

On May 10, Holgate and Fuller were interviewed on the radio show "Weekday" on the subject of US-Russia nonproliferation activities. Later, in the evening, Holgate spoke to Ambassador Thomas Graham Jr.'s Arms Control and International Law class at the University of Washington. Her presentation, "Controlling Fissile Material in Russia," included discussion of the Cooperative Threat Reduction Program, the Fissile Material Cut-Off Treaty, and plutonium disposition. The lecture took place in the University of Washington's Kane Hall, and was also open to the public. Co-sponsors included the Institute for Global and Regional Security Studies, the Jackson School of International Studies, the Lawyers' Alliance for World Security and the Abe Keller Peace Fund.

Holgate earned an undergraduate degree in politics from Princeton University, and a Master's degree in political science from the Massachusetts Institute of Technology. She serves on the Executive Board of Women in International Security and has received many medals for public service, including the Defense Medal for Outstanding Public Service.



## *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.*

**5/09/02 Ms. Laura Holgate, Vice President for Russia Programs of the Nuclear Threat Initiative**  
*Helping Russia Control Its Nuclear Infrastructure*

Ms. Laura Holgate is Vice President for Russia Programs of the Nuclear Threat Initiative and former manager of the Cooperative Threat Reduction Program, which aids Russia and the Newly Independent States to secure and destroy excess nuclear, chemical and biological weapons. Founded in January 2001 by Ted Turner and Senator Sam Nunn, the Nuclear Threat Initiative is a nonprofit, nongovernmental effort devoted to preventing the proliferation of nuclear, biological and chemical weapons and reducing the risk these weapons pose. In her presentation, "Helping Russia Control its Nuclear Infrastructure," Ms. Holgate addressed the issues and concerns associated with Russia's nuclear infrastructure as well as programs and efforts in which the United States is involved to aid Russia in addressing its nuclear challenges.

**1/17/02 RADM William Center (Ret), President of the Washington Council on International Trade Security and the Role of International Trade**

RADM William Center served for thirty-five years in the United States Navy and was senior advisor to the Joint Staff on arms control, nonproliferation, international agreements and environmental issues as pertinent to the military. In his current role as president of the Washington Council on International Trade, a nonprofit, nonpartisan organization, he is charged with leading the Council's efforts to inform the public, state officials, educators and the media of the importance of Washington state's overseas trade. In his speech, "Security and the Role of International Trade," Mr. Center shared his thoughts on the importance of the role international trade plays in building relations with other countries and its crucial part in promoting regional and global stability.

**12/18/01 Ambassador Linton Brooks, Deputy Administrator of the National Nuclear Security Administration**

*My Vision for Defense Nuclear Nonproliferation*  
Ambassador Linton Brooks, Assistant to the President for Policy Analysis at the Center for Naval Analyses, visited Pacific Northwest National Laboratory for the first time in December. The visit was part of his tour of all United

States Department of Energy national laboratories, which receive much of their funding from the National Nuclear Security Agency's National Security Directorate. During his visit he expressed the importance of the national laboratory system, and the research and development they perform, to resolving long-term security issues and challenges. He also voiced his strong support of security programs such as Materials Protection, Control and Accounting, created to reduce Russian inventories of weapons usable fissile materials and protect them from theft and diversion. In addition, he advocated the debt-for-nonproliferation concept, a program being put together to promote the use of debt swaps with Russia for the purpose of relieving the nation's debt burden through underwriting projects of mutual interest, like clean up of the country's radioactive contamination and waste.

**11/27/01 Dr. Frederick Lorenz, Professor of International Law, University of Washington/ Seattle University**

*Response to Terrorism: Military Force and International Law*

Dr. Frederick Lorenz is an expert on international law and security, and a former Marine colonel. He was a United States military judge advocate for 27 years, and has served as a legal affairs officer for the United Nations. In his presentation, Dr. Lorenz addressed the legality of the United State's retaliation against Afghanistan under the United Nations Charter, spoke about the law of war under current international standards and those of the Koran, and addressed the conditions promoting a radical, militant interpretation of the word "jihad."

**11/13/01 Dr. Resat Kasaba, Professor of International Studies, University of Washington**  
*Do They Really Hate Us?*

Dr. Resat Kasaba is a professor at the University of Washington's Jackson School of International Studies, and co-founder of the University of Washington's Center on Ethnic Conflict and Conflict Resolution. He has also written extensively on the Ottoman Empire, Turkey and the Middle East. In his discussion, Dr. Kasaba provided a thoughtful analysis of the events of September 11th, including commentary on the stereotypes of "Western culture" and "Muslim militants," and the need for increased tolerance and communication between cultures.

# Upcoming Events...

**May 23**

**Activities in the US and Russia to Limit Proliferation and Reduce Nuclear Weapons—Jim Fuller**

5:30-6:20 p.m., Kane Hall, Rm 200, University of Washington  
*Jim Fuller*, Director of the Pacific Northwest Center for Global Security and Defense Nuclear Nonproliferation Programs at Pacific Northwest National Laboratory, will speak about US-Russian cooperative government efforts to limit global proliferation and reduce nuclear weapons stockpiles in Russia. The lecture will be part of the World Affairs Council's Annual Lecture Series, and Ambassador Thomas Graham's course on international law.  
Information: (206) 441-5910, IGRSS

**May 28**

**Intergovernmental Contracting: Everyday Choice and Long-Run Change in European Union Institutions—Joe Jupille**

3:30-5:00, Parrington Forum, University of Washington  
*Joe Jupille* of Florida International University's Political Science Department presents his paper, "Intergovernmental Contracting" on the European Union and procedural politics with the objective creating a broader understanding of the nature and trajectory of the EU's political system during this time of European transition.  
Info: CWES 206-543-1675

**May 28**

**Re-Joining Europe? Socialization and European Institutions—Jeffrey Checkel**

1:30-3:30 p.m., Parrington Forum, University of Washington  
*Jeffrey Checkel*, Research Professor of International Politics at ARENA, University of Oslo, speaks about socialization dynamics and re-integration with Europe on the part of nations of the Former Soviet Union. Checkel will look at the growth of the European Union, North Atlantic Treaty Organization and other institutions from various analytical perspectives.

**May 30**

**Looking to the Future: Proceeding Toward Disarmament?—Robert McNamara**

5:30-6:20 p.m., Kane Hall, Rm 220, University of Washington  
*Robert McNamara*, former Secretary of Defense 1961-1968 for the Kennedy and Johnson Administrations, and former President of both the World Bank and Ford Motor Company, speaks about the current state of arms control and the consequences for the future as part of the "International Law and Arms Control" spring lecture series.  
Information: (206) 543-6938, IGRSS/ISIS

**May 31**

**The US Nuclear Posture Review and Weapons Reductions Announcements: Where Do We Go From Here?—Robert McNamara**

7:30-8:20 p.m., Kane Hall, Rm 110, University of Washington  
*Robert McNamara*, former Secretary of Defense, provides his views on the current nuclear policy of the United States. The speech will be part of the World Affairs Council's Annual Lecture Series, "Arms Control Disarmament and the Proliferation of Weapons of Mass Destruction." The lecture will be the fourth of five lectures by expert veterans from the arms control community.  
Information: (206) 441-5910 World Affairs Council/IGRSS/ISIS

**June 5**

**Freight Security Issues & Trade Impacts in the Context of the September 11<sup>th</sup> Terrorist Attacks—Speakers To Be Announced**

2:30-6:00 p.m., Douglas Forum, Seafirst Executive Education Center  
The University of Washington presents a seminar on trade in the University District's Seafirst Building, near the University of Washington campus. Speakers and topics to be announced.  
Information: (206) 616-5778, Greg Shelton, GTTL

## Pacific Northwest National Laboratory

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