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# Report on the September 2011 Meeting of the Next Generation Safeguards Professional Network

ET Gitau  
JM Benz

December 2011



**Pacific Northwest**  
NATIONAL LABORATORY

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Pacific Northwest National Laboratory  
Richland, Washington 99352

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# 1. Introduction

In 2007, the Department of Energy (DOE) National Nuclear Security Administration (NNSA) identified several challenges and opportunities facing the international nuclear safeguards community in their report, “International Safeguards: Challenges and Opportunities for the 21<sup>st</sup> Century”. These challenges and opportunities focused on the current and future impact of expanding mission needs on international safeguards infrastructure, technologies, and human capital. A significant recommendation from the report was the need for DOE/NNSA to establish a new initiative to spawn renewed interests and development in these areas.

To foster this renewed interest and development, DOE/NNSA created the Next Generation Safeguards Initiative (NGSI) to strengthen and promote international nuclear safeguards. With the current expansion of nuclear energy programs across the globe, NGSI has a mission to ensure the safe, secure and peaceful development and operation of these facilities by utilizing domestic technical expertise and international cooperation to develop and promote the technologies and human capital necessary to detect and deter nuclear proliferation. To meet the challenges associated with the mission, NGSI has established the following program elements<sup>1</sup>:

1. **Policy and Outreach** – support IAEA safeguards policy and outreach by promoting universal adoption of safeguards agreements, supporting state-level safeguards evaluation and implementations, and by assessing
2. **Concepts and Approaches** – application of a system-level approach to safeguards and promotion of safeguards by design for newly developed nuclear fuel cycle facilities
3. **Technology Development** – development of technologies to address the efficient implementation of safeguards at declared facilities and the improved capability to detect undeclared facilities
4. **Human Resources** – the recruitment, training and retention of international safeguards professionals to replace capabilities lost due to retirement of current safeguards professionals
5. **Infrastructure Development** – development of the institutional capacities, human capital, and infrastructure necessary to apply efficient and effective safeguards to nuclear fuel cycle facilities worldwide

Taken together, efforts in these focus areas are not only poised to sustain United States (U.S.) leadership in safeguards policy and technology, but also to invigorate the international safeguards community to continue their commitment to the nonproliferation of nuclear weapons.

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<sup>1</sup> “NNSA Next Generation Safeguards Initiative,” National Nuclear Security Administration Fact Sheet, January 2009, available at: <http://nnsa.energy.gov/mediaroom/factsheets/nextgenerationsafeguards>.

## 2. Next Generation Safeguards Professional Network

Following the inception of NGSI, in 2009 staff at Oak Ridge National Laboratory (ORNL) saw a need for an organization targeted towards the growing number of young and mid-career staff entering the safeguards profession. With the majority of current safeguards experts expected to retire or leave the workforce in the next 10 years, ORNL began an effort to connect and develop young safeguards professionals across domestic and international organizations. This led to what is now known as the Next Generation Safeguards Professional Network (NGSPN).<sup>2</sup> Serving the next generation of safeguards policy and technology professionals, the NGSPN has the following goals and objectives<sup>3</sup>:

- provide a mechanism for young safeguards professionals to connect and foster professional and personal relationships;
- share information on events, developments, and opportunities of safeguards importance;
- provide a forum to cultivate collaborative research and development efforts between young and mid-career safeguards professionals;
- facilitate knowledge transfer and retention by visiting various relevant nuclear facilities and organizations, instilling awareness of facility capabilities and expertise while also providing hands-on experience; and
- act as a collective voice, representing the interests of the international community of young and mid-career safeguards professionals.

Membership in NGSPN is available at no cost to interested participants; however, individuals must have been employed full-time in nuclear safeguards for 5 years or less or be employed full-time in a safeguards-related field, with an interest in shifting their focus to nuclear safeguards related work. As a member, young and mid-career professionals have access to the NGSPN Members' Directory, receive invitations to participate in network events, forums, and discussions and gain access to the NGSPN newsletter.<sup>3</sup>

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<sup>2</sup> Laughter, MD and Zhernosek, AV, "Report on the Inaugural Meeting of the Next Generation Safeguards Professional Network – October 2009," Oak Ridge National Laboratory, April 2010.

<sup>3</sup> Zhernosek, AV; Lynch, PD; Scholz, MA, "The Next Generation Safeguards Professional Network: Progress and Next Steps," Proceedings of the 52<sup>nd</sup> Annual Meeting of the Institute of Nuclear Materials Management, Palm Desert, CA, July 2011.

### **3. Previous Meetings of the NGSPN**

The initial meeting of the NGSPN was held at ORNL in October 2009. With 22 participants in attendance, the meeting worked to: 1) establish the network, 2) lay the foundation for network objectives, goals, and the path forwards, and 3) to introduce attendees to safeguards capabilities at ORNL. At the conclusion of the meeting attendees voiced opinions asking for longer meetings that allow for focused discussion on issues facing the next generation of safeguards experts, increased facilitation of knowledge transfer from today's safeguards experts, and more facility exposure showing the real world application of safeguards. Participants agreed that the diversity of attendees (policy and technical backgrounds) was a strength that the network should capitalize on and support by allowing participants time to discuss their current safeguards-related work.

In September 2010, the second meeting of the NGSPN took place at Savannah River National Laboratory (SRNL). Expanding upon the foundation laid at the inaugural meeting, the second meeting was longer and the 17 attendees included previous and new attendees from national laboratories, commercial industries, and academia. Participants learned of SRNL safeguards capabilities and were exposed to multiple facilities related to the nuclear fuel cycle located in the region. Suggestions from participants attending this meeting included<sup>4</sup>:

- expansion of NGSPN membership beyond government organizations to the commercial nuclear industry and academia;
- improved use of the NGSPN website;
- formation of a steering committee to guide NGSPN growth and development;
- increased participation in larger professional societies such as the Institute of Nuclear Materials Management and the American Nuclear Society; and
- shifting from annual meetings to biannual meetings, utilizing existing mechanisms such as annual meetings of professional societies to increase the visibility of the organization.

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<sup>4</sup> Strohmeyer, DC and Sexton, LT, "Report on the Workshop for the Next Generation Safeguards Young Professional Network," Savannah River National Laboratory, December 2010.

## 4. Pacific Northwest National Laboratory Meeting of the NGSPN

The most recent meeting of the NGSPN was held at Pacific Northwest National Laboratory (PNNL) from September 20 – 23, 2011. Representing both policy and technical backgrounds, the 13 attendees came from laboratories across the DOE Complex and the NNSA. A list of attendees and the organizations they represented can be found in Appendix A.



Figure 1. Attendees of the NGSPN September 2011 Meeting at Pacific Northwest National Laboratory. (From left to right: John Schweighardt, Adrian Mendez-Torres, Richard Metcalf, Roberta Burbank, Jake Benz, Melissa Scholz, Eric Rauch, Travis Gitau, Matt Siegfried, Sara Kutchesfahani, Jay Disser, Emily Mace, Celia Reynolds, Ben McDonald)

One of the stated goals of the network is to facilitate knowledge transfer and retention from the current to next generation of safeguards professionals. The focus of the meeting at PNNL was to provide the opportunity for the participants to interact with resident world-renowned experts, and introduce them to the unique facilities and capabilities housed at PNNL. Due to the nature of PNNL's relationship with the Hanford site, the theme surrounding the meeting focused on the nuclear fuel cycle. The concepts introduced included uranium enrichment, plutonium production, and reprocessing and waste management. Under each concept, the goal was to provide an overview of the relevant technologies and signatures, and issues and concerns for both safeguards and international inspectors.

Additionally, incorporating comments from the previous meetings, substantial time was set aside to allow the participants to interact with each other, discuss questions and topics of interest, and foster relationships.

Over the three-and-a-half day long workshop, participants received a variety of presentations and tours that introduced attendees to each step of the nuclear fuel cycle and related safeguards technology and policy challenges. A copy of the workshop agenda can be found in Appendix B. During the workshop



participants also had the opportunity to visit several regional nuclear facilities that worked to provide a real world perspective on issues discussed in the lectures throughout the workshop. These included:

Columbia Generating Station – an operating 1150 MWe boiling water reactor located near Richland, WA where NGSPN participants toured the Control Room Simulator

Volpentest HAMMER Training Facility and Port of Entry – a facility dedicated to hazardous materials management and emergency response that trains visitors through a variety of demonstrations and exercises where NGSPN attendees received hands-on instruction and training on the interdiction of nuclear related equipment and materials potentially seen at border crossings and ports of entry across the world

Hanford's B Reactor – the world's first large-scale nuclear reactor used to produce plutonium, built as part of the Manhattan Project in the 1940s



Figure 2. Participants during tour of the Pretreatment Engineering Platform.

Pretreatment Engineering Platform (PEP) – a quarter-scale demonstration facility of waste ultrafiltration and leaching pretreatment processes where participants learned of the initial processes involved in the reprocessing of used nuclear fuel and the challenges associated with safeguarding such a facility



Figure 3. Meeting attendees at the front face of Hanford's B Reactor.

## 5. Results of the September 2011 Meeting

Gaining from lessons learned from previous NGSPN meetings, the PNNL meeting of the NGSPN was able to better capitalize on the time available to discuss a wide array of issues and challenges of importance to young professionals face in the safeguards community. Among these were the development of the State-Level Approach to safeguards, international adoption and implementation of the Additional Protocol, collaboration between young professionals across the DOE Complex, and experiences with current practices in the proposal process. Also discussed was the current state of the network and necessary steps to strengthen the mission and increase participation. In addition to comments and suggestions made during workshop, an evaluation was sent to attendees to gain further insight on the value and effectiveness of the workshop.

Overall, attendees felt the majority of presentations and tours received during the workshop were of good quality and beneficial to the participants. A complete breakdown of evaluation results can be found in Appendix C.

The lowest rated elements of the workshop were the “Overview of Graphite Reactors and Plutonium Production” and the pre-tour presentation on the Pretreatment Engineering Platform (PEP). Comments behind these low ratings revealed that for the length and timing (over lunch) of the graphite reactors presentation made for a presentation that at times wavered from its intended purpose. Some participants felt that the pre-tour presentation for PEP while informative on the technical and operating characteristics of the facility was too long and did not focus enough on the safeguards relevance of the equipment.



Figure 4. Participants receiving instruction and first-hand experience with radiation detection and identification equipment commonly used at ports of entry and border crossings.

The highest rated components of the workshop were the tour of Hanford’s B Reactor, the Case Briefings on Iraq, South Africa, and DPRK, and the activities at the Volpentest HAMMER Facility. While highly rated, the comments on the case briefings were split. Some participants felt that hearing the old “war stories” of these case and their beginnings was the execution of the knowledge transfer and education that is key to the success of the next generation of safeguards experts. However, similar to comments made at previous workshops, participants were interested in receiving more detailed case briefings on the events of significance that led to these cases.

Participants felt that the activities at HAMMER were a great complement to the focus of the workshop. While not directly safeguards related, interdiction of the illicit trade of sensitive nuclear material and equipment is key to preventing the spread of nuclear weapons. The table top activities at HAMMER allowed participants to be hands on with many of these materials and equipment, helping attendees understanding the challenges and difficulty associated with the interdict mission. Addressing the vehicle inspection activity at the Point of Entry, some participants suggested that the exercise be performed using actual plutonium and uranium sources available at the facility, in addition to commonly used source material such as lantern mantles and ore. Furthermore, several participants commented that the exercise be performed initially with the sources in typical containers in the vehicle, then the exercise should be



repeated with the material shielded in manners similar to that of an adversary to demonstrate the difficulty of interdiction. Most participants also commented that they would have appreciated more time at HAMMER to interact with experts, displays, and equipment at the facility.

Additional comments from attendees suggested that the policy element of nuclear safeguards play a larger role in future meetings. While attendees were largely from a technical background, many suggested they would have benefitted from presentations that focused on issues such as the legal framework behind safeguards, safeguards infrastructure, and the safeguards-related treaties agreements by which the international community is bound. Lastly, participants also suggested that in future workshops time be given for attendees to present and discuss their backgrounds and research. This better utilizes NGSPN meetings as a mechanism to increase collaboration across the DOE Complex and between young safeguards professionals.



Figure 5. Attendees inside the Surface-to-Air Missile Bay located at HAMMER.

## **6. Future Network Plans**

Attendees of the meeting also discussed ideas for future events of NGSPN. Discussion revolved around two concepts: an event to be held during the INMM 53<sup>rd</sup> Annual Meeting from July 15-19, 2012 in Orlando, FL and a future network workshop that would be held in Washington, D.C.

The 2012 INMM event was conceptualized to be a forum or poster session after traditional technical sessions that would serve the needs of NGSPN members, and not the larger safeguards community. The event would focus on network members providing brief presentations on their background and current research. This will serve to develop collaborative research efforts and help acquaint attendees with the many members of the network. An event at INMM would also work to engage individuals, many from foreign countries, who may not have the means to attend other NGSPN events.

A Washington, D.C. meeting of the NGSPN would have the purpose of familiarizing the commonly new, young individuals entering the safeguards profession with the various organizations that often fund and direct the policy and technology research that young safeguards professionals are involved in. This includes not just government elements like DOE/NNSA, the Department of State, and the Department of Homeland Security, but also the wide multitude of non-governmental organizations (NGOs) that often work on parallel efforts. Key themes attendees want addressed at such a meeting are the funding mechanisms available for safeguards-related research and development, thought processes behind the direction of programs, and familiarization of Washington, D.C.-based leaders with current research engaging young safeguards professionals.

## 7. Final Recommendations

Throughout the workshop and through the evaluations, participants of the September 2011 Meeting of the NGSPN discussed the future of the network and the necessary next steps to ensure the success of future meetings. These include:

- Increased representation of the policy element of nuclear safeguards in future workshops and meetings at host sites
- Further development of a clear, organized leadership structure for the network focusing national-level coordination with a dedicated steering committee and regional- and local-level coordination driven by leaders at each site
- Greater advanced planning and advertisement of network events to allow greater utilization of time at sites to learn of capabilities and allow for the opportunity of increased attendance of veteran and new members
- Expansion of network diversity and participation to include not just national laboratories in the DOE Complex, but also private companies, academia, and other government agencies with a vested interest in nonproliferation including the Nuclear Regulatory Commission, the Department of Homeland Security, and the Department of State
- Better functionality and increased utilization of the NGSPN wikispace currently located at <http://ngspn.wikispaces.com>. The website should work to provide a central location where members and interested participants can locate information on network news, events, and leadership

The meeting at PNNL successfully achieved the stated goals and objectives set established for the network by providing a forum and mechanism to discuss areas of interest for young safeguards professionals, foster relationships that will continue to develop as the participants progress through their careers, and begin to provide the information necessary for them to become the next generation of experts. The recommendations of the group establish a goal which will continue to expand the voice and influence of the group in the coming years. If successfully implemented, the network will become a forum to broaden and represent the interests of the international community of young and mid-career safeguards professionals.

## Appendix A: Attendee List

Attendee	Organization
Jake Benz	Pacific Northwest National Laboratory
James Jay Disser	Brookhaven National Laboratory
Travis Gitau	Pacific Northwest National Laboratory
Sara Kutchesfahani	Los Alamos National Laboratory
Emily Mace	Pacific Northwest National Laboratory
Benjamin McDonald	Pacific Northwest National Laboratory
Adrian Mendez-Torres	Savannah River National Laboratory
Richard Metcalf	Idaho National Laboratory
Eric Rauch	Los Alamos National Laboratory
Celia Reynolds	Lawrence Livermore National Laboratory
Melissa Scholz	National Nuclear Security Administration
John Schweighardt	Pacific Northwest National Laboratory
Matthew Siegfried	Savannah River National Laboratory

## Appendix B: Workshop Agenda

<b>Tuesday, September 20<sup>th</sup></b>	<b>1 Poor</b>	<b>2 Fair</b>	<b>3 Good</b>	<b>4 Above Average</b>	<b>5 Excellent</b>
Energy Northwest Columbia Generating Station	0%	0%	33%	67%	0%
Fuel Cycle 101	0%	0%	33%	33%	33%
Reactors 101	0%	0%	33%	22%	44%
Reactor Safeguards and Inspection Issues	0%	11%	22%	56%	11%
<b>Wednesday, September 21<sup>st</sup></b>					
HAMMER	0%	0%	22%	33%	44%
Overview of Graphite Reactors and Plutonium Production	0%	22%	22%	22%	33%
B Reactor	0%	0%	0%	13%	88%
<b>Thursday, September 22<sup>nd</sup></b>					
Reprocessing Technology and Signatures	0%	11%	11%	44%	33%
Reprocessing Inspections Issues and Concerns	0%	22%	22%	44%	11%
U Enrichment Technology and Safeguards Issues	0%	11%	22%	44%	22%
U Enrichment Inspection Issues	0%	0%	22%	67%	11%
<b>Friday, September 23<sup>rd</sup></b>					
Pretreatment Engineering Platform (presentations)	0%	25%	25%	50%	0%
Pretreatment Engineering Platform (tour)	0%	0%	38%	38%	25%
Case Briefings on Iraq, South Africa, and DPRK	0%	0%	13%	25%	63%
<b>Overall Average Ratings</b>	0%	7%	23%	40%	30%

## Appendix C: Attendee Biographies

Jake Benz

Pacific Northwest National Laboratory

Radiological Science and Engineering

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Jacob Benz is currently employed as a staff engineer at Pacific Northwest National Laboratory. He has been at his current position since 2008. Since that time he has been engaged in a number of projects in the areas of both arms control and safeguards. In the former, Jacob's projects involve implementation and verification of current and future arms control treaties; including the bilateral Plutonium Management and Disposition Agreement, and collaboration with the United Kingdom on technologies for use in future multilateral arms reduction treaties. In safeguards, Jacob's work currently includes human capital development and university outreach. He is actively engaged in introducing safeguards to the next generation professionals, and providing opportunities for further education for those young professionals both at PNNL and university. He received his BS in nuclear engineering from Oregon State University in 2005, and his MS in nuclear engineering from Oregon State University in 2008.

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James Jay Disser

Brookhaven National Laboratory

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International Safeguards Project Office

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As a project engineer in the International Safeguards Project Office at Brookhaven National Laboratory, Jay Disser helps manage the United States Support Program contribution to the International Atomic Energy Agency's Department of Safeguards. He is responsible for making technical and funding recommendations to the US Government on safeguards projects requested by the IAEA. Jay then manages the progress of these ongoing tasks in the national laboratories and with government contractors. Projects include training for IAEA inspectors, equipment development for safeguards applications, and recruiting Americans to work at the Agency.

Prior to joining Brookhaven Jay worked was a licensed operator of the nuclear reactors aboard naval aircraft carriers at Newport News Shipbuilding. Here he led the operation and testing of all nuclear power-generating equipment. This included the nuclear reactors on ships under various stages of construction and refueling.

Jay obtained a Bachelors of Science in Mechanical Engineering from the University of Central Florida and is currently taking graduate classes in the nuclear engineering program at Pennsylvania State University. Jay is a fellow of the World Nuclear University where he completed a six week long intensive leadership development program for future leaders in the nuclear industry. Jay is Vice President of his local American Nuclear Society Chapter and has been a member of the INMM since 2010.



E. Travis Gitau  
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Travis Gitau started as an engineer at Pacific Northwest National Laboratory (PNNL) in September 2011. Having recently completed his M.S. in nuclear engineering at Texas A&M University, Travis has gained experience in nonproliferation and safeguards through several internships at PNNL. In his time at PNNL he has had the opportunity to work on projects related to radioactive source development, export controls, antineutrino detector development, and reliability of fuel services. His most recent experience comes from his graduate work where he developed and evaluated a new safeguards system concept for a pebble-fueled high temperature gas-cooled reactor.

Since his hiring at PNNL, Travis has been engaged in wide multitude of projects focused in nonproliferation and safeguards. These include human capital development, Additional Protocol implementation, export controls, and radiation portal monitoring. His career interests lie in proliferation risk assessment, at the state and facility levels, as well as safeguards approaches and concepts. As a fairly new member of safeguards workforce Travis looks forward to continued engagement with young safeguards professionals supporting the field today and shaping the future of international safeguards.

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Sara Z. Kutchesfahani  
Los Alamos National Laboratory  
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Sara Kutchesfahani has worked in the area of nonproliferation for the past seven years, most recently as a post-doctoral researcher at Los Alamos National Laboratory (LANL). Before joining LANL in January 2011, Sara completed her PhD in Political Science in November 2010 from University College London. Her thesis explored the role of epistemic communities – groups of experts knowledgeable in niche issue areas – in nuclear nonproliferation outcomes. While a PhD student, Sara was a Teaching Fellow for an undergraduate course on International Security. She also previously worked at the International Institute for Strategic Studies in London as a research assistant for Dr. Gary Samore, at the European Union Institute for Security Studies, at LANL (as a Nuclear Nonproliferation Science Fellow), and more recently at the RAND Corporation in Washington, D.C.

At LANL, Sara supports a number of nonproliferation policy projects, including research in the IAEA's Additional Protocol, the role of special inspections, and contributing to the teaching in the Nonproliferation Division's Safeguards Policy and Technology Summer Workshop.

Emily K. Mace  
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Emily Mace is currently a Scientist II at Pacific Northwest National Laboratory (PNNL). She received her M.S. in Physics from Purdue University in August 2006. She received her B.S. in Engineering Physics from Northwest Nazarene University in June 2004. As a scientist at PNNL, she has spent 3 years working on the UF<sub>6</sub> Cylinder Verification project using non-destructive assay (NDA) techniques to verify <sup>235</sup>U mass. Two goals of the project are to design a system capable of verifying 100% of UF<sub>6</sub> cylinders present at a given enrichment facility and capable of performing full volume assays on each cylinder.

Emily has worked on a variety of projects in the National Security Directorate. These projects include radiation portal monitoring at border crossings and ports of entry, characterizing ultra-low-background proportional counters, mitigating skyshine interference, portal/handheld/pager detector characterization, testing, and evaluation, and various forms of data acquisition and analysis. She is also the delegate Cognizant Space Manager for 2 lab spaces at PNNL. Earlier in her career, Emily worked as a scientist performing research on neutron induced gamma-ray spectroscopy systems: the first system was for a vehicle-borne improvised explosive device (VBIED) application to detect explosives in vehicles, and the second system was to detect chemical warfare agents in hermetically sealed containers for homeland security airport luggage screening applications.

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Benjamin McDonald is a staff scientist at Pacific Northwest National Laboratory (PNNL). In 2004 he completed his undergraduate degree in applied physics and computer science at Whitworth University. In 2003 and 2004, Benjamin interned at PNNL where he contributed to several software development and Monte Carlo radiation transport projects. These summers working in the applied radiation detection field shaped his interests and led him to pursue a PhD at Vanderbilt University. While at Vanderbilt, Benjamin completed his PhD thesis, which involved building a small-animal gamma-ray imaging system. After completing his degree, he was hired at PNNL and since has contributed to several safeguards, arms control, and detector development projects including low-intrusion imaging algorithms for warhead counting, development of x-ray imaging systems, and the UF<sub>6</sub> cylinder hybrid enrichment assay method. Ben is excited to be working on projects in the national interest that may reduce nuclear dangers and better enable peaceful use of nuclear technology. One of his aims is to develop a tool or method that will find use by the IAEA or as part of a treaty verification regime.

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Dr. Mendez-Torres is a senior research engineer in Science & Technology at Savannah River National Laboratory (SRNL). He initially joined SRNL as a DOE-National Nuclear Security Administration NGS (Next Generation Safeguards Initiative) Fellow in 2009 and became a member of the permanent research staff in 2010. A nuclear fuel cycle expert by training, his research is focused on the development of facility-specific safeguards approaches relying on process monitoring and verification where possible and on advanced sensor materials for safeguards application in the back-end of the fuel cycle.

Dr. Méndez Torres research areas include development of sensors materials and non-destructive analysis (NDA) techniques for the direct quantification of fissionable material. Dr. Méndez receives his BS in physics (1998), Master in engineering management (2001) and Ph.D. in nuclear engineering and certificate in nonproliferation from the University of Missouri (2008). His research experience includes modification and characterization of wide bandgap materials,  $Sp^3$  carbons and semi-conductive nanoparticles for unique environments. Dr. Méndez Torres possesses over 5 years of experience in non-destructive evaluation, microscopy, and spectroscopy techniques including UV-VIS, FTIR and Raman. His current research areas include study and development of radiation tolerant sensors, concepts for nuclear proliferation risk reduction, multifunctional coatings for detection and verification, nano-fluidics platform for speciation and quantification of SNM materials in aqueous solutions, and mid- and long term storage of UNF and MOX. Dr. Mendez has also participated in several multidisciplinary research projects were technology-meet-with-policy including technology and SNM materials assessment under different programs suchy as GTRI, PDMA, and AP. Dr. Méndez Torres is currently an Adjunct Professor at the University of South Carolina where he collaborated in areas of biological sensor development, quantum dots, PWAS, materials for harsh environment, biocompatible materials for drug delivery systems (DDS) and cancer treatment.

Dr. Méndez Torres has a growing interest in safeguards and nonproliferation with emphasis in educational component at undergraduate and graduate levels. Areas of attention include the impact of technological advancements in policies in an international framework (Latin America, South America and Spanish speaking countries). He has additional interests in treaty verification policy and technologies (FMCT, PMDA, an AP) and safeguard ability of processes at the back-end of the nuclear fuel cycle (INFCIRC/153).

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Dr. Richard Metcalf is a safeguards engineer at the Idaho National Laboratory's Nuclear Nonproliferation Division. He recently was granted his nuclear engineering degree at Texas A&M University, while concurrently working full time at the INL in nonproliferation technology and methods development with four years of relevant experience.

Richard's recent work has been in all aspects of nuclear reprocessing and bulk handling facilities with a focus in small scale aqueous facilities and all scale electrometallurgical refinement. Historically he has studied process monitoring methods, safety, and systems engineering for quantitative safeguards conclusions while maximizing facility throughput for commercial application. Through this research Dr. Metcalf has submitted three invention disclosure records (for patent) with several co-inventors. Aligned with his historical focus, Richard seeks projects that allow for greater integration of safeguards systems with commercial requirements for application in bulk handling facilities, including safeguards by design and post-build operation optimization methods.

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Eric Rauch is currently a R&D Engineer at Los Alamos National Laboratory (LANL). Eric has spent the last five years performing research in nonproliferation and safeguards, most recently as a member of the team responsible for upgrading the security and safeguards of nuclear materials at a CAT I nuclear facility located at LANL. He has previously contributed to projects to design, develop, and test a neutron counter for uranyl nitrate, as well as, being a member of the NGSF spent fuel measurement program. As he continues to gain experience in safeguards Eric would like to get into more policy related fields of work. Additionally, he would like to remain involved in detector development, creating new tools to address problems differently than they have been before.



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Celia Reynolds is a nonproliferation analyst at Lawrence Livermore National Laboratory (LLNL) with the Nonproliferation, International Security, and Safeguards group in the Global Security Directorate's E Program. She joined LLNL's staff in June 2011 after receiving her M.A. in Political Science from the University of California, Irvine and is currently contributing to several projects funded by DOE/NNSA's Next Generation Safeguards Initiative. One focuses on studying the conceptual framework and exploring candidate methodologies for the IAEA's state-level concept in support of the IAEA's continuing efforts to strengthen international safeguards as it evolves into a more fully information driven system. She is also assisting with the planning and development of the 2012 International Nuclear Safeguards Policy and Information Analysis Course that LLNL and the James Martin Center for Nonproliferation Studies (CNS) at the Monterey Institute of International Studies (MIIS) will co-host.

Formerly, Celia worked as an imagery analyst with the National Geospatial-Intelligence Agency (NGA) in Washington, DC where she focused on nonproliferation issues in the Middle East. Her formal introduction to international safeguards occurred when she attended the LLNL-CNS International Safeguards Policy and Information Analysis course and worked as an LLNL NGSI policy intern in the summer of 2010. During her internship, she worked on case studies of how the IAEA has handled the investigation and reporting of noncompliance. Her project took a cross cutting look at these cases and examined how the IAEA Board of Governors' deliberations and rulings were influenced by the relative significance of the violations involved, by the way in which issues were framed for the Board in reports from the Director General, political division in the Board, and external events. The study traced linguistic and interpretative changes within the IAEA's official reporting of its deliberations to better understand how the IAEA's noncompliance ruling process has evolved since the early 1990s.

In the future, Celia plans to continue developing her international safeguards policy subject matter expertise, especially in areas where this policy intersects with broader US government nonproliferation goals. She is particularly interested in learning more about the legal and interpretative aspects of international safeguards policy, as well as the challenges that arise in conceptualizing and implementing this policy.

John R. Schweighardt  
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John Schweighardt is a Research Analyst in the Applied Statistics and Computational Modeling Group at the Pacific Northwest National Laboratory with three years of experience in project work related to IAEA Safeguards.

John has conducted project work supporting NA-243's efforts to expand the usage of IAEA Safeguards. From 2007-2008, John worked on a variety of IAEA safeguards related projects researching nuclear knowledge management, environmental sampling, and the relationship between the government and the nuclear industry in The People's Republic of China. John has supported several NA-24 programs that examined export controls in Asia, as well as, medical isotopic production and related proliferation issues. His current work is analytical in nature and focuses on information analysis and open source analysis to support a diverse group of projects in the fields of insider threat, ontological development, and state level cultural assessments that support analytical endeavors.

In the future, John would like to expand his skill sets pertaining to intelligence, information, and open source based analysis. In addition, he wants to continue to expand his knowledge in structured analytical techniques to be used in nonproliferation, cyber, and threat assessment based projects. The diversity of project work at PNNL makes it an ideal location for him to accomplish his individual goals.



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Dr. Matthew J. Siegfried is a Senior Scientist in the Nonproliferation Technology Section at the Savannah River National Laboratory. He received his Ph.D. from Purdue University in 2007 where he worked to develop an understanding of the shape guiding processes in electrodeposition/electrocrystallization in order to enhance the efficiency of photovoltaic materials.

Since joining Savannah River National Laboratory in 2007, Dr. Siegfried's research has focused primarily on nanotechnology and aerosol science. He currently manages a number of projects to design, build, and test particle collectors utilizing electrostatic precipitation to concentrate and collect airborne particulates.

