

**50th Annual Meeting of the  
Institute of Nuclear Materials  
Management 2009**

**INMM 50th Annual Meeting**

**Tucson, Arizona, USA  
12-16 July 2009**

**Volume 1 of 5**

**ISBN: 978-1-61567-742-9**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2009) by the Institute of Nuclear Materials Management  
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact the Institute of Nuclear Materials Management  
at the address below.

Institute of Nuclear Materials Management  
111 Deer Lake Road, Suite 100  
Deerfield, IL 60015

Phone: (847) 480-9573

Fax: (847) 480-9282

[www.inmm.org](http://www.inmm.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

Volume 1

## **CONCURRENT TECHNICAL SESSIONS I**

### **SESSION A INTERNATIONAL SAFEGUARDS: THE NEXT STEPS IN INTERNATIONAL SAFEGUARDS I**

<b>THE NEW NEXUS, 3SS: SAFEGUARDS, SAFETY, SECURITY, AND 3S-BASED INFRASTRUCTURE DEVELOPMENT FOR THE PEACEFUL USES OF NUCLEAR ENERGY</b> .....	1
<i>T. Arai, K. Naito</i>	
<b>NEW VERIFICATION CHALLENGES</b> .....	10
<i>J. Carlson</i>	
<b>MOVING TOWARD MULTILATERAL MECHANISMS FOR THE FUEL CYCLE</b> .....	21
<i>A. Panasyuk, G. V. Efremov, M. D. Rosenthal</i>	
<b>THE EURATOM REGIONAL SAFEGUARDS SYSTEM: AN INTERNATIONAL PERSPECTIVE</b> .....	30
<i>S. Tsalas, R. Clarke</i>	
<b>IMPROVING THE SAFEGUARD ABILITY OF NUCLEAR FACILITIES</b> .....	36
<i>T. Bjornard, M. Schanfein, D. Hebditch, R. Bari, P. Peterson</i>	

### **SESSION B INTERNATIONAL SAFEGUARDS: MOX – WHAT DOES THE FUTURE HOLD? I**

<b>POTENTIAL PU UTILISATION IN FUTURE UK PWRS</b> .....	49
<i>A. Worrall</i>	
<b>COOPERATION BETWEEN THE IAEA AND EURATOM SAFEGUARDS IN THE DEVELOPMENT AND IMPLEMENTATION OF A SAFEGUARDS APPROACH FOR THE EXPORT OF FABRICATED MOX FUEL FROM FRANCE TO JAPAN</b> .....	59
<i>W. Koehne, A. Terrasi, P. Dossogne, J. C. Saglini, A. Thomas</i>	
<b>CAN WE CONTROL WHAT WE CAN'T COUNT? THE CHALLENGES INVOLVED IN SAFEGUARDING CLOSED FUEL CYCLES WHICH INCLUDE ELECTRO-PROCESSING</b> .....	67
<i>R. Leslie, J. Carlson</i>	
<b>DEVELOPMENT OF INTEGRATED SAFEGUARDS APPROACH FOR JNC-1 SITE FROM THE OPERATOR'S VIEWPOINT</b> .....	74
<i>T. Asano, S. Fujiwara, S. Takahashi, T. Nagatani, J. Fukuhara, Y. Kodani, T. Kimura, Y. Miura</i>	
<b>OPERATOR'S EXPERIENCE ON RANDOM INTERIM INSPECTION FOR MOX FUEL PLANT AT JNC-1 SITE</b> .....	84
<i>T. Nagatani, T. Asano, S. Fujiwara, S. Takahashi</i>	
<b>OPERATOR'S EXPERIENCE ON RANDOM INSPECTION FOR REPROCESSING PLANT AT JNC-1 SITE</b> .....	94
<i>K. Ishiyama, Y. Miura, T. Kimura, T. Hina, Y. Kodani, J. Fukuhara, K. Yamaguchi, A. Ikeda, T. Kabuki</i>	

### **SESSION C INTERNATIONAL SAFEGUARDS: STATE LEVEL AND INTEGRATED SAFEGUARDS**

<b>DEPARTMENT OF ENERGY EFFORTS TO PROMOTE UNIVERSAL ADHERENCE TO THE IAEA ADDITIONAL PROTOCOL</b> .....	103
<i>M. H. Killinger, L. H. Hansen, D. N. Kovacic, M. C. Van-Sickle</i>	
<b>NGSI STUDENT ACTIVITIES IN OPEN SOURCE INFORMATION ANALYSIS IN SUPPORT OF THE TRAINING PROGRAM OF THE U.S. DOE LABORATORIES FOR THE ENTRY INTO FORCE OF THE ADDITIONAL PROTOCOL</b> .....	109
<i>M. A. Sandoval, E. Uribe, M. N. Sandoval, B. D. Boyer, R. Stevens</i>	
<b>IMPLEMENTING A STATE-LEVEL INTEGRATED SAFEGUARDS APPROACH IN CANADA</b> .....	119
<i>K. Owen, M. Kent, A. Parsons</i>	
<b>TRANSITION TO INTEGRATED SAFEGUARDS AT NUCLEAR FUEL FABRICATION PLANTS</b> .....	127
<i>Z. Starovich, J. Araujo, D. Hurt, J. W. R. Lepingwell, M. S. Pellechi, P. Titov, A. Tolba</i>	

### **SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: ACCOUNTING SYSTEMS**

<b>MAIN APPROACHES TO ORGANIZATION OF ASSESSMENT OF NUCLEAR MATERIALS CONTROL AND ACCOUNTING STATUS ON THE SITE</b> .....	136
<i>V. Y. Chukov, G. V. Lavrentieva, S. E. Shmelyov, F. S. Podolsk</i>	
<b>SUPPORT OF NEW COMPUTER HARDWARE AT LUCH'S MC&amp;A SYSTEM: PROBLEMS AND A SOLUTION</b> .....	141
<i>V. Fedoseev, O. Shanin</i>	
<b>NEW AUTOMATED INVENTORY/MATERIAL ACCOUNTING SYSTEM (AIMAS) VERSION FOR FORMER SOVIET UNION COUNTRIES*</b> .....	147
<i>T. Ewing, I. Sakunov, S. Drapey, J. Kuzminski, J. Nations</i>	

<b>AUSTRALIAN EXPERIENCE IN USING THE FILEMAKER RELATIONAL DATABASE MANAGEMENT SYSTEM COUPLED WITH OPEN SOURCE ACTIVESTATE PERL MODULES FOR ADVANCED NUCLEAR MATERIAL ACCOUNTANCY AND CONTROL REPORTING REQUIREMENTS</b> .....	155
<i>M. Bridson</i>	
<b>SAFETY SOFTWARE AND NUCLEAR MATERIAL ACCOUNTABILITY SYSTEMS</b> .....	165
<i>J. A. Seneker, A. J. Jackson</i>	

### **SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: NEUTRON MEASUREMENT METHODS I**

<b>SIMULATIONS AND MEASUREMENTS OF PLUTONIUM-OXIDE POWDER STANDARDS</b> .....	175
<i>S. D. Clarke, S. A. Pozzi, M. Flaska, P. Peerani</i>	
<b>CHARACTERIZATION OF CERIUM FLUORIDE NANOCOMPOSITE SCINTILLATORS</b> .....	185
<i>S. Strange, E. I. Esch, L. O. Brown, A. J. Couture, R. E. Del-Sesto, R. D. Gilbertson, T. M. McCleskey, E. A. McKigney, R. E. Muenchausen, R. Reifarh</i>	
<b>PROMPT NEUTRON DECAY CONSTANT FROM FEYNMAN VARIANCE FITTING</b> .....	194
<i>S. McConchie, P. Hausladen, J. Mihalcz</i>	
<b>REPLACING A <sup>252</sup>CF SOURCE WITH A NEUTRON GENERATOR IN A SHUFFLER - A CONCEPTUAL DESIGN PERFORMED WITH MCNPX</b> .....	204
<i>M. A. Shear, S. J. Tobin</i>	
<b>SAMPLE CHARACTERIZATION USING BOTH NEUTRON AND GAMMA MULTIPLICITIES</b> .....	214
<i>A. Enqvist, S. Avdic, I. Pazsit</i>	

### **SESSION F NONPROLIFERATION AND ARMS CONTROL: SNM DETECTION TECHNOLOGIES**

<b>DIRECTION SENSITIVE NEUTRON DETECTORS USING BORON LOADED SEMICONDUCTORS?</b> .....	224
<i>G. Spence, G. Ford, R. Vanderplas, W. Charlton</i>	
<b>DIRECTIONAL DETECTION OF FAST NEUTRONS USING A TIME PROJECTION CHAMBER</b> .....	232
<i>N. S. Bowden, M. Heffner, G. Carosi, D. Carter, M. Foxe, I. Jovanovic</i>	
<b>MEASUREMENT OF <sup>238</sup>U MUONIC X RAYS WITH A GERMANIUM DETECTOR SETUP</b> .....	238
<i>E. I. Esch, N. J. Hoteling, A. Adelman, R. H. Heffner, A. Jason, L. Mitchell, H. Miyadera, T. J. Stocki</i>	
<b>SNM DETECTION WITH A LARGE WATER CERENKOV DETECTOR</b> .....	248
<i>S. Dazeley, A. Bernstein, N. S. Bowden, S. Ouedraogo, R. Svoboda, M. Sweany</i>	
<b>BATCH MODE DATA ANALYSIS AT ORNL FOR RADIATION PORTAL MONITORING</b> .....	256
<i>R. J. Livesay, C. S. Blessinger, J. M. Crye, S. Alcalá, T. W. Adkins</i>	

### **SESSION G NONPROLIFERATION AND ARMS CONTROL: DPRK VERIFIABLE DISMANTLEMENT**

<b>VERIFYING NORTH KOREA'S NUCLEAR PROGRAMME: TECHNICAL OPTIONS AND POLICY CHOICES</b> .....	266
<i>J. M. Acton</i>	
<b>DECOMMISSIONING THE NORTH KOREAN NUCLEAR FACILITIES: APPROACHES AND COSTS</b> .....	276
<i>H. Zhang</i>	
<b>MOTIVATIONS BEHIND NUCLEAR WEAPONS PROGRAMS: THE NORTH KOREAN CASE</b> .....	284
<i>N. V. Saraeva</i>	
<b>HOW TO APPLY A COOPERATIVE THREAT REDUCTION PROGRAM TO NORTH KOREA?</b> .....	294
<i>K. K. Choe</i>	

### **SESSION H MATERIALS CONTROL AND ACCOUNTABILITY/WASTE MANAGEMENT: WASTE MEASUREMENTS**

<b>NEUTRON MULTIPLICATION ERROR IN TRU WASTE MEASUREMENTS</b> .....	304
<i>S. Stanfield, J. Veilleux, R. Ceo, J. Wachter</i>	
<b>WIPP CERTIFICATION AND ROUTINE WASTE MEASUREMENTS PERFORMED ON THE LARGE BOX ASSAY SYSTEM AT THE SAVANNAH RIVER SITE</b> .....	313
<i>R. Ceo, D. Remington, T. Shepley, B. Templeton</i>	
<b>IMPROVED PU ASSAY USING A NOVEL MONOCHROMATIC WAVELENGTH DISPERSIVE X-RAY FLUORESCENCE INSTRUMENT</b> .....	321
<i>G. J. Havrilla, M. Collins, V. Montoya, Z. Chen, F. Wei</i>	
<b>DETECTION LIMITS FOR ACTINIDES IN A MONOCHROMATIC, WAVELENGTH-DISPERSIVE X-RAY FLUORESCENCE INSTRUMENT</b> .....	330
<i>M. L. Collins, G. J. Havrilla</i>	
<b>DESIGN AND OPERATION OF A GAMMA RAY DETECTOR SYSTEM FOR CONFIRMATORY MEASUREMENTS OF LARGE BOXES AND OBJECTS</b> .....	341
<i>J. A. Mason, R. A. Price, E. R. Martin, T. P. Donohoue, M. Rhodes</i>	

## **CONCURRENT TECHNICAL SESSIONS II**

### **SESSION A INTERNATIONAL SAFEGUARDS: SAFEGUARDS IN JAPAN: ACHIEVEMENTS AND CHALLENGES**

<b>JAPAN'S EFFORTS TOWARD ACHIEVING EFFECTIVE AND EFFICIENT IAEA SAFEGUARDS</b> .....	350
<i>K. Naito</i>	
<b>US-JAPAN COOPERATION ON SAFEGUARDS</b> .....	358
<i>D. H. Beddingfield, H. O. Menlove, M. Hori, Y. Kawakubo, J. McClelland-Kerr</i>	
<b>THE J-MOX PROJECT: MEETING THE CHALLENGES OF SAFEGUARDING A COMMERCIAL MOX FUEL FABRICATION PLANT</b> .....	368
<i>T. Renis, A. Alessandrello, C. Creusot, C. Liguori</i>	
<b>JAEA'S EFFORTS FOR SAFEGUARDS TECHNOLOGY DEVELOPMENT</b> .....	377
<i>M. Senzaki, N. Inoue, Y. Kuno</i>	
<b>SAFEGUARDS IMPLEMENTATION AT ROKKASHO NUCLEAR FUEL CYCLE FACILITIES</b> .....	387
<i>S. Uehara, K. Fujimaki, T. Sanpei, R. Mura</i>	
<b>PROGRESS REPORT ON DEVELOPING JAPANESE SAFEGUARDS "HUMAN CAPITAL DEVELOPMENT PLAN" AND "TECHNOLOGY DEVELOPMENT STRATEGY"</b> .....	396
<i>N. Muroya, Y. Aono</i>	
<b>ADVANCED SAFEGUARDS AND PROLIFERATION RESISTANCE OF THE FUTURE NUCLEAR FUEL CYCLE SYSTEMS</b> .....	405
<i>Y. Kuno, N. Inoue, M. Senzaki</i>	
<b>SAFEGUARDS BY DESIGN - CONCEPT, IMPLEMENTATION AND FUTURE DEVELOPMENTS</b> .....	415
<i>J. N. Cooley, E. Hass, T. Killeen, B. Moran</i>	
<b>FUTURE CHALLENGES AND DOE/NNSA-JAEA COOPERATION FOR THE DEVELOPMENT OF ADVANCED SAFEGUARDS</b> .....	422
<i>J. McClelland-Kerr, R. Stevens, M. Senzaki, M. Hori</i>	

### **SESSION B INTERNATIONAL SAFEGUARDS: SAFEGUARDS INFORMATION: SATELLITE IMAGERY AND ENVIRONMENTAL SAMPLING**

<b>CYBER SECURITY AND RESILIENT SYSTEMS</b> .....	430
<i>R. S. Anderson</i>	
<b>INTRINSIC CODE VERIFICATION</b> .....	440
<i>T. Ross</i>	
<b>ANALYSIS OF HIGH-RESOLUTION SAR FOR NUCLEAR SAFEGUARDS</b> .....	449
<i>Q. S. B. Truong, G. Parsons, J. Mulvie, P. J. Alasset</i>	
<b>NUCLEAR SAFEGUARDS MONITORING WITH SPACEBORNE SAR</b> .....	458
<i>G. Staples, Q. S. B. Truong</i>	
<b>SUPPLEMENTING HIGH-RESOLUTION SATELLITE IMAGERY WITH LOWER RESOLUTION MULTISPECTRAL AND RADAR IMAGERY FOR SAFEGUARDS APPLICATIONS</b> .....	468
<i>Q. S. B. Truong, J. B. Lim, G. A. Borstad</i>	
<b>ENHANCING THE SAFEGUARDS ANALYTICAL LABORATORY: CONCEPT AND DESIGN</b> .....	476
<i>M. Hosoya, C. Schmitzer, D. Donohue, J. Poth, T. Lemma, S. Balsley</i>	
<b>INVESTIGATING THE GHOST OF PAST ACTIVITIES: AN ENVIRONMENTAL SAMPLING CASE STUDY</b> .....	484
<i>D. M. Fischer, A. Axelsson, M. Penkin</i>	
<b>NOVEL TECHNOLOGIES FOR THE DETECTION OF UNDECLARED NUCLEAR ACTIVITIES, MATERIALS AND FACILITIES: NUCLEAR FUEL CYCLE INDICATORS AND SIGNATURES AND TECHNOLOGY GAP ANALYSIS</b> .....	493
<i>C. Annesse, A. Hamilton, A. Monteith, J. Whichello</i>	

### **SESSION C INTERNATIONAL SAFEGUARDS: GLOBAL SAFEGUARDS R&D**

<b>THE STATUS OF THE INTEGRATED SAFEGUARDS IMPLEMENTATION AND R&amp;D ACTIVITIES IN KOREA</b> .....	502
<i>N/A</i>	
<b>THE ROLE OF THE RUSSIAN METHODOLOGICAL AND TRAINING CENTER IN PROVIDING NONDESTRUCTIVE ASSAY TECHNICAL ASSISTANCE TO RUSSIAN ENTERPRISES</b> .....	503
<i>S. Bogdanov, G. Bezhunov, B. Ryazanov, V. Talanov, G. Thomas, D. Dickman</i>	
<b>MAINTAINING FOCUS AND SEEKING SYNERGIES - ENSURING THAT SMALL R&amp;D PROGRAMS ARE ABLE TO MAXIMISE THE EFFECTIVENESS OF THE EFFORTS IN SUPPORT OF SAFEGUARDS</b> .....	509
<i>R. Leslie, J. Carlson</i>	
<b>A SELECTION OF RECENT ACHIEVEMENTS AND FUTURE CHALLENGES IN SAFEGUARDS R&amp;D AS IDENTIFIED BY THE EUROPEAN SAFEGUARDS RESEARCH AND DEVELOPMENT ASSOCIATION</b> .....	516
<i>W. A. M. Janssens, B. Aurusson, M. Boella, L. V. Bril, J. G. M. Goncalves, G. G. A. Janssens-Maenhout, E. Martikka, K. Mayer, P. Peerani, A. Rezniczek, M. Richard, B. Richter, F. Sevini, B. T. Stanley, G. Stein, R. Weh</i>	
<b>SAFEGUARDS RESEARCH AND DEVELOPMENT AT ABACC. ACCOMPLISHMENTS AND FUTURE STRATEGY</b> .....	526
<i>O. A. M. Canto, O. J. M. Peixoto, E. G. Galdoz</i>	

<b>SAFEGUARDS R&amp;D PROGRAMS IN THE UNITED STATES</b> .....	535
<i>R. Williams, R. Budlong-Sylvester, M. Goodman, F. Keel, S. LaMontagne, H. Lee, D. Lockwood, M. Miller, J. Sprinkle, M. Whitney, B. Williams</i>	
<b>INTERNATIONAL SAFEGUARDS : GLOBAL SAFEGUARDS R&amp;D</b> .....	544
<i>H. Lee, W. Janssens</i>	

**SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: NEUTRON MEASUREMENT METHODS II**

<b>PERFORMANCE TESTING OF THE JSR-15 MULTIPLICITY SHIFT REGISTER AT HIGH COUNTING RATES</b> .....	547
<i>N. Mena, M. F. Villani, S. Croft, S. Philips, R. D. McElroy, C. G. Wilkins, M. Newell, D. C. Jones</i>	
<b>THE DIGITAL SIGNAL PROCESSING IN NEUTRON COINCIDENCE COUNTING: TRIDEN SOFTWARE DEVELOPMENT AND MEDAS DATATION CARD USING</b> .....	555
<i>J. L. Dufour, P. Funk, T. Lamert, A. L. Weber</i>	
<b>PASSIVE TIME COINCIDENCE MEASUREMENTS WITH ASSEMBLIES OF HEU AND DU CASTINGS</b> .....	565
<i>S. McConchie, P. Hausladen, J. Mihalcz</i>	
<b>DEADTIME LOSSES IN MULTIPLICITY COUNTING AT LOW RATES WITH <sup>252</sup>CF</b> .....	575
<i>L. G. Evans, S. Croft</i>	
<b>ACTIVE NEUTRON COINCIDENCE COUNTING USING A NEUTRON GENERATOR FOR A FISSILE MATERIAL ACCOUNTING</b> .....	586
<i>S. K. Ahn, T. H. Lee, H. S. Shin, H. D. Kim</i>	

**SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: NUCLEAR FORENSICS I**

<b>ANALYSIS OF URANIUM METAL SAMPLES FROM GERMANY'S WORLD WAR II NUCLEAR PROGRAM - A CASE BETWEEN SCIENCE HISTORY AND NUCLEAR FORENSICS -</b> .....	595
<i>K. Mayer, M. Wallenius, Z. Varga, J. Horta, K. Lutzenkirchen, A. Nicholl, S. Millet, G. Rasmussen, T. Wiss, H. Thiele</i>	
<b>RADIOCHRONOMETRY OF NUCLEAR MATERIALS</b> .....	603
<i>R. Essex, P. Coatto, K. Orlandini, S. Goldberg, J. Neuhoﬀ, S. Vogt</i>	
<b><sup>230</sup>Th-<sup>234</sup>U MODEL-AGES OF SOME URANIUM STANDARD REFERENCE MATERIALS</b> .....	608
<i>R. W. Williams, A. M. Gaffney, M. J. Kristo, I. D. Hutcheon</i>	
<b>NUCLEAR FORENSIC SIGNATURES IN URANIUM ORE CONCENTRATES</b> .....	615
<i>E. Keegan, Z. Varga, M. Wallenius, K. Mayer, G. Rasmussen</i>	
<b>IMPURITIES AS FINGERPRINTS IN NUCLEAR FORENSICS ANALYSIS - THE ROLE OF CERTIFIED REFERENCE MATERIALS AND NBL CRM 124 SERIES</b> .....	623
<i>S. Burger, K. J. Mathew, P. Mason, U. Narayanan</i>	
<b>DETERMINATION OF THE RELATIVE AMOUNT OF FLUORINE IN URANIUM OXYFLUORIDE PARTICLES USING SECONDARY ION MASS SPECTROMETRY AND OPTICAL SPECTROSCOPY</b> .....	631
<i>R. Kips, M. Kristo, I. Hutcheon, J. Amonette, Z. Wang, T. Johnson, D. Gerlach, K. B. Olsen</i>	
<b>ISOTOPE ENRICHMENT DETECTION BY LASER ABLATION - DUAL TUNABLE DIODE LASER ABSORPTION SPECTROMETRY</b> .....	641
<i>N. C. Anheier, B. A. Bushaw</i>	
<b>EXPERIENCE ON PREPARATION OF LSD SPIKES FOR MOX SAMPLES</b> .....	651
<i>M. Sumi, K. Abe, T. Kageyama, H. Nakazawa, T. Katchi, Y. Murakami, T. Hishi, H. Ai</i>	

**SESSION F NONPROLIFERATION AND ARMS CONTROL: NONPROLIFERATION POLICY AND APPROACHES**

<b>A NONPROLIFERATION IMPACT ASSESSMENT OF THE GNEP ALTERNATIVES</b> .....	660
<i>M. Goodman, J. Sprinkle</i>	
<b>EXTRA-TERRITORIAL SITING OF NUCLEAR INSTALLATIONS</b> .....	669
<i>T. E. Shea, F. A. Morris</i>	
<b>CURRENT STATUS OF INPRO METHODOLOGY FOR EVALUATING PROLIFERATION RESISTANCE</b> .....	677
<i>H. Chayama, E. Haas, M. Zentner, J. Whitlock, H. L. Chang, E. H. Kwon, K. Zhou</i>	
<b>PROCESS MODELING FOR LEU FUEL FABRICATION TO SUPPORT MINIMIZING USE OF HEU IN RESEARCH REACTORS1</b> .....	686
<i>D. E. Kornreich, J. W. Jackson</i>	
<b>CHALLENGES IN THE PRELIMINARY RESULTS DISPLAY FROM THE GIF PROLIFERATION RESISTANCE AND PHYSICAL PROTECTION EVALUATION METHODOLOGY</b> .....	696
<i>Z. N. Gastelum, M. D. Zentner</i>	

Volume 2

<b>COUNTRY ASSESSMENTS AND THE IAEA MILESTONES PROCESS</b> .....	706
<i>J. Essner, S. Goldberg, C. Welling</i>	

<b>PERFORMING COUNTRY ASSESSMENTS USING THE IAEA MILESTONES PROCESS, DETAILED ANALYSIS OF TWO KEY INFRASTRUCTURE ISSUES</b> .....	712
<i>R. S. Faibish, S. M. Goldberg</i>	
<b>MULTILATERAL SAFEGUARDS SYSTEM FOR NUCLEAR FUEL ASSURANCE</b> .....	719
<i>S. Y. Jo</i>	
<b>ON CHINA'S COMMERCIAL REPROCESSING POLICY</b> .....	727
<i>H. Zhang</i>	

### **SESSION G PACKAGING AND TRANSPORTATION: TRANSPORTATION ISSUES**

<b>NEW APPROACH TO ADDRESSING GAS GENERATION IN RADIOACTIVE MATERIAL PACKAGING</b> .....	735
<i>R. W. Watkins, D. R. Leduc, N. M. Askev</i>	
<b>A GIS-BASED METHODOLOGY USING WIND SPEED, FREQUENCY AND DIRECTION TO MODEL AIRBORNE MATERIAL TRANSPORT FOR SELECTION OF NUCLEAR MATERIALS TRANSPORTATION ROUTES</b> .....	740
<i>J. S. Cole, K. M. Trauth, Y. Li, T. R. Marrero</i>	
<b>NEPTUNIUM OXIDE PROCESSING</b> .....	748
<i>J. M. Jordan, R. W. Watkins, S. J. Hensel</i>	
<b>ONGOING INVESTIGATION OF THE EFFECT THAT DRUGSTORE BEETLES HAVE ON CELOTEX ASSEMBLIES FOUND WITHIN RADIOACTIVE MATERIAL PACKAGINGS</b> .....	753
<i>B. M. Loftin, J. M. Shuler</i>	
<b>DRAFT STANDARD REVIEW PLAN FOR LICENSE RENEWAL OF INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS</b> .....	760
<i>A. Lstar, C. Regan, G. Hornseth</i>	

### **SESSION H MATERIALS CONTROL AND ACCOUNTABILITY/WASTE MANAGEMENT/INTERNATIONAL SAFEGUARDS: MEASURING RADIONUCLIDE CONTENT IN SPENT NUCLEAR FUEL**

<b>HIGH-ENERGY DELAYED GAMMA SPECTROSCOPY FOR SPENT NUCLEAR FUEL ASSAY</b> .....	774
<i>L. W. Campbell, E. Smith, A. C. Misner, J. J. Ressler</i>	
<b>NONDESTRUCTIVE SPENT FUEL ASSAY USING NUCLEAR RESONANCE FLUORESCENCE</b> .....	786
<i>B. J. Quiter, B. A. Ludewigt, V. V. Mozin, S. J. Tobin</i>	
<b><sup>244</sup>CM NEUTRON MEASUREMENTS FOR SPENT FUEL USING A NEUTRON COINCIDENCE COUNTER AND A COMPARISON WITH CHEMICAL ANALYSIS RESULTS</b> .....	796
<i>T. H. Lee, H. O. Menlove, S. Y. Lee, H. S. Shin, H. D. Kim</i>	
<b>QUANTIFYING THE PASSIVE GAMMA SIGNAL FROM SPENT NUCLEAR FUEL IN SUPPORT OF DETERMINING THE PLUTONIUM CONTENT IN SPENT NUCLEAR FUEL WITH NONDESTRUCTIVE ASSAY</b> .....	806
<i>M. L. Fensin, S. J. Tobin, H. O. Menlove, M. T. Swinhoe</i>	
<b>MODELING OF X-RAY FLUORESENCE USING MCNPX AND GEANT4</b> .....	815
<i>A. Rajasingum, A. S. Hoover, S. J. Tobin, M. L. Fensin</i>	
<b>TIME-SPECTRAL ANALYSIS ALGORITHMS FOR LEAD SLOWING-DOWN SPECTROSCOPY OF SPENT FUEL</b> .....	825
<i>L. E. Smith, K. K. Anderson, J. J. Ressler, M. W. Shaver, A. Gavron, S. D. Kiff</i>	
<b>BEHAVIOR OF <sup>241</sup>AM IN FAST REACTOR SYSTEMS - A SAFEGUARDS PERSPECTIVE</b> .....	838
<i>D. H. Beddingfield, A. M. LaFleur</i>	

### **CONCURRENT TECHNICAL SESSION III**

#### **SESSION A INTERNATIONAL SAFEGUARDS: THE NEXT STEPS IN INTERNATIONAL SAFEGUARDS II**

<b>THE STATE-LEVEL APPROACH TO INTERNATIONAL SAFEGUARDS</b> .....	848
<i>J. N. Cooley</i>	
<b>IMPLEMENTING THE STATE-LEVEL APPROACH: MOVING FORWARD</b> .....	855
<i>J. A. Casterton</i>	
<b>THE CHALLENGES OF NON-PROLIFERATION INFORMATION ANALYSIS</b> .....	864
<i>J. Baute</i>	
<b>SAFEGUARDS INFORMATION FROM OPEN SOURCES</b> .....	871
<i>R. Wallace, G. Anzelon, J. Essner</i>	
<b>SAFEGUARDS TECHNICAL PARAMETERS: DIRECTIONS FOR EVOLUTION</b> .....	891
<i>J. Larrimore</i>	

#### **SESSION B INTERNATIONAL SAFEGUARDS: MOX – WHAT DOES THE FUTURE HOLD? II**

<b>RECYCLING IN FRANCE</b> .....	904
<i>J. Krellmann, M. Arslan, J. P. Gros</i>	

<b>STUDY ON INTERNATIONAL NUCLEAR FUEL CYCLE FRAMEWORK FROM NUCLEAR NON-PROLIFERATION VIEWPOINT</b> .....	911
<i>Y. Kuno, J. S. Choi</i>	
<b>AN ASSESSMENT OF THE ATTRACTIVENESS OF MATERIAL ASSOCIATED WITH A MOX FUEL CYCLE FROM A SAFEGUARDS PERSPECTIVE</b> .....	920
<i>C. G. Bathke, B. B. Ebbinghaus, B. W. Sleaford, R. K. Wallace, B. A. Collins, K. R. Hase, M. Robel, G. D. Jarvinen, K. S. Bradley, J. R. Ireland, M. W. Johnson, A. W. Prichard, B. W. Smith</i>	
<b>PROLIFERATION RISK REDUCTION STUDY OF ALTERNATIVE SPENT FUEL PROCESSING TECHNOLOGIES</b> .....	935
<i>R. A. Bari, L. Y. Chen, J. Phillips, J. Pilat, G. Rochau, I. Therios, R. Wigeland, E. Wonder, M. Zentner</i>	
<b>GENPROM DEVELOPMENT FOR DETECTION OF DIVERSION SCENARIOS IN FUEL PROCESSING PLANTS</b> .....	941
<i>Y. S. Park, J. F. Krebs, H. Ley, A. S. Hebden, T. Y. C. Wei, M. C. Regalbutto</i>	
<b>TRANSFERRING MOX TECHNOLOGY TO THE UNITED STATES</b> .....	951
<i>L. Bourachot, J. P. Bariteau, D. Leach</i>	
<b>OPTIONS FOR CONVERTING EXCESS PLUTONIUM TO FEED FOR THE MOX FUEL FABRICATION FACILITY (U)</b> .....	959
<i>J. A. Watts, J. D. Psaras, G. D. Jarvinen, D. A. Costa, E. L. Joyce, P. H. Smith</i>	
<b>SAFEGUARDS FOR THE URANIUM EXTRACTION (UREX) +1A PROCESS</b> .....	969
<i>J. S. Feener, W. S. Charlton</i>	

### **SESSION C INTERNATIONAL SAFEGUARDS: DESIGN INFORMATION VERIFICATION I**

<b>3D LASER-BASED SYSTEM FOR DESIGN INFORMATION VERIFICATION</b> .....	976
<i>V. Sequeira, G. Bostrom, J. G. M. Goncalves</i>	
<b>INVESTIGATION OF COMBINED MEASUREMENTS WITH THREE-DIMENSIONAL DESIGN INFORMATION VERIFICATION SYSTEM AND GAMMA-RAY IMAGING SYSTEMS FOR INTERNATIONAL SAFEGUARDS APPLICATIONS</b> .....	986
<i>A. C. Raffo-Caiado, K. P. Ziock, J. Hayward, S. Smith, A. Solodov, L. Mihailescu, K. Vetter, A. Dougan, M. Burks, J. G. M. Goncalves, V. Sequeira, O. J. Peixoto, S. Almeida, E. Galdoz, G. Renha</i>	
<b>DEMONSTRATION OF A NOVEL STAND-OFF 3D GAMMARAY IMAGING TECHNIQUE</b> .....	994
<i>L. Mihailescu, J. Rohel, K. Vetter</i>	
<b>ABACC AND JRC COOPERATION ON 3D LASER RANGE FINDER (3DLR) FOR DESIGN INFORMATION VERIFICATION</b> .....	997
<i>O. J. M. Peixoto, S. Almeida, J. G. M. Goncalves, V. Sequeira</i>	
<b>REINFORCEMENT OF DIV CAPACITIES BY GEOPHYSICAL INSPECTION TOOLS</b> .....	1004
<i>N/A</i>	
<b>A FEASIBILITY STUDY OF CODED-APERTURE IMAGING AND 3D-DIV FOR NUCLEAR MATERIALS ACCOUNTANCY IN ENRICHMENT PLANTS</b> .....	1005
<i>J. Hayward, K. P. Ziock, N. Abdul-Jabbar, A. Solodov, J. Carrigan, S. Smith, A. Raffo-Caiado</i>	
<b>DESIGN INFORMATION VERIFICATION - DIV PANEL</b> .....	1015
<i>S. Johnson, J. Cooley, P. Friend, R. Metcalf, O. Peixoto</i>	

### **SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: NUCLEAR FORENSICS II**

<b>THE AUG 2008 INCIDENT AT THE IAEA SAFEGUARDS ANALYTICAL LABORATORY INVOLVING A SMALL QUANTITY OF PU-240</b> .....	1016
<i>C. Schmitzer, S. Balsley, D. Donohue, J. Poths, J. Hunt, A. Bunce, R. Hochmann, H. Eisenwagner, T. Benesch</i>	
<b>NUCLEAR FORENSIC INFERENCES USING ITERATIVE MULTIDIMENSIONAL STATISTICS</b> .....	1026
<i>M. Robel, M. J. Kristo, M. A. Heller</i>	
<b>A NEW APPROACH TO ESTIMATE ISOTOPIC RATIOS IN NUCLEAR AND RADIOLOGICAL MATERIALS FROM NUCLEAR SPECTROMETRIC MEASUREMENTS WITH COUNT RATES CLOSE TO BACKGROUND</b> .....	1036
<i>M. Steiner, M. Zaehringner, A. Berlizov, G. Kirchner</i>	
<b>URANIUM ASSAY DETERMINATION USING DAVIES AND GRAY TITRATION: AN OVERVIEW AND IMPLEMENTATION OF GUM FOR UNCERTAINTY EVALUATION</b> .....	1046
<i>K. J. Mathew, S. Burger, S. Vogt, P. Mason, M. E. Morales-Arteaga, U. I. Narayanan</i>	
<b>DETERMINATIONS OF PLUTONIUM AND CURIUM IN THE INSOLUBLE MATERIALS OF SPENT FUEL DISSOLVER SOLUTIONS AT THE TOKAI REPROCESSING PLANT</b> .....	1053
<i>M. Okano, T. Kuno, H. Nemoto, K. Yamada, M. Watahiki, T. Hiyama</i>	
<b>INTERNATIONAL NUCLEAR FORENSICS COOPERATION - FUTURE OPPORTUNITIES</b> .....	1062
<i>M. Dreicer, I. D. Hutcheon, M. J. Kristo, D. K. Smith, E. S. Vergino, R. W. Williams</i>	
<b>ANALYTICAL INVERSE MODEL FOR THE POST-EVENT ATTRIBUTION OF PLUTONIUM</b> .....	1070
<i>J. C. Miller, W. S. Charlton</i>	
<b>COMPLETE CHARACTERIZATION OF URANIUM COMPOUNDS</b> .....	1080
<i>T. G. Schaaff, V. F. Belt, S. J. Bobrowski</i>	



**SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: NUCLEAR REGULATORY COMMISSION**

**THE NRC MC&A INSPECTION PROGRAM**..... 1089  
*G. Tuttle*

**IDENTIFICATION AND PROTECTION OF SENSITIVE INFORMATION AT THE U.S. NUCLEAR REGULATORY COMMISSION** ..... 1093  
*B. Stapleton*

**NUCLEAR REGULATORY COMMISSION PHYSICAL PROTECTION LICENSING AND INSPECTION** ..... 1097  
*A. Frazier, O. Bukharin*

**IMPLEMENTING AN MC&A PROGRAM AT AN LEU FABRICATION PLANT** ..... 1104  
*R. N. Martyn*

**THE NRC REGULATORY FRAMEWORK** ..... 1111  
*G. Tuttle, M. Williams*

**STATUS OF RECENT AND ONGOING NUCLEAR REGULATORY COMMISSION RULEMAKING EFFORTS**..... 1115  
*M. F. Kelly, A. Giantelli*

**THE U.S. NUCLEAR REGULATORY COMMISSION'S INTERNATIONAL INVOLVEMENT** ..... 1121  
*M. D. Kohen, T. Grice, K. Henderson*

**PANEL DISCUSSION ON NRC REGULATORY PROCESS**..... 1129  
*N/A*

**SESSION F MATERIALS CONTROL AND ACCOUNTABILITY: GAMMA MEASUREMENTS I**

**PASSIVE GAMMA SPECTROSCOPY FOR ENRICHED URANIUM MASS FLOW MEASUREMENTS** ..... 1130  
*J. A. Danzer, J. L. Cochran*

**THE INTERFERING SOURCE PROBLEM**..... 1140  
*S. Croft, W. F. Mueller, R. Venkataraman*

**SIMULATION OF THE EFFECTS OF SMALL ANGLE SCATTERING WHEN APPLYING THE ENRICHMENT METER PRINCIPLE** ..... 1150  
*H. Schwenn, S. Croft, A. Bosko, S. Philips, R. Venkataraman*

**REAL-TIME DETECTION OF UREX+3A EXTRACTION STREAMS FOR MATERIALS ACCOUNTANCY** ..... 1166  
*B. Goddard, W. S. Charlton, S. M. McDevitt*

**OPTIMIZATION OF A COMPTON SUPPRESSION DETECTION SYSTEM USING CDZnTE AND LIQUID SCINTILLATORS**..... 1176  
*M. M. Bourne, S. D. Clarke, S. A. Pozzi, A. Gueorguiev*

**STUDY OF PERFORMANCE OF A LANTHANUM BROMIDE DETECTOR FOR URANIUM ENRICHMENT DETERMINATION IN UF<sub>6</sub> CYLINDERS** ..... 1186  
*F. C. Dias, M. S. Grund, Av. S. Allende, G. Renha, E. Galdoz, M. Facchinetti, S. E. Smith, A. A. Solodov, S. F. Saavedra, A. C. R. Caiado*

**POTENTIAL METHODS FOR MEASURING URANIUM MASS FLOW IN A PRODUCTION ENVIRONMENT** ..... 1191  
*J. L. Cochran, J. A. Danzer, J. M. Holland, R. L. Moyers*

**GENERALIZED GAMMA-RAY ISOTOPIC ANALYSIS SOFTWARE AND RE-EVALUATION OF THE TWO IMPORTANT <sup>242</sup>Pu BRANCHING RATIOS** ..... 1199  
*T. F. Wang, K. Raschke, K. Roberts, A. Dougan*

**SESSION G NONPROLIFERATION AND ARMS CONTROL: FISSILE MATERIALS DISPOSITION**

**BACKGROUND OF U.S. EFFORTS TO DISPOSE OF SURPLUS FISSILE MATERIALS** ..... 1204  
*K. Durbin, K. Niewiadomski, K. Bromberg, D. Tousley*

**THE U.S. HIGHLY ENRICHED URANIUM DISPOSITION PROGRAM**..... 1210  
*S. Sanders, D. Tousley*

**OVERVIEW OF U.S.-RUSSIAN PLUTONIUM DISPOSITION PROGRAM**..... 1218  
*K. Durbin, G. Lunsford, K. Bromberg*

**STATUS OF U.S. PLUTONIUM DISPOSITION** ..... 1222  
*S. Glenn, C. Ramsey, K. Durbin, K. Bromberg*

**STATUS OF RUSSIAN PLUTONIUM DISPOSITION**..... 1228  
*G. Lunsford, K. Durbin, K. Bromberg*

**STATUS OF A PMDA MONITORING AND INSPECTION REGIME** ..... 1232  
*G. Lunsford, K. Durbin*

**DOWN BLENDING OF HIGH ENRICHED URANIUM AT THE ULBA METALLURGICAL PLANT** ..... 1236  
*A. Yashin, I. Rakitina, I. Bolshinsky, J. Thomas*

**SESSION H NONPROLIFERATION AND ARMS CONTROL: GLOBAL THREAT REDUCTION INITIATIVE-  
PROTECT/INTERNATIONAL**

<b>FOSTERING MULTI-LATERAL COOPERATION BETWEEN THE GOVERNMENTS OF DOMINICAN REPUBLIC, COLOMBIA, AND THE UNITED STATES TO ENHANCE THE PROTECTION OF HIGH-ACTIVITY RADIOACTIVE SOURCES</b> .....	1241
<i>N. Butler, E. E. Watson, K. Wright, M. Medina</i>	
<b>FOSTERING MULTI-LATERAL COOPERATION BETWEEN THE GOVERNMENTS OF MEXICO, COLOMBIA, AND THE UNITED STATES TO ENHANCE THE PROTECTION OF HIGH-ACTIVITY RADIOACTIVE SOURCES</b> .....	1245
<i>N. Butler, E. E. Watson, K. Wright</i>	
<b>LATIN AMERICAN AND CARIBBEAN WORKSHOP ON THE SUSTAINABILITY OF RADIOACTIVE SOURCE PHYSICAL PROTECTION UPGRADES HOSTED IN GUATEMALA</b> .....	1249
<i>R. Greenberg, E. E. Watson, F. A. Morris, P. Leal</i>	
<b>CENTRAL STORAGE FACILITY PROJECT IN COLOMBIA TO PROVIDE THE SAFE STORAGE AND PROTECTION OF HIGH-ACTIVITY RADIOACTIVE SOURCES</b> .....	1254
<i>R. Greenberg, K. Wright, E. McCaw, J. Vallejo</i>	
<b>AN OVERVIEW OF THE GLOBAL THREAT REDUCTION INITIATIVE'S PHYSICAL PROTECTION WORK IN URUGUAY</b> .....	1258
<i>M. V. Strosinski, R. F. Greenberg</i>	
<b>GHANA ATOMIC ENERGY COMMISSION AND GTRI ACTIVITIES IN GHANA</b> .....	1263
<i>G. Emi-Reynolds, M. Itamura, C. M. Kenzie</i>	
<b>U.S.-CHINA RADIOLOGICAL SOURCE SECURITY PROJECT: CONTINUING AND EXPANDING BILATERAL COOPERATION</b> .....	1271
<i>Z. Zhixuan, Z. Qifu, Y. Yaoun, H. Chaoun, J. Lloyd, A. Williams, A. Feldman, M. Hawk, R. Rawl, R. Howell, C. Kennedy</i>	
<b>REGIONAL RADIOLOGICAL SECURITY PARTNERSHIP IN SOUTHEAST ASIA - INCREASING THE SUSTAINABILITY OF SECURITY SYSTEMS AT THE SITE-LEVEL BY USING A MODEL FACILITY APPROACH</b> .....	1276
<i>T. Chamberlain, S. Dickerson, S. Ravenhill, A. Murray, F. A. Morris, G. A. Herdes</i>	
<b>GLOBAL WELL LOGGING SECURITY INITIATIVE</b> .....	1282
<i>J. H. Schwartzel, K. A. Wright</i>	

**SESSION I PACKING AND TRANSPORTATION: SECURITY**

<b>A NATIONAL TRACKING CENTER FOR MONITORING SHIPMENTS OF HEU, MOX, AND SPENT NUCLEAR FUEL: HOW DO WE IMPLEMENT?</b> .....	1288
<i>M. Schanfein, P. C. Durst</i>	
<b>ARG-US - AN RFID-BASED TRACKING AND MONITORING SYSTEM FOR NUCLEAR MATERIAL PACKAGES</b> .....	1294
<i>K. Chen, H. Tsai, Y. Liu, J. Shuler</i>	
<b>EXPERIMENTAL ANALYSIS OF POWDER RESUSPENSION FACTORS IN CASE OF HEDD ATTACK</b> .....	1302
<i>O. Loiseau, B. Autrusson</i>	
<b>ACTIVE SECURITY OPERATING DOCTRINE AT THE NNSA OFFICE OF SECURE TRANSPORTATION</b> .....	1309
<i>J. Thomas</i>	
<b>SHIPMENT OF IRRADIATED MOX FUEL RODS-LESSONS LEARNED</b> .....	1319
<i>S. B. Ludwig, B. B. Bevard</i>	

**SESSION J PHYSICAL PROTECTION/MATERIALS CONTROL AND ACCOUNTABILITY: DETECTION TECHNOLOGIES**

<b>SECURITY APPLICATIONS OF GROUND-BASED SURVEILLANCE RADARS</b> .....	1329
<i>M. G. Williams, M. S. S. Hoo, T. J. Reecer</i>	
<b>NON-LETHAL WEAPON AUGMENTATION OF NUCLEAR SECURITY</b> .....	1337
<i>J. W. Piper</i>	
<b>INVESTIGATION OF MUONIC CASCADES IN ORGANIC MOLECULES AND THE POSSIBLE APPLICATION TO EXPLOSIVES DETECTION</b> .....	1347
<i>N. Hoteling, E. I. Esch, A. Adelman, R. Heffner, A. Jason, L. Mitchell, H. Miyadera, T. J. Stocki</i>	
<b>AN OPERATIONAL APPROACH TO SCORING RADIATION DETECTOR IDENTIFICATION RESULTS</b> .....	1355
<i>J. Blackadar, D. Blumenthal, L. Pibida, J. Shergur</i>	
<b>INTEGRATION OF MATERIAL CONTROL MEASURES INTO A COMPREHENSIVE PHYSICAL PROTECTION PROGRAM FOR NUCLEAR MATERIALS</b> .....	1361
<i>T. Bonner, S. Dattres, T. Hasty, D. Hembree, K. Mutreja, N. Bratuschenko, A. Momot</i>	
<b>MONTE CARLO OPTIMIZATION OF A TWO-PLANE COMPTON IMAGER</b> .....	1367
<i>B. A. Maestas, A. Poitrasson-Riviere, P. R. Stanfield, S. D. Clarke, M. Flaska, S. A. Pozzi, A. Guergueiev, G. Pausch, C. M. Herbach, M. Ohmes, J. Stein</i>	

**SESSION K MATERIALS CONTROL AND ACCOUNTABILITY/WASTE MANAGEMENT: NUCLEAR MATERIALS MANAGEMENT I**

**DOE NUCLEAR MATERIAL PACKAGING MANUAL: STORAGE CONTAINER REQUIREMENTS FOR PLUTONIUM OXIDE MATERIALS**.....1376  
*D. K. Veirs*

**SANDIA NATIONAL LABORATORIES SPECIAL NUCLEAR MATERIAL DE-INVENTORY PROJECT; BEST PRACTICES AND LESSONS LEARNED, FINAL PHASE**.....1386  
*N/A*

**PROGRESS IN REDUCING THE NUCLEAR THREAT: UNITED STATES PLUTONIUM CONSOLIDATION AND DISPOSITION**.....1395  
*J. S. Allender, R. E. Koenig, S. H. Davies*

**OFF-SPECIFICATION HIGHLY ENRICHED URANIUM BLEND DOWN PROGRAM INTERRELATIONSHIPS AND A PROGRAM UPDATE (U)**.....1402  
*V. E. Magoulas, C. R. Goergen, D. M. Davis*

Volume 3

**LIFECYCLE MANAGEMENT OF NUCLEAR MATERIALS AT Y-12**.....1411  
*T. L. Knight*

**NUCLEAR MATERIAL DISPOSITION - A TWOFOLD ADVANTAGE!**.....1418  
*G. Person, E. Kelly*

**ADVANCING THE DEVELOPMENT AND USAGE OF THE Y-12 NATIONAL SECURITY COMPLEX NUCLEAR MATERIAL INVENTORY ASSESSMENT**.....1427  
*J. Vanover, P. Hart*

**IMPLEMENTATION OF AN EXPANDED MATERIAL CONTROL AND ACCOUNTING PROGRAM (MPC&A) THROUGH PERFORMANCE OF A GAP ANALYSIS AND AN EXPANDED MPC&A PLAN AT THE MINING AND CHEMICAL COMBINE**.....1435  
*T. Hasty, K. Mutreja, D. Hembree, S. Suda, T. Bonner, N. Bratuschenko, Y. Anufriev*

**SESSION L POSTER SESSION**

**DEVELOPMENT OF PP MEASURES FOR EVALUATING NUCLEAR FACILITY'S RISK**.....1442  
*H. Yoo, S. W. Kwak, S. S. Chang, J. S. Kim, W. K. Yoon*

**DEVELOPMENT OF MEASUREMENT TECHNIQUES FOR DENSITY AND LIQUID LEVEL OF MOLTEN SALT TO ASSESS AN INVENTORY IN EQUIPMENT OF PYRO-PROCESSING**.....1452  
*M. Fukushima, T. Nagai, H. Kofuji, H. Hirano, M. Myochin*

**A NATIONAL TRACKING CENTER FOR MONITORING SHIPMENTS OF HEU, MOX, AND SPENT NUCLEAR FUEL**.....1462  
*P. C. Durst, M. Schanfein*

**SOFTWARE TO GENERATE THE ACCOUNTINGS REPORTS AND AUDITING FILES IN TEXT FORMATS (ICAIFE)**.....1468  
*R. O. Nicolas*

**AUTONOMOUS ROBOTIC DETECTION OF RADIOISOTOPES BY HIGH PURITY GERMANIUM DETECTOR**.....1473  
*C. J. Moore-Gotcher, M. E. Nelson, M. Harper, R. Broussard, K. Delikat, R. Meyers*

**MASS VERIFICATION METHOD FOR SAMPLES CONTAINING URANIUM, PLUTONIUM, AND OTHER ACTINIDES USING AN ACTIVE WELL COINCIDENCE COUNTER**.....1483  
*B. Goddard, A. L. Thornton, J. P. Hayward*

**SEMI-QUANTITATIVE ANALYSIS OF THE LANTHANIDE SERIES ELEMENTS USING A LASER INDUCED BREAKDOWN SPECTROSCOPY**.....1491  
*S. H. Kim, J. S. Ju, H. S. Shin, H. D. Kim*

**DESIGN OF MOBILE RADIATION DETECTION SYSTEM AGAINST NUCLEAR AND RADIOLOGICAL TERRORISM**.....1498  
*S. W. Kwak, H. Yoo, S. S. Chang, J. S. Kim, W. K. Yoon*

**THE EXPERIENCE OF THE INTEGRATED SAFEGUARDS IMPLEMENTAION IN KOREA**.....1506  
*J. K. Yeo*

**A NEW SOFTWARE APPLICATION FOR HYBRID K-EDGE DENSITOMETRY**.....1511  
*H. Zhu, M. Villani, J. Lamontagne, S. Croft, S. Gaily, H. Hassoubi, G. Landry, R. McElroy, R. Patel, S. Philips, P. Rouleau, R. Venkataraman, V. Yuschuk*

**INCREASING COOPERATION BETWEEN IAEA, ABACC AND THE NATIONAL SAFEGUARDS SYSTEM IN ARGENTINA**.....1521  
*H. Vicens, C. Llacer, L. Castro, T. H. Sanchez, M. Ferro, B. Olano*

**IMPLEMENTING CONTINUOUS LOAD CELL MONITORING OF UF6 WITHDRAWALS AT AN ENRICHMENT PLANT**.....1527  
*A. M. Krichinsky, S. Koo, C. A. Pickett, G. D. Richardson, N. C. Rowe, R. M. Wham, J. M. Whitaker, J. R. Younkin*

<b>ADVANCED SAFEGUARDS TECHNOLOGY DEMONSTRATION AT PACIFIC NORTHWEST NATIONAL LABORATORY</b> .....	1534
<i>L. M. Arrigo, S. Bryan, R. N. Christensen, M. Douglas, D. Duckworth, C. Fraga, T. Levitskaia, M. Liezers, C. R. Orton, S. Peper, J. M. Schwantes</i>	
<b>SOME OBSERVATIONS ON THE USE OF <sup>252</sup>CF IN THE DETERMINATION OF THE DEADTIME PARAMETERS OF NEUTRON MULTIPLICITY COUNTERS</b> .....	1544
<i>S. Craft, N. Mena, R. D. McElroy</i>	
<b>NEUTRON/GAMMA-RAY PULSE SHAPE DISCRIMINATION WITH LIQUID SCINTILLATION DETECTORS BASED ON AVERAGE PULSES</b> .....	1560
<i>S. D. Ambers, M. Flaska, S. A. Pozzi</i>	
<b>PRELIMINARY PLANNING CONSIDERATIONS RELATING TO TRANSPORTATION SECURITY OF NUCLEAR WASTE</b> .....	1569
<i>J. G. Vlahakis</i>	
<b>AN ION EMISSION SOURCE FOR PORTABLE ACTIVE INTERROGATION</b> .....	1579
<i>E. Baxter, S. Kovaleski, A. Benwell, J. Kwon, T. Wacharasindhu, J. Gahl</i>	
<b>STATISTICAL INVESTIGATION OF SAMPLE CHARACTERISTICS NEEDED FOR ESTABLISHING THE ORIGIN OF URANIUM ORE CONCENTRATES/YELLOWCAKE</b> .....	1588
<i>C. K. Bayne, J. M. Begovich, D. A. Bostick, J. A. Carter, J. M. Giaquinto, J. Horita, D. L. Miller, I. D. Hutcheon, M. J. Kristo, E. C. Ramon, M. Robel, S. A. Steward</i>	
<b>GLOBAL RADIOLOGICAL SOURCE SORTING, TRACKING, AND MONITORING (GRADSSTRAM) USING EMERGING RFID AND WEB 2.0 TECHNOLOGIES TO PROVIDE TOTAL ASSET AND INFORMATION VISUALIZATION</b> .....	1598
<i>R. M. Walker, M. Shankar, B. L. Gorman, D. R. Resseguie, M. Ferren, R. Clark, D. Kopsick, J. Pantaleo, C. Bonnell, R. Layton, L. Astor</i>	

#### **CONCURRENT TECHNICAL SESSION IV**

##### **SESSION A INTERNATIONAL SAFEGUARDS: ADVANCES IN SAFEGUARDS IMPLEMENTATION**

<b>DEVELOPMENT OF A STATISTICAL MODEL FOR PLANNING RANDOM INTERIM INSPECTIONS UNDER INTEGRATED SAFEGUARDS</b> .....	1606
<i>A. Odulaja, L. Bevaart, C. Norman</i>	
<b>NATIONAL AUTHORITY ROLE IN THE IMPLEMENTATION OF SNRI REGIME TO A FUEL FABRICATION PLANT IN ARGENTINA</b> .....	1616
<i>H. Vicens, C. Llacer, S. M. B. Duran</i>	
<b>DEVELOPING A SAFEGUARDS APPROACH FOR A GRAPHITE MODERATED REACTOR AND ASSOCIATED FUEL CYCLE FACILITIES</b> .....	1623
<i>E. B. Rauch, W. S. Charlton, D. G. Ford</i>	

##### **SESSION B INTERNATIONAL SAFEGUARDS: DESIGN INFORMATION VERIFICATION II**

<b>DESIGN INFORMATION VERIFICATION FOR NUCLEAR SAFEGUARDS</b> .....	1633
<i>R. S. Bean, R. R. M. Metcalf, P. C. Durst</i>	
<b>ROBOTIC DEPLOYMENT FOR FACILITY AND HAZARD MAPPING</b> .....	1642
<i>D. A. Few, C. W. Nielsen</i>	
<b>ADVANCED TECHNOLOGIES FOR DESIGN INFORMATION VERIFICATION</b> .....	1652
<i>M. L. Watkins, D. M. Sheen, J. L. Rose, S. E. Cumblidge</i>	
<b>THE USE OF 3D LASER BASED SYSTEMS FOR IAEA SG DESIGN INFORMATION VERIFICATION (DIV)</b> .....	1662
<i>S. Poirier, M. Moeslinger, M. Zendel, S. Haslam, K. Hughes</i>	
<b>COMPTON DIV: USING A COMPTON-BASED GAMMA-RAY IMAGER FOR DESIGN INFORMATION VERIFICATION OF URANIUM ENRICHMENT PLANTS</b> .....	1671
<i>M. Burks, J. Verbeke, A. Dougan, T. F. Wang, D. Decman, L. Mihailescu</i>	

##### **SESSION C INTERNATIONAL SAFEGUARDS: SAFEGUARDING GAS CENTRIFUGE ENRICHMENT PLANTS I**

<b>A CONCEPT FOR A WORLD-WIDE SYSTEM OF IDENTIFICATION OF UF<sub>6</sub> CYLINDERS</b> .....	1682
<i>P. Friend, D. Lockwood, D. Hurt</i>	
<b>DEVELOPMENT OF A PORTAL MONITOR FOR UF<sub>6</sub> CYLINDER VERIFICATION</b> .....	1687
<i>L. E. Smith, M. M. Curtis, M. W. Shaver, J. Benz, A. C. Misner, E. K. Mace, D. V. Jordan, D. Noss, H. Ford</i>	
<b>ANALYSIS OF FIELD MEASUREMENTS ON UF<sub>6</sub> CYLINDERS AT A COMMERCIAL ENRICHMENT PLANT</b> .....	1697
<i>R. L. Mayer, B. R. McGinnis, J. M. Whitaker, J. Morgan</i>	
<b>SUMMARY OF FIELD MEASUREMENT ON UF<sub>6</sub> CYLINDERS USING ELECTROMECHANICALLY COOLED SYSTEMS</b> .....	1706
<i>B. R. McGinnis, S. E. Smith, A. Solodov, J. M. Whitaker, J. Morgan, R. L. Mayer, J. B. Montgomery</i>	

<b>IN-BORN RADIO FREQUENCY IDENTIFICATION DEVICES FOR SAFEGUARDS USE AT GAS-CENTRIFUGE ENRICHMENT PLANTS .....</b>	<b>1716</b>
<i>R. Ward, M. D. Rosenthal</i>	

**SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: GAMMA MEASUREMENTS II**

<b>ACHIEVEMENTS IN TESTING OF THE MGA AND FRAM ISOTOPIC SOFTWARE CODES UNDER THE DOE/NNSA-IRSN COOPERATION ON GAMMA-RAY ISOTOPIC MEASUREMENT SYSTEMS .....</b>	<b>1727</b>
<i>D. Vo, T. F. Wang</i>	
<b>INTERNATIONAL WORKSHOP ON GAMMA SPECTROMETRY ANALYSIS CODES FOR U AND PU ISOTOPICS: WORKSHOP RESULTS AND NEXT STEPS .....</b>	<b>1737</b>
<i>B. R. McGinnis, A. A. Solodov, J. L. Shipwash, A. V. Zhernosek, T. McKinney, C. Pickett, P. Peerani</i>	
<b>PROGRESS AND GOALS FOR INMM ASC N15 CONSENSUS STANDARD "ADMINISTRATIVE PRACTICES FOR THE DETERMINATION AND REPORTING OF RESULTS OF NON-DESTRUCTIVE ASSAY MEASUREMENTS OF NUCLEAR MATERIAL IN SITU FOR SAFEGUARDS, NUCLEAR CRITICALITY SAFETY, AND OTHER PURPOSES" AND "IMPLEMENTATION PLAN FOR DEFENSE NUCLEAR FACILITIES SAFETY BOARD RECOMMENDATION 2007-1 SAFETY-RELATED IN SITU NONDESTRUCTIVE ASSAY OF RADIOACTIVE MATERIALS." .....</b>	<b>1746</b>
<i>D. S. Bracken, F. W. Lamb</i>	
<b>NONDESTRUCTIVE ASSAY HOLDUP MEASUREMENTS WITH THE ORTEC DETECTIVE .....</b>	<b>1753</b>
<i>D. Vo, D. Bracken, M. Dempsey, W. Geist, M. Gonzales, J. Valdez, T. Wenz</i>	

**SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: NATIONAL NUCLEAR SECURITY ADMINISTRATION**

<b>COMPREHENSIVE ANALYSIS OF SAFEGUARDS STRATEGIES (COMPASS) AS A PROGRAM EFFECTIVENESS INDICATOR.....</b>	<b>1762</b>
<i>J. Poorbaugh</i>	
<b>SAFEGUARDS FIRST PRINCIPLES INITIATIVE (SFPI) .....</b>	<b>1768</b>
<i>A. Whitworth</i>	
<b>PROCESS MONITORING IN THE URANIUM PROCESSING FACILITY (UPF) AT Y-12 (U).....</b>	<b>1781</b>
<i>N/A</i>	
<b>A SELF ASSESSMENT OF THE MATERIAL CONTROL AND ACCOUNTABILITY IMPLEMENTATION FUNCTION BY NATIONAL NUCLEAR SECURITY ADMINISTRATION HEADQUARTERS (NNSA-HQ) PROGRAM ORGANIZATION.....</b>	<b>1791</b>
<i>S. Venkatesh, C. Key</i>	

**SESSION F NONPROLIFERATION AND ARMS CONTROL: INTERNATIONAL SCIENCE & TECHNOLOGY ENGAGEMENT**

<b>NONPROLIFERATION AND ARMS CONTROL TOPICAL PANEL SESSION: INTERNATIONAL SCIENCE &amp; TECHNOLOGY ENGAGEMENT .....</b>	<b>1799</b>
<i>M. Dreicer, L. Livermore, T. Sobolev</i>	

**SESSION G NONPROLIFERATION AND ARMS CONTROL: GLOBAL THREAT REDUCTION INITIATIVE-PROTECT/DOMESTIC**

<b>OVERVIEW OF GLOBAL THREAT REDUCTION INITIATIVE DOMESTIC THREAT REDUCTION EFFORTS.....</b>	<b>1804</b>
<i>P. Tensmeyer, I. Iliopoulos</i>	
<b>CESIUM IRRADIATOR IN-DEVICE DELAY SECURITY ENHANCEMENTS.....</b>	<b>1811</b>
<i>P. Tensmeyer, E. Bodnaruk, S. Brooks, C. Greenholt</i>	
<b>IMPLEMENTATION OF RADIOLOGICAL MATERIAL SECURITY ENHANCEMENTS AT RUTGERS UNIVERSITY .....</b>	<b>1818</b>
<i>P. J. McDermott, J. Pelletier</i>	
<b>GLOBAL THREAT REDUCTION INITIATIVE - DOMESTIC SECURITY PROGRAM RESPONSE FORCE TRAINING AND EXERCISES FOR NUCLEAR AND RADIOLOGICAL SITES .....</b>	<b>1824</b>
<i>M. West, S. Smith, T. Williams</i>	
<b>RESEARCH AND TEST REACTOR SECURITY ENHANCEMENTS .....</b>	<b>1831</b>
<i>C. Johnson, I. Atencio, J. Pelletier, G. Herdes, R. Butler, R. Butler</i>	

**SESSION H WASTE MANAGEMENT: WASTE MANAGEMENT**

<b>ADVANCED INVESTIGATIONS TO EVALUATE SPENT FUEL CASK SAFETY FOR EXTENDED STORAGE PERIODS.....</b>	<b>1836</b>
<i>H. Volzke, D. Wolff, U. Probst</i>	

<b>NUCLEAR SAFEGUARDS INFRASTRUCTURE DEVELOPMENT: TECHNICAL ASSISTANCE TO VIETNAM IN RADIOACTIVE WASTE MANAGEMENT AND ENVIRONMENTAL MONITORING</b> .....	1846
<i>M. Bissani, L. K. Harvey, J. F. Hughes, D. N. Kovacic, D. P. Le, J. McClelland-Kerr, J. L. Shipwash</i>	

**CONCURRENT TECHNICAL SESSION V**

**SESSION A INTERNATIONAL SAFEGUARDS: SAFEGUARDING GAS CENTRIFUGE ENRICHMENT PLANTS II**

<b>HARD BOUNDARIES VERSUS SOFT BOUNDARIES - WHAT ARE THE CONCEPTUAL ADVANTAGES TO SAFEGUARDING SENSITIVE FUEL CYCLE FACILITIES UNDER INTEGRATED SAFEGUARDS</b> .....	1854
<i>R. Leslie, J. Carlson</i>	
<b>SAFEGUARDING GAS CENTRIFUGE PILOT PLANTS</b> .....	1862
<i>H. G. Wood</i>	
<b>SAFEGUARDS FOR ALTERNATIVE UF6 ENRICHMENT PLANTS</b> .....	1870
<i>M. Laughter</i>	
<b>DEMONSTRATION WORKSHOP ON SAFEGUARDS TECHNOLOGIES FOR URANIUM ENRICHMENT PLANTS</b> .....	1880
<i>J. M. Whitaker, D. Lockwood, A. Lousteau, A. Zhernosek</i>	
<b>DEFINING THE NEEDS FOR NON DESTRUCTIVE ASSAY OF UF6 FEED, PRODUCT, AND TAILS AT GAS CENTRIFUGE ENRICHMENT PLANTS AND POSSIBLE NEXT STEPS</b> .....	1890
<i>B. D. Boyer, M. T. Swinhoe</i>	
<b>PROGRESS IN DEVELOPMENT OF AN ADVANCED ENRICHMENT MONITOR BASED ON TRANSMISSION MEASUREMENTS WITH AN X-RAY SOURCE AND NAI(TL) SPECTROMETER</b> .....	1900
<i>K. D. Ianakiev, B. D. Boyer, J. M. Goda, T. R. Hill, C. E. Moss, H. Nguyen, B. P. Nolen, M. T. Paffett, R. F. Parker, M. T. Swinhoe</i>	
<b>THE PROBLEM WITH CONTINUITY OF KNOWLEDGE IN ENRICHMENT PLANT PROCESS MONITORING</b> .....	1912
<i>M. M. Curtis</i>	
<b>INTEGRATING UF6 CYLINDER RF TRACKING WITH CONTINUOUS LOAD CELL MONITORING FOR VERIFYING DECLARED UF6 FEED AND WITHDRAWAL OPERATIONS</b> .....	1920
<i>A. M. Krichinsky, L. P. Miller, C. A. Pickett, G. D. Richardson, N. C. Rowe, J. M. Whitaker, J. R. Younkin</i>	

**SESSION B INTERNATIONAL SAFEGUARDS: U.S. ADDITIONAL PROTOCOL IMPLEMENTATION**

<b>ROLE OF THE BUREAU OF INDUSTRY AND SECURITY (BIS) IN IMPLEMENTING THE ADDITIONAL PROTOCOL TO THE U.S.-IAEA SAFEGUARDS AGREEMENT</b> .....	1925
<i>J. Shepherd</i>	
<b>TRAINING PROGRAM TO PREPARE THE U.S. DOE LABORATORIES FOR THE ENTRY INTO FORCE OF THE PROTOCOL ADDITIONAL TO THE AGREEMENT BETWEEN THE UNITED STATES OF AMERICA AND THE INTERNATIONAL ATOMIC ENERGY AGENCY FOR THE APPLICATION OF SAFEGUARDS IN THE UNITED STATES OF AMERICA</b> .....	1930
<i>B. D. Boyer, R. Stevens, E. Uribe, M. A. Sandoval, M. N. Sandoval, J. U. Valente, J. H. Jo, J. Sellen, E. Wonder</i>	
<b>PREPARING FOR THE ENTRY-INTO-FORCE OF THE U.S. ADDITIONAL PROTOCOL AT THE NATIONAL SECURITY LABORATORIES</b> .....	1940
<i>J. Essner, A. Dougan, M. Dahlstrom, J. Marcisz, S. Graham, L. McLemore</i>	
<b>LESSONS LEARNED AT THE IDAHO NATIONAL LABORATORY FOR THE ENTRY INTO FORCE OF THE U.S. ADDITIONAL PROTOCOL</b> .....	1948
<i>J. C. Joe, S. A. Hoiland</i>	
<b>PREPARATIONS FOR ADDITIONAL PROTOCOL IMPLEMENTATION AT OAK RIDGE NATIONAL LABORATORY</b> .....	1952
<i>R. A. Cain, O. J. McCowan</i>	
<b>LESSONS LEARNED DURING THE TRAINING EXERCISE FOR THE ENTRY INTO FORCE OF THE U.S. ADDITIONAL PROTOCOL IN THE DOE COMPLEX</b> .....	1961
<i>B. D. Boyer</i>	

**SESSION C INTERNATIONAL SAFEGUARDS: NONPROLIFERATION AND SAFEGUARDS HUMAN CAPITAL DEVELOPMENT**

<b>NEXT GENERATION SAFEGUARDS INITIATIVE WORKSHOP ON ENHANCED RECRUITING FOR INTERNATIONAL SAFEGUARDS</b> .....	1964
<i>S. E. Pepper, M. D. Rosenthal, L. G. Fishbone, D. M. Occhiogrosso, C. J. Carroll, M. Dreicer, R. Wallace, J. Fankhauser</i>	
<b>PROPOSED METHODOLOGY FOR DEVELOPING A NATIONAL STRATEGY FOR HUMAN RESOURCE DEVELOPMENT: LESSONS LEARNED FROM A NNSA WORKSHOP</b> .....	1974
<i>O. Elkhamri, S. Frazar, J. Essner, E. Vergino, M. Bissani, K. Apt, J. McClelland-Kerr, M. Mininni, M. Van-Sickle, D. Kovacic</i>	
<b>AN ACADEMY FOR PREPARING AMERICAN SAFEGUARDS INSPECTORS FOR THE IAEA</b> .....	1983
<i>P. C. Durst</i>	
<b>FUTURE DIRECTIONS IN SAFEGUARDS EDUCATION AND TRAINING</b> .....	1992
<i>M. Leek, W. Jansses, D. Dickman, G. Janssens-Maenhout</i>	

<b>TECHNICAL TRAINING WORKSHOP ON INTERNATIONAL SAFEGUARDS: AN INTRODUCTION TO SAFEGUARDS FOR EMERGING NUCLEAR STATES</b> .....	2002
<i>F. Sarah, Z. Gastelum, J. Olsen, C. Mathews, A. Solodov, A. Zhermosek, A. Raffo-Caiado, G. Baldwin, K. Horak, J. McClelland-Kerr, M. Van-Sickle, M. Mininni, D. Kovacic</i>	
<b>THE OPEN WORLD NONPROLIFERATION VISITORS PROGRAM AND ITS BENEFITS FOR YOUNG RUSSIAN LEADERS</b> .....	2012
<i>N. V. Saraeva</i>	
<b>INTERNATIONAL SAFEGUARDS TECHNOLOGY AND POLICY EDUCATION AND TRAINING PILOT PROGRAMS</b> .....	2022
<i>M. Dreicer, G. Anzelon, J. Essner, A. Dougan, J. Doyle, B. Boyer, P. Hypes, E. Sokova, F. Wehling</i>	
<b>SAFEGUARDS EDUCATION OUTREACH AT TEXAS A&amp;M UNIVERSITY</b> .....	2029
<i>D. G. Ford, W. S. Charlton, K. Ragusa</i>	
<b>DEVELOPMENTS IN THE NUCLEAR SAFEGUARDS AND SECURITY ENGINEERING DEGREE PROGRAM AT TOMSK POLYTECHNIC UNIVERSITY</b> .....	2036
<i>V. I. Boiko, D. G. Demyanyuk, M. E. Silaev</i>	
<b>DEVELOPING BETTER PRACTICE IN SECURITY, SAFEGUARDS AND NUCLEAR MATERIALS MANAGEMENT ACROSS THE NDA ESTATE</b> .....	2043
<i>B. Burrows, R. Blue</i>	

#### **SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: MEASUREMENT MODELING**

<b>SIMULATED VERIFICATION OF FUEL ELEMENT INVENTORY IN A SMALL REACTOR CORE USING THE NUCLEAR MATERIALS IDENTIFICATION SYSTEM (NMIS)</b> .....	2053
<i>B. R. Grogan, J. T. Mihalcz</i>	
<b>INTRINSIC EFFICIENCIES OF SCINTILLATION DETECTORS FOR NUCLEAR NONPROLIFERATION APPLICATIONS</b> .....	2063
<i>J. L. Dolan, M. Flaska, S. A. Pozzi</i>	
<b>MONTE CARLO STUDY OF FEASIBILITY OF PASSIVE, TIME-COINCIDENCE MEASUREMENTS FOR MONITORING LARGE FISSILE STORAGE ARRAYS</b> .....	2072
<i>J. Bevins, J. Hayward, J. Mihalcz</i>	
<b>CHARACTERIZATION OF A BORON-LOADED LIQUID SCINTILLATOR BC-523A FOR NEUTRON ENERGIES BETWEEN 0.8 AND 6 MEV</b> .....	2083
<i>M. Flaska, S. A. Pozzi, L. C. Mihailescu, P. Schillebeeckx</i>	
<b>MEASUREMENT AND CHARACTERIZATION OF NUCLEAR MATERIAL AT IDAHO NATIONAL LABORATORY</b> .....	2093
<i>J. L. Dolan, M. Flaska, S. A. Pozzi, D. L. Chichester</i>	
<b>DEVELOPMENT OF A SIMULATION METHODOLOGY FOR NEUTRON MULTIPLICITY ANALYSIS</b> .....	2102
<i>E. C. Miller, S. D. Clarke, M. Flaska, S. A. Pozzi, P. Peerani</i>	

#### Volume 4

<b>MONTE CARLO SIMULATIONS OF MULTIPLICITY MEASUREMENTS OF THE PLUTONIUM BERP BALL</b> .....	2112
<i>E. C. Miller, B. D. Dennis, S. D. Clarke, S. A. Pozzi, J. K. Mattingly</i>	
<b>MONTE CARLO SIMULATION OF PORTAL MONITOR DETECTION PERFORMANCE</b> .....	2122
<i>R. Evans</i>	
<b>THORIUM BLENDED AND REGULAR MOX BURN-UP STUDIES FOR FAST REACTOR FUEL CYCLE SAFEGUARDS</b> .....	2130
<i>S. Chirayath, J. Ragusa, P. Nelson</i>	

#### **SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: NDA MEASUREMENTS**

<b>HIGH PERFORMANCE, DIRECTIONAL GAMMA RAY DETECTOR SOLUTIONS FOR THE DETECTION AND QUANTIFICATION OF CRITICAL MATERIALS</b> .....	2138
<i>G. V. Walford, J. S. Bogard, S. E. Smith, A. A. Solodov</i>	
<b>ALTERNATIVE MATERIALS TO CADMIUM FOR NEUTRON ABSORBERS IN SAFEGUARDS APPLICATIONS</b> .....	2150
<i>C. Freeman, W. Geist, J. West</i>	
<b>CAN ULTRA-HIGH ENERGY RESOLUTION GAMMA-RAY SPECTROMETERS DIRECTLY DETECT FISSILE ISOTOPES IN SPENT NUCLEAR FUEL?</b> .....	2160
<i>O. B. Drury, A. Robles-Olson, M. Velazquez, J. G. Dreyer, S. Friedrich</i>	
<b>DESIGN OF HEU TEST OBJECTS</b> .....	2169
<i>C. Blessinger, C. Pickett, J. H. Leckey, A. DeMint, J. Gooch, T. Hawk</i>	
<b>FABRICATION OF A SOURCE TO EVALUATE SNM PORTALS</b> .....	2180
<i>J. H. Leckey, A. DeMint, J. Gooch, T. Hawk, C. Pickett, C. Blessinger</i>	
<b>TESTING OF LIQUID SCINTILLATOR MATERIALS FOR GAMMA AND NEUTRON DETECTION</b> .....	2193
<i>J. M. Verbeke, D. Dietrich, A. Dougan, A. Glenn, P. Kerr, L. F. Kakae, R. J. Newby, N. Snyderman, R. Wurtz</i>	

<b>DESIGN AND OPERATION OF A LARGE VOLUME TWIN CELL HEAT-FLOW CALORIMETER FOR THE MEASUREMENT OF BOTH TRITIUM AND PLUTONIUM SAMPLES.....</b>	2204
<i>J. A. Mason, K. J. Burke, N. J. Challacombe, A. R. Packman, A. C. N. Townner</i>	

**SESSION F NONPROLIFERATION AND ARMS CONTROL: TRANSPARENCY AND VERIFICATION TECHNOLOGIES**

<b>FROM START TO FINISH? STRATEGIC CHALLENGES REMAINING AFTER A START FOLLOW-ON.....</b>	2212
<i>J. E. Doyle</i>	
<b>RESEARCH INTO NUCLEAR ARMS CONTROL VERIFICATION AT THE UK ATOMIC WEAPONS ESTABLISHMENT AUTHORS: HELEN WHITE, DAVID M. CHAMBERS, DAVID KEIR, KEIR ALLEN .....</b>	2221
<i>H. White, D. M. Chambers, D. Keir, K. Allen, A. Burjan, M. Owen</i>	
<b>DESIGNING A 3RD GENERATION, AUTHENTICATABLE ATTRIBUTE MEASUREMENT SYSTEM .....</b>	2229
<i>J. Thorn, P. Karpus, P. Santi, M. Smith, D. Vo, R. Williams</i>	
<b>ULTRA-LOW FIELD NMR FOR DETECTION AND CHARACTERIZATION OF <sup>235</sup>UF<sub>6</sub>.....</b>	2236
<i>M. A. Espy, P. E. Magnelind, A. N. Matlashov, A. V. Urbaitis, P. L. Volegov</i>	
<b>USING ROSE AND COMPASS FOR AUTHENTICATION.....</b>	2244
<i>G. White</i>	
<b>FIELDABLE NUCLEAR MATERIAL IDENTIFICATION SYSTEM.....</b>	2250
<i>J. E. Radle, D. E. Archer, J. A. Mullens, J. T. Mihalcz, C. L. Britton, R. F. Lind, M. C. Wright, C. R. Brittain</i>	
<b>DESIGNING A MINIMUM-FUNCTIONALITY NEUTRON AND GAMMA MEASUREMENT INSTRUMENT WITH A FOCUS ON AUTHENTICATION.....</b>	2259
<i>P. J. Karpus, R. B. Williams</i>	
<b>REFLECTIVE PARTICLE TAG FOR ARMS CONTROL AND SAFEGUARDS AUTHENTICATION.....</b>	2267
<i>A. Gonzales, N. Wang, A. Faust, K. Larson, J. Barberger, K. Horak, N. Schanfein, M. Trujillo, K. Tolk, P. Merkle</i>	
<b>CHALLENGE MEASUREMENTS FOR AUTHENTICATION.....</b>	2274
<i>W. K. Pitts</i>	

**SESSION G NONPROLIFERATION AND ARMS CONTROL: GLOBAL THREAT REDUCTION INITIATIVE – REMOVE**

<b>RECOVERING U.S.-ORIGIN HEU SPENT NUCLEAR FUEL FROM FOREIGN RESEARCH FACILITIES .....</b>	2279
<i>C. Messick, J. L. Taylor</i>	
<b>INTERNATIONAL COOPERATION ON RADIOLOGICAL THREAT REDUCTION PROGRAMS IN RUSSIA .....</b>	2284
<i>C. C. Landers, A. P. Tatyrek</i>	
<b>10 YEARS AND 20,000 SOURCES: THE OFFSITE SOURCE RECOVERY PROJECT .....</b>	2289
<i>J. Whitworth, C. Abeyta, J. Matzke, J. A. Tompkins, M. Pearson</i>	
<b>DESIGN AND APPLICATION OF SPENT NUCLEAR FUEL CASKS FOR THE KAZAKHSTAN BN-350 PROGRAM .....</b>	2300
<i>E. Howden, R. Snipes, J. Ballowe, V. Tkachenko</i>	
<b>GTRI ACCOMPLISHMENTS AND PLANS FOR REMOVING AND DISPOSING OF CIVILIAN HEU.....</b>	2308
<i>J. Chamberlin</i>	
<b>HIGHLY ENRICHED URANIUM SPENT NUCLEAR FUEL SHIPMENT FROM LATVIA.....</b>	2311
<i>I. Bolshinsky, S. D. Moses</i>	
<b>RUSSIAN-ORIGIN HIGHLY ENRICHED URANIUM SPENT NUCLEAR FUEL SHIPMENT FROM BULGARIA.....</b>	2317
<i>I. Bolshinsky, K. Allen, T. Apostolov, I. Dimitrov</i>	
<b>RUSSIAN-ORIGIN HIGHLY ENRICHED URANIUM SPENT NUCLEAR FUEL SHIPMENT FROM HUNGARY.....</b>	2324
<i>I. Bolshinsky, J. Dewes, J. Gado, I. Vidovszky, S. Tozser</i>	
<b>THE SHIPMENT OF RUSSIAN-ORIGIN HIGHLY ENRICHED URANIUM RESEARCH REACTOR SPENT NUCLEAR FUEL FROM KAZAKHSTAN.....</b>	2332
<i>I. Bolshinsky, J. Thomas, P. Chakrov, D. Nakipov</i>	

**SESSION H PACKAGING AND TRANSPORTATION: PACKAGING: SPECIAL PANEL SESSION**

<b>SUMMARY OF SPECIAL PANEL DISCUSSION PACKAGING AND TRANSPORTATION CONTAINMENTS ASME BOILER &amp; PRESSURE VESSEL CODE, SECTION III, DIVISION 3 (NUPACK).....</b>	2339
<i>N/A</i>	

**SESSION I MATERIALS CONTROL AND ACCOUNTABILITY/WASTE MANAGEMENT/INTERNATIONAL SAFEGUARDS: SPENT FUEL MEASUREMENTS**

<b>DETERMINATION OF PLUTONIUM CONTENT IN SPENT FUEL WITH NONDESTRUCTIVE ASSAY .....</b>	2341
<i>S. J. Tobin, N. P. Sandoval, M. L. Fensin, S. Y. Lee, B. A. Ludewigt, H. O. Menlove, B. J. Quiter, A. Rajasingum, M. A. Shear, L. E. Smith, M. T. Swinhoe, S. J. Thompson</i>	



<b>MEASUREMENT OF PLUTONIUM IN SPENT NUCLEAR FUEL BY SELF-INDUCED X-RAY FLUORESCENCE</b> .....	2351
<i>A. S. Hoover, C. R. Rudy, S. J. Tobin, W. S. Charlton, A. Stafford, D. Strohmeyer, S. Saavedra</i>	
<b>VERIFICATION OF PLUTONIUM CONTENT IN SPENT FUEL ASSEMBLIES USING NEUTRON SELF-INTERROGATION</b> .....	2361
<i>H. O. Menlove, S. H. Menlove, S. J. Tobin</i>	
<b>SPENT NUCLEAR FUEL SELF-INDUCED X-RAY FLUORESCENCE SIMULATIONS FOR NORTH ANNA AND TMI</b> .....	2371
<i>A. S. Stafford, W. S. Charlton, J. White, A. S. Hoover, S. Saavedra</i>	
<b>UNDER-SODIUM VIEWING TECHNOLOGY FOR IMPROVEMENT OF FAST-REACTOR SAFEGUARDS</b> .....	2381
<i>D. H. Beddingfield, Y. Kawakubo, J. J. Gerhart</i>	
<b>ACCOUNTING AND CONTROL OF RADIOACTIVE SUBSTANCES AND WASTE: APPLICATION OF NEOGEOGRAPHY PRINCIPLES</b> .....	2391
<i>S. U. Gevorkov, V. A. Agamalyan</i>	

## **CONCURRENT TECHNICAL SESSION VI**

### **SESSION A INTERNATIONAL SAFEGUARDS: SAFEGUARDS POLICIES, ISSUES AND CHALLENGES**

<b>LONG-RANGE STRATEGIC PLANNING IN THE IAEA DEPARTMENT OF SAFEGUARDS</b> .....	2398
<i>J. N. Cooley, B. Moran, E. Pujol, J. Rissanen</i>	
<b>IAEA INSPECTIONS FOR UNDECLARED AND DECLARED ACTIVITIES: IS A MORE ROBUST APPROACH NEEDED?</b> .....	2408
<i>M. Schanfein, M. D. Rosenthal</i>	
<b>A COMPARISON OF THE ADDITIONAL PROTOCOLS OF THE FIVE NUCLEAR WEAPON STATES AND THE ENSUING SAFEGUARDS BENEFITS TO INTERNATIONAL NONPROLIFERATION EFFORTS</b> .....	2415
<i>E. Uribe, M. A. Sandoval, M. N. Sandoval, R. M. Leitch, B. D. Boyer</i>	
<b>COOPERATION BETWEEN JAEA AND DOE IN SAFEGUARDS AND NUCLEAR NONPROLIFERATION</b> .....	2425
<i>Y. Kawakubo, M. Hori</i>	
<b>NUCLEAR SAFEGUARDS INFRASTRUCTURE DEVELOPMENT AND INTEGRATION WITH SAFETY AND SECURITY</b> .....	2435
<i>D. N. Kovacic, A. Raffo-Caiado, J. McClelland-Kerr, M. Van-Sickle, M. Bissani, K. Apt</i>	
<b>ENABLING INTERNATIONAL SAFEGUARDS RESEARCH AND DEVELOPMENT IN THE UNITED STATES</b> .....	2442
<i>J. E. Dwight, M. J. Schanfein, T. A. Bjornard</i>	

### **SESSION B INTERNATIONAL SAFEGUARDS: PROCESS MONITORING – I SOLUTION BASED MONITORING**

<b>DIFFERENTIATING BETWEEN NORMAL AND ABNORMAL SITUATIONS WITH SOLUTION MONITORING SYSTEMS</b> .....	2447
<i>J. Howell</i>	
<b>THE OPTIMAL PERFORMANCE OF CURRENT SOLUTION MONITORING EVALUATION SYSTEM APPROACHES</b> .....	2457
<i>T. Burr, J. Howell, G. Bevan</i>	
<b>TANK MONITORING EVALUATION SYSTEMS: METHODS AND ALGORITHMS</b> .....	2467
<i>J. Howell, R. Binner, G. Bevan, B. Sirajov</i>	
<b>CHANGE DETECTION IN SOLUTION MONITORING FOR SAFEGUARDS</b> .....	2477
<i>T. Burr, J. Howell, C. Longo, M. Suzuki</i>	
<b>MEASUREMENT ERROR MODELING AND SIMULATION FOR SOLUTION MONITORING</b> .....	2487
<i>T. Burr, M. Hamada</i>	
<b>PROCESS MONITORING FOR NUCLEAR SAFEGUARDS</b> .....	2496
<i>M. Ehinger, G. Pomeroy, K. Budlong-Sylvester</i>	
<b>USING RULES-BASED EVENT PROCESSING FOR SAFEGUARDS MONITORING SYSTEMS</b> .....	2502
<i>J. R. Younkin, C. A. Pickett, G. D. Richardson, A. M. Krichinsky, N. C. Rowe</i>	
<b>FIRST TRIAL TO STUDY THE FEASIBILITY OF DIRECT PLUTONIUM MASS MEASUREMENT IN A PROCESS TANK BY A NEW NDA - ADVANCED SOLUTION MEASUREMENT AND MONITORING SYSTEM -</b> .....	2509
<i>H. Nakamura, A. Takaya, Y. Mukai, T. Hosoma, K. Yoshimoto, T. Tamura, T. Iwamoto</i>	

### **SESSION C INTERNATIONAL SAFEGUARDS: NONPROLIFERATION AND SAFEGUARDS TRAINING PROGRAMS AND RESULTS**

<b>AN OVERVIEW OF THE 17TH US-IAEA "STATE SYSTEMS OF ACCOUNTING FOR AND CONTROL OF NUCLEAR MATERIALS" COURSE</b> .....	2518
<i>M. Flagg, D. J. Robertson, J. Gahl, L. Foyto</i>	
<b>ANALYSIS OF HISTORICAL DELTA VALUES FOR IAEALLANL NDA TRAINING COURSES</b> .....	2526
<i>E. Bonner, W. Geist, P. Hypes, P. Santi, M. Swinhoe</i>	

<b>KNOWLEDGE- AND SKILL-BASED INSTRUCTION FOR IAEA SAFEGUARDS INSPECTORS</b> .....	2537
<i>C. Carroll, C. Dye</i>	
<b>TRAINING IN ENVIRONMENTAL ANALYSES FOR SAFEGUARDS</b> .....	2547
<i>R. W. Williams, A. M. Gaffney, N. A. Hutcheon, A. B. Kersting</i>	
<b>PROOF-OF-CONCEPT APPROACHES FOR KNOWLEDGE CAPTURE</b> .....	2550
<i>Q. S. B. Truong, K. Desson, D. J. Martin</i>	
<b>NONPROLIFERATION EDUCATION INITIATIVES FOR THE NEXT GENERATION OF SAFEGUARDS SPECIALISTS</b> .....	2556
<i>M. D. Eipeldauer</i>	
<b>THE BALANCE BETWEEN VISUAL AND TEXTUAL TRAINING MATERIAL: HOW MUCH IS A PICTURE REALLY WORTH?</b> .....	2564
<i>Q. S. B. Truong, N. Herber, D. J. Martin</i>	
<b>A REVIEW OF COMPUTATIONAL TOOLS FOR NUCLEAR APPLICATIONS AVAILABLE FROM THE RADIATION SAFETY INFORMATION COMPUTATIONAL CENTER (RSICC)</b> .....	2573
<i>B. L. Kirk</i>	
<b>IMPLEMENTATION OF TRAINING SIMULATORS AND COMPUTER MODELS FOR IMPROVING TRANSPORTATION SECURITY TRAINING</b> .....	2578
<i>Y. I. Davydov, A. V. Izmailov, N. N. Shemigon, T. D. Welch, W. C. Brunsdon, P. A. Byrson</i>	

**SESSION D MATERIALS CONTROL AND ACCOUNTABILITY: METHODS STANDARDS & BEST PRACTICES**

<b>FEASIBILITY STUDIES TO ESTABLISH AT THE KAZAKHSTAN ULBA METALLURGICAL PLANT THE MANUFACTURING CAPABILITY TO PRODUCE LOW-ENRICHED URANIUM CERTIFIED REFERENCE MATERIALS</b> .....	2587
<i>J. Neuhoff, P. Croatto, G. Pfennigwerth, A. Mikhailenko, I. Maliutina, J. Kuzminski, J. Nations</i>	
<b>ACCREDITED STANDARDS COMMITTEE N15 DEVELOPMENTS AND FUTURE DIRECTIONS</b> .....	2593
<i>C. Mathews, M. May, L. Preston</i>	
<b>NBL SAFEGUARDS MEASUREMENT EVALUATION PROGRAM: UNCERTAINTY ESTIMATION IN NUCLEAR MATERIAL ACCOUNTABILITY MEASUREMENTS</b> .....	2603
<i>B. Srinivasan, W. F. Guthrie, K. J. Mathew, J. Neuhoff, C. E. Pietre</i>	
<b>A SYSTEMS ENGINEERING PROCESS FOR SAFEGUARDS DESIGN</b> .....	2613
<i>F. A. Duran, B. B. Cipiti</i>	
<b>THE GUM UNCERTAINTY APPROACH FOR SAFEGUARDS MEASUREMENTS</b> .....	2623
<i>S. Goldberg</i>	
<b>IMPLEMENTING NEW METHODS OF LASER MARKING OF ITEMS IN THE NUCLEAR MATERIAL CONTROL AND ACCOUNTABILITY SYSTEM AT SSC RF-IPPE: AN AUTOMATED LASER MARKING SYSTEM</b> .....	2628
<i>V. I. Regoushevsky, S. D. Tambovtsev, V. G. Dyukhshestnov, V. F. Efimenko, A. I. Ilyantsev</i>	
<b>ENHANCED MATERIAL ACCOUNTABILITY THROUGH USE OF CENTRIFUGAL CONTACTORS AT THE Y-12 NATIONAL SECURITY COMPLEX</b> .....	2634
<i>G. L. Pfennigwerth, P. Singh, J. Birdwell, J. Randolph</i>	

**SESSION E MATERIALS CONTROL AND ACCOUNTABILITY/WASTE MANAGEMENT: NUCLEAR MATERIALS MANAGEMENT II**

<b>DOE ORDER 410.X MANAGEMENT OF NUCLEAR MATERIALS</b> .....	2641
<i>P. D. Edgerton</i>	
<b>PIT DISASSEMBLY AND CONVERSION-CHALLENGES AND OPPORTUNITIES</b> .....	2648
<i>R. A. Lewis</i>	
<b>ENVIRONMENTAL DOCUMENTATION FOR THE PLUTONIUM DISPOSITION PROGRAM</b> .....	2658
<i>H. Nigam, C. D. Groome</i>	
<b>HANFORD DE-INVENTORY</b> .....	2668
<i>J. M. Silko, G. R. Konzek</i>	
<b>LOS ALAMOS NATIONAL LABORATORY STANDARD NUCLEAR MATERIAL CONTAINER</b> .....	2675
<i>C. J. Mills, T. A. Stone, L. Worl, T. F. Yarbrow</i>	
<b>NEW GENERATION STANDARD NUCLEAR MATERIAL CONTAINER</b> .....	2685
<i>L. Anderson, T. Stone, T. Yarbrow, P. Smith, T. Wickland</i>	

**SESSION F NONPROLIFERATION AND ARMS CONTROL: PROLIFERATION RESISTANCE: EVALUATION AND DECISIONS**

<b>GUIDELINES AND RECOMMENDATIONS FOR PERFORMING STRUCTURED PROLIFERATION RESISTANCE EVALUATIONS USING THE PROLIFERATION RESISTANCE AND PHYSICAL PROTECTION (PR&amp;PP) METHODOLOGY</b> .....	2693
<i>N/A</i>	

<b>EVALUATING PROLIFERATION RESISTANCE AND SECURITY NEEDS OF NUCLEAR FUEL CYCLE TECHNOLOGIES THROUGH A FUZZY-LOGIC BARRIER MODEL</b> .....	2694
<i>S. E. Skutnik, M. S. Yim, J. Li, D. N. McNelis</i>	
<b>THE UTILITY OF SOCIAL MODELING FOR PROLIFERATION ASSESSMENT</b> .....	2704
<i>G. Coles, Z. Gastelum, A. Brothers, S. Thompson</i>	
<b>INTERPRETATION AND USE OF THE RESULTS OF PROLIFERATION RESISTANCE STUDIES.</b> .....	2713
<i>M. D. Zentner, G. Pomeroy, R. A. Bari, G. G. M. Cojazzi, E. Haas, T. Killeen, P. Peterson, J. J. Whitlock, E. Wonder</i>	
<b>NUCLEAR ENERGY IN THE TRANSITION TO A NUCLEAR-WEAPON-FREE WORLD</b> .....	2721
<i>H. A. Feiveson, A. Glaser</i>	
<b>DETERMINATION OF RELATIVE IMPORTANCE OF NONPROLIFERATION FACTORS</b> .....	2732
<i>R. Metcalf</i>	
<b>QUANTIFYING NUCLEAR WEAPONS LATENCY</b> .....	2743
<i>D. J. Sweeney, J. M. Stanker, W. S. Charlton</i>	
<b>AN OPEN SOURCE BASED APPROACH TO PREDICT NUCLEAR PROLIFERATION DECISIONS.</b> .....	2751
<i>J. Li, M. S. Yim, D. N. McNelis</i>	

**SESSION G NONPROLIFERATION AND ARMS CONTROL: BORDER SECURITY/ILLICIT TRAFFICKING**

<b>EXAMINING THE RISKS OF NUCLEAR TRAFFICKING</b> .....	2761
<i>G. Balatsky</i>	
<b>THE ROLE OF BORDERS IN RADIOACTIVE AND NUCLEAR MATERIALS COUNTERPROLIFERATION</b> .....	2765
<i>R. Duggan</i>	
<b>OPTIMIZATION OF OPERATIONAL PROCEDURES TO PREVENT UNAUTHORIZED TRANSPORTATION OF RADIOACTIVE MATERIALS ACROSS BORDERS</b> .....	2771
<i>L. Kagan, A. Stavrov</i>	
<b>BORDER RADIOACTIVITY MONITORING UPGRADING PROJECT IN FINLAND</b> .....	2777
<i>T. Honkamaa</i>	
<b>X-RAY INSPECTION INTERFERENCE ON A GERMANIUM SPECTROSCOPY PORTAL MONITOR</b> .....	2783
<i>B. M. Young, S. W. Mettler, R. Huckins, M. Rotty</i>	
<b>PRIORITIES FOR TECHNOLOGY DEVELOPMENT AND POLICY TO REDUCE THE RISK FROM RADIOACTIVE MATERIALS</b> .....	2792
<i>R. Duggan</i>	
<b>SEARCHING AND IDENTIFYING RADIOACTIVE MATERIAL WITH HANDHELD HIGH-RESOLUTION GAMMA DETECTORS</b> .....	2798
<i>W. Berky, S. Chmel, H. Friedrich, T. Koble, M. Risse, W. Rosenstock</i>	
<b>STANDOFF PERFORMANCE OF HPGE DETECTORS IN IDENTIFICATION OF GAMMA-RAY RADIATION SOURCES</b> .....	2808
<i>R. M. Keyser, T. R. Twomey, S. Hitch</i>	
<b>PROBABILISTIC EFFECTIVENESS METHODOLOGY USE IN PREVENTIVE RADIOLOGICAL/NUCLEAR DETECTION</b> .....	2816
<i>R. W. Snare</i>	

Volume 5

**SESSION H NONPROLIFERATION AND ARMS CONTROL: GLOBAL THREAT REDUCTION INITIATIVE-CONVERT**

<b>GLOBAL THREAT REDUCTION INITIATIVE REACTOR CONVERSION PROGRAM: STATUS AND CURRENT PLANS</b> .....	2822
<i>P. Staples, W. Leach, J. Lacey</i>	
<b>GOING FROM HEU TO LEU: CONVERSION OF THE OREGON STATE TRIGA<sup>®</sup> REACTOR</b> .....	2828
<i>S. T. Keller, S. R. Reese</i>	
<b>CONVERSION OF THE SAFARI-1 RESEARCH REACTOR FROM HEU TO LEU FUEL</b> .....	2838
<i>G. Ball</i>	
<b>STATUS OF MO-99 PRODUCTION USING LOW-ENRICHED URANIUM</b> .....	2845
<i>G. F. Vandegrift, A. Bakel, S. Chemerisov, J. Fortner, A. Gelis, A. Hebden, J. Jerden, A. Leyva, D. Stepinski, T. Wiencek, A. Ziegler</i>	
<b>THE FUEL FABRICATION CAPABILITY (FFC) PROJECT OVERVIEW: FROM RESEARCH TO PRODUCTION</b> .....	2857
<i>J. Cleary, M. Zocher, J. Creasy, R. Omberg, J. Hopkins, M. Moran, J. Roglans</i>	
<b>USE OF HIGHLY-ENRICHED URANIUM IN RUSSIAN REACTORS</b> .....	2864
<i>P. Padvig, S. S. Voss</i>	

**SESSION PACKAGING AND TRANSPORTATION: PACKAGING DEVELOPMENT AND OPERATIONS**

<b>DEVELOPMENT OF THE H1700 SHIPPING PACKAGE</b> .....	2874
<i>G. A. Abramczyk, B. M. Loftin, P. S. Mann</i>	
<b>OPERATIONAL READINESS AND USE OF THE NEW ES-3100 TYPE B RAM SHIPPING CONTAINER</b> .....	2881
<i>J. G. Arbital, K. A. Pilcher, L. Roberson, S. Johnson, B. A. McKeehan</i>	

<b>REGULATORY TESTING OF A NEW TYPE AF RADIOACTIVE MATERIAL PACKAGING FOR THE DEPARTMENT OF ENERGY</b> .....	2891
<i>K. R. Eberl, P. S. Blanton, A. K. Kapoor, P. T. Mann</i>	
<b>EVALUATION OF MATERIAL FLAWS IDENTIFIED DURING FABRICATION LEAK TESTING OF A 304L CONTAINMENT VESSEL</b> .....	2901
<i>P. S. Blanton, M. Trosen, S. Martin, K. R. Eberl, W. Daugherty</i>	
<b>MEETING PACKAGING NEEDS FOR RADIOACTIVE MATERIAL</b> .....	2910
<i>N/A</i>	
<b>STRUCTURAL ANALYSES OF FUEL CASKS SUBJECTED TO BOLT PRELOAD, INTERNAL PRESSURE AND SEQUENTIAL DYNAMIC IMPACTS</b> .....	2915
<i>T. T. Wu</i>	
<b>SHIPMENT OF SMALL QUANTITIES OF UNSPECIFIED RADIOACTIVE MATERIAL IN CHALFANT PACKAGINGS</b> .....	2925
<i>A. C. Smith, G. A. Abramczyk, J. S. Bellamy, S. J. Nathan</i>	
<b>REGULATORY LEAK TESTING OF THE BULK TRITIUM SHIPPING PACKAGE</b> .....	2932
<i>P. S. Blanton, D. Trapp, G. Sides, K. R. Eberl</i>	

**SESSION J PHYSICAL PROTECTION/MATERIALS CONTROL AND ACCOUNTABILITY: ASSESSMENT METHODOLOGIES**

<b>DOMESTIC SAFEGUARDS SYSTEM EFFECTIVENESS SURVEY RESULTS</b> .....	2942
<i>C. W. Coates</i>	
<b>THE CONCEPT OF EQUIVALENT PROTECTION</b> .....	2951
<i>R. L. Donovan</i>	
<b>QUANTIFYING THE DEGREE OF BALANCE IN PHYSICAL PROTECTION SYSTEMS</b> .....	2955
<i>G. D. Wyss</i>	
<b>VULNERABILITY TESTING AGAINST CYBER TERROR</b> .....	2962
<i>J. S. Kim, D. H. Yoo, H. Yoo, H. Lee, S. W. Kwak, S. S. Jang, J. K. Kim, W. K. Yoon</i>	
<b>A TOTAL RISK ASSESSMENT METHODOLOGY FOR SECURITY ASSESSMENT</b> .....	2970
<i>G. Wyss, D. Pless, R. Rhea, C. Silva, P. Kaplan, R. Aguilar, S. Conrad</i>	
<b>RISK-BASED COST-BENEFIT ANALYSIS FOR SECURITY ASSESSMENT PROBLEMS</b> .....	2980
<i>G. D. Wyss, J. Darby, C. Silva, A. Walter</i>	
<b>HOURGLASS SAMPLING OF PARTICIPANTS IN THE HUMAN RELIABILITY PROGRAM (HRP) FOR DRUG AND ALCOHOL (D&amp;A) TESTING</b> .....	2990
<i>I. R. Thomas</i>	
<b>A SYSTEMS-BASED APPROACH TO INSIDER SECURITY</b> .....	2999
<i>P. Hester, F. A. Duran, D. P. Duggan</i>	

**CONCURRENT TECHNICAL SESSIONS VII**

**SESSIONS A INTERNATIONAL SAFEGUARDS: NEXT GENERATION SAFEGUARDS INITIATIVE**

<b>A NEXT GENERATION SAFEGUARDS INITIATIVE: OUTLINE OF INTERNATIONAL COOPERATION</b> .....	3009
<i>M. W. Goodman, S. A. Lamontagna, J. P. McClelland-Kerr, D. Lockwood, K. R. Mendelsohn, J. K. Reed, J. K. Sprinkle, A. D. Sunshine</i>	
<b>NEXT GENERATION SAFEGUARDS INITIATIVE: HUMAN CAPITAL DEVELOPMENT PROGRAMS</b> .....	3018
<i>D. Lockwood, E. Wonder, A. Seward</i>	
<b>INTERNATIONAL COLLABORATIONS IN PROCESS MONITORING</b> .....	3028
<i>J. Howell</i>	
<b>DEVELOPMENT OF LASER INDUCED BREAKDOWN SPECTROSCOPY (LIBS) FOR SAFEGUARD APPLICATIONS</b> .....	3035
<i>S. A. LaMontagne, J. E. Barefield, S. M. Clegg, D. K. Veirs, K. Veal, M. Browne, L. Lopez, R. Martinez, L. Le</i>	
<b>SAFEGUARDS AT THE COMMERCIAL CENTRIFUGE PLANT AT RESENDE, BRAZIL</b> .....	3042
<i>O. J. M. Peixoto, O. C. Larrieu</i>	
<b>NUCLEAR SAFEGUARDS INFRASTRUCTURE DEVELOPMENT: TECHNICAL COLLABORATION WITH THE VIETNAM ATOMIC ENERGY COMMISSION</b> .....	3051
<i>L. D. Phac, D. N. Kovacic, J. Shipwash, J. McClelland-Kerr, M. Bissani, K. Apt</i>	
<b>NUCLEAR SAFEGUARDS INFRASTRUCTURE DEVELOPMENT: COLLABORATION WITH VIETNAM AGENCY FOR RADIATION AND NUCLEAR SAFETY</b> .....	3059
<i>L. C. Dung, N. N. Hoai-Vi, D. N. Kovacic, J. Shipwash, M. Van-Sickle, R. Stevens, K. Apt, F. Morris, M. Killinger, L. Hansen</i>	
<b>PANEL DISCUSSION ON THE NEXT GENERATION SAFEGUARDS INITIATIVE</b> .....	3067
<i>M. Whitney</i>	

**SESSION B INTERNATIONAL SAFEGUARDS: CONTAINMENT AND SURVEILLANCE, AND UNATTENDED AND REMOTE MONITORING**

<b>THE REMOTELY MONITORED SEALING ARRAY</b> .....	3070
<i>M. Stein, M. Fontanarosa, B. Wishard, B. Schoeneman, M. Goldfarb</i>	

<b>SEAL WIRE INTEGRITY VERIFICATION INSTRUMENT: EVALUATION OF LABORATORY PROTOTYPES</b> .....	3078
<i>M. S. Good, J. R. Skorpik, V. Kravtchenko, B. Wishard, J. M. Prince, A. F. Pardini, P. G. Heasler, E. Santiago-Rojas, R. A. Matthews, S. Khayyat, J. E. Tanner, H. A. Undem</i>	
<b>SERS-ACTIVE NANOPARTICLES AS A BARCODING TECHNOLOGY FOR TAGS AND SEALS</b> .....	3088
<i>L. O. Brown, S. K. Doorn, P. B. Merkle</i>	
<b>THE IAEA'S NEXT GENERATION SURVEILLANCE SYSTEM</b> .....	3094
<i>M. Stein, S. Lange, N. Elektronik, M. Moeslinger, G. Nuemann, A. Queirolo, B. Richter, P. Schwalbach</i>	
<b>NEXT GENERATION REMOTE MONITORING SYSTEMS PROGRAM DEVELOPMENT OF THE SECURE SENSOR PLATFORM FOR INTERNATIONAL SAFEGUARDS</b> .....	3102
<i>B. Schoeneman, K. Tolk</i>	
<b>SECURE VIDEO SURVEILLANCE SYSTEM (SVSS) FOR UNANNOUNCED SAFEGUARDS INSPECTIONS</b> .....	3111
<i>R. L. Lucero, J. C. Bartberger, D. Eichert, M. Pinkalla, G. Baldwin</i>	
<b>CONSISTENT AND EFFICIENT USE OF SURVEILLANCE EQUIPMENT BY INTERNATIONAL SAFEGUARDS</b> .....	3118
<i>J. Huenefeld, M. Moeslinger, B. Moran, M. Zendel</i>	
<b>THE APPLICATION OF FORMAL SOFTWARE ENGINEERING METHODS TO THE UNATTENDED AND REMOTE MONITORING SOFTWARE SUITE AT LOS ALAMOS NATIONAL LABORATORY</b> .....	3127
<i>J. C. Determan, J. F. Longo, K. D. Michel</i>	
<b>ENHANCED SAFEGUARDS RELATED FUNCTIONS AND CAPABILITIES OF THE NGAM/URDM INSTRUMENT SYSTEM</b> .....	3137
<i>D. Bot</i>	

**SESSION C INTERNATIONAL SAFEGUARDS: PROCESS MONITORING – II NON-SOLUTION BASED APPLICATIONS**

<b>VIRTUAL SAFEGUARDS TESTING FOR PROCESS MONITORING AND ADVANCED MATERIALS ACCOUNTANCY</b> .....	3145
<i>B. B. Cipiti</i>	
<b>IMPLEMENTATION OF REMOTE MONITORING IN FACILITIES UNDER SAFEGUARDS WITH UNATTENDED SYSTEMS</b> .....	3153
<i>D. H. Beddingfield, E. Umebayashi, H. Nordquist</i>	
<b>ON-LINE MONITORING FOR CONTROL AND SAFEGUARDING OF RADIOCHEMICAL STREAMS AT SPENT FUEL REPROCESSING PLANT</b> .....	3163
<i>S. A. Bryan, T. G. Levitskaia, J. M. Billing, A. J. Casella, A. M. Johnsen, J. M. Peterson</i>	
<b>ELECTROCHEMICALLY-MODULATED SEPARATIONS FOR DESTRUCTIVE AND NONDESTRUCTIVE ANALYSIS FOR PROCESS MONITORING AND SAFEGUARDS MEASUREMENTS</b> .....	3173
<i>M. A. Green, L. M. Arrigo, M. Liezers, C. Orton, M. Douglas, S. M. Peper, J. M. Schwantes, D. C. Duckworth</i>	
<b>THE MULTI-ISOTOPE PROCESS (MIP) MONITOR: A NEAR-REAL-TIME, NONDESTRUCTIVE, INDICATOR OF SPENT NUCLEAR FUEL REPROCESSING CONDITIONS</b> .....	3182
<i>J. M. Schwantes, C. R. Orton, C. G. Fraga, M. Douglas, R. N. Christensen</i>	
<b>APPLICATION OF PROCESS MONITORING TECHNIQUES FOR TRANSFER FACILITY SAFEGUARDS</b> .....	3193
<i>J. J. Henkel, J. W. Hines</i>	
<b>PLUTONIUM INVENTORY ESTIMATION OF EXTRACTION CYCLES AT ROKKASHO REPROCESSING PLANT</b> .....	3200
<i>K. Yamaya, N. Sato, T. Iseki, A. Kawai, T. Iwamoto</i>	

**SESSION D INTERNATIONAL SAFEGUARDS/WASTE MANAGEMENT: SAFEGUARDING SPENT NUCLEAR FUEL**

<b>SYMMETRIC PIN DIVERSION DETECTION USING A PARTIAL DEFECT DETECTOR (PDET)</b> .....	3209
<i>S. Sitaraman, Y. S. Ham</i>	
<b>DETECTION OF A MISSING FUEL ROD IN A DISCHARGED CANDU BUNDLE</b> .....	3218
<i>B. D. Murphy</i>	
<b>EXPERIMENTAL VALIDATION OF THE METHODOLOGY FOR PARTIAL DEFECT VERIFICATION OF THE PRESSURIZED WATER REACTOR SPENT FUEL ASSEMBLIES</b> .....	3224
<i>Y. S. Ham, S. Sitaraman, H. Shin, S. Eom, H. Kim</i>	
<b>PARTIAL DEFECT DETECTION IN LWR SPENT FUEL USING A DIGITAL CERENKOV VIEWING DEVICE</b> .....	3233
<i>J. D. Chen, D. A. Parcey, A. F. Gerwing, P. Carlson, R. Kosierb, M. Larsson, K. Axell, J. Dahlberg, B. Lindberg, S. J. Svard, E. Sundkvist</i>	
<b>METHODOLOGY AND DETERMINATION OF FIELD OF VIEW OF NEUTRON AND GAMMA DETECTORS IN THE ATUCHA SPENT FUEL STORAGE POOL</b> .....	3241
<i>W. Walters, M. Wenner, A. Haghighat, S. Sitaraman, Y. Ham</i>	
<b>TESTING OF THE DUAL SLAB VERIFICATION DETECTOR FOR ATTENDED MEASUREMENTS OF THE BN-350 DRY STORAGE CASKS</b> .....	3251
<i>P. A. Santi, M. C. Browne, R. F. Parker, R. B. Williams</i>	

<b>BN-350 UNATTENDED SAFEGUARDS SYSTEM CURRENT STATUS AND INITIAL FUEL MOVEMENT DATA</b> .....	3262
<i>R. B. Williams, M. C. Browne, R. F. Parker, P. A. Santi</i>	

**SESSION E MATERIALS CONTROL AND ACCOUNTABILITY: POLICY AND INTEGRATED SAFEGUARDS**

<b>LEAN NUCLEAR MATERIALS SUPPLY CHAIN MANAGEMENT FOR SAFEGUARDS/MC&amp;A ENHANCEMENT IN PROCESSING FACILITIES DESIGN (U)</b> .....	3270
<i>J. Long</i>	
<b>MC&amp;A SYSTEM INTEGRATION IN PROCESSING FACILITIES DURING CONCEPTUAL AND PRELIMINARY DESIGN (U)</b> .....	3279
<i>J. Long</i>	
<b>STATUS UPDATE: URANYL NITRATE CALIBRATION LOOP EQUIPMENT (UNCLE) AT ORNL</b> .....	3289
<i>J. L. Ladd-Lively</i>	
<b>INTEGRATED SAFEGUARDS TESTING LABORATORIES IN SUPPORT OF THE ADVANCED FUEL CYCLE INITIATIVE</b> .....	3295
<i>P. A. Santi, S. F. DeMuth, K. L. Klasky, H. Lee, M. C. Miller, J. K. Sprinkle, S. J. Tobin</i>	
<b>VACUUM AND GAS TRANSFER TECHNOLOGY FOR THE NONDESTRUCTIVE, IN-LINE DETERMINATION OF ISOTOPIC CONTENT IN UF6 PROCESS GAS</b> .....	3305
<i>M. T. Paffett, T. R. Hill, K. D. Ianakiev, B. P. Nolen, C. E. Moss</i>	
<b>IMPLEMENTATION OF THE TRANSITION PLAN AS PART OF THE EFFECTIVE LONG-TERM SUSTAINABILITY OF THE MPC&amp;A SYSTEM AT FGUP "RISI"</b> .....	3313
<i>T. A. Piskureva, A. M. Chlenov, E. A. Tsilina</i>	
<b>A DEDICATED DETECTOR FOR THE VERIFICATION OF HIGHLY ENRICHED URANIUM IN NAVAL REACTORS</b> .....	3323
<i>F. Dalnoki-Veress, A. Glaser</i>	

**SESSION F MATERIALS CONTROL AND ACCOUNTABILITY: MATERIAL CONTROL SYSTEM**

<b>AN IDEAL MARRIAGE: PROJECTED VIRTUAL REALITY &amp; NUMERICAL MODELS THAT KEEP IT REAL</b> .....	3333
<i>K. Michel, B. Hayes, J. Montoya</i>	
<b>APPLICATION OF MSET METHOD FOR ASSESSING EFFECTIVENESS OF THE MATERIAL CONTROL &amp; ACCOUNTING SYSTEM AT A NUCLEAR FACILITY</b> .....	3343
<i>A. S. Sviridov, A. A. Petrov, I. N. Sazonov, V. V. Erastov, A. V. Stepashko, A. A. Voronkov, B. Jensen, R. Elwood, L. Neymotin, C. Roche</i>	
<b>STATUS OF IMPLEMENTATION OF MODERN MEASUREMENT EQUIPMENT AND METHODOLOGIES AT ROSATOM FACILITIES UNDER THE U.S-RUSSIAN MPC&amp;A PROGRAM</b> .....	3349
<i>V. V. Erastov, V. A. Pitel, A. S. Sviridov, A. V. Stepashko</i>	
<b>COMPARISON OF ULTRA-HIGH-FREQUENCY READERS FOR PASSIVE RADIO-FREQUENCY TAGS</b> .....	3354
<i>J. W. Hickerson, A. M. Krichinsky</i>	
<b>FRESH NUCLEAR FUEL MEASUREMENTS AT UKRAINIAN NUCLEAR POWER PLANTS</b> .....	3361
<i>V. Gavrilyuk, S. Drapey, V. Kirischuk, N. Strilchuk, T. Ewing, J. Kuzminski, D. Dickman</i>	
<b>MATERIAL RECONCILIATION: A SOFTWARE SOLUTION FOR ACCURATE AND RAPID IDENTIFICATION OF ASSETS</b> .....	3371
<i>G. D. Richardson, W. J. Bicha, C. A. Pickett, B. S. Weil, J. R. Younkin</i>	
<b>DEVELOPMENT, INSTALLATION AND OPERATION OF THE MPC&amp;A OPERATIONS MONITORING (MOM) SYSTEM AT THE JOINT INSTITUTE FOR NUCLEAR RESEARCH (JINR) DUBNA, RUSSIA</b> .....	3380
<i>V. V. Kartashov, Y. A. Romanov, V. N. Samoilov, B. A. Shestakov, C. Duncan, L. Brownell, W. T. Pratt, J. Carbonaro, R. M. White, J. A. Coffing</i>	
<b>TRIAL OPERATIONS OF THE TAMPER-INDICATING DEVICES AT THE KRASNOYARSK ELECTROCHEMICAL PLANT</b> .....	3390
<i>E. Antonov, B. Weil, M. Carroll, K. Mutreja, E. Ku</i>	
<b>STATUS OF UPGRADING TAMPER-INDICATING DEVICE SYSTEMS AT THE STATE CORPORATION ROSATOM ENTERPRISES</b> .....	3397
<i>V. Pitel, A. Stepashko, N. Isaev, K. Mutreja, E. Ku, B. Weil</i>	

**SESSION G NONPROLIFERATION AND ARMS CONTROL: INTERNATIONAL NONPROLIFERATION APPROACHES**

<b>HOW MIGHT INDUSTRY GOVERNANCE BE BROADENED TO INCLUDE NONPROLIFERATION?</b> .....	3404
<i>G. Hund, A. Seward</i>	
<b>THE NUCLEAR NON-PROLIFERATION REGIME - POLICIES AND REGULATIONS TOWARDS NON-PARTY STATES</b> .....	3414
<i>R. Abbasi</i>	
<b>THE PROSPECT OF A REVITALIZED RUSSIAN AND AMERICAN NUCLEAR SAFEGUARDS PARTNERSHIP</b> .....	3426
<i>P. C. Durst, C. A. Gariazzo</i>	

<b>KINAC'S EXTERNAL COOPERATION APPROACH BASED ON ITS FUTURE VISION</b> .....	3436
<i>J. U. Lee, B. W. Sin</i>	
<b>AN ANALYSIS OF INTERNATIONAL NUCLEAR INSTITUTIONS' EFFECT ON NUCLEAR ACTIVITIES IN THE MIDEAST</b> .....	3443
<i>M. J. Finnegan</i>	

**SESSION H NONPROLIFERATION AND ARMS CONTROL/PHYSICAL PROTECTION: INFRASTRUCTURE AND SUSTAINABILITY**

<b>COMPUTERIZED MAINTENANCE AND TRAINING MANAGEMENT SYSTEM FOR THE KOLA TECHNICAL CENTER</b> .....	3451
<i>G. Thomas, L. D. Lambert, K. Kaldenbach, O. Yakovenko</i>	
<b>TRANSITION OF RESPONSIBILITY FOR MAINTENANCE, SUPPORT AND FURTHER DEVELOPMENT OF MPC&amp;A SYSTEMS FROM THE USPT TO NCCP</b> .....	3457
<i>A. Tomashkov, I. Zubairova, A. Vorobyov, M. Barham, J. Lloyd, M. Clardy</i>	
<b>THE MATERIAL PROTECTION CONTROL AND ACCOUNTING (MPC&amp;A) HUMAN RESOURCE MANAGEMENT AND SITE TRAINING PROGRAM AT THE ELECTROCHEMICAL PLANT AS IMPLEMENTED THROUGH THE MPC&amp;A SUSTAINABILITY PROGRAM</b> .....	3465
<i>V. Sirotenko, E. Ku, M. Carroll, R. D. Dabbs</i>	
<b>THE URAL ELECTROCHEMICAL INTEGRATED PLANT SUSTAINABILITY PROGRAM OF NUCLEAR MATERIAL PROTECTION, CONTROL AND ACCOUNTING SYSTEM UPGRADES</b> .....	3475
<i>A. Vakhonin, R. Yuldashev, R. D. Dabbs, M. Carroll, A. Garrett, S. Patrick, E. Ku</i>	
<b>DEVELOPMENT OF REGULATORY DOCUMENTS FOR CREATION (UPGRADE) OF PHYSICAL PROTECTION SYSTEMS UNDER THE RUSSIAN/AMERICAN MPC&amp;A PROGRAM</b> .....	3482
<i>A. Izmaylov, V. Babkin, F. S. Eleron, V. Kurov, A. Piskarev, P. O'Brien, T. Wright, S. Schlegel, M. Hazel, D. Miller, J. Tuttle, D. Kovchegin</i>	
<b>STAGES OF THE MODEL SITE IMPLEMENTATION AT "LUCH"</b> .....	3488
<i>S. V. Leonov, G. V. Lavrentieva, V. Y. Chukov</i>	

**SESSION I PHYSICAL PROTECTION/MATERIALS CONTROL AND ACCOUNTABILITY: INTEGRATED DESIGN**

<b>USING THE DOD ARCHITECTURE FRAMEWORK AND SYSTEM MODELING LANGUAGE FOR THE DEVELOPMENT OF SECURITY SYSTEM ARCHITECTURES</b> .....	3494
<i>L. A. Cano</i>	
<b>DEVELOPMENT OF AN "INTRINSIC SECURITY" DESIGN AND ASSESSMENT METHODOLOGY</b> .....	3502
<i>A. Walter, R. Allen, N. Brown, D. Duggan, R. Duggan, C. J. Silva, C. Ulibarri, L. Varoz, G. Wyss</i>	
<b>MOCK FUEL STORAGE MBA AT MURR</b> .....	3512
<i>C. L. Weaver, J. S. Cole, M. A. Flagg, L. P. Foyto, J. M. Gahl, K. M. Trauth, D. J. Robertson, W. H. Miller</i>	
<b>PROCESS TO CREATE THE NATIONAL NUCLEAR SECURITY ADMINISTRATION ANNUAL PHYSICAL SECURITY TECHNOLOGY MANAGEMENT PLAN</b> .....	3515
<i>C. J. Silva, C. Jaeger, J. L. Russell, J. Sandoval, T. Torres, C. Ulibarri, A. Walter, G. Wyss</i>	
<b>PROMOTING MEDIOCRITY: NRC'S POLICY FOR NEW FACILITY SECURITY DESIGN</b> .....	3525
<i>E. S. Lyman</i>	

**Author Index**