

# **IAEA ANNUAL REPORT 2013**

## **Additional Annex Information**



# THE ANNUAL REPORT FOR 2013

## Additional Annex Information



**Table A24. Coordinated research projects initiated in 2013**

### **Nuclear Power**

- Application of Computational Fluid Dynamics (CFD) Codes for Nuclear Power Plant Design
- Sodium Properties and Safe Operation of Experimental Facilities in Support of the Development and Deployment of Sodium-cooled Fast Reactors (NAPRO)

### **Nuclear Fuel Cycle and Materials Technology**

- Establishment of Material Properties Database for Irradiated Core Structural Components for Continued Safe Operation and Lifetime Extension of Ageing Research Reactors

### **Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development**

- Financing Nuclear Investments

### **Nuclear Science**

- Plasma–Wall Interaction with Irradiated Tungsten and Tungsten Alloys in Fusion Devices
- Primary Radiation Damage Cross-Sections
- Reference Database for Beta-Delayed Neutron Emission Evaluation
- Testing and Improving the IAEA International Reactor Dosimetry and Fusion File (IRDF)

### **Food and Agriculture**

- Accessible Technologies for the Verification of Origin of Dairy Products as an Example Control System to Enhance Global Trade and Food Safety
- Enhancing Vector Refractoriness to Trypanosome Infection
- Exploring Genetic, Molecular, Mechanical and Behavioural Methods of Sex Separation in Mosquitoes
- Landscape Salinity and Water Management for Improving Agricultural Productivity
- Optimizing Soil, Water and Nutrient Use Efficiency in Integrated Cropping-Livestock Production Systems
- Response to Nuclear Emergencies Affecting Food and Agriculture

### **Human Health**

- Development of Quality Audits for Advanced Technology (IMRT) in Radiotherapy Dose Delivery
- Doctoral CRP in Advances in Medical Imaging Techniques
- Doctoral CRP on Longitudinal Measures of Body Composition of Healthy Infants and Young Children up to 2 Years of Age Using Stable Isotope Techniques
- Integrated Imaging (SPECT/CT; PET/CT; MRI) in Infection/Inflammation Spine Pathology
- Nuclear Cardiology in Congestive Heart Failure Value of Intraventricular Synchronism Assessment by Gated-SPECT Myocardial Perfusion Imaging in the Management of Heart Failure Patients Submitted to Cardiac Resynchronization Therapy (IAEA-VISION CRT)
- Standardizing Interpretation Criteria for Early Response Evaluation with <sup>18</sup>F-FDG PET/CT in Paediatric Lymphoma
- To Investigate the Relationship Between End to End Accuracy and Quality Assurance Extent and Depth in Radiotherapy
- Using Nuclear Techniques to Assess the Role of Nutrition-sensitive Agri-food Systems in Improving Diet, Health and Nutritional Status of Vulnerable Populations

### **Water Resources**

- Stable Isotopes in Precipitation and Paleoclimatic Archives in Tropical Areas to Improve Regional Hydrological and Climatic Impact Models

### **Environment**

- Environmental Behaviour and Potential Biological Impact of Radioactive Particles

### **Radioisotope Production and Radiation Technology**

- Application of Radiation Technology in the Development of Advanced Packaging Materials for Food Products

### **Nuclear Security**

- Development of Nuclear Security Assessment Methodologies (NUSAM) for Regulated Facilities
- Identification of High Confidence Nuclear Forensics Signatures for the Development of National Nuclear Forensics Libraries

**Table A25. Coordinated research projects completed in 2013**

### **Nuclear Power**

- Benchmarking Severe Accident Computer Codes for Heavy Water Reactor Applications
- Control Rod Withdrawal and Sodium Natural Circulation Tests Performed during the PHENIX End-of-Life Experiments
- Development of Methodologies for the Assessment of Passive Safety System Performance in Advanced Reactors
- Heat Transfer Behaviour and Thermo-hydraulics Code Testing for Super-critical Water Cooled Reactors (SCWRs)

### **Nuclear Fuel Cycle and Materials Technology**

- Conversion of Miniature Neutron Source Research Reactors (MNSR) to Low Enriched Uranium (LEU)
- Upgrading of Near Surface Disposal Facilities

### **Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development**

- Increasing NPP Performance through Process-oriented Knowledge Management Approach

### **Nuclear Science**

- Characterization of Size, Composition and Origins of Dust in Fusion Devices
- Data for Surface Composition Dynamics Relevant to Erosion Processes
- Development, Characterization and Testing of Materials of Relevance to Nuclear Energy Sector Using Neutron Beams
- Micro-analytical Techniques Based on Nuclear Spectrometry for Environmental Monitoring and Material Studies
- Nuclear Data Libraries for Advanced Systems: Fusion Devices (FENDL-3)

### **Food and Agriculture**

- Biology of Male Mosquitoes in Relation to Genetic Control Programmes
- Control of Contagious Bovine Pleuro Pneumonia
- Integrated Analytical Approaches to Assess Indicators of the Effectiveness of Pesticide Management Practices at a Catchment Scale
- Integrated Isotopic Approaches for an Area-wide Precision Conservation to Control the Impacts of Agricultural Practices on Land Degradation and Soil Erosion
- The Early and Sensitive Diagnosis and Control of Peste des Petits Ruminants (PPR)

### **Human Health**

- Development of Quality Audits for Radiotherapy Dosimetry for Complex Treatment Techniques
- Improving Outcomes in Radiotherapy Using New Strategies of Treatment Delivery with Focus on Oesophageal Cancer
- Investigation of Optimal Radiotherapy Regimen and Type of Irradiation in Treatment of Painful Bone Metastasis
- Longitudinal Monitoring of Complicated Osteomyelitis by SPECT/CT
- Radiotherapy and Chemotherapy in Advanced Non-small Cell Lung Cancer
- Resource Sparing Curative Treatment in Breast Cancer
- Role of Nuclear Cardiology Techniques in Ischemia Assessment with Exercise Imaging in Asymptomatic Diabetes
- The Use of Sentinel Lymph Node in Breast, Melanoma, Head & Neck and Pelvic Cancers

### **Water Resources**

- Quantification of Hydrological Fluxes in Irrigated Lands Using Isotopes for Improved Water Use Efficiency
- Use of Environmental Isotope Tracer Techniques to Improve Basin-scale Recharge Estimation

### **Environment**

- Benchmarking Calibration for Low-level Gamma Spectrometric Measurements of Environmental Samples
- Nuclear and Isotopic Studies of the El Niño Phenomenon in the Ocean

### **Radioisotope Production and Radiation Technology**

- Development of  $^{18}\text{F}$ -labeled Radiopharmaceuticals (beyond [ $^{18}\text{F}$ ]FDG) for use in Oncology and Neurosciences
- Development of Radiation-processed Products of Natural Polymers for Application in Agriculture, Healthcare, Industry and Environment
- Nanoscale Radiation Engineering of Advanced Materials for Potential Biomedical Applications
- Production and Utilisation of Emerging Positron Emitters for Medical Applications with an Emphasis on Cu-64 and I-124

### **Nuclear Installations Safety**

- Innovative Methods in Research Reactor Analysis: Benchmark against Experimental Data on Neutronics and Thermalhydraulic Computational Methods and Tools for Operation and Safety Analysis of Research Reactors.

**Table A26. Publications issued in 2013**

**Nuclear Power**

- Advanced Surveillance, Diagnostic and Prognostic Techniques in Monitoring Structures, Systems and Components in Nuclear Power Plants — IAEA Nuclear Energy Series No. NP-T-3.14
- Advances in Airborne and Ground Geophysical Methods for Uranium Exploration — IAEA Nuclear Energy Series No. NF-T.1.5
- Approaches for Assessing the Economic Competitiveness of Small and Medium Sized Reactors — IAEA Nuclear Energy Series No. NP-T-3.7
- Benchmark Analyses on the Natural Circulation Test Performed during the PHENIX End-of-life Experiments — IAEA TECDOC Series No. 1703
- BN-600 MOX Core Benchmark Analysis: Results from Phases 4 and 6 of a Coordinated Research Project on Updated Codes and Methods to Reduce the Calculational Uncertainties of the LMFR Reactivity Effects — IAEA TECDOC Series No. 1700
- Challenges Related to the Use of Liquid Metal and Molten Salt Coolants in Advanced Reactors — IAEA TECDOC Series No. 1696
- Climate Change and Nuclear Power 2013
- Commercial Products and Services of Research Reactors — IAEA TECDOC Series No. 1715
- CORR Guidelines: Preparing and Conducting Review Missions of Construction Project Readiness for Nuclear Power Plants — IAEA Services Series No. 24
- Country Nuclear Power Profiles: 2013 Edition — IAEA-CNPP/2013/CD
- Design Features and Operating Experience of Experimental Fast Reactors — IAEA Nuclear Energy Series No. NP-T-1.9
- Energy, Electricity and Nuclear Power Estimates for the Period up to 2050, 2013 Edition — Reference Data Series Edition 33, No. 2
- Evaluation of Advanced Thermohydraulic System Codes for Design and Safety Analysis of Integral Type Reactors — IAEA TECDOC Series No. 1733
- Evaluation of High Temperature Gas Cooled Reactor Performance: Benchmark Analysis Related to the PBMR-400, PBMM, GT-MHR, HTR-10 and the ASTRA Critical Facility — IAEA TECDOC Series No. 1694
- Framework for Assessing Dynamic Nuclear Energy Systems for Sustainability: Final Report of the INPRO Collaborative Project GAINS — IAEA Nuclear Energy Series No. NP-T-1.14
- Hydrogen Production Using Nuclear Energy — IAEA Nuclear Energy Series No. NP-T-4.2
- INPRO Assessment of the Planned Nuclear Energy System of Belarus — IAEA TECDOC Series No. 1716
- International Safeguards in Nuclear Facility Design and Construction — IAEA Nuclear Energy Series No. NP-T-2.8
- Legal and Institutional Issues of Transportable Nuclear Power Plants: A Preliminary Study — IAEA Nuclear Energy Series No. NG-T-3.5
- Model Regulations for the Use of Radiation Sources and for the Management of the Associated Radioactive Waste — IAEA TECDOC Series No. 1732
- Non-HEU Production Technologies for Molybdenum-99 and Technetium-99m — IAEA Nuclear Energy Series No. NF-T-5.4
- Nuclear Power Newsletter, Vol. 10, Nos 1 and 3, January and September 2013
- Nuclear Power Reactors in the World 2013 Edition — Reference Data Series, Edition 33, No. 1
- Nuclear Reactor Technology Assessment for Near Term Deployment — IAEA Nuclear Energy Series No. NP-T-1.10

- Operating Experience with Nuclear Power Stations in Member States in 2012, 2013 Edition (CD-ROM)
- Operation and Licensing of Mixed Cores in Water Cooled Reactors — IAEA TECDOC Series No. 1720
- Options for Management of Spent Fuel and Radioactive Waste for Countries Developing New Nuclear Power Programmes — IAEA Nuclear Energy Series No. NW-T-1.24
- Overcoming Barriers in the Implementation of Environmental Remediation Projects — IAEA Nuclear Energy Series No. NW-T-3.4
- Passive Safety Systems in Advanced Water Cooled Reactors (AWCRs): Case Studies — IAEA TECDOC Series No. 1705
- Performance Assessment of Passive Gaseous Provisions (PGAP) — IAEA TECDOC Series No. 1698
- PRIS- STATISTICS: Power Reactor Information System Statistical Reports: User's Manual — IAEA Computer Manual Series No. 22
- Status of Fast Reactor Research and Technology Development — IAEA TECDOC Series No. 1691
- Status of Fast Reactor Research and Technology Development — IAEA TECDOC Series (CD-ROM) No. 1691CD
- Structural Materials for Liquid Metal Cooled Fast Reactor Fuel Assemblies: Operational Behaviour — IAEA Nuclear Energy Series No. NF-T-4.3

#### **Nuclear Fuel Cycle and Materials Technology**

- Advances in High Temperature Gas Cooled Reactor Fuel Technology — IAEA TECDOC Series (CD-ROM) No. 1674CD
- An International Peer Review of the Programme for the Deep Geological Disposal of High Level Radioactive Waste from Pyro-processing in the Republic of Korea
- Characterization of Swelling Clays as Components of the Engineered Barrier System for Geological Repositories — IAEA TECDOC Series No. 1718
- Design, Manufacturing and Irradiation Behaviour of Fast Reactor Fuel — IAEA TECDOC Series No. 1689
- Fuel Behaviour and Modelling under Severe Transient and Loss of Coolant Accident (LOCA) Conditions — IAEA TECDOC Series No. 1709CD
- Fuel Cycle and Waste Newsletter, Vol. 9, No. 1, March 2013
- Guidelines for the Review of Research Reactor Safety: Revised Edition — IAEA Services Series No. 25
- Hot Cell Post-irradiation Examination and Poolside Inspection of Nuclear Fuel: Proceedings of the IAEA-HOTLAB Technical Meeting held in Smolenice, Slovakia, 23–27 May 2011 — IAEA TECDOC Series No. 1693CD
- Improvement of Computer Codes Used for Fuel Behaviour Simulation (FUMEX-III) — IAEA TECDOC Series No. 1697
- In-pile Testing and Instrumentation for Development of Generation IV Fuels and Materials — IAEA TECDOC Series No. 1726CD
- Management and Storage of Research Reactor Spent Nuclear Fuel: Proceedings of a Technical Meeting held in Thurso, United Kingdom, 19–22 October 2009 — Proceedings Series
- Management of Discharge of Low Level Liquid Radioactive Waste Generated in Medical, Educational, Research and Industrial Facilities — IAEA TECDOC Series No. 1714
- Management of NORM Residues — IAEA TECDOC Series No. 1712
- Measurement and Calculation of Radon Releases from NORM Residues — Technical Reports Series No. 474
- Nuclear Fuel Cycle Objectives — IAEA Nuclear Energy Series No. NF-O
- Planning, Management and Organizational Aspects of the Decommissioning of Nuclear Facilities — IAEA TECDOC Series No. 1702

- Spent Fuel Storage Operation: Lessons Learned — IAEA TECDOC Series No. 1725
- The Behaviours of Cementitious Materials in Long Term Storage and Disposal of Radioactive Waste: Results of a Coordinated Research Project — IAEA TECDOC Series No. 1701
- The Use of Numerical Models in Support of Site Characterization and Performance Assessment Studies of Geological Repositories — IAEA TECDOC Series No. 1717
- Water Chemistry and Clad Corrosion/Deposition Including Fuel Failures: Proceedings of a Technical Meeting held in Kiev, 2010 — IAEA TECDOC Series No. 1692CD

#### **Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development**

- The Impact of Knowledge Management Practices on NPP Organizational Performance: Results of a Global Survey — IAEA TECDOC Series No. 1711

#### **Nuclear Science**

- Applications of Research Reactors towards Research on Materials for Nuclear Fusion Technology — IAEA TECDOC Series No. 1724
- Benchmarking Severe Accident Computer Codes for Heavy Water Reactor Applications — IAEA TECDOC Series No. 1727
- Dense Magnetized Plasmas — IAEA TECDOC Series No. 1699
- Instrumentation for Digital Nuclear Spectroscopy — IAEA TECDOC Series No. 1706
- Integrated Approach to Dense Magnetized Plasmas Applications in Nuclear Fusion Technology — IAEA TECDOC Series No. 1708
- International Bulletin on Atomic and Molecular Data for Fusion, Issue No. 69, January 2013
- Library of Recommended Actinide Decay Data 2011
- Nuclear Data Newsletter, Issue No. 55, May 2013
- Nuclear Data Newsletter, Issue No. 56, November 2013
- Pathways to Energy from Inertial Fusion: An Integrated Approach — IAEA TECDOC Series No. 1704
- Proceedings of the 5th International Conference on the Frontiers of Plasma Physics and Technology (CD-ROM) — Proceedings Series
- Training Guidelines in Non-Destructive Testing Techniques: Manual for Visual Testing at Level 2 — Training Course Series No. 54
- XRF Newsletter X Ray Fluorescence in the IAEA and its Member States, No. 24

#### **Environment**

- ALMERA Proficiency Test: Determination of Natural and Artificial Radionuclides in Soil and Water — IAEA Analytical Quality in Nuclear Applications Series No. 32
- Certification for Trace Elements and Methyl Mercury Mass Fractions in IAEA-452 Scallop (*Pecten maximus*) Sample — IAEA Analytical Quality in Nuclear Applications Series No. 24
- Certification of Trace Element Mass Fractions in IAEA-457 Marine Sediment Sample — IAEA Analytical Quality in Nuclear Applications Series No. 26
- Certification of Trace Element Mass Fractions in IAEA-458 Marine Sediment Sample — IAEA Analytical Quality in Nuclear Applications Series No. 31
- Certified Reference Material IAEA-448: Soil from Oil Field Contaminated with Technically Enhanced Radium-226 Counting — IAEA Analytical Quality in Nuclear Applications Series No. 30
- Detection of Harmful Algal Toxins Using the Radioligand Receptor Binding Assay: A Manual of Methods — IAEA TECDOC Series No. 1729
- Emergency Response Proficiency Test for Japanese Laboratories: Determination of Selected Radionuclides in Water, Soil, Vegetation and Aerosol Filters Counting — IAEA Analytical Quality in Nuclear Applications Series No. 29

- Guidelines for Remediation Strategies to Reduce the Radiological Consequences of Environmental Contamination — Technical Reports Series No. 475
- Isotopes in Hydrology, Marine Ecosystems and Climate Change Studies - Proceedings of the International Symposium Held in Monaco, 27 March–1 April 2011 (2 Volumes) — Proceedings Series
- National and Regional Surveys of Radon Concentration in Dwellings: Review of Methodology and Measurement Techniques — IAEA Analytical Quality in Nuclear Applications Series No. 33
- Rapid Simultaneous Determination of <sup>89</sup>Sr and <sup>90</sup>Sr in Milk: A Procedure Using Cerenkov and Scintillation Counting — IAEA Analytical Quality in Nuclear Applications Series No. 27
- Worldwide and Regional Laboratory Comparison on the Determination of Organochlorine Compounds, Polybrominated Diphenyl Ethers and Petroleum Hydrocarbons in IAEA-451 Clam (*Gafrarium tumidum*) Samples — IAEA Analytical Quality in Nuclear Applications Series No. 28
- Worldwide Laboratory Comparison on the Determination of Radionuclides in IAEA-446 Baltic Sea Seaweed (*Fucus vesiculosus*) — IAEA Analytical Quality in Nuclear Applications Series No. 25
- Worldwide Laboratory Comparison on the Determination of Trace Elements in IAEA-452 Biota Sample — IAEA Analytical Quality in Nuclear Applications Series No. 23

#### **Food and Agriculture**

- Animal Production and Health Newsletter, No. 57, January 2013
- Food and Environmental Protection Newsletter Vol. 16, Nos 1 and 2, January and July 2013
- Animal Production and Health Newsletter, No. 58, July 2013
- Optimizing Productivity of Food Crop Genotypes in Low Nutrient Soils — IAEA TECDOC Series No. 1721
- Optimizing Productivity of Food Crop Genotypes in Low Nutrient Soils — IAEA TECDOC (CD-ROM) Series No. 1721CD
- Soils Newsletter Vol. 35, No. 2, January 2013
- Plant Mutation Reports Vol. 3, No. 1, July 2013
- Soils Newsletter Vol. 36, No. 1, July 2013
- Plant Breeding and Genetics Newsletter, Nos 30 and 31, January and July 2013
- Insect Pest Control Newsletter Nos 80 and 81, January and July 2013

#### **Human Health**

- Body Composition Assessment from Birth to Two Years of Age — IAEA Human Health Series No. 22
- Clinical Training of Medical Physicists Specializing in Diagnostic Radiology — Training Course Series No. 47
- Clinical Training of Medical Physicists Specializing in Nuclear Medicine— Training Course Series No. 50
- Development of Procedures for In Vivo Dosimetry in Radiotherapy — IAEA Human Health Reports No. 8
- IAEA Syllabus for the Education and Training of Radiation Oncologists Endorsed by the American Society for Radiation Oncology (ASTRO) and the European Society for Therapeutic Radiology and Oncology (ESTRO) — Training Course Series No. 36
- Management of Cervical Cancer: Strategies for Limited-resource Centres — A Guide for Radiation Oncologists — IAEA Human Health Reports No. 6
- Postgraduate Medical Physics Academic Programmes — Training Course Series No. 56
- Practical Guidance on Peptide Receptor Radionuclide Therapy (PRRNT) in Neuroendocrine Tumours — IAEA Human Health Series No. 20

- Record and Verify Systems for Radiation Treatment of Cancer: Acceptance Testing, Commissioning and Quality Control — IAEA Human Health Reports No. 7
- Roles and Responsibilities, and Education and Training Requirements for Clinically Qualified Medical Physicists — IAEA Human Health Series No. 25
- SSDL Newsletter Issue No. 61, June 2013
- Standard Operating Procedures for PET/CT: A Practical Approach for Use in Adult Oncology — IAEA Human Health Series No. 26
- Transitioning from 2-D Radiation Therapy to 3-D Conformal Radiation Therapy and Intensity Modulated Radiation Therapy: Training Material — Training Course Series (CD-ROM) No. 55

#### **Water Resources**

- Application of Isotope Techniques for Assessing Nutrient Dynamics in River Basins — IAEA TECDOC Series No. 1695
- Isotope Methods for Dating Old Groundwater — Non-serial Publication
- Isotopes in Hydrology, Marine Ecosystems and Climate Change Studies, Proceedings of an International Symposium held in Monaco, 27 March–1 April 2011 (2 Volumes) — Proceedings Series
- Water and Environment News, Issue 32, September 2013

#### **Radioisotope Production and Radiation Technology**

- Design, Development and Optimization of a Low-cost System for Digital Industrial Radiology — IAEA Radiation Technology Reports No. 2
- Guidelines for Development, Validation and Routine Control of Industrial Radiation Processes — IAEA Radiation Technology Series No. 4
- Radiotracer Generators for Industrial Applications — IAEA Radiation Technology Series No. 1579

#### **Emergency Preparedness and Response**

- Aplicación del Método de la Matriz de Riesgo a la Radioterapia — IAEA TECDOC Series No. 1685
- Programa Nacional de Protección Radiológica en las Exposiciones Médicas — IAEA TECDOC Series No. 1710
- Regulatory Control for the Safe Transport of Naturally Occurring Radioactive Material (NORM) — IAEA TECDOC Series No. 1728
- Application of Nuclear Forensics in Combating Illicit Trafficking of Nuclear and Other Radioactive Material — IAEA TECDOC Series No. 1730
- Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor — EPR-NPP-PPA (2013) Emergency Preparedness and Response
- Communication with the Public in a Nuclear or Radiological Emergency — EPR-Public Communications 2012, Emergency Preparedness and Response Series
- Considerations in Emergency Preparedness and Response for a State Embarking on a Nuclear Power Programme: Training Materials — EPR-Embarking 2012 Emergency Preparedness and Response
- Considerations in Emergency Preparedness and Response for a State Embarking on a Nuclear Power Programme — EPR-Embarking 2012 Emergency Preparedness and Response
- Control of Transboundary Movement of Radioactive Material Inadvertently Incorporated into Scrap Metal and Semi-finished Products of the Metal Recycling Industries: Results of the Meetings Conducted to Develop a Draft Code of Conduct
- Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies – Training Materials — EPR Biodosimetry/T2012 Emergency Preparedness and Response
- Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies — EPR-Biodosimetry 2011 Emergency Preparedness and Response

- Environmental Sensitivity in Nuclear Emergencies in Rural and Semi-natural Environments: Report of Working Group 8 Environmental Sensitivity of EMRAS II Topical Heading Approaches for Assessing Emergency Situations — IAEA TECDOC Series No. 1719
- IAEA Report on Preparedness and Response for a Nuclear or Radiological Emergency in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant
- IAEA Response and Assistance Network: EPR-RANET 2013 — EPR-RANET (2013) Emergency Preparedness and Response
- IEC Information Bulletin No. 42. Q4-2012
- IEC Information Newsletter No. 43. Q1-2013
- IEC Information Newsletter No. 44. Q2-2013
- INES: The International Nuclear and Radiological Event Scale User's Manual: 2008 Edition
- Joint Radiation Emergency Management Plan of the International Organizations EPR-JPLAN (2013) — EPR-JPLAN (2013) Emergency Preparedness and Response
- Lessons Learned from the Response to Radiation Emergencies (1945–2010) (EPR-Lessons Learned 2012) — EPR-Lessons Learned 2012 Emergency Preparedness and Response
- Operations Manual for Incident and Emergency Communication, Attachment 1 — EPR-IEComm/A1 (2012) Emergency Preparedness and Response
- Safety Assessment for Decommissioning — Safety Reports Series No. 77

#### **Safety of Nuclear Installations**

- Implications for Occupational Radiation Protection of the New Dose Limit for the Lens of the Eye — IAEA TECDOC Series No. 1731
- Education and Training in Radiation, Transport and Waste Safety Newsletter Focus on Africa
- Education and Training in Radiation, Transport and Waste Safety Newsletter Focus on Asia and the Pacific
- Education and Training in Radiation, Transport and Waste Safety Newsletter Focus on Europe
- Education and Training in Radiation, Transport and Waste Safety Newsletter Focus on Latin America
- Radiation Protection and Management of NORM Residues in the Phosphate Industry — Safety Reports Series No. 78
- IAEA Report on Strengthening Nuclear Regulatory Effectiveness in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant
- Implementation of a Management System for Operating Organizations of Research Reactors — Safety Reports Series No. 75
- Integrated Regulatory Review Service (IRRS) Guidelines for the Preparation and Conduct of IRRS Missions — IAEA Services Series No. 23
- Periodic Safety Review for Nuclear Power Plants — IAEA Safety Standards Series No. SSG-25
- Regulatory Oversight of Safety Culture in Nuclear Installations — IAEA TECDOC Series No. 1707
- Safety Assessment for Research Reactors and Preparation of the Safety Analysis Report — IAEA Safety Standards Series No. SSG-20
- SALTO Peer Review Guidelines: Guidelines for Peer Review of Safety Aspects of Long Term Operation of Nuclear Power Plants — IAEA Services Series No. 26
- The Safety Case and Safety Assessment for the Predisposal Management of Radioactive Waste — IAEA Safety Standards Series No. GSG-3
- Use of External Experts by the Regulatory Body — IAEA Safety Standards Series No. GSG-4

### **Radiation and Transport Safety**

- Education and Training in Radiation, Transport and Waste Safety Newsletter: Focus on Africa
- Education and Training in Radiation, Transport and Waste Safety Newsletter: Focus on Asia and the Pacific
- Education and Training in Radiation, Transport and Waste Safety Newsletter: Focus on Europe
- Education and Training in Radiation, Transport and Waste Safety Newsletter: Focus on Latin America
- Implications for Occupational Radiation Protection of the New Dose Limit for the Lens of the Eye — IAEA TECDOC Series No. 1731
- Radiation Protection and Management of NORM Residues in the Phosphate Industry — Safety Reports Series No. 78
- Radiation Protection in Paediatric Radiology — Safety Reports Series No. 71
- Regulatory Control for the Safe Transport of Naturally Occurring Radioactive Material (NORM) — IAEA TECDOC Series No. 1728

### **Management of Radioactive Waste**

- IAEA Report on Decommissioning and Remediation after a Nuclear Accident

### **Nuclear Security**

- Application of Nuclear Forensics in Combating Illicit Trafficking of Nuclear and Other Radioactive Material — IAEA TECDOC Series No. 1730
- Computer Security at Nuclear Facilities — IAEA Nuclear Security Series No. 17
- Establishing the Nuclear Security Infrastructure for a Nuclear Power Programme — IAEA Nuclear Security Series No. 19
- Identification of Vital Areas at Nuclear Facilities — IAEA Nuclear Security Series No. 16
- Nuclear Security Plan 2014–2017
- Nuclear Security Systems and Measures for the Detection of Nuclear and Other Radioactive Material out of Regulatory Control — IAEA Nuclear Security Series No. 21
- Objective and Essential Elements of a State's Nuclear Security Regime — IAEA Nuclear Security Series No. 20

### **Nuclear Verification**

- Preparing for Future Verification Challenges: Summary of an International Safeguards Symposium held in Vienna, 1–5 November 2010 — Proceedings Series
- Safeguards Implementation Guide for States with Small Quantities Protocols — IAEA Services Series No. 22

### **Legislative Assistance**

- Legal Framework for IAEA Safeguards
- The 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention — Explanatory Text — IAEA International Law Series No. 5

**Table A27. Training courses, seminars and workshops in 2013**

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**Administration and General Services**

- RTC for communicators  
Argentina

**Assessment and Management of Marine and Terrestrial Environments**

- Marine radioactivity  
Germany
- Chemical speciation and modelling  
Monaco
- Risk assessment for seafood and health  
Ghana
- Regional training course on analysis of marine radioactivity with application of radio-analytical procedures  
China
- RCA regional training course on basic ocean sampling practices in Member States  
Malaysia
- IAEA/RCA regional training course for those with limited QMS experience  
Sri Lanka
- Interpretation and statistical analysis of nuclear and isotopic data in addressing climate change issues  
Malaysia
- Methods and tools to identify trans-boundary movements and sources of APM  
Lithuania

**Capacity Building and Nuclear Knowledge Maintenance for Sustainable Energy Development**

- MESSAGE  
Burundi
- NTC  
Benin
- Joint Japan–IAEA School of Nuclear Energy Management  
Japan
- Joint Japan–IAEA School of Nuclear Energy Management  
Japan
- KAERI-KOICA training course on nuclear power policy, planning and project management  
Republic of Korea
- Diagnostic Radiology  
Jamaica
- Energy supply assessment — Application of IAEA’s tool MESSAGE  
Mauritania
- MESSAGE  
Mauritania
- MESSAGE  
Mauritania
- The use of IAEA’s model for analysis of energy demand (MAED)  
Mozambique
- MAED for energy demand analysis  
Niger

- MESSAGE  
Niger
- Requirements for developing feasibility for a nuclear power programme  
Nigeria
- ICT in management of radiation incidents in clinical practice  
South Africa
- Energy balance studio  
Benin
- Developing regional electricity plans using IAEA's tool MESSAGE  
United Republic of Tanzania
- Train-the-trainers e-learning course on energy planning: a regional training course for Asia & Pacific  
Indonesia
- MESSAGE  
Senegal
- MESSAGE  
United Republic of Tanzania
- MESSAGE  
United Republic of Tanzania
- MESSAGE  
Uruguay
- MESSAGE  
Zimbabwe

#### **Emergency Preparedness**

- First response to radiological emergencies  
Austria
- Medical response to radiation emergencies  
Algeria
- Response to a nuclear or radiological emergency at research reactors  
Morocco
- Medical response to radiation emergencies  
Japan
- Regional training course in connection with national exercise on emergency response  
Brazil
- Public communications in radiation emergencies  
Bolivia
- Micronuclei and radiobiological basis of radiation protection  
Argentina
- Medical response to radiation emergencies  
Peru
- National training course on medical response  
Venezuela
- Radiation emergencies caused by natural disasters  
Cuba
- First responders to a radiological emergency  
Nicaragua
- Basic applications of biodosimetry in case of a radiation emergency  
Bolivia

- Public communication during nuclear and radiological emergencies  
United Arab Emirates

### **Executive Management, Policy-Making and Coordination**

- International School of Nuclear Law  
France
- 3rd session of the Nuclear Law Institute  
Austria
- First School for drafting regulations on radiation safety for Asia & the Pacific  
Austria

### **Food and Agriculture**

- HPLC method(s) for analysis of antimicrobial residues in foods  
Benin
- Regional training course on mutation breeding techniques: mutation induction, detection and pre-breeding  
Austria
- Mutation breeding techniques  
Austria
- Mutation breeding techniques: mutation induction, mutation detection and pre-breeding  
Austria
- Accelerated breeding of mutant traits  
Austria
- Use of SIT and related techniques for AW-IPM of native and exotic insect pests  
Guatemala
- Use of SIT and related techniques for AW-IPM of native and exotic insect pests  
Mexico
- Artificial insemination field services and feeds and feeding of cattle  
Madagascar
- Transboundary animal disease surveillance applying molecular techniques  
Ghana
- Area-wide integrated fruit fly suppression, including MAT and SIT  
Burkina Faso
- Pest risk analysis, quarantine and international standards for phytosanitary measures  
Mozambique
- Use of fallout radionuclide based techniques for soil erosion assessment  
Madagascar
- Basic mutation breeding techniques  
Benin
- Molecular marker and biochemical characterization  
Kenya
- Nuclear and complementary analytical techniques in food safety and consumer protection  
Tunisia
- ISO/IEC 17025:2005 for quality management systems in food safety/control labs  
Nigeria
- Regional training course on the use of compound specific isotope analysis (CSIA) for identification of hot spot of land degradation in the landscape  
China

- Use of nuclear and isotopic techniques in assessment of fertilizer and water use  
Philippines
- Regional training course on the application of new mutagenesis approaches in crop plants  
China
- Regional training course on mutation induction techniques  
Austria
- Regional training course on double haploids and in vitro techniques  
Jordan
- Regional training course on phenotypical characterization of mutants  
Jordan
- Regional training course on detection of homogeneity and better quality of advanced mutant lines  
Qatar
- Regional training course on risk analysis for trans-boundary animal diseases  
Indonesia
- The rapid and confirmatory diagnosis of avian influenza H7N9  
Austria
- FRTC: Application of stable isotope & trace element analyses for food traceability  
Malaysia
- Advanced molecular genetic tools for characterization and improvement of indigenous small ruminants  
Austria
- Regional training course on radioimmunoassay procedures and data interpretation  
Tunisia
- Regional training course on GxE testing, seed storage and farmer participation  
Philippines
- Avian influenza H7N9  
Austria
- Fruit fly detection for Balkans and Eastern Mediterranean  
Turkey
- Regional training course on area-wide integrated fruit fly suppression  
Croatia
- Evaluation of risks and production of guidelines  
Panama
- Integrated analytical approaches to assess indicators of pesticide management practices at a catchment scale  
Uruguay
- Regional training course on modelling and advanced GIS  
Chile
- Advanced modelling on pesticide data  
Costa Rica
- Use of isotopic and nuclear techniques to assess soil quality and soil erosion  
Cuba
- Native germplasm characterization and development of descriptors  
Mexico
- Regional training course on applications induced mutations to plant breeding  
Brazil
- Regional training course on statistical considerations for radionuclide concentrations in foods  
Uruguay

## **Human Health**

- Transition from two dimensional to three dimensional external beam radiotherapy  
Bangladesh
- National training course on clinical aspects and applications of brachytherapy  
Bangladesh
- Quality assurance (QA) management in radiation oncology  
Bangladesh
- Approach to treatment planning and TPS quality assurance  
Bosnia and Herzegovina
- Commissioning and QA of external radiotherapy TPS  
Bosnia and Herzegovina
- Basic review and updates in adult nuclear medicine  
Bosnia and Herzegovina
- Dosimetry and quality assurance in radiotherapy  
Kazakhstan
- National course on image quantification in nuclear  
Mexico
- National training course on 3D CRT  
Thailand
- National training course on 3D brachytherapy  
Thailand
- Cardiology and renal imaging  
Niger
- SPECT/CT and PET/CT in oncology and cardiology  
Nigeria
- Activity measurement using quantitative imaging techniques  
Austria
- Internal dosimetry procedures for dose assessment  
Austria
- Grant writing and publications  
Namibia
- Standard operating procedures (SOPs) for deuterium dilution techniques  
Morocco
- Transitioning from 2D to 3D CRT  
South Africa
- Frontline servicing of best equinox cobalt teletherapy units  
United Republic of Tanzania
- RTT  
Mauritania
- Image based radiotherapy and QA for lung and gastrointestinal cancer  
Thailand
- Regional training course on overview of 3D-CRT and site specific radiotherapy  
Malaysia
- IAEA/RCA regional training course on advances on hybrid imaging in oncology  
India
- RCA/regional training course on essentials of hybrid nuclear medicine imaging in oncology  
Singapore

- Basic concepts of 3D image-guided brachytherapy (IGBT) for cervical cancer  
Thailand
- Regional training course on multi-modality approaches in the diagnosis of cardiovascular diseases  
Japan
- Regional training course on functional radionuclide imaging in the management of cardiovascular disorders  
India
- RCA regional training course on clinical application of stereotactic body radiation therapy (SBRT)  
Republic of Korea
- Regional training course on nuclear oncology for nuclear medicine specialists  
Jordan
- Regional training course on brachytherapy  
Qatar
- Digital industrial radiography  
Turkey
- Microbiological aspects of radiation sterilization validation process  
Portugal
- Image-guided radiotherapy and chemotherapy in gynaecological malignancies  
Russian Federation
- Multidisciplinary management of head & neck oncology  
Hungary
- Best practice in radiation oncology: a four phase project to train RTT trainers  
Austria
- Dose modelling  
Italy
- Advanced imaging course  
Austria
- Quality assurance of treatment planning systems  
Russian Federation
- Dosimetry and quality assurance of external beam radiotherapy  
Russian Federation
- Quality assurance of treatment planning systems  
Russian Federation
- Physics for clinical radiotherapy  
Russian Federation
- EANM neuroimaging course  
Austria
- EANM technologist PET/CT basic course  
Austria
- EANM technologist PET/CT course, advanced  
Austria
- IAEA/EANM PET/CT in oncology advanced course  
Austria
- PET/CT in oncology  
Austria
- EANM cardiovascular course  
Austria

- IAEA/EANM paediatric course  
Austria
- EANM PET/CT in oncology advanced course  
Austria
- Hybrid imaging  
Italy
- Cancer control planning  
Georgia
- Regional training course on nuclear cardiology: from theory to practice  
Mexico
- Diagnostic CT and PET/CT  
Austria
- Diagnostic CT and PET/CT  
Austria
- Regional training course on nuclear cardiology: techniques for nuclear medicine technologists  
Peru
- Role of nuclear medicine in the evaluation of heart failure for clinical cardiology  
Ecuador
- Data analysis  
Argentina
- Definition and delineation of target volume in H&N and CNS tumours  
Romania
- Patient positioning and immobilization in radiotherapy  
Romania
- Target volume definition in CNS, lung and rectal cancers  
Slovakia
- National training course  
Serbia

#### **Information and Communications Technology (ICT)**

- E-learning materials related to reactor physics  
Ghana

#### **Management of Radioactive Waste**

- Training session for CONNECT users — AFRICA  
South Africa
- Nuclear facility decommissioning and environmental remediation skills  
United States of America
- Practical application of safety assessment methodology in the decision making process  
Kyrgyzstan
- Terraloc MK-8 system training  
Austria
- Practical training course in NORM waste management  
Oman
- Cradle-to-grave management of radioactive sources  
Malaysia
- Regional training course on modular design of processing and storage facilities  
Indonesia

- Regional training course on identification, analysis and presentation of spatial variability in site investigations for radioactive waste repositories  
Austria
- Obtaining site data and developing numerical simulations  
Czech Republic
- Obtaining site data and developing numerical simulations  
United Kingdom
- Regional training course on fundamentals of geological disposal  
Japan
- Non-destructive assay  
Czech Republic
- Identification, characterization and register of unused sealed sources  
Chile

#### **Management of Technical Cooperation for Development**

- Master in medical physics  
Peru

#### **Nuclear Fuel Cycle and Materials Technologies**

- Uranium mining and ore processing tailings management  
Zambia
- Stakeholder communications in uranium mining  
Democratic Republic of the Congo
- Regional training course on QA source apportionment to complete data for fingerprint database  
China
- Strategy for radiotherapy modernization and development: equipment and staffing  
Russian Federation

#### **Nuclear Power**

- MESSAGE  
Egypt
- National training course on developing a financial strategy for NP projects using the IAEA's financial model FINPLAN  
Indonesia
- School of nuclear knowledge management  
Italy
- INT training course on nuclear power infrastructure capacity building  
Republic of Korea
- Successful management of nuclear power programmes  
Republic of Korea
- INT training course on leadership and management for introducing and expanding nuclear power programmes  
United States of America
- Engineering procurement & construction (EPC) contracting and nuclear power programme  
China
- Training course on management systems and safety culture  
United States of America
- Training course on radioactive waste management: stakeholder considerations  
Philippines

- Nuclear reactor technology and related fuel cycles for policy makers  
Turkey
- Boiling water reactors available for near-term deployment  
Sweden
- Training course on fundamentals of pressurized water reactors with PC-based simulators  
Republic of Korea
- Optimization in uranium and REE production  
Tunisia
- Uranium exploration strategy  
India
- ITC on evaluation of sustainable energy using MESSAGE  
Republic of Korea
- Providing decision support for nuclear power planning and development  
Japan
- Design features of new plants: inspection during construction and management  
Turkey
- Material degradation mechanisms and ageing management programme in nuclear power  
Slovenia

#### **Nuclear Science**

- The Ninth Annual World Nuclear University (WNU) Summer Institute  
United Kingdom
- Use of microcontrollers and PLCs for developing and refurbishing  
Nigeria
- Programmable system-on-chip (PSOC)  
Sudan
- Basic electronics and nuclear instrumentation maintenance  
Egypt
- Operation and maintenance of gamma cameras  
Austria
- The use of labview for developing and refurbishing of nuclear instruments  
Nigeria
- Repair and maintenance of X ray fluoroscopy machines  
United Republic of Tanzania
- Refurbishment and customization of nuclear instrumentation  
Madagascar
- Basic electronics and nuclear instrumentation maintenance  
Côte d'Ivoire
- Maintenance, troubleshooting, repair & QC of modern scientific/nuclear instruments  
Kenya
- Basic electronics and nuclear instrumentation maintenance for newcomers  
Tunisia
- Calibration of electronic test and measurement equipment  
Cameroon
- Quality control and maintenance of gamma camera  
Zambia
- Radiotracers in ore processing and cement industry  
Zimbabwe

- Regional training course on atmospheric aerosol sampling procedures and analysis techniques  
Jordan
- Regional training course on organization of proficiency tests and interlaboratory comparisons  
Austria
- Regional training course on harmonization of procedures for sampling techniques  
Austria
- Dating of cultural heritage artefacts using nuclear analytical techniques  
Croatia
- Advanced maintenance of gamma cameras (South America)  
Cuba
- Quality control of computer tomography  
Costa Rica
- Use of Montecarlo code GEANT4 for dose estimation  
Mexico
- Regional training course on examples of application of software validation methodology  
Peru
- Regional training course on design of complex instruments using FPG  
Ecuador
- Nuclear and atomic physics  
Uzbekistan

#### **Nuclear Security**

- Security in the transport of radioactive material  
Niger
- Introduction to nuclear forensics  
Algeria
- Regional training course on security in the transport of nuclear material  
Indonesia

#### **Radiation and Transport Safety**

- Introductory training course on authorization and inspection of radiation source  
Indonesia
- Radiation protection in nuclear medicine  
Bahrain
- Physicians in charge of the health surveillance of exposed workers  
Bosnia and Herzegovina
- National training course on organization and implementation of national regulatory programme for contr.  
Cambodia
- Authorization, inspection and enforcement for the new recruited regulatory staff  
Malawi
- Radioactive sources in medical and industrial practice  
Mozambique
- Effective and sustainable regulatory control of radiation sources  
Ethiopia
- Radiation safety for customs officers  
Zimbabwe
- Control of import and export of radioactive sources  
Sudan

- Authorization and inspection of radiation sources (English)  
Ethiopia
- Authorization and inspection of radiation sources (French)  
Morocco
- Licensing and inspection of uranium mining and milling activities  
South Africa
- Drafting regulations on radiation safety  
Austria
- Dose management and inter-comparison methodology for external monitoring  
Algeria
- Internal dosimetry  
Ghana
- Public exposure control issues  
Algeria
- Regional training course on radiation protection in vascular surgery  
Thailand
- Radiation protection and the safety of radioactive sources  
Malaysia
- Postgraduate education course in radiation protection and the safety of radioactive sources  
Malaysia
- Regional training course on compliance assurance training aligned to the regulations for the safe transport of radioactive material  
China
- Regional training course on measurement protocols for national radon strategies  
Thailand
- Radiation protection and the safety of radiation sources (PGEC)  
Belarus
- Orphan sources and vulnerable sources recovery based on Safety Standard SSG-19  
Brazil
- Radiotherapy with emphasis on linear accelerators  
Peru
- Training course for regulations on safety analysis  
Mexico
- Train-the-trainers on occupational radiation protection programmes  
Venezuela
- Radiation protection and optimization in PET/CT  
Argentina
- Regional training course on radiation protection and optimization in dental  
Honduras
- Radiation protection and safety of radiation sources  
Argentina
- Regional postgraduate course on nuclear safety  
Argentina
- Radiation safety infrastructure  
Jamaica

### **Radioisotope Production and Radiation Technology**

- National training course on radiation processing for industrial applications  
Cuba
- Cleaner and safer management of industrial processes  
Morocco
- Advances in radiopharmacy practices  
Austria
- Regional training course on industrial process single photon emission computed tomography  
Viet Nam
- IAEA/RCA regional training course in radiation grafting of membrane fibres for industrial applications  
Philippines
- Ultrasonic phased array technique for personnel already certified in ultrasonic level II  
Jordan
- Establishment and implementation of quality management system (QMS) in radiation  
Romania
- Practical issues for increasing the regional production of column generators  
Cuba
- Radiation safety of cyclotrons  
Turkey

### **Safety of Nuclear Installations**

- Self-Assessment of National Regulatory Infrastructures for Safety (SARIS)  
Zimbabwe
- Regional training course on use of high energy radiation sources and advanced supplementary techniques for NDT applications  
India
- Regional training course on use of advanced NDE technology for in-service inspection of NPP & other civil engineering structures for life prediction and extension  
China
- Inspection methodologies  
Austria
- Safety assessment of NPP  
United States of America
- Determination of root causes of operational events  
Slovakia
- Practical gamma ray spectrometry  
Uzbekistan

### **Water Resources**

- Groundwater dating  
Ecuador
- Isotope techniques  
Georgia
- Isotope hydrology  
Jamaica
- Basic isotope hydrology  
Peru

- Isotope hydrology methods in water resources assessment and management  
Algeria
- Isotope hydrology methods in water resources assessment and management  
Ghana
- Isotope hydrology methods in water resources assessment and management  
Ghana
- Final water balance model  
United Republic of Tanzania
- Hydrologic and hydrogeologic modelling  
Tunisia
- IAEA/RCA regional training course on groundwater dynamics using isotopes and other tools  
Sri Lanka
- Regional training course on the use of isotopic techniques for the evaluation of  
Mexico
- Use of stable and radioactive environmental isotopes in hydrological assessments  
Dominican Republic
- Basic isotope hydrology  
Sierra Leone
- The application of isotope techniques at an advanced basic level  
Uganda

#### **Incident and Emergency Centre**

- ANNuR regional workshop on emergency preparedness and response  
Morocco
- ANSN communication topical group (regional)  
Indonesia
- Application of the Requirements (GS-R-2), Guidance on General Aspects of Emergency Preparedness (GS-G-2.1) and Generic Criteria for Developing Operational Levels (GSG-2) (inter-regional)  
Austria
- Applications of biodosimetry in case of a radiation emergency (regional)  
Serbia
- Assessment of national EPR capabilities and implementation of EPREV (inter-regional)  
Austria
- Basic applications of biodosimetry in case of a radiation emergency (national)  
Bolivia
- Basic Safety Standards (inter-regional, in Spanish)  
Uruguay
- Basic Safety Standards (regional)  
South Africa
- Basic Safety Standards (regional)  
Philippines
- Capacity building towards the use of guidelines for the development of required infrastructure for radiation emergencies and preparedness in GCC (regional)  
Kuwait
- Communication with the public in a nuclear or radiological emergency (inter-regional, in French)  
Morocco
- Communication with the public in a nuclear or radiological emergency (regional)  
Belgium

- Communication with the public in radiation emergencies (regional, in Spanish)  
Bolivia
- Developing national capability in the Islamic Republic of Afghanistan for response to a nuclear or radiological emergency (national)  
Malaysia
- Developing a national radiation emergency plan (NREP) (Egypt and Jordan) (sub-regional, Part 1)  
Austria
- Developing a national radiation emergency plan (NREP) (Egypt and Jordan) (sub-regional, Part 2)  
Austria
- Developing a national radiation emergency plan (NREP) (regional, in Russian)  
Republic of Moldova
- Emergency consequence management (inter-regional)  
Austria
- Emergency preparedness and response (inter-regional)  
Austria
- Emergency preparedness and response for States embarking on a nuclear power programme (inter-regional)  
Austria
- Training and exercises on response actions and communication with the IAEA during a nuclear or a radiological emergency (Egypt and Jordan) (sub-regional)  
Austria
- Exercising the response to radiation emergencies (regional)  
South Africa
- First response to radiological emergencies (national, train-the-trainers)  
Austria
- First responders to a radiation emergency (Afghanistan, national)  
Austria
- First responders to a radiological emergency (national)  
Nicaragua
- First response to a radiation emergency (inter-regional)  
Austria
- First response to radiation emergencies: Procedures for ports and customs offices (inter-regional)  
United States of America
- Generic procedures for response to a nuclear or radiological emergency at research reactors (regional)  
Morocco
- Identification of reference hospitals to respond to radiation emergencies and national course on medical response (national)  
Venezuela
- Notification, reporting and requesting assistance (inter-regional)  
Austria
- Medical response (regional)  
Japan
- Medical response to radiation emergencies  
Austria
- Medical response to radiation emergencies (inter-regional)  
Austria
- Medical response to radiation emergencies (inter-regional)  
Japan

- Medical response to radiation emergencies (national)  
United Arab Emirates
- Medical response to radiation emergencies (national)  
Peru
- Medical response to radiation emergencies (sub-regional in French)  
Algeria
- Micronuclei and radiobiological basis of radiation protection (regional)  
Argentina
- Monitoring during a nuclear or radiological emergency (Asia and the Pacific region)  
Japan
- NIRS workshop on medical response to nuclear accidents (regional)  
Japan
- Notification, reporting and requesting assistance (inter-regional)  
Austria
- Notification, reporting and requesting assistance (inter-regional)  
Austria
- Notification, reporting and requesting assistance (national)  
Austria
- Notification, reporting and requesting assistance (national)  
Austria
- Notification, reporting and requesting assistance (national)  
Austria
- Notification, reporting and requesting assistance (national)  
Austria
- Notification, reporting and requesting assistance (national)  
Brazil
- Protective actions for severe reactor accidents (inter-regional)  
Austria
- Radiation air monitoring (national)  
Belarus
- Radiation emergencies caused by natural disasters (national)  
Cuba
- Response and assistance network (inter-regional)  
Japan
- Actions to protect the public in an emergency at a nuclear power plant (train-the-trainers, inter-regional)  
Austria
- First response to radiological emergencies (train-the-trainers, inter-regional)  
Austria
- Training in connection to a full scale exercise in Angra dos Reis (regional, in Spanish)  
Brazil
- Training/exercises to test radiological emergency plan of radon facilities (sub-regional, in Russian)  
Ukraine
- Workshop on INES (train-the-trainers, inter-regional)  
Austria

**Table A28. Relevant Agency web sites**

Public web site

<http://www.iaea.org/>

### **Nuclear Power**

Nuclear energy

<http://www.iaea.org/OurWork/ST/NE/index.html>

Nuclear power

<http://www.iaea.org/NuclearPower/>

Nuclear power technology development

<http://www.iaea.org/NuclearPower/Technology/>

Nuclear power engineering

<http://www.iaea.org/NuclearPower/Engineering/>

Nuclear energy knowledge resources

<http://www.iaea.org/inisnkm/nekr/index.html>

INPRO

<http://www.iaea.org/INPRO/>

Planning and economic studies

<http://www.iaea.org/OurWork/ST/NE/Pess/index.shtml>

International Nuclear Information System and Nuclear Knowledge Management

<http://www.iaea.org/inisnkm/>

Nuclear energy databases

<http://www.iaea.org/OurWork/ST/NE/databases.html>

### **Nuclear Fuel Cycle and Materials Technologies**

Nuclear fuel cycle and waste technology

<http://www.iaea.org/OurWork/ST/NE/NEFW/index.html>

Integrated Nuclear Fuel Cycle Information System (iNFCIS)

<http://www-nfcis.iaea.org/>

### **Nuclear Science**

Portal for medical related nuclear data

<http://www-nds.iaea.org/medportal/>

Research Reactor Database

<http://www.iaea.org/worldatom/rrdb/>

Information on ageing related operating experience from research reactors around the world (available to research reactor operators)

[http://www.iaea.org/OurWork/ST/NE/NEFW/rrg\\_operation.html](http://www.iaea.org/OurWork/ST/NE/NEFW/rrg_operation.html)

### **Nuclear Applications**

Joint FAO/IAEA Programme on Nuclear Techniques in Food and Agriculture

<http://www-naweb.iaea.org/nafa/index.html>

Physical and chemical sciences

<http://www-naweb.iaea.org/napc/ih/index.html>

### **Food and Agriculture**

Agency managed database for officially released mutant varieties

<http://mvgs.iaea.org/>

## **Human Health**

Programme of Action for Cancer Therapy (PACT)

<http://cancer.iaea.org/index.asp>

Guidance and educational resources to Member States

<http://nucleus.iaea.org/apps/HHW/root/content/MedicalPhysics>

Distance Assisted Training on-line (DATOL)

<http://nucleus.iaea.org/apps/HHW/root/content/Technologists/NuclearMedicine/Educationalresources/DistanceAssistedTrainingforNuclearMedicineTechnologists>

Training materials for distance learning

<http://www-naweb.iaea.nahu/default.asp>

## **Water Resources**

Isotope measurements from non-Agency projects on rivers and groundwater (available to Member States)

<http://www.iaea.org/water>

## **Environment**

Reference material web site

<http://nucleus.iaea.org/rpst/index.htm>

## **Incident and Emergency Preparedness and Response**

Incident and Emergencies, main page:

<https://iec.iaea.org/>

Unified System for Information Exchange in Incidents and Emergencies

<https://iec.iaea.org/usie/>

## **Radiation and Transport Safety**

Radiation Safety Information Management System (RASIMS)

<http://rasims.iaea.org>

Radiation safety

<http://rpop.iaea.org/RPoP/RPoP/Content/index.htm>

Radiation, transport and waste safety

<http://www-ns.iaea.org/home/rtws.asp>

Nuclear installation safety

<http://www-ns.iaea.org/home/nis.htm>

## **Safeguards**

<http://www.iaea.org/OurWork/SV/Safeguards/index.html>

## **Management of Technical Cooperation for Development**

<http://www-tc.iaea.org/tcweb/default.asp>

## **Regional Sites**

Africa

<http://www-tc.iaea.org/tcweb/regionalsites/africa/default.asp>

Europe

<http://www-tc.iaea.org/tcweb/regionalsites/europe/default.asp>

Latin America

<http://www-tc.iaea.org/tcweb/regionalsites/latinamerica/default.asp>

TC Pride

<http://tcpride.iaea.org/Default.asp>

TC country profile

<http://tcpride.iaea.org/?TCCountryProfile>

### **Standards, Guides and Conventions**

International standards, guides and codes

<http://www.iaea.org/Publications/Standards/index.html>

International conventions and agreements

<http://www.iaea.org/Publications/Documents/Conventions/index.html>

### **Legal Assistance**

<http://ola.iaea.org/OLA/default.asp>

**Table A29. Facilities under Agency safeguards or containing safeguarded nuclear material on 31 December 2013**

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
<b>Power reactors</b>		
Argentina	Atucha I Nuclear Power Plant	Lima
	Atucha II Nuclear Power Plant	Lima
	Carem	Lima
	Embalse Nuclear Power Plant	Embalse
Armenia	Armenian NPP	Metsamor
	Armenian NPP 3	Metsamor
Belarus	Belarus 1	Ostrovets
	Belarus 2	Ostrovets
Belgium	Doel 3 NPP	Doel
	Doel 4 NPP	Doel
	Elbel. Doel 1	Doel
	Elbel. Tih. 1	Tihange
	Tihange 2 NPP	Tihange
	Tihange 3 NPP	Tihange
Brazil	Admiral Alva. Alberto-(Angra2)	Angra Dos Reis
	Admiral Alva. Alberto-(Angra3)	Angra Dos Reis
	Alm.Alv.Alberto (Angra1)	Angra Dos Reis
Bulgaria	NPP Kozloduy 1-2	Kozloduy
	NPP Kozloduy 3-4	Kozloduy
	NPP Kozloduy 5-6	Kozloduy
Canada	Bruce 'A' N.G.S.	Tiverton, Ontario
	Bruce 'B' G.S.	Tiverton, Ontario
	Darlington NGD	Bowmanville, Ontario
	Gentilly II	Gentilly, Quebec
	Pickering N.G.S.	Pickering, Ontario
	Point Lepreau	Pt. Lepreau, New Brunswick
China	QSNPP	Hai Yan, Zhe Jiang
Czech Republic	NPP Dukovany (Edu-1)	Dukovany
	NPP Dukovany (Edu-2)	Dukovany
	NPP Temelin	Temelin
Finland	Hanhikivi-1	Pyhaejoki
	Loviisa NPP	Loviisa
	TVO I	Olkiluoto
	TVO II	Olkiluoto
	TVO III	Olkiluoto
	TVO IV	Olkiluoto Site
Germany	AVR	Juelich
	HKG-THTR 300	Hamm
	KKW Brokdorf	Brokdorf
	KKW Brunsbuettel	Brunsbuettel

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	KKW GR3. 5	Lubmin
	KKW Grafenrheinfeld	Grafenrheinfeld
	KKW Greifswald 1 & 2	Lubmin
	KKW Grohnde	Emmerthal
	KKW Gundremmingen, Block B	Gundremmingen
	KKW Gundremmingen, Block C	Gundremmingen
	KKW Isar 1	Essenbach
	KKW Isar 2	Essenbach
	KKW Kruemmel	Geesthacht
	KKW Neckarwestheim 1	Neckarwestheim
	KKW Neckarwestheim 2	Neckarwestheim
	KKW Obrigheim	Obrigheim
	KKW Philippsburg 1	Philippsburg
	KKW Philippsburg 2	Philippsburg
	KKW Rheinsberg	Rheinsberg
	KKW Unterweser	Unterweser
	KKW Emsland	Lingen (Ems)
	KW Biblis A	Biblis
	KW Biblis B	Biblis
	KW Muelheim-Kaerlich	Muelheim-Kaerlich
	KWL-Lingen	Lingen
	NS 'Otto Hahn'	Geesthacht
Hungary	MVM Paks NPP Ltd. I	Paks
	MVM Paks NPP Ltd. II	Paks
India	KAPS 1 & 2	Surat, Gujarat
	KKNPP	Kudankulam, Tamil Nadu
	RAPS 1 & 2	Rawatbhata, Rajasthan
	RAPS 3 & 4	Rawatbhata, Rajasthan
	RAPS 5 & 6	Rawatbhata, Rajasthan
	TAPS	Tarapur, Maharashtra
Iran, Islamic Republic of	Bushehr NPP	Bushehr, Halilem
	IR360	IR360
Italy	Area Disattivazione Caorso	Caorso
	Centrale Latina	Borgo Sabotino
	Centrale Nucleare Di Trino	Trino Vercellese
	Cirene (On Load)	Borgo Sabotino
	So.G.I.N. CN Del Garigliano	Sessa Aurunca(Ce)
Japan	Fuku-I-1	Futaba-Gun, Fukushima-Ken
	Fuku-I-2	Futaba-Gun, Fukushima-Ken
	Fuku-I-3	Futaba-Gun, Fukushima-Ken
	Fuku-I-4	Futaba-Gun, Fukushima-Ken
	Fuku-I-5	Futaba-Gun, Fukushima-Ken
	Fuku-I-6	Futaba-Gun, Fukushima-Ken
	Fuku-N-1	Futaba-Gun, Fukushima-Ken

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	Fuku-N-2	Futaba-Gun, Fukushima-Ken
	Fuku-N-3	Futaba-Gun, Fukushima-Ken
	Fuku-N-4	Futaba-Gun, Fukushima-Ken
	Genkai-1	Higashimatsuura-Gun, Saga-Ken
	Genkai-2	Higashimatsuura-Gun, Saga-Ken
	Genkai-3	Higashimatsuura-Gun, Saga-Ken
	Genkai-4	Higashimatsuura-Gun, Saga-Ken
	Hamaoka-1	Ogasa-Gun, Shizuoka-Ken
	Hamaoka-2	Ogasa-Gun, Shizuoka-Ken
	Hamaoka-3	Ogasa-Gun, Shizuoka-Ken
	Hamaoka-4	Ogasa-Gun, Shizuoka-Ken
	Hamaoka-5	Ogasa-Gun, Shizuoka-Ken
	Higashidoori-1	Shimokita-Gun, Aomori-Ken
	Higashidoori-1	Shimokita-Gun, Aomori-Ken
	Ikata-1	Nishiuwa-Gun, Ehime-Ken
	Ikata-2	Nishiuwa-Gun, Ehime-Ken
	Ikata-3	Nishiuwa-Gun, Ehime-Ken
	Joyo	Higashi, Ibaraki-Ken
	Kaminoseki-1	Kumage-Gun, Yamaguchi-Ken
	Kashiwazaki-1	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-2	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-3	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-4	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-5	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-6	Kashiwazaki-Shi, Niigata-Ken
	Kashiwazaki-7	Kashiwazaki-Shi, Niigata-Ken
	Mihama-1	Mikata-Gun, Fukui-Ken
	Mihama-2	Mikata-Gun, Fukui-Ken
	Mihama-3	Mikata-Gun, Fukui-Ken
	Monju	Tsuruga-Shi, Fukui-Ken
	Ohi 1 & 2	Ohi-Gun, Fukui-Ken
	Ohi 3	Ohi-Gun, Fukui-Ken
	Ohi 4	Ohi-Gun, Fukui-Ken
	Ohma	Shimokita-Gun, Aomori Prefecture
	Onagawa-1	Oshika-Gun, Miyagi-Ken
	Onagawa-2	Oshika-Gun, Miyagi-Ken
	Onagawa-3	Oshika-Gun, Miyagi-Ken
	Sendai-1	Sendai-Shi, Kagoshima-Ken
	Sendai-2	Sendai-Shi, Kagoshima-Ken
	Sendai-3	Satsumasendai-Shi
	Shika-1	Hakui-Gun, Ishikawa-Ken
	Shika-2	Hakui-Gun, Ishikawa-Ken
	Shimane-1	Yatsuka-Gun, Shimane-Ken
	Shimane-2	Yatsuka-Gun, Shimane-Ken

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	Shimane-3	Yatsuka-Gun, Shimane-Ken
	Takahama-1	Ohi-Gun, Fukui-Ken
	Takahama-2	Ohi-Gun, Fukui-Ken
	Takahama-3	Ohi-Gun, Fukui-Ken
	Takahama-4	Ohi-Gun, Fukui-Ken
	Tokai	Tokai-Mura, Ibaraki-Ken
	Tokai-2	Tokai-Mura, Ibaraki-Ken
	Tomari-1	Fururu-Gun, Hokkaido
	Tomari-2	Fururu-Gun, Hokkaido
	Tomari-3	Fururu-Gun, Hokkaido
	Tsuruga-1	Tsuruga-Shi, Fukui-Ken
	Tsuruga-2	Tsuruga-Shi, Fukui-Ken
Kazakhstan	BN-350	Aktau
Korea, Republic of	Hanbit-1	Yeonggwang
	Hanbit-2	Yeonggwang
	Hanbit-3	Yeonggwang
	Hanbit-4	Yeonggwang
	Hanbit-5	Yeonggwang
	Hanbit-6	Yeonggwang
	Hanul-1	Ulchin
	Hanul-2	Ulchin
	Hanul-3	Ulchin
	Hanul-4	Ulchin
	Hanul-5	Ulchin
	Hanul-6	Ulchin
	Shin Hanul 1	Ulchin
	Shin Hanul 2	Ulchin
	Kori-1	Pusan
	Kori-2	Pusan
	Kori-3	Pusan
	Kori-4	Pusan
	Shin Kori-1	Pusan
	Shin Kori-2	Pusan
	Shin Kori-3	Pusan
	Shin Kori-4	Pusan
	Shin Kori-5	Pusan
	Shin Kori-6	Pusan
	Shin Wolsong-1	Kyongju
	Shin Wolsong-2	Kyongju
	Wolsong-1	Kyongju
	Wolsong-2	Kyongju
	Wolsong-3	Kyongju
	Wolsong-4	Kyongju
Lithuania	Ignalina NPP	Visaginas

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
Mexico	Central Laguna Verde Unit I	Muni. Al. Luc. Veracruz
	Central Laguna Verde Unit II	Muni. Al. Luc. Veracruz
Netherlands	Epz. Borssele	Borssele
	N. V. GKN-Dodewaard	Dodewaard
Pakistan	Chasnupp-1	Kundian, District Mianwali
	Chasnupp 2	Kundian, District Mianwali
	Chasnupp-3	Kundian, District Mianwali
	Chasnupp-4	Kundian, District Mianwali
	Kanupp	Karachi
Philippines	BNPP	Morong, Bataan
Romania	Cernavoda-3	Cernavoda
	Cernavoda-4	Cernavoda
	CNE Cernavoda 1	Cernavoda
	CNE Cernavoda NPP 2	Cernavoda
Slovakia	JAVYS NPP A-1	Jaslovske Bohunice
	JAVYS NPP V-1	Jaslovske Bohunice
	NPP Mochovce Units 1 & 2	Mochovce
	NPP Mochovce Units 3, 4	Mochovce
	V-2 NPP	Jaslovske Bohunice
Slovenia	Krško (NEK)	Krško
South Africa	Koeberg Unit I	Cape Town
	Koeberg Unit II	Cape Town
Spain	Asco 2	Asco
	Asco NPP 1	Asco
	C.N. Almaraz 1	Almaraz
	C.N. Almaraz 2	Almaraz
	C.N. Cofrentes	Cofrentes
	C.N. de Sta. Maria de Garona	Santa Maria De Garona
	C.N. Jose Cabrera	Almonacid De Zorita
	CN Trillo-1	Trillo
	CN Vandellos II	Vandellos
Sweden	Barsebaeck Unit 1	Loeddekoeping
	Barsebaeck Unit 2	Loeddekoeping
	Forsmark Unit 1	Oesthammar
	Forsmark Unit 2	Oesthammar
	Forsmark Unit 3	Oesthammar
	Oskarshamn Unit 1	Oskarshamn
	Oskarshamn Unit 2	Oskarshamn
	Oskarshamn Unit 3	Oskarshamn
	Ringhals Unit 1	Ringhals
	Ringhals Unit 2	Ringhals
	Ringhals Unit 3	Vaeröbacka
	Ringhals Unit 4	Ringhals
Switzerland	KKB Beznau-I	Beznau Doettingen

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	KKB Beznau-II	Beznau Doettingen
	KKG-Goesgen	Goesgen-Daeniken
	KKL-Leibstadt	Leibstadt
	KKM Muehleberg	Muehleberg
Ukraine	Chernobyl NPP, Unit 1	Chernobyl
	Chernobyl NPP, Unit 2	Chernobyl
	Chernobyl NPP, Unit 3	Chernobyl
	Khmelnitski 1	Neteshin
	Khmelnitski 2	Neteshin
	Khmelnitski 3	Neteshin
	Khmelnitski 4	Neteshin
	Rovno 1 & 2	Kuznetsovsk
	Rovno 3	Kuznetsovsk
	Rovno 4	Kuznetsovsk
	South Ukraine 1	Yuzhnoukrainsk
	South Ukraine 2	Yuzhnoukrainsk
	South Ukraine 3	Yuzhnoukrainsk
	Zaporozhe 1	Energodar
	Zaporozhe 2	Energodar
	Zaporozhe 3	Energodar
	Zaporozhe 4	Energodar
	Zaporozhe 5	Energodar
	Zaporozhe 6	Energodar
United Arab Emirates	Braka NPP	United Arab Emirates
Viet Nam	Ninh Thuan 1 Plant Unit 1	Phuoc Dinh Comm. Thuan Nam Dt.
	Ninh Thuan 1 Plant Unit 2	Phuoc Dinh Comm. Thuan Nam Dt.
	Ninh Thuan 2 Plant Unit 1	Vinh Hai Comm. Ninh Hai Dist.
	Vinh Hai Comm. Ninh Hai Dist.	Vinh Hai Comm. Ninh Hai Dist.
<b>Research reactors and critical assemblies</b>		
Algeria	Es Salam Reactor	Ain Oussera
	Nur Reactor	Draria-Bp29 Wilaya De Tipaza
Argentina	Argentine Reactor 0 (RA-0)	Cordoba
	Argentine Reactor 1 (RA-1)	Centro Atomico Constituyentes
	Argentine Reactor 3 (RA-3)	Centro Atomico Ezeiza
	Argentine Reactor 4 (RA-4)	Rosario
	Argentine Reactor 6 (RA-6)	Centro Atomico Bariloche
	Argentine Reactor 8 (RA-8)	Pilcaniyeu
Australia	HIFAR	Lucas Heights, New South Wales
	MOATA	Lucas Heights, New South Wales
	OPAL	Lucas Heights, New South Wales
Austria	TRIGA Mark II Reactor	Vienna
Bangladesh	Atomic Energ. Res. Estab.	Dhaka
Belarus	Sosny	Minsk
Belgium	BR1-CEN	Mol

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	BR2	Mol
	CEN-Venus	Mol
	Thetis Universiteit Gent	Gent
Brazil	Argonauta Reactor-IEN	Rio de Janeiro
	Brazilian Multipurpose Reactor	Ipero, São Paulo
	IPEN/MB01 Critical Assem.	São Paulo
	IRP-R1 Reactor-CDTN	Belo Horizonte
	Research Reactor IEA-R1	Cidade Univ. A. S. D. Oliveira
Bulgaria	IRT-2000	Sofia
Canada	Biology, Chemistry, Physics	Chalk River, Ontario
	DIF	Chalk River, Ontario
	Ecole Polytechnique	Montreal, Quebec
	McMaster Nuc. Reactor	Hamilton, Ontario
	NRU Reactor	Chalk River, Ontario
	NRX Reactor	Chalk River, Ontario
	Slowpoke Alberta	Univ. of Alberta, Edmonton
	Slowpoke Kingston	Kingston, Ontario
	Slowpoke Saskatchewan	Saskatoon, Saskatchewan
Chile	La Reina Reactor	Santiago
	Lo Aguirre Experimental React.	Santiago
China	HTR-10	Nankou, Beijing
Colombia	Ian-R1 R. Reactor	Bogota
Czech Republic	LR-0	Řež
	LVR-15	Řež
	VR-1	Prague
Dem. Republic of the Congo	TRIGA II Reactor	Kinshasa
Denmark	Danish Decommissioning - DR3	Roskilde
Egypt	ET RR-1	Inshas
	MPR (Multi Purpose Reactor)	Aea Nuc Res C. Near Inshas
Estonia	A.L.A.R.A.	Paldiski
Finland	FiR 1	Espoo
Georgia	Decom. IRT-M	Tbilisi
Germany	AKR-2	Dresden
	BER-II	Berlin
	FH-Furtwangen	Furtwangen
	FRM	Garching
	FRM II	Garching
	Helmholtz-Zentrum Geesthacht	Geesthacht
	KFA-FRJ2	Juelich
	Labor-ST	Zittau
	SUR100	Hannover
	SUR100	Stuttgart
	SUR100-FHU	Ulm
	SUR100-RWTH	Aachen

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	TRIGA Mainz	Mainz
Ghana	GHARR-1 Ghana Research React.1	Legon-Accra
Greece	GRR-1	Attikis
Hungary	Budapest Res. Reactor	Budapest
	Training Reactor	Budapest
Indonesia	CHTKN	Bandung
	PPNY	Yogyakarta
	RSG-GAS	Serpong
Iran, Islamic Republic of	Esfahan MNSR	Esfahan
	HWZPR	Esfahan
	IR-40	Arak - Khondab
	LWSCR	Esfahan
	Tehran Res. React. (TRR)	Tehran
Israel	Israel R. R.-1 (IRR-1)	Soreq
Italy	AGN-201	Palermo
	CEC-Complexe-Essor	Ispra
	CISAM-RTS-1	San Piero A Grado
	CNEN-RB-3	Montecuccolino
	LE.N.A. Pavia	Pavia
	RB-1	Montecuccolino
	TAPIRO-Casaccia	Santa Maria Di Galeria
	TRIGA-RC1 Mark II	Santa Maria Di Galeria
Jamaica	CNS	Kingston
Japan	DCA	Oarai-Machi, Ibaraki-Ken
	FCA	Tokai-Mura, Ibaraki-Ken
	HTR	Kawasaki-Shi, Kanagawa-Ken
	HTTR	Higashi, Ibaraki-Ken
	JMTR	Higashi, Ibaraki-Ken
	JMTRC	Higashi-Gun, Ibaraki-Ken
	JRR-2	Tokai-Mura, Ibaraki-Ken
	JRR-3	Tokai-Mura, Ibaraki-Ken
	JRR-4	Tokai-Mura, Ibaraki-Ken
	KINKI	Higashiosaka-Shi, Osaka-Fu
	KUCA	Osaka
	KUR	Sennan-Gun, Osaka
	Musashi Reactor	Kawasaki-Shi, Kanagawa-Ken
	NCA	Kawasaki-Shi
	NSRR	Tokai-Mura, Ibaraki-Ken
	Rikkyo	Nagasaki, Kanagawa-Ken
	TCA	Tokai-Mura, Ibaraki-Ken
	TODAI	Tokai-Mura, Ibaraki-Ken
	TTR	Kawasaki-Shi, Kanagawa-Ken
	VHTRC	Tokai-Mura, Ibaraki-Ken
Kazakhstan	Kurchatov Test Reactors	Kurchatov

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	WWR-K	Almaty
Korea, Republic of	Gijang Research Reactor	Gijang, Busan Metrp. City
	Hanaro	Taejon
	Kyung Hee	Suwoon
Latvia	IRT	Salaspils
Libya	IRT-Tajura	Tajura
Malaysia	Puspati	Bangi, Selangor
Mexico	TRIGA Mark III	Ocoyoacac
Morocco	MA-R1	Rabat, Agdal
Netherlands	HFR-Petten	Petten
	IRI. HOR	Delft
	LFR-Petten	Petten
Nigeria	NIRR-1	Ahmadu Bello University, Zaria
Norway	HBWR	Halden
	JEEP-II	Kjeller
Pakistan	PARR-1	Rawalpindi
	PARR-2	Rawalpindi
Peru	CNIP RP-10 R. Reactor	Lima
	RP-0 R. Reactor	Lima
Philippines	PRR-1	Quezon City, Diliman
Poland	Anna & Agata	Otwock Swierk
	Maria	Otwock-Swierk
Portugal	IST (CTN) RPI	Sacavem
Romania	IFIN-HH	Magurele
	TRIGA Res. & MTR	Pitesti-Mioveni
Serbia	RA-RB	Vinca
Slovenia	TRIGA II	Ljubljana
South Africa	Safari-I Research Reactor	Pelindaba
Sweden	Studsvik Ab And Ab Svafo	Studsvik
Switzerland	AGN 211-P	Basel
	Crocus	Lausanne
	Proteus	Wuerenlingen
Syrian Arab Republic	MNSR	Syria
Tajikistan	Argus Research Reactor	Physical-Tech. Inst., Dushanbe
Thailand	ONRC	Ongkharak
	TRR-1	Bangkok
Turkey	Cekmece Nuc. Res. & Tr. Centre	Istanbul
	ITU-TRR-TRIGA MARK II	Istanbul
Ukraine	IR-100 Res. Reactor	Sevastopol
	WWR-M Res. Reactor	Kiev
Uzbekistan	IIN-3M	Tashkent
	WWR-SM	Ulugbek
Venezuela	RV-1 Ivic R. Reactor	Altos De Pipe
Viet Nam	Da Lat	Da Lat, Lam Dong

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
<b>Conversion plants</b>		
Algeria	Pilot Uranium Conversion Plant	Draria Nuclear Research Center
Argentina	Experimental Dry Conversion	Bariloche
	UF <sub>6</sub> Production Plant	Pilcaniyeu
	UO <sub>2</sub> Conversion Plant	Cordoba
	Uranium Powder Production Fac.	Las Mesillas, La Rioja Prov.
Brazil	UOC To UF <sub>6</sub> Conversion	Ipero, Sao Paulo
Canada	Blind River	Blind River, Ontario
	Port Hope	Port Hope, Ontario
Chile	Lab. Experiment. De Conversion	Santiago
Iran, Islamic Republic of	EUPP	Esfahan
	UCF	Esfahan
Japan	JCO	Tokai-Mura, Ibaraki-Ken
	PCDF	Tokai-Mura, Ibaraki-Ken
Mexico	Fuel Fabrication Pilot Plant	Salazar
Romania	Nat. Uranium Company	Feldioara
South Africa	Conversion Plant (U Plant)	Pelindaba
	HEU/LEU Conversion Plant	Pelindaba
Sweden	RMA	Stenstorp
<b>Fuel fabrication plants</b>		
Algeria	UDEC	Draria Nuclear Site
Argentina	Exp. Pl. Fuel Mat. & Powder Met.	Centro Atomico Constituyentes
	Fuel. Fab. Plant - Fecn	Centro Atomico Ezeiza
	Res. Reac. Fuel Elem. Fab.Plant	Centro Atomico Constituyentes
	Res. Reac. Fuel Fab. Plant	Centro Atomico Ezeiza
Belgium	FBFC Int.	Dessel
	FBFC Int.	Dessel
	N.V. BN	Dessel
Brazil	Fuel Fabrication Plant-FEC	Resende
Canada	Cameco, Port Hope	Port Hope, Ontario
	Fuel Eng. Met. Che. Op.	Chalk River, Ontario
	Fuel Fabrication Facility	Chalk River, Ontario
	GE, Hitachi Inc., Peterborough	Peterborough, Ontario
	GE, Hitachi Inc., Toronto	Toronto, Ontario
Chile	Unidad De Metalur. Fisica (UMF)	Santiago, Chile
Egypt	FMPP (Fuel Manuf. Pilot Plant)	Inshas, 35 km N/NE From Cairo
	R&D - NFL	Inshas Nuc. Res. Center, Cairo
France	Melox de Marcoule	Chusclan
Germany	Adv. Nuclear Fuels	Lingen
	Siemens MOX II	Hanau
India	NFC	Hyderabad
	NFC - NU	Hyderabad
Indonesia	IEBE	Serpong
	IPEBRR	Serpong

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
Iran, Islamic Republic of	FMP	Isfahan
	FPFP	Esfahan
Italy	FN-Bosco Marengo	Bosco Marengo
Japan	GNF-J	Yokosuka-Shi, Kanagawa-Ken
	J-MOX	Oaza Obuchi, Rokkasho-Mura
	MNF	Tokai-Mura, Ibaraki-Ken
	NFI Kumatori-1	Sennan-Gun, Osaka
	NFI Tokai-1	Tokai-Mura, Ibaraki-Ken
	NFI Tokai-2	Tokai-Mura, Ibaraki-Ken
	PFPP	Tokai-Mura, Ibaraki-Ken
	PPFF	Tokai-Mura, Ibaraki-Ken
Kazakhstan	UMP	Ust-Kamenogorsk
Korea, Republic of	KNFFP	Taejon
Romania	SN NFP Subsidiary	Mioveni
South Africa	LEU Fuel Fabrication Plant	Pelindaba
	MTR Fuel Fabrication Plant	Pelindaba
Spain	ENUSA Fab. Juzbado	Juzbado
Sweden	Westinghouse Electric	Vaesteras/Finnslaetten
Turkey	Nuclear Fuel Pilot Plant	Istanbul
Ukraine	NFFP	Smolino Village, Kirovograd Re
<b>Reprocessing plants</b>		
Egypt	Hydrometallurgy Unit	Inshas, Cairo
France	AREVA NC - UP2 et UP3	La Hague
Germany	WAK/VEK	Eggenstein-Leopoldshafen
India	PREFRE	Tarapur, Maharashtra
Iran, Islamic Republic of	Mix Separation Facility	Tehran Nuc Res Center, Tehran
Italy	So.G.I.N. SpA - Impianto EUREX	Saluggia
	So.G.I.N. SpA - Trisaia	Rotondella
Japan	CPF	Tokai-Mura, Ibaraki-Ken
	RETF	Tokai-Mura, Ibaraki-Ken
	RRF	Ibaraki-Ken
	RRP	Kamikita-Gun, Aomori-Ken
	SCF	Tokai-Mura, Ibaraki-Ken
	TRP	Tokai-Mura, Ibaraki-Ken
<b>Enrichment plants</b>		
Argentina	Mol Exc & Iso-Sep Tech R&D Lab	Centro Atomico Bariloche
	Pilcaniyeu Mock-Up Laboratory	Pilcaniyeu
	Uranium Enrichment Plant	Pilcaniyeu
Australia	Silex	Lucas Heights, New South Wales
Brazil	Isotopic Enrich. Lab.(LEI)	Ipero, São Paulo
	Laser Spectroscop. Lab.(AR/LAS)	San Jose Dos Campos
	U-235 Centrifuge Enr. Plant	Resende
	Uran. Enrich. Pilot Plant(USIDE)	Ipero, São Paulo
China	Shaanxi	Han Zhang, Shaanxi Province

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
France	Georges Besse II	Bollene
Germany	UTA 1 and UTA 2	Gronau
Iran, Islamic Republic of	FEP	Natanz
	FFEP	20 km Northeast of Qom City
	PFEP	Natanz
Japan	CTF	Kitakami-Gun, Aomori-Ken
	NEP	Tomata-Gun, Okayama-Ken
	REP	Kamikita-Gun, Aomori-Ken
Netherlands	Urenco Nederland	Almelo
United Kingdom	Urenco Capenhurst E22, E23, A3	Capenhurst
<b>Separate storage facilities</b>		
Argentina	Cent. St. Irr. Sp. Fiss. M. (DCMFEI)	Centro Atomico Ezeiza
	Cent. Store Sp. Fiss. Mat. (DCMFE)	Centro Atomico Constituyentes
	DUE	Centro Atomico De Ezeiza
	Irrad. Res. React. Fuel Store.	Centro Atomico Ezeiza
	Nuclear Material Storage	Centro Atomico Constituyentes
	Storage Bunker	Centro Atomico Ezeiza
Armenia	SSFS	Metsamor
Australia	Bulk Storage Facility	Lucas Heights, New South Wales
Belarus	Belarus NPP FF Storage	Ostrovets
Belgium	Belgoprocess	Dessel
	Belgoprocess	Dessel
	Belgoprocess UF6	Dessel
	Elbel. DL. DS	Beveren
	Wet Store	Tihange
Brazil	Aramar Store	Ipero
	Planned Fuel Storage Facility	Ilha Da Madeira, Itaguaí
Bulgaria	DSFSF KNPP 2	Kozloduy
	SFSF Kozloduy 1	Kozloduy
Canada	ACEL Research	Pinawa, Manitoba
	CRL Waste Storage Facility	Chalk River, Ontario
	DP Dry Storage	Tiverton, Ontario
	DWMF	Darlington, Ontario
	FPSF	Chalk River Laboratories
	Gentilly I	Gentilly, Quebec
	NMSF	Chalk River, Ontario
	PUFDSF	Pickering, Ontario
	Spent Fuel Canister Storage	Chalk River, Ontario
	Waste Storage Facility	Chalk River, Ontario
	WUFDSF	Tiverton, Ontario
Czech Republic	ISFS Dukovany	Dukovany
	ISFS Temlin	Temelin
	Radioactive Waste Rep. Richard	Litomerice
	Vao, HLWS	Řež

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
Denmark	DD Storage	Roskilde
	DD Waste	Roskilde
Finland	Encapsulation Plant	Olkiluoto
	SF Repository	Olkiluoto
	TVO-KPA-Store	Olkiluoto
Germany	AVR-BL	Juelich
	BZA Ahaus	Ahaus
	EWN Zwischenlager Nord GmbH	Lubmin
	HDB	Eggenstein - Leopoldshafen
	Kernmateriallager 87	Rosendorf
	KFA-AVR	Juelich
	KFK-FR-2	Eggenstein-Leopoldshafen
	NCS-Lagerhalle	Hanau
	PTB-Spaltstofflager	Hanau
	SZK Kruemmel	Geesthacht
	SZL Biblis	Biblis
	SZL Brokdorf	Brokdorf
	SZL Brunsbuettel	Brunsbuettel
	SZL Emsland	Lingen (Ems)
	SZL Grafenrheinfeld	Grafenrheinfeld
	SZL Grohnde	Emmerthal
	SZL Gundremmingen	Gundremmingen
	SZL Isar	Essenbach
	SZL Neckarwestheim	Neckarwestheim
	SZL Philippsburg	Philippsburg
	SZL Unterweser	Stadland
	TBH (B) 87.2	Rosendorf
	TBL-G	Gorleben
	Uranoxid-Lager UAG	Gronau
Hungary	Cent. Isotope Store	Budapest
	MVDS	Paks
India	TAPS AFR	Tarapur, Maharashtra
Indonesia	Ria-Nd ISFSF	Serpong
Iran, Islamic Republic of	KWS	Karaj
Iraq	Tuwaitha Location C	Tuwaitha
Italy	CCRM-Ispra Cent. Store	Ispra
	Centro Di Comune Di Ricerca	Ispra
	Dep. Avogadro-Elementi Irragg.	Torino
	Essor Storage	Ispra
	Lab.Misure Nucleari Perla	Ispra
	Nucleco S.P.A.	Rome
Japan	Fugen	Tsuruga-Shi, Fukui-Ken
	Fuku-I-CSFS	Futaba-Gun, Fukushima-Ken
	JAERI Mutsu	Mutsu-Shi, Aomori-Ken

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	KUFFS	Sennan-Gun, Osaka
	NFI Kumatori-2	Sennan-Gun, Osaka
	Ningyo R&D	Tomata-Gun, Okayama-Ken
	RFSC	Mutsu-Shi, Aomori-Ken
Kazakhstan	Baikal-1 DSFS	Kurchatov
	BN-350 Temp. Storage	Aktau
	Ulba Thorium Storage	Ust-Kamenogorsk
Korea, Republic of	Acrylonitrile Plant	Ulsan
	NMSF	Kaeri Site in Taejon
	Uranium Residue Storage Fac.	Kaeri-Daejeon
Lithuania	Radioactive Waste Management	Vilnius
	SNFS-1	Visaginas
	SNFS-2	Visaginas
Netherlands	COVRA	Vlissingen-Oost
	HABOG	Vlissingen
Poland	ZUOP	Swierk
Portugal	IST (CTN) Instalacao Piloto	Sacavem
Romania	CNE Cernavoda IDSFS	Cernavoda
Russian Federation	IUEC Storage Facility	Angarsk
Slovakia	Javys ISFS	Jaslovske Bohunice
	Javys Nuclear Store	Jaslovske Bohunice
South Africa	E-Building Storage Facility	Valindaba
	HEU Storage Vault	Pelindaba
	Koeberg Castor Storage Fac.	Cape Town
	Thabana Pipe Store	Pelindaba
	Waste Storage Facility	Pelindaba
	Y-Plant Storage Facility	Pelindaba
	Z-Plant Storage Facility	Pelindaba
Spain	Asco ATI	Asco
	ATI	Almonacid De Zorita
	CN Trillo	Trillo
Sweden	SFK	Oesthammar
	SKB Clab Store	Oskarshamn
Switzerland	Saphir	P. Sherrer Inst. (Psi) Wuerenlin
	Zwibez Kernkraftwerk Beznau	Kernkraftwerk Beznau
	Zwilag	Wuerenlingen Aargau
Ukraine	Chernobyl NPP-SFS	Chernobyl
	Chernobyl SNFSF-2	Chernobyl
	Khmelnitski FF Storage	Neteshin
	Rovno FF Storage	Kuznetsovsk
	South Ukraine FF Storage	Yuzhnoukrainsk
	Ukraine Centralized Dry Store	Chernobyl Exclusion Zone
	Zaporozhe FF Storage	Energodar
	Zaporozhe SFS	Energodar

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
United Kingdom	SNM Store 9	Sellafield
	Thorp Product Store	Sellafield
USA	KAMS Storage	Savannah River Site
<b>Other facilities</b>		
Algeria	AURES I	Birine Nucl. Site (Ain Oussara)
Argentina	Alpha Laboratory	Centro Atomico Constituyentes
	Enriched Uranium Recovery Lab.	Centro Atomico Ezeiza
	Fission Products Division	Centro Atomico Ezeiza
	Lapep	Centro Atomico Ezeiza
	Triple Altura Laboratory (LTA)	Centro Atomico Ezeiza
	Uranium Powder Fab. Plant	Centro Atomico Constituyentes
Australia	R&D Labs	Lucas Heights, New South Wales
Belgium	Belgoprocess	Mol
	I.R.E.	Fleurus
	IRMM	Geel
	SCK-Cen Lab.	Mol
	SCK-CEN Pu Laboratories	Mol
Brazil	(Ladesi)-Copesp	São Paulo
	Fuel Development & Tech. Fac.	São Paulo
	Labgene	Ipero, Aramar, São Paulo
	Nuc. Fuel & Instr. Devel. Lab.	São Paulo
	Nuclear Mat. Lab.-Labmat	Ipero
	Reprocess. Proj.(IPEN-CNEN/SP)	São Paulo
Czech Republic	Lab. & Stores, Centr. Anal. Lab	Řež
	UJP	Prague
Denmark	Danish Decommiss. - Hotcell	Roskilde
Egypt	Molybdenum Production Unit	Inshas, Cairo
	NCB	Inshas
Georgia	Razmnozhitel-1	Tbilisi
	Sukhumi Inst.	Sukhumi
Germany	Inst. Kernchemie	Mainz
	JRC-ITU	Eggenstein-Leopoldshafen
	KFA-HZ	Juelich
	Lab. Juelich	Juelich
	PKA Gorleben	Gorleben
	WAK-Heisse Zellen der HVT	Eggenstein-Leopoldshafen
Indonesia	RMI	Serpong
Iran, Islamic Republic of	JHL	Tehran Nuc Res Center, Tehran
Italy	CNEN-ISTEC	Santa Maria Di Galeria
	Impianto Plutonio	Santa Maria Di Galeria
	OPEC 2-CAS	Santa Maria Di Galeria
Japan	NC Tokai R&D	Tokai-Mura, Ibaraki-Ken
	FMF	Higashi, Ibaraki-Ken
	IRAF	Higashi-Gun, Ibaraki-Ken

State <sup>a</sup>	Name of Facility	Location <sup>a</sup>
	JAERI Oarai R&D	Higashi, Ibaraki-Ken
	JAERI Tokai	Tokai-Mura, Ibaraki-Ken
	JNC Oarai R&D	Higashi, Ibaraki-Ken
	Kumatori	Sennan-Gun, Osaka
	Mitsui Iwakuni-Ohtake	Kuga-Gun, Yamaguchi-Ken
	Mitsui Osaka	Takai-Shi, Osaka-Fu
	NDC Fuel Hot Lab	Tokai-Mura, Ibaraki-Ken
	NERL	Tokai-Mura, Ibaraki-Ken
	NFD	Higashi, Ibaraki-Ken
	NRF	Tsukuba-Shi, Ibaraki-Ken
	Showa	Kawasaki-Shi, Kanagawa-Ken
	Sumitomo-Chiba	Sodegaura-Shi, Chiba-Ken
	UML	Higashi, Ibaraki-Ken
Korea, Republic of	ACPF	Kaeri Site, Daejeon
	DFDF	Taejeon
	HFFL	Taejeon
	IMEF	Taejeon
	KAERI R&D Facility	Taejeon
	PIEF	Taejeon
	PRIDE	Kaeri-Daejeon
Libya	Tajura Uranium R&D Facility	Tajura
Netherlands	GCO/ECN Lab.	Petten
Norway	Research Laboratories	Kjeller
South Africa	Decontam. & Waste Recovery Pl.	Pelindaba
	Hot Cell Complex	Pelindaba
	Nu And Du Metals Plant	Pelindaba
Spain	C.A. El Cabril	El Cabril
Switzerland	CERN	Meyrin-Geneva
	E.I.R.	Wuerenlingen
Ukraine	Chernobyl Conditioning	Chernobyl
	Chernobyl Unit 4 Shelter	Chernobyl
	KHFTI	Kharkov
	Sevastopol Subcritical Assy.	Sevastopol

<sup>a</sup> An entry in this column does not imply the expression of any opinion whatsoever on the part of the Agency concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

**Note:** 1. The Agency was also applying safeguards at 17 facilities in Taiwan, China.

2. Additionally under Agency safeguards were 562 material balance areas outside facilities in 121 States and in Taiwan, China. These include 52 material balance areas established for States with the amended small quantities protocol in force.