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In This Issue

The IAEA Environment Laboratories assist Member States to monitor pollution in the environment and to help mitigate the effects on ecosystem services. Almost 30 years after the Chernobyl accident and 5 years after the Fukushima Daiichi accident, the IAEA is continuing to assist Members States to monitor the environment and provide expertise in vital areas such as emergency preparedness and remediation. In this edition of the Environment Laboratories newsletter we take a closer look at the situation in Chernobyl and some of the activities to support recovery.

We also provide an update on the Polessye State Radioecological Reserve and its fauna and flora. We discuss projects in Japan, where among others the Environment Laboratories are working on quality assurance of the data collected. We also report on a diverse range of initiatives such as seafood safety with the Regional Organisation for the Protection of the Marine Environment of the Gulf (ROPME).

For more information on the activities of the IAEA's Environment Laboratories please visit:
www.iaea.org/nael

David Osborn
Director, Environment Laboratories

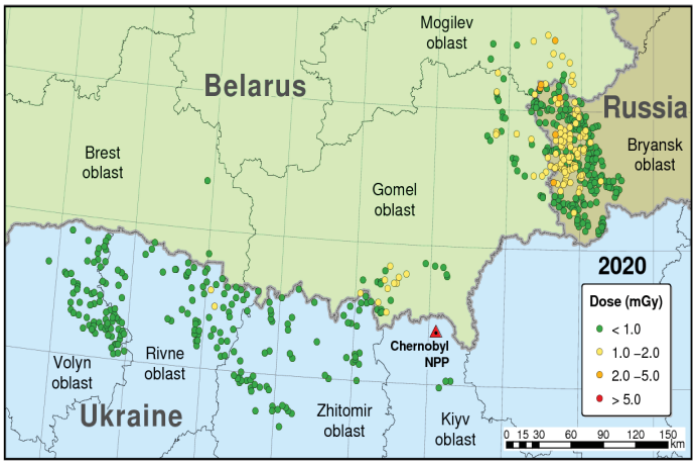
Wild boar (left) and red deer (right). Photos obtained by wildlife trap cameras in the Chernobyl Exclusion Zone (CEZ). Photo credit: TREE project, www.ceh.ac.uk/TREE

In Focus: Supporting Recovery of the Environment in the Areas Affected by the Chernobyl Accident

The first data and assessments of the consequences of the Chernobyl accident were presented by the Soviet Union delegation at the International Experts' Meeting of the International Atomic Energy Agency (IAEA) in Vienna, 25 to 29 August 1986. The Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident was published in September 1986 (IAEA Safety Series No. 75-INSAG-l). Since that time the IAEA has continuously supported the efforts of affected countries on the mitigation of consequences of the accident and on the recovery of the affected area. The United Nations (UN) and the IAEA have supported the Republic of Belarus, the Russian Federation and Ukraine through numerous Chernobyl-related projects conducted by the IAEA and by other international organisations with IAEA support.

The 4th Unit of the Chernobyl NPP: 25 years after the accident. (Photo: State Agency for the Exclusion Zone Management, Ukraine)

In October 1989, the Government of the Soviet Union requested the IAEA provide assistance with an international assessment the safety of the population inhabiting the affected areas and evaluate protective measures taken and to be undertaken. In response to the request, the IAEA, with the involvement of the Commission of the European Communities (CEC), the Food and Agriculture Organization of the United Nations (FAO), the International Labour Office (ILO), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the World Health Organization (WHO) and the World Meteorological Organization (WMO), launched the International Chernobyl Project. Coordinated by the International Advisory Committee, more than 200 international experts from 25 countries studied the consequences of the accident, and evaluated the data gathered, concepts, recommendations and actions undertaken by authorities to protect the population and mitigate the consequences of the accident. All this was done in close collaboration with many Soviet organisations.



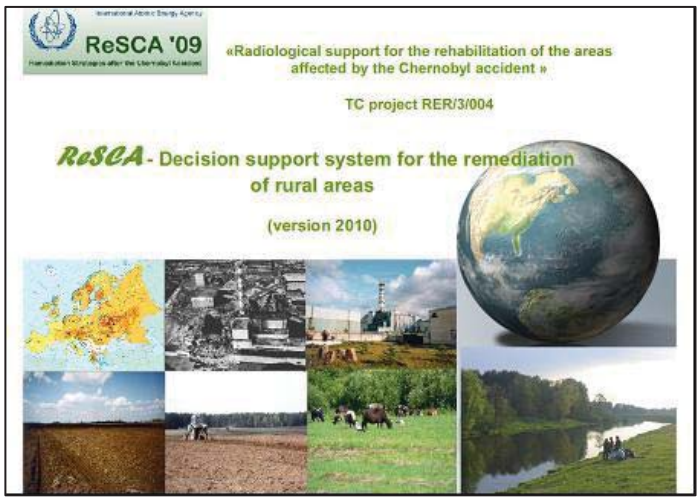
Predicted impact on the Chernobyl affected settlements in 2020 (Figure: S. Fesenko, IAEA)

Since then, NAEL's Terrestrial Environment Laboratory in Seibersdorf, at the time the Chemistry Unit of the Seibersdorf Laboratory (NAAL) was involved in numerous activities supporting the mitigation of the environmental consequences of the Chernobyl accident. The Chernobyl Forum, launched by the IAEA in 2003, was the biggest International Initiative to make balanced assessments of the environmental consequences of the Chernobyl accident. The initiative was coordinated by the IAEA in cooperation with FAO, UNDP, UNEP, OCHA, UNSCEAR, WHO and the World Bank, as well as the competent authorities of Belarus, the Russian Federation and Ukraine. Although the Project started nearly two decades after the accident, there were still many uncertainties related to the real impact of the accident on the environment and on human health. Therefore the major aim of the Chernobyl Forum was "through a series of managerial and expert meetings — to generate *authoritative consensual statements* on the environmental consequences and health effects attributable to radiation exposure arising from the accident, as well as to provide advice on environmental remediation and special health care programmes, and to suggest areas in which further research is required." Over a two-year period, two groups of experts from 12 countries and from relevant international organizations assessed the accident's environmental and health consequences. The Forum working groups produced two reports: one addressing the environmental consequences of the Chernobyl accident and the other the health effects (coordinated by WHO). The reports were approved by the International Conference

"Chernobyl: Looking Back to Go Forwards", held in Vienna on 6 and 7 September 2005, prior to the 20th anniversary of the Chernobyl accident. TEL, and other IAEA sections, provided substantial support to the development of the reports.

Since 1990 the IAEA has launched more than 30 projects aimed at mitigating the consequences of the Chernobyl accident. The main purpose of these projects was largely to provide technical advice related to long-term measures of radiation monitoring and protection of the population, including providing equipment for sampling and measurements. Some IAEA projects also focused on validation of specific remedial options, such as field trials of rapeseed cultivation on land contaminated by radioactivity in order to select varieties with the minimum uptake of radionuclides for the production of biodiesel and industrial lubricants (1995-1997). A study of the migration of radionuclide contaminants in soils, forests and lakes in the Baltic and the Black seas to obtain data for future cropping possibilities in areas contaminated by Chernobyl fallout was also completed.

Two of the key objectives of Chernobyl-related Technical Cooperation (TC) projects were assessing the effectiveness of countermeasures (or remedial actions) as well as supporting planning and implementation of national remediation programmes. In this context, a number of remediation options were developed and tested, and the decision support system, ReSCA, was developed and used for the planning of remediation activities in Belarus, Russia and Ukraine. The software was widely used for optimising remediation strategies in the affected countries.



Cover page of the CD for RESCA. (Figure: S. Fesenko, IAEA)

Fifty-five compact discs (CD-ROM) were distributed every two years among end-users along with the appropriate trainings organised in the affected countries.

Some time after the Chernobyl accident it was recognised that some soil-based remedial measures can have a detrimental effect on the environment. Therefore, development of the ecologically sound remediation technologies was identified as one of the key elements for collaboration between TEL and the institutions responsible for implementing remediation in contaminated areas.

European bison at the 30 km zone of the Chernobyl NPP. (Photo: Polessye State Radiation Ecological Reserve)

For many years TEL has supported the Polessye State Radiation Ecological Reserve, a reserve inhabited by many "red book" wild species, species listed on a register of rare or endangered species for Eastern Europe. Founded on the Belarussian side of the Chernobyl exclusion zone, the reserve represents a unique place for radioecological studies and as part of the coordinated research project (CRP) K41013, TEL provides wide support to the Reserve staff in capacity building, creation of infrastructure, , and more. The Polessye State Radiation Ecological Reserve also represents a uitable site for testing, validation of new approaches to remediation and optimising use of natural products in areas subjected to radioactive contamination.

After the Chernobyl accident, the entire suite of IAEA documentation on radiation protection, emergency preparedness, response and remediation of the affected areas was revised and substantially developed. The IAEA Basic Safety Standards (1996 and 2011 editions) and other specific IAEA International Safety Standards include a number of requirements and recommendations on these issues. The Chernobyl experience and data were used extensively to update modern IAEA documents containing parameters for radiological assessments and remediation, such as TECDOC 1616, TRS 472 and TRS 475.

Przewalski's horse at the 30 km zone of the Chernobyl NPP. (Photo: Polessye State Radiation Ecological Reserve)

Currently, the IAEA contributes to the mitigation of the consequences of the Chernobyl accident within the framework of the UN Action Plan on Chernobyl for 2016 which defines the UN strategy in the third decade of joint recovery efforts. It is anticipated that the plan will be extended in the spring of 2016 and that NAEL will be an important contributor to its implementation. Key TEL activities will include radiological support for the rehabilitation of the areas most affected by the Chernobyl accident, support for the safe use of abandoned areas and management of radioactive materials within these areas.

Assessing the Environmental Behaviour and Potential Biological Impact of Radioactive Particles

One of the important activities of the IAEA's Environment Laboratories in Seibersdorf is the Coordinated Research Project (CRP) on assessing the long-term environmental behaviour and potential biological impact of radioactive particles (CRP K41013) in the terrestrial environment. Intended to foster a novel cross-sectorial collaboration between laboratories studying environmental impact of radioactive particles and radiobiological laboratories, this CRP includes 12 participating institutions from 11 countries. The second Research Coordination Meeting (RCM) in September 2015 was also attended by representatives of several European initiatives in the field, such as the EU COMET/RATE project. More than 20 presentations were given, covering radionuclide transfer in environments contaminated with radioactive particles and recommendations on assessment of the biological impacts in such environments. Related aspects of the measurement of radiation received by human beings, (dosimetry) were also discussed with the representatives of the International Commission on Radiological Protection. The RCM developed a detailed road map for the project finalisation including a joint IAEA CRP/EU COMET/RATE protocol on abiotic leaching of radioactive particles.

Regional Workshop on Remediation Technologies at Uranium Production Legacy Sites (UPLS)

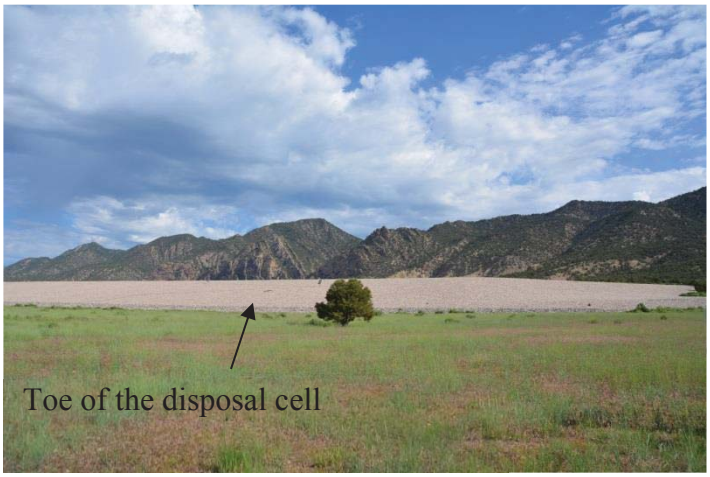
The production of nuclear materials has left a legacy of large amounts of radioactive residues in some countries. Member States are now attempting to address these legacy contaminated sites. As part of Technical Cooperation project RER9122, whose overall objective was to support the safe management and assist in the preparation for remediation of former uranium exploration and exploitation sites within the European Region, a regional workshop was arranged to visit five different sites in the USA under the United States Department of Energy (USDOE) Legacy Management office as well as two sites of the Moab Uranium Mill Tailings Remedial Action (UMTRA) Project. The purpose of these visits was to provide participants with onsite demonstrations and explanations of the application of various remediation technologies to address issues specific to the site and/or the type of residue contained at the site. For example, the Groundwater Interim Remedial Action at the Moab site was designed to address concerns regarding elevated ammonia and uranium levels in groundwater discharging into the Colorado River.

Colorado River next to the Moab site, where the Interim Remedial Action is implemented. (Photo: M. Phaneuf, IAEA)

21 participants from 9 Eastern European and Central Asian Member States took part in the scientific visit. (Photo: M. Phaneuf, IAEA)

At the Grand Junction (Colorado) disposal and processing sites, participants were introduced to the Enhanced Cover Assessment Project (ECAP), in which disposal cells are covered with engineered earthen layers designed to contain tailings for the long term. Conventionally, it is understood that natural ecological and soil-forming processes may slowly change the engineered properties of disposal cell covers in ways which reduce protectiveness and increase maintenance costs over the long term. However, counterintuitively, studies have shown that these natural ecological and soil-forming processes may sometimes transform how covers function in ways that can be exploited to enhance protectiveness and reduce costs. ECAP was designed to develop and test various enhancement methods.

The participants of the regional workshop were very interested and engaged. They used this opportunity both to garner knowledge to bring back to their home institutes and to foster new relationships and potential collaborations with counterparts from other Member States and with the USDOE and its scientists.



Rifle, CO, disposal cell (Photo: M. Phaneuf, IAEA)

Shaping Tomorrow's Experts in the Field of Ocean Acidification

One of the missions of the Ocean Acidification International Coordination Centre (OA-ICC) hosted by the IAEA Environment Laboratories is to promote capacity building and international collaboration on ocean acidification. To this end the OA-ICC organized the first comprehensive international training courses on ocean acidification for the Asia Pacific and African regions, both largely under-represented in terms of ocean acidification monitoring and research.

Training of fellows to measure carbonate chemistry parameters during an international training course on ocean acidification (Photo: L. Hansson, IAEA)

Hosted in Xiamen (China) and Cape Town (South Africa), the training courses benefited a total of 54 researchers from 27 IAEA developing Member States who had the opportunity to get an insight into both the theoretical framework and practical demonstrations of instrumentation for ocean acidification monitoring and laboratory experiments. The overall goal of these capacity building exercises, taught by leading experts in the field, was to enhance participants' expertise in conducting ocean acidification research and avoid typical pitfalls. They also sought to encourage networking and collaboration among scientists working on ocean acidification in Asia and Africa and familiarize them with existing international collaboration opportunities and platforms.

Field trip to local aquaculture farms during a regional training course on ocean acidification. (Photo: V. Shi)

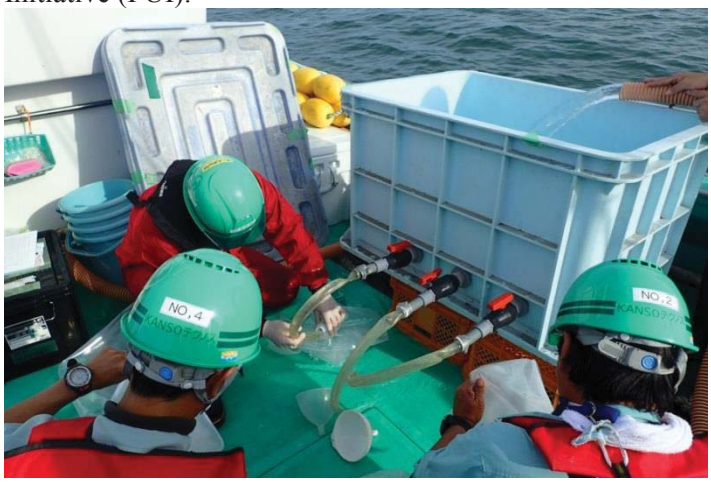
Lectures included information on the basics of the carbonate chemistry system and hands-on exercises with software to calculate the carbonate system parameters. Acquaintance with instrumentation was facilitated during group assignments. Several lectures were dedicated to the biological response of marine organisms, with an emphasis on laboratory and field experimental methodology, including the application of nuclear and isotopic techniques. Participants also had the opportunity to go on field trips to local aquaculture farms, and interact with local decision-makers and aquaculture managers. The courses were also the starting point for the first discussions and planning to develop regional collaborative networks on ocean acidification ("OA-ASIA" and "OA-AFRICA").

According to the participants' feedback, the training courses were "helpful, informative and well-prepared", and provided enriching interaction with "highly engaged lecturers". For one participant this experience was "just a beginning of a new career in OA", while another participant described it as "an eye-opener for freshmen in this field", allowing them to address many of the difficulties associated with ocean acidification research design and to deepen their understanding of various concepts and techniques.

Supporting the Japanese Marine Monitoring Programme

The IAEA Environment Laboratories continued to assist the Government of Japan in ensuring that the Sea Area Monitoring Plan is comprehensive, credible and transparent. A sampling mission was organized in November 2015 to collect seawater and fish samples for an inter-laboratory comparison (ILC). Like the previous three sampling missions, which took place in 2014 and early 2015 (see Environment Laboratories Newsletters Vol 1, No 2, and Vol 2, No 1), this mission was carried out as part of a series of ILCs organized within the Nuclear Safety Action Plan project for "Marine Monitoring: Confidence Building and Data Quality Assurance".

The four sampling missions have demonstrated that sample collection procedures used by Japanese laboratories follow the appropriate methodological standards required to obtain representative samples. The results obtained in proficiency tests and ILCs demonstrated a high level of accuracy and competence on the part of the Japanese laboratories involved in the analysis of radionuclides in marine samples for the Sea Area Monitoring programme. In November 2015 the results and conclusions of the ILCs and PTs were presented to the Japanese media and to scientists from 23 Asia and Pacific countries gathered in Tokyo for the final meeting of the regional Technical Cooperation project for the "Marine Benchmark Study on the Possible Impact of the Fukushima Radioactive Releases in the Asia-Pacific Region", a project funded under IAEA's Peaceful Uses Initiative (PUI).



Collection of the seawater samples (Photo: A.V. Harms, IAEA)

Training on the Analysis of Trace Elements and Organics for Marine Pollution Monitoring

Two parallel training courses on the analysis of trace elements and organic contaminants in marine samples were organised by the IAEA Environment Laboratories from 26 October to 6 November 2015. The training courses were attended by 11 scientists from 9 Mediterranean countries. Organised in collaboration with the United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP), the courses aimed at strengthening the analytical skills of scientists involved in national marine pollution monitoring programmes. These are regionally coordinated by UNEP/MAP – MED POL, the programme for the assessment and control of pollution in the Mediterranean Sea.

During the training course on trace element analysis, the principles of sample preparation methodology and moisture determination were presented and lectures were dedicated to analytical techniques that are used for trace elements and speciation analysis in marine samples (Atomic Absorption Spectrometry – AAS, Inductively Coupled Plasma Mass Spectrometry – ICP-MS, Direct Mercury Analyser – AMA, Cold Vapour Atomic Fluorescence Spectrometry – CV-AFS). Lectures also included quality assurance and quality control principles, validation of measurement procedures and uncertainty of measurement results. During the practical session of the training course, the complete procedure for marine sample preparation and the quantification of trace elements in sediments and biota using AAS, ICP-MS and AMA instrumentation were demonstrated.

Laboratory practical training (Photo: R. Cassi, IAEA)

In the training course on the analysis of organic contaminants, the basic concepts and terminology on persistent organic contaminant analysis were introduced, followed by lectures on sample preparation methodologies for sediments and biological materials, description of analytical techniques (high resolution gas chromatography) for the determination of organochlorinated and other organic contaminants in marine samples, and principles for quality assurance and quality control. The most important concepts of measurement science (metrology in chemistry): validation of measurement procedure, use of reference materials, and uncertainty of measurement results, were also presented. During the practical sessions, the procedures for the preparation of marine samples for analysis and quantification of polychlorinated biphenyls and organochlorinated pesticides in sediments and biota were demonstrated, using gas chromatography coupled to the electron capture detector.

Sampling field trip (Photo: C. Funkey, IAEA)

The trainees of both courses participated in a sampling field trip for the demonstration of marine sediment and water sampling techniques. During the sea-going field trip, the procedures for surface sediment (grab sampler), surface water and under-water sampling (Niskin bottle, in-situ water pump) were shown to the trainees, who could appreciate how samples are collected and handled following strict procedures ensuring the highest sample quality.

The participants stated that the training course was very useful and valuable and that the trainees' needs were met. The IAEA Environment Laboratories will continue the organisation of similar training courses in following years, in close collaboration with UNEP/MAP.

Implementation of the 2014-15 ROPME Mussel Watch Programme

The IAEA Environment Laboratories has signed a new extra-budgetary agreement with the Regional Organisation for the Protection of the Marine Environment of the Gulf (ROPME) for the analysis of contaminants in oysters and sediments from the coastal zone of the Persian Gulf. Samples were collected by ROPME Member States and sent to Monaco to be analysed by the IAEA's three Monaco-based laboratories, i.e. the Marine Environmental Studies Laboratory (trace elements, chlorinated pesticides, petroleum hydrocarbons, PCBs, and organotins), the Radioecology Laboratory (HAB-related biotoxins) and the Radiometric Laboratory (radionuclides). The analytical work was completed in 2015 and 7 relevant reports were prepared and submitted to the ROPME Secretariat. The

results of the analyses will be used to assess temporal changes in coastal pollution levels in the Gulf region and evaluate potential health risks to seafood consumers.

Oysters (Photo: www.earthtimes.org)

New IAEA Collaborating Centre for Production and Characterization of Terrestrial Certified Reference Materials

IAEA Deputy Director General of the Separtment of Nuclear Sciences and Applications Aldo Malavasi officially redesignated the Hungarian National Food Chain Safety Office as an IAEA Collaborating Centre for the production and characterization of terrestrial Certified Reference Materials. The National Food Chain Safety Office has already been a collaborating centre with the IAEA for two terms since 2005 and with its large experience in preparation and analytical characterisation of environmental matrix reference materials it has provided extremely valuable support to IAEA activities.

This redesignation as an IAEA Collaborating Centre recognises both its significant achievements in the field, as well as the close and valuable cooperation between Hungary and the IAEA. During their previous designation period, the Hungarian National Food Chain Safety Office contributed to the production and characterization of several reference materials, including soils with different physicochemical properties, hay, milk powder and phosphogypsum, a by-product from the phosphate industry. It also assisted the IAEA in the preparation of test materials for IAEA proficiency tests.

Redesignation of Collaborating Centre (Photo: A. Pitois, IAEA)

Ecosystems and Industries at Risk: Impact of Multiple Stressors

A training course on “Marine ecosystems and industries at risk: impact of multiple stressors”, organized jointly by the IAEA Environment Laboratories and Argonne National Laboratory (USA) was offered in Monaco in November 2015. Over three weeks, participants from 20 Member States learned how to use research laboratory facilities, devise an experimental protocol, realize experiments with live animals, and validate data for use in reports or publications. The experimental work focused on multiple stressors’ influence on caesium-134 and zinc-65 accumulation from seawater to mussels at different water acidity. Participants quantified radioisotopes’ accumulation, depuration kinetics and distribution in mussels’ organs.

Participants during the laboratory exercises (Photo: Jean-Louis Teyssie, IAEA)

This intensive training combining lectures and practical exercises developed participants’ capacity to translate protocol ideas into experimental reality and the production of reliable data. As part of the training, ecotoxicological, economic, sanitary, climate change and ocean acidification

themes were approached during lectures that complemented the practical coaching.

Part of the training also focused on determination of polonium-210 in marine biota (fish and mussels). ^{210}Po is a naturally occurring radioisotope in the ocean with a strong affinity for organic matter. It therefore accumulates in organisms and significantly contributes to the natural radiation dose received by marine biota and consequently by humans consuming seafood. Determination of ^{210}Po consists of a relatively simple radiochemical procedure and measurement and therefore could be applicable in many Member States. As ^{210}Po has a significant contribution to total internal doses, its determination in seafood is an important part of monitoring for radiological impact assessments.

Determination of Trace Elements and Uranium Isotopes in Drinking Water

An important service of the IAEA Environment Laboratories is to provide proficiency tests (PTs). Participation in PT exercises allows laboratories to assess the quality of their analytical results and is often a prerequisite for accreditation.

One key activity of analytical laboratories worldwide is monitoring drinking water quality. Possible contaminants range from heavy metals (e.g. cadmium or lead) to radionuclides like uranium – all of which can create serious hazards to human health. To detect a contaminant early enough, one needs reliable analytical techniques that guarantee high quality results even at trace levels. Therefore the Terrestrial Environment Laboratory organised a PT on the determination of lead, cadmium, arsenic, copper, zinc and uranium in drinking water at mass concentrations between 2 and 20 µg/L. These are levels typical for drinking water for some substances and close to the maximum accepted concentrations for others. At the same time, concentrations were close to the detection limit of some common analytical techniques, which made the PT a challenging exercise, but also an interesting one. In addition to trace element content, laboratories were also requested to quantify the two major uranium isotopes ^{238}U and ^{235}U. The ratio of these two isotopes gives an indication whether the uranium is of natural origin or from the nuclear fuel cycle.

A barrel of mineral water was prepared by adding the analytes (substances) of interest, then characterized and bottled. Samples were subsequently sent to participating laboratories and at the end of November 2015, 91 participants from more than 50 Member States had reported their results. One week later they received individual reports on their performance. Currently, all results are being compared and analysed in closer detail and a comprehensive evaluation report is in preparation.

National (AFRA) Training Course in Cameroon

Under the African Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA), the IAEA organised a training course on the development and use of instrumentation for digital nuclear spectroscopy between 7-11 December 2015 in Cameroon at the University of Yaoundé I, Laboratory of Nuclear Physics. There were 22 participants which included PhD students and scientists from the University of Yaoundé I, the University of Dschang, the Research Institute of Geology and Mining, the Cameroon National Radiation Protection Agency, Cameroon and from the University of Sciences and Techniques of Masuku in Gabon. A staff member from the Department of Nuclear Sciences and Applications of the IAEA Terrestrial Environment Laboratory in Seibersdorf, Austria gave presentations and practical exercises as a Technical Cooperation Project expert. The main objective of the course was to introduce participants to the practice of gamma ray spectrometry including sample preparation, calibration of equipment, spectrum analysis, and calculation and reporting results. After the presentations, the participants had practical exercises such as dry weight determination of samples, energy, peak shape and efficiency calibration, gamma ray spectrometry systems, preparation of the gamma nuclide library for the uranium-238, uranium-235, and thorium-232 decay series and relevant anthropogenic and natural radionuclides.

National (AFRA) training course on the development and use of instrumentation for digital nuclear spectroscopy (Photo: Gy. Kis-Benedek, IAEA)

Surroundings of the University of Yaoundee 1's campus (Photo: Gy. Kis-Benedek, IAEA)

Research on Climate Trends and Variability and Pollution Trends in Coastal Areas

In 2016, the Radiometrics Laboratory will see the initiation of two new Coordinated Research Projects (CRP) on the "Application of Nuclear Analytical Techniques to Marine Environmental Studies of Climate Trends and Variability" (CRP 2067) and the "Study of temporal trends of pollution in selected coastal areas by the application of isotopic and nuclear tools" (CRP 2070).

To begin the process of planning these CRPs, two separate Consultancy Meetings were held in December 2015 at the Agency's marine Environment Laboratories in Monaco. The purpose of these meetings was to invite a small number of technical experts and have them provide knowledge and advice in order to formulate the science plans and CRP proposals.

Participants of the CRP 2067 Consultancy meeting, Monaco, 10-11 December 2015 (Photo: Emmanuel Tiam Fondop, IAEA)

CRP 2067 aims to be a follow-up and a complementary effort to the now completed CRP 1347 "Nuclear and Isotopic Studies of the El Niño Phenomenon in the Ocean" (soon to be summarised in an IAEA TECDOC report), and will expand the area of investigation to look at climate trends and variability on larger spatial scales. During the 2-day consultancy meeting, hot topics that were discussed included paleotempestology (the study of storms in the past), ocean warm pools (areas of elevated sea-surface temperature in tropical latitudes), and the linking of recent instrumental records with well intercalibrated proxy records that delve deeper into the past to study climate cyclicity and variability. The meeting was attended by experts from Portugal, the USA, the United Kingdom, Germany, Australia (via video link), and the IAEA.

During the consultancy meeting for CRP 2070, the state of knowledge on the application of isotopic and nuclear tools in the study of temporal trends of pollution in coastal areas was reviewed by experts from Australia, Brazil, Italy, Kenya, Portugal and the IAEA. Priority scientific issues, existing gaps and limits in the understanding of pollution trends as well as coastal areas to be targeted by comprehensive pollution studies were identified. The scope and research objectives of the CRP were defined and a scientific plan including 5 years' project activities and expected outcomes was proposed. The resulting recommendations and guidelines for the CRP proposal submission will be available on the IAEA website.

Participants of the CRP 2070 Consultancy meeting, Monaco, 1-4 December 2015 (Photo: Emmanuel Tiam Fondop, IAEA)

IAEA Hosts the 12th Coordination Meeting of the ALMERA Network, Marking its 20th Anniversary

Joining a network of expert laboratories is the most efficient way for analytical laboratories worldwide to strengthen their expertise and competence in environmental radioactivity measurements whilst ensuring measurement consistency at a global scale. Sixty scientists from 41 Member States gathered for the 12th Coordination Meeting of the IAEA's Network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA), which took place at the IAEA Environment Laboratories in Monaco from 13 to 15 October 2015. The annual meeting provides a forum for representatives of the ALMERA laboratories to share their knowledge and expertise within a large network, consisting of 154 laboratories in 85 Member States in October 2015. The ALMERA network's goal is to provide reliable and timely determination of radionuclides in environmental samples in the event of any accidental or intentional release of radioactivity to the environment.

In his welcoming remarks to the participants, Mr David Osborn, Director of the IAEA Environment Laboratories, highlighted the benefits of network collaboration and further stressed that "for environmental radioanalytical laboratories worldwide, participation in the network's activities is important to demonstrate technical competence in measuring environmental radioactivity, to enhance the analytical skills of their specialists and to ensure wider application of recommended validated methods and methodological harmonization, leading to increased worldwide comparability of environmental radioactivity measurement results. We celebrate this year 20 years since the network was established, with just 24 laboratories in 15 Member States. With over 6 times more members today and a much more representative global coverage, I am pleased to see the sustained interest and growing participation of Member States in this collaborative effort."

The core objectives of the meeting were to review the planned ALMERA activities and to define a future work plan for the development of the activities in the areas of proficiency testing, recommended radioanalytical methods, training courses and workshops, methodologies supporting routine and emergency environmental monitoring, and radioecological assessment. The meeting also fostered discussion on how to increase the role of regional coordination centres in mobilizing the network's experience, supporting capacity building and provision of expertise in accordance with the IAEA technical cooperation programme, and encouraging initiatives for regional and inter-network cooperation.

The 60 participants who contributed to the 12th Coordination Meeting (Photo: A. Pitois, IAEA)

The meeting included a plenary session and working sessions for the network's regional and task groups. Presentations by ALMERA member laboratories on the development of radioanalytical methods, quality systems, environmental monitoring programmes, and radioecological assessment projects were included. Participants also visited the facilities of the IAEA Environment Laboratories ranging from the measurement of environmental radioactivity in marine environments to the use of nuclear techniques for studying ocean acidification. The ALMERA work plan for 2016 was presented at the final plenary session.

Staff Spotlight

Ms. Alessia Ceccatelli studied Nuclear Physics and has a PhD in Medical Physics. She started her professional experience at the Italian Metrology Institute of Ionizing Radiations (ENEA-INMRI), where she worked for about 10 years in the field of primary metrology of radionuclides and its applications to environmental and medical studies.

She has been working at the IAEA Environment Laboratories in Seibersdorf, Austria since 2009 as Gamma Spectrometry Specialist. In these years, she has been in charge of assuring the quality of measurement results obtained by gamma-ray spectrometry, characterizing candidate reference materials of environmental and food matrices for their content of gamma-emitters and contributing to the establishment of target values of IAEA proficiency test samples.

She has supported the IAEA Member States analytical laboratories, providing specialized on-the-job training in the field of gamma-ray spectrometry and quality assurance in radio-analytical techniques. She is the author of several publications on gamma-ray spectrometry, focused on the application of radionuclide metrology principles to environmental sample analysis.

Her passion for experimental work and teaching has led her to transfer her knowledge to different scientists worldwide, involved daily in radioactivity measurements.

Ms. Alessia Ceccatelli in her laboratory. (Photo: A. Kazmierska, IAEA)

Intern's Corner

Ms. Ashild Dybdal was awarded an internship at the IAEA Environmental Laboratories in Seibersdorf in October 2015. Ms. Dybdal has enjoyed the diversity of the laboratory team and has been able to take on a variety of tasks, from validation of procedures in view of the imminent accreditation process to statistical programming.

"An internship with the IAEA has first and foremost provided me with the valuable experience of working at an international organisation. I feel that I have gotten a peek into the inner machinery of the Agency, as well as developed valuable skills for the future. I would like to thank Mr. Manfred Groening, along with everyone else in the team, for this opportunity and for the warm welcome on-board.", says Ms. Dybdal.

During her internship she has optimised reporting procedures for proficiency tests, by automating the creation of publication-ready table outputs straight from the database. With a background in physics and mathematics, Ms. Dybdal may be very different from her chemical colleagues, but she quickly felt at home in the coffee-addicted kitchen environment.

Ms. Ashild Dybdal in front of the IAEA Laboratories in Seibersdorf. (Photo: A. Trinkl, IAEA)

Fellows in Jul.-Dec. 2015

Fellows are young scientists, who are trained for several months on specific technical aspects required for the implementation of national or regional IAEA technical cooperation projects.

Name of Fellow	Country	Field of training
Ms. Yapa Pathirannehelage Shamalie Siriwardana	Sri Lanka	ICP-MS for uranium and thorium analysis in terrestrial environmental samples
Mr. Omar Alqudah	Jordan	Gamma-ray spectrometry and liquid scintillation counting for Ra-226, Ra-228 and Pb-210 in water
Mr Waqas Munir	Pakistan	Sample preparation and measurement by liquid scintillation counting, use of RMs, QA/QC.
Mr Mazin Mohammed Attiyah	Iraq	Quality management system for gamma-ray spectrometry radioanalytical technique.
Weerasuriyage Indika Hema Kumara WIJERATHNA (Mr)	Sri Lanka	Analysis of stable isotopes of C and N using IRMS-EA
Ms Zarina Serzhanova	Kazakhstan	Determination of artificial radionuclides in water (Sr-90, Am-241, Pu-239/240,...) by alpha-particle spectrometry and liquid scintillation.
Ms Gulnura Abasova	Kyrgyzstan	Gamma-ray spectrometry applied to environmental sample analysis.

Eurasian lynx (left) and black stork (right). Photos obtained by wildlife trap cameras in the Chernobyl Exclusion Zone (CEZ). Photo credit: TREE project, www.ceh.ac.uk/TREE

Publications

Osvath, I., Tarjan S., Pitois, A. Groening M., IAEA's ALMERA network: Supporting the quality of environmental radioactivity measurements. Applied Radiation and Isotopes 109 (2016) 90-95. doi: 10.1016/j.apradiso.2015.12.062.

Iurian A.R., Pitois A., Kis-Benedek G., Migliori A., Padilla-Alvarez R., Ceccatelli A., Assessment of measurement result uncertainty in determination of 210Pb with the focus on matrix composition effect in gamma-ray spectrometry. Applied Radiation and Isotopes 109 (2016) 101-104, doi: 10.1016/j.apradiso. 2015.11.067

Pham M.K, Kis-Benedek G., et al., Certified reference materials for radionuclide in Bikini Atoll sediment (IAEA-410) and Pacific Ocean sediment (IAEA-412). Applied Radiation and Isotopes 109 (2016) 101-104.doi: 10.1016/j.apradiso.2015.11.041

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Beresford N.A., et al., Radionuclide biological half-life values for terrestrial and aquatic wildlife, Journal of Environmental Radioactivity 150 (2015) 270-276

Meslnaumann, M.S., et al., Trophic ecology of two cold-water coral species from the Mediterranean Sea revealed by lipid biomarkers and compound-specific isotope analyses, Coral reefs, Vol.34, Iss.4 (2015) pp. 1165-1175

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Upcoming Events

Dates	Description	Location
1 - 5 February 2016	2nd Mares Conference on Marine Ecosystems Health and Conservation	Olhão, Portugal
26 - 29 April 2016	Technical Meeting on Assessment of Levels, Trends and Radiological Effects of Radionuclides in the Marine Environment	Monaco
3 - 6 May 2016	4th Symposium on the Ocean in a High-CO2 World	Hobart, Australia
8 - 10 May 2016	3rd International meeting of the Global Ocean Acidification Observing Network	Hobart, Australia
13 - 17 June 2016	Monacology Event	Monaco
18 - 21 July 2016	6th International Ra-Rn Workshop (organized in cooperation with the IAEA)	Girona, Spain
26 - 30 September 2016	ALMERA Training Workshop on the Determination of Organically Bound Tritium in Food Samples Using Liquid Scintillation Counting	Ottawa, Canada

You & NAEL

Reference Materials (RMs)

NAEL provides reference materials to laboratories worldwide to assist them in the quality of the results they produce by nuclear analytical techniques.
Each of the RM is characterised for analyses belonging to one of the following groups: Radionuclides, Trace Elements and Methyl Mercury, Organic Compounds, Stable Isotopes. The IAEA is the world's largest supplier of matrix reference materials characterised for radionuclides, some of the IAEA reference materials characterized for isotope ratios are at the highest metrological level as international measurement standards.

For further information, please contact: EL@iaea.org and visit *http://nucleus.iaea.org/rpst/ReferenceProducts/About/index.htm*

Interlaboratory Comparisons (ILCs) and Proficiency Tests (PTs)

The implementation of accepted quality assurance practices to analytical chemistry is recognized as a prerequisite to producing data with known metrological qualities. Regardless of the target analyse or sample type, quality assurance and quality control are the cornerstones of analytical data validation and the results from ILCs or PTs are of crucial interest for laboratories as these provide clear information of its measurement capabilities. NAEL organizes more than three IC and PT exercises annually, one each for radionuclide, organic and inorganic contaminants. The inorganic study also includes the determination of methyl mercury.

For further information, please contact: EL@iaea.org and visit
http://nucleus.iaea.org/rpst/ReferenceProducts/Proficiency_Tests/index.htm

The ALMERA network

The ALMERA network (Analytical Laboratories for the Measurement of Environmental Radioactivity) is a cooperative effort of analytical laboratories worldwide. Members of the network are nominated by their respective IAEA Member States as those laboratories which would be expected to provide reliable and timely analysis of environmental samples in the event of an accidental or intentional release of radioactivity. NAEL in Seibersdorf and Monaco are additional members of the network and are the central coordinator of the ALMERA network's activities.
NAEL helps the ALMERA network of laboratories to maintain their readiness by coordinating activities including organization of meetings, development of standardized methods for sample collection and analysis, and organization of interlaboratory comparison exercises and proficiency tests as a tool for external quality control.

For further information, please contact: almera@iaea.org and visit *http://nucleus.iaea.org/rpst/ReferenceProducts/ALMERA/index.htm*

Ocean Acidification-International Coordination Centre (OA-ICC)

The OA-ICC news stream (news-oceanacidification-icc.org) provides daily information on ocean acidification (scientific papers, media coverage, jobs and meeting announcements). The OA-ICC data compilation on the biological response to ocean acidification gives easy access to ocean acidification experimental data through a user-friendly data portal *(http://www.iaea.org/ocean-acidification/page.php?page=2203)*.

The OA-ICC bibliographic database is regularly updated on Mendelay. The database currently has more than 2000 references and includes citations, abstracts and allocated keywords that can be used for statistical analysis. (*http://www.mendeley.com/groups/4333941/ocean-acidification-oa-icc/*).

Impressum

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