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In This Issue

Responding to Member States' requests to physically monitor and report on the types and trends of contaminants in the natural environment is core business for the IAEA Environment Laboratories. This includes providing quality control and capacity building services relevant to radioactive substances and toxic pollutants, as well as communicating how environmental contaminants interact with other stressors to impact biodiversity and undermine the provision of essential ecosystem services. By fulfilling these functions using a practical, hands-on approach, the IAEA Environment Laboratories are unique within the UN system.

In this edition of the Environment Laboratories Newsletter, we focus on recent initiatives and field activities to monitor radioactive and other substances in the environment, as well as key partnerships focused on improving the performance of analytical laboratories around the world. We report on a diverse array of activities, from sea water monitoring off the coast of Fukushima, Japan, and the Barents Sea, to training courses on the rapid determination of radioactive strontium in milk and the analysis of trace elements and organic contaminants in marine samples.

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

David Osborn
Director
Environment Laboratories

Top story page 2, Fukushima Daiichi: IAEA/NAEL assisting to build trust, (middle) the nuclear power station from off-shore, (left and right) seawater sampling using a Niskin (Photo: Petr Pavlicek/IAEA).

In Focus

Fukushima Daiichi: IAEA/NAEL Fosters Data Quality

The accident at the Fukushima Daiichi Nuclear Power Plant in Japan in March 2011 led to the release of radioactive elements into nearby coastal waters. This triggered the Japanese Nuclear Regulation Authority (NRA) to establish an intensive marine monitoring programme to assess the impact of discharges and effluents to the coastal and marine environment and to assure seafood safety. There were as many as 10 Japanese institutions and laboratories involved in the marine monitoring programme to perform the analyses of samples.

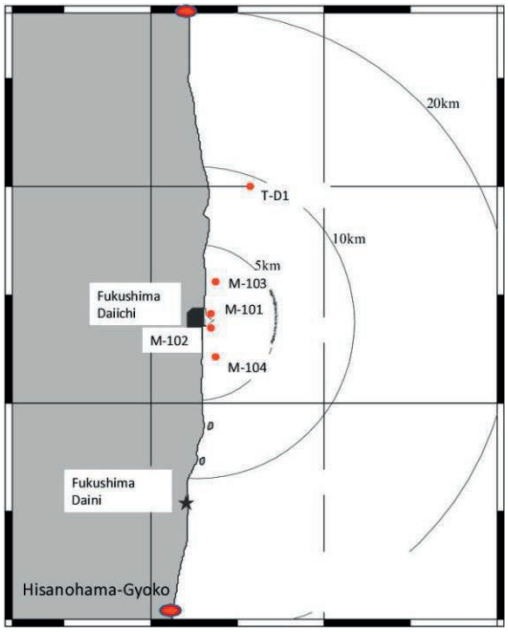
As any information released was under continuous scrutiny of the international media and the general public; it became essential to ensure a high standard of results that would generate confidence and build trust.

IAEA Environment Laboratories (NAEL) was thus called upon to assist Japan to carry out the surveillance of the sea area in an internationally recognized, transparent and reliable manner. NAEL has the duty to perform its role in a neutral and independent manner, thus confirming the credibility of the results published by Japan. Amongst the core activities in which NAEL excels and that were immediately implemented are the coordination of Interlaboratory comparisons (ILC) and the organisation of Proficiency Tests (PT).

Seawater sampling outside the crippled Tokyo Electric Power Company's. (TEPCO), Fukushima Daiichi nuclear plant, with the assistance of an IAEA expert (blue helmet) (Photo: Petr Pavlicek/IAEA).

The coordination of ILC ensures an independent system to verify the performance of the various laboratories in Japan in relation to analysing marine samples. This ascertains the general performance of reporting laboratories and builds trust in the monitoring results, both in Japan and abroad. The concept is to provide a comprehensive evaluation of the whole process involved in obtaining environmental radioactivity data, starting from the sampling, through the processing and analyses to the data evaluation and reporting. Such an approach, referred to as "split sample analysis" is commonly used in projects relying on data produced by several participating laboratories. This approach documents and compares the data produced by different laboratories, and identifies the extent of data variability.

Two ILC exercises were organised for radionuclides in seawater in September and November 2014, the latter being led by Mr. David Osborn, Director of the Environment Laboratories. A team of 2 NAEL experts travelled on both occasions to Fukushima and participated together with Japanese experts in the routine collection of seawater samples for the regular sea area monitoring programme. Large volume seawater samples were collected from each of five locations offshore from the Fukushima Daiichi Nuclear Power Plant (within a 10 kilometres radius) and were shared between Japanese and IAEA participants for the determination of caesium activity concentrations. Identical samples were then measured independently in Japanese and IAEA Monaco laboratories and the results compared. The results of Japan's laboratories were found to be statistically the same with those obtained by the IAEA laboratories. "From the results for ^{134}Cs and ^{137}Cs in the five seawater samples shared between Japanese and IAEA laboratories, it can be concluded that the results are comparable with a high degree of confidence," said Mr Osborn.



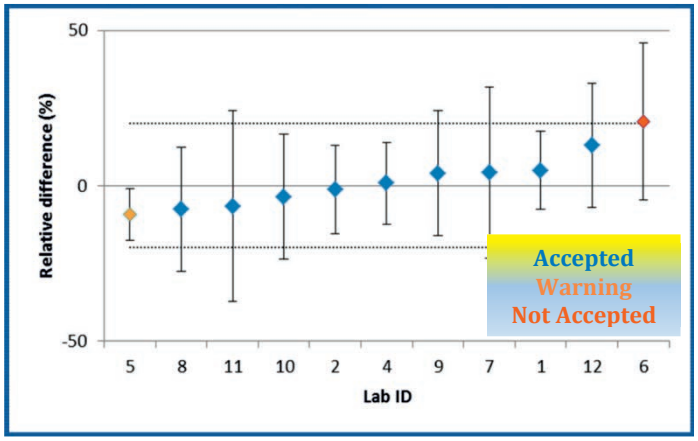
To get an accurate picture of the levels of radioactivity in the near-shore coastal waters, five stations (red dots) within a radius of 10 kilometers from the coast were studied (Diagram: NRA).

IAEA experts "splitting" seawater samples for laboratory intercomparisons (Photo: Petr Pavlicek/IAEA).

Proficiency Tests (PT) assess the analytical performance of the participating laboratories. Seawater or sediment samples with known activity for the relevant radionuclides are prepared to be tested by the respective Japanese laboratories without prior disclosure of the activity concentrations. In addition to Japanese institutions, well-performing laboratories outside Japan have been involved in order to provide independent results of the highest quality. Such tests include ^{134}Cs, ^{137}Cs, ^{90}Sr and ^{3}H, which are the most relevant nuclides in relation to radiological doses via the marine exposure pathways. PT samples consist of seawater of very low background levels; the Environment Laboratories in Monaco uses Mediterranean seawater; or characterised sediments or reference materials.

A PT for ^{134}Cs, ^{137}Cs, ^{90}Sr and ^{3}H in seawater was organised for the twelve Japanese laboratories participating in Japan's sea area monitoring programme. Eighteen other laboratories worldwide were included in this PT exercise to allow a direct comparison of performance and an assessment of data variability. The results submitted by the laboratories had to pass three different test levels before being deemed acceptable. The data produced by Japan were very good and this conclusion should serve to increase confidence that the data regularly reported by Japan presents an accurate picture of the levels of radioactivity in the sea area monitored.

"The Japanese laboratories performed very well," concluded Mr Osborn. "The results for each of the four isotopes demonstrated a high level of accuracy by the respective Japanese laboratories."



Performance of Japanese laboratories in the PT for ^{137}Cs.

On the 3 December 2014, three high-level staff from the NRA, Ms. Kayoko Nakamura, Commissioner, Mr. Go Kobayashi, Deputy Director of the International Affairs Division and Ms. Mashiho Nishioka from the Radiation Monitoring Division visited the Monaco Laboratories to discuss the status and outcomes of the inter-comparison exercise and proficiency test, and future actions. As a result, in 2015, two more sampling missions and ILC exercises, jointly carried out with Japan within their routine monitoring programme, are foreseen. The same strict protocol that has been used for sampling, homogenising, splitting and shipping will be rigorously applied again. In addition to seawater, the sampling will also include sediment and biota. Furthurmore, a second Proficiency Test for radionuclides in seawater is also planned for June 2015.

Mr. David Osborn, Director NAEL and Ms Iolanda Osvath, Radiometrics Laboratory Head, speak to the press in Tokyo on November 2014 (Photo: Yoshikazu Tsuno/AFP/Getty Images).

For further information, please contact: EL@iaea.org

Towards Better, More Accurate Radioactivity Measurements

Joining a network of expert laboratories is the quickest way for scientists to rapidly gain expertise and competence in radioactivity measurement while ensuring consistency of data. This was one of the main underlying messages as participants gathered for the 11th Coordination Meeting of the IAEA's Network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA), which took place at the IAEA headquarters in Vienna.

Eighty-four ALMERA laboratory representatives from 50 countries participated in this year's technical meeting that took place from 7 to 10 October 2014. This annual meeting provided a forum for representatives of the ALMERA laboratories to share their knowledge and expertise within this large network of expert laboratories.

In his welcoming remarks to the participants, Mr. Aldo Malavasi, Deputy Director General and Head of the IAEA Department of Nuclear Sciences and Applications, highlighted the significance of ALMERA by emphasising that "this network is of particular importance in the event of any release of radioactivity to the environment by providing reliable and timely determination of radionuclides in environmental samples." He further stressed that "for laboratories worldwide, participation in the network's activities is important to enhance the analytical skills of their specialists, demonstrate technical competence in measuring environmental radioactivity, and to increase worldwide comparability of environmental radioactivity measurement results."

Participants at the 11th Coordination Meeting of ALMERA at the IAEA headquarters in Vienna (Photo: IAEA).

The core objectives of this meeting were to review the planned ALMERA activities and to define a future work plan for the development of the network's 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, encouraging exchange of expertise and supporting capacity-building.

The meeting consisted of a plenary session and working sessions for the network's regional groups as well as its task groups. There were presentations by IAEA specialists in relevant areas such as novel developments in nuclear instrumentation, monitoring of radioactivity in food, emergency response and preparedness. The overall ALMERA work plan was presented at the plenary session on the last day of the meeting.

Participants also visited selected facilities of the IAEA laboratories located in Seibersdorf, Austria, and learned about how nuclear technology is applied in a range of different fields including food, health and agriculture.

For further information, please contact: EL@iaea.org

The Radiological Impact of Sunken Submarine K-159 in the Barents Sea

In August 2003, the nuclear submarine K-159 sank in the waters near Kildin Island in the Barents Sea with about 800kg of spent nuclear fuel in its reactors. Given that the hull of the submarine was already heavily corroded when the accident happened, there is major concern that the prolonged stay of the K-159 in seawater will eventually result in drastic leakage of radioactive waste. This would cause not only an ecological disaster, but also a financial crisis as that area is a fertile fishing ground for Norway and Russia. As part of a continuous monitoring programme for the investigation of Radioactive Contamination in the Northern Areas, a joint Norwegian-Russian expedition took place from the 21th August to 9th September 2014, in which the Environment Laboratories were invited to participate as observers.

The submersible unit (left) remotely operated from on-board (right) (Photo: O.Blinova/IAEA).

Prior to any sample handling, a remotely operated submersible equipped with an echo sonar, a camera and a

gamma detector was used to map the sea floor where the K-159 rests and scan radioactivity concentrations. The radiation levels observed were comparable to those determined during previous studies indicating that sample collection and on-board pre-treatment could be safely performed. As a result, seawater, fish and sediment samples were collected in which ^{137}Cs, ^{90}Sr and Pu/Am isotopes will be measured in the respective laboratories of the participants.

For further information, please contact: EL@iaea.org

Detecting Radiostrontium in Milk

Twelve scientists, representing laboratories from Canada, France, Greece, Indonesia, Ireland, Malaysia, Pakistan, South Africa, Sri Lanka, Thailand, Turkey and Ukraine, gathered from 3 to 7 November 2014 in Daejeon, Republic of Korea to gain hands-on experience in the rapid determination of 'radioactive strontium' in milk and the methods and procedures involved in its assessment. This training course was organised by the IAEA in cooperation with the Korea Institute of Nuclear Safety (KINS).

"In case of a radiological emergency situation, radioactive strontium may be released to the environment and may present human health issues due to its potential incorporation into the calcium pool of the human body through the principal pathway: soil to plant to cow's milk to humans" said Mr. David Osborn. "Therefore, in emergency situations, the rapid analysis of radioactive strontium in milk is essential to protect humans from radiation exposure due to intake of contaminated milk."

The training course included a half-day technical visit to selected KINS facilities, which provided an opportunity for the participants to learn about various nuclear applications. KINS is an IAEA collaborating centre for analytical method development and is the ALMERA regional coordinator for the Asia-Pacific region.

During the course, the participants practised the radioanalytical method in a radiochemical laboratory and were taught specific data analysis techniques for the calculation of the measurement results and their associated uncertainties. Experts from KINS and the IAEA guided the scientists on the key components of the analytical quality work that had to be implemented to reach a conclusive result.

This unique nuclear assessment tool was developed through the cooperative effort amongst ALMERA laboratories. To test the reliability of this innovative laboratory method, a large number of ALMERA laboratories participated to validate the procedure and ensure its reliability. This, in turn, contributed to its wider application and facilitated the harmonization of such methods among environmental radioanalytical laboratories.

It is planned that this course will be repeated due to the high demand for such practical training course and to enhance good laboratory practices in the field of nuclear science and technology.

Training of scientists on a rapid analytical method for food monitoring in emergency situations (Photo: A.Pitois/IAEA).

For further information, please contact: EL@iaea.org

Upgrading the IAEA's Marine Radioactivity Database

The IAEA Environment Laboratories organised a consultants meeting from 15 to 18 September to redesign, foster and increase synergy around IAEA's Marine Information System (MARiS).

Participants to the MARiS meeting, Monaco, 15-18 September 2014 (Photo: J.L.Teyssie/IAEA).

MARiS is a publically accessible database (http://maris.iaea.org) that allows the search and recovery of measurements of marine radioactivity in seawater, biota, sediment and suspended material. MARiS includes a graphic user interface that allows searching of data either using an input form or by selecting an area on an interactive world map. Marine radioactivity measurements

have been collected, managed and curated at the Environment Laboratories since the early 1990s, and draws on various sources that include contributions from other databases from outside the IAEA, reports, books, publications and data generated in-house.

The main topics addressed were:

- Structure of the database
- Expansion of the database to include non-radioactive datasets
- Networking the database to other databases
- Using virtual research environments for data analysis and synthesis
- Development of the MARiS website

For further information, please contact: EL@iaea.org

IAEA/NAEL Trains Mediterranean Scientists

From 3 to 14 November 2014, the Environment Laboratories organised two parallel training courses on the analyses of trace elements and organic contaminants in marine samples in collaboration with the United Nations Environment Programme (UNEP)/Mediterranean Action Plan (MAP). The aim of these courses was to strengthen the analytical skills of scientists involved in national marine pollution monitoring programmes, which are regionally coordinated by UNEP/MAP – MEDPOL (Programme for the assessment and control of pollution in the Mediterranean Sea).

Participants to the MEDPOL Training Course, Monaco, 3-14 November 2014 (Photo: J.L.Teyssie/IAEA).

Thirteen scientists from 8 Mediterranean countries (Albania, Algeria, Croatia, Israel, Morocco, Slovenia, Tunisia and Turkey) attended the courses that included theoretical lectures and practical exercises in the laboratory on sample preparation, moisture determination, analytical techniques for trace element and organic contaminants determination and quality assurance/quality control principles. The concepts of measurement science - metrology in chemistry - validation of measurement procedure, use of reference materials, and uncertainty of measurement results, were also discussed.

All trainees participated in a sampling cruise off the coast of Monaco and were trained on water and sediment sampling, as well as on-board sample pre-treatment and preservation. In the laboratory, the Trace Element group analysed marine sediments and biota for trace elements and mercury using atomic absorption spectrometry (AAS) and advanced mercury analyser (AMA) respectively. The Organic Contaminants group was trained on a multi-residues procedure, from the sample extraction to the quantification of chlorinated pesticides, PCBs and polycyclic aromatic hydrocarbons in sediment samples, using gas chromatography.

At the end of the courses, a questionnaire was distributed to the trainees to collect their feedbacks on training organization, content and structure. The trainees found the courses very useful and valuable and provided ideas for their future development.

IAEA Environment Laboratories has organised these training courses yearly since 1989 and trained more than 300 Mediterranean scientists.

For further information, please contact: EL@iaea.org

Making Environment Laboratories Radiation Friendly

Explaining radiation monitoring and measurement devices (Photo: L. Liong Wee Kwong/IAEA).

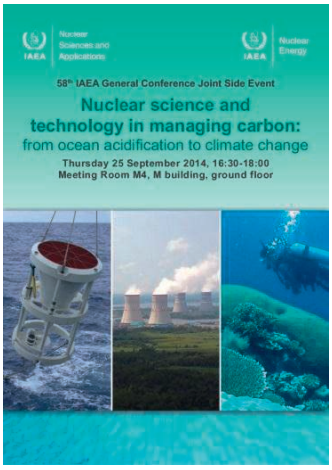
To maintain the high technical expertise of staff at the Environment Laboratories in handling radioactive materials, refresher courses on radiation protection are provided on an annual basis for occupationally exposed workers. These courses are also intended for IAEA fellows and interns; mandatory for those dealing with ionising radiation or having to work in supervised areas. The main aim is to promote the peaceful uses of radioisotopes and to promote a safety culture.

To this end, a course took place on the 22 to 23 September 2014 with specific emphasis on the proper operation,

calibration and maintenance of different types of radiation monitoring and contamination control instruments. The course was conducted by Mr. Tobias Benesch from the IAEA Radiation Safety Technical Services Unit and initiated by Mr. Adam Sam, Radioprotection Officer of the Environment Laboratories.

For further information, please contact: EL@iaea.org

Carbon: From Ocean Acidification to Climate Change



During the 58th IAEA General Conference Joint Side Event that took place in Vienna on 25 September 2014, experts met to discuss the biggest cause of anthropogenic climate change, namely carbon.

Carbon is an element that is an essential building block of life and is ubiquitous. Yet one of its gaseous compounds, carbon dioxide (CO_2), holds a special status for humans. On the one hand, it is innocuously produced by our own biology in tiny quantities every time we breathe, but on the other, the burning of fossil fuels, like oil and coal that drive our economies and improve our lives, produces massive amount of CO_2 that goes from our industries smokestacks or car exhaust pipes to the atmosphere. This build-up is driving climate change on a global scale, as this greenhouse gas simultaneously causes global temperatures to rise and makes our oceans more acidic.

In the opening presentation, Mr. David Osborn, Director NAEL, emphasized the message that ocean acidification is a very real environmental problem that needs to be addressed by the international community. Ocean acidification occurs when CO_2 mixes with water and forms carbonic acid that decreases the ocean's pH, increasing its acidity. Each person on Earth produces an annual average of 4.5 tons of CO_2, 25-30% of which is absorbed by the oceans. By the end of the 21st century, it is estimated that ocean acidity could increase by 150% since preindustrial levels, and that 70% of the world's corals will have been exposed to corrosive water. Mr. Osborn explained that a more acidic ocean, affects the calcification, reproduction and growth rates of many marine species, with larval forms of many ecologically important species being particularly vulnerable. Ocean acidification is one of the most recently recognised factors on the list of stressors that affect marine life. "The global response to this ecological threat has led the IAEA and other international organizations to help the international community to address ocean acidification", stated Mr. Osborn. He highlighted the efforts being made through the IAEA Ocean Acidification International Coordination Centre (OA-ICC). This project aims to communicate, promote and facilitate a series of overarching activities in science, capacity building and communication related to monitoring and understanding ocean acidification using nuclear science and technology.

The second NAEL speaker was Mr. Juan-Carlos Miquel, Acting Laboratory Head of the Radioecology Laboratory. He described how oceans help to reduce the amount of carbon in the atmosphere. Oceans do so by locking carbon away in the deep ocean and on the seabed. Typically, phytoplankton, photosynthetic microscopic organisms, and zooplankton, microscopic organisms that eat phytoplankton, produce particles and aggregates known as 'marine snow' that sink to the ocean floor, thus sequestrating carbon. Mr. Miquel described how NAEL uses ^{238}U, ^{234}Th to quantify carbon export, and ^{210}Pb, ^{14}C to measure marine snow/sedimentation rates. He explained that isotopic techniques provide invaluable data that complements and validate more widely practiced but less empirical forms of measurement.

For further information, please contact: EL@iaea.org

Investigating Ocean Deoxygenation and its Consequences on the Global Carbon Cycle

In collaboration with GEOMAR (Helmholtz Centre for Ocean Research Kiel) and the University of Kiel in Germany, the Environment Laboratories participated in a sampling expedition on board R/V *Meteor* from 28 May to 4 July 2014 that sailed from Fortaleza, Brazil to Las Palmas, Gran Canaria in the Canary archipelago.

This field mission is integrated in a vast German research program, "Climate-Biogeochemistry Interactions in the Tropical Ocean" and has been funded by the German Research Foundation since 2008. It tackles the issue of ocean deoxygenation, its impact on oxygen minimum zones and its consequences on the global climate-biogeochemistry system.

The target site for the sampling programme was the oxygen minimum zone off the coast of Mauritania. Using specially designed *in situ* pumps, the Environment Laboratories collected large volumes of seawater and shared samples with the German partners. The primary interest of NAEL is to quantify carbon and nutrient fluxes in the water column and compare these data sets with nutrient fluxes across the benthic boundary layer using the natural radioisotopes of thorium, uranium and radium.

This collaborative effort with our Germans partners is a fruitful endeavour that will have follow-ups allowing the

scientific community to gain more knowledge on marine processes.

Deploying the *in situ* pump (left) and recovering sampling equipment on board "R/V *Meteor*" (right) (Photo: A.Pietri/GEOMAR).

For further information, please contact: EL@iaea.org

OA-ICC Promotes Capacity Building

The Expert Training Course: "Effects of ocean acidification and global warming on Mediterranean selected marine organisms (polychaetes and coralline algae) – *in situ* and laboratory studies for monitoring future oceans" organized by the Ocean Acidification International Coordination Centre (OA-ICC) in cooperation with ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) took place from 1 to 7 September 2014 in La Spezia, Italy. Eight young researchers, five of whom were from developing IAEA Member States (Algeria, Egypt, Indonesia, Lebanon, Tunisia) and sponsored by the OA-ICC, attended the course.

The goal of this initiative, developed within the framework of the OA-ICC capacity building activities, was to provide young scientists with the necessary tools for ocean acidification research (in a multiple stressors context) and to help them establish networks for prospective collaborations. Over the duration of the training course, the participants managed to perform a botanical trek, attend seminars and carry out exercises on global climate change topics, do relevant field work, and improve their data collection and management skills. Additionally, all the participants presented their on-going research projects and shared their expectations regarding the evolution of the field.

The training facilities offered by ENEA and the teaching task force provided by the MARES Joint Doctoral Programme on Marine Ecosystem Health and Conservation contributed to the success of the training course. This event represents yet another example of effective institutional partnerships promoting global actions in a changing ocean world.

Participants of the OA-ICC Expert Training Course, La Spezia, Italy, 1-7 September 2014 (Photo: OA-ICC).

For further information, please contact: EL@iaea.org

Visit of DDG and Members of the Vienna-based Permanent Missions

Mr. Aldo Malavasi (fourth from the right), DDG IAEA/NA and Members of the Vienna-based Permanent Missions (Photo: J.L.Teyssie/IAEA).

From 23 to 24 October 2014, Mr Aldo Malavasi, Deputy Director General and Head of the IAEA Department of Nuclear Sciences and Applications, and Members of the following Vienna-based Permanent Missions (Belarus, China, Czech Republic, Finland, France, Germany, Hungary, India, Iraq, Kuwait, Mauritania, Myanmar, Namibia, Russia, South Africa and USA) visited the Environment Laboratories of Monaco to learn about the involvement of EL in activities and projects that pertain to their respective countries and be informed of the outcomes.

For further information, please contact: EL@iaea.org

UN General Assembly President Visits the Environment Laboratories

On the 31 July 2014, the Environment Laboratories in Monaco was extremely honored to receive the visits of His

Excellency, Mr. John W. Ashe, President of the United Nations General Assembly and Her Excellency, Ms. Isabelle Picco, Ambassador, Permanent Representative of the Principality of Monaco to the United Nations.

His Excellency Mr. John Ashe and his wife (left), Her Excellency Ms. Isabelle Pico (middle) and Mr. David Osborn, Director NAEL (right), Monaco, July 2014 (Photo: J.L.Teyssie/IAEA).

"To the management and staff of the IAEA Environment Laboratories, my heartfelt thanks and appreciation for the informative tour of your facilities and for the in-depth knowledge of the excellent work that is being done here" commented the President of the UN General assembly.

For further information, please contact: EL@iaea.org

TC (Technical Cooperation) Highlight: NAEL Assists with Harmful Algal Blooms

One of the main mechanisms through which the IAEA disseminates knowledge and expertise to its Member States is through Technical Cooperation (TC) programmes. Using this channel, the IAEA helps Member States to build, strengthen and maintain human and institutional capacities for the safe, peaceful and secure use of nuclear technology in support of national development priorities.

Under the umbrella of TC project OMA 7001, "Establishing a Reference Laboratory for Harmful Algal Blooms", Ms. Ahlam Sulieman Al Kharusi, from the Ministry of Agriculture and Fisheries Wealth, Marine Science and Fisheries Centre of the Sultanate of Oman, carried out an internship between September to November 2014 in our laboratories. We contacted Ms. Ahlam Sulieman Al Kharusi to get some feed-back about her internship.

Q: Dear Ms Al Kharusi, to what extent is the phenomenon of HABs (harmful algal blooms) affecting the economy and the well-fare of the Sultanate of Oman?

A: As several major cities of Oman are located along the coast, the quality of coastal waters is of utmost economic and social importance. The marine coastal environment plays an important role in maintaining biodiversity and is very relevant to food safety due to the abundance of marine life it supports. Furthermore, coastal waters are used in desalination plants making coastal water quality a critical issue for the country's survival.

The occurrence of HABs, also known as "red tides" appeared few years ago and has significantly increased with time. During fall and winter 2008-2009, the coastal areas of Oman were severely impacted by extensive blooms of several toxic algal species, of which the predominant "*Cochlodinium polykrikoids*". This situation lasted for 8 months, causing severe fish, shellfish, coral reefs mortalities and the shut-off of many desalination plants. This catastrophe affected the fishing and tourist industries, forcing residents to abandon their beach houses fearing the noxious odours would be health-hazardous. Inevitably, these events led to a major public outcry demanding for governmental actions. It was estimated that the average annual tourism revenue fell by almost 50-60% with no official governmental record of poisoning due to seafood intake though.

As a result, the government of the Sultanate represented by the Ministry of Agriculture and Fisheries Wealth has implemented many projects with local and international support to monitor, mitigate and manage the effects of HABs in the marine environment, fisheries resources and social health of Oman.

Q: What knowledge did you acquire from this internship?

A: My internship programme was as comprehensive as it was informative. I learnt how to safely manipulate radioactive tracers and more specifically, how to use the radioligand receptor binding assay (RBA), a nuclear based technique used to detect and measure marine algal toxins (biotoxins) such as saxitoxin and brevetoxin in seafood and sea water samples. I was intensively trained on how to use this technique.

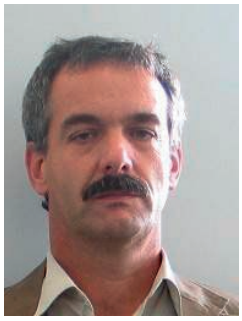
Q: How can the knowledge you have acquired at NAEL be used to benefit your Member State?

A: Through this training, I gained scientific and "hands-on" laboratory experience regarding the use of nuclear technology to monitor and better manage HABs. I am now able to apply this technique in the laboratory in my country, in Oman, transfer this experience to my colleagues and together; we will contribute to the preservation of the marine environment of Oman.

Ms. Al Kharusi explaining her laboratory experiments to Mr. Aldo Malavasi, DDG IAEA/NA (Photo: J.L.Teyssie/IAEA).

For further information, please contact: EL@iaea.org

Staff Spotlight



Gyula Kis-Benedek
(Photo: IAEA)

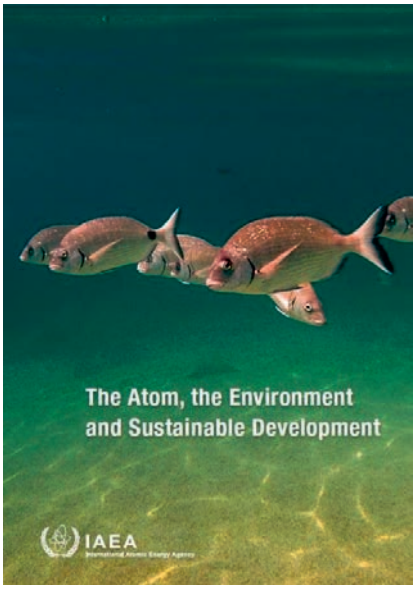
Mr Gyula Kis-Benedek holds a doctoral degree in nuclear techniques earned at the University of Technology and Economics in Budapest. Since 1999, he has been working in the Terrestrial Environment Laboratory (TEL) in Seibersdorf. His field of expertise lies in radiochemical separation techniques and radiation detection methods. He is very much involved in the training of TC (Technical Cooperation) fellows and provides support for the production of reference materials and the elaboration of proficiency tests. Mr Kis-Benedek is also the Environment Laboratories alternate staff representative.

Karin Will
(Photo: IAEA)

After finishing her studies in 1980 at the "European Secretary Academy" in Vienna, Ms. Karin Will started to work as a secretary in the Chemistry Unit of the IAEA Laboratories, former name for TEL. During her long career, she has worked for more than six section heads and she, now, occupies the post of executive assistant within the group. Ms. Will coordinates all administrative, budget-related and clerical tasks within TEL and closely collaborates with her administrative colleagues in Monaco. In addition, Ms. Will is also the central focal point for AIPS and assists Project Managers with Oracle Business Intelligence Enterprise Edition (OBIEE) for TEL.

New Reports

"The Atom, the Environment and Sustainable Development", IAEA Topical Booklets and Overviews, September 2014; 30 pages.



The IAEA is the world's centre of cooperation in the nuclear field. It was set up as the world´s "Atoms for Peace" organization in 1957 within the United Nations family. The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful nuclear technologies.

Using nuclear techniques to address a wide range of issues related to environment, food or water quality (Photos: IAEA databank)

Using isotopes and radionuclides, the IAEA assists in understanding, protecting people, monitoring the environment and contaminants to help achieving remediation on environmental issues.

Through "The Atom, the Environment and Sustainable Development", the IAEA aims to raise awareness of the unique contributions nuclear science and technology can make to the environmental dimension of sustainable development.

https://www.iaea.org/sites/default/files/atomsd0914.pdf

This edition of Environment Laboratories Newsletter was edited and coordinated by Mr. Laval Liong Wee Kwong.

Upcoming Events

12-14 Jan 2015	3rd International workshop: Bridging the Gap between Ocean Acidification Impacts and Economic Valuation, "Ocean Acidification Impacts on Coastal Communities"	Oceanographic Museum, Monaco
19-23 Jan 2015	2nd Consultancy Meeting on the Determination and Interpretation of Characteristic Limits for Analytical Measurements	Vienna, Austria
16-20 Feb 2015	2nd Consultancy Meeting on Soil and Vegetation sampling for Environmental Monitoring	Vienna, Austria
16-20 Feb 2015	1st Consultancy Meeting on the Chernobyl Experience in Environmental Monitoring in Areas Affected by Radiation Accidents	Vienna, Austria
4-15 May 2015	ALMERA Training Course on Rapid Assessment Methods for Environmental Radioactivity	Argonne National Laboratory, Chicago, USA
March/Dec 2015	Implementation of IAEA/NAEL and ROPME (Regional Organisation of the Protection of the Marine Environment of the Gulf) Agreement in assisting ROPME Member States on the analysis of trace elements, organochlorinated compounds, petroleum hydrocarbons, tributyltin, radionuclides and HAB-related biotoxins, in oysters and sediments collected by Member States along the coastline of the ROPME Sea Area.	NAEL/Monaco and elsewhere.
June 2015	Initiation of "Proficiency Test 2015: Determination of Radionuclides in Seawater." Interested participants are encouraged to contact Mr. Arvic Harms at A.Harms@iaea.org to receive a letter of invitation.	NAEL/Monaco
22 June2015	Training Course on the Theory and Practical Application of RESRAD-BIOTA and Other Codes in the RESRAD Family for the Determination of Dose, Risk and Authorized Limits at Radioactively Contaminated Sites at the Argonne National Laboratory.	Argonne National Laboratory, Chicago, USA
June 2015	Monacology – Monegasque Awareness week for Children on Environment. NAEL will present workshops to familiarise children with the work of the Agency.	Monaco

You & NAEL

Reference Materials (RMs)

NAEL provides reference materials to laboratories world-wide to assist them in the quality of the results they produce by nuclear analytical techniques.

Each of the RM is characterised for analytes belonging to one of the following groups: Radionuclides, Trace Elements and Methyl Mercury, Organic Compounds, Stable Isotopes. 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 analyte or sample type, quality assurance and quality control are the cornerstones to 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 world-wide. 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 coordination 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 data base 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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