
Thoughts
following the
7th International
CBRN Safety
and Security
Conference

الله اكبر



CB7RN
4–6 Dec. 2022



The Seventh International **CBRN** Safety and Security Conference

Introduction

Welcome to *Thoughts following the 7th International CBRN Safety and Security Conference*. This magazine has been created with the kind help of the University of Babylon, Coalescion, and WinfieldCBRN.

Inside you will find a snapshot of the many voices that are dedicated to improving safety and security in Iraq against chemical, biological, radiological and nuclear (CBRN) weapons. The majority of people that gave their time to speak to us were either presenters at the 7th International CBRN Safety and Security Conference or leading dignitaries within Iraq's CBRN defence agencies. We are grateful for all their efforts on the day and in keeping Iraq safe.

CBRN Safety and Security is a major issue for Iraq, as it is for many other countries. There has been a lasting legacy of war damage and hostile actors in the region for more than twenty years and this has left institutional and security challenges that the country is still trying to overcome. No sooner did the Covid pandemic pass but the conflict in Ukraine started, an event that has had complex second orders of effect. Both of these are lessons in how important CBRN preparedness is.

The magazine is split into two sections. The first, pages 1 to 45, has key elements from the event

and the wider community. The second presents some of the poster presentations that were delivered on the day. Since this was a hybrid event of live and virtual it is important that everyone sees the research that has been going on in Iraqi institutions. If you missed the event, and have found this on a coffee table somewhere, please check out <https://cbrn.edu.iq/> and we all hope to see you at a future conference!

At time of writing the team that brought you the seventh event is already hard at work to bring you the next iteration. Each one sees the event gain further traction at senior levels within various Iraqi ministries and we have no doubt that the same will be true for the eighth. The committee is keen to hear from people that might want to contribute research papers or provide insight into their CBRN defence capability, so please reach out via the link above to provide the details.

I hope you enjoy the magazine and the efforts that have been undertaken for improved CBRN security in Iraq. If you want to know more about initiatives in the region please email gwyn@winfieldcbrn.com and I will be happy to pass your request on.

Gwyn Winfield
Editor



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Conference Programme - Day 1

1600 – 1645 **Opening of the Conference with the Holy Quran & Iraqi National Anthem**

Keynote Speakers:

- GOI Keynote Speaker His Excellency **Qassem Al-Araji**, National Security Advisor
- GOI Keynote Speaker His Excellency **Lieutenant General Abdul-Wahhab Al-Saadi** the head of the Iraqi Counter-Terrorism Service (ICTS)
- GOI Keynote Speaker His Excellency Head of Iraqi National Security Service
- GOI Keynote speaker His Excellency Engineer **Mohemmed Al- Darragee**, Head of the Military Industrialization Authority,
- GOI Keynote Speaker His Excellency **Prof. Dr. Kahtan Hadi Hussein**, President, University of Babylon,
- USG Keynote Speaker Her Excellency Undersecretary of State, **Bonnie Jenkins (v)**,
- USG Keynote Speaker Her Excellency US Ambassador **Alina Romanowski (v)**,
- GOI Keynote Speaker His Excellency Director General, Iraqi National Center for Joint Planning and Chairman of the International Advisory Committee, **Dr. Ali Al-Yasery**,
- USG Keynote Speaker His Excellency U.S. Department of Defense, Defense Threat Reduction Agency, Cooperative Threat Reduction Program Director, **Dr. Robert Pope (v)**,

1645 – 1800 **Distinguished Guest Presenters**

- Dr. Ali Al-Yasery**, Director General, National Center for Joint Planning, National Security Advisory (NSA) "NSA Management of CBRN Affairs in Iraq"
- Dr. Christina Baxter** PhD, CEO at Emergency Response TIPS and Partner at Hazard3 (v), "The Evolution of CBRN Threats"
- Brigadier General Ali Shallal**, National Security Services, Iraq, "The Iraq National Security Services Role in Epidemics"
- Mr. Scott Spence**, Senior Legal Adviser, The Pontica Group LLC (v), "Implementation of UN Security Council Resolution 1540 (2004) Opportunities and Challenges"
- Dr. Mohammed Al-Sharaa**, retired Director General, Iraq National Monitoring Authority (INMA), "UNSCR 1540 (2004) Legally Binding Obligations: Implementations in Iraq"

1800 – 1820 **Presentation of Awards**

1820 – 1830 **Conferece Schedule Overview**

International Advisory Committee Vice Chairman, **Ms. Shawn C. Baker-Garcia**

1830 – 1900 **Intermission**

1900 – 2130 **Day 1 Breakout Sessions – Panel Discussions**

TRACK A	TRACK B	TRACK C	TRACK D	TRACK E
<p>Applying Mapping Strategies to Improve CBRN Security Outcomes</p> <p>Moderators: Ms. Shawn Baker-Garcia (v), Coalescion Dr. Riad Al-Tamimi, Iraq National Monitoring Authority (INMA)</p> <p>Panelists: Brigadier General, retired, Mr. Khaled Al-Shoubaki, ROCK Company for Security Services and Consultancy, General Headquarters – Jordan Armed Forces, Jordan "CBRN Mapping Strategy – Jordan Case Study" Rear Admiral, retired, Joseph Sarkis, Lebanon Brigadier General Mahmoud Delli, Iraq Ministry of Interior, Civil Defense Directorate "Threat Management" Brigadier General Amwal Abu Bakr, CBRN Response Unit, Peshmerga, Kurdistan, Iraq "Rapid Response Team CBRN" Brigadier General Saad Khalif Fauzi Alzubaidi, Federal Police Combat "Chemical Department CBRN"</p>	<p>Implications of Pharmaceutical-Based Agents (PBAs) on CBRN Security</p> <p>Moderators: Mr. Gwyn Winfield (v), <i>CBRN World</i> Dr. Wafaa N. Al-Hussaini, Ibn Sina University of Medical and Pharmaceutical Sciences College</p> <p>Panelists: Colonel, retired, Mr. Jeff Brodeur (v), CBRN Officer, U.S. Army Captain Ziad Abou Malhab, CBRN Company Commander, Lebanese Armed Forces (LAF) "Challenges PBAs pose on CBRN response" Dr. Peter Hotchkiss (v), Senior Science Policy Officer and Secretary to the Scientific Advisory Board Organisation for the Prohibition of Chemical Weapons (OPCW) Office of Strategy and Policy Dr. Souzan Eassa, University of Duhok, Kurdistan, Iraq "The Dual Use of Pharmaceuticals for Bioterrorism" Dr. Nawfal Hussein Aldujaili, University of Kufa, Iraq "CBRN Terrorism" Christina M. Baxter, PhD (v), CEO, Emergency Response TIPS and Partner, Hazard3</p>	<p>How Universities and Technical Communities Support National CBRN Security Goals</p> <p>Moderators: Dr. Ismail Ali (v), Hargeisa University Mr. Nidal Abu Sammour, U.S. Department of State, EXBS Subject Matter Expert</p> <p>Panelists: Dr. Ayad Al-Mamoori, College of Science, University of Babylon "National Biosecurity Curriculum Plan for Academic, Animal, and Public Health Institutions" Mr. Jason Krause (v), LSU-NCBRT Dr. Alpana Goel (v), Director of Amity Institute of Nuclear Science and Technology, and World Institute for Nuclear Security (WINS) Ambassador Dr. Maria Espona (v), International Science & Technology Center / Science & Technology Center in Ukraine (Argentina) "ISTC and STCU Targeted Initiatives on Export Control of Dual-Use Materials and Technologies" Dr. Roy Samihardjo (v), State College for Intelligence Studies (STIN), Indonesia "The Role of the Universities in Countering the Possible CBRN Threats" Mr. Adil Radoini (v), United Nations Interregional Crime and Justice Research Institute (UNICRI) "CoE Regional Coordinator Middle East and GCC Region"</p>	<p>Best Practices for Traditional and Emerging Dual-Use CBRN Commodities Management</p> <p>Moderators: Dr. Caner Zambak (v), Independent Consultant Engineer Luay Al-Mokhtar, Ministry of Environment</p> <p>Panelists: Dr. Mohammed Al-Sharaa, retired Director General, Iraq National Monitoring Authority (INMA) Dr. Bilal Nsouli, Head of the CBRN National Commission – Lebanon Mr. Mohammed Salman, Ministry of Industry & Minerals (MIM), Iraq "Chemical Management in the Ministry of Industry and Minerals" Mr. Faris Yaqoubi, Vice President, Iraq Chemists Syndicate Mr. Ahmed Adil Shihab, Ministry of Environment, Radiation Protection Center (RPC), "The Oversight Role of the Radiation Protection Center in Monitoring Radiological Activities Emergency Response, (Achievements and Challenges)" Ms. Ruxandra Ullrich, LL.M. (v), German Federal Office of Economic Affairs and Export Control (BAFA) "Transfer of Technology in the Context of Strategic Trade Controls" Mr. Francesco Marelli (v), United Nations Interregional Crime and Justice Research Institute (UNICRI) "CBRN Disinformation"</p>	<p>Criminality and CBRN Terrorism: Trends, Vectors, and Consequences</p> <p>Moderators: Ms. Bethany Banks (v), Coalescion Mr. Hayder Fouad, Iraq National Monitoring Authority (INMA)</p> <p>Panelists: Dr. Zaid F. Makki, Nahrain Center for Strategic Studies, Iraq "Risks of Cyber Attacks in Hybrid Wars" Ms. Maria Lorenzo Sobrado (v), United Nations Office on Drugs and Crime (UNODC), CBRN Terrorism Prevention Programme "The International Legal Framework Against CBRN Terrorism" Mr. David Hargreaves (v), INTERPOL Mr. Juan Gonzalez (v), Federal Bureau of Investigation (FBI) "Threats Facing Radiological Class 7 Transports" Brigadier General Ali Shallal, National Security Services, Iraq "Radiological Emergencies and the Role of the National Security Apparatus in Radiological and Nuclear Security" Major Ayad Mohammed Jarih Cybercrime Programmer Cybercrime Forensic Laboratory, Ministry of Interior Affairs "Definition Of Cyber-Crime"</p>

Conference Programme - Day 2

- 1600 – 1610 **Dr. Falah H. Hussein**, "Welcome Back and Housekeeping"
- 1610 – 1645 **Keynote Speakers:**
 GOI Keynote Speaker **Dr. Ali Al Shukree**, Deputy Ministry of Higher Education and Scientific Research,
 GOI Keynote Speaker **Dr. Abbas Kadhim Obaid**, Ministry of Foreign Affairs,
 GOI Keynote Speaker, **Ms. Ahlam Allami**, Chair of the Lawyers Syndicate
 GOL Keynote Speaker, **Dr. Bilal Nsouli**, Head of the CBRN National Commission – Lebanon
 GOJ Keynote Speaker, **Brigadier General, retired, Mr. Khaled Shoubaki**, General Manager, ROCK Company for Security Services and Consultancy, General Headquarters-Jordan Armed Forces, Jordan
- 1645 – 1700 Expert Presentation: **Dr. Hooi-Ling Lee**, School of Chemical Sciences, Universiti Sains Malaysia (v), "Development of Chemical Security Undergraduate Course at Universiti Sains Malaysia"
- 1700 – 1715 Expert Presentation: **Prof. Dr. Hussam Al-Humadi**, Dean of the College of Pharmacy, University of Babylon, "Shedding Light on Some Pharmaceutical Based Agents: Threats and Challenges"
- 1715 – 1730 Expert Presentation: **Engineer Luay Al-Mukhtar**, Iraq Ministry of Environment "Chemical Safety and Security in Iraq, Gaps in Regulations and Practices and Reflect on Reality"
- 1730 – 1745 Expert Presentation: **Mr. David Duhamel**, Oakridge National Laboratory (v), "Security of High-Consequence Materials during Transport"
- 1745 – 1800 Expert Presentation: **James A. Banaski, Jr.**, MS, MEP, CEM Senior Technical Advisor for Emergency Management, CRDF Global (v), "Applying the Steps for Capacity Development to CBRN Programming"
- 1800 – 1815 Expert Presentation: **Dr. Nezha Barakate**, Chemical Safety Manager at the National Institute of Hygiene- Rabat/Morocco (v), "European Union Initiative of CBRN Centres of Excellence Model of Regional Cooperation"
- 1815 – 1830 Expert Presentation: **Colonel Waleed Khaled**, Commander of the Central Chemical Laboratory, Ministry of Defense, "Capabilities of the Chemical Division Directorate to Respond to CBRN Threats in Iraq"
- 1830 – 1900 **Intermission**
- 1900 – 2130 **Day 2 Breakout Sessions – Panel Discussions**

TRACK A	TRACK B	TRACK C	TRACK D	TRACK E
<p>Applying Mapping Strategies to Improve CBRN Security Outcomes</p> <p>Moderators: Ms. Shawn Baker-Garcia (v), Coalescion Dr. Riad Al-Tamimi, Iraq National Monitoring Authority (INMA)</p> <p>Panelists: Brigadier General, retired, Mr. Khaled Al-Shoubaki, ROCK Company for Security Services and Consultancy, General Headquarters – Jordan Armed Forces, Jordan Rear Admiral, retired, Joseph Sarkis, Lebanon Brigadier General Mahmoud Delli, Iraq Ministry of Interior, Civil Defense Directorate "Gap Analysis" Brigadier General Amwal Abu Bakr, CBRN Response Unit, Peshmerga, Kurdistan, Iraq Brigadier General Saad Khalif Fauzi Alzubaidi, Federal Police Combat</p>	<p>Implications of Pharmaceutical-Based Agents (PBAs) on CBRN Security</p> <p>Mr. Gwyn Winfield (v), <i>CBRNe World</i> Dr. Wafaa N. Al-Hussaini, Ibn Sina University of Medical and Pharmaceutical Sciences College</p> <p>Panelists: Colonel, retired, Mr. Jeff Brodeur (v), CBRN Officer, U.S. Army Captain Ziad Abou Malhab, CBRN Company Commander, Lebanese Armed Forces (LAF) Dr. Peter Hotchkiss (v), Senior Science Policy Officer and Secretary to the Scientific Advisory Board Organisation for the Prohibition of Chemical Weapons (OPCW) Office of Strategy and Policy Dr. Souzan Eassa, University of Duhok, Kurdistan, Iraq Dr. Nawfal Hussein Aldujaili, University of Kufa, Iraq "Prevention of Bioterrorism" Christina M. Baxter, PhD (v), CEO, Emergency Response TIPS and Partner, Hazard3</p>	<p>The Role of Universities and Technical Communities in Support of National CBRN Security Goals</p> <p>Moderators: Dr. Christine Straut (v), Sandia National Laboratories Mr. Nidal Abu Sammour, U.S. Department of State, EXBS Subject Matter Expert</p> <p>Panelists: Dr. Mahdi Al-Silawi, College of Medicine, University of Kufa, "Examples of Biological Security Incidents" Mr. Jason Krause (v), LSU-NCBRT Dr. Maria Espona (v), International Science & Technology Center / Science & Technology Center in Ukraine (Argentina) Dr. Roy Samihardjo (v), State College for Intelligence Studies (STIN), Indonesia Mr. Adil Radoini (v), United Nations Interregional Crime and Justice Research Institute (UNICRI)</p>	<p>Best Practices for Traditional and Emerging Dual-Use CBRN Commodities Management</p> <p>Moderators: Dr. Caner Zambak (v), Independent Consultant Engineer Luay Al-Mokhtar, Ministry of Environment</p> <p>Panelists: Dr. Mohammed Al-Sharaa, retired Director General, Iraq National Monitoring Authority (INMA) Dr. Bilal Nsouli, Head of the CBRN National Commission – Lebanon Mr. Mohammed Salman, Ministry of Industry & Minerals (MIM), Iraq Mr. Faris Yaqoubi, Vice President, Iraq Chemists Syndicate Mr. Ahmed Adil Shihab, Ministry of Environment, Radiation Protection Center (RPC) Ms. Ruxandra Ullrich, LL.M. (v), German Federal Office of Economic Affairs and Export Control (BAFA) Mr. Francesco Marelli (v), United Nations Interregional Crime and Justice Research Institute (UNICRI)</p>	<p>Criminality and CBRN Terrorism: Trends, Vectors, and Consequences</p> <p>Moderators: Dr. Salim Khaleel (v), Independent Consultant Mr. Hayder Fouad, Iraq National Monitoring Authority (INMA)</p> <p>Panelists: Dr. Zaid F. Makki, Nahrain Center for Strategic Studies, Iraq Mr. David Hargreaves (v), INTERPOL Mr. Juan Gonzalez (v), Federal Bureau of Investigation (FBI) Brigadier General Ali Shallal, National Security Services, Iraq Major. Ayad Mohammed Jarh, Cybercrime Programmer Cybercrime Forensic Laboratory, Ministry of Interior Affairs</p>

Conference Programme - Day 3

1600 – 1605 **Dr. Falah H. Hussein**, "Welcome Back"

1605 – 1620 **Keynote Speakers:**

- GOI Keynote Speaker, Member of Parliament (MP), **Dr. Yassin Mohammed Al-Ithawi**
- USG Keynote Speaker, U.S. Department of State, Bureau of International Security and Nonproliferation, Office of Export Control Cooperation, Acting Director **Ms. Julia Khersonsky** (v),
- 1620 – 1630 Expert Presentation: **Mr. Nabeel Jamal**, Iraq Radioactive Sources Regulatory Authority (IRSRA) "Human Resource Development for IRSRA"
- 1630 – 1645 Expert Presentation: **Mr. Brian Gunn**, ORS Associate Program Leader, and Mr. Aaron Aguilar, ORS Reduce Team Leader, Lawrence Livermore National Laboratory (v), "Radioactive Source Security in Iraq"
- 1645 – 1700 Expert Presentation: **Dr. Raghdah Hassan**, Iraqi Chemists Syndicate, "Preventative Action and National Measures to Address the Dangers of Weapons of Mass Destruction"
- 1700 – 1715 Expert Presentation: **Dr. Ismail Ali**, Hargeisa University (v), "Chemical Safety and Security"
- 1715 – 1730 Expert Presentation: **Mr. Ives Van Haute**, Belgian National Crisis Centre (v), "Project Bullseye"
- 1730 – 1745 Expert Presentation: **Dr. Mays Shamout**, U.S. Centers for Disease Control, Response Capacity Specialist (v), "Rapid Response Team Management Workshop"
- 1745 – 1800 Expert Presentation: **Mr. Muhammed Ali Alkis**, Research Affiliate and Gender Champion, and Ms. Valeriia Gergiieva, Research Fellow, at the Odessa Center for Nonproliferation (v), "Nuclear Terrorism: A New Perspective"

1800 – 1830 **Intermission**

1830 – 2100 **Day 3 Breakout Sessions – Panel Discussions**

TRACK A	TRACK B	TRACK C	TRACK D	TRACK E
Applying Mapping Strategies to Improve CBRN Security Outcomes	Implications of Pharmaceutical-Based Agents (PBAs) on CBRN Security	The Role of Universities and Technical Communities in Support of National CBRN Security Goals	Best Practices for Traditional and Emerging Dual-Use CBRN Commodities Management	Criminality and CBRN Terrorism: Trends, Vectors, and Consequences
<p>Moderators:</p> <p>Ms. Shawn Baker-Garcia (v), Coalescion</p> <p>Dr. Riad Al-Tamimi, Iraq National Monitoring Authority (INMA)</p> <p>Panelists:</p> <p>Brigadier General, retired, Mr. Khaled Al-Shoubaki, ROCK Company for Security Services and Consultancy, General Headquarters-Jordan Armed Forces, Jordan</p> <p>Rear Admiral, retired, Joseph Sarkis, Lebanon</p> <p>Brigadier General Mahmoud Delli, Iraq Ministry of Interior, Civil Defense Directorate "Preparedness Concept"</p> <p>Brigadier General Amwal Abu Bakr, CBRN Response Unit, Peshmerga, Kurdistan, Iraq</p> <p>Brigadier General Saad Khalif Fauzi Alzubaidi, Federal Police Combat</p>	<p>Moderators:</p> <p>Mr. Gwyn Winfield (v), <i>CBRNe World</i></p> <p>Dr. Wafaa N. Al-Hussaini, Ibn Sina University of Medical and Pharmaceutical Sciences College</p> <p>Panelists:</p> <p>Colonel, retired, Mr. Jeff Brodeur (v), CBRN Officer, U.S. Army</p> <p>Captain Ziad Abou Malhab, CBRN Company Commander, Lebanese Armed Forces (LAF)</p> <p>Dr. Peter Hotchkiss (v), Senior Science Policy Officer and Secretary to the Scientific Advisory Board Organisation for the Prohibition of Chemical Weapons (OPCW) Office of Strategy and Policy</p> <p>Dr. Souzan Eassa, University of Duhok, Kurdistan, Iraq</p> <p>Dr. Nawfal Hussein Aldujaili, University of Kufa, Iraq</p> <p>"Prevention of Bioterrorism"</p> <p>Christina M. Baxter, PhD (v), CEO, Emergency Response TIPS and Partner, Hazard3</p>	<p>Moderators:</p> <p>Dr. Christine Straut (v), Sandia National Laboratories</p> <p>Mr. Nidal Abu Sammour, U.S. Department of State, EXBS Subject Matter Expert</p> <p>Panelists:</p> <p>Dr. Ayad Al-Mamoori, College of Science, University of Babylon</p> <p>Mr. Jason Krause (v), LSU-NCBRT</p> <p>Dr. Maria Espona (v), International Science & Technology Center / Science & Technology Center in Ukraine (Argentina)</p> <p>Dr. Roy Samihardjo (v), State College for Intelligence Studies (STIN), Indonesia</p> <p>Mr. Adil Radoini (v), United Nations Interregional Crime and Justice Research Institute (UNICRI)</p>	<p>Moderators:</p> <p>Dr. Caner Zambak (v), Independent Consultant</p> <p>Engineer Luay Al-Mokhtar, Ministry of Environment</p> <p>Panelists:</p> <p>Dr. Mohammed Al-Sharaa, retired Director General, Iraq National Monitoring Authority (INMA)</p> <p>Dr. Bilal Nsouli, Head of the CBRN National Commission - Lebanon</p> <p>Mr. Mohammed Salman, Ministry of Industry & Minerals (MIM), Iraq</p> <p>Mr. Faris Yaqoubi, Vice President, Iraq Chemists Syndicate</p> <p>Mr. Ahmed Adil Shihab, Ministry of Environment, Radiation Protection Center (RPC)</p> <p>Ms. Ruxandra Ullrich, LL.M. (v), German Federal Office of Economic Affairs and Export Control (BAFA)</p> <p>Mr. Francesco Marelli (v), United Nations Interregional Crime and Justice Research Institute (UNICRI)</p>	<p>Moderators:</p> <p>Dr. Salim Khaleel (v), Independent Consultant</p> <p>Mr. Hayder Fouad, Iraq National Monitoring Authority (INMA)</p> <p>Panelists:</p> <p>Dr. Zaid F. Makki, Nahrain Center for Strategic Studies, Iraq</p> <p>Mr. David Hargreaves (v), INTERPOL</p> <p>Brigadier General Ali Shallal, National Security Services, Iraq</p> <p>Major Ayad Mohammed Jarih, Cybercrime Programmer, Ministry of Interior Affairs</p> <p>Mr. Günter Povoden (v), Head of Section Chemistry, CBRN Defence Centre, Austrian Armed Forces; Expert on site for North Africa, the Sahel and the Middle East</p> <p>EU CBRN Centres of Excellence Initiative</p>

2100 – 2200 **Closing Plenary Session**

- 2100 – 2105 **Dr. Falah H. Hussein**, "Welcome Back"
- 2105 – 2115 Presentation of Awards

2115 – 2145 **Keynote Speakers:**

- GOI Keynote Speaker, Director General, Iraqi National Center for Joint Planning and Chairman of the International Advisory Committee, **Dr. Ali Al-Yasery**

2145 – 2200 **Conference Close, Dr. Falah H. Hussein**, "Conference Findings and Next Steps"

Hammurabi's CBRN code

**Falah H Hussein,
Emeritus Professor
at the University of
Babylon's Faculty
of Pharmacy, and
Shawn C Baker-
Garcia, CEO of
Coalescion, talk to
Gwyn Winfield
about taking CBRN
excellence out to
the regions**

The more data points there are on any graph, the easier it is to see progression. In terms of the International CBRN Safety and Security conference, the seventh iteration removes any doubt about upwards progression. While there is a lot of anecdotal evidence to show it is getting better qualitatively, the quantitative improvement is obvious. The 2022 event saw 510 registered participants from 26 countries, and 218 attending physically. Among the delegates were Spain's ambassador, the Japanese ambassador, representatives from the EU and the International Centre for Migration Policy Development, various ministers, security leaders and first level representatives of ministries, government institutions, the private sector, and syndicates. In naming some of these you'd included the minister of interior, the national security advisor, the heads of the Defense Industries Commission, and the Counter Terrorism Service, the deputy minister of higher education and scientific research, the chief of law, Iraqi lawyers' syndicates, the Iraqi chemical union syndicates, and a member of parliament. The International

CBRN Safety and Security conference has 'arrived'. It no longer hides in the shadows, but has let the light in and thrown the doors open!

The event also saw a different subject matter approach to that of previous years. Hitherto the event worked at a more foundational or basic CBRN knowledge level. Starting last year, and clearly evident this year, was an expectation of more advanced levels of CBRN knowledge! Previously there was an expectation of a base level of CBRN knowledge, expected in a country that has suffered so many CBRN attacks, but which has also been seeded by the Babylon/Coalescion team for the past seven years. Now along with plenary presentations there were three days of streamed sessions on: applying mapping strategies; pharmaceutical based agents; the role of research in supporting national CBRN goals; emerging dual use commodities and CBRN criminality and terrorism. In addition to national and US speakers, the organizers had cast their net far wider than in previous years, and built on existing relationships with Jordan

and Lebanon. This showed a maturity of the event, and not just in knowledge level. Having helped build a national CBRN community, the organizing committee is now branching out into regional CBRN competence. Professor Falah, from the University of Babylon's faculty of pharmacy, and Shawn Baker-Garcia, CEO of Coalescion are taking the event to a variety of new levels!

They both felt that the promise of previous events, of being a place where the entire Iraqi CBRN community could come together had long been met, and were pleased to see that grow within and outside the country. "This conference is distinguished as the only Iraqi event that brings together all Iraqi sectors in one hall," stated Prof. Falah. "Security,

industry, agriculture, health, private enterprise, academia, have all joined this conference and it's the only event in Iraq that could gather all these people together! This is a matter of pride."

"The in-person delegations from Jordan and Lebanon matter for a number of reasons," said Shawn Baker-Garcia. "They convey that regionally Iraq's neighbors care about this issue and want to improve the bilateral or trilateral relationship to work together and address severe insecurity throughout the region. Additionally, we're going to find that the final participant statistics continue to see a right sizing of distribution of attendees. In other words, the ratio by sector is improving so that it's more equally distributed across all the different interested parties, which

shows that Iraq understands what a whole ecosystem approach will require. This gives everybody a unified sense of purpose - that we're working towards a shared goal for improved CBRN security in Iraq, the region and the world."

The challenge for any agency keen to strike while the iron's hot is maintaining the focus on issues such as health security, pandemic awareness and chemical security when attention has suddenly turned to Ukraine, election results, or numerous matters that seem far more important at the moment. Emerging from the Covid pandemic there is a need to be seen to 'know about these things...' which as time goes on will naturally be replaced with something else. Can this trend be retarded or does the team



The conference has seen a 'right sizing' of delegates so the relevant government agencies are represented proportionally ©Falah

have to accept that this year's event might represent the high water mark of CBRN interest in the region?

Shawn Baker-Garcia felt that there was enough background to maintain the current level of interest in the topic. "In the past couple of years we have continued to see industrial 'accidents' of significance that give cause for pause, at least on the chemicals management front. This is without there being an actual terrorist attack or orchestrated nefarious act conducted by some stakeholder. Our barometer for success should be how well we would respond to unintentional incidents that present as crises.

"I also think that you can't rule out the nexus between CBRN and elements of general criminal activity in the region, like narco-trafficking. What does the insecurity in the Afghanistan area mean for supply chain routes and potential new concerns around radiological or nuclear smuggling? Iraq needs to keep an eye on a lot of potential second and third order impacts."

Prof Falah felt that there had been a Covid dividend, but it was not so much in awareness raising, as in getting people to work together, and that was the focus of hope for the future. "Covid-19 made CBRN an interesting subject because it borders on biosafety

and biosecurity. It has elevated CBRN in people's minds, especially since all the ministries needed to cooperate to prevent Covid-19 increasing. This provided new understanding on how to manage CBRN missions."

Shawn Baker-Garcia agreed, and suggested that the university's neutral status provided ideal soil for these discussions to flourish in, as it meant that no one ministry owned the topic. "The university provides a different partnership. Babylon University has been able to establish itself as a thought leader on CBRN security from the holistic angle as opposed to a narrow kinetic security aspect. The university can, and should, continue to be a neutral arbiter, a broker of stakeholders. It's also important that the introduction to this topic comes in a distinctive multidisciplinary environment for many people, providing multiagency foundations for them to continue thinking about how they can prepare."

As mentioned previously, one sign of the health of CBRN education in the conference audience and Iraq responders, was the step change in terms of the types of topics covered. This, combined with increased numbers not only shows that Iraq is aware of the current generation of threats, but is also preparing for future ones. Shawn Baker-Garcia agreed that it was a great indicator of

growing CBRN understanding in Iraq and that this was something that future iterations of the conference would build on.

"We had some boutique topics that pushed the envelope in terms of discussions and my track, 'A', which covered mapping as an analytical exercise to achieve optimal CBRN security outcomes include some sophisticated ideas and perspectives. For example, we discussed whether there is a role for artificial intelligence (AI) to augment, or enhance the CBRN security element in Iraq. One individual opened the debate, stating: 'We don't need robots. We're only just handling our human personnel, we're not ready for robots!' Another panelist explained that AI was more than just robots explaining that it could be used to mine and curate data to support CBRN missions at a lower cost.

"Some of the members of the pharmaceutical based agent panel were not previously aware of the topic and were glad of the information, which provided an overall educational enhancement to their professional interests and needs. All the moderators this year did a phenomenal job of keeping the participants focused on the realm of the possible: what's the next step? People were talking about these issues in a very sophisticated manner that they wouldn't have done years ago. Their foundation of CBRN

knowledge is so strong that they are able to talk about some of the fringe elements and make it useful for everybody."

Prof Falah agreed. "I got a very good response on the deep dive, it was an excellent step. This was thanks to the International Advisory Committee, and people welcomed all these new materials. We had some classic tracks, but we also offered the chance to go deeper."

As you move away from classic CBRN discussions you cannot escape a degree of specialization - some topics just don't fall into everyone's sphere. Add in more niche products and there's the risk of alienating the generalists or people with other fringe interests. This also raises the issue: as the event grows does it need to bifurcate, becoming an event for responders on one side, and academics on another? What is the balance between being focused and only appealing to elements, or being generalist and appealing equally to all?

Ms Baker-Garcia agreed that it's the right time for this discussion, but felt that regardless of the content, Iraq benefits from a national CBRN event as a means to keep the whole ecosystem connected. "You need an annual touch base and place to remind people of the mission. You're also likely to get more progress with the whole community present. It

allows you to foster the sense of one team, and build and maintain friendships and relationships. This year saw a right-sizing of participation as the number of academics fell and there was a dramatic increase in the government sector. I think we should continue to meet annually as a combined group but also look at smaller gatherings. We could have one with academia and one with action-oriented responders to cover implementing CBRN security or safety practices."

A dream for the team has been the start of a CBRN Center of Excellence in Iraq. This is something that Prof Falah has been lobbying for, and judging by some of the keynote presentations it might be finally on the way!

"The CBRN Center is coming! The president of the university, Professor Dr Qahtan Al-Jubouri discussed it directly with the minister of interior, it is officially included in the recommendation. All the ministries say they are ready to help the University of Babylon establish this center and they don't mind sending people from the ministries of defense and interior, and other sectors, for training and to get official certificates. Shawn and I called it a dream two years ago, now it's a dream widely shared.

"We are in real need of a center to educate, teach, and elevate CBRN knowledge scientifically. We should invite experts to our

country to lecture at this center and send groups of Iraqis to the US or UK, to return and train more people. I want this center to educate people in CBRN at a low cost, and increase the center's professionalism."

Ms Baker-Garcia agreed that it was a great start, but there was still much to do. "The most important thing for the university is to sit down and write a charter for the CBRN Center of Excellence, including its purpose, primary objective and function. You'll then be able to make sure the center is embraced by the full community rather than rejected by parts of it because they see it as doing something that is outside the university's purview. The idea is great but they should be very clear about where their line starts and stops. In the US, we would never have a academic institution training law enforcement or an emergency response team on how to do their job. A discussion is needed to give Babylon University some ideas on how to create the center's mission space so it doesn't compete with the ministries that are actually doing CBRN response."

Now that there is a green light, Prof Falah said that a percentage of next year's conference will be devoted to the next steps for the center, and he hopes that with the support of the Ministry of Higher Education and Scientific Research it will be established



Some of next year's conference will be given over to planning out the new CBRN centre ©Falah

soon after that. This isn't the only concrete evidence of the conference's beneficial effects, however. A major focus of 2021's event was the signing of a series of memorandums of understanding, and these have been ongoing in the background adding to both the networks and the knowledge. Prof Falah explained: "One of the benefits of these conferences is that all Iraqi institutions and ministries now know what CBRN means. Before 2012, this was not common. Now the ministries of defense, the interior, Peshmerga and Kurdistan have got important CBRN safety and security equipment and advanced training from international agencies. When I visit an agency in the green zone, they are starting to get a CBRN department and improve it."

Shawn agreed, and stated that the Civil Defense Directorate is a

model of what can be built through hard work on all sides. "The CBRN response team at Civil Defense is one of the most heralded professional CBRN units in Iraq when it comes to CBRN prowess. That's hats off to the ministry of interior and the US government for an effective collaboration on creating a team out of thin air in December 2013. This CBRN response team should be used by the Department of State as a case study for what success looks like as regards security capacity development outcomes. For every CBRN response team success there are hundreds of other well intended security initiatives that don't produce these sorts of transformational outcomes.

"The first National CBRN Response Conference took place in 2016, attended by all the key players representing the sectors

that today send legions of people to this event. It was the germination of a whole of government approach to supporting this civil defense CBRN response team. The Iraqis should be applauded for their sophisticated approach to managing a security challenge that is so difficult to combat. I would love to work with Dr Al Sharaa, Dr Falah and others to export this model to other regions around the world, because I think Iraq has cracked the code on bringing together many different types of stakeholders to yield a meaningful outcome.

"The core group has been together for so long that there are friendships that mitigate instinctive tendencies to see others as competitors. It still happens, I'd be lying if I said otherwise, but because of trust within the core group they can combat that and



2022 saw the event become a true regional event, rather than a national one ©Falah

work together productively."

It seems that there will be a lot going on behind the scenes for the eighth annual conference in 2023. But for those not involved in the discussions, what is planned to be new and exciting for that iteration? If international experts are thinking about joining what will they see in Baghdad in December that they won't have seen before?

"We don't want to spoil the surprise," Prof Falah joked. "Shawn and her staff are in continuous discussion with us about new ideas for the next conference. We're also talking about inviting companies to exhibit and have started cooperating with the Defense Industry Commission to deal with these companies and exchange information with them."

Shawn Baker-Garcia suggested that they had previously reached

most of the agencies they needed to make the event a success. This year saw them bring in the Defence Industry Commission and the judiciary, with which they would continue to build bridges. She also felt that the ratio of delegates was improving every year, and the in-person and virtual event was becoming well established. In terms of content she thought it was time for an increased radiological presence.

"Maybe for the eighth conference we need to started pivoting to topics along the rad/nuke axis so we can expand within the US department of energy, the National Nuclear Security Agency and Iraqi entities like the Iraq Radioactive Sources Regulatory Authority and some of the hospitals. Iraq is not a nuclear power but I think with some of the region's insecurities, such as Afghanistan's devolution in security, there may be an increase in ungoverned spaces. We need

counter nuclear smuggling back on the table. We've done a lot on chem/bio, so let's give the rad/nuke folks their time in the sun. We also need a frank discussion about the explosives element. Why are explosives not falling into one of the other categories? Don't be surprised if we have a workshop asking if explosives should be part of the acronym. We're going to look for practical educational topics that will enhance people's foundational CBRN knowledge."

Having been involved in this conference since 2018 it does feel like 2022 was a jumping off point. Some of the elements that were only discussed then, such as the center of excellence, are now on the cusp of actuality. Ministries and segments of the CBRN community that previously looked askance at an event run by a university, rather than a senior ministry, have now thrown themselves behind it and are regulars attendees. This is the result of a lot of hard work, late nights and energetic meetings over tea or coffee. Perhaps one of the greatest achievements is that it has stopped being a national event, and become a regional one. With Jordan and Lebanon starting to send delegations to Baghdad it is having a positive influence beyond Iraq's borders and perhaps that will be the next dream. Not just excellence in Iraqi CBRN, but across the entire Levant.

President of the University of Babylon

Q. In your speech at the opening session of the Seventh International CBRN Safety and Security Conference, you mentioned your readiness to open a centre concerned with safety and security. What is your vision and what objectives will be achieved by establishing it?

A. A regional centre specializing in CBRN safety and security will serve all of Iraq, the region and neighbouring countries. It will provide safety and security instruction to all departments of state and the private sector, along with advice and other services.

Q. Do you have the necessary human and material capabilities to open such a centre?

A: Over recent years, the University of Babylon has developed specialized scientific cadres capable of managing and operating such a centre. This is due to the involvement of our university cadres working on CBRN related programs at various levels both inside and outside Iraq. The centre is also ready to cooperate with any ministry or

donor in providing the required infrastructure by harnessing all its available resources. Thus, the university is able to accommodate the development of the centre in the event that international and local supporting bodies cover the financial aspects.

Q. How do you expect this centre to contribute to spreading a safety and security culture at both local and regional levels?

A. We expect this centre to be a great success due to the lack of such capability within Iraq. There is an urgent need for this centre because of the recent security situation that Iraq and the region have had to endure. The centre will also spread a culture of CBRN safety and security among students, professors and employees, not only at the University of Babylon, but also at other Iraqi universities, especially those with a given geographical location. One way it will do this is by holding special courses involving various governmental and private institutions.

Q. What is the university's current role in spreading the culture of safety and security?

A. We work through the safety and security conference, as well as other courses and workshops, to spread and enhance a culture of safety internally, and across all government departments. Over seven iterations of this conference, the University of Babylon, has played a pivotal role in coalescing various governmental and private institutions from all over Iraq and the Kurdistan region. As a result we were able to indicate and warn of the dangers of al-Qaeda and ISIS terrorists, and share those warnings and expectations with the security authorities. The university also makes recommendations on keeping Iraqi land and airspace safe, at the end of each conference.

In the future we will continue to provide consultancy and conduct courses and workshops around consolidating CBRN culture throughout Iraqi society.

Q. Does the curriculum include a course on safety and security?

A: A safety and security curriculum has been approved as a basic topic for inclusion in the first semester of a bachelor's degree in the science faculties. Postgraduate students receive intensive training in safety and security before they start the practical side of their studies.

Q. Does the university have any programs interested in tracking its own CBRN materials and how storage is controlled?

A. We have advanced and applied electronic programs in our university, and all other Iraqi universities, to monitor the storage of chemicals through semi-annual reports. The chemical assets tracking program

was recently launched in all Iraqi universities.

Q. What are your plans for treating chemical and biological waste generated in the university laboratories?

A: We have plans for providing the necessary infrastructure for this, including treatment devices, incinerators, and other resources to deal with chemical and biological waste. These have come a long way, and will be completed once Iraq's general budget is approved in 2023. Some of the university's colleges have already delivered this using their own funds.

Q. What are the most prominent challenges that you face in the field of safety and security?

A: As I see it, there are five major

challenges. The first is insufficient control of the borders with neighboring countries. The second is the lack of a special budget to deal with CBRN, despite having assistance from friendly foreign countries such as the US. Thirdly there is a lack of legislative controls governing the trade in dual-use chemicals in the Iraqi market, which has made these materials available to all. Next, we have difficulty in applying relevant international principles due to the red tape imposed by the authorities responsible for political decisions. Finally there is the absence of international aid concerned with the requirements of applying the principles of CBRN. The aid received is limited to storage of chemical materials and support for related conferences.



The University of Babylon, has played a pivotal role in coalescing various governmental and private institutions ©Falah

Take you higher!

Dr Naeem Al-Aboudi, Minister of the Ministry of Higher Education and Scientific Research, on improving CBRN defence across Iraq

Q. What are the most important challenges facing the Ministry of Higher Education and Scientific Research (MOHESR) in CBRN safety and security? Are there administrative obstacles that hinder these programs?

A. We do have challenges and these are a lack of financial support for processing and disposal of chemical waste, and developing laboratories to the standards required by international systems.

Q. Has the ministry succeeded in developing its policies and programs in the field of CBRN in line with other scientific developments that are going on in the world?

A. In terms of policies for CBRN safety and security, we do this via follow up inspections at laboratories in public and private universities. It's also done through MOHESR being a member of various monitoring and security committees, such as

the education and monitoring committee, the Iraqi National Monitoring Authority (INMA) and other intelligence services.

Capacity building is achieved by conducting workshops, and remote and in-person seminars, in which CBR safety and security concepts are defined. CBR safety and security is included in our curriculums, both at the early stages and later on.

We also encourage researchers, teachers and postgraduate students, to investigate and address issues emanating from this field and identify solutions. Further, we are controlling our chemical inventory by restricting movements of radioactive sources and monitoring them using an online inventory system managed by the R&D department.

Q. Does the ministry have future plans for specialized scientific studies in the CBRN field?

A. We collaborate with all of Iraq's ministries in applying CBR safety and security. These include: INMA, the Department for the Treatment of Hazardous Chemical, Biological and Warfare Waste, the Iraqi Radioactive Sources Regulatory Authority, and the ministries of health, environment, the interior, defense, trade, finance, oil, industry, and agriculture.

Q. Does the ministry have specialized centers for training its cadres and staff from other ministries that deal with CBRN?

A. We suggest postgraduate programs for regular students, or a collaboration mechanism that would benefit government agency workers in CBRN. Both these approaches help build capacity.

Q. Has MOHESR formed a committee concerned with CBRN, and if so, what are its main activities?

A. In light of limited funding, it's difficult to establish centers

requiring modern devices or human resources and the facilities needed to meet the specifications required for work in this field. That's without the costs of send people to training courses inside and outside Iraq. We are starting to set up specialist research centers at universities and are awaiting funding to complete these centers and equip them with the necessary cadres and technology.

Q. Are there CBRN safety and security elements in the curricula for undergraduate and postgraduate studies in Iraq? How successful are they, and how relevant are they to

global developments in the field of CBRN?

A. A CBRN team was formed of specialist teachers from public and private universities and members of the R&D Department/CBR Safety and Security Division. Its most important tasks included site visits, following up on ministry formations, implementing CBR safety and security concepts, developing general CBRN policies, and providing full consultative scientific and executive support in troubleshooting CBRN issues.

We also now have a ministerial committee, which supervises the development of chem/bio safety

and security programs and projects. This is led by the deputy minister for administrative affairs and supervises the implementation of CBR safety and security projects.

Q. Do the Iraqi universities have an emergency plan on how to act in the event of accidents, especially biological ones? Is there cooperation between the Civil Defense Corps and the ministry of the interior's response teams?

A. Due to limited funding, the laboratories are not completely prepared, but we hope to increase the lab safety and security levels through site visits and guidance.



MOHESR collaborates with all of Iraq's ministries in applying CBR safety and security ©M. Delli

Advanced Safe!

Dr Hooi-Ling Lee, Associate Professor at the School of Chemical Sciences, Universiti Sains Malaysia (USM), talks to Gwyn Winfield about taking chemical safety to the next level

GW: You've been instrumental in bringing the Malaysian Qualifications Agency (MQA) accreditation in chemical safety into your institute. How did you get involved and what were you hoping to achieve?

HLL: MQA is the body that decides the accreditations for most degree courses in Malaysia, not just chemistry. MQA worked with the Malaysian Institute of Chemistry (IKM) and a few years back, MIC proposed to MQA that the chemical safety component should be compulsory in our syllabus. This meant it that should a be course by itself, rather than a briefing or informal workshops, so that the students weren't just aware, but really knew about it. They required the student to take the course, which would form part of the credit hours for the entire chemistry program. As it depends on the assessment, we decide to have it as 100% coursework with tests.

GW: Was there a need for improved chemical safety or was it just a gap that had

to be filled? How did you bring chemical security into the picture?

HLL: Sandia National Laboratories came to Malaysia and gave a workshop in 2019. We had a gathering of academics from different universities, and I was then Chair of the American Chemical Society's (ACS) Malaysian chapter.

I'd been thinking I wanted to champion chemical security, so applied for and got a chemical security program grant. We worked with the IKM to organise a workshop in Penang, because many science majors are located there. I reached out to Sandia National Laboratories for some trainers to come over, but to do that they also needed to develop a workshop. We obtained the US Chemical Safety Board¹ (CSB) Chemical Security Program (CSP) grant in 2019, and I was one of the trainers, having attended the ACS Global Chemists' Code of Ethics workshop in 2017, which was actually about chemical security.

We had other trainers at our 2019 workshop, like Associate Professor Dr Goh Choo Ta from the National University of Malaysia (UKM), whose background is chemical safety. Some workshop participants went back and embedded chemical security in their courses, such as a course for safety and security in sustainable chemistry. This was the first time we made a chemical security element visible in Malaysia, but it was not official. I thought, why not embed it in the research methodology course?

I then applied for the Fulbright-ASEAN, and returned to the US to collaborate with Sandia National Laboratories, because I know them well, and developed the module there. As educators my colleagues and I mapped it so that it is not too heavy for a first year undergraduate course, and that's why a lot of our assessment does not involve high order thinking. You provide a case study and let them consider why this thing happened. Where are the errors and what could we have done to overcome them? There are three parts to the course, basic knowledge of chemical security, analysis of the situation, a presentation element (how you communicate that knowledge to other people).

GW: What happens when the grant ends?

HLL: It ended after the workshop in 2019, but we are planning to

apply again this year. This time I'm the advisor rather the applicant as I am no longer Chair of the ACS Malaysia chapter and wish to nurture younger scientist to involve in this field. We are still discussing whether it will be the same or something different. Initially we wanted to do something similar, but we'll need to fit into what the CSP wants. I'll have to discuss this further with CSP or the Defense Threat Reduction Agency (DTRA).

There are a few people in the Association of Southeast Asian Nations (ASEAN) doing chemical security, though some of them started much earlier and have established themselves well. When I reach out to them it's a little challenging, because they have already got to a certain level but they're willing to communicate. Whether this turns into some kind of future collaboration has yet to be discussed. I've also reached out to the National Authority Chemical Weapons Convention (NACWC) Malaysia as they set up a scientific advisory board in 2020. It consists of academics, some from the Department of Chemistry in Malaysia, and if there is any discussion on this type of topic they'll ask our opinion. This committee is running some outreach programs and because of these my university became aware that I play quite a big role in chemical security, so a Deputy Vice

Chancellor at that time suggested that a committee is set up to look at the implementation of chemical safety and security management in our university.

I have established my team and we want to look at implementing chemical safety and security at USM level. It's not that the university doesn't have a chemical safety element, it just needs to be better organized. Right now it deals with safe waste disposal in the lab and proper PPE, but we want to encourage the university to actually carry out chemical safety and security. For instance, we might want to improve our procedures for the receipt of chemicals, starting from scratch. How do we track chemicals the moment they come into the university?

When I was doing my Fulbright I collaborated with a computer science lecturer from USM on a similar system for the final year project. We looked at incorporating safety and security into the chemical inventory software, setting alerts for schedule two or three chemicals etc. I am still working on that, with a pilot study in my lab as the school of chemical sciences has the most chemicals in our area. We want to look into the facility and develop a more structured way of monitoring the chemicals in the inventory.

Another element is raising awareness of chemical security



USM has worked with Sandia, and other agencies, to improve chemical safety and security ©Magnus Manske

for everyone in the university as many people are unaware of the difference between safety and security, thinking they're the same thing!

GW: Have you seen any police and law enforcement interest in your chemical security efforts? Where they could teach a module explaining to the students how chemicals and bad actors can create problems?

HLL: I've sometimes seen Sandia National Laboratories target police, fire and even enforcement officers from pharmaceutical sites, but as an academic I've never

joined those workshops. Thanks to the [Iraqi] CBRN conference one of the people on the international committee is from Interpol. He [Dave Hargreaves – see last year's magazine] reached out and told me that next year there will be workshops with various police organisations and invited me to join, as maybe I can bring in something as an academic. I'm quite excited as possibly the way academics present will be slightly different to technical trainers. I'm not saying I'm a good presenter, it's just how we tell a story so that the audience will understand it.

GW: Hopefully you'll be a catalyst for chemical security change in Malaysia. Perhaps by bringing people like Interpol, law enforcement and academia together, law enforcement will understand how they need to mesh with higher education to take an interest in problems that might arise further down the line?

HLL: Definitely! The research methodology in chemistry course with chemical safety embedded had the same intention. It slowly developed into a postgraduate course and became compulsory for all postgraduate research



Covid dislocated a lot of training and best practice ©M. Delli

students over a 5 year span. So hopefully this course might start with undergraduates and then become compulsory for any school with elements of chemistry, like pharmacy. Should it be taught in pharmacy courses? I don't have any say in the matter as we don't interfere with each other's syllabuses, but hopefully they'll see its importance and adopt it for their studies. There are other chemical security champions in respected universities, but they haven't gone full out as I have. They're a bit low profile, but given some motivation and resources, they'll champion it in their own universities.

GW: There was a 2004 survey on health and safety practices in the Malaysian education sector². With everything that you and others have been doing, would you like to see a new

survey? Have you seen any ideas about how much health and safety have improved?

HLL: That survey was not about universities, it was actually about high schools. There was another survey in 2020³, and one of the corresponding authors was, Goh Choo Ta, who I mentioned earlier. His PhD is in chemical safety, which is why he's a consultant for the government on that. When I look at his paper, I truly agree with the integrated way of monitoring, but for the undergraduate it might be a bit heavy. Undergraduates only need to know the basics, matters as simple as what PPE or eye wash they need. At high school it's even simpler, the last few years have seen an increase in passive education, with the teacher doing the demonstration to show the students. It's for budgetary reason. By the time students get to university some of the skills are

lacking. I believe that chemical safety should be taught in high schools, but it has to go together with practicals. If the practical slows down, then the safety information won't be emphasized. Luckily at university level it is now compulsory, but I am not sure whether it continues to be taught in the second year. At my university the students are exposed to chemical safety as soon as they come in, and as they develop through the practical lab work we continue to provide chemical safety briefings. By the time they reach year four they are truly aware.

GW: As regards the CBRN Safety and Security conference, what were you hoping to get from it? Are there existing bilaterals between your university and Babylon or are there government bilaterals? What were your aims and objectives?

HLL: I was invited to this conference by Dr Falah. Sandia National Laboratories organized a workshop in South Africa, when I had just finished my Fulbright-ASEAN attachment. They said why not present your work at the IUPAC Chemical Education Conference⁴ in South Africa and you can also join our workshop and share your experience. There were participants from Iraq, Libya, Somalia and Nigeria. So that's how I got to know Dr Falah, who invited me to join the international committee.

GW: Obviously you've made a good start with Interpol, are there other positives that came out of it for you? What did you find helpful?

HLL: I really appreciate that Interpol reached out to me, as I see them as something big. It never entered my mind that the international police would work with me. But I also hope that after my presentation people will contact me so I can share my experiences and they can design their curricula based on local requirements. Often things don't fit well because of local context or culture so finding ways to deal with that is important.

Michael Jones from the CSP will sometimes send email me, saying

this person from this country is interested in knowing about my journey. Part of my Fulbright, was a pledge to give back to the community, and sharing my experience is a way to do that. It's not easy to start from the beginning. You might have attended the workshop, but planning and execution is very different.

It's still changing as over a five year period chemical security has evolved considerably. It's not just pure chemical security but also things like insider threats and cyber security.

Those aren't necessarily related to chemistry, but they're the trend. People don't go and physically steal things anymore! It has a lot to do with organizational behavior, which as a chemist you'll never think you'd need to be aware of, but it's also exciting. The course progress is never ending learning.

Another thing is that most of the time this is not an academic's main job. We have our own research, but out of interest we invest a lot of time in this topic. You make associations with people, so when I see someone's CV, and I read a background in nanochemistry, I'm motivated to share.

GW: Will you be back for the eighth conference?

HLL: It depends on whether Dr Falah invites me. I'll be happy to share more of my experiences as I'll have more to share by way of challenges we've faced and lessons we've learned. For example, I've already seen that I'm somewhat ambitious, as sometimes the content is a bit too much for the students. As time passes you know what you can make easier and what needs more emphasis. Currently we emphasize a lot including health and the environment.

We're also bringing in online guest lecturers. One is the previous Undersecretary for the NACWC, and I thought that would give a different perspective without the student getting too bored. It can be a dry subject.

GW: Chemical weapons are not a dry subject!!

HLL: It's dry subject! It's very technical! I've been about making the assessment more interesting and activity based. Currently I'm testing the water with first year undergraduate students. They're so used to classes and exams all the time that if you make a sudden change, there might be a big loss. So that's something I can talk about during the eighth event.

¹ <https://www.chem-security-program.net/>

² <https://iopscience.iop.org/article/10.1088/1757-899X/257/1/012004/pdf>

³ <https://pubs.acs.org/doi/pdf/10.1021/acs.jchemed.9b00999>

⁴ <https://iupac.org/event/26th-iupac-international-conference-on-chemistry-education/>

Doctor, doctor, give me the news...

**Dr Souzan Eassa,
Assistant Professor
at the School of
Medicine at the
University of
Duhok, Kurdistan,
talks to Gwyn
Winfield about the
future threat from
pharmaceutical
based agents**

The history of chemical and biological weapons (CBW) is inextricably linked to the development of science. Long before microbes were understood invading armies realized that if you hurled diseased bodies over a wall or into a well, people became sick. Similarly, once people recognised that not all smoke was equal, invading and defending armies started using poisonous smoke, beginning around 1000BC. For some the apogee of this is the development of the Novichok A-series chemical weapons in the

1990s... but that is to miss part of the picture.

As suggested above CBW were first developed by chance, and trial and error, but then as science improved, by design. As science and industry blossomed through the 19th century it became evident that toxic substances could be produced on a scale previously unimaginable. This saw the Hague Conventions of 1899 and 1907, and the 1925 Geneva Convention, attempting to curtail interest in the development of



Kurdish forces have needed to train hard to defend against Daesh chemical attacks. Could PBAs be next? ©DoD

these substances, but as the Nazi organophosphate programme and subsequent work by Soviet and Nato scientists was to show, this was wildly optimistic. A source of optimism, however, was the Chemical Weapons Convention coming into force in 1997. This keystone legislation was to end research and development into chemical weapons, and the same was true of biological weapons via the Biological and Toxic Weapons Convention (BTWC) in 1975.

Science has now moved so far forward that the development of new CBW might, once again, be more by chance than design. Such is the pace of research that millions of compounds are being developed, in a search for positive applications, yet this might mask the potential for them to be used for ill. Either because they are damaging to the human body, or because our understanding of pathways within the body is so good, we realise that pushing a helpful substance in the opposite direction can make a harmful one.

For example, one of the most toxic substances we have, botulinum toxin, is now so well understood that elements of it can be neutralized and used in seven different types of medical treatment¹. This complex development path is not just limited to the substances themselves. Improvements in artificial intelligence and machine learning mean that a

researcher can feed requirements into supercomputers on Friday and come back on Monday to blueprints for substances that could kill and damage humanity in ways undreamt². Finally, within the CWC there is scope for legally developing chemicals and psychoactive substances for law enforcement or riot control purposes.

All these potential substances fall into the broad category of pharmaceutical based agents (PBAs). This category is currently dominated by the *enfant terrible*, fentanyl, a synthetic opioid used in anaesthesia, as a recreational drug, and as a weapon of mass destruction. It epitomizes the challenges to both responders and legislators, yet it cannot be banned, like VX, as it has too many clear beneficial applications. It poses an immediate danger to life and health, however. Its recreational use is killing tens of thousands of Americans every year, and it is constantly being encountered by law enforcement officers. If dispersed in a large enough quantity its impact on a crowd would be dramatic, resulting in many deaths, as seen in the 2002 Moscow theatre siege³.

Both through the terrorism of the Hussein regime, and then Daesh, Kurdistan has long and bitter experience of chemical weapons. PBAs offer terrorists, and others, the opportunity to circumvent

lengthy research, expensive facilities and staff. At the same time, some of the no mans land in northern Iraq, where Daesh still survives, offers liberal opportunities for toxic industrial chemicals (TICs), and potentially even first generation CWAs, such as mustard, that Daesh used in its previous campaign.

How then does the Kurdistan region balance the threat between potential PBAs and existing TICs? Dr Souzan Eassa, assistant professor in the University of Duhok's school of medicine suggested that much of the recognition of the threat PBAs pose was still held at an academic level, and had yet to reach down to responders. "Academics, chemists, pharmacists, etc, have a decent foundation, but in general PBAs are not well understood in Iraq. One of the reasons I wanted to participate in this conference was to learn more about them."

As mentioned above the fentanyl analogues are the most current PBAs, but for many countries these are an American problem. Had Dr Eassa noted any discussion on these threats within academic circles? "We should always be prepared for those and any other risk situation. We need to further understanding, however, and the stream B PBA workshop at the seventh CBRN Safety and Security Conference was helpful, but these awareness campaigns must be strictly

supervised. Even so, it's a two edged sword as too much awareness increases the risk. There should be ethical and research committees in place through which proposals on some of these agents must be submitted and approved. We need to reinforce this in Iraq, we have them on paper, but they are not applied or effective."

The problem with PBAs is that they are so broad, that unlike with CWAs, it is very difficult to set up schedules to ban research in certain areas. There are national focuses, as the US has on fentanyl, and sometimes there are biases dependent on national and regional academic excellence. Should this national prioritization of threat - what Iraq should be worried about - develop organically as cases come to light, or does Dr Eassa think that the international order should provide the country with some direction? "I think we need assistance from the international community on setting priorities and helping us change, especially when it comes to expert guidelines and policy formation. Those will be beneficial as we don't currently have a lot of experience with this. It would be very important to have them lead us and provide guidelines in terms of policy and regulation."

She agreed that Daesh with its interest in chemical weapons continues to be a problem, especially after the legacy of Mosul. " We are a country always expecting some kind of disaster. Whatever chemical they can use they will. The chemical store in my previous college, the College of Veterinary Medicine in Mosul, was raided and all the chemicals removed. During the fighting, the site was destroyed completely, so we have no idea what is missing or destroyed. We can never be too sure about such situations and the matter should be not taken lightly. A balance is needed between secure borders and monitoring and having enough freedom for people and research."

One of the things that Dr Eassa took from the conference was the opportunity to meet people and organisations facing similar challenges across the region. For example the Lebanese army was represented at the event, and she hopes that there might be closer bridges between the two areas that build on this year's iteration. She feels that this event is making concrete improvements to the security situation and also suggested that the conference did good work in raising awareness at multiple levels and that this should continue. "Those in academia must be made more

aware of CBRN issues and take appropriate action. Secondly the public needs improved understanding so that people can take the necessary precautions if they come into contact with these agents. Finally the government, which is responsible for security and legislation, must move forward with preventive measures and guidelines.

"Once I return to my college I'll be writing a report to my dean asking him to recommend several staff in regards to the biosecurity of the chemical stores in our health labs. I will also ask for help in presenting a workshop for our students and teachers, to raise understanding of these agents, including the pharmaceutical ones."

Raising awareness of PBAs is vital, since it will be the health scientists that inevitably get the call as to what it might be, when an unknown agent is released. The ability to recognise that chemicals that cure us can also kill us if pushed in the other direction is vital when putting together a medical response to save lives. We are all going to have to live with the challenge of PBAs, but it looks like Dr Eassa and the Kurdistan region is moving in the right direction to ensure they won't be surprised.

¹ <https://pubmed.ncbi.nlm.nih.gov/28356439/>

² <https://www.nature.com/articles/s42256-022-00465-9.epdf>

³ <https://www.bbc.co.uk/news/world-europe-20067384>

Training day

Brigadier General Eng Alzubaidi speaks to Zoe Rutherford about the Iraq Federal Police's CBRN capabilities

The federal police are the best equipped and trained of Iraq's police forces. They respond to domestic incidents beyond the capabilities of the police, but not severe enough for the army. In this they are expected to wear many hats, and fulfill many roles across a range of specialties. At the International CBRN Safety and Security Conference BG Eng Saad Khleef Alzubaidi, director of the Iraq Federal Police's CBRN department spoke to us about its CBRN capabilities, training and response.

ZR: Can you tell me about the state of the federal police's CBRN capability?

SKA: The CBRN Department of the Federal Police provides support against attacks and CBRN incidents in all departments of responsibility in formations and units in coordination with the CBRN incident response teams of the Directorate of Civil Defense in Baghdad and the provinces by

conducting early detection and reconnaissance operations and opening disinfection stations.

However, we lack chemical equipment and supplies to combat CBRN. That is why, during battles, we ask for the civil defense teams to support us with the required CBRN equipment and supplies, having been excluded from the necessary resources to



The Federal Police provides support to the Civil Defence CBRN forces ©M. Delli

support our CBRN team. What we have been using is our officers with their own experience in chemistry, along with the civil defense teams' supplies and equipment. We merged them together in order to combat the CBRN threat and thankfully it was without casualties.

ZR: Do the teams also have special weapons and tactics (SWAT) capabilities?

SKA: Our main responsibility as federal police is SWAT for rapid response. We also have a separate, independent directorate for SWAT.

ZR: What training has the CBRN police unit done with Interpol and other organizations?

SKA: We haven't had any type of support or joint training with Interpol or any international organization. The reason why, and this is linked to the first question, is that our CBRN federal police are inactive forces, not put into action. But a battle situation obligates us to enter the fray. The civil defense teams are accredited internationally as CBRN capabilities, we are not. That's why we don't have the resources or the equipment and supplies, and why we didn't get any training from international organizations, but we need this type of capacity building.

ZR: What was the unit's mission during some of the Daesh bombings and hazmat incidents?

SKA: Regarding the battle against

Daesh, the civil defense teams do not have combat units, so they provided us with their CBRN equipment and supplies, as we are officers and already combat units. That's what our role was, to go into combat areas and perform decontamination and purification of those areas. It is very easy for us to cooperate with the civil defense teams because we're under the same ministry of interior umbrella. Whenever there is a requirement to go into combat territory, we cooperate with the civil defense teams to do our job.

The most important of our activities is assigning our sectors the duties of liberating areas that were under control of terrorist groups, in coordination with the CBRN incident response teams of the Directorate of Civil Defense, which are present in those areas, by providing protective masks, opening decontamination stations, and field training during the battle.

ZR: What does the unit's capability consist of? Is it chemical and radiological or is it mainly chemical?

SKA: We do all CBRN. What we have done is, after receiving the security file for the capital, Baghdad, and the provinces by the MOI, coordination efforts have been made with the CBRN Incident Response Section in the Civil Defense Directorate and the response teams associated with it

in Baghdad and the provinces for joint CBRN work within the cities.

ZR: How was the unit deployed and utilized during the Covid pandemic?

SKA: During the time of Covid-19, we were deployed in civilian populated areas for decontamination and purification activities. We were also deployed to hospitals within our federal police sector, as well as shopping malls and supermarkets. We conducted these activities using our own vehicles. This was an initiative we undertook, to have a chemical disinfection unit built to high specifications to complete such duties. It enables us to provide rapid response decontamination capabilities.

ZR: Have you and the team undertaken any initiatives in the past couple of years that you are particularly proud of?

SKA: Naturally, we take pride in having defended against chemical attacks during the Daesh battles, and this defense was really successful. At the same time, we are proud of our part in the decontamination of the factories that exploded, some of which had toxic gases on site. We were also able to distribute gas masks to civilians and forces in those territories.

ZR: Training courses have been opened for chemical offices and guides at the team's headquarters. Have you found

enthusiasm for these courses, and are the attendees enjoying the content?

SKA: The CBRN Department of the Federal Police believes in raising the training capacity of the leadership of the Federal Police Forces through the training curricula of the courses, the preparation of chemical teachers, and how to deal with CBRN accidents, in cooperation with the CBRN teams in the Directorate of Civil Defense in order to ensure their safety from its impact.

The attendees of our courses are very enthusiastic actually, because it's a new experience to them. They are very eager to learn more and more, because they've been suffering in many of the missions they've undertaken due to lack of

training. So now they're very enthusiastic, it's the only kind of training where I find my officers wish that the lecture would never finish, they want it to last forever! They are keen to learn more about this work because CBRN weapons are the only type of weapons that can be defeated by knowledge and education.

ZR: Are there any specific training courses coming up in the next six months? Would you like to address any specific priorities through training?

SKA: One of the things we have faced difficulty with in the past, and I don't believe it will happen again, is that our officers have tried to be self-sufficient, maintaining a situation, while defending against chemical

attacks. Under enemy fire, they were trying to be both CBRN officers and combat officers, simultaneously. This is extremely unlikely to happen again, so our training focus in the next six months is to have worst case scenarios and to teach them about how to deal with them.

ZR: What are your priorities for the force in the next year, what would you like to achieve overall?

SKA: Our prime priority is to have a standardized force, just like the Ministry of Defense and Civil Defense. Also, we want standardized CBRN units, like other international forces, because the federal police are deployed in populated areas, so we need standardization.

ZR: How valuable do you find events such as the International CBRN Safety and Security Conference to you and your forces?

SKA: I consider this kind of event very valuable for the non specialists. For example, the federal police have CBRN, the civil defense have CBRN, the ministry of defense has CBRN, we are all experts and professionals. But for other ministries such as higher education, health, and environment it is important for them to get acquainted with CBRN affairs both nationally and internationally, so that they can learn and play their roles in supporting us, the CBRN specialists.



Gen Alzubaidi's men are keen to have more CBRN training ©M. Delli

Changing the aim point

Lt. Gen. Abdul-Wahhab Al-Saadi, Head of the Counter Terrorism Service on keeping Iraq safe in a difficult global environment

Q: What are the strategic threats to Iraq?

A: There are a number of risks.

1. Terrorism is a primary threat to the Iraqi government and people and is the main field work of the agency in accordance with Law No. 31 of 2016 as amended and agreed in cooperation with other ministries and security agencies.

2. Money laundering and the financing of terrorism are the pre-eminent economic security risks. These enable the continuation of terrorist operations, so the ability to interdict these financial transfers in a disciplined manner, to track them, and examine the commercial mechanisms that allow them to spread corruption [is important].

3. Financial and administrative corruption constitutes an enormous danger as it provides an environment which will sustain terrorism and allow the further development of its capabilities. Such corruption also disrupts civilian development projects and is a waste of national wealth.

4. The recruitment of terrorists is a risk [exacerbated by the] broadcasting and spreading of extremist ideological thought. This is practiced by preachers, via speeches, and jihadi chants.

Digital spaces and social networking sites are used as a primary means of recruitment.

5. The families of ISIS terrorist gangs constitute a strategic threat to the Iraqi government in terms of terrorism, its causes and how to deal with it. These are a dangerous incubator for the growth of terrorism and encourage revolutionary activities.

6. [Terrorist prisoners coexisting with others] in prisons is a risk as prisons are considered a means of recruitment and spreading extremist ideology. If this isn't dealt with prisons may become academies for these organizations.

7. Extremist sectarian discourse. The absence of moderation among some forces and individuals plays an active role in the development of terrorism by implanting sectarian notions rather than national identity in the minds of citizens.

8. Forced displacement [or the possibility of it] constitute a threat. Such operations may have prompted a desire for revenge in some areas, which if it was for sectarian purposes, would have shaken people's confidence.

9. Finally, information security. This may constitute a danger to Iraq at the strategic level, as

cyber and electronic security have become a major factor in electronic warfare, especially in regards to state systems.

In terms of threats Iraq has several priorities. The first is border security, which poses a significant threat in the country's battle against terrorist organizations and their affiliates. Some relationships with neighboring countries are tainted by security interests, and this weakness leads to the influx of Arab and foreign terrorist organizations. Previously this has made Iraq a gateway to terrorism and a hotbed of extremist ideas. Also the lack of border control facilitates smuggling, which can have a huge economic impact on the country.

The next priority is provocative media. This is one of the great threats because it leads to the revival and growth of terrorism at national, regional and international levels. It constitutes an opportunity for marketing terrorist ideas, ideologies and deviant concepts and takes advantage of technological developments. It also assists in sectarian entrenchment and makes Iraq a liquidation arena for international accounts. This interference may be direct or indirect and takes multiple forms, including economic and political ones. It fuels the flames of terrorism and can relate to a negative external impression.

Finally there's the possibility of terrorists possessing non-conventional weapons. Terrorist organizations in Iraq have previously possessed chemical and biological weapons having utilized expertise gained from the previous defunct regime's manufacturing activities. Even if simple, such weapons attracted them because they correspond with their extremist doctrine based on killing, destruction and lethality.

Q What lessons have you drawn from current international conflicts, such as that in Ukraine, and how have they contributed to the development of national policies and the higher decisions that will enhance security in Iraq and the region?

A: Iraq is part of the international system and an active member of the UN. As such it may be impacted by activities affecting the regional and international environment, like international conflicts. Even if they do not cause material, economic or political damage to Iraq, these conflicts can have an indirect impact on security and the economy.

The scarcity of oil and gas, and high prices in the EU have a positive impact on the Iraqi economy, given that Iraq is a strong player in Opec and that over 90% of it's budget depends on oil exports. But the decline in the grain trade, wheat in particular, and other foodstuffs

produced by Ukraine, has had a noticeable negative impact on Iraq's economy given that it is an importer of foodstuffs and grains.

We are also seeing a decline in terrorist organizations, such as ISIS in Iraq, as they attempt to move fighters to support the Ukrainian forces. This shifts the risk level from those elements from Iraq to Ukraine.

In addition to the specifics mentioned above, there are also general repercussions. One of these will be the effect of the war on the world as a whole, and the possibility of a Third World War as many foreign and European countries mobilize their military, logistical, technical and intelligence capabilities. Another is the change in American redeployment policies towards Europe. The Biden administration has reconsidered US military deployment plans around the world, especially in areas affecting the Russian and Chinese poles of influence. There are also global repercussions at individual and population levels, especially in poor countries due to a reduction in aid and a diminution of the labour market resulting from the coronavirus pandemic from which the world has not yet fully emerged. The impact of this epidemic on the standard of living, particularly in poor countries, continues.

The Russian invasion of Ukraine, will also lead to further

strengthening of Russian military and naval superiority in the Black Sea and its control over this region. But it has delivered various Russian losses. These include human and military losses in combat operations. Economic losses have been due to US and Western sanctions on the Russian economy, which affected many Russian sectors, including oil and gas, the freezing of assets, the collapse of commercial banks and supplies, and the obligation on many US allies to implement sanctions. Political losses are due to Russia's present isolation from the international community, which leave it more isolated than it was even during the cold war.

It has also resulted in Ukrainian losses such as the impact on the economy and the destruction of basic infrastructure. The aim has been to destroy military sites and civilian targets, and Ukraine's communications infrastructure has also been targeted. Most Ukrainian ports and airports were closed as a result of the damage, and many roads and bridges were either damaged or destroyed. The closure of its Black Sea ports has impeded the movement of maritime transport, and the Ukrainian government tried to send agricultural goods to neighbouring European countries by rail, replace sea transportation, before it banned the export of many agricultural commodities. Although it is difficult to determine the extent of material

damage in Ukraine because the war is ongoing, initial estimates indicate that at least \$100bn of infrastructure and buildings have been destroyed.

Feeling is growing among the political systems of the Middle East about the decline of US policy in the region. There is a tendency within some Arab Gulf countries, especially Saudi Arabia and the United Arab Emirates, to move away from the American pole in favour of the Russian one. They are opening channels of communication, coordination and sponsorship of interests with those countries at the expense of American interests in the area.

Q Do you think the international bodies are as committed to Iraq as they were at any time in the past?

A: Since the beginning of the new regime Iraq has been under the auspices of the international coalition forces. The US and some EU countries have supervised its rehabilitation, training and arming. The foreign forces present have now turned to advisory and training tasks and we are continuing to coordinate with their teams. US and Nato forces continue to supervise some training, give advice, and provide simple requirements that can be considered an addition to the Iraqi counter terrorism capabilities, to help achieve positive results.

Q ISIS is a terrorist organization that may resume its activities. What are the improvements in the field of countering chemical or biological weapons, if they try to use these prohibited weapons?

A: Iraqi counter terrorism works hard to collect information about terrorist organizations and especially ISIS, wherever they are, and to pursue them in valleys, caves and mountains or any other shelters. Our information does not indicate current attempts to obtain advanced weapons or chemical or biological weapons. We are tightening the screws on the organization, arresting its leaders, killing others and cutting off funding, [affecting the] ability to develop its capabilities at the present time.

Q: What are your suggestions for developing international conferences on security and safety? How could these recommendations be activated and achieved?

A: Qualitative conferences related to security and safety are of great importance in building and developing capabilities to challenge and combat terrorism. The decisions and recommendations that result from these conferences are an important work guide for us in developing the activities of the agency to be in line with international trends in the field of combating terrorism.

Providing better intel

A member of the Iraqi National Intelligence Service on working closer together

Q. Can you tell us what are the major challenges to preventing any CBRN incident?

There are two very important challenges. The first is controlling the transfer and circulation of raw materials used in the manufacture of non-conventional weapons locally and internationally. Second is identifying and neutralizing members of terrorist groups with scientific knowledge and the ability to manufacture non-conventional weapons and promote them through internet sites.

Q. What approved policies and plans do you have to deal with this?

The Iraqi National Intelligence Service works to maintain communication with local and international training institutions to update information and train cadres. This is in addition to carrying out scheduled practical training for the agency's CBRN team, which is responsible for protecting the agency's institutions in this field and providing them with modern devices and equipment.

Q. Dealing with CBRN networks requires the coordination of Iraqi national institutions. How do you map this progress?

We communicate with the various Iraqi institutions and ministries concerned with CBRN matters through accredited representatives in those institutions. Information is circulated and exchanged at meetings and workshops, to neutralize any possible incident.

Q. What kind of international collaboration do you have that assists in this mission?

International bodies support our national institutions in various fields, including scientific ones. This is achieved through workshops and specialized courses in this field inside and outside Iraq, along with logistical support that involves providing some Iraqi institutions, including the intelligence service, with specialized equipment. The international community collaborates with the Iraqi National Intelligence Service by providing information. We

cooperate with foreign agencies regarding the exchange of information on non-traditional materials and in various fields.

Q. Are there selected programmes that you would highlight?

We have been automating the lists of international and local dual-use materials and making them accessible to Iraqi National Intelligence Service officers, especially those serving at border crossings, so that those materials can be detected early. We've also been developing the devices and equipment used by this service's CBRN team, and providing individuals with training and exercises.

Q. Do you have specific proposals on how you are going

to further develop intelligence cooperation and coordination?

At the national level we are going to create an operations room that includes representatives from security and intelligence institutions, as well as technical institutions. This will carry out interim assessments depending on the type of threat. We are concluding cooperation agreements with other countries in our region to exchange information on the movement of non-traditional and dual-use materials. Finally on the international level we are strengthening cooperation with specialized international organizations such as the Organization for the Prohibition of Chemical Weapons, the International Atomic Energy

Agency, and the International Organization for Biological Sciences. We are activating Iraq's role in them by naming specialized representatives from the relevant Iraqi institutions so we can quickly obtain data on the movement of devices and non-traditional materials.

Q. What conference themes do you think we should develop and how can we implement them?

It will be important to align conference topics with the interim challenges. We should take the opportunity to explain some real CBRN incidents with suggestions of how they could have been better dealt with and improved procedures for doing so. We should also host international experts and academics specializing in CBRN.



The Iraqi National Intelligence Service have been developing devices and equipment used by their CBRN team ©M Delli

Building networks

Hamid Al-Shatri, Head of the Iraqi National Security Service, explains how they are stopping CBRN attacks

Q. The role of the Iraqi National Security Service is very important in stopping CBRN incidents before they occur.

What are the most important challenges that you think we should be prepared for?

A. These challenges are threefold. First is the use, or circulation, of biological agents or toxins by terrorist organizations or smugglers. Secondly there's illegal trafficking of radioactive and nuclear materials by similar actors. Finally it would be exchanges of chemical agents.

Q. What policies and plans have been adopted by the Iraqi National Security Service to develop the capabilities of partner individuals and institutions so that the level of readiness matches the challenge?

A. The general policy is to create an Iraq free of illegally circulating CBRN materials, and to prosecute anyone that might try to distribute such materials. Our strategy is to intensify the training, plans and programs for intelligence operatives through

coordination and joint work with the relevant state institutions. If we can develop the capabilities of our staff to identify CBRN factors then we can build trustworthy relationships with other national institutions. It is equally important to build networks beyond our borders, by signing memorandums of understanding, so that we can exchange intelligence and information. These requirements were included in previous safety and security conference recommendations.

Q. How do you develop a coordination map between the various Iraqi national institutions to develop preparedness capabilities?

A. We achieve national coordination by working as an integrated team to implement the national strategy and any plan that might emanate from it. The national strategy is sponsored by the Iraqi national security adviser and through him we have joint operations rooms linked to response teams who can apply CBRN measures.



The National Security Adviser has joint operations rooms linked to CBRN response teams ©M. Delli

Q. How do you assess the international interaction and support for the national authorities working to address CBRN incidents in Iraq in general, and the participation of the Iraqi National Security Agency in particular?

A. There is serious, continuous international support on this aspect, but it is small in comparison with the responsibilities of the Iraqi National Security Agency, especially in intelligence programs, and development and equipment programs.

Q. What programs do you suggest will develop the responsibilities of your agency and its affiliated CBRN safety

and security response formations?

A. Training on programs dealing with information about CBRN risks, particularly with regard to cybersecurity and penetration, will be a great help. The same applies to practical exercises in intelligence work, especially with regard to biological security and limiting illegal trafficking in CBR materials. It would be good to set up scenarios and see what might well happen, and then work up preparations and plans, in conjunction with other countries that are experienced in this area. It is helpful to develop such scenarios in case they arise and anticipate responses.

Q. What would you suggest will help in developing the

intelligence cooperation and coordination that is needed to deal with CBRN incidents?

A: Useful, high-level coordination exists between our institution and other national bodies. Currently we are assigned to head the intelligence team for CBRN response. This is for the purpose of addressing such incidents before they arise or mitigating them if they do happen. We believe that national intelligence needs to be part of regional and international intelligence through joint cooperation protocols and advanced intelligence programs. This could be through Interpol, the Organization for the Prohibition of Chemical and Biological Weapons, the International Atomic Energy Agency or other related organizations.

Q. What would you propose to develop security and safety in CBRN and how can these recommendations be achieved?

A. We need to bring together regional and international scientific and responder elements to deal jointly with CBRN events. I would also recommend more coordination in accordance with laws and instructions. At the international level, there has to be more interaction between regional and international partners, especially in terms of information sharing and specialized intelligence training. This will result in information exchanges, experience-building and joint work agreements.

Defeating terrorism and organized crime

His Excellency Qassem Al-Araji, the Honorable National Security Adviser's answers questions about developing requirements

Q. What are the most important challenges facing Iraqi national security in the context of the possible use of non-conventional weapons by terrorists?

A. There is a major possibility of new terrorist activities in the region, especially on the Syrian side. This coincides with terrorists insisting that they will carry out their criminal acts using chemical substances and, if they can develop them, biological ones too.

We have a growing number of cases of illegal trafficking in CBRN materials. This is due to the absence of an international and regional strategy to develop joint procedures to prevent non-state actors from accessing WMD and related materials, and using them for terrorism.

There is also poor coordination between the regional and international authorities, who are responsible for joint planning and response to any terrorist attack using CBRN. Realistic training scenarios are needed to enhance the response to any CBRN emergency.

Additionally, regional and international plans to coordinate the intelligence effort are lacking.

This is despite the fact that global intelligence confirms the CBRN intentions of terrorist groups, and their endeavors to obtain these materials. These intentions need to be countered by training and equipment for detection and response, but there is not enough support from international agencies in providing it.

But it isn't just terrorism. We are seeing a nexus between the activities of terrorist groups and organized crime gangs, in the areas of drug and human trafficking, and dangerous materials. Weak border security therefore constitutes a hole in our armoury for combatting terrorism. It leads to the revival of smuggling and the entry of materials used in non-conventional weapons.

Thanks to the Iraqi security forces' military victory over Daesh, it is now difficult for them to wage battles directly. So, many indications show that they are increasing their attempts to obtain unconventional weapons, and use them against civilians and security forces. It is worth remembering that this organization has previously made many attacks on civilians using chemical weapons.

We also have to tackle the use of social media for disseminating methods of manufacturing chemical and biological materials or for accessing black networks to obtain these materials. Social media generally is an issue as many satellite channels can still be used to incite violence, despite the fact that they are owned in countries that fight terrorism and support democracy! These constitute a forum for marketing terrorist ideas, ideology and deviancy.

Q. What are the most important strategies and policies that the National Security Adviser (NSA) has managed and developed to support other national agencies in their work to address CBR incidents?

Probably the most important is the National Strategy for Chemical Security in Iraq. The head of mission for this, and also the NSA of the National Center for Shared Planning is Dr Ali Abdul Aziz Al-Yasiri. The approved mission and vision for this strategy is to prepare the national policy for chemical security in Iraq so it delivers safe management to deal with chemical security challenges and the requirements for developing the sector.

The national strategy also confronts the threats of WMD in Iraq. It reports on the level of readiness of the authorities concerned with dealing with CBRN accidents (2016–2017), and the requirements for supporting and developing the national CBRN response teams.

Also important is organizing and standardizing the national context for the roles and responsibilities that support the CBRN teams' requirement development, and other supporting bodies at national and international levels. The purpose is to unify the national vision and deal with field requirements, command, control and capacity building, and activate the supporting CBRN agencies.

The NSA is further involved in mechanisms and controls for issuing import licenses for chemicals and dangerous materials, as well as following up on end users. Dr Ali Abdul Aziz Al-Yasiri heads the mission and is in charge of the Hazardous Materials and Equipment List Update File - List (16S) and List of Dual Use Materials (32S). These update the list of hazardous materials prepared by the Diwani Order Committee (16S) for 2009, according to Iraq's security and economic requirements.

Additionally, Dr Al-Yasiri heads: Iraq's national strategy for integrated border management; its national strategy for combating terrorism; the national policy for transporting hazardous materials;

and the annual international conferences on CBRN safety and security, organized through a joint working group. He is head of the permanent secretariat for developing the readiness of Iraq's CBRN teams, directly coordinating with the organizing committees for the academic aspects of the ministry of higher education and scientific research, represented by the University of Babylon.

He is involved in the formation of a permanent secretariat to develop the readiness of the CBRN teams and their governing bodies, which encompasses two complementary levels of work. The first is command and control, including decision-making, development of strategies, policies and plans and their activation. The second is the high-level technical team to determine field requirements, executive management, technical and training requirements and identification of appropriate equipment.

Dr Al-Yasiri also heads the permanent secretariat responsible for the readiness of Iraq's CBRN teams, which is involved in developing equipment and training requirements for military and civil response teams. He does the same for the intelligence team and other authorities in Iraq. This raises the readiness level for CBRN incidents and takes advantage of the potential of the Iraqi Military Industrialization Authority and any international effort. By building coordination mechanisms among

relevant national institutions, we can develop, activate and invest national capabilities to support field efforts by any of the response teams or supporting agencies like laboratories or universities.

Q. How are you developing the readiness levels of the national authorities for dealing with CBRN security and safety requirements via the national center,?

A. The NSA's office organizes the national effort of the main and supporting authorities through a set of activities, meetings and field visits that was jointly identified under an eight-part task framework.

First comes the national committee for leadership and development of CBRN teams in Iraq, headed by the ministry of interior's Directorate of Civil Defense (general and membership of the bodies specified with the tasks of the committee in Paragraph E - i - III) of national security council resolution 34 of 2018. Next is the civil response team to CBRN incidents at national level, headed by the ministry of interior's General Directorate of Civil Defense. Third is the national level military response team to CBRN Incidents lead by the Ministry of Defense's Chemical Class Directorate.

Fourthly, national strategies, policies and plans are prepared via the national security policy adviser and the director general of the National Center for Joint Planning

who, as head of the national teams, prepares and updates policies and tasks, and activates them in cooperation with the authorities responsible for implementation. Fifth comes the intelligence effort, headed by the Iraqi National Security Service, with membership in the Iraqi National Intelligence Service.

The next task concerns formal exchanges between the international support bodies, diplomatic missions, and the NSA's permanent secretariat. This incomes under the Ministry of Foreign Affairs, which is responsible for communicating with other countries, international organizations, and diplomatic missions.

Seventh, the national oversight authority to prevent proliferation (the Ministry of Higher Education, Science and Technology), coordinates with the relevant international authorities for the requirements of this task.

Finally, a large number of agencies implement, support and assign priority and responsibilities to these tasks. The agencies include the General Civil Defense Directorate, Criminal Evidence Investigation Directorate, and Explosives Control Directorate, etc, at the Ministry of Interior.

These long term efforts to develop the readiness of the national teams have been coordinated at a high-

level to achieve a national policy and strategy, and further developed by the permanent secretariat, with a membership representing all the parties mentioned above. The secretariat is firstly tasked with coordinating all preparatory procedures and requirements that are necessary to hold international CBRN conferences in Iraq. Secondly, it is about developing the CBRN readiness of the military, civil response teams and intelligence teams as well as other supporting authorities. Finally it has to develop coordination mechanisms enabling national institutions to improve national capabilities in the response teams

Q. How does the NSA assess the international effort supporting the Iraqi authorities in developing their capabilities? What are the proposals for advancing the supportive international effort to achieve common goals?

A. The NSA greatly appreciates international efforts to strengthen Iraq's capabilities. The US is the main partner for supporting and equipping the response teams, and thanks to its defense and state departments we have been able to equip and train the national CBRN response teams. The US has also supported our processing laboratories to allow them to develop and enhance their CBRN safety and security, and has assisted in developing more secure borders.

We are still seeking to develop our relationships with countries or

organizations that are combating terrorism and organized crime. In particular, we'd like more support in boosting the readiness level of our CBRN teams, especially in terms of preparing plans, training and detection equipment. We want to confront these terrorist challenges by strengthening international enforcement of the UN mandate, which criminalizes all forms of support for terrorist networks, including ISIS.

Q. How would you propose to develop the themes of the global conferences on security and safety, the CBRN, and how can the recommendations they issue be activated and achieved?

We'd like to increase the level of participation in conferences at national and international levels. It's important to emphasise the need for professional training for members of the permanent secretariat, a hub for establishing field techniques that can be used by the national team and other response teams in the region.

The outputs and decisions of the seventh safety and security conference need to be formally approved by a joint report prepared by a specialized team under the security policy adviser. We look forward to further support in implementing these recommendations, especially in terms of capacity building and appropriate equipment.

National champion

Engineer Mohamed Sahib AlDaraji, President of the Defence Industries Commission on developing Iraqi CBRN technology

Q. How are you planning to develop the Iraqi military industries that can support the security services in confronting terrorist organizations?

A. The Defense Industries Commission (DIC) has drawn up plans to develop our defense industries to face the magnitude of the current challenges, expanding our production and manufacturing capacity for military equipment. This will meet international conditions and specific standards.

We will identify the appropriate solutions so that the competent ministries gain trust in local producers, and obligate them to encourage industry to deliver solutions that match imported products but at a lower cost.

Q. Does the DIC have production lines for CBRN response requirements? If they don't currently exist, do you have any suggestions?

A. We are developing production lines for CBRN response

requirements, and are currently introducing the manufacture of safety and protection equipment for such purposes as decontamination or pollution removal. We will continue to develop these to meet Iraq's needs in accordance with international conditions and standards, enabling our CBRN teams to combat any incidents that might occur.

Q. What are the mechanisms for concluding memoranda of understanding (MOU) between your organization and international companies, especially those manufacturing equipment for CBRN incidents?

A. MOU mechanisms could be adopted with international companies manufacturing CBRN response equipment. That will be achieved through meetings and communications with these companies, looking at their products, holding international exhibitions and by attracting all types of manufacturers. We will encourage them to exhibit their

products for our response teams to see, and work towards establishing production lines for such specialized equipment.

Q. What is your vision in dealing with the type of unconventional weapons that may be used by terrorist organizations? What are your suggestions for controlling them?

A. The DIC has a clear vision as regards handling non-conventional weapons, which is to provide equipment that will enable us to manage these weapons. We want to develop production lines, attract those with expertise and knowledge in manufacturing protection equipment, and provide a proper work space for this expertise. By doing so we can control terrorist groups and prevent them from using non-conventional weapons, or at least safely dispose of such weapons.

Q. Is inadequate border security a contributory factor in relation to weapons and equipment gaining illicit entry?

A. Border security and border controls to stop the transfer of weapons and equipment is a complicated topic that needs collaboration to meet all the requirements. Attention should be given to border crossing procedures, and developing the security teams, providing them with advanced equipment that can help control the border and prevent

the entry of materials and weapons that lack the necessary official importation permits. We need to be

able to counter smuggling efforts using tethered balloons, thermal cameras and drones.



DIC is developing production lines for CBRN response in things like decontamination ©G Winfield

Making stronger institutions

Nizar Amedi,
Honorable Minister
of the
Environment,
answers the
questions of the
Prime Ministry /
National Security
Adviser

Q. What are the most important challenges facing the Ministry of Environment in developing its commitments in the field of chemical and biological safety and security?

A. The first of these is implementing the radiological examination procedures at our border crossings. This will see us installing ionizing radiation detectors at the examination gates, to monitor attempts to smuggle nuclear materials or radioactive sources into the country and enhance our border intelligence and security. The result will be to shut down smuggling or trafficking of radioactive materials.

We also look forward to many government and private entities achieving compliance with environmental radioactive regulations and legislation. These will generate a situation whereby it is impossible to enter Iraq, or transfer and circulate ionizing radiation sources, except under the control of the the national radiation regulatory body.

The filing of radioactive contamination is a major challenge to prevention, safety and environmental radiation safety,

and we need to accomplish it faster. There has been a delay in identifying sites for storing and burying radioactive waste in accordance with the national strategy for radioactive waste management, which is based on International Atomic Energy Agency (IAEA) standards. This makes such waste vulnerable to tampering or vandalism. We also lack qualified and trained technical staff who understand radiation, its prevention and response to emergencies that may arise, either through improper handling or terrorist use of nuclear materials and ionizing radiation sources.

The ministry has not been allocated sufficient funding to enable its technical departments dealing with radiological, chemical and biological risks, to properly perform the tasks assigned to them under today's laws. Finally there is an overlap of tasks and powers between the government oversight agencies and the National Authority for Nuclear and Radiological Control, which requires legislation.

Q. What are your ministry's approved policies for developing aspects of CBRN safety and

security, capacity building, studies and research?

A. In terms of safety and security, our laws on environmental radiation protection and the instructions issued for the Radiation Protection Center's (RPC) work are currently being applied. Regarding capacity building, we are sending our technical staff to training courses, workshops, and internal and external conferences organized by various parties, including the IAEA. Where CBRN research is concerned, we are reviewing various international research bodies, led by the IAEA. We are also preparing studies and research related to developments in the regulatory institutions around follow up and control of all activities that result in ionizing radiation.

Q. Do your institutions have preparedness programs and contingency plans for chemical, biological, radiological and nuclear accidents? How do they work?

A. The environment ministry and the RPC have plans for responding to radiological and nuclear emergencies that may occur in institutions working with radioisotopes. We are also prepared for radiological and nuclear emergencies that may arise as a result of cross-border nuclear or radiological threats due either to operator errors or terrorist/military events. Special teams have been set up to implement these plans,

including reconnaissance, survey and decontamination.

Our specialized technical personnel are going on virtual exercises, practicing our emergency response plans for radiological and nuclear accidents. We are also licensing our radiological or nuclear emergency plans for governmental and private institutions that work with radiation to ensure they meet requirements.

Q. What programs are you proposing, to develop your ministry's responsibilities and its formations in terms of responding to security and safety incidents?

A. The ministry and the RPC are represented on the national CBRN team, which responds to incidents. Regarding the proposed programs, we are strengthening radiological monitoring at border crossings and holding virtual exercises in responding to accidents, should



The ministry has not been allocated sufficient funding to enable its technical departments to deal with CBR Risks ©M. Delli

they they occur. Our teams are currently training with international bodies in the CBRN arena to improve their responses, and we are also enhancing general societal awareness of CBRN incidents.

Q. What is the ministry's vision for developing its CBRN capabilities and are there plans for cooperation with other state ministries to support and assist in this field? What other ministries and agencies are you coordinating with?

A. The RPC cooperates with relevant ministries and authorities to support and assist them in this field. We will continue to cooperate, coordinate and develop our regulatory work through cooperative radiation programs. For example, we have ongoing coordination with the National Operations Center (NCO) and the ministry of interior's national CBRN team. The RPC also cooperates with authorities like the National Security Agency, the National Intelligence Service, the Iraqi Authority for the Control of Radioactive Sources and the executive authorities of the Iraqi Atomic Energy Authority.

Q. If there is a leakage of one of the materials (chemical, biological, radiological, nuclear), what is the emergency plan for dealing with it, in your ministry's various institutions?

A. There is a national plan for radiological and nuclear emergencies under the supervision

of the Council of Ministers. Ministries and other relevant authorities are allocated tasks and duties within the overall response, according to the type of event, its size and the resultant damage.

Q. Should terrorists obtain these materials in exceptional circumstances, what is the plan of action to prevent their development, distribution and use?

A. There are specific procedures for responding to such incidents, that involve coordination by the relevant authorities. Work teams have been formed across the security authorities, covering detection, follow-up and investigation of these materials, and preparation of the response and response teams depending on the type of material and the risks.

Q. What are the most important security and safety measures for preserving radiological and nuclear technology equipment and wastes in institutions?

A. These include licensing workers and institutions in the field of radiation, and inspecting all their activities. Physical protection is provided using such means as surveillance cameras, restricting site access and defense in depth.

Q. Does the environment ministry participate in coordination and tasks with the rest of the national authorities in CBRN? Have you been developing risk management

strategies and defining the roles and responsibilities of competent authorities?

A. The RPC participates in coordinating plans and tasks with all ministries, especially the border crossings authority, customs, Interpol and other security agencies. There are directorates affiliated to the ministry in all governorates and deals with local government.

Q. What are the challenges of applying security and safety standards in the various institutions of your ministry?

A. A major challenge for us is that we lack the financial allocations necessary to implement security and safety standards, which is reflected in a shortage of the devices and equipment we require. We also need specialized and trained technical staff, and training opportunities via the relevant international bodies. All this stops us from accessing the experience of developed countries, which would enable us to develop technical staff who can improve the country's radiological situation.

Q. What are the most important environmental threats to Iraq, now and for the near future? How are you preparing to confront them?

A. The strongest threat is the possibility of ISIS or other terrorist gangs that controlled areas of the country between 2002 and their recent liberation, getting hold of radioactive

sources or nuclear materials. Tracing any lost radioactive sources is a task for the Iraqi commission to control radioactive sources, who have programs to search for those sources.

We also need to be aware of how we handle and transport ferrous waste, especially when it's of military origin, without being subject to RPC's regulatory control. In addition the environment ministry/RPC is working to enhance radiological monitoring at border crossings in line with current capabilities. These measures require the implementation of a radiation detection program at all ports to achieve control of all radiological materials entering Iraq.

Looking to the future, concern continues over the repercussions of transboundary radiological or nuclear accidents. We hope that a combination of early warning systems, coordination with the international agency providing information on nuclear activity in Ukraine and regional nuclear facilities, along with a raised level of readiness and preparedness for all technical staff at the RPC will help. In addition we are preparing devices and equipment for any accident (maintenance, calibration), enhancing capacity building programs, activating field practices, and improving performance based on the lessons drawn from these practices. In the event of an emergency, control over food imports from Europe and regional

countries, particularly Ukraine, would be tightened, with follow-up examinations to ensure it is free of radioactive materials.

Q. How is the environment ministry planning to develop, to become more effective and efficient in terms of environmental concerns in its various institutions?

A. The RPC's plans are summarized as the development of the environmental reality and protection of human health and the environment from radioactive contamination or exposure. This contamination may have emanated from radiation sources and generators in Iraq, through the implementation of some of the tasks within the center's work plans and programs for monitoring radioactive environmental pollution. These activities are in accord with approved controls and in line with IAEA regulations.

The work involves controlling the movement of radiation sources inside Iraq and granting licenses for all activity related to radiation sources and generators for peaceful uses, while also ensuring protection from exposure. Workplaces are monitored, and controls for working on radiation sources are defined, by means of site checks and preliminary and periodic radiological site surveys. The entire country is covered by the RPC and radiation protection divisions in all the governorates' environment directorates, who grant licenses for

each experimental and continuously operated ionizing radiation source.

Licenses for people working in the radiation field are approved, and workers' exposure is measured periodically using various devices and films, which reveal the biological effects of radiation. Workers are monitored through medical examinations, after which their data is entered into the National Dose Record (NDR) that was installed in cooperation with the IAEA. The NDR enables Iraq to maintain a database of workers and the doses received as a result of their dealings with radiation sources.

Basic training courses for new and established workers are held in order to build capacity in protection from ionizing radiation, for both the private and government sectors. Courses follow the IAEA approved curriculum to ensure compliance with safety principles and requirements.

- Iraq's radiological environment is monitored by measuring the radioactive background in environmental models (soil, water, air) that are collected by the RPC and provincial environment directorates.
- In addition, radiological assessments are made of sites, buildings, government and private facilities suspected of being contaminated, and a database is being built to give a clear picture of Iraq's environment for monitoring purpose.

Further work includes follow-up and documentation of the early warning systems and radioactive interstitial monitoring stations in Baghdad and the provinces, and recording average readings. Environmental radiological determinants are being developing and updated on the basis of global determinants according to sources from the IAEA. These take into account environmental and geographical conditions and the country's geology, and sharing on ionizing radiation issues with relevant government agencies. Finally, the plan involves granting certificates of validity for consumption and human use of imported materials

from a radiological standpoint and certificates of freedom from radioactive contaminants for Iraqi exports.

Tasks outside the plan include monitoring nuclear facilities through follow-up and coordination with the IAEA and information exchange networks, and responding to any incident by activating emergency procedures and early warning networks along with environmental monitoring across all governorates.

Q. How would you develop the themes of the international conferences on security and safety? How do you think some

of the recommendations can be activated?

A. We benefit from international experience in dealing with nuclear security issues. By participating in international conferences and forums we can exchanging visions and knowledge, update our radiological and nuclear activities database, develop laboratories, and continuing to cooperate in technical, security and safety projects. Participation also allows us to improve the performance of our national nuclear accident monitoring and response institutions. Finally it promotes a culture of nuclear and radiological safety and security at institutional and societal levels.



Special teams have been set up to do reconnaissance, survey and decontamination tasks ©M. Delli

Annexe

The following are based on poster presentations delivered live at the 7th International CBRN Safety and Security Conferencens



CB7RN
4–6 Dec. 2022



The Seventh International CBRN Safety and Security Conference



Abstract

The international regulations of chemical, biological and radiological safety and security are fully implemented at the scientific laboratories of Almaaqaal University. disciplines and modules concerning CBRN standard are given to the undergraduate students. The PPE are compulsory to be dresses up. Chemicals and biological reagents are kept safety and secured under proper conditions. The chemical and biological waste are treated properly. The university was awarded five certificates concerning safety

Introduction

Safety and Security management became essential and basic powerful shield to protect people, students, personals, environment, society, etc. and to prevent incidental and accidental events such as fire, earthquakes, terrorist's attacks,etc. Mitigation, also, is a substantial device to reduce harmful events.

Almaaqaal university is one of the Iraqi private universities, recently built in the southern city, Basra. Twenty-four Scientific laboratories are equipped with sophisticated safety requirements. The purpose of this paper is to illustrate these facilities as more money being spent to back and support this issue.



Results

More than 2000 undergraduate students are attending 24 scientific laboratories, weekly, including chemical, biological, pharmaceutical and dental specialties. These labs are furnished with fully safe and secured equipment. X-ray lab is well protected with lead-sheet wall inside cover. Fully equipped cupboard, ventilation, eye fountain, biocabinet, anti-flammable cabinets, etc. are available. Useful information were extracted from MSDS texts considering every single chemical and biological reagent. These reagents are stored under proper conditions chemical and biological wastes are treated according to a widely useful technique. Solvents wastes are segregated in suitable containers and treated with a handled chemical manner. While the biological waste (blood specimen, contaminated items, syringe ... etc.) are burned using a special furnace. An emergency plan has been stated and studied carefully. Evacuation practical event being implemented at the beginning of the academic year.

Conclusion

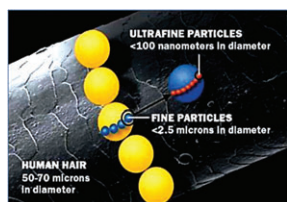
Almaaqaal university has been awarded five ISO – certificates including “Occupational health and safety management system” certificate.



Abstract

The concept of safety is as ancient as the history of humankind. However, as civilization progressed, this concept has showed a new dimension. Nanomaterials, the particle with diameters less than 100 nanometers (0.1 micrometers), has many benefits. The use of these materials or technology has a great impact on the progress of industry, agriculture, and the advancement of scientific research. Its applications also have a direct impact to people's lives. Many researchers show interest in the unique properties of nanomaterials, ignoring the safety measures that should be taken when handling with these materials.

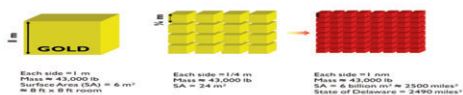
Properties of Nanomaterials



High surface areas can be achieved through the rational design of nanoparticles. Producing nanomaterials can be achieved with outstanding magnetic, optical, mechanical, electrical and catalytic properties that are ultimately different from bulk counterparts. The nanomaterial properties can be tuned as desired via precisely controlling the shape, size, appropriate functionalization and synthesis conditions.



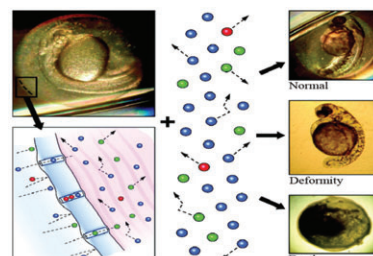
Surface Area is a Big Factor



Toxicological Aspects of Nanomaterials

Despite the attractive properties of these nanoparticles, they may still also be responsible for harmful effects on living organisms. Therefore, researchers are keen to study the toxicity of nanomaterials to understand and evaluate their hazardous properties. However, a major challenge for nanotoxicology is to understand the mechanisms of these reactions to produce conventional toxic products that have not yet been studied or elucidated.

Effects of Nanotoxicity on Female Reproductivity and Fetal Development in Animal Models



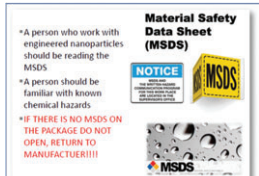
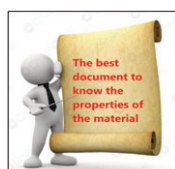
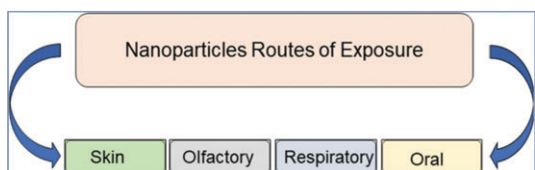
TiO₂ is known for long time as "the environmental white knight" due to its limited toxicity, inertness, and biocompatibility.

The lethal dose at 50% concentration (LD50) of TiO₂ is greater than 10g/kg

The FDA and Environmental Protection Agency (EPA) have specified 50μg/kg body weight/day of nano-TiO₂ (nTiO₂) as safe dose for humans.

Human Rout of Nanomaterials exposure

The main routes of exposure are through the skin, lungs or intestinal tract causing adverse biological effects. Nanomaterials can interact with the cells of the human body directly either through food or indirectly by dissolving from food containers.



Disposal

Nanoparticle must be disposed of as hazardous waste.



Effect of particle size on dust explosion risk

The size of particles in dust can have a significant impact on the explosion risk. Smaller particles have a greater surface to mass ratio and present a greater risk



Personal protective equipment (PPE)

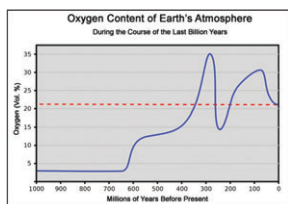


Efficiency of protective gloves	NBR-100	NBR-200	Latex	Butyl rubber
nTiO ₂ in water	Poor	Good	Good	Good
nTiO ₂ in PG	Good	Good	Good	Good
nTiO ₂ in powder	Weak	Good	Good	Poor

Abstract

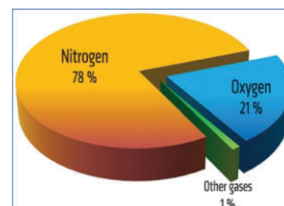
Medical oxygen can be used for oxygen therapy, anesthetics, resuscitation, and life support. Using excess oxygen could cause several side effects, including nasal irritation, hypoxic respiratory drive, and pulmonary oxygen toxicity. During the COVID-19 pandemic, while there is an increasing demand for medical oxygen, it can be noticed that a number of health care centers are not equipped to handle oxygen cylinders in a safe way. Also, the household use of oxygen cylinders can be considered as a new risk in terms of the lack of safe use of compressed gases. Even a small increase in the oxygen level in the air to about 24% can create a dangerous situation. It becomes easier to start a fire, which will then burn hotter and more fiercely than in atmospheric air and may be impossible to put the fire out. Increase the concentration of oxygen due to leaking valve or hose in a poorly ventilated room or in confined space can quickly create a dangerous level.

Oxygen Concentration



Oxygen content in the atmosphere was not constant over the last billion years; it ranged from 3 to 35%. However, it turns out that the oxygen level at the present time is 21%.

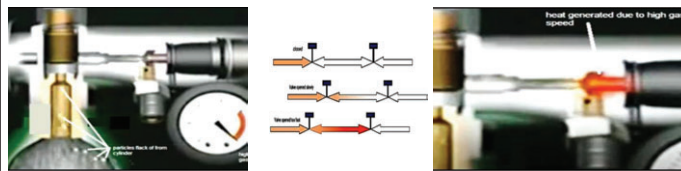
It was reported that a tiny increase in oxygen content, up to 24 %, in the atmosphere leads to hazardous circumstances.



Medical Oxygen Handling During Coronavirus Pandemic

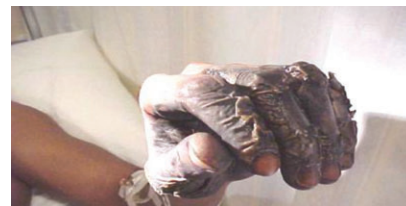


Avoid Rapid Opening of the Oxygen Cylinder Valve



Case study 1

oxygen became in contact with a hydrocarbon material (oil/grease) and yielded an explosion.



Case study 2: A terrible accident in a hospital in Baghdad dedicated to COVID-19 patients

The fire was followed by an explosion of oxygen cylinders. The accident led to 82 deaths and 110 injuries as a result of burning, suffocation, and lack of oxygen



Safety Handling of Medical Oxygen to Avoid Fire and Explosion

Several safety procedures must be taken in consideration to avoid fire and explosion includes:

- Never use oil or grease to lubricate oxygen equipment.
- Prevent oxygen enrichment; a well-ventilated space is required.
- Smoking should be forbidden where oxygen is being used.
- Avoid rapid opening the oxygen cylinder valve.
- Use oxygen equipment which is designed for oxygen service.



Employers are required by law to assess risks in the workplace and to take all reasonable precautions in practice to ensure the safety of workers and members of the public. Careful examination of the risks of using oxygen should be included in the risk assessment.



Abstract

It is the responsibility of all staff and students to manage chemical waste in a reasonable manner. Failure to do so can result in harm to both and/or destruction of work areas due to fires, explosions, or spills. Goals of chemical disposal procedure are: to increase labs safety, quantify amount and type of waste and consolidate and unify lab waste handling procedures. The aim of this presentation is to investigate the chemicals waste management in the of the university of Babylon and assess the levels of worker and staff familiarity about chemicals waste management. The real time to start safety and security issue in the university of Babylon at 2012. The results showed that increase of safety and security culture but there is need to re-assess the waste management issue in all labs in the University of Babylon

Goals of Chemical Disposal Procedure:

- Increase lab safety.
- Meet OSHA and EPA regulations.
- Quantify amount and type of waste.
- Consolidate and unify lab waste handling procedures.
- Integrate labs and safety office.



Characteristic Hazardous Waste

A chemical waste may also be classified as hazardous if it exhibits one or more of the following characteristics: Ignitability, Corrosivity, Reactivity, Toxicity.

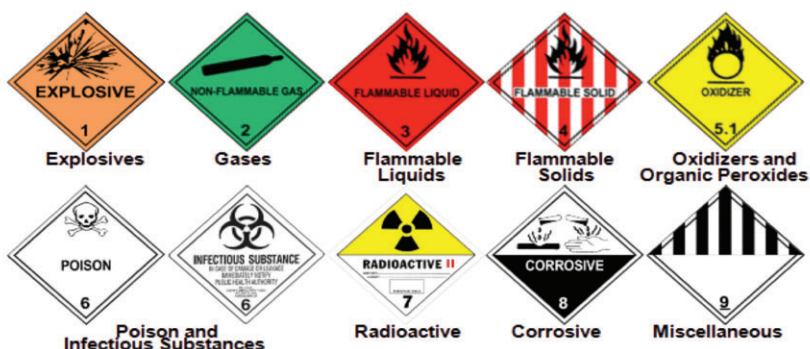
Suggested Storage Locations for Chemical Waste

It is not recommended that flammable waste be stored in the hood. Also note that flammable waste counts against your allowable flammables storage.

Alternatively:

- You can keep a temporary waste collection in your hood while you are working. Commonly this is a 4 L bottle fitted with a funnel that has a lid. The temporary waste should be a single bottle that is used in the hood, and then emptied into a carboy or designated for waste pickup (temporary = must empty into carboy at the end of each day). Note that non-flammable secondary storage containers are recommended (as opposed to plastic bins as shown in the picture)

Types of Chemicals waste



Waste Minimization

- equipment or technology modifications,
- reformulation or redesign of products,
- substitution of less toxic raw materials,
- improvements in work practices,
- maintenance

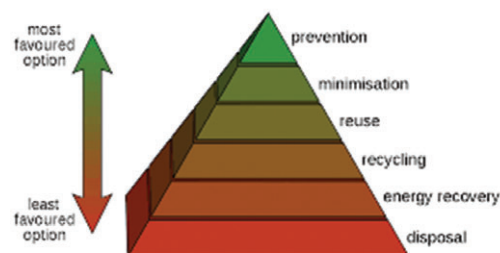
Is this possible in the University of Babylon? Yes

We Have enough knowledge and culture, because CBRN issue started in the University of Babylon since 2012 till now, and there are many conferences, workshops and training.

- We have enough experts
- We and all universities and institutes deal with CBRN have special unites related with CBRN.

Conclusion

- To make above possible in the University of Babylon we need
- Decision Maker take part of this important and dangerous issue .
 - Cooperation between all institutes and universities with with different ministries to find the best way to manage and regulate disposal of chemical waste



Abstract

Controlled nuclear fusion and plasma physics research are currently carried out in more than 50 IAEA Member States. The world's most advanced and largest fusion experiment is, with seven international members (China, India, Japan, South Korea, the European Union, the Russian Federation, and the United States), the International Thermonuclear Experimental Reactor (ITER) project, based on the tokamak concept (using a device that confines plasma through a magnetic field), is currently being built in Cadarache, France. The Reactor is designed to achieve a fusion power gain of at least 10 and produce 500 Megawatt (MW) of fusion power. It will also test key technologies necessary for a fusion reactor.

Another fusion initiative is the International Fusion Materials Irradiation Facility (IFMIF), a joint European-Japanese project that will be constructed in Japan and is planned to operate in parallel with ITER that will test and select materials that can withstand the extreme conditions produced by high-energy fusion neutrons of future fusion reactors.

The commercial prototype, Demonstration Power Plant (DEMO) which is in the design stages is expected to supply fusion electricity to the grid upon ITER.

Results

Over the past 50 years of fusion experiments, the performance of fusion devices has increased by a factor of 100,000, but a further increase of a factor of 5 is needed to reach the level of performance required by the power plant. Improvements have been achieved because experimental fusion reactors have become larger. Since the length and radius of the ITER (FIG.1-3) reactor are twice the length and radius of the common European Torus, the volume of its plasma will increase tenfold. Applying new designs and innovative materials, the ITER reactor will also house some of the most powerful plasma heaters ever used. With only 50 megawatts of heating power injected into the plasma, the goal is to produce 500 megawatts of fusion power - giving a Q value of at least 10 - in pulses of about 5 to 10 minutes each.



Figure 1. Inside the race for nuclear fusion power.

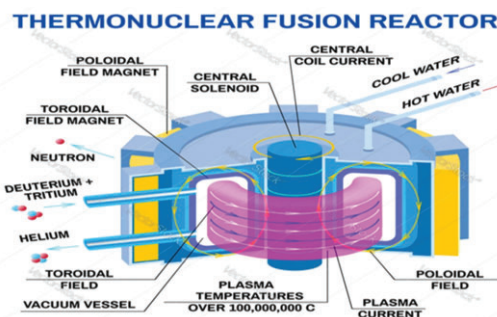


Figure 2. Thermonuclear Fusion Reactor.

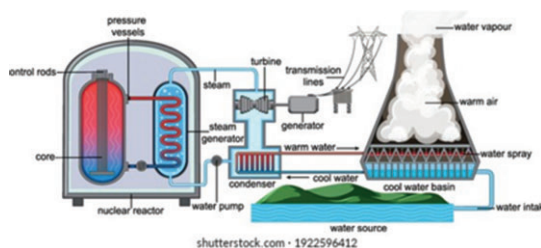


Figure 3. Nuclear Power Plant.

Conclusions

The challenge is to prove that nuclear fusion as an energy source is scientifically feasible and requires large, complex, and expensive instrumentation. With only 50 megawatts, which very high input to heat power injected into the plasma, the goal is to produce 500 megawatts of fusion power - giving a Q value of at least 10 - in pulses of about 5 to 10 minutes each. Therefore, we are looking for a new modification in plasma physics or newly developed engineering measures, moreover the produced power is not stable, possibly due to Deuterium competitive side reactions.



Health Challenges Facing Workers in all Medical Institutions

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¹Department of Clinical Laboratory Sciences / College of Pharmacy / University of Babylon.

²Hammurabi College of Medicine, University of Babylon, Iraq.

Abstract

Health challenges are among the most important fundamentals that have received the attention of many researchers, academics and international, regional and local organizations, given the association of challenges to the health of the individual, and because the health of the individual is one of the basic components of society, it is a basic requirement of life, and it is also a necessity for human best able to work and produce and achieve the goals of development and the advancement of society. The safety and protection of individuals is one of the most important topics and one of the most prominent challenges facing daily specialists and employers, because protecting the human element from work risks means protecting the national economy and society, with the spread and progress of industry in this century and the accompanying risks of industry and the preservation of property from damage. From this logic was the protection of workers and the provision of a safe and correct working environment in institutions by spreading preventive awareness among them and informing them of the expected mistakes in work and training them to use devices to prevent the risk.

Results

Health workers face a wide variety of challenges, and hence their perspectives need to be taken into account to improve health services interventions that aim at enhancing quality of care. Health workers' willingness to further develop skills and knowledge, proactive search of solutions to remedy stock-outs of drugs and other medical devices, and motivational factors to improve the quality of care represent important opportunities for improving health services for all. Modern technology has made healthcare very complex with many hazards. The type of hazards faced by the HCWs are physical, chemical, biological, radiation, reproductive health, stress, psychiatric disorders, stalking by patients and violence. Needle stick injuries (NSIs), radiation exposure, violence, psychiatric disorders, and suicides are common in HCWs. Occupational safety aims to reduce the dangers faced by the worker due to the use of many machines and equipment, as well as health from occupational diseases resulting from the practice of occupational work, and also safety in the work environment itself and the accompanying dangers.

Physical Hazards

Major physical injuries in HCWs are musculoskeletal disorders seen highest in nurses, and orderlies. It is seen more than seven times of other industries, due to patient handling, positioning, lifting, bed making in extremely awkward postures, transferring to bed, chair, toilet, for diagnostics and therapy.



Chemical Hazards

HCWs are exposed to a variety of chemical hazards including cleaning agents used for housekeeping throughout the hospital and waiting areas. The primary routes of exposure to cleaning agents are inhalation of aerosolized droplets, vapors and skin exposure. Some of these chemicals are Ethylene oxide, Formaldehyde, Gluteraldehyde, Methyl methacrylate, Gaseous by-products, Latex and Mercury. All these chemicals lead to irritation of the eyes, respiratory airways (causing sore throat, cough, and nasal irritation) and prolonged exposure may result in pneumonitis, hypersensitivity and asthma.



Biological Hazards

The primary routes of getting affected are direct contact, droplets, and airborne. Influenza, measles, rhinovirus, varicella, and SARS viruses can all be transmitted in healthcare settings by the airborne route.



Radiation Hazards

Ionizing radiation from X-ray machines, fluoroscopes, and computed tomography used for diagnostic and therapeutic procedures, image-guided procedures, cardiac catheterization, angiograms, pain management, and others are hazardous.



Conclusions

When the HCWs are well, they are best able to connect with the care for patients. However, challenges to health of HCWs are widespread, with problems such as dissatisfaction, burnout, high rates of depression, and increased suicide risk affecting their professional careers. These problems are associated with suboptimal patient care, lower patient satisfaction, decreased access to care, and increased healthcare costs. Only by applying robust measures of well-being, engaging HCWs in reflection and conversation about promoting it in their workplace, with a meaningful outcome, and making changes to enhance its realization, will HCWs thrive in their service to patients. Health managers need to ensure that healthcare is geared toward assessment of hazards suffered by HCWs, their reasons, and do everything possible for prevention. All these factors are the main objectives of the concept of occupational safety and health.

Abstract

The present study included determination of diclofenac-Na as NSAIDs in commercial tablets. A 0.01 g of diclofenac-Na was dissolved in 10 mL of methanol to prepare 1000 mg/L of diclofenac-Na as stock solution. After that, it was stored at -20 °C for further preparation and experiments. Additional solutions of diclofenac-Na were prepared by diluting the stock solution (1000 mg/L) in deionized water. All solutions were injected three times and analyzed by HPLC. Calibration curves were constructed by plotting peak area versus concentration.

Diclofenac-Na separation was performed on Waters system (Milford, MA 01757 USA) which has double pump, automatic sampling system and UV visible light detector. A Chromolith® Performance RP-18e column (4.6 × 100 mm, 5 μm) has been used as stationary phase to separate diclofenac-Na at 35 ± 0.30 °C. The composition of mobile phases was (a) 0.1 % formic acid in deionized water (DIW) as mobile phase A and (b) 100% ACN as mobile phase B at 1.0 mL/min. The retention time of diclofenac-Na was 5.43 minutes.

Results

Diclofenac which is the target compound in the present study (Figure 1) has been used as therapeutic drug for treatment of some diseases. It is very well known that chromatographic analysis requires many factors affect peak area and shape of peak. However, mobile phase, flow rate and wavelength are so important and necessary to achieve this purpose. The effect of mobile phase was presented in Figure 2. it could be observed that high peak area was determined with acetonitrile compared to other mobile phases. The flow rate was also participated in enhancement of retention time as shown in Figure 3.

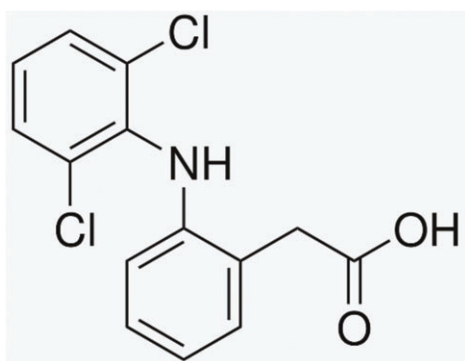


Figure 1. chemical structure of diclofenac

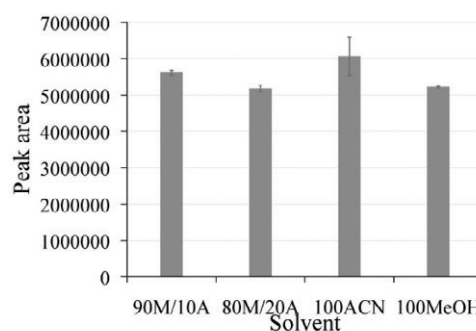


Figure 2. Effect of mobile phase on separation of diclofenac.

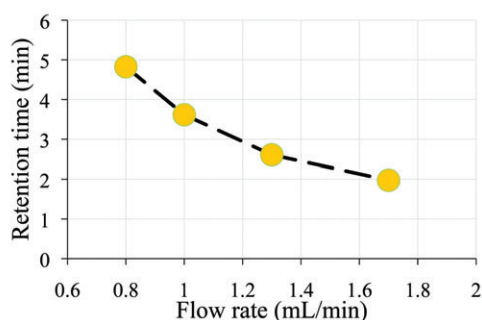


Figure 3. effect of flow rate on separation of diclofenac.

Conclusions

It was very well known that high performance liquid chromatography method exhibited good results and could be considered for further analytical applications in terms of determination of diclofenac-Na in “voltac drug”. Linearity is ore accepted in which R2 is 0.9901 with range of concentration between 10 to 40 mg/L. It is specific, reliable, and high precise. Acetonitrile was selected as the best mobile phase compared to compositions of mixing methanol and acetonitrile. Accuracy was ranged between 94.3 and 98.6%. Investigation of flow rate resulted differences in retention times and peak area so 1 mL/min has been selected as the best flow rate.



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