

The Chemical Safety and Security in the University of Kufa: Progress and Challenges

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Abstract

The importance of chemical safety and security program in academic institutions has been recognized for many years. However, educational institutions in Iraq have been slower to adopt such this program. In the University of Kufa, as well as other Iraqi Universities, there are some regulations, laws, and standards of chemical safety and security exist. Also, an administrative system to fulfillment the requirements of chemical safety and security in this institution are still lacking. Years ago, the concerns of chemical safety and security from junior leadership, researchers, academic staff and postgraduate students are not a high priority. Nowadays, there are three challenges that facing the University of Kufa, as well as the local community, chemical waste, chemicals theft and terrorism. These three risks make the safety and security the main concern. The support and the expertise provided by the CSP define organization and PNNL define laboratories in this field to this University have helped to achieve a significant progress in a very short time. The university has been able to establish an effective administrative structure which is managed by trainees staff and also writing a good strategy plan for chemical safety and security.

Keywords: chemical safety and security, University of Kufa, Progress and Challenges.

Introduction

University of Kufa has been established in 1987, and yet it has been a pioneering force in Iraqi higher education since its inception. The University has been recognized as one of the leading Iraqi research and teaching institutes. Today, the University of Kufa has over 26,000 undergraduate and 2,500 postgraduate students for a University degree, and 2,100 faculty members. There are twenty-one faculties, each of which constitutes an administrative grouping of departments and other institutions. Consequently, it has built a regional center of academic and research excellence. University of Kufa, every year, offers many postgraduate programs in, but not limited to social and applied science, business administration, arts, humanities, medicine, dentistry and engineering [1]. Most of the programs have a research component that goes in line with the University status as a comprehensive and intensive research establishment.

Among these faculties, only nine of them have chemical laboratories for teaching purposes and for postgraduate student research. Also, there is a central chemical laboratory function as service laboratory providing analytical services to internal and external clients.

The workers in chemical laboratories and a community around these laboratories may have shorter life spans, more diseases [2,3] and have potential exposures to variety occupational hazards [4]. These laboratories, also, may be a vulnerable target for chemical theft and terrorism, leading to a threat to the national community, which makes security to be a main concern. This paper aims to explore the state of chemical safety and security in the laboratories and chemical storages at University of Kufa.

Methodology

This study was conducted as a survey using the checklist adopted from American Chemical Society Security Vulnerability Checklist for Academic [5] and American Chemical Society Safety Audit [6,7]. This survey of **chemical** safety and security were conducted in the laboratories and chemical storages at the nine faculties: Science, Medicine, Education for women, Agriculture, Dentistry, Pharmacy, Engineering, Nursing and Veterinary Medicine. Laboratory observations and interviews of laboratory staff, researchers, chemical storage managers and postgraduate students were also conducted.

Result and Discussion

Chemical safety and security assessment was divided into seven categories:

1- chemical safety and security culture 2- chemical safety and security plan 3- policies/standards/guidelines 4-personal protective equipment 5- security requirements 6-handling chemicals and equipment, and 7- Hazardous waste disposal.

Discussion these categories is by no means exhaustive but we try to highlight the picture of the state of the chemical safety and security in the laboratories of the University of Kufa as much as possible and as much as available data permit.

Status of Chemical Safety and Security

The most remarkable barrier is a general lack of safety and security culture among the leaders, academic staff, administrative staff and students in most faculties. Most of them do not have a sense of responsibility, and have very low priority, towards their own safety and those around them. Also, laboratory safety and security are usually not part of the curriculum in most faculties, similar to most other Iraqi Universities, if found, usually only just the marginal and do not meet the level of ambition. No existence the center of chemical safety and security in the management structure in the University and their faculties leads to lack of support, culture and adherence from their academic leaders. In most faculties, the safety and security plan is improvised and it is not a part of its permanent agenda. In their main strategic plan, the program of the lab safety and security training for laboratory workers does not exist. Most of the faculties have policies and guidelines for safety and security but there are no procedures to enforce the laboratories workers and students to follow it. Also, the faculty staff avoids compliance with safety and security regulations with the lack of responsibility and accountability. In terms of general safety equipment, in most laboratories the safety showers and eye wash stations do not exist. The eye protection (goggles) are seldom used, and if used usually only just by graduate students. Gloves and respirators are often neglected due to lack of safety culture (figure 1).



Figure 1: Students in the laboratory do not wear gloves and eye protection.

In terms of the security measures currently employed, the university campus protects by human and nonhuman resources: security guards are stationed at entry and exit points in the main doors who conduct checking and monitoring of personnel and cars entering and leaving the campus and recently supplied by electronic doors (Figure 2). The physical security employed includes building, lockable doors, and windows, walls, and window blinds. Only authorized workers have keys to main buildings, offices, laboratories, and storages. In the University of Kufa, most of the faculties have security cameras system (Figure 3).



Figure 2: The electronic doors at University of Kufa



Figure 3: Screens for security cameras system in the faculties at University of Kufa

The fundamental defense against chemical theft from laboratory and chemical storages users or outside is inventory control of all major hazardous material, dual-use chemicals equipment and valuable equipment that can be used for illegal uses or by terrorism. All faculties have, somewhat, an adequate system for inventory control that helps to warn the managers that something missing or misplaced goods. On the other hand, the bar code system which has the capacity to record a huge inventories information accurately is not available. Nowadays, the universities have been considered a target for terrorism, such as ISIS, which makes security the main concern, therefore, the improving the chemical security practices is required.

With regard to the safety equipment used, a some of the laboratories does not have safety cabinets, safety shields and chemical hoods, the latter if found, usually not working and the laboratory just has exhausted fans for ventilation system (Figure 4). The high cost of the safety equipment with non-available funding serves as the biggest challenges in purchasing this equipment. The basic fire protection and fire alarm systems are available in most laboratories. However, most of the laboratory and chemical storages staff have been not trained for emergencies related to fires and they do not know how to deal with this case. In addition, the laboratories do not have an organizational structure and team for emergency response. Thus, the laboratories are unable to properly response when an emergency occurs.



Figure 4: Safed conditions of chemical hood for laboratory user at faculty of science-University of Kufa

Regarding hazardous waste disposal, the chemical research for the graduate students and researchers in the university regardless of their small size generate a hazardous waste. Furthermore, the chemical waste disposal facilities do not exist in university even in the other government enterprises or private contractors. Consequently, chemical wastes released into sewers and rivers with immense implications on human health, the environment and the pollution which enters the food chain. Moreover, no central database exists for the type, nature and the sites of these chemical waste. On the other hand, the communication between the University with the local community and the governmental authorities regarding risks posed by the hazardous waste to the community and related response measures is inadequate. In fact, the local community and the governmental authorities must be involved in the safety and security planning.

The Progress Being Done

The increased national attention in chemical safety and security and due to the support and the expertise provided by the US State Department Chemical Security Engagement Program together with the CSP organization and PNNL in this field, the

University of Kufa has started working on the establishment of their particular program chemical safety and security program. This effort has helped the University of Kufa to achieve a significant progress in a very short time.

As such, in the 11th of June 2015 the formation of a main committee of Chemical, biological and physical Safety and Security (CBRSS) has been initiated. Fourteen days later, the main committee has started to come up with short and medium-term strategic plan to the top management regarding chemical safety and security measures that need to be done in the university and their faculties. The Strategic plan of the CBRSS main committee consists of five main themes: 1- Promote security culture of chemical and biological safety at the university. 2- Formation of units for the chemical safety and security in each faculty as well as the establishment of training courses for the directors of these units. 3- Include a chemical safety and security curricula within under- and graduate studies. 4- The establishment of committees to follow up and auditing the application of chemical safety and security measures in each faculty. 5- Doing a key role in the deployment of chemical safety and security culture in the community.

In the 1st of November 2015, the CBRSS units have been established in nine faculties: Medicine, Education for women, Agriculture, Dentistry, Pharmacy, Engineering, Science, Nursing and Veterinary Medicine. The workshop and training conducted by CSP and PNNL laboratories in collaboration with the US State Department, have increased the chemical safety and security awareness and culture for the Directors of CBRSS units (Figure 5). Lectures on chemical safety and security have been for researchers. The chemical safety and security materials were included with the undergraduate and graduate curriculums in chemistry programs. As such, the University of Kufa and their faculties are hoping to see steady progress as time goes by.



Figure 4: A number of CBRSS units directors and chemicals storages managers from University of Kufa participated in the Chemical Safety and Security training in University of Kufa, Iraq on Jan. 3–7, 2016 conducted by CSP and PNNL Laboratories in cooperation with the US State Department.

Challenges and the Improvements Required

There are many challenges phases the faculties in the University of Kufa. One of the most important challenges is the ISIS terrorist which the chemicals in the university is an important target for terrorism. Also, the laboratories and chemical storages in faculties considered an easy target for chemical theft. The second important challenge is that the laboratories do not have the authority or treatment facilities for waste treatment. All chemical waste is disposed through sewers and this causes a threat to the health, life, and the environment. Finally, The lack of an effective administrative structure with laws and regulations concerning chemical safety and security.

With these main challenges and the barriers listed in this paper, a long list of things is needed to be done. (1) establish chemical safety and security center (CSSC) (2) improving the chemical security system (3) increased level of safety and security culture (4) improve policies and guidelines (5) emergency response system (6) establish waste disposal systems (7) management of hazardous wastes (8) online reporting systems

Conclusions

In academic institutions, the importance chemical safety and security program has been recognized for many years. However, Iraqi universities have been slower to adopt such this program. There are some regulations, laws and standards with regard to chemical safety and security exist in the university of Kufa. In this University, an administrative system to fulfillment the requirements of chemical safety and security is still lacking. Years ago, in the university of Kufa, the chemical safety and security are not a high priority. The chemical waste, chemicals theft, and terrorism are the main challenges facing the university of Kufa. The training conducted by the CSP organization and PNNL laboratories to the University of Kufa have achieved a significant progress in chemical safety and security in a very short time. The university has been able to establish an effective administrative structure and writing a good strategic plan for chemical safety and security.

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السلامة الكيميائية والأمن في جامعة الكوفة: التقدم والتحديات

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ملخص

قد تم الاعتراف بأهمية السلامة الكيميائية وبرنامج الأمن في المؤسسات الأكاديمية لسنوات عديدة. ومع ذلك، فإن المؤسسات التعليمية في العراق كانت بطيئة في اعتماد مثل هذا البرنامج. في جامعة الكوفة، فضلا عن الجامعات العراقية الأخرى، وهناك بعض اللوائح والقوانين ومعايير السلامة والأمن الكيميائي موجودة. ولكن لا تزال تفتقر الى نظام إداري لتحقيق متطلبات السلامة الكيميائية والأمن في هذه المؤسسة. منذ سنوات، وشواغل السلامة الكيميائية والأمن من القيادة الناشئين والباحثين وأعضاء هيئة التدريس وطلاب الدراسات العليا ليست ذات أولوية عالية. في الوقت الحاضر، هناك ثلاثة تحديات تواجه جامعة الكوفة، فضلا عن المجتمع المحلي، و هي النفايات الكيميائية، وسرقة المواد الكيميائية والإرهاب. هذه المخاطر الثلاثة تمثل

مصدر القلق الرئيسي للسلامة والأمن. الدعم والخبرة التي تقدمها CSP و PNNL في هذا المجال لهذه الجامعة قد ساعدت على تحقيق تقدم كبير في وقت قصير جدا. وكانت الجامعة قادرة على إنشاء هيكل إداري فعال والتي تدار من قبل الموظفين المتدربين، وكذلك كتابة خطة استراتيجية جيدة للسلامة الكيميائية والأمن. كلمات البحث: السلامة الكيميائية والأمن، جامعة الكوفة، التقدم والتحديات.

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