

# **Common Ground on Chemical Risk: Case Studies from the Middle East**



Search for Common Ground  
Washington, DC. USA

Search for Common Ground  
1601 Connecticut Avenue, NW  
Suite 200  
Washington, DC 20009  
USA

Phone: 202-265-4300  
Fax: 202-232-6718  
E-mail: [publications@sfcg.org](mailto:publications@sfcg.org)  
Internet: <http://www.sfcg.org>

Copyright © ~~2003~~ Search for Common Ground  
All rights reserved.

First printing ~~2003~~

### Publishers

Dr. Hasan Dweik, Dr. Derar Melkawi, Major General (ret.) Salah Eldin Selim Mohamed, Dr. Jean Negreanu, Shlomo Rosenberg, Dr. Yair Sharan and Major General (ret.) Mohammad K. Shiyab

Gayle Meyers, editor. – 1st ed.

ISBN: 0-9647474-8

Preassigned LCCN:

Layout;  
Cover;  
Printer;

Printed in the United States of America

# Contents

## Introduction

Chemical Risk and Confidence Building

*Gayle Meyers*

## Chapter One

Jordanian Case Study: Zai Water Treatment Plant

*Dr. Derar Melkawi and Major General (Ret.) Mohammad K. Shiyyab*

## Chapter Two

Palestinian Case Study: Gas Lighter Factory

*Dr. Hasan Dweik*

## Chapter Three

Israeli Case Study: Paz-Chem

*Shlomo Rosenberg, Dr. Jean Negreanu, and Dr. Yair Sharan*

## Chapter Four

Egyptian Case Study: Field Petroleum Company

*Major General (Ret.) Salah Eldin Selim Mohamed*

# Introduction

Gayle Meyers

The case studies in this book were prepared by members of Search for Common Ground's Middle East Chemical Risks Consortium (CRC)—a group of Egyptian, Israeli, Jordanian, and Palestinian research centers that agreed to reach across political lines and cooperate to address the problem of chemical risks. The CRC has two goals: to improve the capacity of the nations of the Middle East to manage the consequences of chemical incidents, both individually and together, and to build confidence among participating nations. This essay will describe the history of the CRC, analyze the rationale behind its creation, and summarize the lessons learned from the case studies.

## History

The CRC was founded by Search for Common Ground (SFCG), a Washington- and Brussels-based nongovernmental organization whose mission is to transform how people and institutions deal with conflict—away from adversarial approaches and toward cooperative solutions. SFCG designs and implements multifaceted programs that aim to resolve conflict and prevent violence. It seeks to help conflicting parties to understand their differences and act on their commonalities.

The CRC grew out of a project on weapons of mass destruction (WMD) in the Middle East. For many years, the SFCG Middle East Security Working Group had discussed the need for arms control in the region. By mid-2001, the dangers of proliferation had escalated with the growing possibility that nuclear, biological, or chemical technology could end up in the hands of unstable regimes, terrorist organizations or other unpredictable non-state actors. It became clear that in the Middle East, few nations are adequately prepared to

---

*Ms. Meyers is the director of Middle East Regional Security Projects at Search for Common Ground, where she manages a Track II working group on security issues and designs cooperative action projects to address the threat of weapons of mass destruction in the Middle East. She came to Search for Common Ground from the U.S. Department of Defense, where she worked in the Office of Counter-proliferation Policy. She is a graduate of the Fletcher School of Law and Diplomacy.*

respond to chemical and biological attacks or accidents, and the worsening Palestinian-Israeli conflict had by then nearly extinguished communication among parties in the region.

The working group met in November, 2001, when the attacks on the Pentagon and World Trade Center and the release of anthrax in the U.S. mail brought concerns about terrorism and WMD into sharp focus. Participants in the meeting, who included strategic analysts from across the Middle East, agreed that they all shared a common vulnerability to unconventional attacks and suggested that SFCG design a project to mitigate that vulnerability. A follow-on meeting of subject-matter experts recommended that the project not only confront the threat from biological and chemical weapons, but also build dual-use capabilities to address related civilian concerns. As a result, the CRC and a companion group—the Middle East Consortium on Infectious Disease Surveillance (MECIDS)—were formed.

SFCG convened the CRC for the first time in January, 2003. The Middle Eastern participants included chemists, environmental engineers, and former military personnel. A health and safety manager from the Organization for the Prohibition of Chemical Weapons (OPCW) provided additional expertise. The participants sketched a picture of a Middle East facing a wide spectrum of chemical risks:

- In areas without a strong government structure, agricultural industries use banned pesticides like DDT, and accidents at unregulated factories claim many lives.
- An earthquake fault runs through the region, threatening chemical plants.
- Non-state actors could use chemicals in an attack against civilians, and the prospect of large-scale conflict brings the fear that a missile could hit a chemical storage area or that chemical-tipped missiles could land on populations.

They agreed that chemical risk management is vitally important and worthy of joint cooperation, and that preparing for chemical accidents helps in preparing for deliberate attacks.

As an initial project, each organization in the CRC agreed to write a case study of a local incident and draw lessons learned for chemical emergency response. They met again in June 2003 in Larnaca, Cyprus, and presented the results of the case studies. This book is a compilation of those studies. This project is novel not only because it produced rare cooperation among these four nations, but also because the Middle East is thinly represented in published literature on disasters. For their next project, CRC participants will collaborate on a publication describing how each nation could contribute to responding to a regional incident and envisioning what such regional cooperation would involve.

## Why a Chemical Risks Consortium?

The CRC meets two kinds of needs: the need for efficient chemical incident response in the Middle East, and the need to build confidence in this tense region.

### **Chemical Incident Response**

Geography compels these nations to cooperate on chemical risks. Cross border effects are very probably in the region. A single catastrophic chemical accident could release a plume that would affect Israeli, Palestinian, and even more remote Jordanian and Egyptian populations. Even if an incident were contained in one country, neighbors should be able to call upon each other for help, rather than waiting for assistance to arrive from the United States or Europe. Rapid assistance would be especially important in a chemical incident, which would have an immediate effect, unlike a biological attack, which would manifest itself over the course of hours or days. On a chronic basis, pollution from poorly regulated factories can harm the neighboring population. And finally, the threat of an unconventional attack by a non-state actor menaces the entire Middle East.

### **Confidence Building**

The CRC can also be viewed as a confidence-building measure (CBM). CBMs are actions or structures designed to reduce the risk of surprise or misinterpretation of military or political activity. They range from routine advance notification of military maneuvers to verification of arms stocks to the availability of a hotline between heads of state. Within the context of a relationship among hostile states—or states like Israel, Jordan, and Egypt that are technically at peace but harbor significant mistrust—they can include small agreements maintained over time that serve to build up trust. More loosely defined, they can include diplomatic relations, scholarly or cultural exchanges, or other ways in which contact among nations is taken out of the crisis sphere and into the realm of routine.

Confidence-building measures perform four basic functions. The first, increasing transparency, is based on the idea that confidence in the military sphere can be ensured by practical actions that are verifiable and can be properly assessed. It can apply to official civilian as well as military activities. It addresses parties' reluctance to enter into treaties they fear their adversaries will not implement.

The second function, acting as a surrogate for trust, involves bringing in a third entity, in the form of an international legal agreement, a piece of monitoring technology, or a powerful nation. This third party guards against the possibility that the adversaries will renege on their agreements by acting as an enforcer and shifting the balance of power toward cooperation.

The third function of CBMs, routinizing contact among adversaries, enables better evaluation of the adversary's actions, especially in the heated atmosphere of a crisis, while at the same time allowing decision makers or future decision

makers to form more sympathetic opinions about each other and to build trust among the individuals involved.

The final function, sending a reassuring message to opposing elites or publics, helps reduce the domestic risks for peacemaking leaders by recasting the enemy in a less threatening mold, and it serves as a moral and psychological guarantee of security.

Scientific and technical cooperation mechanisms like the CRC provide important avenues for routinizing contact among adversaries. A shared professional culture built on objective standards opens the door for scientists to discuss issues of common interest without being diverted by political differences. In face-to-face meetings, individuals replace negative stereotypes with live, generally positive, images of their counterparts. Sustained cooperation on scientific projects is even more powerful as the individuals work together to confront a common problem instead of confronting each other. They, in turn, relay their positive experiences to colleagues back home.

The experience of confidence building will be heightened in the CRC because chemical risk is a sensitive subject in the Middle East, where suspicion about chemical weapons is high. Jordan is a party to the Chemical Weapons Convention, but Egypt has neither signed nor ratified it, and Israel has signed it but not ratified it. Both of the latter two states suspect that the other maintains a weapons program. Increasing transparency about civilian chemical risk management will help build trust. Not only will the parties learn about each other's infrastructure, which corresponds with legitimate civilian uses, but they will benefit from the experience of learning that the other side can share truthful, verifiable information about a sensitive subject.

## The Case Studies: Lessons Learned

Each research center participating in the CRC chose a recent case of a local accident involving toxic chemicals. The cases highlight legal, technical, operational, and human factors contributing to the accident and draw lessons applicable in any country. Unlike the notorious 1984 Bhopal chemical factory accident in India, these incidents received relatively little media coverage and almost no publicly available analysis.

The Jordanian paper, prepared by Dr. Derar Melkawi and Major General (ret.) Mohammad Shiyab, describes a July 1998 incident in which the residents of the Amman west region complained of being supplied with discolored, smelly water. A number of Jordanian government agencies and international consultants investigated the problem and concluded that the taste and odor originated from algae in the water, and that the local water treatment plant's processes and operations were insufficient to deal with the magnitude of the problem.

This case highlights the need for operational flexibility and a good public affairs mechanism. The water treatment plant in question had been running successfully for ten years without incident. Its standard operating procedures of

adding a specified mix of chemicals managed routine issues. When the problem developed, however, the taste and odor problems were far greater than any experienced before, and the plant's staff failed to respond quickly enough to avoid the problem that resulted.

The Jordanian authorities also had some problems explaining the situation. The Minister of Water and Irrigation made two conflicting press remarks. These indicated that the water treatment plant staff had failed to react to the problem they faced and were late in shutting down the water supply, claiming that the plant had failed to cope with the problem sufficiently. Ultimately, however, the authorities provided citizens of Amman with clean drinking water from other sources and with the information they needed.

The Palestinian case, written by Dr. Hasan Dweik, focuses on the need for laws and regulations that are properly written and enforced. On October 21, 1999, a fire broke out in a factory that produced gas-filled cigarette lighters in the city of Hebron in the southern West Bank. Fourteen young women were killed. The factory was on the ground floor of a four-story building in a densely populated area. Its owner had no legal permit to operate his factory and did not follow any fire regulations. The factory had no fire exit and only one front door, which was usually closed after the arrival of the workers. The factory also employed 20 boys aged 6-13 years, who worked after school for 50 cents per hour.

At the time of the incident, there was no legislation fully addressing the health and safety of workers at the workplace. Demonstrations broke out in the city of Hebron for a few days after the incident demanding that the law be implemented, that those responsible be tried in court and sentenced, that members of the Municipal Council in the city of Hebron resign, and that existing legislation be more effectively enforced. The result of this "battle for law," as it was called, was an extensive move to process and endorse relevant laws that prevent such an accident from occurring in the future.

The Egyptian paper, by Major General (ret.) Salah Eldin Selim, explains a fire accident that occurred in May 1998, at an Egyptian field petroleum company in the eastern desert, on the shore of the Gulf of Suez. This fire was the result of a lightning strike on a crude-oil processing plant. Other contributing factors to the fire included defects in the ability to detect a fire quickly, a delay in the alarm system, a failure within the firefighting network, and hesitation in calling professional firefighting teams. As a consequence, five degassing, operational, and storage tanks were burned and some firefighters were injured, including two seriously. The result was the closure of the oil production plant due to the devastation caused by the fire, and extensive environmental damage.

The major lesson of this case is the interaction between technical and human factors. If the plant had had preventive measures in place to better protect it from lightning strikes, the tanks would not have caught fire. Such preventive measures

could include fixed or floating roofs to protect crude oil storage tanks and proper grounding of processed steel structures. Also critical, however, was the delay in calling the armed forces' firefighting units, which were the best trained and equipped in the area. This decision resulted in greater damage.

The Israeli paper, by Shlomo Rosenberg, Dr. Jean Negreanu, and Dr. Yair Sharan, has a similar lesson. It describes a June 1991 incident in which a cloud of undefined chemical vapor escaped from a chemical plant located in the southern region of Israel, near the town of Ashkelon. During the following hours, many people in nearby towns and in more distant locations (including Palestinians in the Gaza Strip) complained about a foul smell.

The chemical plant (Paz-Chem) was producing a dimethoate-based insecticide named "Rogor." The incident was a result of a runaway chemical reaction that occurred after the reactor was shut down. The result was that a PVC tube connected to the reactor broke down. The cloud that emerged from the plant did not contain active organophosphates, but instead decomposition compounds, which affected the people in close proximity to the plant.

In this case, there were proper procedures in place, but they were not properly carried out. Laboratory findings that gave early warning of a problem with the chemical being produced were reported to the production manager, who considered them insignificant and therefore did not stop production. A faulty temperature gauge was ignored. Another factor that impeded the effective preventive measures from being carried out was the weak relationship among relevant managerial actors.

## Conclusion

These cases suggest some fruitful areas for cooperation on chemical risks in the Middle East, which could be carried out through the CRC.

With its focus on legal structures, the Palestinian case makes an explicit link between the conflict in the region and the danger of chemical incidents. An independent and fully functioning Palestinian state could have enforced health and safety laws. Publicizing this side effect of occupation can lend urgency to the search for peace. The case also shows the importance of maintaining cooperation between Palestinian and Israeli authorities, both of whom sent fire brigades that worked together to extinguish the fire.

In the Jordanian case, authorities sought advice from the government of Norway and the World Health Organization. They also consulted with their Israeli neighbors. Because the incident evolved slowly, there was time to involve European experts, so the nations' proximity was not an issue. On the other hand, Jordanian authorities had to deal with popular perception that Israel was responsible for injecting polluted water into the Jordanian system. Visible cooperation between Israeli and Jordanian water experts might have served as a confidence-building measure by routinizing contact and increasing transparency,

but the presence of third-party experts would also have been essential to provide an impartial judgment on the source of the pollution. Publishing detailed information about this incident, as this publication does, also helps increase transparency.

In the Egyptian, Israeli, and Palestinian cases, local response capabilities were overwhelmed, and national police or military units were called in to assist. Human error was also an important factor in all four cases, with the most common error being poor coordination among different players or reluctance to call upon appropriate experts. The widespread need for better training suggests that this could be a useful area for future multinational cooperation.

The Egyptians, Israelis, Jordanians, and Palestinians in the CRC have begun a process of information sharing and confidence building. Their ideas will inform a vision of a safer, more cooperative Middle East.

# Acknowledgements

I would like to thank the many people who made this publication possible. First and foremost, I am grateful to the members of the Chemical Risks Consortium for having the courage to come together, to exchange ideas frankly, and to take a risk on Search for Common Ground—all while maintaining a shared vision of a more secure future in the Middle East. I give my special thanks to John Good for helping the group to meet its objectives and helping me to grow as a leader. This book could not have been published without the partnership and financial support of NTI, the Compton Foundation, and the Ploughshares Fund. Particular thanks are due to Joan Rohlfing of NTI.

Finally, I am extremely grateful to Fatima Ayub and Elyte Baykun, the Middle East Security Projects staff who supported this work, and to the interns who diligently researched case-study formats and shepherded the text from rough drafts to final form: Nathan Ondyak, Zoe Baines, Anne Figge, and Steven Krubiner.

—Gayle Meyers, Editor

# Participating Institutions

**The Cooperative Monitoring Center (CMC) @ Amman** was established in 2002 at Jordan's Royal Scientific Society and officially inaugurated on October, 2003. The center aims at building regional cooperative activities through sponsoring workshops and seminars to address particular security issues as they relate to the Middle East. The CMC is a forum for regional experts to explore jointly ways that technology can improve regional security and enhance confidence among states. CMC @ Amman is a partner of the CMC operating at Sandia National Laboratories, Albuquerque, New Mexico, USA.

**Al-Quds University** is a Palestinian university that is situated in East Jerusalem. It has eleven faculties, including Science and Technology, Arts and Humanities, Law, Engineering, Islamic Studies, Medicine, Pharmacy, Dentistry, Public Health, and others. The university serves the Palestinian community and offers bachelor's and master's degrees in more than thirty disciplines. The university serves more than 6500 students with a staff of more than 700, including academic and nonacademic personnel. The university is involved in research and encourages cooperation with regional and international universities and research centers. It has established strong ties with universities in the US, Germany, France, Italy, Spain, Belgium and had funding for collaboration in research from MERC (USA), DFG (Germany), INCO (Europe), and others. The university encourages gender studies and provides many services to Palestinian institutions and to the community as a whole, to promote growth and development.

**The Interdisciplinary Center for Technology Analysis and Forecasting (ICTAF)** is a leading Israeli institute in technology forecasting, foresight, assessment and long-term planning, and is very active in the international community. The multidisciplinary center taps the expertise of world-class scientists at Tel Aviv University and other well-known research establishments to create a core body of researchers with unrivaled knowledge in a diverse range of fields in exact sciences and engineering, geography, economics, education and

social sciences, information technology and communications. ICTAF functions as a think-tank, working alongside its governmental or business clients to produce far-reaching conclusions that are drawn from a unique blend of academic research and market know-how. In recent years, ICTAF has undertaken special activities in the fields of security and civil defense. These include studies on emerging technologies and the future battlefield, issues in future terrorism, threat analysis, and hazard evaluation. Projects deal with the preparation of the population for emergency situations in war and peace. ICTAF cooperates with partner centers in the European Union and the United States.

**The National Center for Middle East Studies (NCMES)** is the first privately owned and controlled research center in Egypt. However, it exists to meet Egyptian national interests and needs and promote regional peace and security. NCMES is analyzing current events, working to develop sound predictions of future developments in Egypt and the Middle East and endeavoring to influence changes at the regional and international levels. This think-tank has a wealth of knowledgeable and experienced former government officials, intellectuals and businessmen in its organizational structure, staff and as consultants. The NCMES is active in all fields of the second-track efforts to help establish peace and security through regional cooperation efforts in the Middle East.