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ORS/Iraq Collaboration on the Securing of Medical Radioactive Source Devices

2023 INMM/ESRADA Conference

Vienna, Austria

May 25, 2023

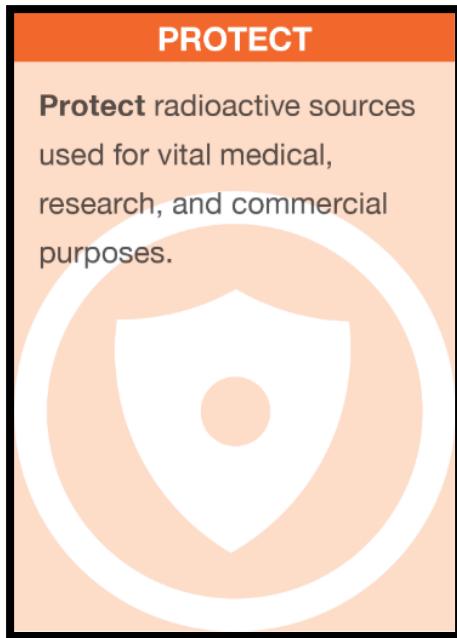
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Lawrence Livermore
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Office of Radiological Security (ORS)

MISSION: Enhance U.S. and global security by preventing high-activity radioactive materials from being used in acts of terrorism.



This presentation focuses on the protect mission.

Introduction

The ORS security enhancement methodology uses a hybrid approach that focuses on security system performance while complying with a country's requirements. The goal is to improve the effectiveness of the physical protection system and reduce the probability of the material from leaving the site.

Joint Project Team

ORS Supports the Republic of Iraq, through the Iraq Radioactive Sources Regulatory Authority (IRSRA). The project work is implemented by Lawrence Livermore National Laboratory (LLNL). For the protect mission, the primary focus is to protect radioactive sources located at 6 hospitals housing gamma knife radiation therapy treatment centers.

This effort includes establishing a remote monitoring center at IRSRA, connected to all hospitals with gamma knife treatment areas.

The primary implementation vendors utilized by LLNL, in Iraq, include SOC, LLC and Kavaal, LLC.

The primary training location is the CYCLOPS Training Facility, located in Cyprus.

Radioactive Source: Cobalt-60

- Teletherapy and Stereotactic Radiosurgery units (cancer treatment)
- Self-shielded and panoramic irradiators (research and sterilization)



- Approximately 400 million Curies of Co-60 in use, far more than any other radioisotope

- ◆ Radioactive element created in select nuclear reactors
- ◆ Commonly used in healthcare, radiation processing, and research applications
- ◆ In the wrong hands, Co-60 could be used to make a radiological dispersal device (dirty bomb)

Establishing Partnerships and Joint Actions

- Partner cooperation was solidified through a 2019 multi-party joint meeting, held in Leon, France.
 - ORS and LLNL
 - IRSRA
 - U.S. Department of State
 - International Atomic Energy Agency (IAEA)
 - Interpol
- ORS and IRSRA developed a list of joint actions with the primary objective of securing Iraqi gamma knife treatment areas, with LLNL designated as the lead for the project.
- Subsequent meetings involving the same participants were held virtually in 2021, and in-person in Leon, France in 2022.

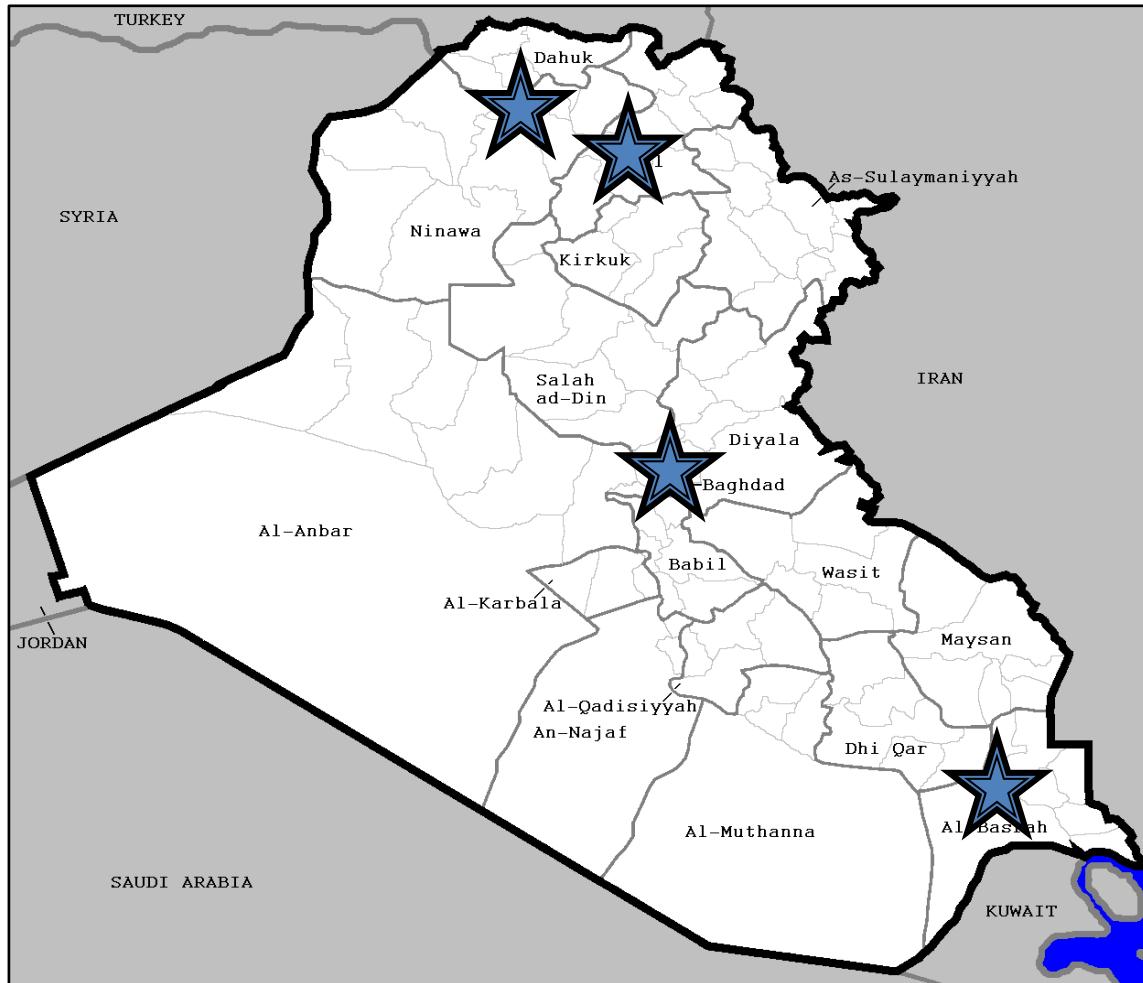
LLNL Project Site Objectives

- Establish cooperative partnership,
- Conduct site assessments to define physical and operational characteristics,
- Design a protection plan for each facility,
- Develop statements of work with conceptual design for vendor contracts to install physical protection system upgrades,
- Complete installations at each facility to **Protect** radioactive sources,
- **Train** applicable personnel, and
- **Sustain** security through effective government and site operations, and the maintenance of upgrades.

Challenges

- ORS does not currently allow LLNL personnel to travel to Iraq.
- The LLNL work scope with Iraq is currently being accomplished remotely, with third parties, virtual meetings, and in-person meetings held in third countries.
- Work was delayed due to the Covid-19 pandemic restrictions.
- Identifying security system vendors in the region to perform security system installations in Iraq.
- Gaining cooperation of hospital staff and their acceptance of security system upgrades.
- Developing enduring relationships with project partners.

Project Sites



Mosul:

University of Mosul Hospital

Erbil:

Hawler Hospital

Baghdad:

IRSRA

Al-Taj Hospital

Saad Al-Watry Hospital

Ghazi Al Hariri Hospital

Basra:

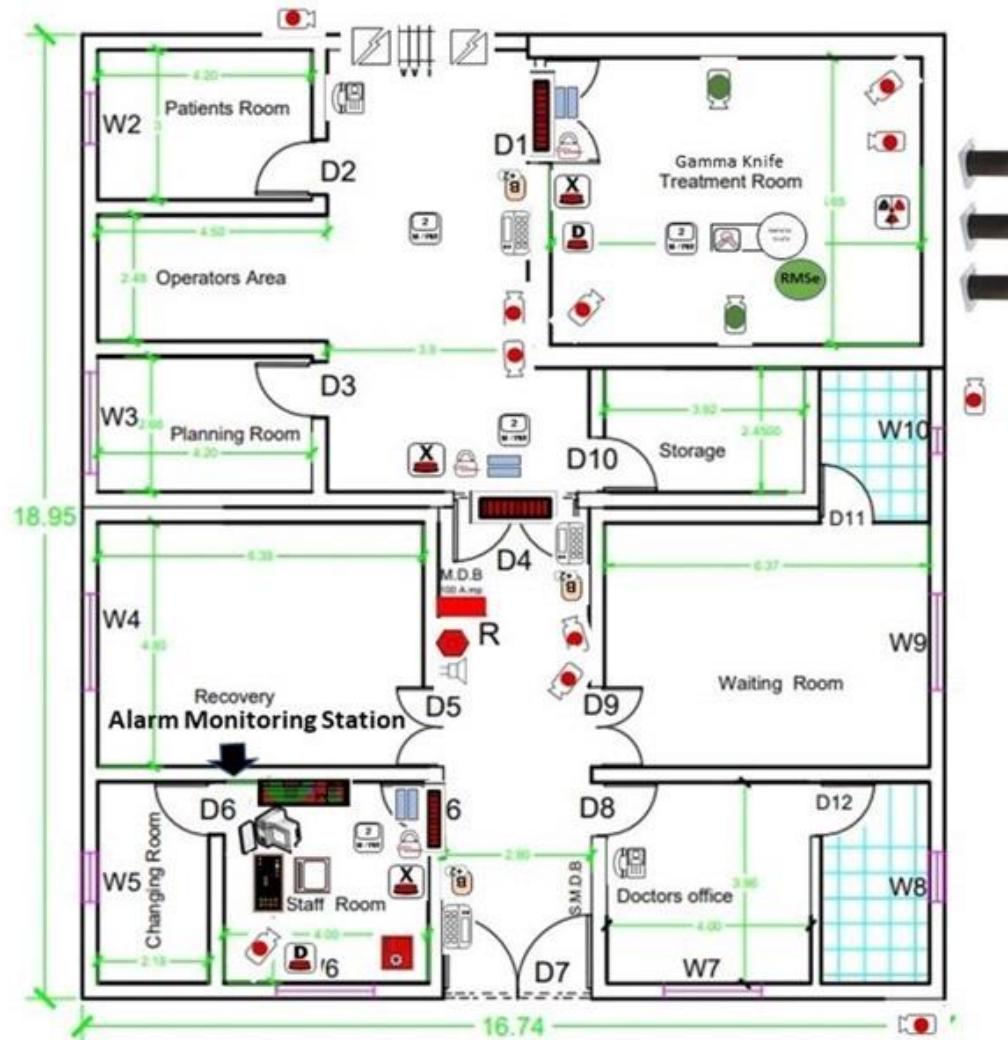
Sader Hospital

Physical Protection System Upgrades

- Physical Protection Upgrades installed to secure radioactive sources, incorporating cyber security, include:
 - two layers of bounded protection zones,
 - multi-function access control,
 - intrusion detection; balanced magnetic sensors and volumetric sensors,
 - closed circuit television (CCTV) with recording,
 - insider protection; tamper indicating and remote monitoring,
 - radiation monitors,
 - duress buttons and audible/visual alarms,
 - barriers,
 - central alarm station, and
 - external systems such as CCTV and barriers serve to compliment interior protection measures.

Typical Installation

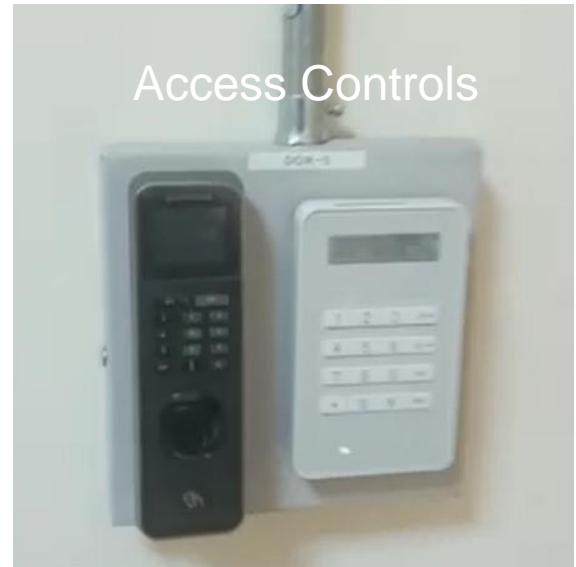
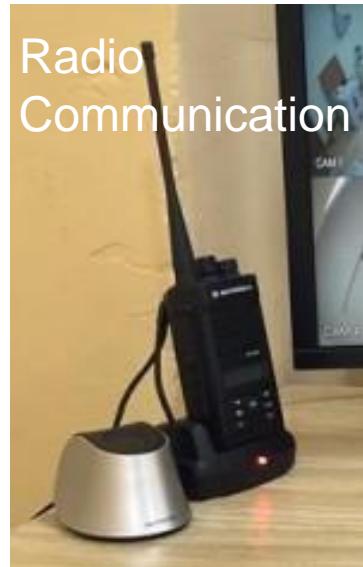
- Typical design for a protection area and a central alarm monitoring station.



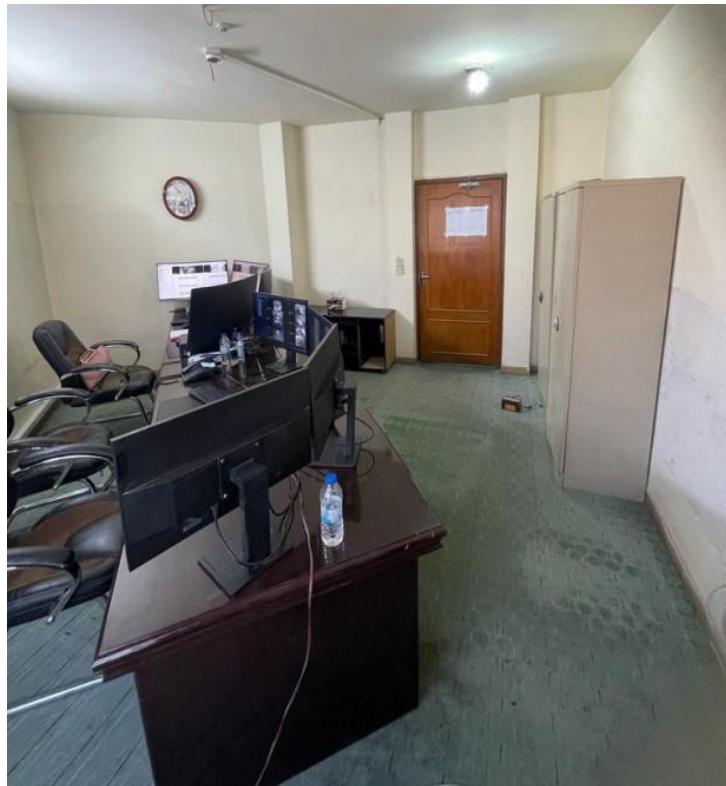
Alarm Monitoring Station View



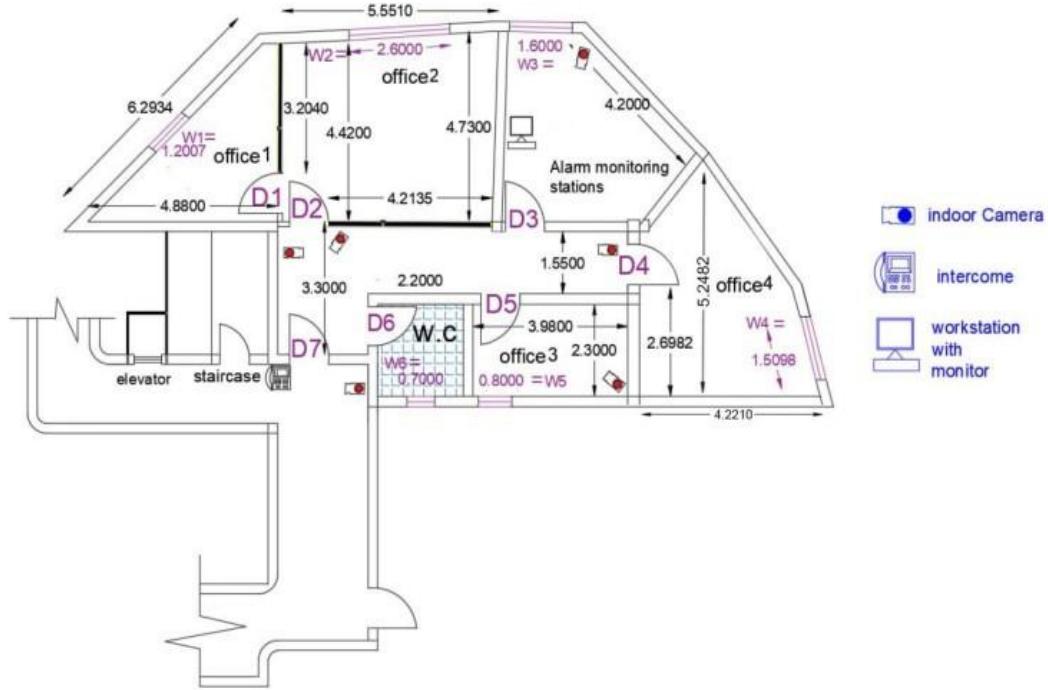
Installation Examples



Remote Monitoring Center (RMS)



Existing room before upgrades



Floor plan with design features

Training

- LLNL and IRSRA have been conducting essential training for key staff personnel. Training has included:
 - Virtual Physical Protection Security Management,
 - Virtual Site Security Planning, and International Response Training (IRT).
 - In-person training for IRT was conducted at the CYCLOPS Training Facility, in Cyprus, in 2022.
 - Follow-on training, scheduled for June 2023, will be conducted at CYCLOPS in Cyprus to jointly revise hospital site security plans, and,
 - LLNL contractors, SOC and Kavaal, have conducted on-site training for hospital personnel regarding use of the physical protection systems, effective monitoring of the systems, and response actions.



Sustain

- LLNL has contracted for testing and maintenance of physical protection system upgrades at all project sites.
- LLNL and IRSRA continue working with project sites to fully implement security plans and response requirements.
- Interactions with local law enforcement have increased.
- Iraqi personnel have expressed interest in on-going security culture training.
- Planning is underway to enhance Iraqi government oversight activities, e.g. inspection process and response to security events.

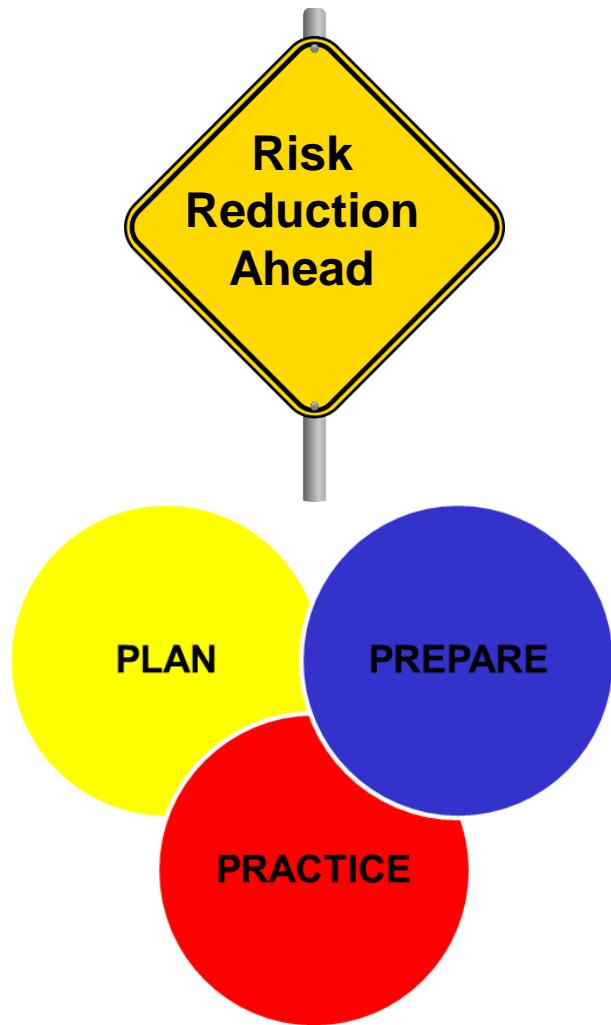
DETECT

DELAY

RESPOND



The Path Forward



- Planning for future activities and sustainability continues, while the final physical protection upgrades and the IRSRA RMS are installed.
- Alternative technologies, that may replace the radioactive sources, are being discussed.
- In addition, redefining and strengthening the Iraqi government agencies' roles and responsibilities for radioactive materials is also underway.
- These activities are being implemented by LLNL and IRSRA and sponsored by ORS.

Summary

- As indicated throughout, international coordination has been essential. Periodic coordination by ORS and LLNL occurs with Interpol, U.S. Department of State, Iraqi and regional stakeholders, as well as the IAEA.
- In conclusion, it is with full appreciation from all involved, that the security measures in Iraq **have reduced risk**, primarily due to the commitment of Iraqi personnel.



Conclusion

THANK YOU!
QUESTIONS?



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