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Activities of Jordan in detecting and responding to radioactive materials out of the regulatory control

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Jordan National Strategies for Regaining Control Over “orphan” Sources

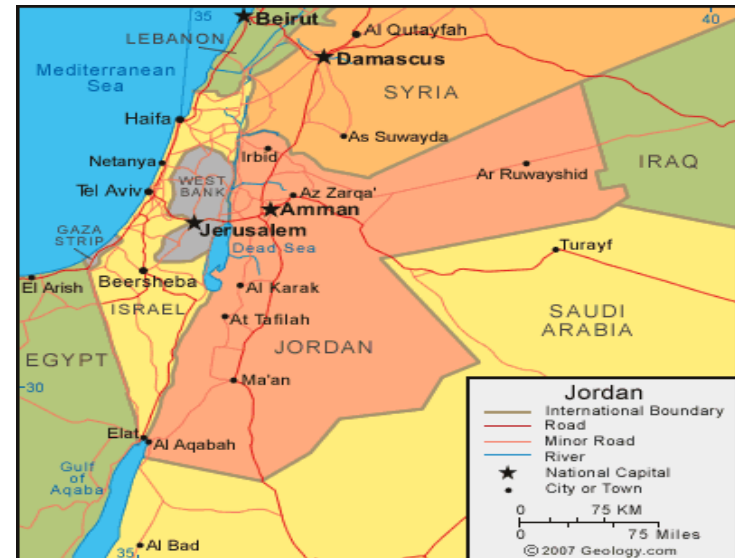
Accidents involving radioactive sources and reports of illicit trafficking in radioactive materials had led to greater awareness of the safety and security risks created by sources that are outside effective regulatory control – or “orphaned”

Accordingly, the Jordanian authority, represented now by the Jordan nuclear regulatory commission (JNRC), initiated, in 2004, a number of actions for:

- upgrading its radiation protection infrastructure;
- improving the safety and security of high-risk radioactive sources
- combating illicit trafficking in nuclear and other radioactive materials.
- Enhancing preparedness for radiological emergencies.
- Raising public awareness through communication, education and training.

Border monitoring program

Jordan is one of the Middle East countries, with a population of (7) million, and a total area of (90,000) Sq.km. Amman is the capital with a habitant of (2.5) million people.



Border monitoring program

- Border monitoring of trucks, lorries and containers is taking place at 9 ports of entry representing 12 border sites to protect and about 4000 trucks/container per day to monitor.
- The objectives are:
 - to minimize any potential health hazards;
 - to bring the nuclear and radioactive materials under appropriate control; and
 - to investigate, gather evidence and prosecute any offenders.
- Radiation detection equipments are designed to locate and identify sources of radiation in trucks and lorries that could be a potential threat to health and safety.

Fixed, installed instruments



Yantar-2U



Thermo FTH1388S



Exploranium AT900

Hand-held instruments



Type: MKC-A02
Company: ASPECT

Gamma: 40x40 mm
NaI-detector + GM
Neutrons: 3 x He3-Tubes
Alpha + Beta: extern

270 x 130 x 190 mm



Type: identiFINDER ultra
Company: TARGET

Gamma: 30x38 mm
NaI-detector + GM
Neutrons: small He3-tube

250 x 100 x 75 mm

Primary Screening

- Rapidly release the majority of vehicles
- Strategically positioned at the earliest point of entry
- Facilitate the flow of commerce
- Survey all vehicles/containers
- High throughput is an operational necessity
- 8 to 15 km/h drive through -- ≤ 20 sec/vehicle



The scanners' effectiveness is affected by many factors including

- Naturally occurring radioactive materials (NORM),
- Innocent goods, such as fertilizers, ceramics and construction materials,
- Distance between trucks,
- Dense materials like steel and lead,
- The speed at which trucks carrying cargo move.

Secondary Screening

- Evaluate all suspect vehicles/items using hand held equipments,
- Confirm primary alarm was not an anomaly,
- Identify any real threats within smaller population,
- Resolve cross-talk alarms (multiple-vehicle alarms),
- More controlled measurement time available per vehicle.

Innocent alarms

- Place an enormous burden on our monitoring offices, who must respond to all radiation alarms,
- At busiest border crossings, can lead to backed-up lines or slow commerce.
- A frequency of about one innocent alarm per 100 monitored vehicles.

Spectroscopic portal monitors may reduce nuisance rates and might improve operational sensitivity to threats of interest.



Border Security Examples

Al-Karama border crossing between Jordan and Iraq

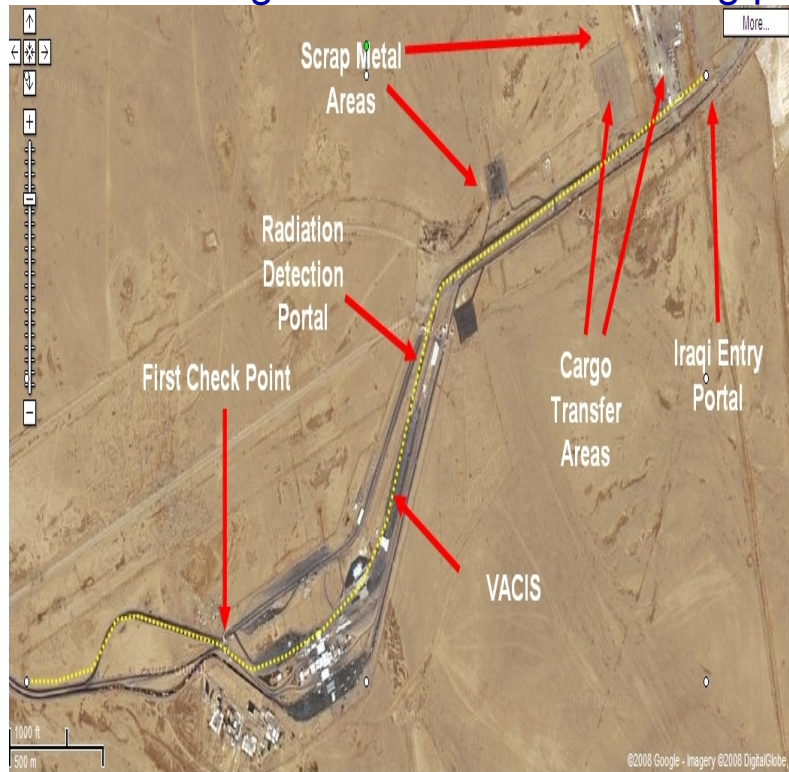
The border crossing is approximately 400 km east of Amman and is the only border crossing between the two countries. A radiation portal for vehicles entering Jordan is located approximately 2 km from the Iraq entry point.



Border Security Examples

Security arrangements

Due to current security concerns, Iraqi trucks containing goods are prohibited from entering Jordan and must be offloaded and reloaded in the cargo transfer area. Only empty Iraqi trucks and Jordanian trucks loaded with cargo bound for Jordan undergo the radiation screening process.



Border Security Examples

- Vehicles triggering the alarm are documented in a logbook and returned to the cargo transfer area where the driver can “decontaminate” the vehicle (if empty) or be refused Jordanian entry (i.e., cargo is reloaded onto an Iraqi truck and sent back to Iraq). Recent JNRC records indicate that most of the recent truck alarms originated from empty Iraqi trucks.
- Vehicles triggering the alarm are documented in a logbook and returned to the cargo transfer area where the driver can “decontaminate” the vehicle (if empty) or be refused Jordanian entry (i.e., cargo is reloaded onto an Iraqi truck and sent back to Iraq). Recent JNRC records indicate that most of the truck alarms originated from empty Iraqi trucks.
- Waste from the “decontamination” process (hand washing with water and/or wipes) is routinely dumped on the ground

Border Security Examples

- Elevated radiation levels in some parts of the east cargo transfer area were noticed. Using their hand-held radiation detector (i.e., 2" x 2" NaI count rate meter), JNRC staff identified several locations where elevated radiation was detected. (Nominal background reading was 30 counts per second [cps]; elevated areas were 70 cps.).
- experts to identify the presence of Bi-214, a naturally occurring isotope associated with the decay of Ra-226
- samples were analyzed and found to contain low-level concentrations of natural uranium (17.7 ppm or 0.22 bq/g) and Ra-226 which is normal for Jordan.

Border Security Examples

Scrap Metal Areas

There are two metal scrap yards at the Al Karama border area. The western scrap yard contains regular scrap metal. The eastern scrap yard is used for military scrap such as tank engines, jet engines, vehicle transmissions, and tank tracks.



Border Security Examples

- When scrap metal arrives, the Jordanians dump the metal in the appropriate scrap metal yard
- Scrap is then scanned for radiation before being shipped for recycling in Jordan.
- Some of the scrap reportedly contained sealed sources.
- scrap material is now being pre-screened in Iraq for radiation prior to crossing into Jordan and since September 2008, no radioactivity has been detected in the bulk scrap metal.

Border Security Examples

Orphan Sources

Jordan has a large number of uncharacterized orphan sources (recovered orphan sources) which are in interim storage awaiting characterization and disposition.



Thank You