



Cobalt 60 Sources in Mosul: Recovery and Lessons for the Future

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(The Institute)

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This report is covered by an exclusive Washington Post [story](#), “How ISIS Nearly Stumbled on the Ingredients for a ‘Dirty Bomb,’” by Joby Warrick and Loveday Morris

Two years ago, in the summer of 2015, the Institute decided to investigate whether Daesh controlled dangerous radioactive material in Iraq or Syria. The result of a few months of study by Sarah Burkhard, a young scientist, and other staff surprised us all. Their investigations found that there were apparently two sources of radioactive cobalt in Mosul that posed a risk of being used in a radiological dispersal device. We could not know if Daesh was aware of these sources and their potential, or had already taken possession of them. We produced a confidential research study that we used to alert the United States and other friendly governments of the situation as we knew it, most of which were also monitoring the situation. At the same time, we decided not to publish any of our results. As we learned more, we updated our study, which remains a confidential report due to its sensitivity.

We are very relieved that these two, older albeit still dangerous, cobalt 60 sources were not found and used by Daesh. They were recovered intact recently. We want to thank in particular Joby Warrick at *The Washington Post*, who we had alerted early on for assistance in researching the fate of these sources. He understood the importance of digging into this story while delaying its publication until the radioactive sources were in safe hands. He and his colleagues at the Washington Post recently added greatly to this important story.

Background

Daesh rapidly seized control of the Iraqi city of Mosul in 2014 and inherited with it, unknowingly to the public, two cobalt 60 teletherapy machines carrying highly dangerous nuclear material. These machines were procured years ago in the 1980s or even 1970s for the treatment of cancer and conducting research. We estimated based on open source information that the cobalt 60 had decayed considerably but still had a radioactive strength that would place it in the International Atomic Energy Agency’s (IAEA’s) category 2 of radioactive sources,

described as “very dangerous to the person.”¹ In terms of dose strength, the sources could produce a fatal dose to an individual at a meter from the source within 2-4 hours. For individuals within 0.1 meter distance, it could occur within 2-3 minutes.

In comparison, a widely publicly discussed radioactive iridium source that went missing in Iraq in late 2015 was also category 2. (The source was later found and secured.)² However, we estimated that at least one of the cobalt-60 sources in Mosul had a dose rate roughly 20 times greater than the missing iridium.

Lessons

This case has several lessons for the future and should serve as a reminder of the risks posed by radioactive sources, many of which are poorly protected or accounted for.

We do not know why Daesh did not use the cobalt 60 sources to make a radiological dispersal device. Our speculations include that since the cobalt 60 comes in metal form and not as a powder, it would be more difficult to use the radioactive cobalt, involving steps that can be very dangerous for unprepared and inexperienced individuals. A more likely possibility is that Daesh did not know about the cobalt 60 sources. Did courageous hospital and university staff work successfully to keep the existence of the sources secret?

Other potential reasons for the lack of use include:

- The sources were judged as not destructive enough for Daesh’s goals;
- The use of the sources in a radiological dispersal device in the West did not fit the Daesh idea of how they would want to attack the West; or
- The Daesh leadership was pre-occupied elsewhere and did not learn about the sources in Mosul or have a chance to think through the opportunities offered by the cobalt 60 sources.

Whatever the actual case, we are relieved that these dangerous sources remained intact and were not seized by Daesh. We may not be so fortunate next time. It is important to learn from this near miss and seek improvements to further reduce the chances of a terrorist group misusing radioactive materials.

This case should lead to reinvigorated efforts to inventory and adequately protect radioactive sources throughout the world. However, as this case highlights, improving physical protection may not be enough. It is also important for the United States and its allies to accelerate programs to identify, consolidate, and remove dangerous radioactive sources, particularly in regions of tension or where terrorists are active. Iraq and other countries in regions of instability and insurgency should receive expedited assistance to remove cobalt 60 sources and receive cobalt-free cancer treatment mechanisms.

¹ IAEA, “Categorization of Radioactive Sources,” Vienna, 2005.

² “Exclusive: Radioactive material stolen in Iraq raises security concerns,” Reuters. February 17, 2016.