

SUSPECT REACTOR CONSTRUCTION SITE IN EASTERN SYRIA: THE SITE OF THE SEPTEMBER 6 ISRAELI RAID?

DAVID ALBRIGHT AND PAUL BRANNAN

THE INSTITUTE FOR SCIENCE AND INTERNATIONAL SECURITY

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ISIS recently obtained commercial satellite imagery from DigitalGlobe taken on August 10, 2007 of a large portion of Eastern Syria along the Euphrates River. After an extensive search and analysis of the imagery, ISIS found a site that could be the target of the Israeli raid inside Syria on September 6, 2007.¹ The tall building in the image may house a reactor under construction and the pump station along the river may have been intended to supply cooling water to the reactor (Figure 1).

The tall building, located approximately 780 meters from the river, is square with approximately 47 meter length sides. There is what appears to be a pump station located on the banks of the river directly west of the tall building. A reactor requires a large volume of water for cooling and this pump station could serve that purpose. The purpose of the secondary building in the image (see Figure 1) is unknown, but it does not appear to be a temporary structure. Trucks can be seen approximately 100 meters to the east of the tall building. This, along with evidence of heavy machinery tracks around this site, indicates recent construction activity.

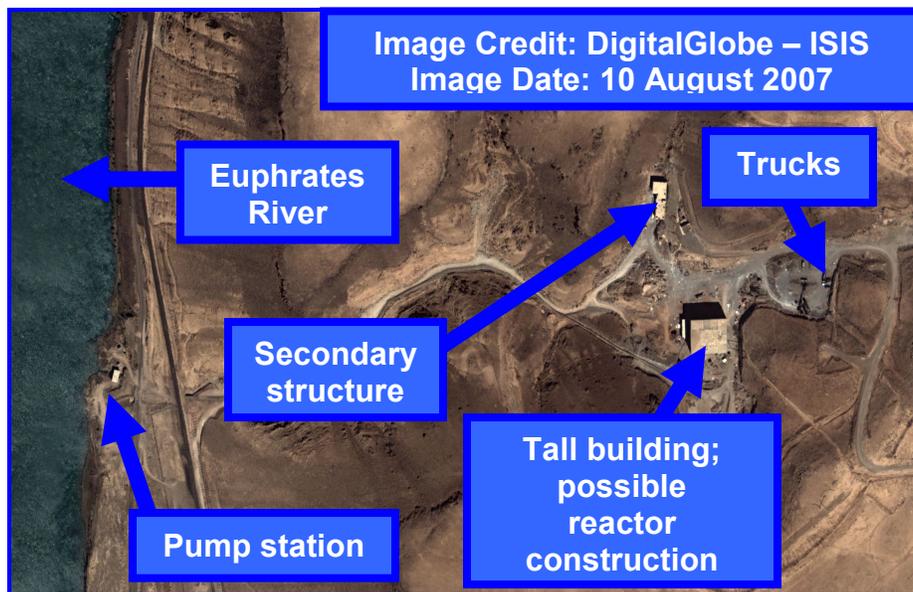


Figure 1.

¹ On October 22, ISIS provided a draft report to *The Washington Post*. According to an October 24 article by Robin Wright and Joby Warrick, "U.S. and international experts and officials familiar with the site, who were shown the photographs yesterday, said there was a strong and credible possibility that they depict the remote compound that was attacked."

This site is approximately 145 kilometers from the Iraqi border and situated 11 kilometers north of At Tibnah in the Dayr az Zawr region of Syria (Figure 2). There is an airstrip located 3.5 kilometers north of the site (Figure 3). Such an airstrip would serve as quick transportation of personnel and officials.

ABC News reported on Friday, October 19th, 2007 that Israel had recruited a spy to take ground photographs of the reactor construction from inside the complex. Recruiting a spy to take ground photographs of an exposed reactor vessel is unnecessary—as high resolution non-commercial satellite imagery would negate this need. If, however, the reactor vessel and associated shielding were surrounded by a building and covered with a roof, a spy may have been necessary to take photographs from inside the reactor building.

[*The Washington Post*](#) reported on Friday, October 19th, 2007 that an official described a facility as similar in structure to a North Korean reactor. North Korean reactor construction is based on an old Russian model—in which the reactor vessel is built gradually and is not brought to the site already constructed or in large pieces, requiring a large crane to move heavy equipment inside. This North Korean/Russian approach would mean that a roof would be placed on a building earlier than in some other reactor designs, and it would hide what was inside the building earlier in the construction timeline.

In comparing the five megawatt-electric (or 20-25 megawatt-thermal) reactor building at North Korea's Yongbyon nuclear facility to this suspected Syrian reactor building, the length of the outer walls of the structures are approximately the same (see Figures 4 and 5). The taller roof of North Korea's reactor measures approximately 32 meters by 24 meters on its sides. There also appears to be a faint square on top of the Syrian building's roof. It is unclear whether something would be built there, but its dimensions, 24 meters by 22 meters, are consistent with the subsequent construction of an upper roof. From the image, the Syrian building is similar in shape to the North Korean reactor building, but the Syrian building is not far enough along in its construction to make a definitive comparison.

If the design of the reactor is similar to a North Korean reactor, it is likely a small gas-graphite reactor of the type North Korea built at the Yongbyon nuclear site north of Pyongyang. The Syrian building size suggests that the reactor would be in the range of about 20-25 megawatts-thermal, large enough to make about one nuclear weapon's worth of plutonium each year (see Figures 4 and 5).

If Syria wanted to build nuclear weapons, it would need a specialized facility to chemically separate the plutonium from the irradiated fuel discharged from the reactor. It is unknown whether Syria has such a facility under construction or planned.

On October 23, 2007, Google Earth posted imagery that covers a wide swath of eastern Syria and includes this site. The suspected reactor building can be seen, but the

secondary structure and the pump station are both missing in this image. The exact date on which the image was taken is not provided by Google Earth, but it must be significantly earlier than August 10, the date of the DigitalGlobe imagery obtained by ISIS. The absence of the pump station would make interpretation of the purpose of the site very difficult.

The images raise as many questions as they answer. How far along was the reactor construction project when it was bombed? What was the extent of nuclear assistance from North Korea? Which reactor components did Syria obtain from North Korea or elsewhere, and where are they now? Is Syria able to produce any of the key reactor components itself? Could Syria have finished the reactor without on-going North Korean assistance? Did Syria plan to build a plutonium separation plant?

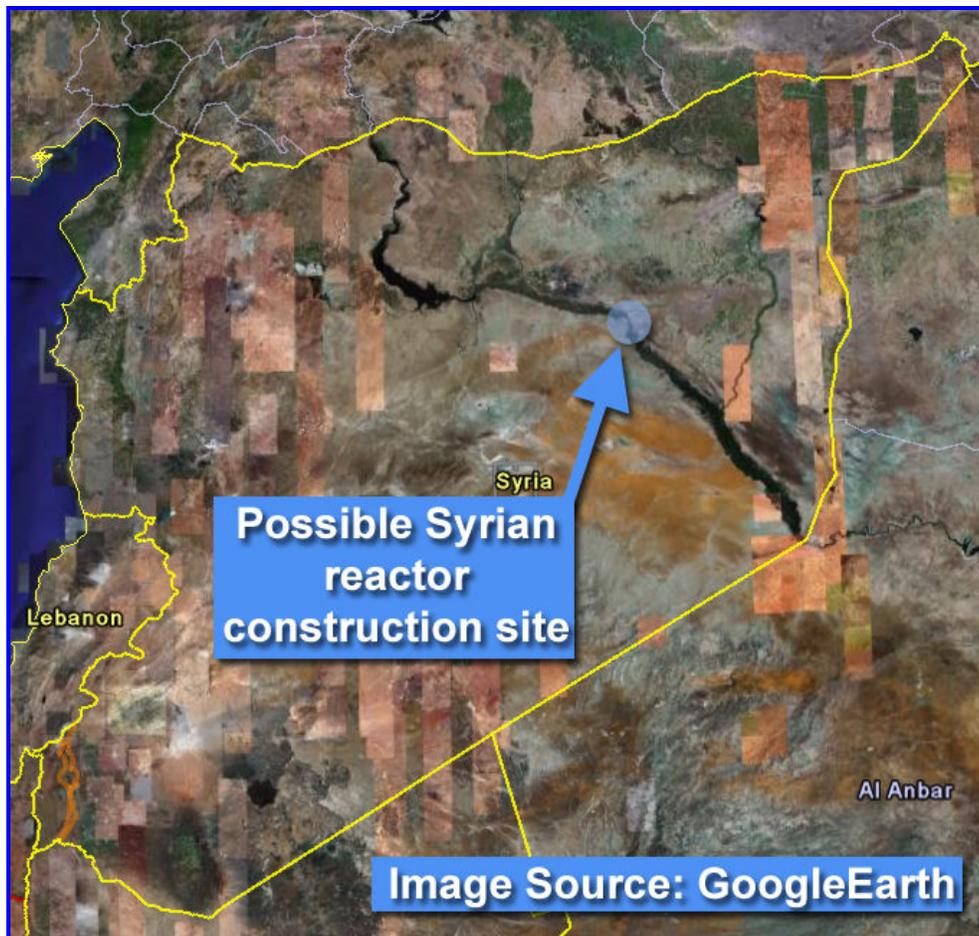


Figure 2.

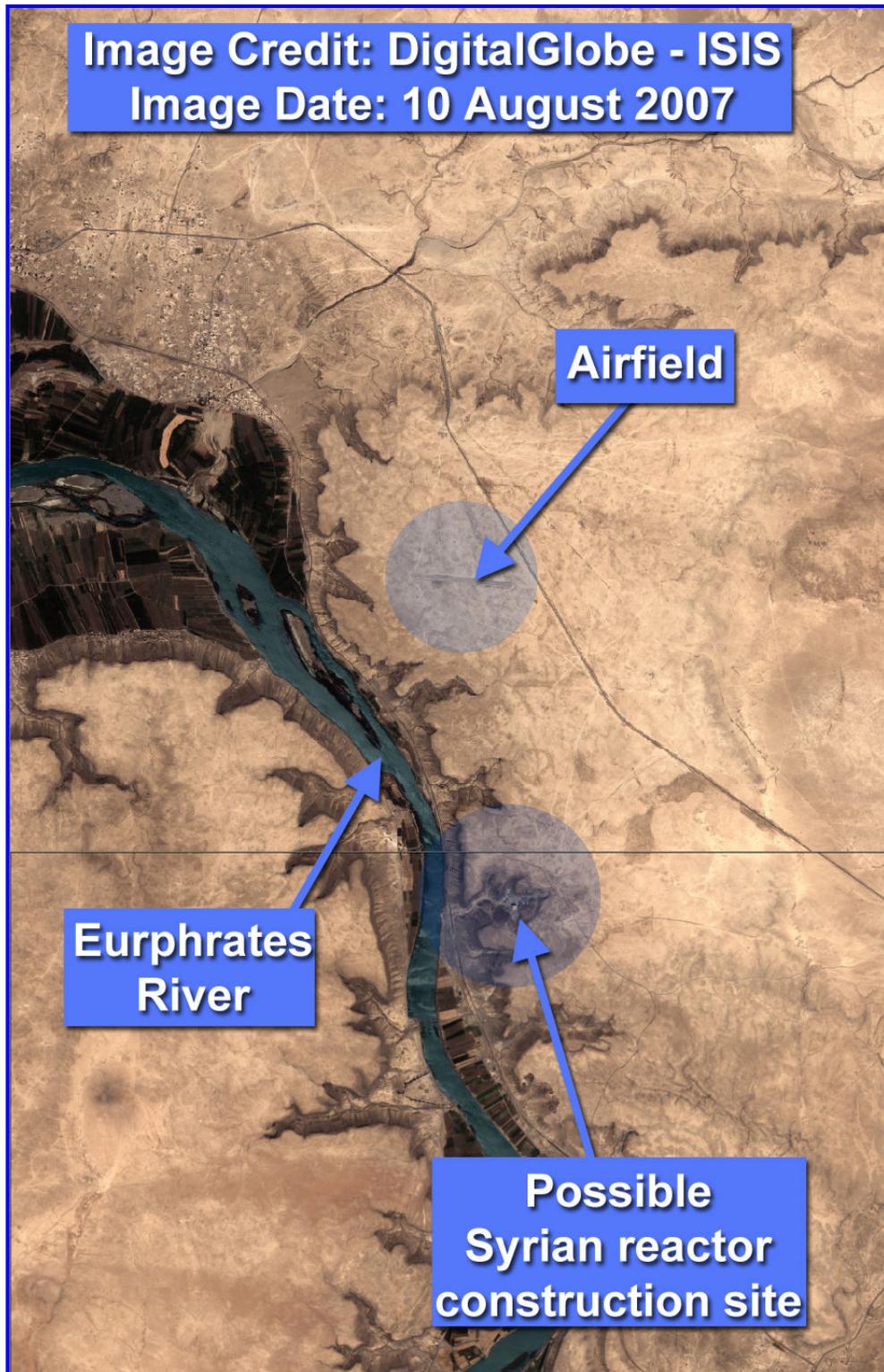


Figure 3.



Figure 4. The five megawatt electric reactor building at Yongbyon, North Korea.

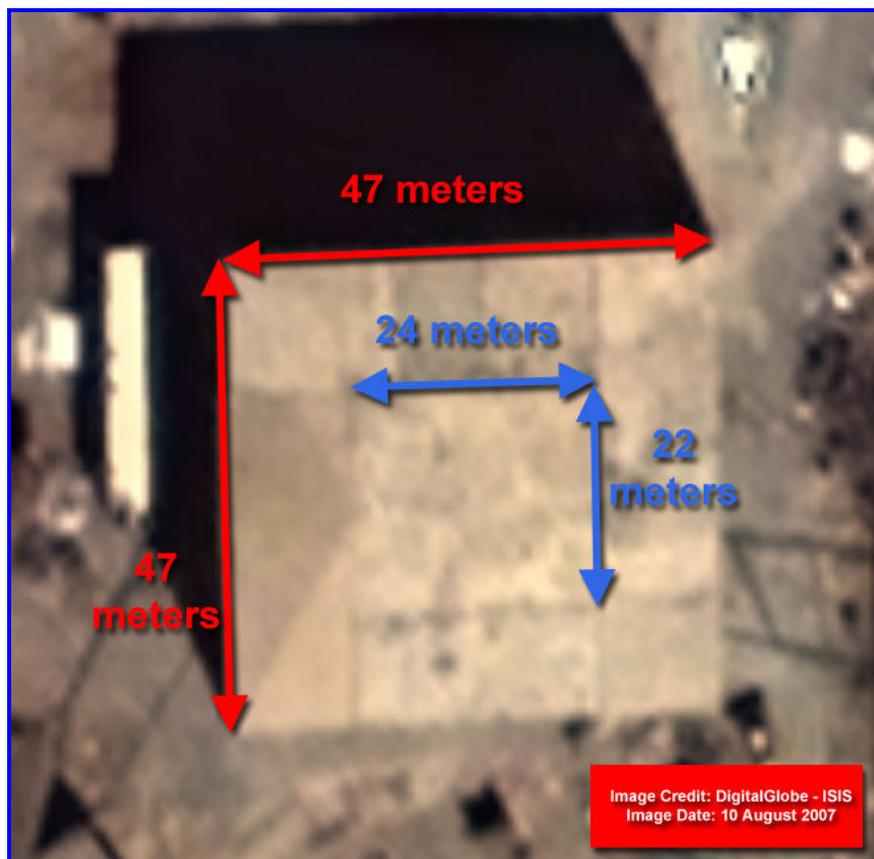


Figure 5. Possible Syrian reactor construction site.