Institute for Science and International Security

ISIS REPORT

The Al Kibar Reactor: Extraordinary Camouflage, Troubling Implications

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Image Credit: U.S. Government

Introduction

The U.S. intelligence community's release of information about the Al Kibar reactor in Syria settles at least part of a public debate that has swirled since Israel bombed the site in the early hours of September 6, 2007. However, the new information again raises difficult questions about the ability of governments and international institutions to detect secret nuclear facilities in their early stages of construction. Early detection is critical to developing effective diplomatic means of preventing the operation of unsafeguarded nuclear facilities.

The information released on April 24, eight months after the strike, does not settle all the major questions about Al Kibar and Syria's nuclear program. But it does address the fundamental question of the purpose of this facility. Faced with intense secrecy from Israel, the United States, and Syria, the public was largely left to speculate about this site through the fall and winter. After ISIS successfully located the attacked site in late October 2007 and tentatively confirmed it

[Banner image credit: DigitalGlobe-ISIS]

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as a reactor, the public debate centered on whether it indeed was a nuclear reactor. Many disagreed with ISIS's assessment, citing the lack of visible attributes expected for a reactor project. Foremost among the skeptics was the International Atomic Energy Agency, whose head Mohammed El Baradei said, "Our experts who have carefully analyzed the satellite imagery say it is unlikely that this building was a nuclear facility." Popular magazines such as *The New Yorker*, also opined that the facility had apparently little to do with nuclear reactors, relying partially on the IAEA for confirmation of that mistaken view. Many experts from the nonproliferation community were drawn into the debate, which was widely recognized as one of the most mysterious nuclear stories in recent memory. One drawback of this debate is that it diverted critical public discussion of the wider implications of the strike.

Few support the use of military force to settle international nuclear disputes. Director General El Baradei was particularly critical of a country taking military action over pursuing established channels for adjudicating compliance or lack thereof with the Nuclear Nonproliferation Treaty. He rightly criticized the United States and Israel for not presenting any evidence about the site to the IAEA and allowing a diplomatic process to resolve the situation peacefully. In addition, after the fiasco of alleged Iraqi WMD, many were skeptical of media reports that sourced anonymous Bush administration officials identifying the site as a reactor.

Many critiques were based on a belief that a reactor construction project would have a range of signatures, and that many of these indicators would be visible in commercial satellite imagery. These include physical protection, distinctive shapes or heights of a reactor building, power lines, water cooling system, a tall stack, specialized or additional transportation arrangements, and near-by housing.

This report focuses on the astonishing lengths to which Syrian engineers and architects went to hide these commonly expected attributes and conceal the building's true purpose. This case serves as a sobering reminder of the difficulty of identifying secret nuclear activities and how too often debate about the veracity of technical assessments is subordinated to political or ideological goals on both the right and left. It should also serve as a call to bolster national and international methods to better detect these facilities. The current domestic and international capabilities to detect nuclear facilities and activities are inadequate to prevent more surprises in the future.

Unexpected Public Release

On April 24, the U.S. intelligence community (IC) revealed striking details of the construction of a nuclear reactor near the Syrian town of Al Kibar that started in 2001. The information is contained in an intelligence community video, a transcript of an intelligence community briefing to journalists, and a hand-out given to the journalists.

In addition to the intelligence community's release, this report draws on an extensive amount of information that ISIS obtained from U.S. government experts knowledgeable about intelligence assessments about the Al Kibar reactor.

The IC identified the reactor as a gas-graphite reactor, based on a North Korean design. The Syrian reactor is similar, but not an exact copy, of the five megawatt-electric reactor at the Yongbyon nuclear center, which has a total power of about 20-25 megawatts-thermal. When operating close to full power, this reactor can produce enough plutonium for a nuclear weapon every year or two.

The full extent of North Korean assistance is unclear, according to U.S. government experts. However, it includes design and engineering assistance, the probable supply of reactor components, and assistance in procuring items illicitly from other countries. The North Korean assistance, however, was not as extensive as providing a complete or "turn-key" facility.

The new information yielded a chronology of the reactor's construction and details about the camouflaging of the reactor building, including ground photos, reportedly obtained by Israel, showing how the building was converted sometime between 2002 and 2003 from one with a shape similar to the Yongbyon reactor to a non-descript building of modest height.

After the bombing of the reactor, U.S. intelligence used overhead imagery to view the cleanup of the destroyed reactor building and its components. This analysis identified the probable locations of three key components of a gas-graphite reactor: the reactor core, the spent fuel pond, and the heat exchanger system (see figures 1 and 2). The heat exchangers transfer heated carbon dioxide gas from the reactor core to water drawn from the nearby river.

The U.S. intelligence community assessed that the reactor's spent fuel pond was on the eastern side of the building (see figures 1 and 2). The spent fuel pond for Yongbyon's reactor is located in a separate building (see figure 3).

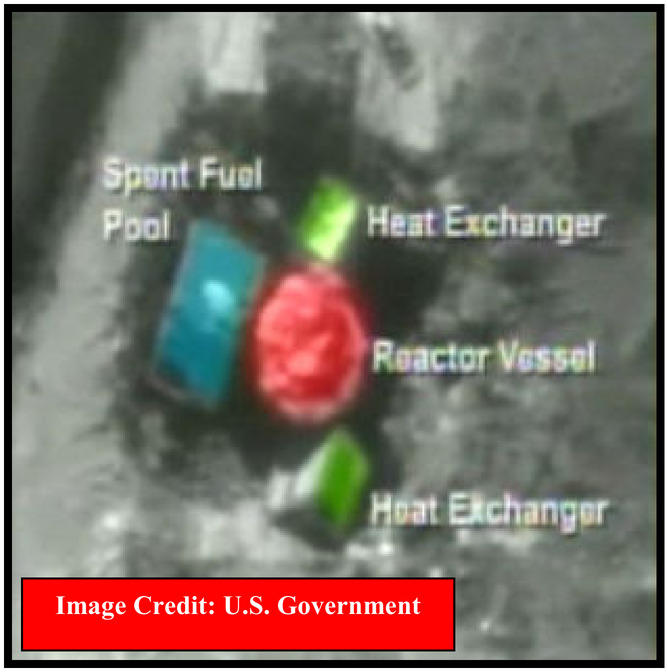

Figure 1. Syrian reactor site after Israeli air strike and after controlled demolition.

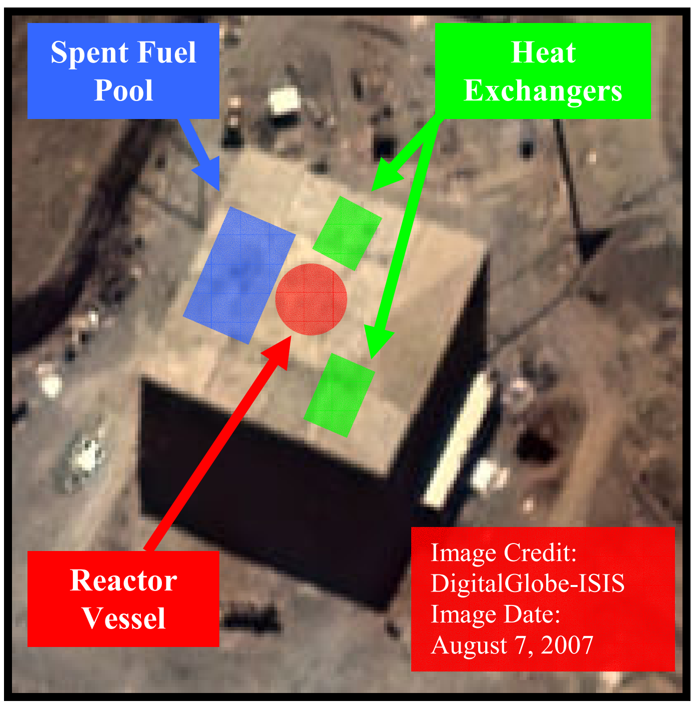

Figure 2. Approximate location of key reactor elements overlaid onto August 10, 2007 commercial image.

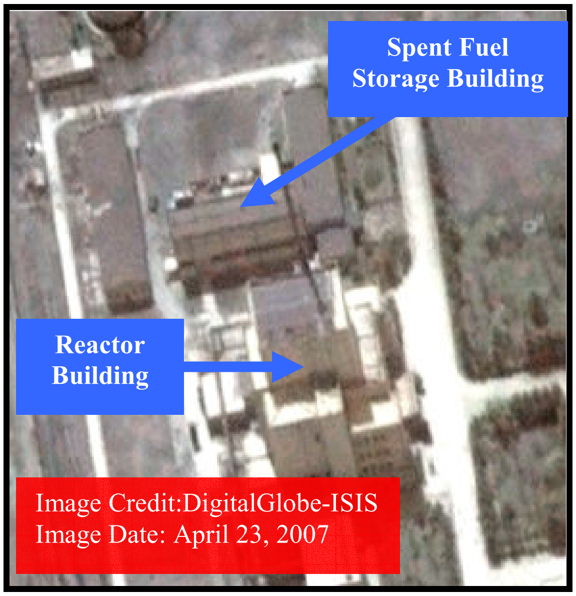

Figure 3. North Korea's Yongbyon reactor with separate spent fuel storage building.

Creating a "Boxy" Non-Descript Building

By far the most dramatic feat of concealment of the building's purpose was the effort to mask the design of the building using fake upper walls and roof. Figure 4 shows the original design of the reactor building, with columns used to suspend what appear to be flimsy camouflaging roofs. These columns were likely later used as the framework for the final fake outer walls and roof. This ground photo dates to before 2003, when GeoEye satellite imagery shows only the boxy structure. The U.S. intelligence community does not have satellite images prior to the completion of the construction of these fake walls and roof, according to US Government experts.

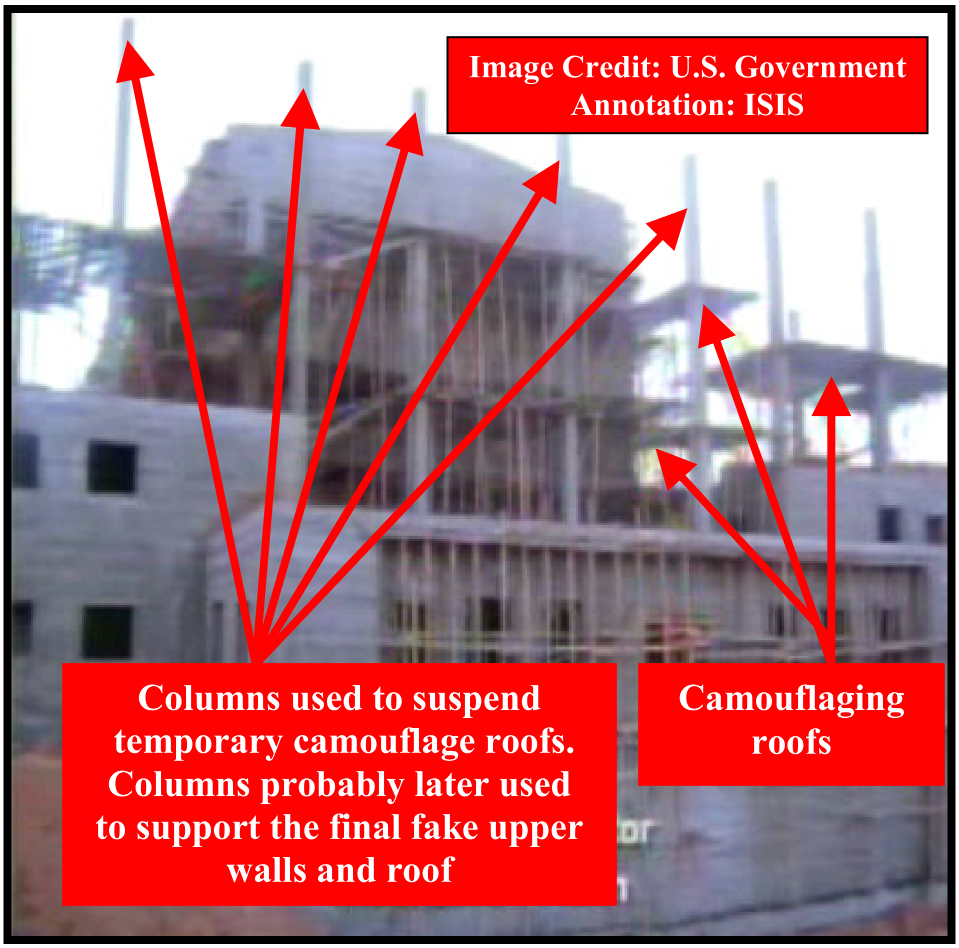

Figure 4. Ground photo of the Syrian reactor building taken before 2003.

Figures 5 and 6 show how the roof of the shorter sides (highlighted in green) was artificially raised up in order to bring these sides level with the top of the reactor building. Doing so alters the original design of the building, which is similar to that of Yongbyon, and transforms it into the box-like structure.

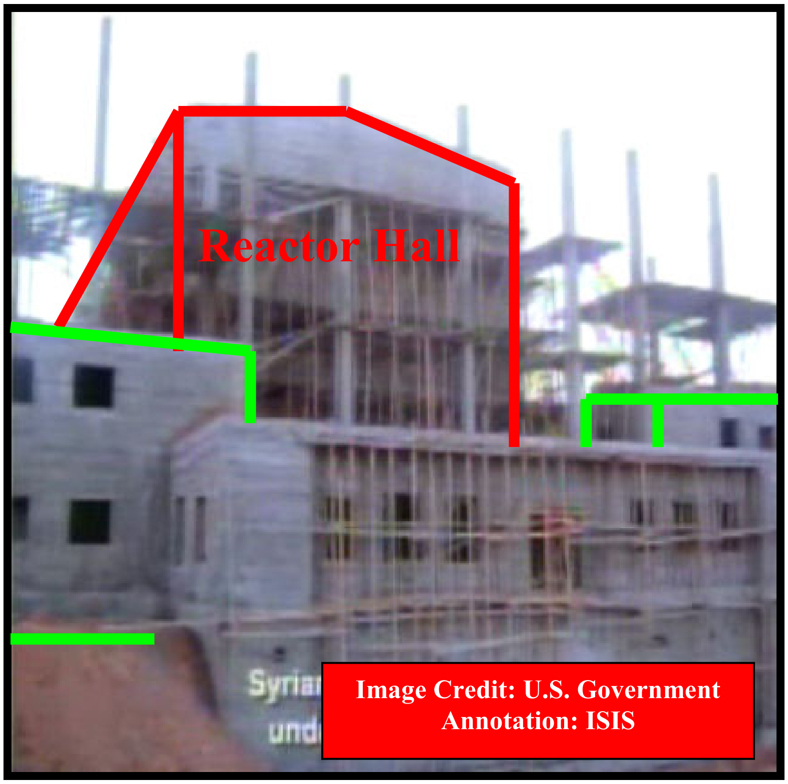

Figure 5. A ground photo of the Syrian reactor building taken before 2003.

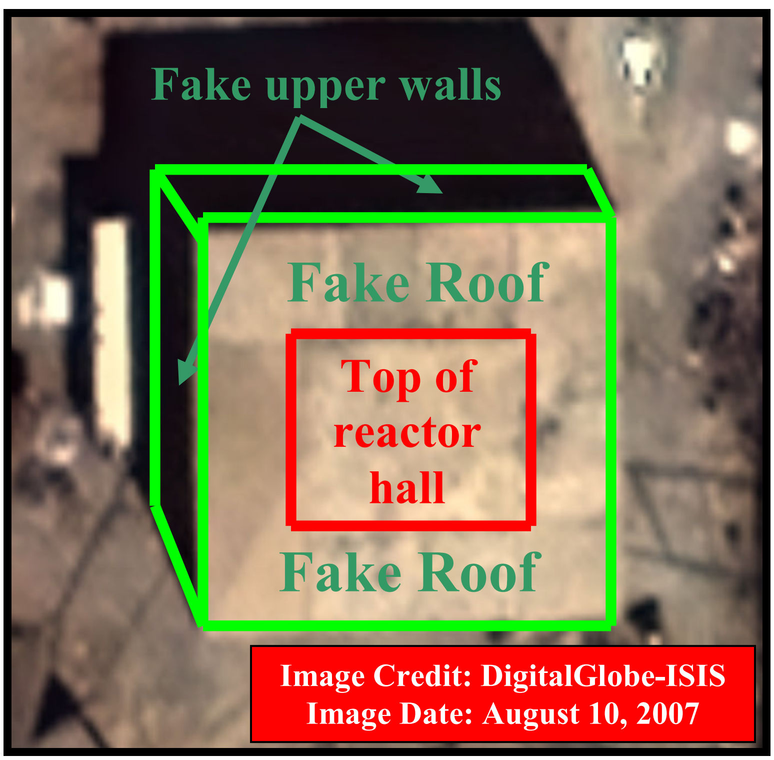

Figure 6. The Syrian reactor building seen in August 2007 in commercial satellite imagery after the fake walls and roof were constructed to make the box.

An unusual feature is that the original construction of the reactor building included windows that were later covered over in the process of creating the boxy structure. This may indicate a decision to conceal the building's design after starting construction, or to clumsily combine a North Korean design with a concealment blueprint. (Figures 7 and 8).

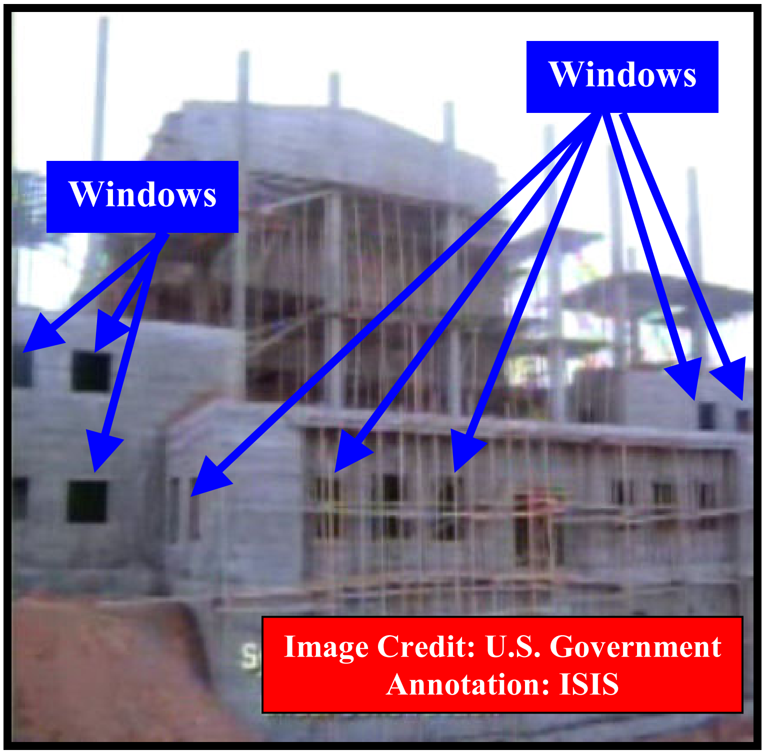

Figure 7. Ground photo of the Syrian reactor building taken before 2003.

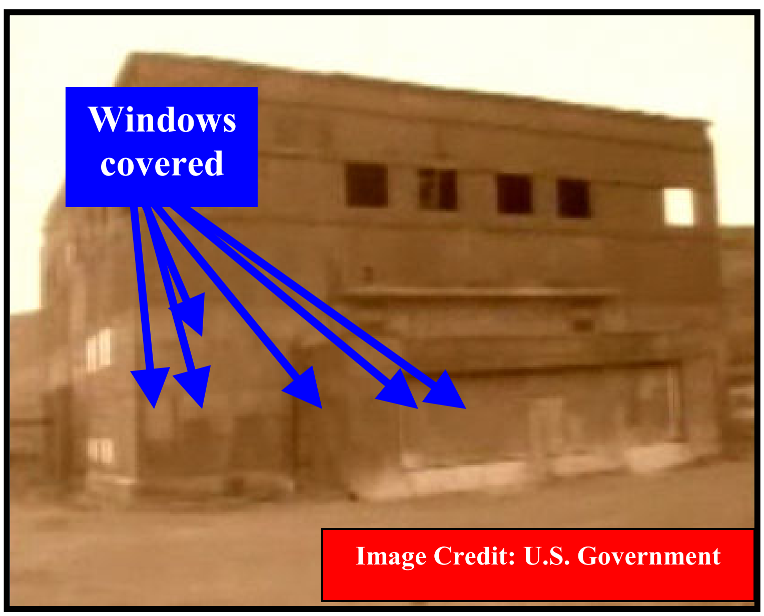

Figure 8. Ground photograph of Syrian reactor after transformation into a box.

The building modifications did not hide all indications of the original building. When ISIS measured the footprint of the altered building in October 2007, it was virtually the same as that of the Yongbyon reactor. Furthermore, the discrepancy between the false outer roof and the actual reactor hall roof created faint yet distinct lines on the roof. ISIS measured these lines and found that the dimensions of the inner square were similar to those of the Yongbyon reactor, leading ISIS to report that this building had dimensions consistent with the North Korean reactor (see figures 9 and 10).

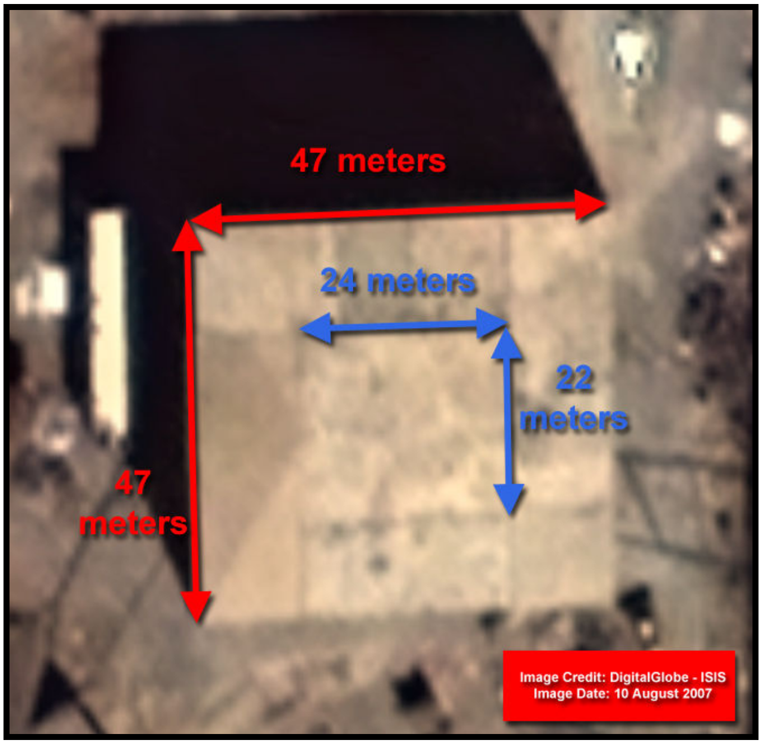

Figure 9. Syrian reactor building.

Figure 10. The five megawatt electric reactor building at Yongbyon, North Korea.

Building Extends Underground

A significant percentage of the Al Kibar reactor building was underground. After demolition of the reactor building on October 10, 2007 and removal of the heavy reactor structures, Syria filled in the resulting hole. Figure 11 shows that this hole was quite deep. According to U.S. government experts, the depth of the hole was several tens of meters. In contrast, the Yonybyon five megawatt-electric reactor was built essentially from the ground upwards.

Figure 11. Bulldozers taking dirt from an adjacent hill and pushing it over the edge of the hole and filling it up.

Figures 12 and 13 show the Syrian reactor building before and after the false roof and upper walls were constructed. The west-facing façade can be seen in Figure 13, and then it is partially buried below ground level in figure 14. Figure 13 shows part of the underground structure.

Figure 12. Ground photograph of Syrian reactor before construction of false upper walls and roof. Portions of the underground construction are visible; compare to figure 13. Photo taken prior to 2003.

Figure 13. Ground photograph of Syrian reactor after transformation into a box. The windows have been covered by a wall, and the underground portion visible in figure 12 is also covered. Date when photo taken is unknown, but likely after 2003.

The front façade of the Yongbyon reactor is taller than that of the Al Kibar reactor, again implying that much of the Syrian reactor is underground (Figures 14 and 15).

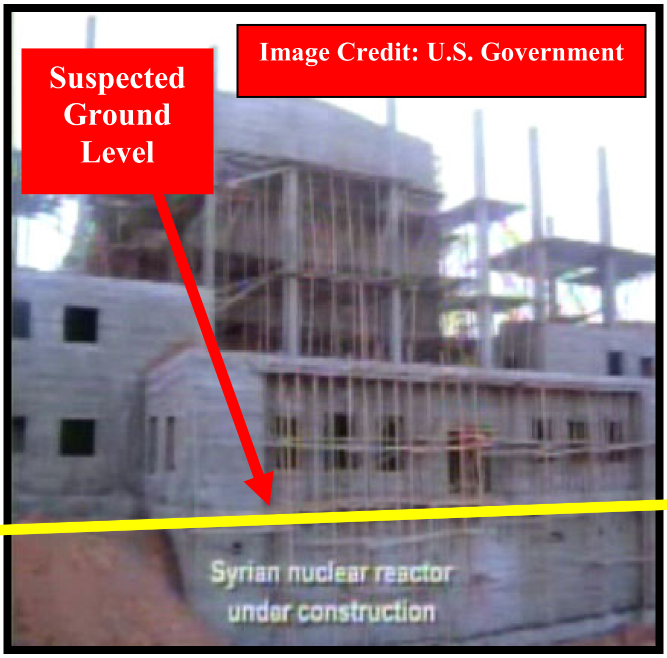

Figure 14. Syrian reactor building from the ground. Photo taken prior to 2003.

Figure 15. Yongbyon's 5MW-electric reactor. The Syrian reactor is similar to the Yongbyon reactor, but this reactor is taller than the Syrian reactor which has several levels below ground.

Isolated Site and Lack of Physical Protection

Isolated Site

The Al Kibar reactor was located in an isolated desert region of eastern Syria. The Euphrates River cuts through this desert, and in many places, villages and industries line the river banks. Syria however, situated the reactor at a point near the river that is likely about as sparse as could be found on the banks of the Euphrates in Eastern Syria. This unlikely location for a reactor helped ensure that Western intelligence agencies would pay little attention to the site, particularly if Syria minimized visible signatures that would attract outside scrutiny. A key signature to minimize was physical protection and the presence of the military. According to U.S. government experts, the Al Kibar reactor site had minimal visible physical protection.

Lack of Physical Protection

When identifying the reactor site in October of 2007, ISIS observed the site's lack of physical protection, including fences, security gates, and guard posts. Such physical protection routinely accompanies declared nuclear facilities around the world. However, Syria likely concluded that such security would arouse suspicion about the site among foreign intelligence agencies, who routinely conduct wide-area satellite surveillance of Syria. ISIS did not ascribe critical importance to the lack of security at the site, in part because other countries, such as Iraq in the 1980s, minimized security signatures at its most secret nuclear facilities.

Earthen Walls

Syria built the reactor at the bottom of a canyon, affording the site a considerable degree of natural isolation. To further increase the site's privacy, Syria created a series of earthen walls at key points around the reactor that would block the view of anyone traveling nearby (see figure 16). These walls were constructed by repeatedly dumping large mounds of dirt in a line and then pushing them from either side with a bulldozer to create a ridge. Some of these walls were created near ridgelines, a difficult feat to accomplish (see figure 17).

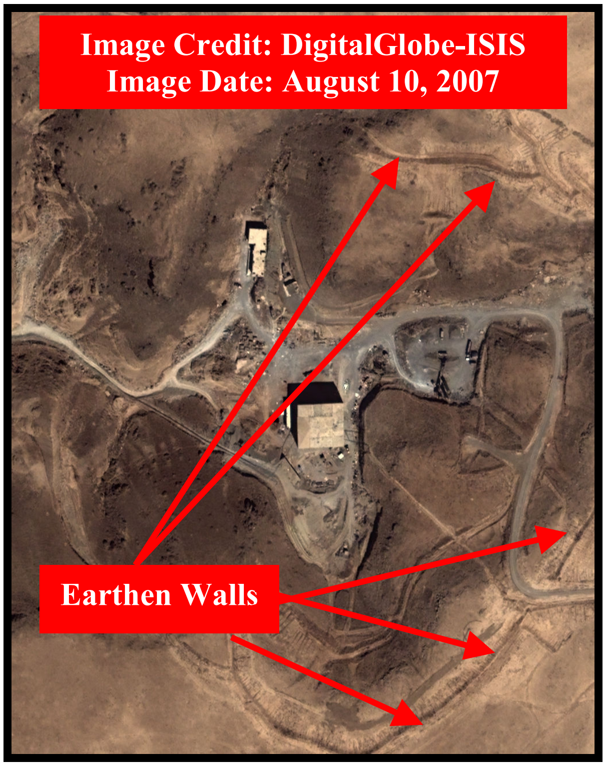

Figure 16. Syrian reactor site with earthen walls

Figure 17. Location of an earthen wall on top of ridgeline.

The site's lack of antiaircraft or visible air defenses can be understood as a way to further disguise the facility. Individual anti-aircraft installations surround known sensitive nuclear installations in such countries as Iran and Pakistan. To those analyzing satellite imagery, these defensive installations are an indicator of a site that warrants closer scrutiny.

In the case of Syria, anti-aircraft installations are relatively easy to spot using commercial satellite imagery. For example, Syria has a long line of anti-aircraft installations along the north-eastern edge of Dayr Az Zwar city (see figures 18 and 19). This line of anti-aircraft installations is likely intended to provide protection against an attack on Dayr Az Zwar city itself, several gas fields and refineries adjacent to the city, an airport and phosphate milling and mining compounds. Such a pattern of anti-aircraft installations is relatively easy to see in commercial satellite imagery. Though anti-aircraft installations are not necessarily easy to find, the deployment of significant air defense around the reactor site could have elevated the site's profile.

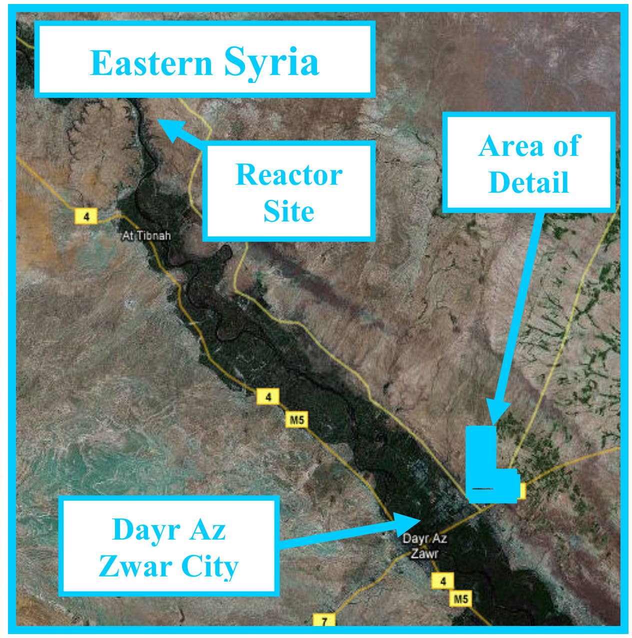

Figure 18. Wide view of Eastern Syria showing area of detail depicted in figure 19. Image Credit: GoogleEarth

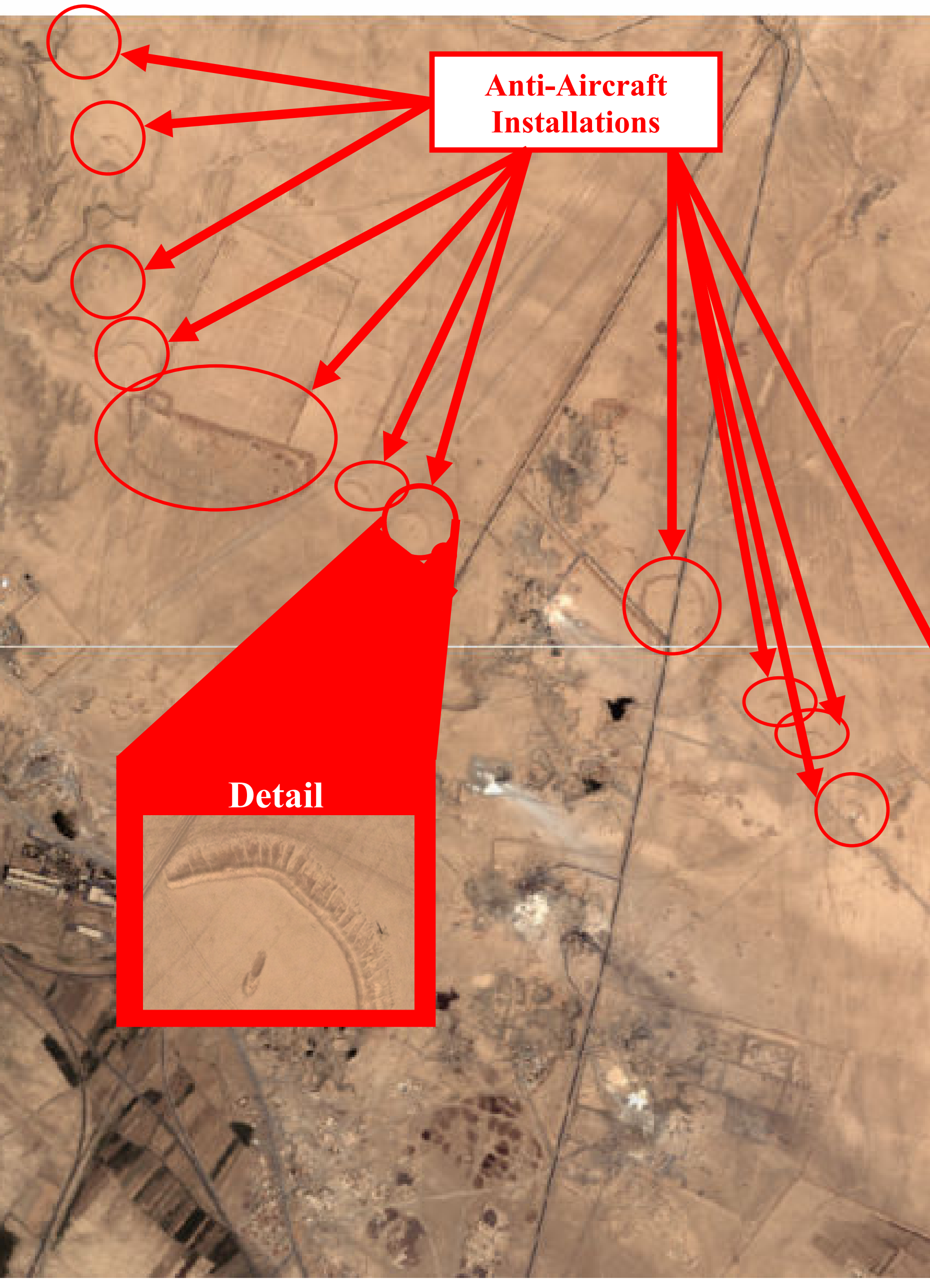
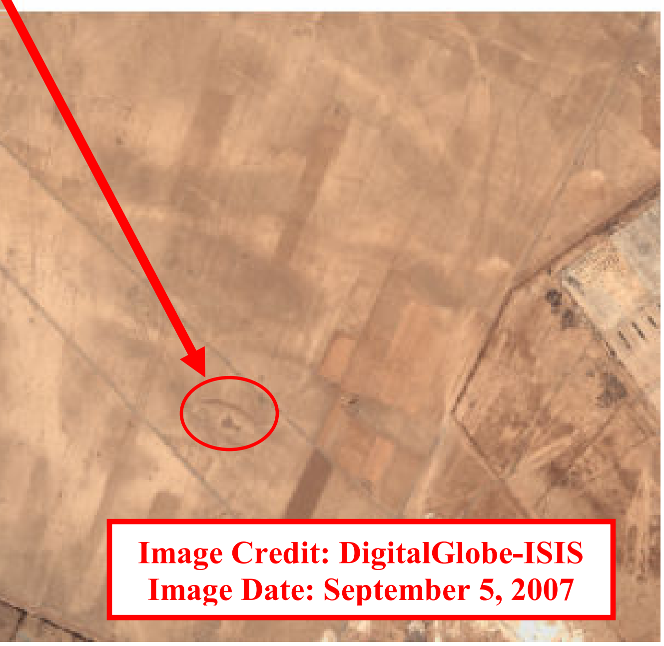

Figure 19. Line of anti-aircraft installations along the north-eastern edge of Dayr Az Zwar city.

Transportation

Syria did not appear to have built any roads or railroads to the reactor site that would attract special interest. An airfield is approximately three kilometers north of the reactor site, and railway tracks servicing a mining operation are approximately three kilometers south of the site (see figure 20). It remains unclear whether the railway line to the south was used to move equipment or materials to the site (see figure 21). The roads appear to be routine in number and size for the area.

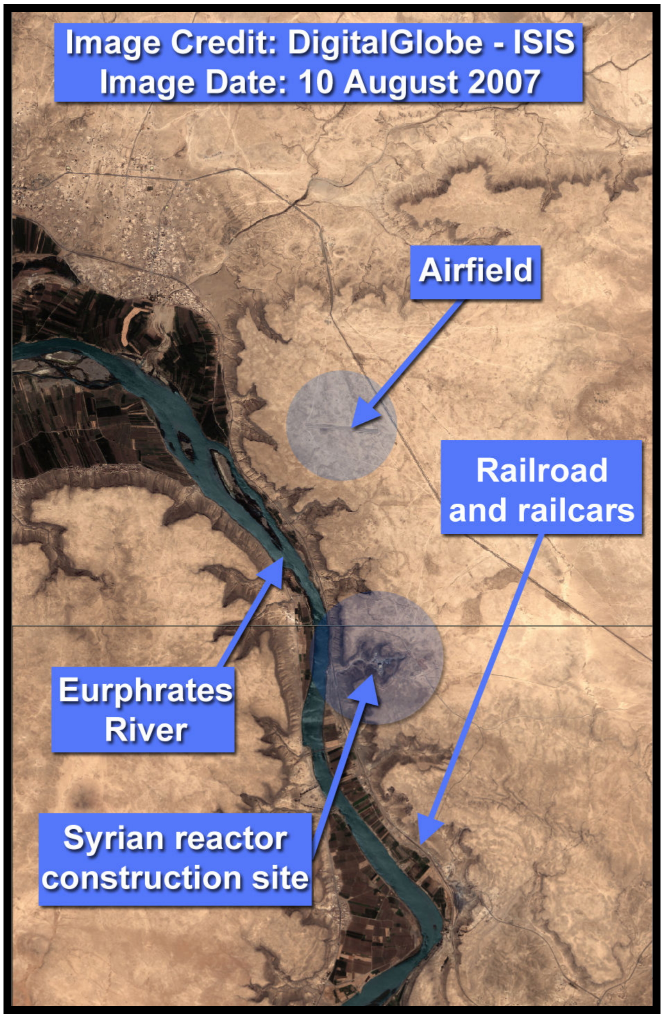

Figure 20. Airfield and railway line with railway cars approximately three kilometers away from the reactor site.

Figure 21. Railway line and railway cars

The construction of a special transport system is not necessary for this type of reactor. Large internal components do not need to be assembled elsewhere and shipped to the site. In about 2002, Syria assembled the steel reactor liner or vessel at or near the site under a tarp to hide it from overhead surveillance, according to U.S. government experts (see figure 22). It was placed inside the building before installing the roof, perhaps at night. The thin sheets of steel and water piping used in the vessel could have easily been transported to the site in trucks. Other components were probably likewise assembled at the site from easily transportable subcomponents.

Figure 22. Syrian reactor vessel under tarps.

Proximity of Worker Housing

Remote nuclear construction projects or nuclear facilities would be expected to have some type of housing for the workers. But imagery showed that this was not the case; ISIS did not find a suitable structure or structures that could serve this purpose in close proximity to the Syrian reactor. One possible explanation is that the reactor workers could share housing with those working on a mining project approximately three kilometers south of the reactor site. It is also possible that the workers are simply transported to and from the site and live in nearby towns.

Air Ventilation System

A nuclear reactor requires an air ventilation system to carry away radioactive gases emitted from the reactor core. A gas-graphite reactor, which uses carbon dioxide gas for cooling, has an even greater need for a robust ventilation system. It must carry away any leaking radioactive carbon dioxide gas. Using a system of air intakes and filters, radioactive gaseous effluents are filtered and then dispersed into the atmosphere through the stack.

Typically, a stack, which is distinctive, is located near or at the reactor building. A ventilation stack is plainly visible towering over North Korea's five megawatt-electric reactor at Yongbyon.

According to U.S. government experts, the reactor's ventilation system was carefully hidden. The air intakes of the ventilation system are assessed to be along one wall of the building, according to these experts (see figure 23). They noted that two rectangular structures located against the wall have louvers at the top through which air can enter.

The building in August 2007 did not have a stack visible (see figure 24). U.S. government experts said that the stack may have been located near the spent fuel pond. Syrian demolition of the building on October 10, 2007 left visible heavy concrete structures. The explosion blew debris and other structures from these hard to destroy parts. One structure visible is what the intelligence community assessed could be the foundation and remaining part of the stack (see figure 25). According to U.S. government experts, a pipe or small stack could have been extended through the fake roof after the reactor started operating. Until that time, the top of the stack may not have been more than a hole or cover in the fake roof, according to U.S. government experts (see figure 24).

Figure 23. The air intakes for the Syrian reactor.

Figure 24. DigitalGlobe satellite imagery from August 10, 2007 of the reactor building. The small dark shaded area could be where the stack would have appeared once the reactor operated, according to U.S. officials.

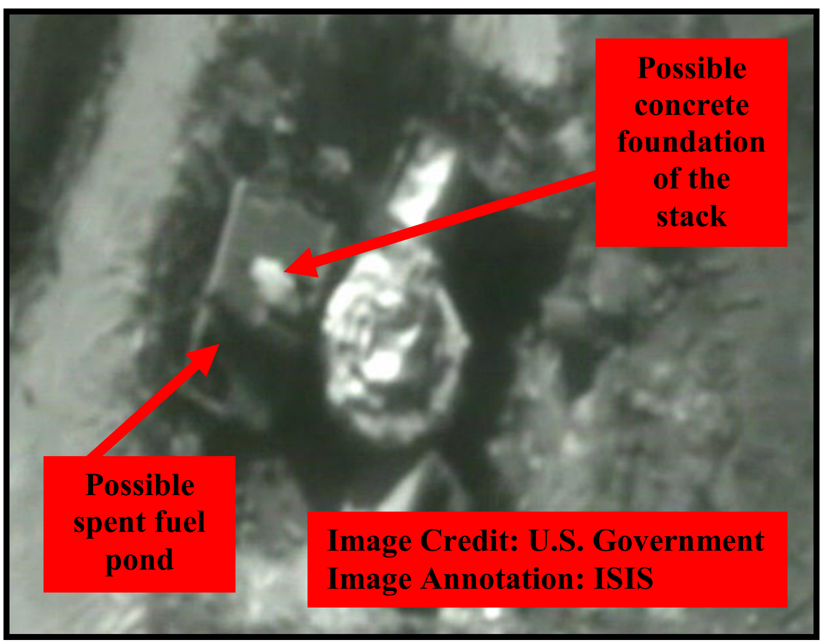

Figure 25. Post-demolition satellite imagery of the reactor building. The white object near the spent fuel pond may have been the remnants of the concrete foundation or other parts of the stack.

Electrical System for the Reactor

The Syrian reactor would have needed a supply of electricity. No obvious high power lines are visible in August 2007 commercial satellite imagery of the site and surrounding area, leading many to discount that the site could be a reactor site.

According to U.S. government experts, the reactor did not have a turbine to make electricity. Thus, electrical power must come from outside the site. According to these same experts, the power lines were hidden underground. Such a strategy was also used by Iraq in the 1980s to disguise electrical inputs into its secret uranium enrichment sites using electro-magnetic isotope separation (EMIS) technology.

In the case of this reactor, the U.S intelligence community assessed that the power lines originated at a water treatment plant that is connected to the local electrical grid (see figure 26). The power lines were likely placed in conduits running underground from the treatment plant to the reactor building (see figures 27 and 28).

Figure 26. Image of water treatment facility after the reactor was destroyed.

Figure 27. Pre-strike wide image of reactor and water treatment facility. A line is visible in the image between the reactor and the treatment plant.

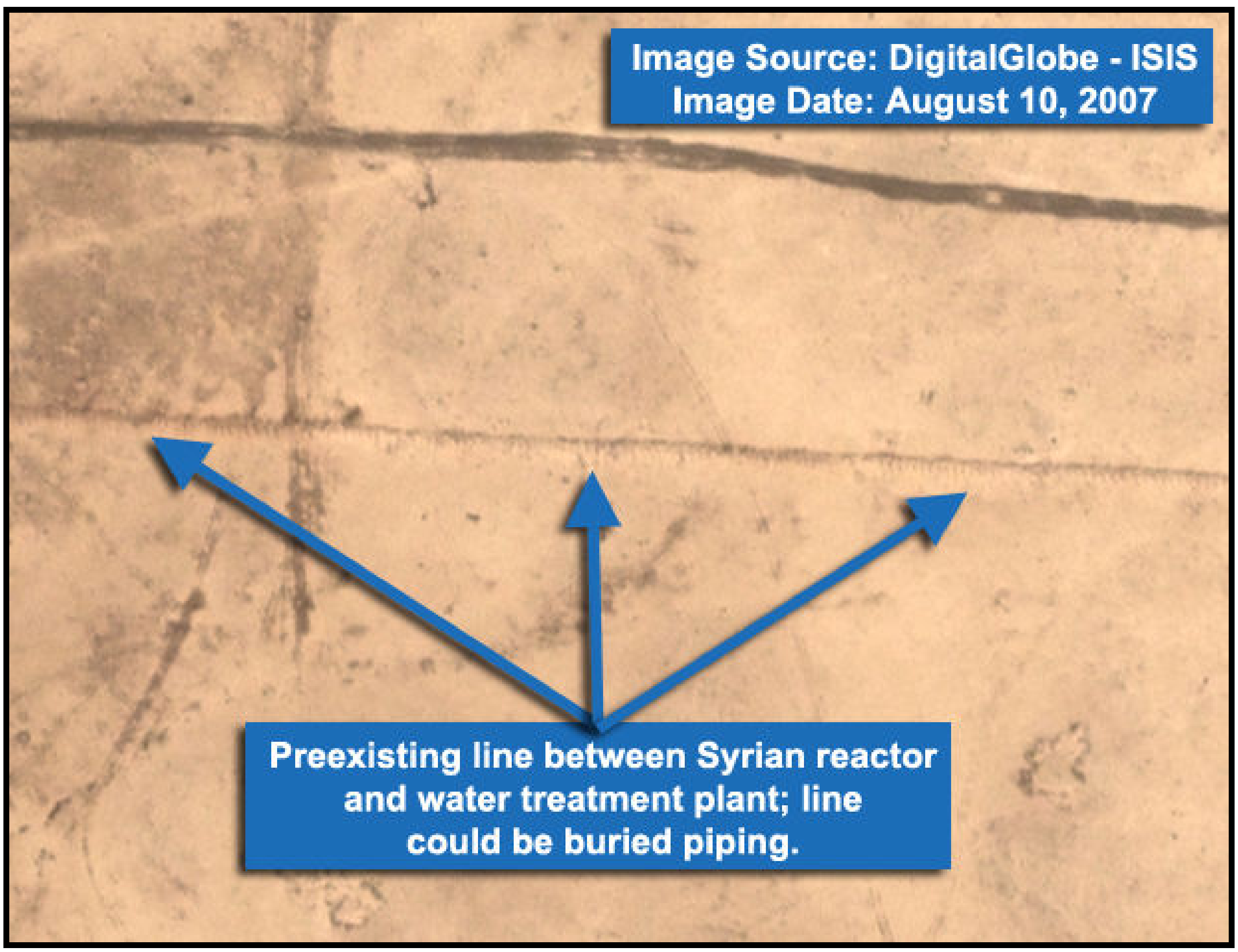

Figure 28. Close-up image of a section of this line before the reactor was destroyed. The line may depict a buried trench that covered piping carrying electricity from the water treatment facility to the reactor.

When Syria constructed a new building over the destroyed reactor site, it dug a series of trenches from the building to the water treatment plant (see figure 29). Many sections of pipe are visible next to these trenches (see figure 30). This construction may have intended to remove the electrical wiring and simultaneously aim to help hide the original building's purpose. A pipe containing the lines could have entered the reactor building on the side opposite the river. A pipe can be seen in figure 31.

Figure 29. Wide image of new building and water treatment facility after the reactor was destroyed.

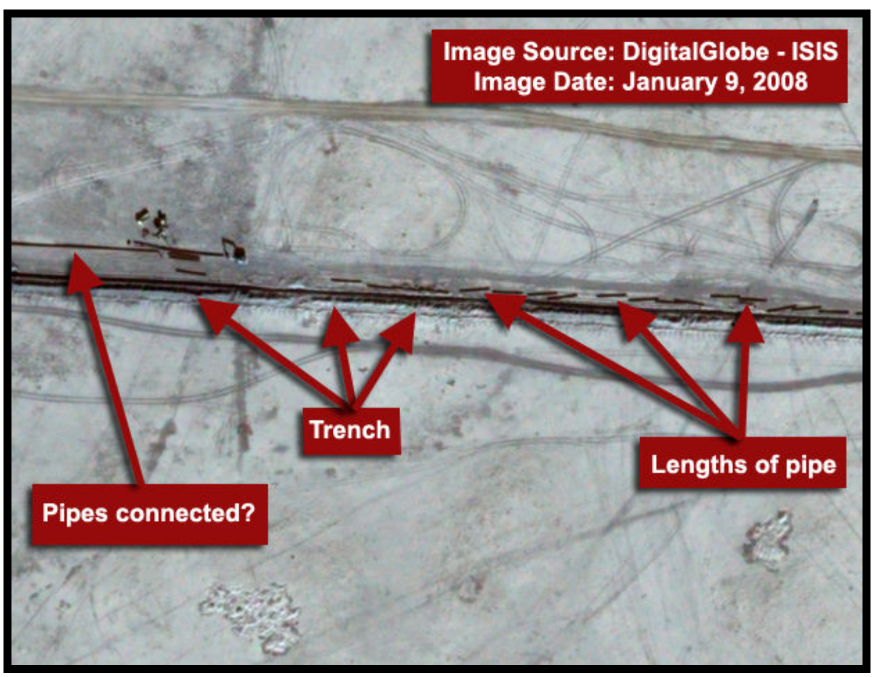

Figure 30. Close-up image of the same area seen in figure 28 between the Syrian reactor site and a water treatment facility after the reactor was destroyed. A trench, lengths of pipe and connected piping can be seen.

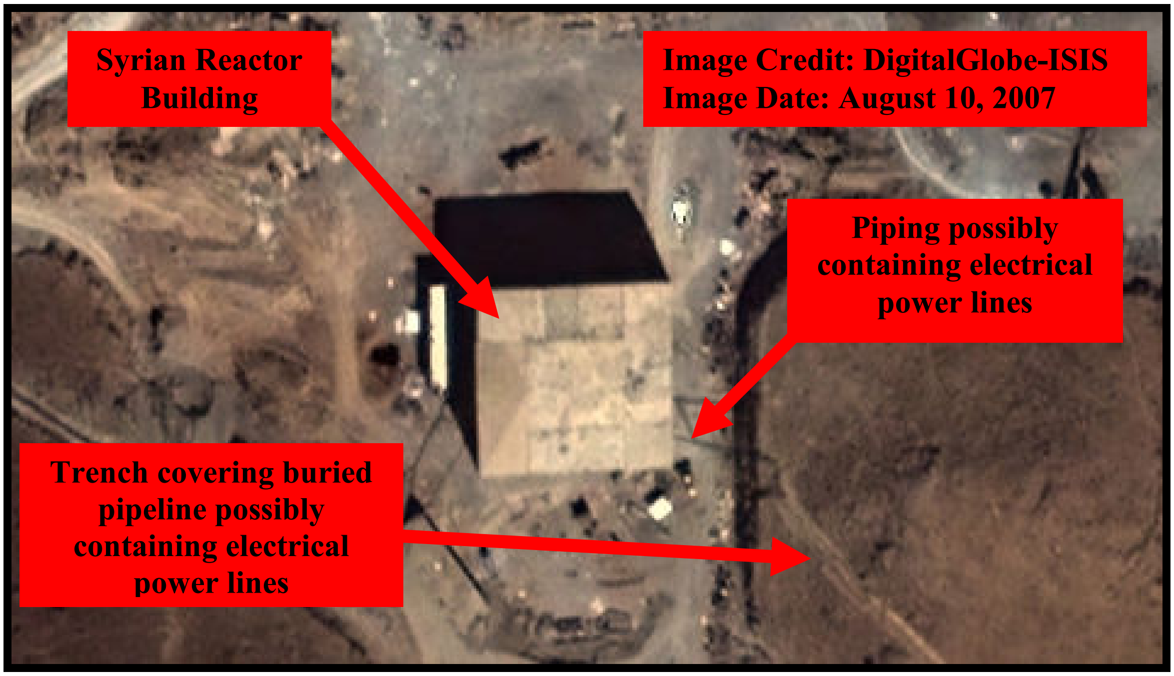

Figure 31. Pipeline possibly carrying electrical power lines entering eastern side of Syrian reactor building.

Water Intake and Discharge

A gas-cooled reactor requires a reliable supply of water to extract heat from the heated carbon dioxide gas. The Yongbyon reactor has a cooling tower, because the river was too small to permit the heated water to be dumped directly back into the adjacent river.

Syria decided not to use a cooling tower, which is readily apparent in satellite imagery, but instead planned to dump the heated water back into the river. According to U.S. government experts, the water is pumped from the river through two pipelines leading to the reactor compound (see figure 32). The water then goes into what the intelligence community has assessed was a buried reserve water storage tank as well as into the reactor building. The purpose of the storage tank could be to provide an emergency supply of water in case of an interruption of the reactor's operation. According to U.S. government experts, Syria may still have intended to install another pumping station between the buried water storage tank and the reactor building to increase the water pressure as it entered the heat exchangers in the reactor building (see figure 33). As noted earlier, the heat exchangers transfer the heat from the gas to the water. This heated water then exits the reactor building through a single discharge pipeline that extends down toward the river. The warm water pipeline discharges into the river under water, making identification of the discharge pipe more difficult (see figure 34).

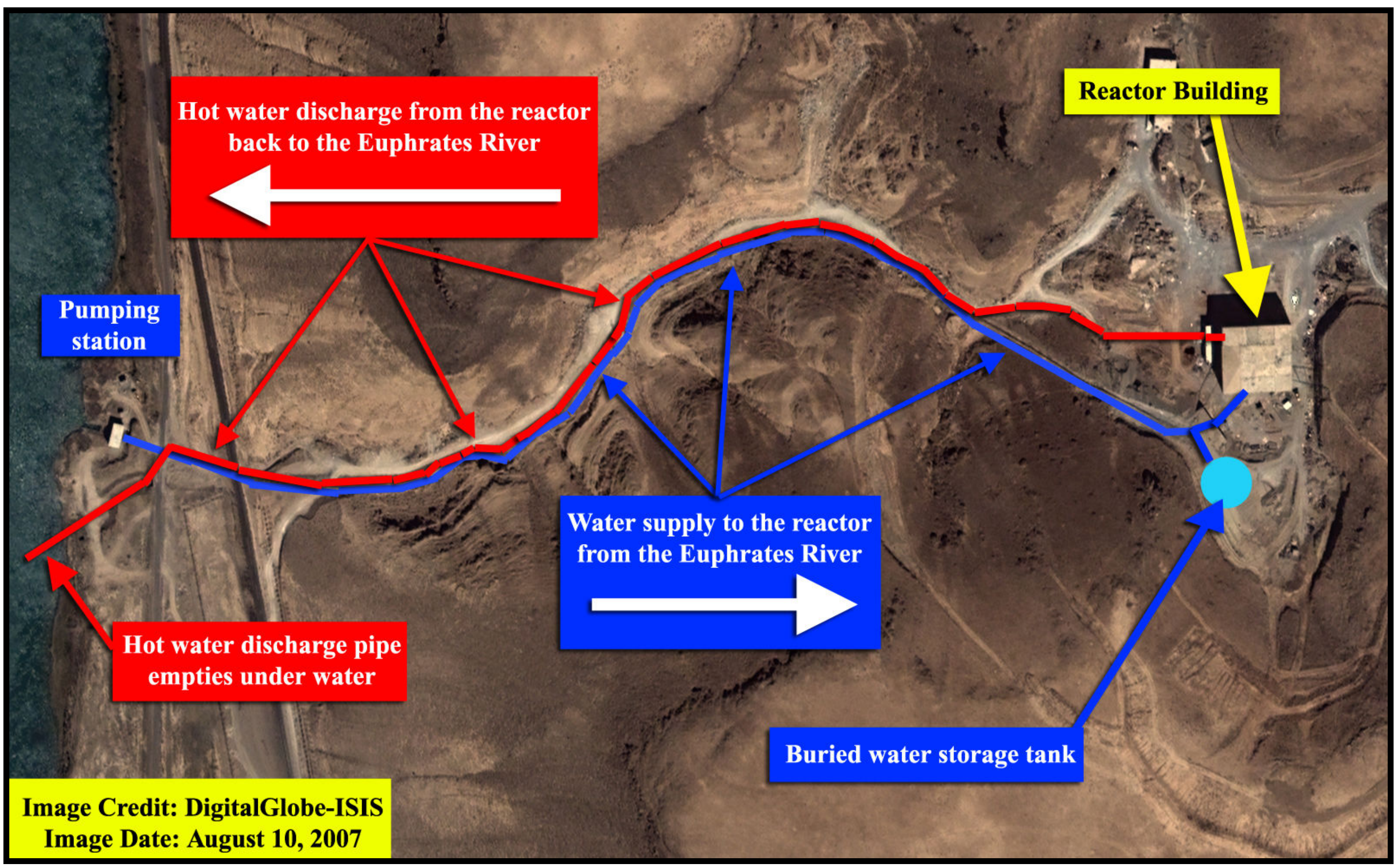

Figure 32. DigitalGlobe satellite image from August 10, 2007.

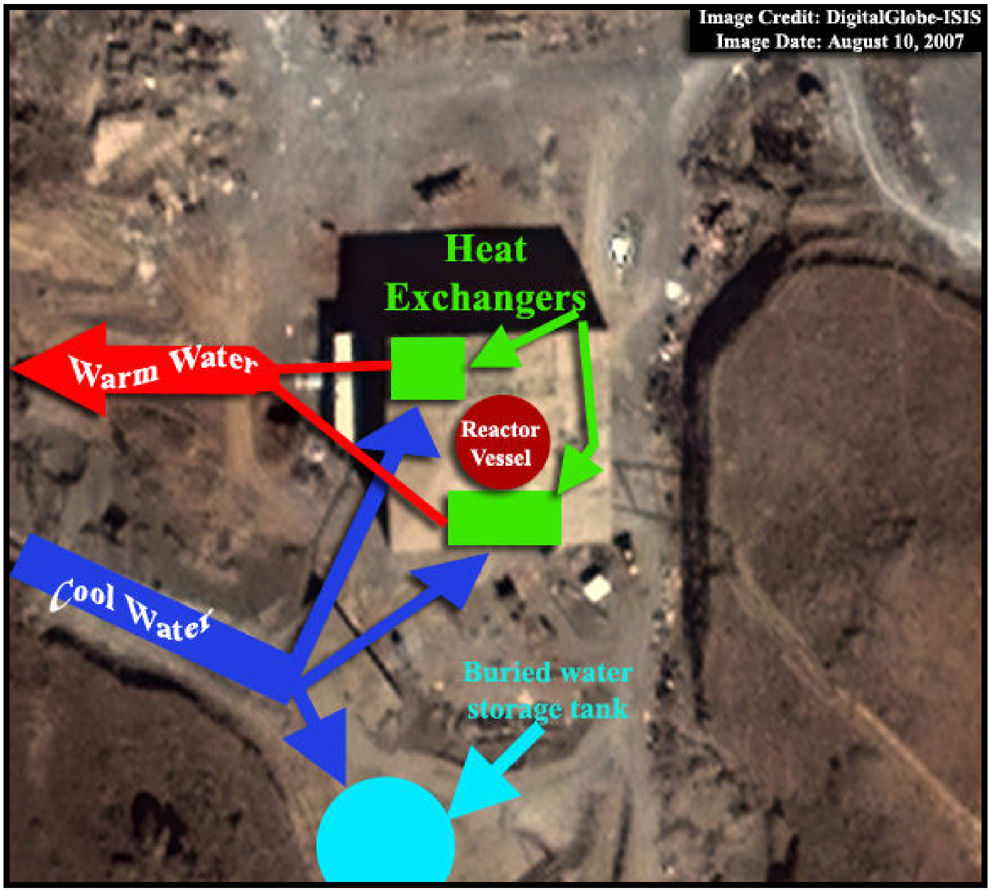

Figure 33. DigitalGlobe satellite imagery from August 10, 2007 of the reactor building. Cool water is pumped from the river and into a buried water storage tank and the reactor building's heat exchangers. The heat exchangers transfer the heat from the gas to the water from the river. The warm water is then discharged and piped back over to the river.

Figure 34. Buried hot water discharge pipe. According to U.S. government experts, this piping ends under water.

Summary and Lessons

In building the Al Kibar reactor, Syria used three basic methods to avoid detection: locating the reactor in a remote area, building portions of it underground, and camouflaging the design of the reactor building along with its ventilation, cooling, and electrical supply.

Locating the reactor in a remote location certainly did not guarantee that it would go unnoticed by intelligence agencies. In fact, there are equally logical reasons to build a reactor closer or even among developed areas. For instance, Syria might have located the reactor on the same compound as an established large industrial facility, such as an oil refinery or a milling plant, which could mask the new construction. If the final product were the box-like structure that the Syrian reactor came to be, it might more easily blend in with the rest of the facility and look like any other large industrial building among many others on the compound.

Last fall, when ISIS was scanning satellite imagery looking for nuclear facilities in eastern Syria, we examined both remote and developed areas, and did in fact dwell on the refineries, milling facilities and mines that dot the Syrian desert, particularly scrutinizing industrial buildings on site. A drawback to locating the facility in such a place would be widening the circle of people who were aware of the reactor construction to include the dozens or even hundreds of workers at other buildings on the compound or in the area. Minimizing the number of people knowledgeable of the program appears to have been a priority.

Another disadvantage to locating the reactor in or near to an established industrial facility is that construction would be readily visible by anyone on the ground. Because the reactor was built at the bottom of a canyon with earthen walls used to further obstruct the view from beyond the plateau of the canyon, hiding the reactor from view on the ground also appears to have been a priority. Nevertheless, the choice by Syria to site the reactor in a remote location rather than incorporate it into an established industrial area appears to have been a successful one in avoiding detection of the building’s true purpose for a significant period of time.

Building significant portions of the reactor underground also helped mask the true purpose of the site. Other than the extra excavation activities required during the initial phase of construction, the builders likely faced few significant drawbacks to building much of the reactor underground. The distance between the top of the reactor building and the ground level was significantly reduced by doing so, thereby obscuring the true purpose of the site, as a Yongbyon-type reactor building is notably tall. Similarly, the extra effort to disguise the cooling, ventilation, and electrical systems had few drawbacks.

Other than the additional construction activity required after the initial reactor building was complete, creating a boxy building went a long a way in masking the purpose of the facility. A typical reactor building has a tall central reactor hall extending through the middle of a shorter, yet otherwise tall building.

The Syrian strategy worked for years. According to U.S. government experts, U.S. intelligence had determined in 2005 that Syria and North Korea were involved in a project in the province Dayr az Zawr. However, the nature of the cooperation and the location of the site remained unknown. However, suspicions based on earlier obtained information, pointed to some type of nuclear activity taking place in this province.

The 2005 assessment led to an intensified imagery search, which resulted in the discovery of a large unidentified building near the town of Al Kibar. According to a U.S. government expert, it was “odd and in the middle of nowhere,” but analysts could not ascribe the building with a nuclear character, and U.S. intelligence labeled it an “enigma facility.” In the spring of 2007, the building was determined to be the covert nuclear reactor based on photos acquired by U.S. intelligence, reportedly from Israel, that showed the inside and outside of the building.

The detection of the reactor in 2007 and the initial identification of the suspect building in 2005 should be viewed as intelligence successes. The IC’s unequivocal identification of the Al Kibar reactor depended on human intelligence from a friendly intelligence service. Even if the information was not U.S. human intelligence, this cooperative effort should also be viewed as a success.

Because of its late detection of the Al Kibar reactor, Israel felt compelled to strike the site militarily. Its analysis, which in hindsight must be viewed as a worst-case assessment, was that Syria could soon load uranium fuel and start the reactor. It did not want to attack the reactor after start-up because of the risk of radioactive material contaminating the area.

The United States did little if anything to stop Israel. This perceived urgency to attack discounted diplomatic options that may have halted this reactor project. Although the justification of a military strike deserves debate, a key underlying issue is the need to improve capabilities for early detection of covert nuclear facilities. Early detection of the reactor construction project in Syria would have increased the number of options available to Israel and the United States. Utilizing one of the diplomatic options may well have been successful in stopping the reactor project and could have set a precedent that served as an even greater deterrent to undeclared nuclear activity than did military action.

The failure to find and identify the building during its early construction raises troubling questions about the U.S. ability to detect undeclared nuclear activities. U.S. government experts acknowledge that the IC lacks high-quality overhead imagery of the construction site before the building was turned into a non-descript boxy shape. If the United States or other countries had acquired pre-2003 satellite imagery of the site, particularly imagery showing the creation of a false roof, the Syrian construction site would have looked more suspicious and more like a North Korean reactor.

This case highlights the limits of national satellite-based intelligence; U.S. satellites cannot be everywhere at all times. Although a discussion of the classified U.S. satellite program, or indeed of the U.S. intelligence effort in this case, is beyond the scope of this report, the Syrian reactor underscores the importance of collecting and archiving high-resolution satellite imagery. NGOs and commercial satellite companies have an important role to play in such an effort. They should acquire and archive far more commercial satellite imagery of sensitive areas of the world. U.S. and other governments could participate in such purchases. The images should be placed in a public archive. GoogleEarth offers one possibility, although its current method of presenting imagery is inadequate for this task.

Syria depended on illicit trade to build the Al Kibar reactor. While it obtained some assistance from North Korea, it also used its own smuggling networks to obtain equipment. The Six Party process currently well underway provides the best way to stop North Korean proliferation. Halting Syrian smuggling requires more attention, in particular finding innovative methods that are more effective than the standard ones, namely more sanctions and tightened national and international export controls. These reforms often do not increase the chance of detecting illicit nuclear trade. One area that has received too little attention in this country is increasing industry-governmental cooperation on identifying and stopping illicit nuclear trade. Responsible companies have no interest in outfitting secret nuclear programs in countries such as Syria. Yet, they often receive requests for dual-use items from trading companies or middlemen trying to do just that. In most cases, the companies throw away these suspicious enquiries rather than forward them to authorities. Sending a copy to authorities, which with today's technology requires merely a mouse click, would provide valuable, real-time information about illicit trade. Likewise, companies could benefit from tips from U.S. intelligence about attempts by proliferators and their agents to dupe them into selling their wares.

For years, Syria has refused to accept the IAEA's Additional Protocol, which requires a country to declare much more of its nuclear program and to allow more intrusive inspections. Libya likewise refused to allow the Additional Protocol when it was constructing a secret nuclear weapons program that depended on secret purchases from the Khan network. In both cases, the Protocol would have increased the chance of earlier detection of these secret nuclear activities. The Protocol could have also functioned to deter Syria or Libya from proceeding. It is time to make acceptance of the Protocol a requirement and not a voluntary undertaking with few consequences for refusing.

In the Middle East, bringing the Protocol into wider acceptance is particularly important. Syria is not the only country without the Protocol in force. Critical countries in the region, such as Algeria, Egypt, Iran, Saudi Arabia, and the United Arab Emirates, have also not agreed to bring the Protocol into force. All of these countries either have growing nuclear energy programs or have ambitions to buy nuclear reactors. The UAE remains a key transshipment point of illicit dual-use nuclear items to proliferant states, such as Pakistan and Iran, despite recently implementing national export controls.

The IAEA should insist on thoroughly inspecting the reactor site and any sites it determines may involve undeclared nuclear materials or facilities. If Syria is unwilling to allow such inspections, the IAEA should call for "special inspections" of these sites, using its existing authority under the NPT. It certainly has enough evidence to do so. The IAEA is uniquely positioned to clarify this important issue and determine whether this reactor was part of a nuclear weapons program.