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BUSINESS | JUNE 13, 2010

Jordan's Nuclear Ambitions Pose Quandary for the U.S.

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By JAY SOLOMON

SAWAQA, Jordan—The Kingdom of Jordan is in a sprint to become the Arab world's next nuclear power. And America wants to help it succeed.



Royal Hashemite Court

King Abdullah II says he wants to reduce Jordan's dependence on energy imports by developing nuclear energy.

angering Israel and risking a Mideast arms race.

The deal has catches for the Jordanians, too: The U.S. is demanding that Amman not produce its own nuclear fuel. That's a right Jordan enjoys as a signatory to the United Nations key nonproliferation treaty—and is reluctant to surrender, thanks to its recent discoveries of big deposits of uranium ore.

The U.S. last week pushed through the United Nations a fourth round of economic sanctions

U.S. and Jordanian officials are negotiating a nuclear-cooperation agreement that would allow American firms to export nuclear components and know-how to the Mideast country, America's closest Arab ally in the volatile region.

The Obama administration views Jordan as a key potential partner in its global program to promote the nonmilitary use of atomic energy—part of a broader plan to increase pressure on other Middle East countries, particularly Iran and Syria, to bring transparency to their own nuclear programs.

"I believe nuclear energy in Jordan will be done in such a way where it is a public-private partnership so everyone can see exactly what's going on," Jordan's King Abdullah II said in an interview. "If we can be the model of transparency, it will push others."

But it's a partnership that puts the Obama administration in a bind: It is trying to make good on its pledge to promote greater civilian use of atomic energy, without

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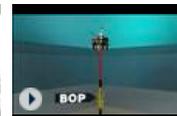
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U.S. to Demand BP Fund

against Iran in a bid to curtail its advancing nuclear work. Tehran says its program is purely for civilian purposes, a charge challenged by the U.N. and the West. U.S. officials worry the Arab states, fearing the Iranian threat, could one day seek to develop atomic weapons themselves.

Senior Jordanian officials say Amman can't renounce its right to produce nuclear fuel under the Nuclear Nonproliferation Treaty, both for strategic and economic reasons. They say that if Jordan cuts a side agreement with the U.S. on this point it would undermine the integrity of the treaty. They also say such an agreement would limit Jordan's ambition to become a "regional nuclear fuel supply and export center."

Failure to reach consensus on this point, U.S. and Jordanian officials acknowledge, could kill the cooperation deal.

"We believe in the universality of the NPT," said Khaled Toukan, the head of the Jordan Atomic Energy Commission. "We do not agree on applying conditions and restrictions outside of the NPT on a regional basis or a country-by-country basis."

Raw Material

Known recoverable resources of uranium, 2008, in thousands of metric tons

Australia	1,243
Kazakhstan	817
Russia	546
South Africa	435
Canada	423
U.S.	342
Brazil	278
Namibia	275
Niger	274
Ukraine	200
Jordan	112

Source: Europe's Energy Portal

Jordan is among a slew of Arab countries, including Egypt, the United Arab Emirates and Bahrain, that are seeking to become among the first Mideast countries to develop a civilian nuclear-power industry. Israel is the lone country in the region believed to possess atomic weapons, but it hasn't moved to build nuclear power plants.

Jordan's nuclear ambitions are driven by economics. Wedged between Israel and oil giants Saudi Arabia and Iraq, the kingdom is 95% dependent on imported oil and has among the world's smallest reserves of potable water.

But the discovery of at least 65,000 tons of uranium ore in the deserts outside Amman in 2007 has led King Abdullah to order a drastic reshaping of his nation's economic strategy.

French and Chinese geologists are combing southern, central and eastern Jordan in search of additional uranium deposits. In addition to fueling its own plants, Jordan hopes to use its projected four nuclear power plants to begin exporting electricity to neighbors including Iraq and Syria by 2030 and to commercially mine and export uranium. Even if it doesn't process any nuclear fuel itself, Jordan could still produce and export electricity by buying the fuel for its reactors on the international market.

"Now that we have a raw material, people are coming for the first time in our history and knocking on our door," King Abdullah said in the interview.

U.S. officials say they recognize Jordan's desire to achieve energy independence. They praise Jordan's early outreach to the U.N.'s nuclear watchdog, the International Atomic Energy Agency, and Amman's willingness to allow international inspectors unhindered access to its growing nuclear infrastructure.



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JAEC

The Jordan Atomic Energy Commission in Amman

But U.S. negotiators are unwavering in their insistence that Amman commit to purchasing its reactor fuel from the international market to guard against its potential internal diversion for military purposes. Iran's insistence on producing its own nuclear fuel stands at the center of its current conflict with the West.

U.S. officials argue if Jordan doesn't surrender its rights to produce fuel, it raises proliferation risks. Countries with the complete nuclear fuel cycle—from mining uranium to processing it into fuel—can convert their civilian plants for military applications.

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Under terms of the U.S. agreement, Jordan could mine the ore but not convert it into fuel for nuclear power.

Such fears could hamstring Washington's ability to win necessary Congressional approval for a nuclear cooperation agreement with Jordan. Last year, Congress approved a similar deal with the United Arab Emirates only after the country agreed to buy its nuclear fuel overseas.

Jordan could pursue its nuclear ambitions without the U.S., but would face steep diplomatic and financial hurdles. Still, Amman is aggressively pressing forward: In March, it purchased a research reactor for a northern Jordanian university and is in talks with four international consortia to buy its first nuclear power plant.

Those moves are stoking tensions with neighboring Israel.

In the interview, King Abdullah said Israel has been pressuring countries like South Korea and France not to sell nuclear technologies to Jordan. He said Israel's "underhanded" actions have helped bring Jordan-Israeli relations to their lowest point since a 1994 peace agreement.

"There are countries, Israel in particular, that are more worried about us being economically independent than the issue of nuclear energy, and have been voicing their concerns," King Abdullah said. "There are many such reactors in the world and a lot more coming, so [the Israelis must] go mind their own business."



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Jay Solomon

Uranium miners at Sawaqa.

Israeli officials denied any effort to undermine Amman's nuclear procurement efforts.

Jordan's fixation on nuclear power is rooted in its near total dependence on imported oil.

When global oil prices spiked above \$100 a barrel in 2007, Amman was forced to spend the equivalent of 20% of its total economic output on energy. That bill could rise sharply over the next decade, say Jordanian officials, as electricity demand is projected to double.

Energy shortages have also threatened Amman's ability to address its severe water deficiency with power-hungry desalination plants near the Red Sea.

The oil-price shock led King Abdullah and his ministers in 2007 to fashion a new energy strategy. The project calls for Jordan to draw 10% of its energy from solar and wind by 2020; 30% from natural gas; and 14% from oil shale. The strategy foresees a special role for nuclear power: 30% of Jordan's overall energy needs by 2030.

The center of Jordan's uranium push is the desolate Bedouin village of Sawaqa, an hour south of Amman. Here the French nuclear-power giant, [Areva SA](#), is partnering with Jordanian mining firms and geologists to try to transform the area into a major center for uranium production.

An encampment of rowed housing units, a cafeteria and sheds used to store and test mineral samples stands amid central Jordan's barren, gravelly landscape. A lone camel occasionally meanders past the walled site.

Jordanian geologists have explored the Sawaqa area for decades, confirming sizable deposits of phosphates and oil shale. But the joint Areva-Jordanian camp's general manager, Gilles Recoche, has been tasked to ensure the uranium ore found here and nearby can be mined on a commercially viable scale. He then hopes to process the ore on-site into the powdery substance known as yellowcake, which can in turn be processed into the low-enriched uranium used to power nuclear reactors.



On a recent afternoon outside the Sawaqa camp, Mr. Recoche and his Jordanian colleague, Allam Saymeh, walked through a dug-out excavation trench with gamma-



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JUST

The Jordan University of Science and Technology in Irbid.

radiation guns.

Moving through the narrow sandy passage, they point out the yellow stains on the trench's rock walls that indicate uranium ore. They then pass their guns over the yellow markings to gauge the grade of the uranium—anything over 100 particles-per-million is judged to have commercial prospects.

"This project is my child," said the 52-year-old Mr. Saymeh, noting that he'd explored the areas around Sawaqa since the 1980s.

Jordan's government is also putting in place the bureaucracy and infrastructure to run its nuclear program. Parliament has passed laws establishing the country's first nuclear regulatory body and the Atomic Energy Commission.

Amman has signed nuclear-cooperation agreements with eight countries, including France, China and Russia. Negotiations have begun with such companies as Russia's Rosatom Corp. and Seoul's [Korea Electric Power Corp.](#) to construct Jordan's first power reactor.

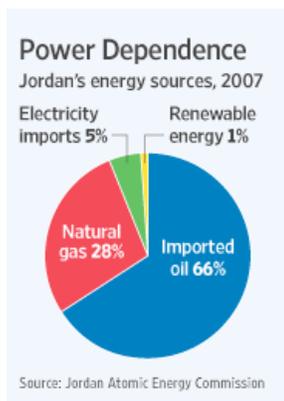
The nuclear program's point man is Mr. Toukan, a Massachusetts Institute of Technology-trained nuclear scientist and a former education minister. As chairman of the country's Atomic Energy Commission, the 55-year-old has broad powers, overseeing everything from choosing the reactor's construction site to negotiating the cooperation agreement with the U.S. He views Jordan's nuclear program as providing the base for a scientific resurgence across the Middle East.

A focal point is the nuclear-engineering department at the Jordan University of Science and Technology in the northern city of Irbid. Here, Mr. Toukan's agency contracted in March with a South Korean consortium to build Jordan's first 5-megawatt research reactor, which could break ground later this year.

Students and teachers on the expansive palm-tree-lined campus talk excitedly of the research reactor's arrival. The nuclear-engineering department is only three years old, with just 100 students.

"Right now, we have nothing practical to work on here," says Abtihal Almalahim, a 21-year old junior and one of the program's female candidates. The reactor's arrival "will make our study a lot more real."

A key to achieving King Abdullah's ambitions, however, remains the cooperation agreement with the U.S., say Jordanian officials.



They say it could prove difficult to secure some of the core technologies for their nuclear infrastructure without the Obama administration's seal of approval. The U.S. is a leading player in the Nuclear Suppliers Group, a Vienna-based body aimed at controlling the flow of nuclear technologies internationally. Many reactors from France, Japan and Canada contain significant U.S. components and would require Washington's approval for a sale.

Mr. Toukan nearly concluded a nuclear-cooperation pact with George W. Bush's administration in 2008, according to Jordanian and American officials. It got sidelined in the final months of Mr. Bush's term as Washington aggressively pushed forward and completed a separate nuclear deal with the United Arab Emirates, which does not have its own uranium reserves and agreed to

purchase all its reactor fuel from international suppliers.

The Obama administration views the U.A.E. deal as a model for its nonproliferation drive. American experts say it would be virtually impossible for the Emirates or any other nation to develop atomic weapons without the ability to produce highly enriched uranium at home.

The White House has good reason to stick to its guns in its talks with Jordan: the U.A.E., in its agreement with the U.S., won the right to negotiate a new deal if another Mideast country concludes a nuclear pact with the U.S. on more favorable terms.

King Abdullah, is pushing ahead. He met one-on-one with President Obama during Washington's nuclear security summit in April to discuss regional peace and nonproliferation issues, according to Jordanian officials.

The king also instructed his foreign minister to formally reprimand Israel's ambassador to Jordan over the charges that Israel has been seeking to block the sale of the South Korean or French reactors to Jordan.

On the outskirts of the port city of Aqaba, just miles from the Israeli resort city of Eilat, international contractors have been conducting feasibility studies to gauge whether the site can house Jordan's first nuclear-power reactor. Aqaba also lies close to a seismic fault line. Israeli officials have publicly voiced concerns about a reactor being situated so close to the fault.

"We are way ahead of Israel" when it comes to securing new reactor technology, King Abdullah said. "And if you have the private sector involved in nuclear power, it's difficult to do anything sinister."

Write to Jay Solomon at jay.solomon@wsj.com

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