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THREATS AND RESPONSES: THE IRAQIS; U.S. SAYS HUSSEIN INTENSIFIES QUEST FOR A-BOMB PARTS

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More than a decade after Saddam Hussein agreed to give up weapons of mass destruction, Iraq has stepped up its quest for nuclear weapons and has embarked on a worldwide hunt for materials to make an atomic bomb, Bush administration officials said today.

In the last 14 months, Iraq has sought to buy thousands of specially designed aluminum tubes, which American officials believe were intended as components of centrifuges to enrich uranium. American officials said several efforts to arrange the shipment of the aluminum tubes were blocked or intercepted but declined to say, citing the sensitivity of the intelligence, where they came from or how they were stopped.

The diameter, thickness and other technical specifications of the aluminum tubes had persuaded American intelligence experts that they were meant for Iraq's nuclear program, officials said, and that the latest attempt to ship the material had taken place in recent months.

The attempted purchases are not the only signs of a renewed Iraqi interest in acquiring nuclear arms. President Hussein has met repeatedly in recent months with Iraq's top nuclear scientists and, according to American intelligence, praised their efforts as part of his campaign against the West.

Iraqi defectors who once worked for the nuclear weapons establishment have told American officials that acquiring nuclear arms is again a top Iraqi priority. American intelligence agencies are also monitoring construction at nuclear sites.

While there is no indication that Iraq is on the verge of deploying a nuclear bomb, Iraq's pursuit of nuclear weapons has been cited by hard-liners in the Bush administration to make the argument that the United States must act now, before Mr. Hussein acquires nuclear arms and thus alters the strategic balance in the oil-rich Persian Gulf. Prime Minister Tony Blair of Britain met with President Bush today to reaffirm his nation's support for action against Iraq. [Page 23.]

Iraq's nuclear program is not Washington's only concern. An Iraqi defector said Mr. Hussein had also heightened his efforts to develop new types of chemical weapons. An Iraqi opposition leader also gave American officials a paper from Iranian intelligence indicating that Mr. Hussein has authorized regional commanders to use chemical and biological weapons to put down any Shiite Muslim resistance that might

occur if the United States attacks.

The paper, which is being analyzed by American officials, was provided by Abdalaziz al-Hakim of the Supreme Council of the Islamic Revolution in Iraq, an Iran-based group, during his recent visit with other Iraqi opposition leaders in Washington.

Much of the administration's case, however, revolves around Iraq's attempts to develop nuclear weapons and assessments of the pace of the efforts. In the unfolding debate, administration hard-liners argue that possession of nuclear arms would enhance Iraq's sway in the region.

Administration officials also assert that the acquisition of nuclear arms might embolden Mr. Hussein and increase the chances that he might use chemical or biological weapons. The officials contend that Mr. Hussein refrained from using chemical and germ weapons during the 1991 Persian Gulf war because he feared a devastating retaliatory blow from the United States and that he might now conclude that the Americans would not dare strike him if he had nuclear weapons.

"The jewel in the crown is nuclear," a senior administration official said. "The closer he gets to a nuclear capability, the more credible is his threat to use chemical or biological weapons. Nuclear weapons are his hole card."

"The question is not, why now?" the official added, referring to a potential military campaign to oust Mr. Hussein. "The question is why waiting is better. The closer Saddam Hussein gets to a nuclear weapon, the harder he will be to deal with."

On the Brink of War

Hard-liners are alarmed that American intelligence underestimated the pace and scale of Iraq's nuclear program before Baghdad's defeat in the gulf war. Conscious of this lapse in the past, they argue that Washington dare not wait until analysts have found hard evidence that Mr. Hussein has acquired a nuclear weapon. The first sign of a "smoking gun," they argue, may be a mushroom cloud.

Still, even though hard-liners complain that intelligence about Iraq's program is often spotty, they plan to declassify some of it to make their case in coming weeks. The administration briefed members of Congress on Iraq's programs to develop weapons of mass destruction this week, but it is not known to what extent officials talked about the intercepted shipments. Given the special intelligence-sharing relationship with Britain, the information on the attempted purchases Mr. Blair plans to release in a few weeks.

The administration's critics assert that the last decade has shown that Mr. Hussein can be contained through a combination of United Nations sanctions, carefully designed inspections and, if Iraq refused to admit the monitors, targeted air strikes. Iraq, the critics say, remains heavily dependent on external assistance to advance its nuclear program. Washington, the critics say, has time to try its hand at diplomacy and should enlist United Nations backing to force Mr. Hussein to accept inspectors back. Taken in its totality, the critics insist that the intelligence suggests there is no rush to take military action.

The Central Intelligence Agency still says it would take Iraq five to seven years to make a nuclear weapon if it must produce its own supply of highly enriched uranium for a bomb, an administration official said. American intelligence officials believe that Iraq could assemble a nuclear device in a year or somewhat less if it obtained the nuclear material for a bomb on the black market. But they say there are no signs that Iraq has acquired such a supply.

Still, Mr. Hussein's dogged insistence on pursuing his nuclear ambitions, along with what defectors described in interviews as Iraq's push to improve and expand Baghdad's chemical and biological arsenals, have brought Iraq and the United States to the brink of war.

President Bush seems to share the hard-liners' concerns and, officials say, is determined to resolve the Iraq problem on his watch. In drawing up plans for military action, the administration is preparing to act while Iraq's conventional forces are still reeling from the effects of United Nations sanctions and the gulf war, while Iraq's nuclear arsenal is nonexistent, and while the shock of the Sept. 11 attacks have made many Americans receptive to the idea of pre-emptive military action.

Painting an up-to-date picture of Iraq's weapons of mass destruction is not easy. United Nations arms inspectors have not visited Iraq for almost four years, and there are significant gaps in what American intelligence knows about the Iraqi program.

Consequently, Bush administration officials are hoping to use what one official called a mosaic of disturbing new reports -- including intelligence that Iraq has tried to purchase the special tubing to make centrifuges -- to underscore their dire warnings about Iraq's military ambitions.

A 20-Year Effort to Build a Bomb

Iraq's nuclear ambitions have a long history. Iraq first sought to obtain the plutonium for a nuclear bomb by purchasing a nuclear reactor from France, among other steps. That effort was stymied when Israel bombed the plant in 1981.

Iraq's next step was to mount a secret program to develop highly enriched uranium for a bomb. American officials discovered after the gulf war that Iraq had duplicate programs for every key aspect of its nuclear weapons program and that it had been pursuing at least two methods for producing highly enriched uranium.

Baghdad, they concluded then, was only several years away from making a nuclear bomb from indigenously produced nuclear material. Although experts concluded that the weapon would have been too large to put on Iraq's missiles, it would have dramatically altered the strategic equation in the gulf region.

Under the cease-fire arrangements made after the gulf war, Iraq promised to dismantle its weapons of mass destruction and to admit United Nations weapons inspectors. Still, American and United Nations officials believe that Iraq sought to keep its nuclear program alive by, for instance, keeping its teams of nuclear scientists together.

Frustrated by Iraq's repeated refusal to cooperate fully with United Nations inspectors, the Clinton administration -- joined by Britain, also Mr. Bush's most likely partner if he decides to attack Iraq -- decided to mount a series of airstrikes in late 1998. The United Nations inspectors were withdrawn shortly before the attacks and have never returned, depriving Washington of information about the status of Iraq's program.

Former American government experts say that Iraq is not on the verge of fielding a nuclear weapon, but has the expertise in nuclear weapon designs and engineering to develop nuclear arms over time.

"If Iraq has revived its enrichment program, it would probably take Iraq a number of years to complete a production scale facility for producing fissile material and Iraq would probably require a considerable amount of foreign equipment and expertise," said Gary Samore, a staff member on President Clinton's National Security Council who has overseen a new study for the London-based International Institute for Strategic Studies of Iraq's program to make weapons of mass destruction.

"But if they keep working at it, it is likely that they will eventually get there," Mr. Samore added. "The fact that they were able to successfully conceal a mammoth enrichment project prior to the gulf war has to give you some concern that they are pretty good in the art of deception. If Iraq was somehow able to acquire fissile material from a foreign source, it could produce nuclear weapons much sooner."

Bush administration officials say the quest for thousands of high-strength aluminum tubes is one of several signs that Mr. Hussein is seeking to revamp and accelerate Iraq's nuclear weapons program.

Officials say the aluminum tubes were intended as casing for rotors in centrifuges, which are one means of producing highly enriched uranium. The Washington Times reported in July that Iraq sought to acquire stainless steel for centrifuges on one occasion. Officials say that the material sought was special aluminum tubes and that Iraq sought to acquire it over 14 months.

Centrifuge technology spins uranium in a gas form at high speeds to separate the lighter and heavy isotopes. Mounted inside the aluminum casing, rotors are the spinning part of the centrifuge machine. In 1991, Iraq planned to build a centrifuge plant of 1,000 machines designed to produce 10 kilograms (22 pounds) of highly enriched uranium a year. That was enough for half a bomb's worth given the Iraq design.

In addition to the special aluminum tubes, a senior administration official said Iraq had made efforts to purchase other equipment, epoxy and resins that could be used for centrifuges. A key issue is whether the items Iraq tried to buy are uniquely designed for centrifuge use or could have other applications.

Experts say the dimensions and precise specification of the aluminum tubes would provide a clear indication of its intended use. Iraq used European designs for centrifuges in its earlier efforts, and American experts know what type of tubes are

needed to make such centrifuges. Senior administration officials insist that the dimensions, specifications and numbers of the tubes Iraq sought to buy show that they were intended for the nuclear program.

Those skeptical about the urgency of the threat say Iraq's procurement efforts illustrate how dependent Baghdad is on foreign assistance and the difficulties it is encountering in trying to develop nuclear weapons. But administration hard-liners say that the attempted purchases confirm Mr. Hussein's persistent determination to acquire nuclear weapons and that export controls can slow but not stop that effort.

Chemical Weapon Warheads

Chemical weapons could be a major worry on the battlefield if the United States mounts an invasion. According to the United Nations Special Commission, or Unscm, the now defunct group charged with inspecting Iraq after the gulf war, industrial-scale chemical weapons production began in 1982. Iraq acknowledged having produced sufficient quantities of chemical precursors for almost 500 metric tons of VX, the deadly nerve agent, as well as hundreds of tons of mustard gas, tabun and sarin.

In its war with Iran, which lasted from 1980 to 1988, Iraq used artillery shells, aerial bombs and rockets to deliver deadly chemicals. Iraq revealed after the gulf war in 1991 that it had also deployed some 50 missiles equipped with chemical warheads.

The commission was able to verify Iraq's claims to have destroyed 34,000 chemical munitions and 823 tons of key chemical precursors. But the inspectors were unable to account for 2,000 supposedly unfilled munitions, and 25 "special warheads" intended to hold chemicals or germs. Nor could they verify Iraq's claims to have destroyed 500 mustard-gas artillery shells and 150 aerial bombs.

One central mystery concerns VX, a nerve agent so potent that a drop on the skin or inhaled can kill an adult within minutes. Although Iraq claimed to have destroyed 3.9 tons of VX nerve agent and several hundred tons of precursor chemicals it produced before the gulf war, the commission concluded that Iraq might have retained enough precursor chemicals to produce about 200 tons of VX. After inspectors found VX traces on Iraqi warheads in the summer of 1998, they challenged Baghdad's assertions that Iraq had never loaded its warheads with VX.

In interviews in a European capital late last month, an Iraqi who said he was involved in the chemical weapons program before he defected two years ago said that Mr. Hussein had never stopped producing VX and other chemical agents, even when international inspectors were in Iraq.

Speaking on the condition that neither he nor the country in which he was interviewed be identified, Ahmed al-Shemri, his pseudonym, said Iraq had continued developing, producing and storing chemical agents at many mobile and fixed secret sites throughout the country, many of them underground.

"All of Iraq is one large storage facility," said Mr. Shemri, who claimed to have worked for many years at the Muthanna State Enterprise, once Iraq's chemical

weapons plant. Since leaving Iraq, he has joined the Iraqi Officers Movement, an opposition group.

Mr. Shemri said Iraq had produced 5 tons of stable VX in liquid form between 1994 and 1998, before inspectors were forced to leave Iraq. Some of this agent, he said, was made in secret labs in the northern city of Mosul and in the southern city of Basra, which Unscm inspectors confirmed they had rarely visited because of their long distance from Baghdad.

He said Iraq had the ability to make at least 50 tons of liquid nerve agent, which he said was to be loaded into two kinds of bombs and dropped from planes.

Of even greater concern is Mr. Shemri's allegation that Iraq had invented, as early as 1994, and is now producing a new, solid VX agent that clings to a soldier's protective clothing and makes decontamination difficult. An intelligence report dating to October 1990, just after Iraq's invasion of Kuwait, reflected American concern that Iraq might have mastered the production of "dusty VX," despite the fact that there was "no evidence" it had done so, according to an intelligence report written in October 1990. "Dusty agents can penetrate U.S. C.B.W. overgarments under certain conditions," the report warned. It recommended that soldiers throw ponchos over their protective gear if such an agent is used.

Mr. Shemri said Iraq had received assistance in its chemical, germ and nuclear programs from Russian scientists who are still working in Iraq. At least two Iraqi scientists traveled to North Korea in early 2002 to study missile technology, he said.

Asked about his allegations, American officials said they believed these reports were accurate, although they noted that North Korea and Iraq had regular technical exchanges, and that Russian scientists appeared to be free-lancers and not part of a Russian government effort. An former Unscm inspector called at least some of Mr. Shemri's information "plausible." While he said it was impossible to determine the accuracy of all his claims, he believed that Mr. Shemri "is who he claims to be, and worked where he claimed to work."

Arsenal of Deadly Germs

On the spectrum of weapons of mass destruction, biological weapons are far more worrisome than chemical weapons. They not only have the potential to kill troops on the battlefield but also can be used to strike at and terrorize an adversary's civilian population.

Iraq denied the existence of a germ warfare program entirely until 1995, when United Nations inspectors forced Baghdad to acknowledge it had such an effort. Then, after insisting that it had never weaponized bacteria or filled warheads, it again belatedly acknowledged having done so after Hussein Kamel, Mr. Hussein's brother-in-law, defected to Jordan with evidence about the scale of the germ warfare program.

United Nations and American records show that Iraq made More than 22,000 gallons of anthrax and 100,000 gallons of botulinum toxin, one of the world's most lethal

poisons. The fate of those stocks remains uncertain. Any botulinum toxin produced before 1991 would no longer be active, but prewar stocks of anthrax spores could still be deadly if stored properly.

Its final report to the United Nations Security Council in 1999, the inspectors said Iraq had concealed almost 160 bombs and more than two dozen Scud missile warheads filled with anthrax. But one key issue is Iraq's delivery ability.

The missile warheads that Iraq had at the time of the gulf war were very inefficient. They detonated on impact, which would have destroyed most of the biological agents. They did not disperse their chemical or biological agents in an airburst. It is not known if Iraq has devised an improved warhead. Iraq could also try to disperse the biological agents by using aircraft or unmanned drones. The germs could be dropped in a bomb or sprayed into the air. Finally, and most difficult to defend against, biological agents could be delivered against civilian targets by Iraqi agents.

Mr. Shemri said he had been told that Iraq was still storing some 12,500 gallons of anthrax, 2,500 gallons of gas gangrene, 1,250 gallons of aflatoxin and 2,000 gallons of botulinum throughout the country.

American officials have also expressed intense concern about smallpox, one of history's greatest scourges, which was declared eradicated from human populations in 1980. Today, only the United States and Russia have publicly declared stocks of the virus. But terrorism experts say clandestine supplies probably exist in several countries, including Iraq.

Although administration officials say they have no proof that Baghdad possesses the smallpox virus, intelligence sources say they cannot rule that out.

"There's a number of sensitive things," said a senior government official who has studied the evidence for more than a decade. He added that "on a scale of one to 10, I'd say it's probably a six" that Iraq has the virus.

Experts say Iraq could easily have obtained the starter germs from a natural outbreak of the disease that swept Iraq in 1971 and 1972, infecting at least 800 people, according to "Smallpox and its Eradication," a World Health Organization book.

During the gulf war, evidence of Baghdad's interest in smallpox came to light as allied forces discovered that a number of Iraqi soldiers had been vaccinated against the disease. The clue was ambiguous, however, since some allied troops had also had immunizations.

In 1994, United Nations inspectors examining Iraqi plants found a freeze drier at the repair shop of the State Establishment for Marketing Drugs and Medical Appliances that was industrial sized and marked "smallpox machine" in Arabic.

Iraqi officials insisted that the machine was not for drying the smallpox virus, but for drying the vaccinia virus, at the heart of the smallpox vaccine. This is a common practice, and the answer was judged plausible by the United Nations inspectors. If it

was a lie, however, the machine had sinister implications, as did further clues contained in three papers on smallpox that were in documents on weapons programs turned over to the United Nations by Iraq.

It is Iraq's pursuit of nuclear weapons, however, that is at the top of the administration's list of worries and forms a key part of its case for a military campaign to overthrow Mr. Hussein. In their effort to make their case, administration officials are even using Mr. Hussein's own words.

They cite what they call a morale boosting speech Mr. Hussein gave after meeting with the head of Iraq's Atomic Energy Organization last month. The speech was directed to the staff of the Iraqi Atomic Energy Organization and the oil and military industrialization ministries. Iraqi television later reported that Mr. Hussein stressed "the importance of collective work in enabling the individual to overcome any trouble and achieve what is beyond his capabilities and energy."

Photos: DISPUTED IRAQI PLANT -- Iraq says the West suspects this plant at Al Qaim, 280 miles west of Baghdad, of being an arms site, something Iraqi officials disputed last week when they gave reporters a tour of the site. The plant came under attack during the gulf war.; SEEKING SUPPORT IN BAGHDAD -- Members of Iraq's Revolution Command Council took part last week in an emergency session of the Arab Parliaments Union in Baghdad, where Iraq sought support against a possible attack by the United States. (Photographs by Reuters)(pg. 25)