[redacted] (b)(2)

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MID

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MILITARY INTELLIGENCE DIGEST SUPPLEMENT

[redacted]

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(U) Iraq: Procuring Possible Nuclear-Related Gas Centrifuge Equipment

(b)(1),1.4 (c)

(U) In the past year, Iraq has increased efforts through a network of front companies to acquire [redacted] specialized aluminum tubes that it could use to construct gas centrifuge rotors. If Baghdad acquires the tubes, it could, in 5 to 7 years, fabricate a centrifuge cascade able to produce enough highly enriched uranium for [redacted] per year.

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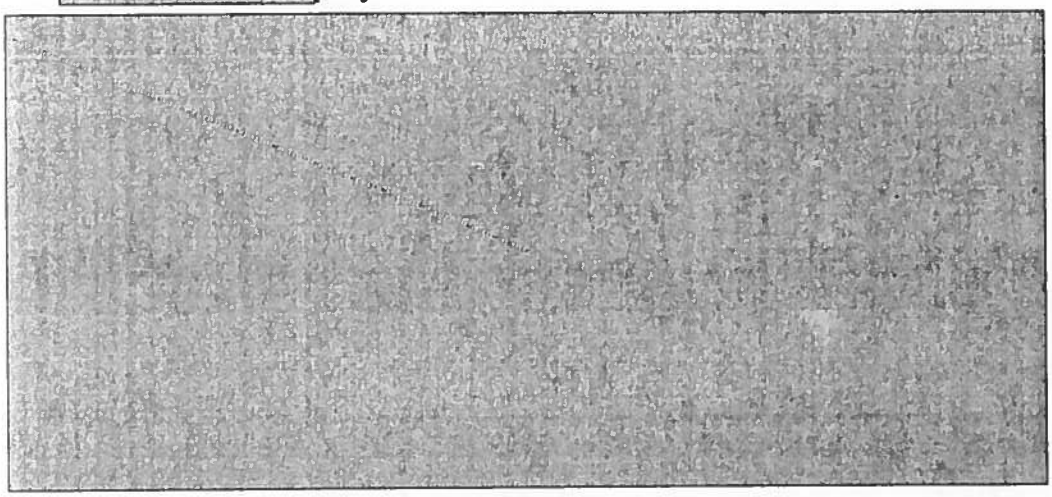
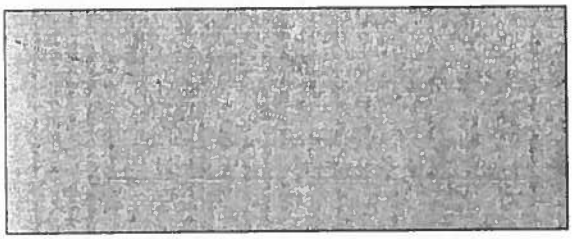


Aluminum Tubes

(b)(1),1.4 (c)



(U) From 1986 to 1991, Iraq's early attempts to produce enriched uranium through gas centrifuges concentrated on carbon composite rotors and maraging steel — more sophisticated technology than the aluminum tubes. However, Iraq seeks to develop highly enriched uranium no matter the level of technology and by any means.

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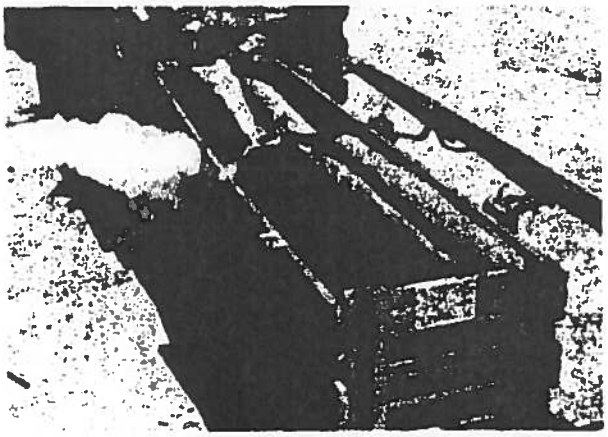

(U) **Open Tube Crate Detained by Jordanian Authorities.** The 7075 T-6 aluminum tubes could be used for gas centrifuges that enrich uranium for nuclear weapons.

Conventional Military Uses Unlikely for Aluminum Tubes

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(U) Despite the possibility that these aluminum tubes could be for conventional rocket uses, a review of rocket motor bodies and launch tubes shows such uses are unlikely. Although 7075 T-6 aluminum could be an acceptable metal for small rocket motor bodies, make these particular tubes poor choices for rocket motor bodies. The 0.1-mm metal thickness tolerance along the 900-mm length is excessive for both rocket motor bodies and rocket launch tubes.

(U) The solid-propellant grain carried inside the body would not require a surface as straight and smooth as that of the aluminum tubes. Moreover, a rocket launch tube does not need such tight manufacturing tolerances. The rocket's folding fins will cause slight wear on the inner wall as they fire. If the launcher is reusable, as all known multiple rocket launchers are, the tight manufacturing tolerances are not required. A launcher firing spin-stabilized rockets (no fins) would cause similar wear to the launch tube.

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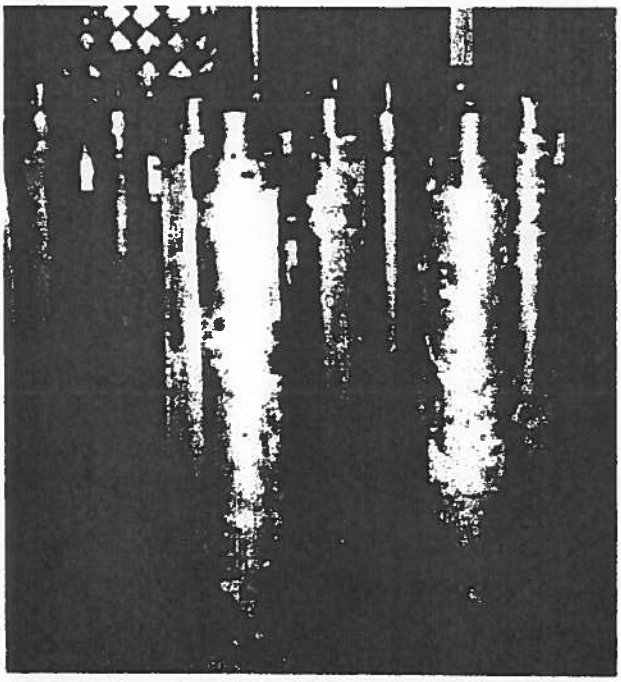

(U) **Iraqi Centrifuges Used in One Method of Uranium Enrichment.** These centrifuges used for uranium enrichment were found in Iraq after the Gulf War.

Gas Centrifuges

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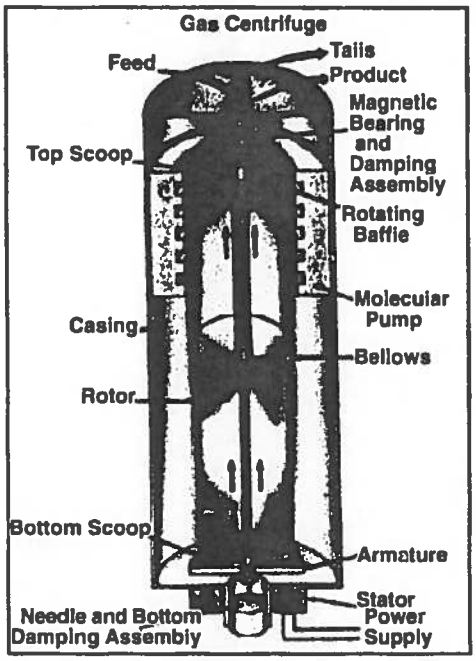

[redacted] The centrifuge operates on a basic principle of centrifugal force, which separates the fissionable U-235 for weapons use from the heavier U-238. Gaseous uranium hexafluoride (UF_6) is fed into a centrifuge that spins at high speed inside a casing. The resulting centrifugal effect forces the UF_6 gas into a thin layer next to the rotor wall. Centrifugal force also moves the heavier $^{238}UF_6$ molecules closer to the wall than it does the lighter $^{235}UF_6$ molecules. Because of the small amount of enrichment and small quantity flowing (throughput), producing one or two weapons' worth of highly enriched uranium a year typically requires a plant with several thousand centrifuges operating nearly full time. The resultant 90-percent U-235 product is a common fissile material for nuclear weapons.

Iraqi Nuclear Program

[redacted] Iraq does not have the infrastructure to support Saddam Husayn's nuclear aspirations, but the country's procurement efforts suggest an intent to reconstitute the pre-Gulf War nuclear weapon program. Since the end of UN Special Commission intrusive monitoring in 1998, Iraq has increased its procurement efforts for dual-use items. Moreover, the Iraqis have the expertise to reconstitute a nuclear weapons program, and they have retained some key nonfissile materials and equipment. Some scientists involved in the country's nuclear weapon program before Operation DESERT STORM most likely are working on low-level theoretical design and research projects.

[redacted] Baghdad probably would need foreign assistance and at least 5 years from the start of a major effort to produce fissile material for one weapon. However, Iraq could develop a crude weapon within 1 year if it acquired sufficient weapons-grade fissile material from a foreign source.

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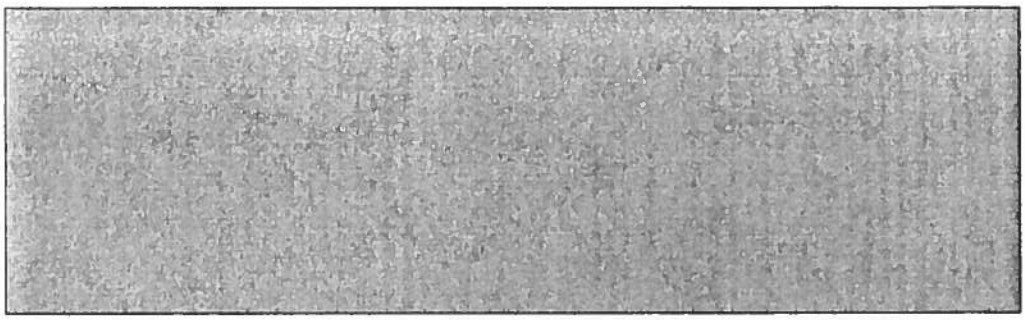

Assessment

(b)(1),1.4 (c)

([redacted]) Since mid-2000, Iraq has [redacted] tried to procure at least [redacted] (b)(1) 7075 T-6 aluminum tubes in violation of UN sanctions and despite great international pressure against such procurement.

([redacted]) Although alternative uses for these tubes are possible, such as rocket motor cases or rocket launch tubes, the specifications are consistent with earlier Iraqi gas centrifuge rotor designs. The specified tolerances for the tubes are extremely high. The high-grade, rigid aluminum tube properties would allow the tubes to operate at high speeds as centrifuge rotors, and anodization would protect against damage from the highly reactive properties of uranium hexafluoride gas. If Baghdad procures most of these tubes, it could, in 5 to 7 years, fabricate a centrifuge cascade able to produce enough highly

(b)(1),1.4 (c) enriched uranium for [redacted] per year.

(b)(2),(b)(3):10 USC 424

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