



ISIS REPORT

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A Company's Discretion Detects Large Iranian Valve Orders by Scrutinizing Items and End-Users Instead of Lists

David Albright, Paul Brannan and Andrea Schedel

Starting in August 2002, right before an Iranian opposition group revealed publicly the existence of the secret Natanz nuclear site in Iran, a European high-technology vacuum equipment manufacturer received a series of enquiries from trading companies for large numbers of fast-acting valves suspected for use in Iran's uranium enrichment program. Over the next 14 months, this manufacturer received a total of 15 suspicious enquiries for valves, five of which are depicted in Figure 1. The manufacturer specializes in cutting-edge vacuum equipment, which has both nuclear and non-nuclear applications. The vast majority of enquiries that it receives are intended for legitimate and legal end-uses. A small fraction, however, originate from front companies seeking to illicitly purchase items for use in secret nuclear programs. The manufacturer's officials suspected that these valve enquiries were in the latter category. What they started to realize is that these enquiries revealed the nature and scope of Iran's secret gas centrifuge program months before Iran admitted to that program's existence in February 2003.

The first enquiry was received on August 14, 2002 from a German trading company (Trading Company A), which stated the valves were destined for a petrochemical factory in the United Arab Emirates. The manufacturer's officials linked this company to Iran and did not make the sale. This enquiry was followed by an enquiry in October of 2002 from another German company (Trading Company B), which stated that Iranian universities were the end users, but the enquiry was for an initial 3,000 valves and a total of 50,000 valves, an unusually large number for a university, but in line with the requirements of a growing gas centrifuge program. Other requests followed. In two more instances, the manufacturer received requests from German and Italian trading companies (Trading Companies C and D), who themselves were representing other trading companies, one of which was in Iran. Figure 1 shows these enquiries as well as several others.

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236 Massachusetts Avenue, NE, Suite 500 Washington, DC 20002

TEL 202.547.3633 • FAX 202.547.3634

E-MAIL isis@isis-online.org • www.isis-online.org

The largest order was from a South Korean company in May 2003 (Trading Company E), seeking an annual quantity of 50,000 to 100,000 valves. The end user of this request was an Iranian nuclear power plant, another strange customer for this number of valves.

The export control manager for the manufacturer, had become convinced that the orders were for the Natanz enrichment plant, which would need at least 150,000 valves for all the centrifuges Iran planned to deploy at Natanz. These centrifuges are based on an early Dutch design that Pakistan stole in the early 1970s and later A. Q. Khan secretly sold to Iran in the 1980s and 1990s. This type of centrifuge is subject to excessive vibration and the fast-acting valves allow rapid shutdown of an individual centrifuge before it breaks.

But some were skeptical about stopping these sales, since the valves were not the ones on the international control lists of dual-use items. However, as the manufacturer's export officials had became more familiar with enquiries from sensitive countries, they had noticed that proliferant states were deliberately avoiding ordering items on lists of nuclear dual-use items subject to strict licensing requirements of newer laws. Instead of ordering vacuum pumps and valves manufactured specially for gas centrifuge uranium enrichment plants, sensitive programs ordered these items from the manufacturer's catalog. In the above cases, the valves were not of the type found on lists of nuclear dual-use equipment that require a government-issued license to export.¹ The procurement specialists and scientists running these programs had apparently learned that items on dual-use export control lists could be avoided by substituting items that were less capable than the listed item, but still good enough for the intended nuclear purpose. Doing so would also attract far less scrutiny from suppliers and authorities.

In September 2003, the manufacturer's export control manager brought the enquiries to the attention of a European government agency responsible for export controls. This agency, after doing its own interval technical evaluation, confirmed the export control manager's hunch that these valves were suitable for use in a centrifuge plant and would not be approved for export to Iran.

The enquiries continued through October 2003, at which point they stopped. Whether Iran succeeded in acquiring enough valves through other suppliers is unknown. But the enquiries had provided early warning of Iran's intentions to build thousands of centrifuges and valuable insight into the nature of the centrifuges.

Iran started ordering valves again from Europe in late 2005 or early 2006. Before authorities were aware, a British vacuum company sent an order of about 1,000 valves to Iran. Several similar enquiries followed for thousands of valves, fittings, and pipes that appeared to be enough for an entire facility. Several other vacuum companies received enquiries from a multitude of different trading companies. Initially the orders came from a multitude of Iranian companies. Later, trading companies with offices in Dubai and a company with offices in both Dubai and India made similar orders. Iran's international

¹ These valves were made of stainless steel, while the valves on the lists were made from aluminum, aluminum alloys, or other materials resistant to uranium hexafluoride. U.S. exports to North Korea are an exception, where a special list of items, including valves and vacuum pumps, are controlled directly.

search for valves became so apparent that the United Nations Security Council in 2006 highlighted valves in a resolution sanctioning Iran for refusing to suspend its uranium enrichment program and permit adequate IAEA inspections.²

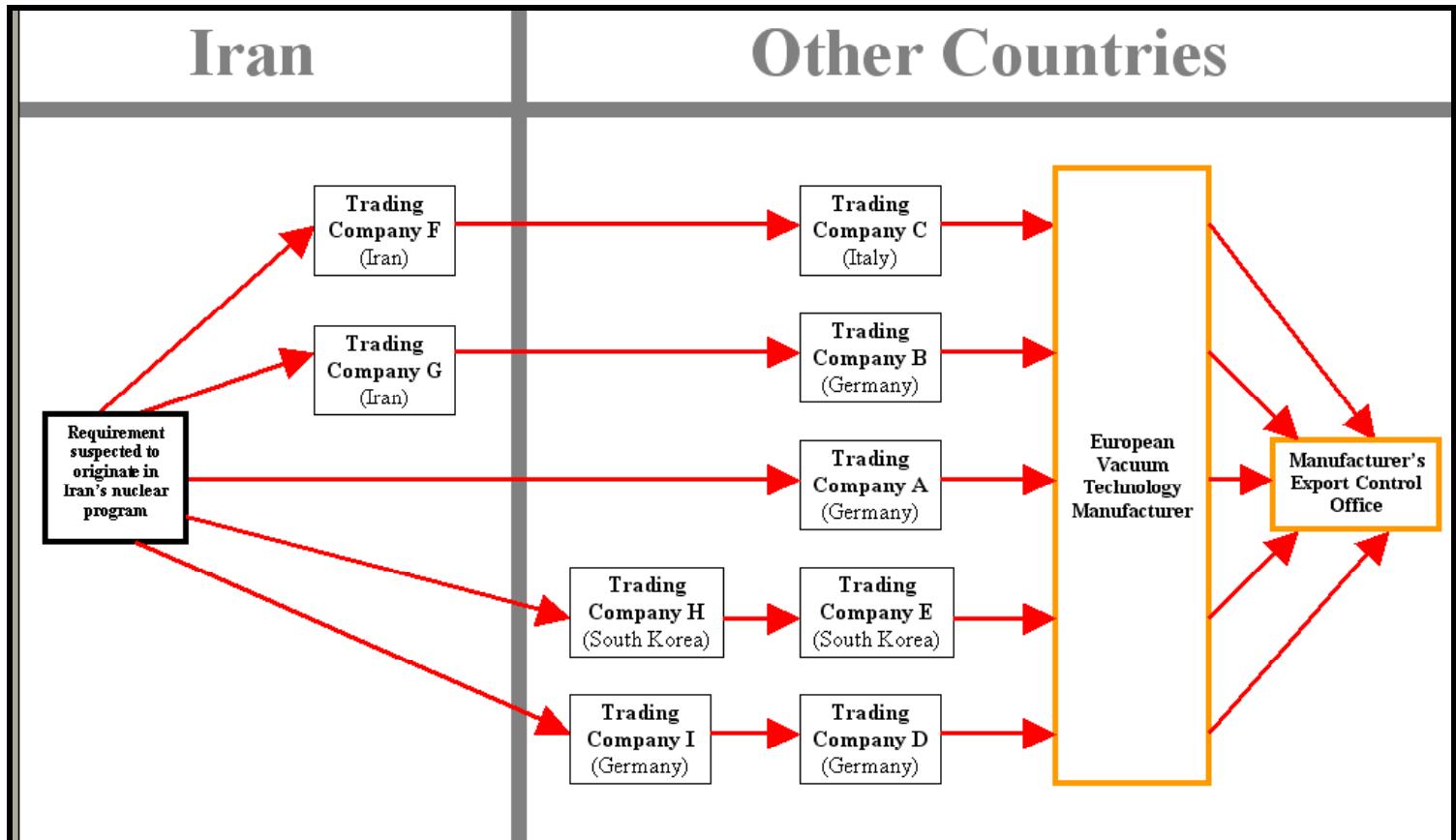


Figure 1. Diagram showing the path of five of the fifteen enquiries for fast acting valves received by a European vacuum technology manufacturer between August of 2002 and October of 2003. Export control managers for this manufacturer suspected that these enquiries were intended for use in a gas centrifuge uranium enrichment plant in Iran.

² U.N. Security Council Resolution 1737 (2006), adopted by the Security Council on 23 December 2006.