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The 2015 nuclear deal between Iran and the international community that required Iran to eliminate its stockpile of medium-enriched uranium and to limit both the quantity and quality of its gas centrifuge uranium enrichment facilities highlighted the political and strategic sensitivity of centrifuge technology. These concerns were not new. In the 1960s, U.S. policy makers became increasingly concerned that the gas centrifuge posed a significant nuclear proliferation risk. A more simple and efficient process than gaseous diffusion, the centrifuge offered countries an alternate means of producing enriched uranium for civil use free from the constraints demanded by America and its allies. Due to its relatively small size and the ability to cascade multiple systems, centrifuge technology could be developed in concealed locations away from prying eyes. The centrifuge also made it possible for a determined government to circumvent international controls and to produce fissile material for nuclear weapons.

The realisation that advances in gas centrifuge technology posed significant nuclear proliferation risks created new requirements for U.S. diplomacy and security policy. Determined to minimise such risks, officials in the Eisenhower administration realised that they required the assistance of allies to establish both export controls and a security regime in order to delay rather than halt the application of gas centrifuge technology by potential nuclear weapons states. It was believed that nuclear proliferation would complicate superpower relations and raise the danger of local conflicts triggering nuclear war. To limit nuclear proliferation, the U.S. Atomic Energy Commission sought to restrict access to centrifuge technology. Britain, The Netherlands, and West Germany were also aware of the technology and began to develop research programmes of their own. To control application of the technology, the countries agreed on an informal agreement to classify centrifuge technology as secret and to develop a system of export restrictions. The scientific community on both sides of the Atlantic expressed doubts that such a regime could control scientific developments and expressed concern that the agreement would help West Germany develop a secret military programme.

The article seeks to explain how the U.S. government shaped policies that were responsive to the security and economic challenges raised by the gas centrifuge process. Concerned that nuclear proliferation could weaken U.S. power, complicate diplomacy, and raise the risk of nuclear war, U.S. policy makers sought to minimise
the complications associated with the gas centrifuge by tightening controls and seeking to limit access to a small group of European allies. The emergence of a European centrifuge consortium in the 1960s presented the U.S. administration with a number of policy options. The State Department, tasked with taking a broad view of American foreign policy interests, viewed the European consortium as beneficial to European integration and a way of limiting nuclear proliferation. In contrast, the Atomic Energy Commission responsible for maintaining U.S. secrecy was opposed to the consortium, viewing its activities as a means of facilitating the proliferation of nuclear technology and damaging U.S. commercial interests in the emerging field of civil nuclear power. In attempting to evaluate the various competing views, the article provides a valuable insight into the relatively unexplored role played by commercial interests in the development of nuclear policy.

Burr contends that previous scholarship on the subject of centrifuge technology has misunderstood American motivations, and that despite claims to the contrary, U.S. policy makers expressed concerns about the possibility of clandestine gas centrifuge plants and appreciated ‘political solutions’ to the problem of nuclear proliferation. International agreements and technology sharing were instrumental in mitigating the rise of proliferation challenges, but control in isolation could not prevent the military uses of gas centrifuge technology. In analysing U.S. efforts to prevent the spread of sensitive technology, the article argues that even in the age of U.S. hegemony, Washington could not act in isolation, but required the help of allies to establish and enforce controls over gas centrifuge technology. Moreover, those same allies would be competing with the U.S. for a share of the reactor fuel market.

The article shows that despite the best efforts of the international community, centrifuge technology was always expected to be acquired by other powers and that that U.S. sought to delay dissemination for as long as possible until an effective global non-proliferation system was adopted. To achieve these aims, the U.S. offered attractive terms for the purchase of enriched uranium for reactor fuel to dampen the incentive to develop the gas centrifuge and preserve the value of the huge investment in gaseous diffusion plant that the U.S. had recently undertaken. The relationship with Japan is also explored and charts the difficulty of controlling the spread of sensitive nuclear technology in a country that possessed no system for filing secret patents.

A significant focus of the article is the emergence in the late 1960s of the joint European enrichment project (URENCO) consisting of Britain, the Netherlands, and West Germany, and its consequences for U.S. diplomacy. Once again, U.S. officials were divided, with the Atomic Energy Commission tending to emphasise the danger inherent in technological exchange with the State Department taking a more benevolent position. The evidence clearly shows that despite attempts by the Atomic Energy Commission to prevent, delay or limit European cooperation, the State Department view prevailed. The British were discreetly informed that while Washington did not seek to encourage the joint venture, previous understandings on classification did not preclude cooperation between the three participating nations. While some officials remained worried about the project and sought delay, both the White House and State Department saw important political and non-proliferation benefits: the joint venture brought the United Kingdom closer to the European Community and prevented the development of an independent German nuclear facility.

The reaction of the French government to the joint project is also studied in some detail. President Charles de Gaulle was implacably opposed to the project believing it a ruse by the British to join the European Community and a means for West Germany to develop nuclear weapons. French objections were rebutted on the grounds that the joint project would be placed under the safeguards of the Non-Proliferation Treaty.
Henry Kissinger, the U.S. National Security Advisor, accepted French concerns but believed it safer for the Germans to be involved in a joint venture with the British and Dutch rather than embarking on an independent national programme of their own. The article contends that the project’s multinational character offered the best assurance that European nuclear power would develop on a non-discriminatory basis, affording maximum assurances concerning the non-proliferation of nuclear weapons.

The paper concludes with a discussion of safeguards and role of the International Atomic Energy Agency. The European enrichment facility was the first to be subject to international inspection and was seen as an important test of the safeguard system that was regarded by U.S. officials as essential for an effective non-proliferation policy. While they expressed concern over inspectors collecting intelligence on classified processes, they recognised that the indefinite classification of a commercial application was untenable. The paper shows that in order to provide more effective protection against the illicit use of enrichment facilities, long-term safeguards rather than classification were considered the way forward. The officials nevertheless conceded that whatever measures were adopted could not provide fool-proof assurance against the possibility of secret diversions. The paper shows that non-proliferation regimes are only as good as the security arrangements that support them. The case of Pakistani nuclear engineer Abdul Qadeer Khan is a salutary example. Employed as a subcontractor on the Dutch programme, Khan was soon given access to classified information on centrifuge technology. Following the Indian nuclear test in 1974, he started to pass information to Pakistan intelligence. To paraphrase the article, the genie may well have been bottled up but the cork was less than secure.

A senior analyst and director of the nuclear history documentation project at the National Security Archive, Burr is well placed to chart the often complex diplomacy and technological issues that often characterise the development of the centrifuge programme and the interaction of science, technology, and international relations. The narrative is informed and supported by a wealth of primary source material. A marginal criticism is that the material selected is solely from U.S. sources, but this omission is acknowledge in the text. The article is a welcome addition to the literature for those interested in nuclear diplomacy and the dynamics of the western alliance, and will encourage researchers to build on the scholarship to date to provide a broader history of gas centrifuge diplomacy during this significant period of the Cold War.

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