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"THE IMPLICATIONS OF NUCLEAR COOPERATION WITH SAUDI ARABIA"

A Statement by

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For seventy years, trade in nuclear materials, equipment, and technology has been heavily regulated by the United States and many other countries for one fundamental reason: what is sold or shared for peaceful purposes can be diverted to help make nuclear weapons. There is really no way to prevent diversion by a country determined to produce nuclear weapons but there are many ways to make that diversion difficult, costly, time-consuming, and detectable. The system of deterrence – broadly known as the nuclear nonproliferation regime – is built upon national, bilateral, multilateral and international mechanisms. Over the decades, each instance of countries acquiring nuclear weapons capabilities through peaceful trade has prompted measures to tighten those multi-layered mechanisms. Despite improvements, the risk never drops to zero because states acquiring capabilities are free to opt out of their legally binding commitments.

Today, as this Committee considers the implications of an agreement between the United States and Saudi Arabia to share nuclear technology, the stakes could not be clearer: Saudi officials, including Crown Prince Mohammed bin Salman just last week and Prince Turki al-Faisal in 2011, have indicated that if Iran acquired a nuclear weapon, Saudi Arabia would soon follow suit. This implies that Saudi Arabia is either confident that it could acquire nuclear weapons from another country that has them and is not bound by the Nuclear Nonproliferation Treaty (for example, Pakistan or North Korea) or that it has the intention to acquire latent capabilities that could quickly be converted to military purposes if it finds it necessary to pull out of the Nuclear Nonproliferation Treaty. Sensitive fuel cycle technologies like uranium enrichment and spent fuel reprocessing are essential to a latent capability, and Saudi Arabia is reluctant to renounce acquiring such capabilities.

The United States has long opposed the spread of uranium enrichment and spent fuel reprocessing because of their proliferation risk and it is essential that its nuclear cooperation agreements reflect this, regardless of the partner. This paper assesses the impact of a potential nuclear cooperation agreement with Saudi Arabia, providing background on the role of nuclear cooperation agreements in nonproliferation, Saudi Arabia's plans for a nuclear program and what both parties hope to gain through cooperation. The paper concludes with recommendations for structuring a potential nuclear cooperation agreement for best advantage, and suggests ways to strengthen congressional oversight.

Background

Peaceful nuclear cooperation carries inherent risks, some of which are obvious and others not. The obvious risk is the potential for the misuse of peaceful nuclear energy for military purposes. Agreements typically outline what kinds of technology, material and equipment can be

transferred and what cannot. Recipient countries will almost always ask for the most permissive agreement and supplier countries must weigh the political and economic benefits of selling material, equipment, and services against the political and technical risks of proliferation.

The risk of misuse of U.S. material, equipment and technology is minimized by the stringent requirements for approving these agreements as provided for in the 1978 Nuclear Nonproliferation Act (NNPA) which amended 1954 Atomic Energy Act. The nine requirements contained in Section 123 are:

- Safeguards in perpetuity (whether IAEA or bilateral) on all material and equipment supplied;
- A comprehensive nuclear safeguards agreement with the International Atomic Energy Agency;
- Assurances against use in a nuclear explosive device or any other military purpose;
- Right of return in case of a nuclear test or abrogation of an IAEA safeguards agreement;
- Prior consent by the United States for transfer;
- Adequate physical protection;
- Prior consent by the United States for alteration in form or content, including enrichment or spent fuel reprocessing;
- Approval in advance of storage facilities;
- The application of all those requirements to any material, production facility or utilization facility "contaminated" by any material transferred under the agreement.

Most countries that supply nuclear materials and equipment do not apply such stringent conditions, although over time, the Nuclear Suppliers Group (NSG) has incorporated several of these elements in its guidelines for harmonizing trade. The playing field for suppliers is uneven for many reasons, not least of which is the extent to which governments subsidize their nuclear industries. For example, AREVA's recent restructuring included a $5 billion taxpayer-funded bail-out.

While U.S. agreements are typically more restrictive than others', a nuclear cooperation agreement with the United States is essential for other suppliers if their equipment contains U.S. components, design or technology. For example, the UAE awarded a $40 billion contract in 2009 to Korea's nuclear consortium to build nuclear power plants, of which Westinghouse content is estimated to be $2 billion. The Korean deal would not have been possible without a U.S.-UAE nuclear cooperation agreement in place because of the U.S. content. The dominance of the U.S. nuclear industry has not yet faded entirely, giving U.S. nuclear cooperation agreements more leverage than they might otherwise have. In other words, some countries

may see value in negotiating a 123 agreement with the United States not because they mean to engage in significant trade with the U.S. but because it is the price of admission for broader nuclear commerce.

In addition, U.S. peaceful nuclear cooperation agreements also pose risks that may be less obvious or immediate but significant nonetheless. One is the use of consent rights in such a way that it undermines U.S. policies to discourage uranium enrichment and spent fuel reprocessing. Granting consent for countries to transfer fuel to nuclear weapon states for reprocessing may limit proliferation, but does little for nuclear security. Consent for reprocessing could also encourage countries to delay finding sites for final disposal of waste. In recent agreements concluded by the United States, countries that have foresworn reprocessing on their soil (Taiwan, UAE, ROK) all have been given advance consent to send fuel out of the country elsewhere for reprocessing.[1] Instead, such agreements should have provided incentives for long-term interim storage.

In particular, because the United States has been a leader in nuclear nonproliferation efforts for 70 years, concluding a U.S. nuclear cooperation agreement is the equivalent of providing a Good Housekeeping seal of approval to some countries' nuclear energy programs, regardless of how strict or permissive the agreement may be. This was certainly the case for the U.S.-India nuclear cooperation agreement, which paved the way for other countries to engage in nuclear cooperation with India (but ironically, not the United States). Worse still, the U.S. agreement compounded the problem by legitimizing India's poor separation of military and civilian activities and anemic Additional Protocol.

The common argument that it is better for the United States to engage in nuclear cooperation than for other, perhaps less scrupulous suppliers to do so conveniently ignores that cooperation agreements are not contracts and do not guarantee trade. Moreover, the buyer's market that has persisted over the last few decades makes it more likely for recipients to reward those bidders with the most to offer. The risks of a "race to the bottom" in terms of nonproliferation standards are growing as U.S. nuclear dominance fades.

Another subtle risk has been the use of nuclear cooperation agreements to cement strategic relationships. Making technical cooperation agreements prestigious politicizes them. The more important the relationship is in terms of commercial, political and security needs, the greater the pressure is to adjust the balance of obligations towards facilitating engagement and

[1] While the agreement with South Korea did not contain language about South Korea foreswearing reprocessing (and in fact leaves the door open through future consultations regarding pyroprocessing), South Korea signed a joint declaration with North Korea in 1992 foreswearing enrichment and reprocessing facilities on it soil. Providing South Korea with advance consent to transfer spent nuclear fuel provides a pressure valve against pyroprocessing.

away from restrictions. This has been demonstrated many times over, most recently in the case of the agreement with South Korea.[2]

U.S. Nuclear Cooperation Agreements in the Middle East

In the early days of Atoms for Peace, the United States had nuclear cooperation agreements with Israel (1955-1960), Iran (1959-1964), and Lebanon (1955-1960). The U.S. signed an agreement with Morocco in 1980 (expiring in 2022), with Egypt in 1981 (expiring in 2021), and with the United Arab Emirates in 2009. The U.S. has been in discussions with both Jordan and Saudi Arabia for about ten years on nuclear cooperation agreements.

The United States recognized the importance of not introducing sensitive nuclear technologies into the region and included restrictions on reprocessing in an agreed minute added to its cooperation agreement with Egypt. While the text of the agreement was standard (no reprocessing unless the parties agreed), the agreed minute stated that Egypt had no near-term plans to introduce the fast breeder reactor cycle (which requires reprocessing) or to recycle plutonium in thermal reactors. The agreed minute also stated that if the parties mutually agreed to reprocessing, it would take place in a facility outside of Egypt. Most importantly, the agreement with Egypt provided an assurance that U.S. cooperation with other states in the region would have equal terms and conditions for cooperation. Finally, "If any situation arises which could increase the risk of proliferation of nuclear weapons, the United States and the Arab Republic of Egypt, at the request of either, shall enter into consultations with respect thereto with a view to maintaining the objectives of the NPT."

Negotiators of the 2009 agreement with the UAE clearly recognized the precedent set in the Middle East with the 1981 Egypt 123 agreement and adapted some of the provisions. While the UAE agreement contains an article (Article 7) that explicitly states the UAE would not possess any sensitive nuclear facilities for enrichment or reprocessing on its territory, the text of the Agreed Minute is similar to that in the Egypt agreement. The assurance of equal terms and conditions was also included, along with a specific reference to the possibility of altering the

[2] The ROK agreement was signed in June 2015 after long negotiations that required a two-year extension from Congress. South Korea's demands for advance consent for enrichment and reprocessing, which U.S. policy has long rejected for countries that do not currently have enrichment or reprocessing, were repeatedly framed by Korean senior officials in the context of the strategic ROK-US alliance. The compromise included a first-ever High Level Bilateral Commission (HLBC) within the agreement "to facilitate peaceful nuclear and strategic cooperation between the parties and ongoing dialogue regarding areas of mutual interest in civil nuclear energy, including the civil nuclear fuel cycle." Regarding sensitive nuclear technology, the agreement allows (per amendment of the agreement or by "a separate agreement between the Parties") transfer of SNT and technology that is not in the public domain concerning fabrication of nuclear fuel containing plutonium. While it does not grant advance consent for reprocessing, it states that uranium enrichment up to 20% U-235 is permissible if the Parties agree in writing on an arrangement to do so, following HLBC consultations and consistent with the Parties' applicable treaties, national laws, regulations, and license requirements.

agreement in the event that another state in the region received more favorable terms in scope and effect. The Morocco agreement contains more favorable terms, but predates the other two agreements.

Saudi Arabia as a nuclear energy partner

Saudi Arabia is a "nuclear newcomer." It has been involved for forty years in basic nuclear science, but has no commercial nuclear power plants. In 1977, the Kingdom established the King Abd Al-Aziz Center for Science and Technology for basic nuclear research and in 1988 founded the Atomic Energy Research Institute, which researches "industrial applications of radiation and radioactive isotopes, nuclear power and reactors, nuclear materials and radiation protection."

Like other countries caught up in the resurgence of interest in nuclear energy in the mid-2000s, Saudi Arabia reviewed its nuclear ambitions. A royal decree in 2010 established the King Abdullah City for Atomic and Renewable Energy (K.A.-CARE) in Riyadh. One year later, the scientific coordinator of K.A.-CARE announced Saudi Arabia's intention to construct 16 nuclear reactors to generate about 20% of the Kingdom's electricity by 2032. The announcement followed the March 2011 Fukushima nuclear accident that caused a few states to end nuclear power in their countries, and many states to pause their plans at least long enough to conduct safety reviews. Saudi Arabia moved ahead, however. In mid-2017, the government approved the Saudi National Atomic Energy Project (SNAEP) to implement a civil nuclear program focused on three business areas: large nuclear power plants, small modular reactors, and fuel cycle activities. In late 2017, the Saudi government issued a tender for bids for large nuclear power plants and expects to choose two or three contenders by the end of 2018. According to publicly available government briefing slides, fuel cycle activities are currently limited to an assessment of uranium and thorium reserves in Saudi Arabia (through 2022) and yellowcake production with Jordan. [3]

Saudi Arabia does not have one nuclear suitor in mind; it has been steadily accruing nuclear partners in the last decade. The Saudis already have arrangements with France (2011), China (2016), Argentina (2015), South Korea (2013), Russia (2015) and Kazakhstan (2016). Some of these have already begun training programs for Saudi nuclear workers and construction of the Korean SMART reactor was scheduled to begin in 2018.

[3] See K.A.-CARE's briefing to IAEA meeting, availabile at https://gnssn.iaea.org/NSNI/SMRP/Shared%20Documents/Workshop%2012-15%20December%202017/Saudi%20National%20Atomic%20Energy%20Project.pdf

The two primary motivations for Saudi Arabia to pursue nuclear energy are conserving its oil for export and meeting soaring electricity demand. Others, according to official government briefings, include diversifying the country's economy, diversifying the national energy mix, creating jobs with high returns, developing national human resources, increasing the level of local industries and services, localizing and exporting technologies, and expanding other medical, agricultural and industrial uses of nuclear energy. In 2011, Saudi officials estimated that electricity production would need to triple from 40 GWe to 120 GWe by 2030. Given that oil and gas generate almost 60% of its electricity, finding another fuel for electricity would free up significant quantities of oil for export. The plan in 2011 was to generate 24 GWe, or 20% of expected electricity demand by 2030, from nuclear energy. Adding that kind of capacity in 20 years was fairly ambitious and although the schedule has slipped, the current plan remains ambitious. A sober analysis of responses to Saudi challenges in electricity generation, particularly for water desalination, concluded a few years ago that ending subsidies for electricity could help reduce demand while deploying solar power could be cheaper than nuclear energy in the next decade and take advantage of peak demand during daylight hours.[4]

Saudi Arabia intends to localize and indigenize the supply chain for nuclear technology as well as export, not dissimilar to other recipients of U.S. technology like South Korea and China. Its January 2016 agreement with CNEC includes localization, as does its agreement with Korea. Saudi entities have also embarked on joint ventures with foreign entities, including Argentina's INVAP, to develop small modular reactors based on the Argentinian CAREM design.

With regard to fuel cycle capabilities, it's not clear how Saudi Arabia would pursue uranium enrichment. Current plans are vague. It is clear that indigenous development would take decades and likely billions of dollars unless an existing technology holder transferred technology. Under current NSG guidelines, members are unlikely to agree to transfers unless to a multinational concern and even then, it's never been done. Two options for Saudi Arabia that would not include indigenization of technology would be purchasing equity in a foreign enrichment concern like Orano (the successor to AREVA's enrichment business which owns 50% of the company that holds URENCO's enrichment technology, the Enrichment Technology Corporation) or persuading an enrichment technology holder to build and operate a plant on Saudi soil, without transferring technology or operating know-how. For example, URENCO built a centrifuge enrichment plant in Eunice, New Mexico, and did not transfer the technology, although it is likely that the U.S.'s nuclear weapons state status made certain processes less

[4] Ahmad A, Ramana MV, "Too costly to matter: Economics of nuclear power for Saudi Arabia," *Energy* (2014), http://dx.doi.org/10.1016/j.energy.2014.03.064

difficult (e.g., getting Q-cleared U.S. workers in the construction phase). Despite having the world's most advanced technology in the world's most advanced nuclear state, it still took 10 years between licensing and operation of the first cascades in New Mexico. An agreement with Saudi Arabia would be highly contentious and likely to take longer. As noted above, Saudi Arabia might be more successful proposing a fully multinationally owned and operated enrichment facility on Saudi soil. Although multinational facilities might provide earlier warning of diversion, past experience with such ventures offer few paths forward: the reprocessing multilateral experiment in Europe, Eurochemie, made no effort to compartmentalize knowledge among its international workforce, and the multilateral enrichment consortium, URENCO, let each country (Netherlands, Germany and UK) develop its own technology before choosing one.

For the part of the United States, commercial advantage, rather than technical cooperation, motivates U.S. interest in nuclear cooperation with Saudi Arabia. Saudi Arabia expects to spend $80 billion on 16 nuclear power plants and fuel supply thereafter could be similarly lucrative. However, Saudi Arabia may not choose U.S. vendors and may be considering supplying its own fuel, even though that would not be cost-effective.

U.S. negotiations with Saudi Arabia

After the shock of discovering in 2004 that Pakistani scientist A.Q. Khan had proliferated enrichment equipment, the Bush administration sought to increase restrictions on sensitive nuclear technology. Thus, the U.S. asked Saudi Arabia for assurances on this as it discussed potential nuclear energy cooperation. On May 16, 2008, then-Secretary of State Condoleeza Rice and Saudi Arabia Foreign Minister Prince Saud Al Faisal signed a memorandum of understanding on Civil Nuclear Energy Cooperation. The State Department issued a press release that stated, among other things, that "The United States will assist the Kingdom of Saudi Arabia to develop civilian nuclear energy for use in medicine, industry, and power generation and will help in development of both the human and infrastructure resources in accordance with evolving International Atomic Energy Agency guidance and standards. Saudi Arabia has stated its intent to rely on international markets for nuclear fuel and to not pursue sensitive nuclear technologies, which stands in direct contrast to the actions of Iran."

In subsequent talks, however, the Saudis stepped back from that commitment. In the fall of 2009, the U.S. secured the so-called "gold standard" commitment from the UAE to include a legally binding decision not to enrich uranium or reprocess spent nuclear fuel in the text of its nuclear cooperation agreement. Similar successes with Jordan and Saudi Arabia were not forthcoming. In 2011, the U.S. held an initial round of talks with Saudi Arabia, followed by a round in 2012. At the time, Saudi officials declined the U.S. proposal to sign a side letter to a

123 agreement that contained legally binding restrictions on enrichment and reprocessing. For the remainder of the Obama administration, talks did not advance.

Saudi Arabia as a nonproliferation partner

Assessments of Saudi Arabia as a nonproliferation partner should review past programs, present policies and potential future actions. That said, past clandestine nuclear weapons programs are not an automatic disqualifier for nuclear cooperation with the United States, as the recent agreements with India, Taiwan and the ROK have shown. The State Department will present its perspectives on Saudi Arabia as a nonproliferation partner in the Nuclear Proliferation Assessment Statement (NPAS) that must accompany the 123 agreement when it is submitted to Congress. That NPAS is unlikely to delve too deeply into rumors of Saudi interest in nuclear weapons or tales of investment in Iraq's nuclear weapons program from Saudi defector Mohammed Abdalla al-Khilewi. However, it will likely have to address statements from high-level Saudi officials about Saudi Arabia's intention to match capabilities with Iran, whether in uranium enrichment or actual nuclear weapons. What's more, it will need to address why Saudi Arabia has been so slow to undertake additional safeguards strengthening measures. For example, Saudi Arabia still has a Small Quantities Protocol attached to its comprehensive safeguards agreement that it has not amended, even though the IAEA requested amendment 13 years ago. About half the states (43 of 88) with such agreements complied. The Small Quantities Protocol largely limits a state's responsibilities to an annual report of imports and exports of material and does not allow for the IAEA to conduct inspections until a threshold quantity of nuclear material is present in a facility.[5] The modified protocol amends those weaknesses.

Saudi Arabia also lacks another key feature of the strengthened safeguards system, the Additional Protocol. This addendum to a comprehensive safeguards agreement, which has been signed by 147 countries out of 189 members of the Agency, provides for additional information and access by International Atomic Energy Agency inspectors. It was developed in response to Iraq's clandestine nuclear weapons program in the mid-1990s. Although Saudi Arabia joined the NPT in 1988, it did not complete its safeguards agreement until 2005; that safeguards agreement only entered into force in 2009. The Saudis had at least four years to revise the protocol before going through the ratification process. It is likely that the Bush administration pressured Saudi Arabia to complete its ratification after signing an MOU on nuclear cooperation in 2008. At that time, Saudi Arabia also signed up to join the Global

[5] See, for example, *Safeguards Implementation Guide for States With Small Quantities Protocols*, IAEA Services Series 22, Vienna, 2016. See https://www-pub.iaea.org/MTCD/Publications/PDF/SVS_22_web.pdf

Initiative to Combat Nuclear Terrorism (GICNT) and endorsed the Proliferation Security Initiative.

Real investment in nuclear energy may make Saudi Arabia a more forward-leaning member of the nonproliferation community but for the time being, the U.S. should insist at the very least that Saudi Arabia rescind or update its Small Quantities Protocol and sign an Additional Protocol.

Saudi interest in uranium enrichment

Potential reserves of uranium are one reason for Saudi interest in uranium enrichment, but the fact that Iran still retains some enrichment capability under the JCPOA is another. The Saudi Arabian Geological Survey concluded an agreement with the Chinese National Nuclear Corporation (CNNC) in 2017 to jointly conduct an assessment of Saudi uranium resources. Saudi officials have made the case that enrichment would allow Saudi Arabia to take advantage of potential uranium resources. This echoes arguments made by Jordan in the last ten years. However, the economics are unlikely to support domestic uranium enrichment for many reasons. First, there are high levels of oversupply and inventories in the uranium market worldwide, as concluded in the Nuclear Energy Agency and the International Atomic Energy Agency's *Uranium 2016: Resources, Production and Demand.* In fact, that highly regarded publication concluded that "Regardless of the role that nuclear energy ultimately plays in meeting future electricity demand, the uranium resource base described in this publication is more than adequate to meet projected requirements for the foreseeable future. The challenge in the coming years is likely to be less one of adequacy of resources than adequacy of production capacity development due to poor uranium market conditions." Saudi resources are not covered in those estimates because there is no information or assessment about Saudi uranium. However, the high case for nuclear energy does assume Saudi Arabia will acquire nuclear power. [6] One question is whether small scale production could be cost-effective but more importantly, only two of the thirty countries with nuclear power match their uranium production to domestic needs – Canada and South Africa. For most other countries, there is a significant mismatch in domestic production and use, which does not seem to cause a problem.[7]

A second obstacle is timing. Although Saudi Arabia currently envisions reactors coming on-line by 2040, this is not a long period of time to develop the infrastructure to support nuclear power. After surveying potential resources, Saudi Arabia would need to produce the ore, mill

[6] The Redbook assumed that Saudi Arabia will have installed 1.4 GWe of reactor capacity in 2030 and 2.8 GWe in 2035 (4 smaller reactors or 2 larger ones), requiring about 440 tons of uranium annually.
[7] http://www.oecd-nea.org/ndd/pubs/2016/7301-uranium-2016.pdf See page 102.

it, convert it, enrich it and fabricate it into fuel. How much of that process is Saudi Arabia prepared to do itself or to contract out? The conversion and enrichment industries worldwide have shrunk significantly over time even in advanced nuclear states because of declining economics.

A third obstacle is pricing, both for uranium and enrichment. Uranium has returned to the historically low prices from the 1980s (hovering around $20/lb) after a brief surge ten years ago to a high of $140/lb. One factor has been reduced optimism about nuclear energy following the nuclear accident at the Fukushima Daiichi power plant in March 2011. The Bible of the uranium industry, the so-called Redbook, admitted that "Challenges remain in the global uranium market with high levels of oversupply and inventories, resulting in continuing pricing pressures."[8]

The enrichment market is worse: while the SWU spot price managed to climb through the 1990s to reach a high of $160/SWU in 2009, the price has dropped steadily to today's rate of less than $40/SWU. There are many reasons for this, including overcapacity of enrichment services, particularly in Russia. This is one reason that established uranium enrichment providers like URENCO do not add capacity without signed, long-term contracts for supply. While Saudi Arabia can guarantee demand in its own country (assuming reactor construction proceeds in a predictable way), it could never compete economically with established enrichers.

Simply put, a Saudi enrichment capability is unwise and uneconomic.

At this juncture in time, Congress needs to ask the following questions:
a) What are the minimum adequate nonproliferation assurances in this case?
b) What are the extenuating circumstances that could increase proliferation risk?
c) Are there risks in walking away from a deal?
d) What conditions that could improve the robustness of non-proliferation collaboration and reduce proliferation risks?

What are the minimum adequate nonproliferation assurances?

The nine requirements in Section 123a of the Atomic Energy Act constitute a bare minimum for assurance of nonproliferation. The agreement could include standard language on the possibility for consent to enrich or reprocess on a case-by-case basis, because in practice, such consent has become synonymous with refusal. To meet the "Equal terms and conditions" requirements of the agreements with the UAE and Egypt, the agreement with Saudi Arabia

[8] http://www.oecd-nea.org/ndd/pubs/2016/7301-uranium-2016.pdf

would at least need to include a statement regarding Saudi Arabia's intentions to rely on the international market for fuel cycle services for a foreseeable period. Rather than negotiate a less restrictive agreement, it would be better to negotiate a shorter agreement, even if it is only ten or fifteen years' duration. This would parallel the timeframe for the Joint Comprehensive Plan of Action with Iran, or JCPOA, which Saudi officials have criticized as flawed because it contains sunset clauses on Iranian enrichment capacity.

On IAEA safeguards, the U.S. needs to insist that Saudi Arabia either rescind its Small Quantities Protocol or adopt the amended version recommended by the IAEA. Concluding an Additional Protocol would be a useful, educational exercise for Saudi Arabia's new regulatory authority.

What are the extenuating circumstances that could increase proliferation risk?

Saudi officials have repeatedly stated that acquisition of nuclear weapons by Iran would trigger their own acquisition of nuclear weapons. Bruce Riedel of the Brookings Institution suggested in 2016 that Saudi Arabia is less concerned about Iranian nuclear weapons than Iran's quest for regional hegemony because it believes it is covered by the U.S. nuclear umbrella.[9] However, one way to counter an Iranian regional hegemony based on nuclear weapons would be with Saudi nuclear weapons. Whether fear or regional rivalry motivates Saudi Arabia, the result is the same for the nonproliferation regime -- bad.

A key question is how Saudi Arabia would determine when it was time to break out of the NPT. What threshold of evidence would be sufficient? Some experts suggest that Saudi Arabia would welcome the collapse of the Joint Comprehensive Plan of Action (JCPOA) with Iran. This week, Crown Prince Mohammed bin Salman called the Iran deal flawed, perhaps egging President Trump on to withhold certification of the deal and thus endanger U.S. compliance. Without a replacement for the JCPOA, collapse of the deal could dramatically increase proliferation risks in the Middle East. Collapse as a result of evidence that Iran was engaged in clandestine nuclear activities would be worse than a U.S.-engineered collapse in Saudi eyes, but either way, a collapse could be used as justification for proliferation.

In a scenario where Saudi Arabia decides it must develop nuclear weapons to counter Iran's nuclear weapons, it will not matter whether the United States has successfully negotiated a "gold standard agreement" (wherein the Saudis have renounced enrichment and reprocessing), a standard agreement (with no consent rights) or a permissive agreement (with advance consent rights). Any nuclear cooperation that the United States had provided up to that point could feasibly be diverted for a military program. The only difference would be how much help the U.S. provided.

[9] https://www.brookings.edu/blog/markaz/2016/07/13/what-the-iran-deal-has-meant-for-saudi-arabia-and-regional-tensions/

There is the possibility that Saudi Arabia's statements are meant to deter Iran rather than reflecting actual policy. Such statements, however, undermine norms of nonproliferation. It would be hard to imagine U.S. acceptance of such statements emanating from South Korea or Japan, even though both countries face a growing nuclear weapons threat from North Korea.

Are there risks (or benefits) in walking away from a deal if Saudi Arabia does not accept certain conditions? The common refrain that it's better for the U.S. to sell nuclear equipment than other countries implies that these contracts are all or nothing. In fact, Saudi Arabia may not choose one supplier for its entire fleet of reactors. If U.S. insistence on robust nonproliferation assurances resulted in the failure to conclude a nuclear cooperation agreement, U.S. vendors could lose between $0 and $10 billion worth of business (about 2 reactors worth), assuming they were competitive in the first place. Regardless of the agreement, there is always the risk that no nuclear trade will result because nuclear cooperation agreements are merely frameworks, not contracts. The lack of a U.S.-Saudi 123 agreement could affect South Korea's bid for a nuclear contract, but it is not yet clear to what extent.

The real question is whether other countries are willing to supply what the United States is not willing to supply. Ultimately, Saudi efforts to acquire enrichment and/or reprocessing technology would have to go through the Nuclear Suppliers Group. Technically, Saudi Arabia in the future could meet NSG criteria for transfer but such a decision is unlikely for a group that operates by consensus decision-making.

What conditions that could improve the robustness of non-proliferation collaboration and reduce proliferation risks?

Congress' role over the years has been limited by the NNPA's streamlined approval process for new agreements, wherein agreements that meet all the requirements of Section 123 of the Atomic Energy Act enter into force after 90 days unless Congress passes a law otherwise. A resolution of disapproval is one alternative, and so is a resolution of approval that contains conditions. In 1985, Congress passed a resolution of approval for the first nuclear cooperation agreement with China, but conditions placed within the resolution effectively blocked exportsfor 13 years.

If it is impossible to get language related to an Additional Protocol into the text of the 123 agreement, Congress should condition its approval upon such execution, similar to the approach it took for the U.S.-India nuclear cooperation agreement. Or, Congress could amend Section 123a of the Atomic Energy Act to require that all partners in U.S. nuclear cooperation agreements have an additional protocol in force before agreements can enter into force. Another alternative would be to condition exports, rather than the nuclear cooperation

agreement itself on implementation of an Additional Protocol by Saudi Arabia. This could be a requirement in the resolution of approval for export licensing or a simple presidential certification that an Additional Protocol is in force a prerequisite for export license approvals.

Other ways of strengthening oversight could include a requirement for the Director of National Intelligence to provide annual unclassified (and classified) reports to Congress on WMD-related acquisitions and transfers to and from Saudi Arabia. Since Section 721 reports were discontinued in 2013, there is no regular mechanism for updating Congress on WMD-related acquisitions and transfers. Congress could also authorize expanded export control cooperation between the US and Saudi Arabia.

Part of the challenge in collaborating with Saudi Arabia will likely be a lack of transparency. These steps above would enhance that transparency and provide additional leverage to both the executive branch and the Congress.

Lastly, Congress should consider updating the Atomic Energy Act to strengthen its oversight. In the last ten years, the executive branch has had to renew virtually all of its nuclear cooperation agreements because their 30- or 40-year durations expired around the same time. Officials creatively came up with new ways to limit their work and, in effect, congressional oversight: many agreements now have rolling extensions, automatic extensions, indefinite extensions and in the case of two agreements, indefinite duration. The practical effect is that Congress will have little to no influence over nuclear cooperation with existing partners and approval of 123 agreements may become a historical relic. Members of Congress may want to consider whether specific language regarding extensions or congressional review is desirable to protect its equities in ensuring that U.S. nuclear cooperation does not contribute inadvertently to proliferation. In particular, this could include periodic Nuclear Proliferation Assessment Statements for agreements with indefinite or 40-50 year duration. Congress should also consider specifying a process for preparation of NPASes (e.g., prior consultation with committees and/or agreement on scope) or the content of such assessments. Additional reporting requirements might also be valuable.

Specific actions for Congress are listed below:

1) Require congressional review of ongoing cooperation under 123 agreements with indefinite duration and/or rolling or automatic extensions.
2) Require all new nuclear partners (and in renewal agreements) to have Additional Protocols to their IAEA safeguards agreements in force before a 123 agreement can be approved or enter into force. Making the Additional Protocol a legally binding requirement could eventually help

NSG adoption of that requirement, in much the same way that countries adopted full-scope safeguards as a condition of supply before the NSG did.

3) Require the United States to provide favorable options or incentives to other countries in 123 agreements to adopt interim storage over reprocessing of spent nuclear fuel.

4) Require the executive branch to consult with Congress on the general scope of Nuclear Proliferation Assessment Statements or about individual NPASs before they are written or more substantially, specify additional reporting requirements for NPASs.