The Nuclear Fuel Bank: One Year Down

Last September, Senator Sam Nunn put before the International Atomic Energy Agency (IAEA) a proposal that would involve a donation of $50 million of Warren Buffet's money to create a nuclear fuel bank. There were three strings attached. First, the international community would have to provide a two-to-one match in money, the equivalent value in low enriched reactor loads, or some combination thereof. Second, the IAEA would have to take the lead in setting up the administrative and logistics capacity to carry out the plan. Finally, it would all have to happen within two years. The first condition has not yet been met; the IAEA seems eager to accomplish the second; and the half-way mark has been passed on the third condition.

What is a fuel bank? It is a repository of low enriched uranium (LEU) nuclear reactor fuel that could be used as a supplier of last resort in case there were to be a supply disruption to a participating nation.

Why create a fuel bank? The idea is to eliminate incentives for additional countries to enter the business of making nuclear fuel, because the technologies involved in doing so are the same as those involved in producing fissile material for nuclear weapons. Eliminating the proliferation of technologies that are used in building nuclear weapons is seen as a means to reduce the likelihood the weapons themselves become more widely available.

How does it work? Nations that generate power by nuclear energy face uncertainties about whether their supply of nuclear reactor fuel will be cut off, and this uncertainty factors in as an implicit cost of purchasing fuel from one of the six exporting countries (the US, France, Russia, and URENCO [the UK, Germany, and the Netherlands.]) Therefore, when they consider the cost of purchasing fuel abroad versus developing their own capacity to enrich uranium, they figure in the implicit cost associated with this uncertainty. This makes the foreign fuel option more expensive than the market price of the fuel would indicate. Because nuclear fuel production is a decreasing cost [i.e. increasing return to scale] industry and one in which several challenging technical feats must be mastered, it is hard for new entrants into nuclear fuel production to be competitive with the global market price. However, if the implicit cost of risk is large enough, it might tip the scales in favor of domestic production. Therefore, the idea is to reduce the risk by assuring supply, and, thus, reduce the economic incentive to develop an indigenous uranium enrichment capacity.

Why is it necessary? The Nuclear Nonproliferation Treaty (NPT) states that countries have the right to pursue any nuclear technology for peaceful purposes. This includes uranium enrichment and plutonium separation processes that can

also used to make bomb-usable material. Without this promise, the NPT has little to offer non-nuclear weapon states except a vague commitment that the nuclear weapon states will make a good-faith effort to disarm at some undefined point in the future, and it would likely not have the 188-strong membership it currently enjoys. The nuclear fuel bank is designed to appeal to a state's desire to obtain nuclear fuel in the cheapest possible manner, and, for those who actually are seeking nuclear weapons, it eliminates the economically rational argument based on concerns of supply disruption.

It is not certain how real the risk of supply disruption is. It has not transpired in reality yet. Of the possible reasons for such a disruption, political eventualities seem to be the most feared. That is, a supplied nation falls into disfavor with its supplier, and is cut off by embargo. In the past, "flag swapping" has apparently been conducted to avoid this difficulty. That is, supplying nations might swap an equivalent amount of fuel so that the supplying nation can maintain its appearance of embargo against a nation, while avoiding the destabilizing eventuality of actually cutting the supplied nation off from nuclear power.

In theory, a nation has several potential means to mitigate the risk of supply disruption. First, it can develop its own indigenous capability. This path, vertical integration in economic parlance, is extremely expensive, but, perhaps, also extremely reassuring. It is also what the international community is seeking to avoid through fuel assurances efforts. Second, theoretically a nation could diversify its source of supply. This turns out to be difficult because there are so few exporters, and, to a large extent, they share common values that might make some nations equally uneasy with relying on any of them. Finally, also in theory, a state could insure against such an eventuality. Of course, such an insurance program could not just financially compensate a state or utility company; it would also have to provide them with a supply of fuel. Otherwise, it would not be reassuring enough to have the desired impact. This is the goal of the various fuel assurances programs.

The question of interest is how likely any of the fuel assurances programs are to have the desired effect, and what must be done to make them both feasible and effective? To what degree are states that are seeking uranium enrichment guided by concerns of risk of disruption? If it is a minor factor, what good is such a program? If the enrichment market stays in the hands of a few countries, can new entrants into nuclear power generation be reassured that they can count on the marketplace?

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