SANCTIONING KEROSENE AND JET FUEL IN NORTH KOREA

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I. Introduction

Paragraph 31 of the UN Security Council's sanction resolution 2270 passed on March 2, 2016 specifically takes aim at jet fuel and kerosene-type rocket fuel by the North Korean military. As the DPRK likely makes its own rocket fuel, these sanctions are unlikely to restrain its rocket launching activity. As domestically produced kerosene suffices to meet annual military demand for kerosene, we conclude that the main impact of cutting of imported kerosene-jet fuel will be on households using kerosene for lighting, a small amount of cooking, and a directly proportional amount of space heating in winter time resulting from the lighting and cooking usages, that is, by ordinary North Koreans.

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II. Policy Forum by Peter Hayes, David von Hippel, and Roger Cavazos

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The expanded, tougher UNSC (United Nations Security Council) sanctions imposed on North Korea by resolution 2270 on March 2, 2016 have been widely touted as a step towards squeezing North Korea into compliance with the international community's demand that the DPRK reverse its nuclear armament, stop developing long range rockets capable of supporting military payloads, and stop extracting rent from its own population while denying and transgressing the population's basic human rights.

Encompassing as it does a wide range of activities--"From aviation fuel to Rolex watches to financial actions to having all shipping into and out of North Korea inspected for compliance"—some have characterized it as a de facto strategic strangulation campaign.[1]

Citing the challenge that North Korean nuclear test "constitutes to the Treaty on Non-Proliferation of Nuclear Weapons ('the NPT') and to international efforts aimed at strengthening the global regime of non-proliferation of nuclear weapons, and the danger it poses to peace and stability in the region and beyond," the Council based resolution 2270 on Article 41 of the UN Charter whereby it "may decide what measures not involving the use of armed force are to be employed to give effect to its decisions, and it may call upon the Members of the United Nations to apply such measures. These may include complete or partial interruption of economic relations and of rail, sea, air, postal, telegraphic, radio, and other means of communication, and the severance of diplomatic relations."

Among the tougher sanctions imposed by the Security Council is a blanket ban on importing or exporting minerals and energy. Within the latter category, Paragraph 31 specifically takes aim at jet fuel and kerosene-type rocket fuel by the North Korean military:

> *31. Decides* that all States shall prevent the sale or supply, by their nationals or from their territories or using their flag vessels or aircraft, of aviation fuel, including aviation gasoline, naptha-type jet fuel, kerosene-type jet fuel, and kerosene-type rocket fuel, whether or not originating in their territory, to the territory of the DPRK, or unless the Committee has approved in advance on an exceptional case-by-case basis the transfer to the DPRK of such products for verified essential humanitarian needs, subject to specified arrangements for effective monitoring of delivery and use, and *decides* also that this provision shall not apply with respect to the sale or supply of aviation fuel to civilian passenger aircraft outside the DPRK exclusively for consumption during its flight to the DPRK and its return flight; [2]

Kerosene-type rocket fuel (RP-2) of the type used in the DPRK's space launch rockets is a derivative of kerosene that has been highly refined to increase its energy density and to remove various impurities. The volume involved in the DPRK's rocket launches and engine testing is small. Exactly where and how this refined kerosene is produced in the DPRK is not known to the authors, but the capacity certainly exists, for example, at the Hamhung Chemical Plant, to produce high-octane and pure distillates. It is highly unlikely that the DPRK obtains its rocket fuel from external suppliers, and even if all crude oil and refined product imports were cut off at the border, the DPRK almost certainly has the domestic capability to produce rocket fuel, if necessary, via conversion of coal into liquid hydrocarbons at the east coast Hamhung Chemical Plant. We conclude that implementation of paragraph 31 will have effectively zero marginal impact on the DPRK's ability to produce fuel for long range rockets.

If this is correct, then we infer that the authors of paragraph 31, presumably well-informed about North Korea, were aiming to reduce the fuel available to the DPRK's air force which relies on jet fuel to restrain its military options to wage war (other possible objectives are to create conflict within the North Korean ruling elite; however, we do not believe that this is the goal of Russia and China in agreeing to include aviation fuel, whatever American or other Security Council members sought).

Given these speculations, it is useful to explore the possible actual impact of imposition of the sanctions on the North Korean air force and other users of jet fuel in the DPRK.[3]

In our most recently updated physical estimates of the DPRK's energy use,[4] we have treated kerosene and jet fuel as a single category. In publications released in 2014 and 2015, we estimated the following domestic supply of kerosene and jet fuel as of 2010 in the DPRK as follows (supplies in 2014 would likely not have been much different):

- From DPRK's east and west coast refinery: 27000 tonnes
- From DPRK's small fractionating east coast refinery: 1200 tonnes
- Total annual domestic supply: 28200 tonnes

Also for 2010, we estimated the following end-uses of kerosene and jet fuel:

- Military use, 32200 tonnes (mostly by jet aircraft at a very low annual exercise rate, as observed for many years)
- Civilian Transport use, 16000 tonnes (mostly by domestic aircraft, and use by aircraft flying out of DPRK)
- Civilian urban lighting and some cooking, 18000 tonnes (mostly due to lack of power; in travels to the DPRK in 1998 and 2000, we observed "lamps" fabricated from beer cans burning diesel fuel

used in lieu of kerosene lamps.

- Total annual demand: 66700 tonnes, (including a small amount in the public/commercial sectors), of which estimated military usage is about 47 percent.

Given the above, there obviously was a "supply deficit" of about 38500 tonnes per year between domestic demand and supplies from domestic refineries, which was, at least in the past, covered by imports of refined products to allow total supply to match our estimates of kerosene use.

Overall, estimated annual military use is about the same as domestic production from refined imported crude oil. The DPRK's ability to produce this refined product is a direct outcome of China and Russia's willingness to provide crude oil to the west and east coast refineries by pipeline or ship/rail, or for the DPRK to buy crude oil on the world market. Thus, we conclude that if the DPRK's estimated annual import of about 41,000 tonnes of kerosene as already refined product from external suppliers were to be cut off, but not its crude, then the military would receive first priority on kerosene-jet fuel produced at the two domestic oil refineries.

If we are correct, then the resultant shortfall will affect some households' ability to be lit at night; and the ability of civilian planes to fly domestically (though there is very little domestic civilian air travel in the DPRK, where almost all civilian transport is by car, truck, bus, train, bullock cart, or on foot) or to fly to international destinations such as Beijing or Khabarovsk. However, paragraph 31 specifically exempts such refueling of DPRK civilian planes from sanctions at destinations such as Beijing airport, so continuing these flights will not be affected by the new sanctions. It appears likely, therefore, that the main impacts will be on households using kerosene for lighting, a small amount of cooking, and a directly proportional amount of space heating in winter time resulting from the lighting and cooking usages, that is, by ordinary North Koreans.

It is worth asking the further question whether the sanctions are likely to affect the North Korean air force's ability to operate in wartime. We have addressed this issue directly in a calculation of wartime military usage by the North Korean military.[5] In the calculation, we assumed that the DPRK air force planes and helicopters will be either shot out of the sky, destroyed on the ground, or retreat to hardened hangers (some located underground inside of mountains), and thus effectively cease flying and therefore cease using jet fuel, within 24 hours after the start of a new Korean war. At the calculated usage rate for DPRK air force aircraft of 2570 tonnes of jet fuel per hour, the DPRK's air force would use about 62000 tonnes of jet fuel in 24 hours of all-out activity—about a year's worth of current demand, if in fact all of the aircraft in the DPRK's air force could sustain all-out activity for that long. We infer that the DPRK plans for a very short war, in accordance with its forward-deployed posture and the near-certainty that its refineries and oil distribution system will be destroyed immediately in a war. Consequently, the DPRK military needs to stockpile only sufficient fuel to fight such a short war.

Such stockpiles likely exist at underground locations such as the MIG airfield northeast of Pyongyang and elsewhere. The volume involved for the posited 24 hour aerial campaign is small. The specific gravity of jet fuel is about 0.82 kg/liter, so the wartime 24 hour usage only requires about 75000 cubic meters of tankage—the equivalent of about 10 tanks 20 meters tall and 20 meters in diameter (or more smaller tanks). Even if one extends the survival of the North Korean air force tenfold, the storage and amounts needed are still relatively small. Moreover, such stocks are certainly in place, and the low rate of military aircraft exercise that we estimate has been the practice over most of the last 20 years (on the order of 10 to 50 hours of flight time per aircraft per year, varying by year and by type of aircraft) has doubtless in part been to conserve such stocks, given the supply constraint noted above.

We conclude that imposition of UNSC sanctions is likely to have little or no impact on the KPA's stockpiled jet fuel and its ability to fight a war; and no impact on rocket fuel.

Moreover, we note that apart from paragraph 31's specific exemption for civilian aviation operating to and from the DPRK, that states are authorized to exempt items from sanctions should they determine that they are either justified on humanitarian grounds, or they have determined that the item in question is not diverted to support the sanctioned activities by the DPRK.

In the case of jet fuel-kerosene, states would appear to be justified in exempting North Korean imports of such due to its humanitarian and civil aviation uses, should they wish to do so. Moreover, there is no method that can reliably determine the diversion of a material to military uses in the DPRK, short of on-site monitoring such as the fuel meters that were used to monitor heavy fuel oil flows into power generation and other facilities during the implementation of the US-DPRK Agreed Framework, and which are not proposed in the implementation of the UN sanctions under paragraph 31 (and would not be accepted by the DPRK even if they were). Consequently, it is a political judgement and choice by sanctioning states as to whether a given item such as kerosene-jet-fuel is diverted to the military sector and whether or not to supply such in a given political and military context in relation to the DPRK.

Tangible evidence such as an increased rate of military aircraft exercises might serve as positive indicators of such diversion—but could also easily be the result of a drawdown in military stockpiles.

We conclude that even with kerosene-jet fuel—one of the items with the most direct military impact to be listed by the Security Council-- a sanctioning state is left with the rationale and the ability to not impose sanctions should it so choose. As the two key states involved in supply crude oil and refined product to the DPRK, Russia and China, both made clear in the deliberations leading to the Security Council vote on March 2, they see implementation in the context not only of the DPRK's future "good" or "bad" behavior, but also in the willingness of the United States, South Korea, and other players to resume dialogue with the DPRK in a six party context, in good faith. Given this situation, we are left with the inevitable conclusion that at least when it comes to military-related energy flows, the new sanctions have changed nothing in relation to how China and Russian will exert coercive leverage over North Korea's decisions, as these levers existed before Resolution 2270.

Of course, the atmospherics have shifted slightly. The Philippines was almost gleeful to be the first state to seize a DPRK vessel[6] under Resolution 2218, but it is easy to see this step as related to the Philippines' imbroglio with China and desire to ingratiate itself with the United States. The United States has imposed new unilateral sanctions, including authorizing the US president to sanction persons who "fail to exercise due diligence to ensure that such financial institutions and member states do not facilitate proliferation, arms trafficking, kleptocracy, or imports of luxury goods by the Government of North Korea," for example.[7] However, North Koreans are unlikely to have placed their overseas financial holdings within easy reach of the US Government to be captured by the FBI's Kleptocracy squad working with Treasury's Asset Forfeiture and Money Laundering Section. The irony of Americans setting out to chase down North Korean kleptocrats in US jurisdictions will not be lost on the Chinese.

But if kerosene-jet fuel is any indicator, then Stephen Haggard's lament that while this time sanctions may feel different due to the stringency of some of its controls (for example, possible traction on financial flows), in practice, closer examination may show that many elements, covered by Resolution 2270, not just that related to aviation and rocket fuel, may do little to realize its stated objectives unless the DPRK's major adversaries also change their tune with regard to the modality, timing, and content of resumed dialogue.[8]

III. References

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